2021

NATIONAL SENIOR CERTIFICATE

DIAGNOSTIC REPORT
PART 1: CONTENT SUBJECTS

CONTENTS

Foreword from the Minister

The Class of 2021 will remember their Grade 12 year as one of challenge and triumph, as the country grappled with the unknowns of new Covid-19 variants and managing its subsequent effects on the education sector.

The year 2020, when the Class of 2021 faced great uncertainty in their Grade 11 year, will be recorded in the annals of history as an *annus horribilis*. It is a not a year on which we will look back with undiluted pleasure.

The Class of 2021 sat for the National Senior Certificate (NSC) examinations in an academic year that was the second most challenging one in their school career due to the adverse effects of the Covid-19 pandemic.

By South Africans' concomitant actions, we are enabled to provide quality public schooling in our lifetime. With the support of our stakeholders in education, the challenges in 2021 were dealt with in a strategic manner. The Department of Basic Education and Public Examinations lived up to the expectations to administer credible public examinations.

The education sector faced numerous challenges in 2021 but the true heroes, our teachers, principals, subject advisors and all officials in the sector confirmed that persistence conquers all challenges. It was heartwarming to witness how teachers reported for duty long before their official working hours, offered additional classes over weekends and school holidays and left no chalk unfinished to offer their relentless support to the Class of 2021. I salute you!

In 2021, South African Sign Language Home Language (SASL HL) candidates sat for the fourth SASL HL examinations in the National Senior Certificate Examinations.

Furthermore, the DBE adapted 61 question papers for Braille candidates, and 55 question papers for Deaf candidates, while 72 question papers were made available in large print. In addition, 63 question papers were offered in audio version in the November 2021 examinations.

A dynamic education system keeps abreast with the demands of the fourth industrial revolution. In 2021, Marine Sciences was offered for the first time as an examinable subject in the Grade 12 NSC examinations.

Various technical vocational specialisations, Technical Mathematics and Technical Sciences were offered for the fourth year since their introduction in

2018. A remarkable improvement in the 2021 NSC results was noted in both Technical Sciences and Technical Mathematics.

In the face of the challenges posed by the pandemic, the 2021 learner support programmes encompassed a broad collection of educational strategies, including supplementary materials, vacation classes (during autumn, winter and spring vacations), after-school classes, teacher content with pedagogical and assessment support, mobilising volunteer tutors, as well as alternative and differentiated ways of grouping and teaching learners.

Schools also provided learner support programmes to address specific performance results or trends. NGOs, corporates, institutions of higher learning, community groups, and volunteer-based learning programmes, often worked in partnership with schools and provided highly valuable support to our learners – for that we remain grateful. Stakeholders and partners in education contributed immensely to the readiness of the Class of 2021 for the NSC examinations.

The Quality Assurance Council, Umalusi, approved the 2021 NSC results. The Class of 2021 attained an improved pass rate of 76.4%! It must be noted that the approval was preceded by punctilious verification of all examination processes. This approval confirms the milestones achieved by the DBE in 2021. South Africa offers a credible public examination system, comparable internationally.

The integrity of the 2021 NSC examinations is further confirmed by the fact that none of the high-quality question papers was compromised by serious irregularities, such as leakages. This will allow the National Senior Certificate of 2021 to be acknowledged as credible by the higher education institutions, employers and our people.

The National Senior Certificate has stood the test of time and after 12 years of teaching and learning, this qualification has intrinsic value for both individuals and society.

Once again, I wish to thank parents, teachers, principals, teacher unions, communities, district and provincial officials, and social partners for carrying the Class of 2021. I believe that our unity will make us find new frontiers of cooperation and innovation. I am confident that by working together yet again, we can support the Class of 2022 in the manner that we supported their predecessors.

All social partners have a role to play in fulfilling the Freedom Charter's clarion call that: 'The Doors of Learning and Culture Shall be opened!'

MRS AM MOTSHEKGA, MP
MINISTER OF BASIC EDUCATION
20 JANUARY 2022

CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION, SCOPE AND PURPOSE

The Class of 2021 entered the formal schooling system in Grade 1, in January 2010. This cohort has had the advantage of being the eighth cohort to be exposed to the *Curriculum Assessment Policy Statement* (*CAPS*). The Class of 2021 is the first cohort to sit for the newly introduced Marine Sciences and the second cohort to sit for two question papers in Accounting and Business Studies.

They are also the fourth cohort to offer a series of new subjects in the Grade 12 NSC examinations. These include South African Sign Language at Home Language level (SASL HL), Technical Mathematics, Technical Sciences, Civil Technology (Construction/Civil Services/Woodworking), Electrical Technology (Digital Systems/Electronics/Power Systems) and Mechanical Technology (Automotive/Fitting and Machining/Welding and Metal Work).

These learners are therefore the beneficiaries of the educational transformation that heralds the move towards a technologically enhanced curriculum.

The 2021 Diagnostic Report delves into key observations in learner performance. Therefore, it serves as a primary resource for teaching and learning in the ten high-enrolment subjects, Afrikaans First Additional Language, English First Additional Language, the 12 official home languages, the technologies, technical subjects and Engineering Graphics and Design. This report needs to be used in conjunction with the 2015 to 2020 diagnostic reports. The seven reports outline key subject didactic principles and content matters that can be used effectively in the classroom in 2022.

On conclusion of the marking processes for the November 2021 examinations, the chief markers, internal moderators and subject specialists compiled subject reports that outline qualitative data. The 2021 diagnostic report is based on this data. In the ten key subjects and English First Additional Language, quantitative data was gathered from the analysis of 100 scripts per paper, per subject, randomly selected from each province.

This qualitative and quantitative data highlight the areas of weakness in each of the identified subjects and articulate the remedial measures to be adopted at school level to improve performance in these subjects. As a result, this National Diagnostic Report on learner performance provides teachers, subject advisors, curriculum planners and curriculum implementers with a picture of learner performance in each of the key subjects.

Each subject's diagnostic report commences by presenting comparative data on the performance trends observed over a five-year period in the subject from 2017 to 2021. In the ten key subjects and English First Additional Language, it also provides an overall performance of candidates per question in the respective question papers, in each subject. In all subjects, common errors, misinterpretations and misconceptions identified during marking and suggestions for improvement are also outlined.

Although the pandemic was cited in numerous reports as a possible reason for poor performance in certain examination centres and certain subjects, it cannot be ignored that content coverage was compromised and that teaching methodology needs targeted intervention in 2022.

It is imperative that Subject Advisory Services devise intervention measures to address recurrent areas of weakness. This diagnostic report needs to serve as a baseline for intervention in 2022. This also suggests that continued reference to previous diagnostic reports is essential since the areas of weakness identified in previous years may still be applicable in certain cases.

1.2. METHODOLOGY

In the ten high-enrolment subjects and English First Additional Language, 100 scripts per question paper were randomly selected from each province during the marking. These scripts included samples of low, medium and high achievement scores. The internal moderators and chief markers analysed and noted learners' responses to each question. This entailed recording the marks obtained by learners from the 100 scripts on a per question basis. The individual scripts were scrutinised to provide an in-depth understanding of the range of different responses and to note the strengths and weaknesses. Particular attention was given to common errors and misconceptions identified in the learners' responses.

Based on the analyses, a detailed explanation is provided per question/subquestion under the following three main titles:

Section 1: Performance trends (2017–2021)

A comparative analysis of the performance of learners over the last five years in terms of the number of learners who wrote, the number and percentage of learners who achieved at 30% and above, and the number and percentage of learners who achieved at 40% and above, is presented in this section. The information is represented by tables and graphs to enable easier interpretation of any trends, especially on changes over the medium term, as well as changes from year to year.

Performance distribution curves are also provided to graphically present the distribution of learner scores in the last three examinations. Any improvement or decline in the performance can be observed from the position of the 2019 graph, relative to previous years. If the 2020 graph lies to the right of the two previous graphs, this suggests an improvement in performance, while a slant to the left indicates a decline in performance.

Section 2: Overview of learner performance

This section summarises the performance of learners in the question paper as a whole. It makes reference to generic areas of good performance or weakness and the possible reasons for these observations.

Section 3: Diagnostic question analysis

This includes the following:

- A graphical representation of the average percentage marks obtained per question
- An analysis of the performance of learners in each specific question, stating whether the question was well answered or poorly answered (and the reason)
- Common errors and misconceptions that were identified in candidates' responses
- Suggestions for improvement in relation to teaching and learning, content and methodology, subject advisory support and provision, and utilisation of LTSM

The internal moderators' reports from all nine provinces for each question paper, per subject, were consolidated and the findings are summarised in this report.

It is recommended that this report be read in conjunction with the November 2021 NSC question papers since particular references are made to specific questions in the respective question paper, in each subject. This will enable teachers to establish a baseline for the new cohort of Grade 12 learners in 2022; develop strategies for differentiated learning and provide a frame of reference for the development and design of school-based assessment during the course of the year.

1.3. LIMITATIONS

While further quantitative data would have been useful to provide feedback for the purpose of test development, this is not the intention of this report. The focus of this report is more qualitative than quantitative. The quantitative aspects are limited to the performance trends in each subject and the average performance per question in the 2021 examination papers.

It needs to be noted that areas of weakness could be unique to each district and each school. Therefore, this report provides a national summary of the general areas of weakness. However, district specialists are encouraged to develop a district diagnostic report. Ultimately, there should also be a school diagnostic report, which focuses specifically on the areas of weakness at school level.

The diagnostic analysis of learner performance in this publication is limited only to the ten subjects with high Grade 12 enrolments, Afrikaans First Additional Languages, English First Additional Language and the 12 official home languages, the technologies and technical subjects. The remaining subjects will be covered in reports compiled by the provincial chief markers and internal moderators during the marking process. The DBE will endeavour to broaden the scope of the subject coverage in future.

1.4. GENERAL FINDINGS AND AREAS OF CONCERN

The 2021 diagnostic reports for the ten key subjects covered in this publication (Part 1), indicate that the pass rate has improved in five of these subjects (Agricultural Sciences, Business Studies, Life Sciences, Mathematics and Physical Sciences) at the 30% levels. However, the pass rate has declined to varying degrees at the 30% level in the remaining key subjects. The pass rate for English First Additional Language decreased at both the 30% level and at the 40% level. In the home languages (Part 2) the pass rate remained the same in isiNdebele, Setswana and Tshivenda, improved to varying degrees in three home languages (isiXhosa, isiZulu and Sesotho) and declined in the rest. The most notable decline in the pass rate at 40% was observed in English Home Language.

It is imperative that we reflect on and learn from the performance of candidates of the 2021 NSC examinations.

The following areas of concern were identified in past diagnostic reports and they are, once again, highlighted as concerns in the 2021 NSC examinations.

- Although candidates performed well in questions that required lower-order thinking skills, many learners performed poorly in questions that demanded analytical, evaluative and problem-solving skills. In view of this, teachers are encouraged to expose learners to a wide array of exercises that also include questions that assess higher-order thinking skills.

- In addition to the above, it was observed that many candidates did not have a solid grasp of the subject matter, specifically complicated topics. The diagnostic report is geared towards addressing these concerns and the aim is that teachers need to devise intervention measures to improve on this concern.
- In subjects where new topics were introduced or the formats of question papers changed, it was evident that many candidates were not fully familiar with the new expectations. Teachers and subject advisors need to be well informed of the changes in the *CAPS* and the *2021 Examination Guidelines*.
- In most home languages, it was noted that candidates were not able to recognise the demands of abstract topics and higher-order questions. There is therefore a need to enhance thinking in an abstract context in languages. Challenging topics need to be included in the classroom and homework exercises to allow learners to get accustomed to employing critical language skills to think analytically and critically.
- In all languages, it was witnessed that many candidates were not aware of the various formats of transactional texts. It is advised that teachers revise the required formats on a regular basis throughout the academic year. Informal writing must be taught as per the *CAPS* prescripts. Learners' writing skills will improve if informal writing activities become part of classroom and homework activities. This pertains to all grades and all subjects. A few suggestions to encourage writing in schools is to launch a letter writing competition, establish school newspapers and allow learners to write articles.
- Once again, in 2021, it was noted that a large number of candidates did not understand the vocabulary used in questions, extracts and comprehension texts. Schools are encouraged to initiate reading projects/reading periods/vocabulary/dictionary exercises to expand learners' vocabulary. Teachers are encouraged to expose learners to a wide array of texts to build their vocabulary, improve their comprehension skills and sharpen their critical thinking skills.
- There was a remarkable improvement in both Technical Sciences and Technical Mathematics but it can be deduced from weaker candidates' responses that focused intervention strategies need to be initiated and implemented to ensure that candidates have a solid understanding of the more complex topics.
- In SASL HL, it was observed that candidates did not give sufficient responses in the writing papers and literature. It is imperative that literature needs to be studied in detail and candidates need to be accustomed to the register, style and conventions for transactional writing texts.

1.5. KEY RECOMMENDATIONS

1.5.1 Examination Guidelines and changes in the *CAPS*

It is imperative that teachers and subject specialists fully familiarise themselves with the changes introduced in the *CAPS*, and subsequently the *2021 Examination Guidelines*. This entails that teachers need to be well informed about the new topics, format of question papers and restructured mark allocation to topics.

1.5.2 Diagnostic reports from 2015 to 2020

The diagnostic reports published from 2015 to 2021 are pertinent to gain a holistic grasp of learners' performance and to identify weaknesses in the teaching and learning of the ten key subjects (Part 1). Part 2 of this diagnostic report, published for the first time in 2017, will serve

as a teaching and learning tool in the language classroom. Part 1, Part 2 and Part 3 must be used in preparing the Class of 2022 for the NSC examinations.

1.5.3 Past question papers

Teachers are discouraged from teaching to the paper. However, past question papers should be used as teaching and learning resources, particularly for revision purposes. It must be stressed that the *CAPS* and the examination guidelines for each subject must be followed to ensure that all topics are covered. It must also be noted that in instances where the format of a question paper changed, candidates need to be made aware of such changes.

1.5.4 Language in teaching

Language Across the Curriculum (LAC) acknowledges the fact that language education does not only take place in specific subjects explicitly defined and reserved for it, such as the home languages, first additional languages and second additional languages. Language learning also takes place in each subject in school, whether teachers or learners are conscious of it or not.

Consequently, it is imperative to develop a comprehensive understanding of language learning in school that takes place across all subjects – in addition to the central role of language as a subject itself and all that it involves. Language teaching across the curriculum aims to equip learners with the intellectual and linguistic abilities to learn, understand and conceptualise subject matter. This linguistic dimension in each learning activity is sometimes hidden and partly implicit and therefore often underestimated in its importance.

In an effort to build learners' language proficiency and their confidence in decoding both the Language of Learning and Teaching (LoLT) and the language of assessment, teachers are encouraged to add their own language aspects, as these apply within the context of their schools or classrooms. The following points serve as a guide to teachers:

- It was observed in the marking of the November 2021 examinations that while candidates may have a good grasp of subject matter, many do not have adequate language skills to formulate responses in addressing the requirements of questions.
- Coupled with language skills, a lack of a solid understanding of examination techniques impact negatively on candidates' performance. There needs to be greater emphasis on aspects of language competence, time management and examination technique.
- In view of the point above, it is imperative that learners must have a firm understanding of action verbs that are used in the phrasing of questions. It is also essential that learners understand the meaning of each action verb in its context and in terms of the cognitive demand that is expected.
- Subject terminology and definitions must be clearly understood by learners. A firm understanding of subject matter can only be guaranteed if learners understand terminology and concepts used in the subject. It is suggested that a glossary of subject specific jargon and their definitions is provided to learners.
- Language and comprehension skills must be developed in each classroom across subjects.

1.5.5 Integrated intervention strategies

Given that the 2022 cohort of Grade 12s had an interrupted Grade 10 and Grade 11 year in 2020 and 2021, it is imperative that integrated intervention strategies are used to address gaps in teaching and learning. Such strategies could include the following:

- The extended lockdowns in 2020 and 2021 have proven the benefits of online study groups to facilitate revision activities and examination preparations. This practice needs to continue and expand. Platforms such as Microsoft Teams, Zoom and Google Classroom could be used to good effect.
- At the start of the academic year, teachers should provide the learners with the topics to be covered during the year and the relevant websites for each topic.
- Learners and teachers can gain access to online learning platforms such as YouTube that offer visual presentations and explanations of challenging topics. Teachers and subject specialists can source video clips and incorporate these in their lessons to give learners a clear understanding of subject matter.
- Learners who cannot log on to digital portals could be issued with DVDs, with the information from various websites. Hard copies of the information should be provided to learners who do not have access to electricity and/or technology. This is particularly important as the pandemic has highlighted the great divide between those who have online access and those who do not.
- Teachers from different schools in a given circuit or district could collaborate to support one another in mediating challenging topics to learners.
- Challenging topics must be revisited regularly during the course of the academic year, through extension activities and they should form the basis of all extra classes. Stronger candidates can be paired with weaker candidates to complete assignments on challenging topics.
- Teachers from different schools can build an item bank of higher-order questions and this bank can be used as a resource for revision purposes.

1.6. RESPONSIBILITIES

Provincial Education Departments

- Given that the target audience of this report includes the teacher and learner, this report must be cascaded from the provincial to the district level and finally to the school.

Subject Advisors and District Officials

- Subject specialists should do a baseline assessment of the 2022 Grade 12 cohort to establish the impact that the pandemic had on teaching and learning during 2020 and 2021, in terms of Grade 11 content coverage.
- It is also important that subject advisors emphasise that the Revised Annual Teaching Plan reflects the *minimum* requirements of the subject.
- Subject advisers are encouraged to convene meetings/workshops (on online platforms or in groups that adhere to Covid-19 protocol) that aim to mediate this diagnostic report. It is further suggested that the use of this diagnostic report must be encouraged during on-site support visits.

- Subject advisers should also monitor the improvement plans of their teachers, looking specifically for the inclusion of recommendations emanating from the individual subject reports.
- District officials should closely monitor curriculum coverage to ensure that all the topics in a subject have been covered according to the Revised Annual Teaching Plan (ATP). This will ensure that all topics receive due attention, allowing candidates to be better prepared for the examination.
- The monitoring process also needs to focus on the standard and quality of the assessment tasks used for SBA, as these tasks prepare learners for the NSC examinations. They also provide an opportunity for the teaching and learning interventions to gain traction well before the NSC Examinations.
- Subject Advisors should direct teachers to websites that will enhance teaching and learning.

1.6.3 Teachers

- With the pandemic still posing a possible threat to normal schooling, teachers should ensure that learners are provided with adequate resources to facilitate self-regulated learning.
- In order to develop learners' holistic understanding and applied competence, teachers must prepare learners adequately by creating learning opportunities to reflect, analyse and evaluate the content.
- Teachers should ensure coverage of the curriculum and the full range of cognitive levels in their teaching and assessment strategies. The mere recall of procedures or specific content on the part of learners will not enable them to respond fully to the demands of the question paper.

CHAPTER 2

ACCOUNTING

The 2021 NSC Accounting examination marked the second year of the move to two 2-hour papers of 150 marks each, reflecting two Accounting disciplines as follows:

- Paper 1: Financial Reporting and Evaluation
- Paper 2: Managerial Accounting, Internal Auditing and Control

The following report should be read in conjunction with the Accounting Paper 1 and Paper 2 question papers for the NSC November 2021 examinations.

2.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Accounting examination in 2021 increased by 13 127 compared to that of 2020, i.e. a 14,2% increase of the cohort.

There was an increase in the number of candidates who passed at 30% (Level 2) from 70 014 in 2020 to 79 093 in 2021, and in the number of candidates who passed at 40% (Level 3) from 49 103 to 54 518.

There was a marginal decline in the pass rate at 30% (Level 2) from 75,5% in 2020 to 74,7% in 2021, with a corresponding decrease at 40% (Level 3) from 52,9% to 51,5%. This follows a steady upward trend in pass rates over the past five years.

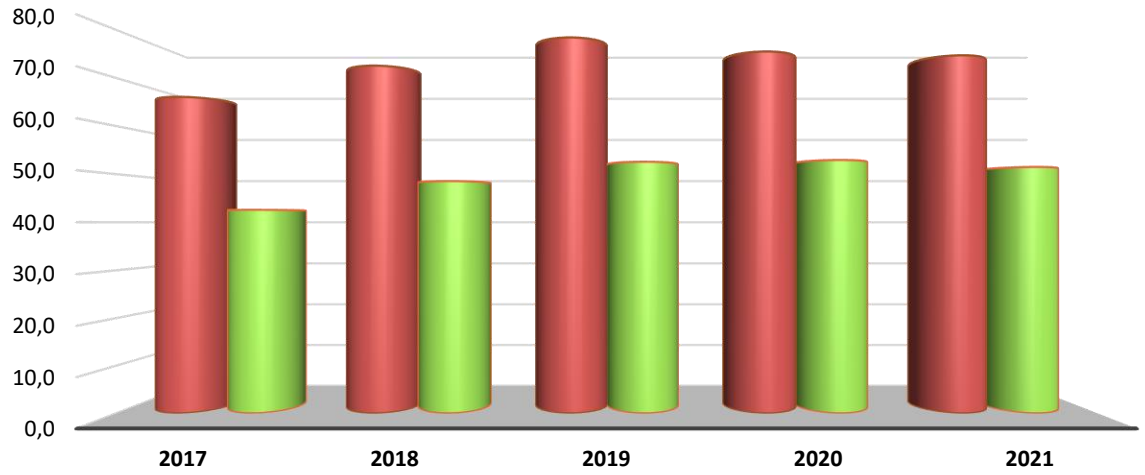
The percentage of distinctions (over 80%; Level 7) remained constant at approximately 6%. Given the increase in the size of the 2021 cohort, this converts into an increase in the total number of distinctions from 5 752 candidates in 2020 to 6 460 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of creative intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 2.1.1 Overall achievement rates in Accounting

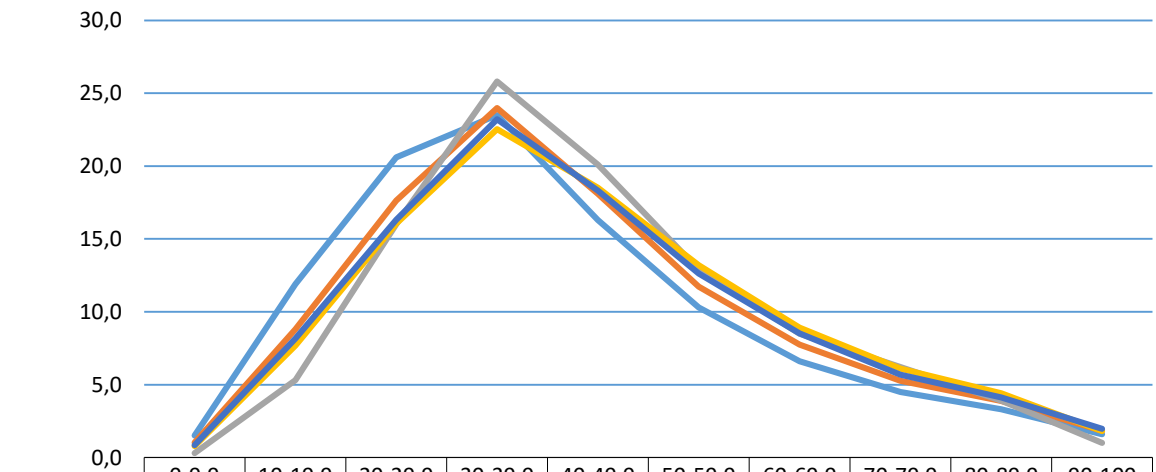
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	103 427	68 318	66,1	44 041	42,6
2018	90 278	65 481	72,5	43 831	48,6
2019	80 110	62 796	78,4	42 113	52,6
2020	92 767	70 014	75,5	49 103	52,9
2021	105 894	79 093	74,7	54 518	51,5

Graph 2.1.1 Overall achievement rates in Accounting (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	66,1	72,5	78,4	75,5	74,7
% achieved at 40% and above	42,6	48,6	52,6	52,9	51,5

Graph 2.1.2 Performance distribution curves in Accounting (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	1,5	11,9	20,6	23,5	16,3	10,3	6,6	4,5	3,3	1,6
2018	1,0	8,8	17,6	24,0	18,1	11,7	7,8	5,3	3,9	1,8
2019	0,3	5,3	16,0	25,8	20,1	12,9	8,5	6,2	3,9	1,0
2020	0,8	7,7	16,1	22,5	18,5	13,2	8,9	6,1	4,4	1,8
2021	0,8	8,2	16,3	23,2	18,3	12,6	8,5	5,7	4,1	2,0

2.2 OVERVIEW OF CANDIDATES' PERFORMANCE: PAPERS 1 AND 2

Accounting is a subject that requires insight and regular practice. The 2021 cohort undeniably experienced two years of disruption due to a variety of contextual factors arising from the Covid-19 pandemic. The writing of high-stakes NSC examinations under these circumstances would not have been easy for most candidates and their teachers.

The general comments below include points that arose from the 2021 Accounting NSC papers, and reiterate relevant advice given in previous diagnostic reports. Particularly in times of change and disruption, it is imperative that teachers refresh and adjust strategies by incorporating their own creative ideas with suggestions contained in this report and in previous editions.

The two-papers model was again well received, as it offers different benefits, which includes:

- **More effective management of time:** Candidates have 2 hours to complete each paper; a total of 4 hours to complete a 300-mark examination.
- **Specific disciplines per paper:** Each paper is written on different days, affording candidates the opportunity to focus their preparations on specific content relevant for each paper.

These benefits were unfortunately not fully exploited by the 2021 Accounting cohort.

General comments

(a) **Quality of candidates' performance**

- Although extensive intervention initiatives were implemented by provinces throughout the year, the plight of the current cohort must be recognised. Continuous content delivery was compromised by disruptions, unavoidable curriculum adjustments and a reduced assessment programme. Despite these challenges, a fair percentage of candidates was proficient in addressing the requirements of all subquestions. The pleasing performance of candidates at certain centres is evidence that teachers have planned well and implemented appropriate strategies proposed in previous diagnostic reports.
- However, widening of the achievement gap between capable and weaker groups of candidates was extremely noticeable this year. This should not be surprising in the context the two abnormal years this cohort experienced in Grades 11 and 12. Capable or motivated candidates with appropriate resources might have appreciated the opportunity to study independently; while less proficient candidates or those lacking resources, might have preferred greater access to teachers.
- The inability of weaker candidates to deal effectively with even the less challenging parts of questions is a clear indication of the impact of the disruptions on teaching and learning processes within the educational environment. All questions are designed to be accessible to all candidates, at least in part. Basic concepts, formats and procedures must be addressed at an early stage and, for many candidates, this had to be supported by an effective assessment strategy and regular interaction with teachers.

(b) **Policy documents and LTSM:**

- The revised *CAPS* documents, recovery annual teaching plans (ATPs), the latest *Examination Guidelines* and diagnostic reports are essential planning documents that form the basis of the planning process.
- Prescribed textbooks, study guides and other departmental publications such as *Mind the Gap* continue to be the primary resources available to teachers. However, teachers are expected to adapt the information to ensure that it remains current and incorporate new developments or scenarios that prevails in the dynamic business environment.

- Online resources play a more significant role in the teaching and learning process under the present circumstances. Education websites, video presentations, shared resources from different provinces and publishers contribute to the continuity necessary in the teaching and learning of Accounting.

(c) **Use of past NSC papers:**

- Past NSC papers are an essential teaching and learning resource. It is evident that teachers make extensive use of these in lessons and revision. NSC Accounting papers serve as a reliable source on questioning patterns and style. Innovative and creative questions are always included as part of the higher-order component. This ensures that the subject remains relevant and reflects modern trends.
- The migration to two papers in 2020 did not necessitate any changes to the content. It is therefore essential that every learner has access to past papers from 2015 onwards, as these are based on the current *CAPS* content. Teachers and candidates must familiarise themselves with the specific content of each paper and extract the relevant questions from these past examination question papers when preparing for examinations.

(d) **Pertinent factors from previous diagnostic reports**

Poor results in many centres have exposed challenges in teaching and learning. The impact of the Covid-19 pandemic is recognised as a major crisis which affected the lives and academic performance of many candidates. However, underlying reasons for poor performance identified in several previous reports still persist. These include:

- **Poor mathematical and arithmetical ability:** Arithmetical calculations filter across all topics. This includes the correct use of rands or cents, positive or negative signs and the appropriate operations. An Accounting learner is expected to have a good understanding of the logic of these calculations. This skill is developed over time with regular practice.

- **Language barriers linked with poor comprehension skills:** Despite the subject-specific language being used in all Accounting tasks and examination papers from Grade 10, many candidates continue to experience difficulty in understanding requirements of questions. Weaker candidates tend to provide incomplete or unclear responses to questions requiring explanations or comments. They often rely on the commonly used responses offered in marking guidelines, and use them inappropriately in different contexts.

- **Inability to identify relevant information to answer specific subquestions:** Accounting questions follow a structure whereby the *requirements* are listed before the *information* necessary to answer the questions. Candidates are expected to engage with the information and extract what is needed to answer the questions. The more capable candidates are able to zoom in on the relevant information with ease. Weaker candidates find this process challenging, often using inappropriate figures and irrelevant information to support their explanations, while overlooking significantly more relevant and pertinent information.

- **Lack of meaningful revision of relevant Grade 10 and 11 content:** The application aspects of most topics are covered in Grade 10 and 11 whilst analysis and interpretation are addressed in Grade 12. In addition, vital concepts, procedures and formats introduced in Grade 10 represent the foundation of more complex analysis in subsequent grades. These must be constantly reinforced at

regular intervals. Tight timeframes may not allow for re-teaching. Teachers must factor revision topics into their teaching plans, intervention initiatives and assessment programmes. It can be very frustrating for candidates when new material is introduced whilst the basics are not clearly understood.

- **Lack of formative testing:** Informal assessment activities are necessary to support the formal assessment programme. Regular formative tasks or tests must be skilfully used to build confidence in all topics. To be effective, these must be practical and designed to achieve specific outcomes. Teachers must analyse these to assess strengths and weaknesses and plan accordingly. Such tests must give learners confidence to attempt more advanced activities with the realisation that their marks can improve.

General suggestions for improvement

The curriculum planning and delivery process is interactive and centralised. National policy on curriculum delivery is communicated to teachers in the form of detailed annual teaching plans and formal school-based assessment programmes. These policy statements are *CAPS*-aligned and strive to achieve consistency and continuity across provinces and districts. They also assist subject specialists to effectively monitor and support schools on a more personalised level. In an effort to maintain standards, subject advisors would often engage lead teachers to develop common assessment tasks for their respective districts or clusters.

Teachers are advised to interrogate the common tasks available and adapt them to meet the unique needs and challenges of their learners. They should be made aware that they have a vital duty to adapt and amend teaching and learning activities accordingly, and in collaboration with subject advisors.

Subject advisors are cognisant of the fact that teachers would lose the skill of planning or setting balanced assessment tasks if they become overly dependent on the common tasks that are set for them. Opportunities are available for teachers to participate in item-development activities to hone their skills.

Examples of recommended techniques to improve examination performance are:

(a) **Comments, explanations and evidence:** The following points will assist to address issues relating to language barriers. They will also satisfy the objectives of the language across the curriculum (LAC) initiatives.

- Initiatives to develop examination-writing skills should be discussed regularly in class. These must include the practice of interpreting and analysing a structured examination question. At strategic times during the academic year, this can be achieved as follows:
  1. Read each word of the instruction (or 'Required') and underline the words.
  2. Identify the relevant evidence in the source information provided.
  3. Require learners to specifically explain what they must do to answer the question.

  This process can be time-consuming, but the benefits are very rewarding.

- Although questions will often require figures or other evidence to be quoted from the information provided, language proficiency should not be viewed as an obstacle in presenting appropriate responses. Learners must primarily focus on identifying the points required to answer the question. Compiling a shortlist of these relevant points is often helpful in constructing a valid response, particularly in dealing with interpretive or open-ended questions. Allowing learners to verbalise

their suggested responses in class could improve confidence and expose them to the opinions of others.

- Encourage learners to offer explanations that are concise and to the point. Often poor or incorrect answers result from learners unnecessarily repeating the specific requirements of the questions in their responses.
- On the other hand, partial, simple or single-word responses may not always be sufficient if an explanation is required. Learners must also realise that unnecessary lengthy explanations are time-consuming and will not earn additional marks. If more than one point is required, explanations in Accounting may be presented in bullet-point form; however, learners should understand that the various points explained will have to be different in nature and not a mere repetition of previous points stated differently.

(b) **Time management:** Examination questions provide time guides, and learners need to practise the skill of adhering to the suggested time allocations. Training on time management must be an ongoing process and must apply to all summative activities, controlled tests and examinations. Effective use of the answer book is also a time-management strategy. The mark allocation is a good indicator of the amount of information needed.

Although the replacement of mid-year and year-end examinations with control tests were necessary steps to compensate for the loss of teaching time, a consequence of this was that learners did not gain sufficient experience on examination technique for 2-hour papers until the preliminary trials papers scheduled at the end of their Grade 12 year. It was, however, pleasing to note that some centres attempted to address this setback by administering informal activities to achieve this purpose, under trying conditions.

A strategy that teachers could employ in such circumstances is to divide past NSC papers into separate parts that could be completed at regular intervals in single teaching periods in Grades 10, 11 or 12. Learners should be trained to answer each question under time constraints appropriate to each subquestion. Self-marking or peer marking should ideally be done in the same teaching period to reinforce this exercise. If this is done regularly, they should acquire the skill of focusing on the specific demands of each subquestion and formulating an efficient way of expressing responses without wasting time on unnecessary or irrelevant comments.

(c) **Appropriate use of the printed answer book:** Learners must be reminded that the answer book should not be relied upon to replicate the question paper, as it only provides a basis for their responses and guides the placement of their answers. It also suggests the expected length of responses so that lengthy explanations can be avoided. It is therefore imperative that learners comply with the requirements of each question as stated in the question paper.

(d) **Ethical, governance and internal control issues:** Given the general public intolerance of crime, particularly in recent years, incidents around these issues have been extensively exposed and debated on various media platforms and in public forums. There is currently no shortage of topical source material that teachers and learners could easily access for productive use in classroom discussions or assignments.

Learners will benefit from verbalising their opinions in class and listening to the opinions of others. This should enable them to develop confidence in stating opinions,

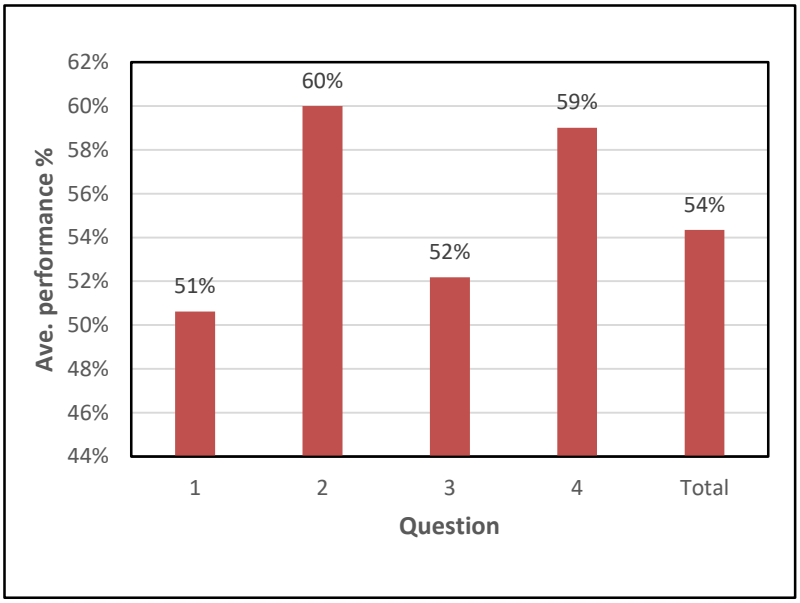
and in being receptive to ideas on appropriate ethical conduct. Awareness and understanding of these issues, why they arose and how they should be solved, are vital to the success they could achieve in any future career.

Internal control processes and ethical considerations are expected to be continuously integrated across all topics at strategic points in the ATP. There are no specific limits on the scope of content that must be covered. Questions on these factors often comprise open-ended, real-life scenarios of problems affecting businesses, such as weak internal controls, lack of accountability, bribery, corruption, tender fraud, auditing irregularities, cybercrime and poor corporate governance.

2.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

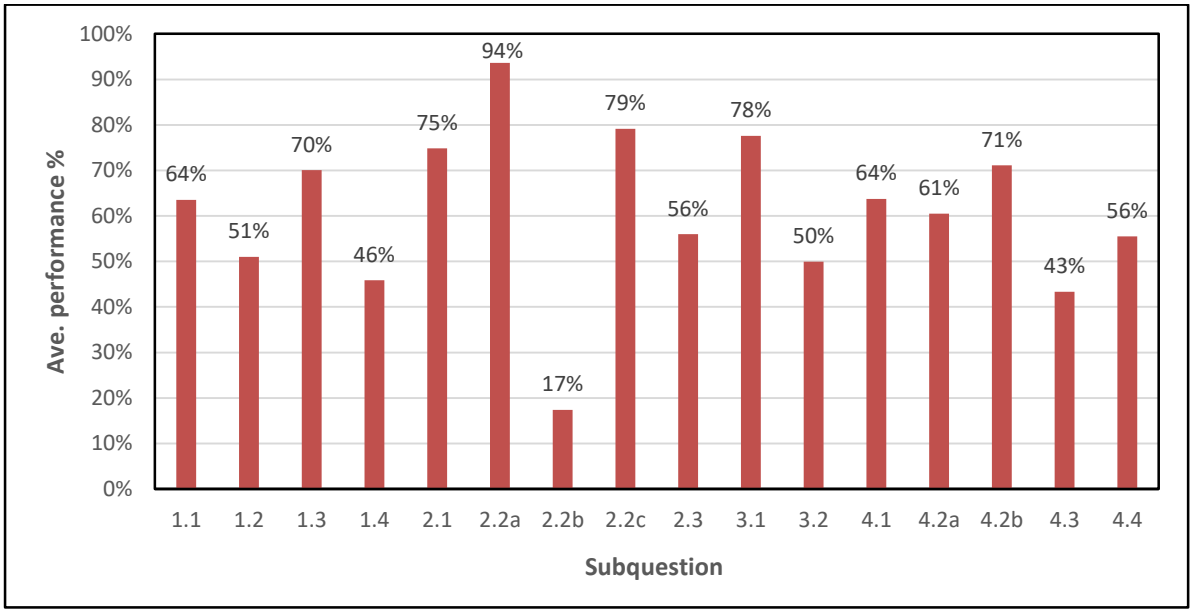
The graphs presented below are based on data from a random sample of candidates in the different provinces. They provide a clear picture of the general performance in each topic (Graph 2.3.1). This is useful in assessing the relative degrees of challenge of each question as experienced by candidates (Graph 2.3.2).

Graph 2.3.1 Average performance per question in Paper 1



Q	Topics
1	Statement of Financial Position
2	Share Capital, Financial Indicators & Cash Flow
3	Interpretation of Financial Information
4	Corporate Governance

Graph 2.3.2 Average performance per subquestion in Paper 1



Subq.	Topic	Subq.	Topic
1.1	Calculate: FIFO Value of Closing Stock	2.3	Complete Cash Flow Statement
1.2	Calculate: Net Profit after Tax	3.1	Concepts: Financial Indicators
1.3	Retained Income Note	3.2	Interpret: Company Financial Info
1.4	Statement of Financial Position	4.1	Disclaimer Audit Report
2.1	Ordinary Share Capital Note	4.2a	Shareholders Appointing Directors
2.2a	Calculate: % Operating Expenses on Sales	4.2b	Directors' Characteristics & Reasons
2.2b	Calculate: Dividends per Share	4.3	Ethics: Tender Corruption
2.2c	Calculate: Return on Average Equity	4.4	Policy on Whistleblowing

The performance in Paper 1 was variable, although the paper was relatively predictable, with all questions being tested over the last five years. Well-prepared candidates coped admirably across all questions. However, weaker candidates struggled to take advantage of marks pitched at the lower- and middle-order ranges.

The minimal variations in this paper in the contexts of certain subquestions appeared to increase the challenge for candidates in some centres, possibly due to their revision being focused on simplistic application questions as they appeared in previous papers. These include the following:

PAPER 1: Calculation of the closing stock using FIFO (Q1.1; 5 marks)
Calculation of dividends per share (Q2.2(b); 4 marks)
Calculating and commenting on % shareholding (Q3.2.3; 10 marks)
Subquestions on corporate governance (Q4.3; 4 marks)

PAPER 2: Calculations and explanations on the control of raw material (Q2.2; 9 marks)
Interpreting actual and budgeted information (Q3.3; 11 marks)

2.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: STATEMENT OF FINANCIAL POSITION (SOFP)

The question integrated a stock valuation calculation, correcting the net profit and preparing the SOFP. These subquestions have been tested extensively in the past. It remains a concern that weaker candidates traditionally find the format of a Statement of Comprehensive Income (SOCI) much easier than that of a SOFP which was asked in this paper.

Many candidates continue to show weaknesses in addressing the adjustments, especially complex calculations and applying the correct treatment (increase or decrease) to adjustment amounts. They did, however, earn method marks for transferring and using relevant figures appropriately.

Common errors and misconceptions

(a) In Q1.1 (5 marks), poorly prepared candidates provided unfamiliar and convoluted workings to arrive at a closing-stock figure that required an application of the FIFO method. This is a topic that relates to both Paper 1 and Paper 2. A fair percentage of candidates showed an understanding of the FIFO method, but neglected to account for the units returned in their calculations.

(b) Q1.2 required candidates to clearly show the effect of adjustments to the incorrect net profit provided. The inappropriate use of signs (+ or -) or use of brackets by weaker candidates was evident in their responses. Adjustment (ii), interest on loan and (iii) rent income, were poorly answered despite these examples being included in tests throughout the year and in past NSC examinations.

(c) The income tax calculation was presented differently, requiring candidates to refer to the basic components of provisional tax and an amount still due to SARS. This inexplicably challenged many candidates.

(d) The Retained Income Note (Q1.3) was generally well done. The simplistic presentation and the fact that there were no interim dividends simplified this subquestion, yet might have confused some candidates.

(e) The preparation of the SOFP (33 marks) reflected variable performance. It was evident that this is not a popular financial statement, and that insufficient time had been devoted to revision of the format of the SOFP. The following items continue to expose weaknesses:

- The order of items in a SOFP, particularly the liquidity items comprising Current Assets, i.e. Inventories, followed by Trade and Other Receivables, and finally Cash and Cash Equivalents
- Transfer of relevant amounts from workings
- Non-current liabilities and current portion of loan
- Financial indicators to calculate specific amounts, including balancing figures

(f) Many candidates did not show workings for Trade and Other Receivables and Trade and Other Payables. These included the adjustment figures from Q1.2, which carried method marks, and a transfer from the Debtors' Ledger to the Creditors' Ledger.

(g) A large percentage of candidates was able to adjust the trading inventories with the cost price of the goods returned but neglected to address a corresponding contra-

account. As an exchange of cash was not mentioned in the adjustment, the logical relevant contra-account would be Trade creditors.

(h) Few candidates recognised that the projected interest on loan, R234 000, had to be excluded from the total annual repayment, in calculating the current portion of loan. Many simply used the total repayment of R420 000 and earned a method mark.

Suggestions for improvement

(a) It must be expected that preparing financial statements will always form a major part of Paper 1. Preparation must include a variety of examples from different resources, especially past NSC examination papers, and focus must be equally devoted to the different financial statements.

(b) Due to the predictable nature of these questions, teachers must explore the different ways in which they can be tested. For example, the SOCI could be a straight-forward question involving a Pre-Adjustment Trial Balance and a list of adjustments; or completing a partially completed statement, use of financial indicators; or correcting the net profit taking into account errors and omissions. Each form would present different degrees of challenge, basically using similar information.

(c) Basic format and structure of financial statements and notes are introduced in Grade 10 where learners are expected to develop a good foundation. It is important that teachers focus on concepts, formats, the Accounting Equation, the double-entry principle and steps in the accounting cycle on an on-going basis. This can be achieved through short informal testing that can be self- or peer marked. It is essential that learners identify that the SOFP actually mirrors the basic Accounting Equation A = O + L, with A at the top of the SOFP, and O and L at the bottom.

(d) Specific notes are applicable to all financial statements, including the SOCI and the Cash Flow Statement (CFS). Ensuring that the components of every note are clearly understood must form the basis of the planning process and should be assessed regularly through formative, aspect testing.

(e) Dealing with specific aspects or notes with the related section of a financial statement will improve learners' understanding of their usefulness and relevance. For example, the Ordinary Share Capital and Retained Income Notes would be relevant to the Shareholders' Equity section of the SOFP, the Fixed Asset Note would provide valuable information on depreciation and asset disposal for the SOCI as well as the Non-current Assets section of the SOFP. All the adjustments are used to complete the SOCI as well as the Current Assets and Current Liabilities sections of the SOFP.

(f) Learners must be taught the skill of inserting all known or previously calculated figures into the SOFP. Thereafter they must proceed to determine other missing figures. Examples of such figures include:
- Final dividends from the Retained Income Note would also appear as Shareholders for dividends.
- The balance on the SARS: Income tax balance will represent the difference between the provisional tax payment and total income tax for the year.
- The current portion of loan is always subtracted from the loan balance.
- Shareholders' Equity consists of Ordinary Share Capital and Retained Income.

(g) Note that the current portion of loan can either be a percentage of the closing balance or an amount equal to the expected monthly capital repayments for the next financial

year. The question would have to clarify if the repayments are identical for the current and future financial years or not. Learners must understand that it is only the borrowed (capital) portion of a loan that has to be split between current and non-current liabilities. As interest is the cost of borrowing these funds (expense), this must be excluded from the current portion.

(h) Once the basics are mastered, opportunities for analysis and insight must be explored, whereby financial indicators are used and balancing figures are calculated. This skill of working from any point to complete financial statements is often the style used in Grade 12 examination papers.

(i) As mentioned in previous reports, teachers should remind learners of the skills learnt in Mathematics or Mathematical Literacy, particularly skills in using fractions, ratios and/or percentages.

(j) Comprehension and interpretation play a vital role in understanding questions and adjustments. It is important that this be addressed in the language of assessment. Teachers are advised to devote time in class to read and identify specific requirements of questions, as well as certain complex adjustments and their components with learners. In this way the skill of interpreting all aspects of a question is imparted to learners.

QUESTION 2: SHARE CAPITAL, FINANCIAL INDICATORS AND CASH FLOW STATEMENT (CFS)

The two-paper model makes it possible to separate the calculations relating to the CFS and financial indicators from the interpretation and evaluation of financial information. Weaker candidates find the calculations more manageable, especially if they are able to make effective use of the formula sheet provided.

The majority of candidates performed well in this question, as is evident by Graph 2.3.1 above, due to the predictable presentation of the content and recent trends. This questioning style tends to suit candidates who prefer to study in rote fashion.

Common errors and misconceptions

(a) The ‘confidence-boosting’ subquestion (Q2.1; 6 marks) was the preparation of the Ordinary Share Capital Note. This did not meet expectations as several centres did not place emphasis on the different approaches to complete this note.

(b) Three financial indicators were asked in Q2.2. Calculating the % operating expenses on sales and the % return on average equity are frequently asked subquestions and were handled well. Calculating the dividends per share (DPS) proved to be the most problematic. The majority of candidates were not aware that the interim dividends and final dividends have to be treated separately when there is a change in share capital during the financial year. They appeared to be confused about the number of shares to be used as the denominator. This is a clear indication that this was not adequately taught and that the formula sheet was not effectively used as the different formulae are provided therein.

(c) In Q2.3 (18 marks) candidates were required to complete the CFS. Although this was consistent with questions asked in many previous papers, basic errors were still noted across a number of centres. These included the inappropriate use of brackets/no brackets to indicate an outflow or inflow of cash and poor presentation of workings to

indicate positive or negative amounts. A few candidates also did not realise that the amounts calculated in Q2.1 had to be used in the Financing Activities section.

(d) Calculating the opening cash balance, which included an overdraft, was well done but calculating the net change in cash and cash equivalent from the top of the CFS unexpectedly presented a challenge to many candidates. This did not follow the trend set in past examination papers.

Suggestions for improvement

(a) The Share Capital Note is relevant to all financial statements and is expected to feature in most Accounting papers. In past NSC papers this question has been posed in many different ways. Teachers must provide a variety of examples from many sources to ensure that learners acquire a clear understanding of the amounts and the calculations. They must be taught to always take into account the information that is given and work from different directions in arriving at any missing (balancing) figures. Different approaches to calculate the average share price must also be emphasised. This may involve using either the share balances before the share buyback or the closing balances, depending on when the share repurchase takes place.

(b) With regard to the calculation of financial indicators, skills involving percentages and ratios are essential. These are developed over time through constant practice. Teachers are advised to use the formula sheet as a teaching tool to explain the different formulae and to stress the importance of reflecting final answers as percentages, rands/cents or ratios. It is also advisable to encourage learners to insert names of financial indicators in this list and to gain some understanding about the usefulness of the different indicators. However, learners must also understand the inherent logic of every financial indicator to enable them to identify and interpret the indicators appropriate to each question. Reliance solely on the formula sheet encourages rote-learning which compromises the understanding required in interpretive questions in Question 3.

Financial indicators that require the number of shares in their calculation will require closer attention due to the fact that the share capital changes over the financial year when shares are either issued or repurchased. It is important to note that dividends per share are paid on a definite number of shares, hence the interim dividends per share plus the final dividends per share will be equal to the dividends per share at the end of the year. The closing number of shares should only be used to calculate DPS if the share capital did not change over the financial year. This concept was assessed in November 2017 and in 2020 in the context of the dividend pay-out rate.

(c) The CFS is based on calculating specific amounts for the three main sections, namely Operating Activities, Investing Activities and Financing Activities. NSC papers would generally pose this question either to focus on specific calculations or to complete the CFS, as per the 2021 paper. A piecemeal approach in addressing each section will enhance calculation skills relevant to specific amounts such as income tax paid and dividends paid to calculate cash effects of operating activities. It is, however, necessary to revise many past examination papers and additional activities from other resources. Such activities should illustrate the way in which the CFS serves as an important link between the SOCI and the SOFP.

QUESTION 3: INTERPRETATION OF FINANCIAL INFORMATION

This question covered basic concepts (Q3.1; 4 marks) and interpretation of financial information of two companies. Candidates had to compare and comment on profitability (Q3.2.1; 4 marks), dividends, earnings and returns (Q3.2.2; 12 marks), % shareholding of a specific shareholder (Q3.2.3; 10 marks) and financing strategies and gearing (Q3.2.4; 10 marks).

It was evident that comments and explanations were well handled by above-average candidates. However, many of these candidates often wrote far more than was required in answering the interpretive questions. This might well be due to a lack of practice in writing 2-hour examination papers, as mentioned in the 'General Comments'.

The average candidates and some below-average candidates were able to score part-marks for quoting relevant financial indicators or appropriate figures. However, it was evident that candidates from many centres continued to struggle to correctly interpret requirements of subquestions, to identify and quote relevant information and to express responses clearly.

The language of assessment is an issue that is raised in every report. Teachers need to recognise that at least 25% of the paper will involve some form of interpretation and commenting and take the necessary steps to ensure that their learners are not disadvantaged.

Common errors and misconceptions

(a) A few candidates found it challenging to correctly match descriptions in Q1.1 (4 marks) to the correct category of financial indicators. It appears that a general lack of understanding of the logic of financial indicators is a concern especially among the weaker candidates. This was intended as a confidence-boosting easy question.

(b) Candidates generally performed well in Q3.2.1 (4 marks) with relevant comparisons on profitability. Many candidates, however, misunderstood the requirements and provided detailed explanations for both companies instead of simply identifying a single company. Valuable time was wasted.

(c) While most candidates were able to adequately comment on the dividend pay-out rate of Flexi Ltd (Q3.2.2; 4 marks), a large percentage of candidates did not provide a valid reason or comment about the decision and lost 2 marks.

(d) With regards to the % return on shareholders' equity (Q3.2.2; 4 marks), the majority of candidates were able to quote the trend, but very few were able to make a comparison with an alternative investment, such as a fixed deposit.

(e) The majority of candidates were not able to explain why the earnings per share in Broom Ltd was better than that of Flexi Ltd (Q3.2.2; 4 marks). This required a comparison of the EPS against the value of the share (either NAV or market price). This appeared to be beyond the scope of many learners. They simply commented on the actual EPS of each company and earned part-marks.

(f) It was disappointing to note that the subquestions on % shareholding (Q3.2.3; 10 marks) were generally poorly answered by a large percentage of candidates. They failed to notice that the price paid to repurchase shares was too high and had compromised the company's cash resources. Many candidates did not understand the concept of majority shareholding despite such scenarios featuring in all recent past examination papers. The poor performance in this subquestion could be a result of the cascading questioning style, whereby subsequent responses were dependent on an understanding of the previous subquestions.

Suggestions for improvement

(a) Class discussions and short questions on basic concepts and the different categories of financial indicators should be the logical step following the preparation of financial statements. In fact, some teachers may decide to integrate the discussion on financial indicators at various stages during the preparation of financial statements. This will also depend of the strength of each current cohort.

(b) Short informal tasks, sometimes referred to as aspect-testing, such as the financial indicators in Q3.1, can be effectively used to sharpen foundational knowledge. This must be followed by meaningful discussions on the logic, usefulness and relevance of the indicators to a factor in a business such as liquidity, solvency, profitability, operating efficiency or financial returns, e.g. 'Can the company settle its current debts within the next financial year?' or 'Should the shareholders be satisfied with their investment in the business?'

(c) Teachers are encouraged to recognise opportunities to extend their learners on aspects of questioning that could go beyond the analysis of financial indicators. Examples of this will include scenarios on % shareholding, manipulation of the share capital, financing strategies or comparing EPS or DPS against share prices. Insightful responses were noticed from certain centres; this is encouraging as they tend to indicate that teachers are taking the initiative to extend capable learners by providing enrichment activities on these factors.

(d) The points mentioned above also serve as opportunities to integrate ethical and corporate governance issues throughout the curriculum where applicable. Being mindful of the time pressures to complete the syllabus, teachers should use other avenues, such as virtual meetings and social media platforms, to skilfully facilitate short discussions and presentations, creating an alternative dimension to excite, motivate and benefit learners.

(e) The correct interpretation or understanding of questions and the information presented is a vital skill that learners need if they wish to achieve their potential. Teachers are expected to be more creative and forward-thinking, essentially looking for the most relevant information instead of relying solely on the traditional textbook.

QUESTION 4: CORPORATE GOVERNANCE

The *CAPS* requires that corporate governance issues be integrated across all topics related to companies. While the trend is to provide scenarios and questions pitched at the middle to higher order, the questions in 2021 appeared to be more general and open-ended, thus accessible to every candidate.

Candidates from many centres managed to score good marks. Part-marks were also earned for partially valid responses. This indicates that teachers have addressed different aspects of the topic to some extent. However, it was evident that many candidates from certain centres were not exposed to such content and either performed poorly or did not attempt the questions, which could also be a consequence of poor time management in attempting to complete the paper.

Common errors and misconceptions

(a) Q4.1 (4 marks) required the *consequences* of a disclaimer audit report. Although the topic of Audit Reports has been covered regularly in past NSC papers, many candidates continue to provide definitions rather than the effect of such a report to the

reputation of a company. This is a language challenge, as mentioned in other parts of this report.

(b) Q4.2 (4 marks) required candidates to explain the responsibility of shareholders in appointing directors, and to provide general characteristics they would expect a director to possess. Whilst many candidates were not clear about shareholders' need to protect their investment, they were proficient in listing a variety of characteristics of a good director, but fell short in expressing valid reasons.

The question specifically required an explanation of two types of characteristics. However, less insightful candidates were not able to think of two different characteristics and simply reworded the first characteristic mentioned, e.g. being honest, trustworthy or possessing integrity.

The types of directors (i.e. executive/non-executive) or the composition of the board were not issues in this question, allowing for a wide variety of simple explanations to be recognised. Some candidates simply quoted random corporate governance concepts such as transparency, accountability and ethics. These are factors that are normally assessed during the operation of their duties rather than characteristics that are observable before being appointed.

(c) A fair percentage of candidates did not recognise the unethical behaviour of the CFO (Q4.3; 4 marks) and focused their responses only on the equipment supplied, clearly misunderstanding the requirements of the subquestion. The issue of bribes and corruption has been covered in recent examination papers, in the context of stock control. It was therefore disappointing that many candidates were not able to provide two different and valid points.

(d) The whistleblowing scenario in Q4.4 (4 marks) appeared to be an unfamiliar concept to many learners. This is despite the alternative wording (informants) that was provided in the extract and the fact candidates are likely to have experienced informants in their schools and private lives. Many candidates simply quoted from the extract and were awarded part-marks.

Suggestions for improvement

(a) Classroom discussions, at strategic points throughout the topic on companies, as explained in the context of interpretation of financial information, are equally applicable to issues of corporate governance and ethics. This will also achieve the integration of these topics as outlined in the ATP.

(b) Although these topics do not always require prescriptive responses and may be open-ended in nature, a fair degree of factual information may be necessary, such as certain rules and policies related to company formation, provisions in the Companies Act and specifics about audit reports. Teachers must ensure that they incorporate such factors into their planning. Extracts from newspapers, scenarios and case studies can be effectively used to achieve this objective. Modern trends and newsworthy items are good sources of relevant material that can be used in short formative class activities.

(c) The school-based assessment stipulates a project on annual reports of companies. This is an opportunity to include practical problem-solving scenarios that emphasise the role of management, principles for responsibility and accountability and ethical considerations applicable to good values and preventative measures to kerb corruption. An all-encompassing annual report would go beyond the analysis and interpretation of the financial statements; the directors' report will cover aspects of the

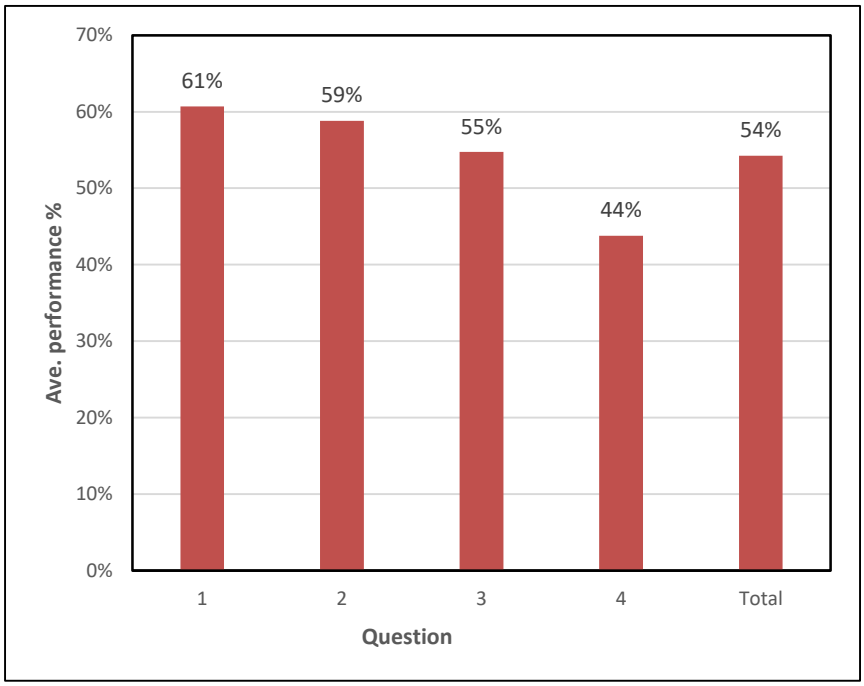
various committees and the long-term goals of the company. Teachers must use these opportunities to further develop learners' appreciation of the dynamic operations within a complex business environment.

(d) At this point, it is necessary to alert teachers to the suggestions made in recent diagnostic reports concerning this topic, and stress the importance of using these reports as useful resources for planning and teaching.

2.5 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 2

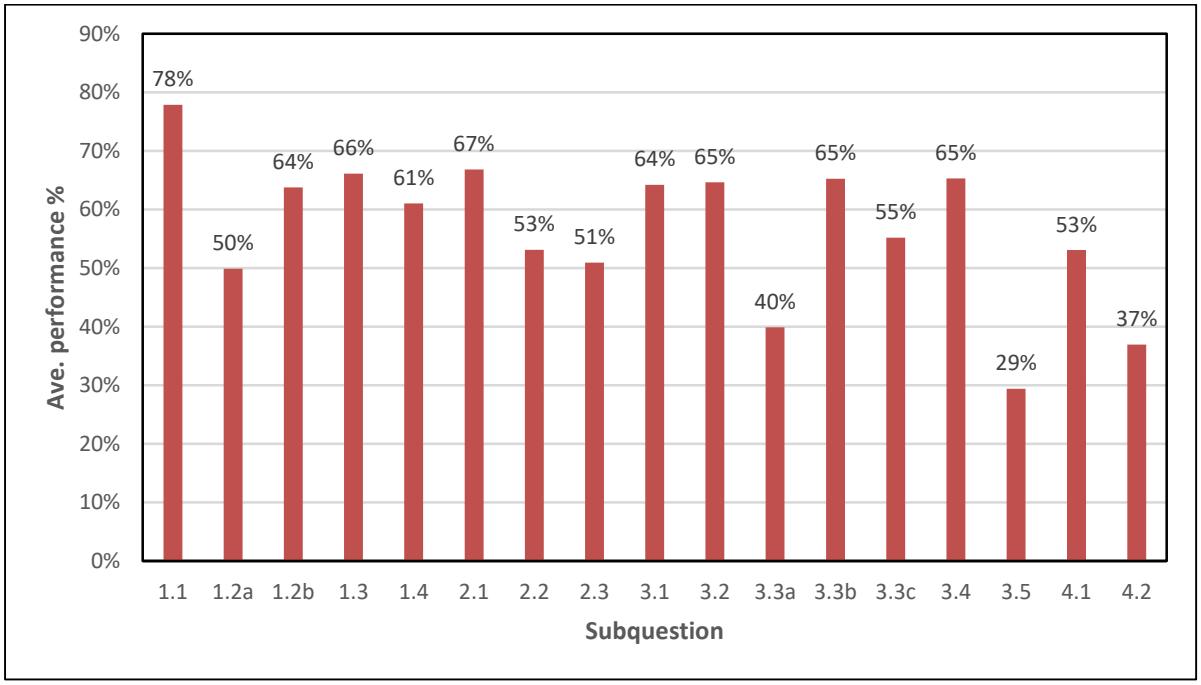
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degree of challenge of each question as experienced by candidates.

Graph 2.5.1 Average performance per question in Paper 2



Q	Topics
1	Debtors' Recon. & Age Analysis
2	Cost Accounting (Manufacturing)
3	Budgeting
4	Stock Valuation & Fixed Assets

Graph 2.5.2 Average performance per subquestion in Paper 2



Subq.	Topic	Subq.	Topic
1.1	Documents for allowing credit	3.1	Debtors' Collection Schedule
1.2a	Calculate: Debtors' Control Balance	3.2	Calculate: Amounts in Cash Budget
1.2b	Calculate: Balances on Debtors' List	3.3a	Explanation: Workload of Sales Staff
1.3	Problems & Evidence in Age Analysis	3.3b	Explanation: Workload of Repair Staff
1.4	Job Description and Potential Fraud	3.3c	Suggestions on Workload of Staff
2.1	Production Cost Stmt. & Abr. Income Stmt.	3.4	Comment on Sales Trends
2.2	Control of Raw Material	3.5	Comment on Control over Expenses
2.3	Break-even Point & Unit Costs	4.1	Inventory Value (Weighted Average)
		4.2	Fixed Assets: Calculations & Control

Well-prepared candidates coped well across all questions while weaker candidates were also able to take advantage of the lower- and middle-order subquestions. This is testament to the initiatives of teachers to adequately address the specific topics and the extensive revision programmes at all levels.

Poor performances were noticed in certain areas particularly the explanatory aspects in various topics. Candidates continued to show weaknesses in reading and understanding, and often provided inappropriate and irrelevant clichés from previous marking guidelines to these interpretative subquestions. Candidates clearly preferred predictable questions expressed exactly as they appear in previous papers because this is how they had been trained for examinations.

2.6 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: DEBTORS' RECONCILIATION AND AGE ANALYSIS

This topic is generally pitched as an easy to medium question, but the process of completing the reconciliation (Q1.2; 18 marks) remains a challenge to many weaker candidates. This is a concern, as the basic applications relevant to answer this question should be covered in

Grades 10 and 11. This type of question should also have been anticipated, due to bank reconciliation not being examinable this year.

Most of the candidates were able to provide a list of appropriate documents required by business before granting credit (Q1.1; 2 marks).

The debtors' age analysis (Q1.3; 6 marks) produced variable results and the majority of candidates were able to offer valid comments to support the concern of the internal auditor regarding Susan's job description (Q1.4; 4 marks).

Common errors and misconceptions

(a) In Q1.2, a small percentage of candidates was not able to place the correct signs (+ or –) to relevant figures. This exposed their lack of understanding of the logic and purpose of reconciliations and their inability to interpret the errors and omissions identified. Weaker candidates often provided figures in all the columns and lost marks for foreign entries.

(b) The below-average candidates struggled with item (iii), an amount incorrectly posted from the Debtors' Journal, item (iv), a credit sales treated as a return and item (vi), an amount incorrectly recorded in the journal and posted accordingly.

(c) Some candidates also experienced difficulty in determining whether an error or omission affected the control account, the debtors' list, or both the account and the list. This once again reveals their inability to correctly interpret the information.

(d) With regard to the debtors' age analysis, the majority of candidates were able to mention credit terms and credit limits as possible problems. They failed to notice that these problems are a result of poor internal control processes. Some candidates provided the evidence in the same column as the problem. They were not penalised for this oversight.

Suggestions for improvement

(a) Reconciliations are relevant monthly internal control processes that follow logical procedures to achieve specific outcomes, and attention must be devoted to cash (bank), debtors and creditors. Bookkeeping aspects (basic application and recording) are covered extensively in Grades 10 and 11. The Grade 12 syllabus addresses analysis and interpretation. It is therefore necessary to constantly reinforce prior knowledge through regular activities. Teachers must use questions from past examination papers and various other sources to ensure that learners become familiar with the different ways in which this topic can be tested.

(b) Class discussions are an effective way of developing language and interpretative skills. Learners must be encouraged to participate actively. This will give them confidence to respond with understanding, rather than reproduce commonly-used statements extracted from past examinations.

(c) Although bank reconciliations did not appear in the 2021 paper, teachers must be aware that learners often find these much more challenging than debtors' or creditors' reconciliations. Teachers must ensure that learners can deal competently with the reconciliation processes in respect of debtors and creditors, as these form the basis of the prior knowledge necessary for understanding bank reconciliations and the different types of bank entries.

(d) The different approaches to the reconciliation processes must be clearly illustrated. Some processes, such as bank and creditors' reconciliations, may depend on external documents (statements received) being compared with internal records. Other processes involve comparing and correcting internal records, such as the control accounts against lists of debtors or creditors.

(e) Once learners understand the logic behind the process of comparing and correcting entries, they should be exposed to issues of mismanagement or possible fraudulent behaviour and the type of control measures needed to kerb such activities.

(f) Formal and informal assessment programmes must include short, formative tests in class that can be self- or peer marked. Assessment can also include real-life scenarios in the form of case studies or reports, whereby learners are alerted to current trends. These include the use of technology, its effect on changes in the banking sector and its effect on the recording and reporting processes within a business.

(g) Teachers are therefore encouraged to explore different sources for relevant material instead of relying solely on textbooks. They can use their own real-life experiences as a basis to plan lessons. This would include the use of banking applications and online transactions with service providers.

(h) Subject advisors can make effective use of cluster groups and lead teachers to develop material so that a common understanding is achieved. Many districts make use of common formal assessment tasks. This teamwork must extend into other areas of curriculum delivery to achieve a more widespread benefit to teachers and learners.

QUESTION 2: COST ACCOUNTING (MANUFACTURING)

Subquestions on this topic comprise content that is generally predictable and manageable and is found to be relatively easy, as reflected on Graph 2.5.1. A change in context and presentation of information in especially the interpretative subquestions has lifted the level of challenge of this topic. This further exposes the fact that candidates prefer basic application and neglect to address the analysis sections of various topics. They tend to rely on stereotypical responses and often use them inappropriately.

Common errors and misconceptions

(a) In completing the Production Cost Statement (Q2.1.1; 10 marks), weaker candidates did not manage the adjustments for direct labour cost and the factory overhead costs, possibly due to poor interpretation and calculation skills. They provided lengthy, irrelevant calculations, making it difficult for markers to search for valid part-marks.

(b) Q2.1.2 (11 marks) tested the Abridged Statement of Comprehensive Income. A fair percentage of candidates did not realise that the Finished Goods Stock balances had to be used to calculate the cost of sales. This is a basic Grade 11 principle. It was also necessary to link the calculations of certain expenses affecting the factory overhead cost to the selling and distribution cost and the administration cost. This was poorly handled by many candidates. They performed poorly in using percentages and ratios to apportion expenses to the appropriate cost line item.

(c) Q2.2 (9 marks) focused on the control over raw material. The scenario required candidates to calculate fabric missing from the storeroom and wasted in the factory. Although these calculations are similar to those used in stock valuation questions, they were generally poorly answered. Fortunately, the impact of the marks lost was not felt, as more marks were allocated to the internal control factors and to the analysis of the

impact of this loss to the profit. Part-marks were earned by many candidates for incomplete responses provided.

(d) Confirming that the break-even point (BEP) was correct (Q2.3.1; 3 marks) and commenting on the level of production achieved against the BEP (Q2.3.2; 4 marks) were generally well managed. A complete answer should include the difference between the break-even point and the number of units produced, as this creates a profit or loss. Comparisons between the BEP for each year or comparisons of the units of production for each year earned only part-marks, as they serve a different purpose which does not capture the relevance of the break-even point.

(e) Q2.3.3 (2 marks) explicitly required an explanation of economies of scale. A majority of candidates answered this literally by quoting the decrease in the factory overhead cost per unit and the administration cost per unit. It was obvious that these candidates did not notice that the total overhead and administration costs remained constant. They were also not aware of the concept of scale whereby fixed costs per unit will naturally decrease if total fixed costs are constant and the total units produced increase.

(f) An analysis of deliberate decisions taken to improve profitability required candidates to quote the increase or decrease in the unit cost of certain variable costs (Q2.3.4; 6 marks). Figures were quoted from the table of information provided and the commonly used comments provided.

Many candidates, however, did not realise that the change in unit costs was indicative of the specific decisions taken by Rosemary regarding direct materials, direct labour and distribution costs. Instead, they quoted the total amounts of the respective variable costs. This does not answer the question because variable costs being directly affected by the levels of production would logically increase if there is an increase in production, whilst the cost per unit might remain unchanged.

Suggestions for improvement

(a) Examiners will always attempt to introduce more creative and innovative ways to extend the challenge of this topic so that all questions achieve a balance between lower- and higher-order subquestions. It is recommended that teachers provide a variety of examples so that learners are exposed to the different questioning styles. Past examination papers are extremely useful. Teachers should use these examples as a basic to create other scenarios and practical case studies. This will require much planning and creativity, but the rewards will be satisfying and beneficial.

(b) Poor interpretation of adjustments as observed in the calculations relevant for the Production Cost Statement revealed that emphasis must also be placed on improving mathematical skills, particularly for weaker learners. Using fractions, ratios and/or percentages to apportion specific expenses to the different cost components must be mastered before moving on to more complex calculations that may include year-end adjustments, errors and omissions. Formative tests on specific aspects must be used to assess prior knowledge. This will assist to address any backlogs and weaknesses from previous grades.

(c) Average and below-average learners may benefit more from practical or visual stimuli, especially since they are familiar with manufacturing concepts and calculations introduced in Grade 10 and reinforced in Grade 11. Teachers could make use of the variety of resources available on educational websites for presentations and real life video clips. Such resources can also assist with time management if used effectively in lessons.

(d) Interpretation of unit costs will always be asked with the information related to the break-even point. The information is almost always presented in a tabular form, either involving a single product with comparative annual figures or a comparison of two products. Learners must be exposed to a variety of formats or presentation of data. Short class tests can be used to develop their skills on how to use unit costs to identify problems or decisions, to comment on economies of scale and to make projections about future prospects. Learners must be encouraged to participate in class discussions and to share their concerns and ideas.

(e) Learners' interpretation of unit costs and understanding of economies of scale should improve if teachers highlight the behaviour of the five different cost categories. For simplification of the Grade 12 curriculum, it is assumed that direct material, direct labour and selling and distribution costs are all variable in nature and that factory overheads and administration costs are fixed in nature. The following table illustrates the assumed behaviour of these costs for Grade 12 and provides a hypothetical example of unit calculations.

	VARIABLE COSTS	**FIXED COSTS**
Assumed behaviour:	Variable, i.e. changes with production	Fixed, i.e. do not change during a year; not affected by units produced
Components:	Direct material Direct labour Selling & distribution	Factory overheads Administration
IF 5 000 UNITS ARE PRODUCED		
Total variable costs might be:	R360 000	R240 000
Variable costs per unit will be:	R72,00	R48,00
IF 6 000 UNITS ARE PRODUCED		
Total variable costs might be:	R432 000	R240 000
Variable costs per unit will be:	R72,00	R40,00
CONCLUSIONS BASED ON THE FIGURES ABOVE		
This indicates:	Unit costs remain unchanged. Efficiency in using material, labour & distribution costs remained the same.	Unit costs decreased. Economies of scale have been achieved, due to the increase in units produced.
	The overall unit cost of the product will be R8,00 cheaper. Profit increases by R8 000 if an extra 1 000 units are produced.	

(f) The deep problem-solving potential of the topic must also be recognised. This would involve an interaction with the data presented, performing calculations and using the results to motivate responses. Examples such as calculating loss due to wastage and the impact on profits and projecting additional profit or additional units required to meet certain targets are normally considered as higher-order questions that should be accessible to all learners. Teachers are reminded about the concept of 'contribution per unit', i.e. the difference between selling price and variable cost per unit. This is often used in predicting future profits or losses. This concept is fully explained in the 2020 Diagnostic Report and in the annexures to the current *Examination Guidelines*.

QUESTION 3: BUDGETING

The performance in this question was satisfactory. Candidates have become more proficient in the basic calculations subquestions, but struggle with interpretation of budget information.

The Debtors' Collection Schedule (Q3.1; 6 marks) and Cash Budget calculations (Q3.2; 9 marks) were well answered. These subquestions comprise Grade 11 easy application processes and the majority of candidates have taken full advantage of the marks on offer.

Q3.3 (11 marks), Q3.4 (3 marks) and Q3.5 (6 marks) covered the interpretation of budget information. Candidates had to analyse the data provided and quote relevant figures to support their explanations. The mediocre responses of candidates are an indication that this aspect of the topic is not given enough attention during class time or revision.

Common errors and misconceptions

(a) Of the calculations asked in Q3.2, only (c) covering payment for cleaning services appeared to be challenging. Many candidates completed only part of the workings for part-marks. This was a complex calculation that required candidates to find the original cost before applying the 5% increase. A lack of reading with understanding could have contributed to the incomplete answers offered.

(b) The below-average candidates continued to show weaknesses in basic Grade 10 calculations involving percentages; either increases or decreases or in working backwards for amounts before the increase/decrease.

(c) The scenario presented in Q3.3 focused on the workload of employees. This required an analysis of the number of employees in each section relative to their expected and actual workload. Candidates found it difficult to provide two valid points or to quote relevant figures to support their arguments. Creative or innovative responses were expected as possible solutions. However, many candidates provided clichéd responses which, at times, were out of context with requirements of this subquestion.

(d) Q3.4 (3 marks) expected candidates to simply identify the switch from cash sales to credit sales and quote the figures for both cash and credit sales given in the question paper. It was surprising that a large percentage of candidates only provided one set of figures; possibly an indication that they misunderstood the requirements.

(e) Many candidates failed to see the relationship between items in a Cash Budget, such as fuel for delivery relative to sales, and consumable stores for repairs relative to fee income (Q3.5; 6 marks). They compared only the actual expenditure amount against the budgeted amount and concluded that the expense was either well controlled or not. Only the more capable candidates were able to identify the connections to sales and fee income, convert to percentages and provide valid and insightful explanations.

Suggestions for improvement

(a) The preparation of the Cash Budget and the Projected Income Statement is covered in Grade 11, while the Grade 12 *CAPS* emphasises analysis and interpretation. Teachers are expected to thoroughly assess prior knowledge and make provisions to address any backlogs emanating from previous grades before addressing the more complex calculations and interpretation of the Grade 12 syllabus. Short formative and summative activities and informal class tests can be used to assess prior knowledge. These activities must include key concepts, basic calculations and mathematical skills, as well as the difference between a Cash Budget and the Projected Income Statement. These activities must also assist in identifying weaker learners who require further assistance and supporting material.

(b) In an effort to improve interpretative skills, it is recommended that various examples and different scenarios be extracted from past NSC examination papers for use in lessons. Teachers can use these tasks as part of the informal assessment programme, or adapt them for assignments or case studies.

(c) With regard to analysing budgeted vs actual figures, the terms *over-budgeted, under-budgeted, overspent, underspent, over the budget* and *under the budget* have subtle differences in meanings depending on how they are used. When analysing the control of an expense item in relation to another, it would make no sense to quote actual figures or the difference, due to the changes in both figures being analysed. It is for this reason that marking guidelines would insist that percentages be used to demonstrate whether an expense item is well controlled or not. For example, in Q3.5, total sales were less than the budgeted sales by R91 000, whereas the fuel expense for deliveries was less than the budgeted amount by R900. Absolute figures such as these do not provide conclusive evidence of good control or not. Learners must be specifically taught how to use % differentials on budgeted and actual figures to enhance their opinions and explanations.

(d) Effective and appropriate use of subject-specific language is paramount in generating meaningful responses. Establishing a glossary of terms, concepts and general vocabulary together with learners, and refreshing the list daily, will go a long way in developing learner confidence. This exercise will also be addressing the issue of language across the curriculum, which forms part of the DBE's long-term goals.

QUESTION 4: INVENTORIES AND FIXED ASSETS

Inventory valuation questions were confined to only 11 marks for calculations and 6 marks for the problem-solving component. This is possibly due to integration of FIFO stock valuation in Paper 1 or in other topics, such as the missing fabric in Q2 (cost accounting). The weighted-average method was tested. The emphasis was on closing stock and the stock turnover rate. The majority of candidates took advantage of these routine calculations which have appeared regularly in past NSC papers.

Q4.2 tested fixed assets in the context of Paper 2, which comprises basic calculations and limited internal control processes. This was regarded as essentially basic Grade 11 content, so it was disappointing that the general performance of candidates did not meet expectations.

Common errors and misconceptions

(a) The weighted average is calculated by dividing the total value of goods available for sale by the number of units. This must then be multiplied by the number of units on hand to determine the value of the closing stock (Q4.1.1; 7 marks). This was generally well understood, except for some candidates who did not take into account the returns and others who omitted to multiply by the closing units on hand.

(b) Q4.1.2 (4 marks) required the stock turnover rate. This was a deviation from the stock holding period that was usually asked in many past papers, causing many candidates to use the incorrect formula.

(c) In Q4.1.3, easy marks were obtained for quoting figures, as the question directed candidates to focus on problems relating to the stock turnover rate. Some candidates confused the column for comments with the column for major problem. This was, however, accommodated in the marking guidelines.

(d) Q4.2.1 (3 marks) was well managed by the majority of candidates. They were able to list relevant internal control measures. Vague general statements and clichés were not accepted, as each item earned only one mark.

(e) It was surprising that a large percentage of candidates was not familiar with the R1,00 rule applicable to a fully depreciated fixed asset (Q4.2.3; 2 marks). This concept forms part of the Grade 11 syllabus.

(f) The poor attempts by many candidates to calculate loss on disposal of asset (Q4.2.4; 6 marks) and the depreciation on the remaining equipment (Q4.2.4; 5 marks) were clear indications of the lack of practice or effective revision of questions from past examination papers. Markers had to spend time searching for relevant figures among the workings for part-marks to be awarded.

Suggestions for improvement

(a) Questions on stock valuation are generally predictable. Teachers are encouraged to use examples from past examination papers to address the sequence of calculations commencing with the value of closing stock. Standard, commonly-used procedures must be adopted for the calculation of the closing stock under each valuation method. This will prevent learners from engaging in lengthy processes, assuming that they are on the right track. Learners should understand that it is seldom necessary to waste time by calculating cost of sales to value stock. The normal and efficient calculation methods will contribute to overall time management. A similar approach can be employed for all other calculations.

(b) An introduction to stock systems starts in Grade 10 where learners are introduced to the perpetual system of recording stock. The periodic inventory system is introduced in Grade 11. In assessing prior knowledge, it is important that learners have a clear understanding of the differences as well as advantages and disadvantages of the two systems. This represents the logic underlying the three stock valuation methods.

(c) A clear distinction of the three stock valuation methods is best illustrated by referring to the relative value of products and the rate at which they are sold. Consequently, the weighted-average method is more appropriate for low-value goods with a high turnover rate whilst the specific identification method will be more relevant for high value, expensive items that appeal to an exclusive clientele. Questions from past NSC papers are reliable and efficient resources that will expose learners and teachers to the different ways in which this topic can be tested. Learners must be made aware of the relevance of stock valuation in both Paper 1 and Paper 2. It can either be set as a complete question or integrated with other topics such as Financial Statements and Cost Accounting.

(d) A question on stock valuation can range anywhere between 20 to 45 marks. It is therefore important that teachers consult diagnostic reports from 2016 and make them an essential part of their planning documents. The reports would obviously highlight trends and offer suggestions that are not readily available in textbooks or study guides.

(e) Learners are familiar with concepts and calculations relating to fixed assets from Grade 10. It was therefore disappointing to note the poor performance in this subquestion. A mastery of the calculations can only be achieved through regular practice using a variety of examples. Teachers must not assume that this topic was effectively covered in previous grades. This is the most integrated aspect of the syllabus and its impact is felt in almost every topic across both papers. Short class tests that can easily be self- or peer assessed and must be administered at regular intervals. Although a specific period is allocated for fixed assets on the ATP, it would be wise to address this topic at strategic points of the syllabus, rather than cover all aspects within the allocated two weeks.

CHAPTER 3

AGRICULTURAL SCIENCES

The following report should be read in conjunction with the Agricultural Sciences Paper 1 and Paper 2 question papers for the NSC November 2021 examination.

3.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Agricultural Sciences examination in 2021 increased by 27 835 compared to that of 2020, i.e. a 30% increase of the cohort.

The table below indicates no definite trend in the pass rate at 30% (Level 2) over the past five years with improvements or declines within a narrow band of only four percentage points at Levels 3 or 4. However, the trend in the pass rate at 40% (Level 3) reflects steady improvement since 2017.

Candidates who passed at 30% (Level 2) improved from 72,7% in 2020 to 75,4% in 2021. There was a corresponding improvement at 40% (Level 3) from 45,9% to 48,6%. Given the increase in the size of the cohort, the number of passes increased considerably by 23 531 at 30% (Level 2) and by 16 194 at 40% (Level 3).

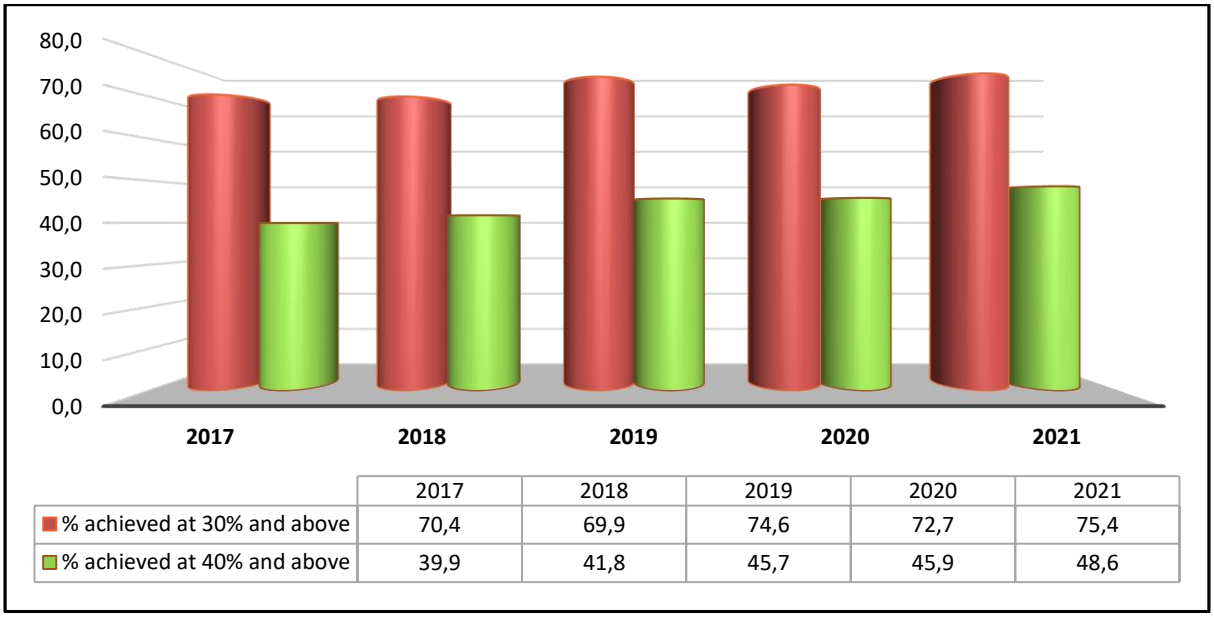
The percentage of distinctions (over 80%; Level 7) remained constant at approximately 1%. This converts into an increase in the total number of distinctions from 865 in 2020 to 1 364 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 3.1.1 Overall achievement rates in Agricultural Sciences

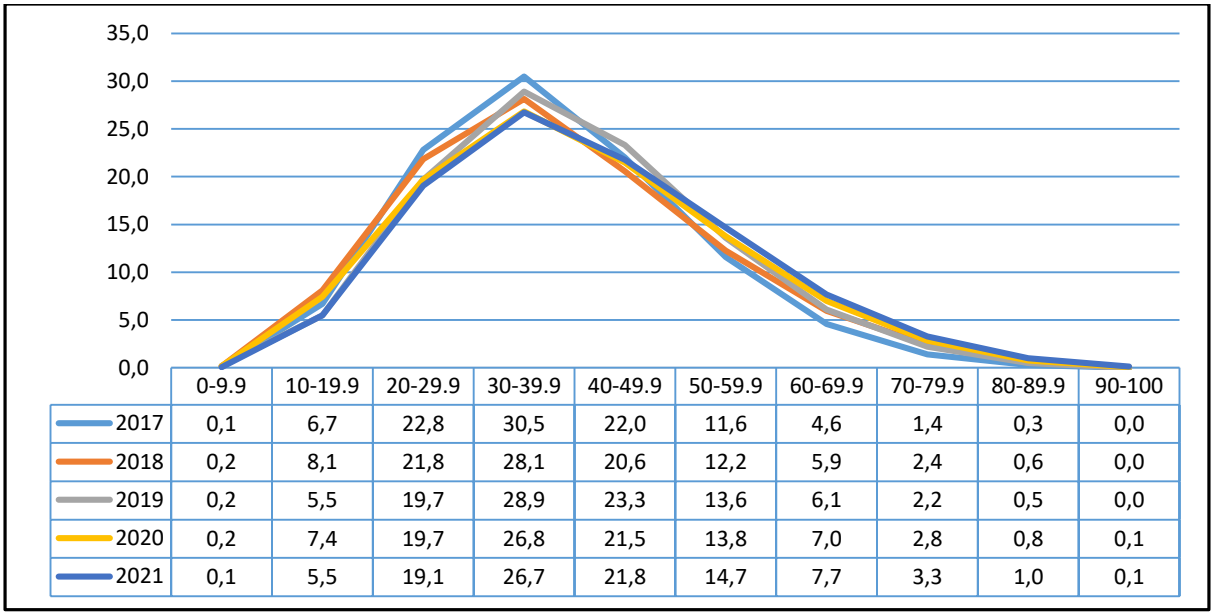
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	98 522	69 360	70,4	39 353	39,9
2018	95 291	66 608	69,9	39 800	41,8
2019	92 680	69132	74,6	42 385	45,7
2020	96 155	69 916	72,7	44 114	45,9
2021	123 990	93 447	75,4	60 308	48,6

Graph 3.1.1 Overall achievement rates in Agricultural Sciences (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	70,4	69,9	74,6	72,7	75,4
% achieved at 40% and above	39,9	41,8	45,7	45,9	48,6

Graph 3.1.2 Performance distribution curves in Agricultural Sciences (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,1	6,7	22,8	30,5	22,0	11,6	4,6	1,4	0,3	0,0
2018	0,2	8,1	21,8	28,1	20,6	12,2	5,9	2,4	0,6	0,0
2019	0,2	5,5	19,7	28,9	23,3	13,6	6,1	2,2	0,5	0,0
2020	0,2	7,4	19,7	26,8	21,5	13,8	7,0	2,8	0,8	0,1
2021	0,1	5,5	19,1	26,7	21,8	14,7	7,7	3,3	1,0	0,1

3.2 OVERVIEW OF CANDIDATE PERFORMANCE: PAPERS 1 AND 2

General comments

Although extensive intervention initiatives were implemented by provinces throughout the year, the plight of the current cohort must be recognised. Continuous content delivery was compromised by disruptions, unavoidable curriculum adjustments and a reduced assessment programme. Despite these challenges, a fair percentage of candidates were proficient in addressing the requirements of all subquestions.

However, widening of the achievement gap between capable and weaker groups of candidates was noticeable this year. This should not be surprising in the context of two abnormal years this cohort experienced in Grades 11 and 12. Capable or motivated candidates with appropriate resources might have appreciated the opportunity to study independently while less proficient candidates or those lacking resources, might have preferred greater access to teachers

The inability of weaker candidates to deal effectively with even the less challenging parts of questions is a clear indication of the impact of the disruptions on teaching and learning processes within the educational environment. The unsatisfactory performance in Section A of both papers, which deal with terminology and concepts, is indicative of the above-mentioned.

Language barriers linked with poor comprehension skills: Despite the subject-specific language being used in Agricultural Sciences, many candidates continue to experience difficulty in understanding the requirements of questions. Weaker candidates tend to provide incomplete or unclear responses to questions requiring explanations or comments. They often rely on the commonly used responses offered in marking guidelines, and use them inappropriately in different contexts.

Inability to analyse the relevant information provided, to answer specific subquestions: This is especially relevant in the Genetics and Calculations in Animal Nutrition sections of the papers, where the more capable candidates are able to extract and respond to the relevant information while weaker candidates find this process challenging, often misinterpreting what is expected from them.

Although there was a slight improvement of learners' ability to draw a graph, which was evident in Paper 1, learners still cannot successfully identify the independent and dependent variables, including the units in both Paper 1 and Paper 2 where the X- and Y-axes were swopped around as seen in Paper 2 which was quite challenging for learners.

General suggestions for improvement

There are several factors that contributed to poor subject knowledge and poor performance by candidates in the 2021 NSC Agricultural Sciences papers. The following general recommendations for improvement are applicable to both papers in 2022:

(a) **The importance of formative testing:** Tests should assess learning to provide directions for remedial measures. Self-assessment and peer assessment with immediate feedback on errors provides learners with an opportunity to increase their understanding of the problem. They also become exposed to valid alternative responses and different, easier approaches to solving problems.

(b) **Basic concepts & terminology:** Learners need to be exposed to the basics of each topic for them to engage effectively with the content in that topic. The process of conceptualising and understanding these concepts is more than merely rote-learning of the definitions. Terminology should form an integral part of teaching and learning and needs to be emphasised on a regular basis. Teachers are advised to make the teaching of terminology interesting by engaging learners in the identification of key concepts for each topic and then guiding them on how to formulate shorter definitions without losing the context. They can also make use of short puzzles based on these terms, thus utilising the art of learning through play.

Teachers are advised to use the following strategies to improve the teaching of basic concepts and terminology:

- Use new concepts and terms in sentences and in short scenarios to illustrate their meaning.
- Engage learners in the identification of new terms and in finding their meanings from the textbooks.
- Learners should be directed to first identify the new concepts for each topic and compile a glossary of terms in their notebooks after completion of the topic, with a brief but clear definition next to each term or concept. A separate notebook for this purpose may also be kept. By the end of the year, all learners should have a comprehensive glossary of all the relevant terms and concepts for all the topics.
- Agricultural Sciences terminology should be assessed daily using different forms of informal activities.
- Challenging or confusing terminology could be explained by using illustrations or posters. These posters can be pinned on notice boards in the classroom so that learners are exposed to them on a regular basis.

(c) **Enhancing learners' skills in accurately interpreting specific subquestions and using information that is relevant:** It is essential that learners have a good understanding of the instructional verbs as emphasised in the *Examination Guidelines*. Teachers must explain the context in which key verbs such as 'deduce', 'justify', 'explain' and 'suggest' are used and the expected depth in the answer that is expected for each. The marking guidelines of past examination papers can be used to show how the responses to similar questions can differ because of the key verb used in the question. A variety of instructional verbs must be used in both informal and formal assessment tasks. It is recommended that these informal tasks lean mostly towards developing conceptual skills, as this will enable learners to develop a better understanding of the requirements of each question.

(d) **Skills to be assessed:** Assessment should be of such a nature that it challenges the learners' ability to think beyond what is presented in the textbooks or by the teacher. Learners need to be guided on how to process data presented in different forms, be it tables, graphs, calculations or scenarios. Teachers need to sharpen their learners' analytical skills by exposing them to challenging informal and formal tasks.

(e) **Real-life scenarios:** Learners show serious deficiencies in the processing of application questions and this is an indication of a lack in the depth of their subject knowledge. Learners need to be exposed to more real-life agricultural situations through visits to sites of practice. Where a practical demonstration is not possible, the use of videos that simulate the actual practice is recommended to enhance intensive learning.

Teachers are advised to include sources such as pictures, scenarios, case studies and short statements in their informal and formal assessment tasks, and demonstrate to learners on how to approach such questions. These tasks should test the application of theoretical knowledge into real farming practices. This could be done by first reading and/or analysing the source, leading them on how to find clues and thereafter associating the key information discovered, before finally attempting to answer the actual questions. In some instances, learners can be requested to formulate their own questions based on the source. This practice will allow learners to critically analyse the source. Teachers can then develop follow-up questions to extend learners' understanding of the content.

(f) **Enhancing the interpretation of calculated values:** Examination papers in Agricultural Sciences contain some simple mathematical processes, e.g., drawing of

graphs, calculating percentages, conversion of values, expression into relevant units, use of formulae and substitution of values. Learners seem to lack appreciation of the magnitude of the various units, such as the difference between tons and kilograms. They also seem uncertain when to divide or multiply, how to convert monthly to daily needs or vice versa or change group needs to individual needs and vice versa.

Teachers are advised to give regular informal tasks on calculations incorporating the different versions. Teachers should not assume that learners have successfully engaged with these skills in other subjects or can successfully transfer these skills from other subjects to the study of Agricultural Sciences. Teachers are advised to first indicate to learners the importance of the various calculations to farming before showing them the actual skill of performing the calculations by applying the information that is given. Moreover, teachers are also advised to mark such calculations accurately paying much attention and emphasising the conversions, units, substitutions of values and formulae.

(g) **Use of past NSC papers:** Learners must have access to past examination papers, but they should also be alerted to the limitations of past papers. It should be noted that although questions in past papers may cover the same content, they may have different foci, e.g., a question which asks for a *comment* requires a different response to a question which asks for *a justification* or *suggestion*. Teachers are advised not to engage in whole question paper revision, it is better to consolidate questions from various papers into a bank of questions for each topic and then engage with question revision.

(h) **Reference to the *CAPS*, *Examination Guidelines* and previous Diagnostic Reports:** Teaching and assessment must be informed by the content prescribed in the *CAPS* and the approach outlined in the *Examination Guidelines*. There might be aspects of the content that have never been assessed in recent question papers. However, it is important that teachers cover these aspects so that learners have a holistic understanding of a topic. It is also important that teachers use a variety of the prescribed textbooks to source information and then consolidate it for learners. It is also imperative that teachers take note of comments and recommendations in previous diagnostic reports.

3.3 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

General comments

(a) There is a noticeable improvement in the candidates' performance in Paper 1 compared to 2020. The number of candidates in levels 1 and 2 appears to have declined leading to an upward inclination towards levels 3, 4 and 5. The number of candidates who have attained levels 6 and 7 has increased in real terms, due to the higher number that wrote this examination, but still accounts for only 1% of the cohort.

(b) The question where candidates performed best was Q3 followed by Q4 and Q1. Q2 which was the best performed question in 2020, was the worst performed in 2021.

(c) There is still a challenge of writing the correct formula in Q2 where candidates write an acronym for a formula on digestibility co-efficiency and end up dividing by DME instead of DMI. In addition, a large number of learners failed to interpret both the Digestibility Coefficient and Pearson Square questions accurately. Candidates lack understanding of the 'dry matter concept'. Some lack understanding of the Pearson Square method and based their response on the Nutritive Ratio instead, as noted in Q2.5.1 and Q2.5.3.

(d) The majority of candidates have now mastered the drawing of a graph but still have a challenge with the interpretation of graphs. In Q3.3 and Q4.2 they struggled to make deductions based on the information presented in graphs.

(e) Answering as per instruction is still a challenge for some candidates. In Q4.5 where they were required to write only the letters of the statements, they lost marks as they ignored the instruction and wrote the statement instead of the letter of the statement.

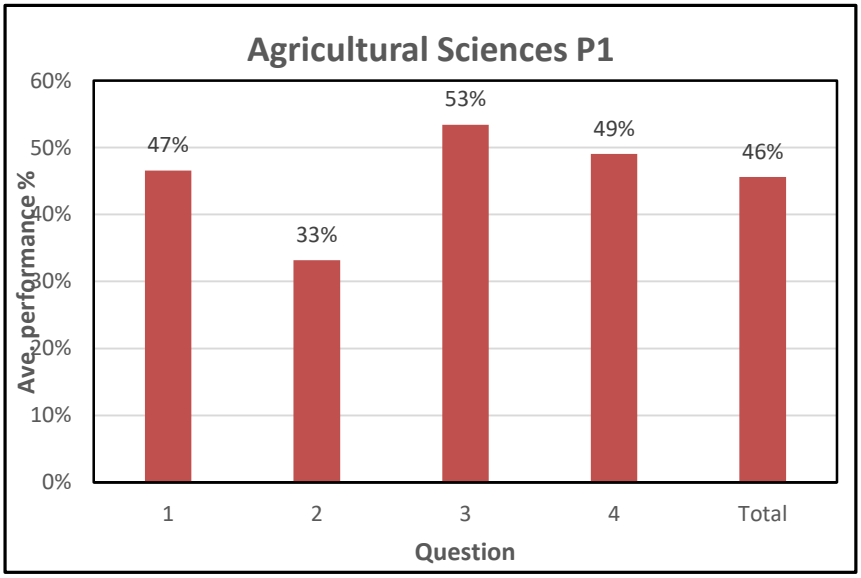
(f) Questions requiring reasoning, motivation or justification were still poorly answered by most candidates. This is an indication that candidates are not sufficiently exposed to these types of questions in the classroom.

(g) The language of learning and teaching has proved to be a challenge to most candidates as they were not able to respond appropriately to the instruction verbs used in questions. They also appear to experience difficulty with the spelling of terms.

3.4 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

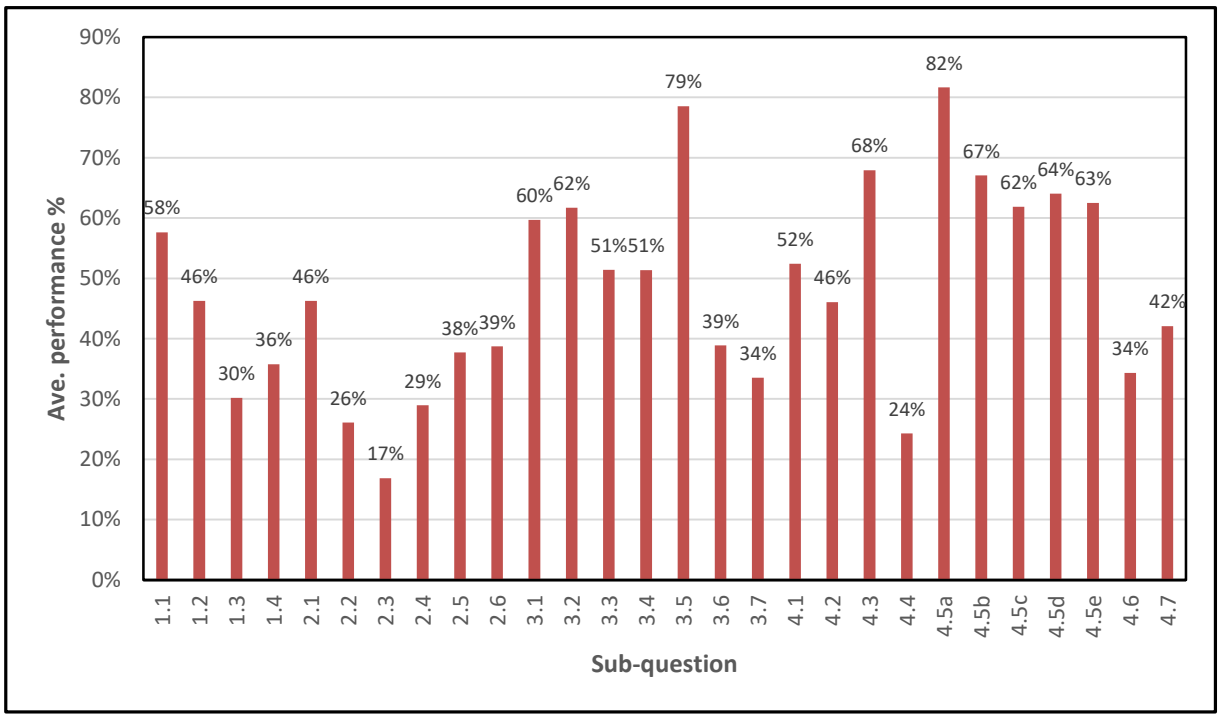
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degree of challenge of each question as experienced by candidates.

Graph 3.4.1 Average performance per question in Paper 1



Q	Topic
1	Short Questions
2	Animal Nutrition
3	Animal Production, Protection & Control
4	Animal Reproduction

Graph 3.4.2 Average performance per subquestion in Paper 1



Sub-Q	Topic	Sub-Q	Topic
1.1	Multiple Choice	3.5	Methods for medication in farm animals
1.2	Match Columns	3.6	Different organisms harmful to animals
1.3	Terminology	3.7	Poisonous plants
1.4	Replace incorrect words	4.1	Identification of secondary sex organs
2.1	Feed intake	4.2	Hormone levels
2.2	Pars of the alimentary canal	4.3	Bar Graph
2.3	Mineral deficiency	4.4	Synchronisation of oestrus
2.4	Calculation of feeds	4.5a	Stages of mating
2.5	Digestibility coefficient	4.5b	Stages of mating
2.6	Fodder Flow planning	4.5c	Stages of mating
3.1	Heat Stress in dairy cattle	4.5d	Stages of mating
3.2	Effect of environmental temperature	4.5e	Stages of mating
3.3	Production systems	4.6	Parturition
3.4	FMD in farm animals	4.7	Multiple births

3.5 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 1

QUESTION 1: SHORT QUESTIONS (ANIMAL SCIENCES)

Common errors and misconceptions

(a) In Q1.1.2 many candidates failed to identify the structures that are well functioning in the alimentary canal of a young ruminant. They showed a lack of understanding of the structural differences of an *Adult Ruminant* to a *Young Ruminant.*

(b) In Q1.1.3 a large number of candidates failed to identify calcium, magnesium and sulphur as minerals that are needed by animals in large quantities. These form part of macro-elements. Candidates lacked a basic understanding of them and some opted for options which have micro-elements such as iron, copper and zinc.

(c) In Q1.1.5 many candidates did not seem to know the difference between *pandemic* and *endemic* as they responded by giving D as the answer.

(d) In Q1.1.6 most candidates failed to eliminate 'electric spray race' from the combination as it was the only expensive modern technology which subsistence livestock farmers could not afford.

(e) In Q1.1.7 many candidates could not pick the statement that is a disadvantage of the free-range system.

(f) In Q1.1.8 option B which is a *point of balance*, was the popular answer given instead of C, *the flight zone*.

(g) In Q1.2.1 most candidates did not see that the question asked for putrefaction in the stomach and not in the small intestines.

(h) In Q1.2.4 many candidates displayed lack of knowledge, understanding and exposure to different housing systems of fowls.

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(i) In Q1.2.5 most candidates were not able to differentiate between layers lining the uterus (endometrium, perimetrium, myometrium) and embryonic membranes (chorion, allantois and amnion) surrounding the foetus.

(j) The majority of candidates gave *net/metabolic energy* as an answer instead of *gross energy*.

(k) In Q1.3.2 some candidates wrote *pathogen/parasites* instead of *vector*.

(l) In Q1.3.5 some answered *heat detector* instead of *pedometer* thus showing a lack of understanding of different devices used to detect heat.

(m) In Q1.4.1 many candidates did not recognise the function of Vitamin A and some wrote vitamin D, which was the underlined word to be changed.

(n) In Q1.4.2 candidates failed to see that the question expected the response to be *a fixed handling facility to restrain animals* and they wrote *electric prodder* as an answer.

(o) In Q1.4.3 the incorrect answer, *penis*, was more popular than *urethra* which is the correct answer.

(p) In Q1.4.4 a range of incorrect responses such as lack of *libido*, *cryptorchidism* and *congenital defects* were given as answers instead of *impotence*. Some committed a spelling error and wrote *importance*. They were marked down due to the word *importance* having a different/another meaning.

(q) In Q1.4.5 many candidates opted for lack of *libido* instead of the correct response of *impotence*. It appears as if they were confused about these terms, as a lack of libido was obviously incorrect because the animal in this instance shows an interest in cows.

Suggestions for improvement

(a) Subject advisors and teachers should compile a document that explains all the terms and concepts for various topics in the curriculum.

(b) Teachers need to provide learners with a list of the terms that are relevant to the topic. They must then engage and guide learners on how to identify these terms. This list will form a 'road map' that will help learners gauge the extent of their knowledge and understanding of a topic.

(c) Development of interesting games, like word puzzles, identification cards and PowerPoint presentations for the teaching of key concepts and improving the spelling of these concepts should be considered. Spelling tests should be considered especially for concepts that are not easy to pronounce or write out.

(d) The use of electronic technology, such as smart boards and the internet, should be encouraged to improve the learners' enthusiasm for the subject. It is hoped that this will stimulate learners to explore other material pertaining to the subject.

(e) Teachers should train learners on how to answer questions by guiding them on what the question expects.

(f) Teachers should refrain from teaching selected parts of the curriculum but should be guided by the content addressed in *CAPS*. 'Selective teaching' hinders a full understanding of topics.

(g) Teachers should form a cohesive unit in their clusters. They can support each other by addressing challenging topics and by suggesting different approaches to teach a topic so that it makes learning easy and enjoyable. These cluster units could also set common assessment tasks collectively.

(h) Provincial coordinators, together with teachers, need to prepare revision packs that cover all the topics. Teachers should use material from these packs as informal tasks, in class revision sessions and as mock examinations.

QUESTION 2: ANIMAL NUTRITION

Common errors and misconceptions

(a) In Q2.1.1 some candidates still classified the animals from the table even though the question only required the name. Others referred to animal in column A as *cattle/cow* instead of *pig*.

(b) In Q2.1.2 candidates were expected to identify a reason from the table to substantiate their choice of farm animal but they ignored the instruction and wrote different reasons. This showed that they lacked data handling skills as well as the ability to follow instructions.

(c) In Q2.1.3 many candidates struggled to provide structural differences in the large intestines between a pig and fowl. Others mentioned the general differences not relevant to the large intestines. They lacked an understanding of these structural differences compounded by the lack of knowledge of the differences between a pig and fowl. A number of candidates did not attempt this question which indicates that they were confused about what an appropriate response should entail. The presence of one caecum in a pig and two caeca in fowl, among other differences, were unknown to many candidates.

(d) Candidates incorrectly based the structural difference of large intestines on the size, that is, bigger size for pigs and smaller size for fowl.

(e) In Q2.2.2 many candidates wrote *duodenal juice*/*succus entericus* which is secreted and not deposited into the duodenum/small intestines. This shows that they did not understand the difference between secretion and deposition.

(f) In Q2.2.3 most candidates did not know that lipase is the only fat digesting enzyme in the alimentary canal. Some offered amylase and any other enzyme that was not relevant to the question.

(g) In Q2.2.4 most candidates were unable to give the reason for breaking down of fat. Some wrote functions of bile and others gave emulsification as an answer.

(h) In Q2.4.1 many candidates gave subdivision of feeds (e.g. carbohydrate-rich or protein-rich concentrates or roughages) instead of main types of feeds which are concentrates and roughages. They continue to use the incorrect word *concentration*, instead of *concentrates*.

(i) In Q2.4.2 few candidates incorrectly assumed that the purpose of feeding maize stalk (which is a protein-poor roughage with only 4% DP) to young ruminants is for growth, whereas growth and production require a protein-rich feed.

(j) In Q2.4.3 some candidates calculated nutritive ratio instead of ratio required to mix two feeds in order to get 15% DP. Others struggled to write the correct ratio for the feed, i.e. 21 parts for fish meal and 6 parts for maize meal.

(k) In Q2.5.1 many candidates did not notice that the % was not for the moisture content but for the DRY content of the feed. The common errors identified in the digestibility co-efficiency calculation were as follows:

- Inability to convert percentages (%) to kilograms (kg)
- Incorrect formula
- Multiplying by 100% instead of 100
- Incorrect unit in the answer (kg instead of %)

(l) In Q2.6.3 many candidates could not work out the total feed available which was just a simple proportion problem thus showing their inability to do calculations.

Suggestions for improvement

(a) Posters indicating the classification of each animal according to its name could be a useful teaching tool. In addition, diagrams of the alimentary canals alongside the classes and names would give learners the opportunity to establish the similarities and differences between the alimentary canals of animals in the various classes.

(b) Various textbooks and the dissection of real animals for observation of the parts, similarities and differences and their roles in nutrition, can be used in this regard.

(c) Carefully planned practical investigations and questionnaires will assist learners in developing an in-depth understanding of the content.

(d) Giving more exercises with different scenarios is imperative to make learners aware of how to respond to questions.

(e) Teachers are encouraged to give regular informal assessment on calculations, providing guidance on the use of correct formulae and following the correct steps

when substituting values. This will develop the learners' ability to make the correct calculation.

(f) The implications of the calculated values should be explained to learners. This will enable learners to have a better understanding of the application of the results.

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Common errors and misconceptions

(a) In Q3.1.1 some candidates missed the trick of identifying the visible actions in the pictures and just gave general responses not in the picture, such as drinking water and swimming, by explaining how high the temperatures were in different weeks without indicating how the temperature requirement changed with increased age.

(b) In Q3.1.2 many candidates provided similar inappropriate responses such as *protect animals from rain, heat or cold* which are all categorised as extreme environmental conditions.

(c) In Q3.1.3 some candidates stated the general guidelines for transportation including licensed vehicle and driver, type and age of animals, number of animals in a vehicle and permit, although they were expected to provide the *requirements* of a vehicle that transports farm animals.

(d) In Q3.2.2 only a few candidates were able to describe the relationship between dry matter intake, water intake and milk production as presented in the table provided. Others mentioned the temperature in their responses and the relationship that it has with water intake, which is not what the question required. The fact that this type of question is often based on temperature and water intake, may have led to confusion.

(e) In Q3.3.1 many candidates struggled to correctly interpret the graph and were not able to identify the farmer representing the two production systems. Some misinterpreted the live weight as the time that animals will live or stay alive leading to responses such as long/short lifespan. This also affected justification in Q3.3.2.

(f) In Q3.4.1 some candidates referred to bacteria as a *pathogen* causing the FMD instead of a *virus*.

(g) In Q3.4.2 there were some candidates who wrote the general symptoms of FMD such as fever, lack of appetite, salivation and abortion overlooking the fact that the question was asking for the MAIN symptoms.

(h) In Q3.4.3 candidates were asked to identify two roles of state from the scenario but many wrote vaccinations, culling and research, all of which were not in the given scenario.

(i) In Q3.4.4 many candidates offered answers that have the same meaning, e.g. loss of income or loss of profit and as a result lost a mark. They were required to state two economic impacts of foot-and-mouth disease.

(j) Some candidates misinterpreted Q3.6.1 by labelling organisms A, B, C and D rather than giving a term that describes them.

(k) In Q3.6.2 instead of classifying the parasites as internal and external, many candidates wrote the names whilst others classified them according to their life cycles.

(l) In Q3.6.3 some candidates failed to correctly identify organisms responsible for transmitting red water, heart water and RVF.

(m) In Q3.7 some candidates incorrectly referred to *thorn apple* as *thorn tree*.

Suggestions for improvement

(a) Teachers need to train learners not only to draw graphs accurately as per the current marking criteria/rubric, but also train them on how graphs are interpreted.

(b) Learners should be encouraged to use the internet to access information about the tools, equipment and facilities used in different farming enterprises.

(c) PowerPoint slides with pictures and videos on the facilities and tools could be prepared and used in the classroom, to arouse the interest of the learners.

(d) Excursions or visits to farms could be organised in collaboration with local extension officers from the Department of Agriculture.

(e) Collaboration among subject teachers in preparation and teaching will be very beneficial. These sessions could build capacity in the concepts and in the teaching of diseases and parasites on production enterprises (by making use of mind maps that group diseases/parasites based on the pathogens/vectors), modes of transmission, key symptoms as well as preventative and control measures.

(f) Teachers should ensure that the learners understand the general and specific roles of the state that are applicable to proclaimed diseases.

(g) Appropriate measures by farmers in the control and prevention of particular diseases and parasites should be clearly outlined.

(h) Intensive revision of work using charts, scenarios and tables on diseases and parasites is necessary as the information is vast and likely to cause confusion.

QUESTION 4: ANIMAL REPRODUCTION

Common errors and misconceptions

(a) In Q4.1.3 many candidates failed to mention that the cervix allows semen to pass to the uterus. Other candidates simply mentioned general responses such as the cervix opens up during mating which is not correct and not specific. This question proved to be a challenge as many failed to mention that a mucus plug forms to prevent microbial infections of the uterus. Candidates provided general responses such as the stimulation of thickness to prevent the foetus from falling which is incorrect.

(b) In 2021, a number of candidates' responses indicated that most of them were unable to identify and interpret diagrams including accurately responding to calculation- based questions.

(c) In Q4.2.1 some candidates gave a definition of an *oestrus cycle* instead of *oestrus*.

(d) In Q4.2.2 some candidates responded correctly but gave an incorrect response for the reason in Q4.2.3 by referring to a high progesterone level when an animal is not pregnant. This shows that they do not understand the levels of hormones (progesterone and oestrogen) during pregnancy.

(e) An inability to follow instructions in Q4.3 (drawing of a graph) was a common problem for those who failed to score the total mark. Common errors were the following:

- Including *lactose* whereas the question only required *fat* and *protein*
- Not plotting the graph only for the weeks in question
- Incorrect labelling of the axis
- Incomplete heading (showing only one variable)
- Graph without a zero baseline
- Absence of a unit (%)
- Drawing of a histogram instead of a combined graph

(f) In Q4.4.1 many candidates wrote *synchronisation* alone without *oestrus*, while others incorrectly identified the process as *artificial insemination*, thus causing them to respond incorrectly in Q4.4.2 which requested techniques or methods.

(g) Failure to respond to the instruction in Q4.5 resulted in the loss of 5 marks as candidates wrote statements instead of letters, as the question had requested.

(h) In Q4.6.3 candidates responded by giving cow-related problems like *inexperience* and *size of the pelvic area* instead of *calf problems causing dystocia*.

(i) In Q4.7(b) candidates confused *fraternal* with *free-martin*.

Suggestions for improvement

(a) Teachers are encouraged to contact institutions where various processes are practised so that learners can observe them to enhance their understanding of these reproductive processes.

(b) In presenting the various processes such as *oestrus cycle, synchronisation of oestrus, artificial insemination, stages of pregnancy, embryo transfer, parturition* and other reproductive processes, teachers should use flow diagrams, schematic representations, projections and videos to identify the characteristics and the effects of various hormones in the different processes.

(c) Enrichment and enhancement material should be sourced from various resources such as the slides from the ASAAE software.

(d) Standardised formal tasks should be prepared, with the aim of raising the level of questioning and preparing the learners for questions that require analysis and reasoning.

(e) The importance of learning the subject terminology must be emphasised.

3.6 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

General comments

(a) Generally, candidates' performance in this paper was similar compared to 2020.

(b) In 2021 candidates' responses indicated that most of them were unable to identify and interpret diagrams and perform calculations.

General suggestions for improvement

The following suggestions for improvement are proposed to address the decline in the performance of candidates:

(a) In addition to textbooks, other resources such as agricultural magazines or the internet should be used to develop a comprehensive understanding of subject terminology.

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(b) Teachers should expose learners to regular and consistent informal assessment tasks or activities that will improve their confidence in dealing with the subject content.

(c) Setting of quality-assured common tasks on more data response questions such as graphs and case studies to enhance interpretation and application is recommended.

(d) Expose learners to simple mathematical calculations involving percentages, ratios, polygenic inheritance, mass, height and length, as well as their respective units. Calculations, pictures, graphs and tables are an integral part of the subject. It is recommended that all calculations commence with the formula/formulae given, then the correct substitution should be done, followed by the actual calculation and ultimately the correct answer. The final answer should also be re-checked, if time allows.

(e) Although learners might have access to only one textbook, teachers should acquaint themselves with and use several available textbooks in their lesson preparation. Teachers and learners would thus be exposed to a wide range of possible activities.

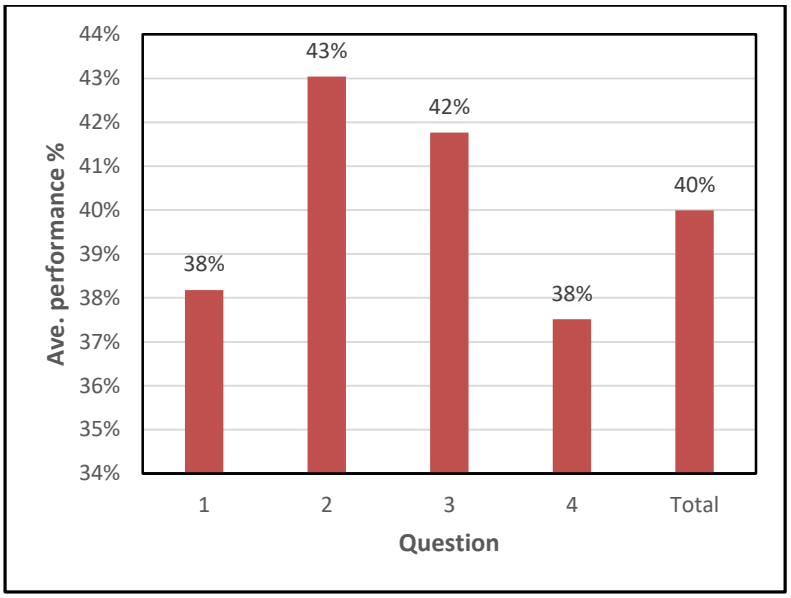
(f) Teachers need to broaden their knowledge and practical experience in certain areas of the curriculum so that they may be able to expose learners to practical situations, e.g. *Production Factors* in Paper 2 required candidates to understand different farm records, management skills, types of labour legislations and interpret tables.

(g) Responses to short questions show that many learners still lack basic conceptual knowledge and teachers should use various approaches to expose and explain terminology and concepts to learners. Teachers must ensure that learners are exposed to the language in which they will be writing the examination, as many learners struggle with reading, understanding and interpreting questions. Such learners also find it challenging to express their responses correctly.

3.7 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2

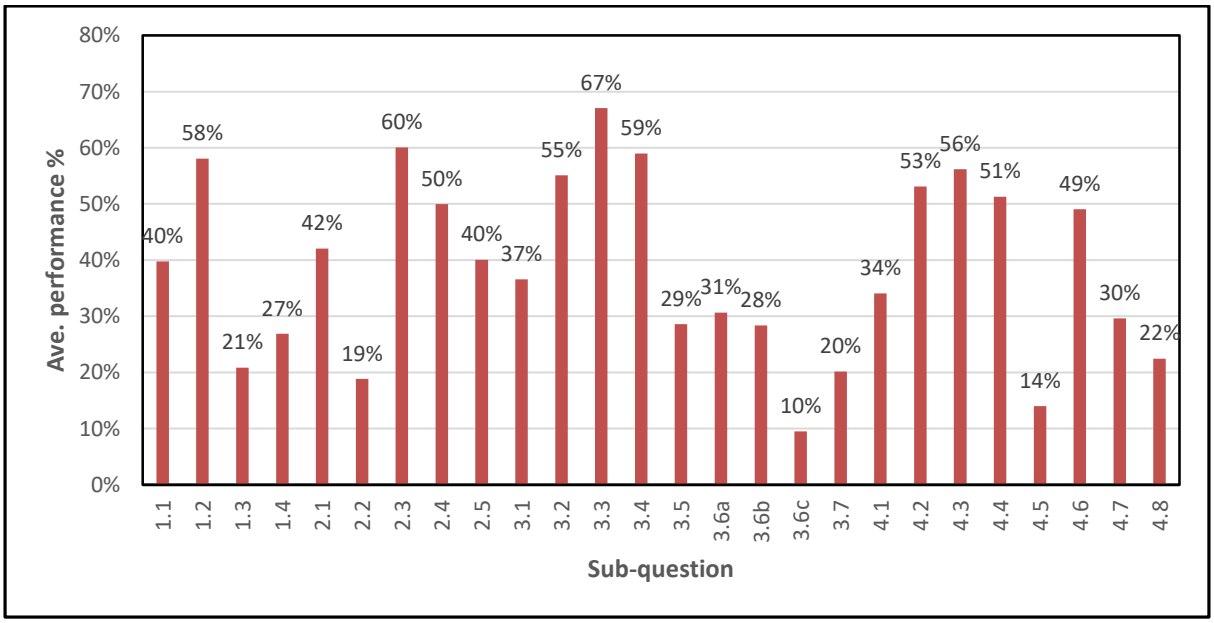
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 3.7.1 Average performance per question in Paper 2



Q	Topic(s)
1	Short questions
2	Agricultural Management & Marketing
3	Production Factors
4	Agricultural Genetics

Graph 3.7.2 Average performance per subquestion in Paper 2



Sub-Q	Topic	Sub-Q	Topic
1.1	Multiple choice	3.5	Financial records- Balance sheet
1.2	Match Column	3.6a	Management skills
1.3	Terminology	3.6b	Management skills
1.4	Replacement of incorrect words	3.6c	Management skills
2.1	Marketing functions	3.7	Risk management
2.2	Co-operative marketing system	4.1	Genetics and Mendel's Laws
2.3	Supply & demand at different prices	4.2	Epistasis
2.4	Price elasticity and inelasticity	4.3	Monohybrid cross
2.5	Entrepreneurship	4.4	Punnet square – Monohybrid cross
3.1	Land as a production factor	4.5	Genetic Terminology
3.2	Identifying types of Labour	4.6	Estimated Breeding Values
3.3	Labour legislation	4.7	Breeding Systems
3.4	Types of Capital	4.8	Genetic modification

3.8 ANALYSIS OF CANDIDATES' PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 2

QUESTION 1: SHORT QUESTIONS (AGRICULTURAL MANAGEMENT AND GENETICS)

Common errors and misconceptions

(a) Both Q1.1.4 and Q1.1.8 had a combination of distractors. One question was on marketing and the other was on production factors. Most candidates struggled to answer questions with combinations of multiple distractors.

(b) In Q1.1.6 many candidates confused *loan* with *interest*. Most candidates chose option A which was a loan instead of option B which is interest.

(c) In Q1.3.1 some candidates wrote *eco-labelling* instead of *green marketing*. Although these two concepts are related, the one is a type of marketing (green marketing) and the other (eco-labelling) involves a method to enhance green marketing.

(d) Q1.1.7 many candidates lacked understanding of the management principles. Many of them opted for other responses instead of choosing *control* as a management principle applicable to farmers monitoring production and comparing results.

(e) Q1.1.9 many candidates opted for duplication instead of identifying that the illustration provided depicted inversion. There seemed to be great confusion and misunderstanding of the causes of chromosome mutation.

(f) Q1.1.10 some candidates could not identify from the responses given that if the sheep has 27 chromosomes then the number of autosomes will be 52, which excludes one pair of sex chromosomes.

(g) In Q1.3.4 some candidates wrote *species breeding* instead of *species crossing* which was not acceptable since Question 1 requires accuracy on agricultural concepts.

(h) Learners confused *Farm gate* marketing with *Farm stall* in Q1.4.1.

(i) Q1.4.3 required candidates to write the *correct technique of genetic modification in plants*. However, many candidates wrote any technique instead of reading the statement and providing the correct answer.

Suggestions for improvement

(a) Past NSC examination papers can be used effectively to enhance learners' understanding of concepts. It is a known fact that learners who understand concepts well enough, can use this information more effectively. The use of past examination papers also exposes learners to the different ways in which questions can be posed. The marking guidelines can illustrate how the responses to these questions will differ.

(b) Teachers need to focus on all aspects of the content that are listed in both *CAPS* and the *Examination Guidelines*. There might be topics which have not been covered in recent question papers, but they remain important content topics.

(c) Terminology is a very important part of teaching Agricultural Sciences. Teachers need to focus on actively teaching the terminology of all topics. This will enhance learner

understanding of the content. The use of word banks, word puzzles and other terminology exercises are strongly recommended.

(d) It is noted from the 2021 paper that terminology questions on genetics were poorly attempted. It is possibly due to learners experiencing challenges in understanding genetics. Teachers are therefore advised to focus on terminology when teaching genetics, and pay careful attention to any weaknesses they may discover.

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Common errors and misconceptions

(a) In Q2.1.1 picture B, most candidates could identify both the requested functions of marketing as being A) transport and D) processing/value adding.

(b) In Q2.1.2 a few candidates confused the guidelines for *packaging* (B) with guidelines for *marketing*.

(c) In Q2.1.3 most candidates recorded partial achievement. However, this content is well discussed in the textbooks and therefore it is disappointing to note answers such as *product*, *price*, and *transport*.

(d) In Q2.2.1 most candidates struggled to identify co-operative marketing from the given picture. If learners read the leading statement with understanding, they might have achieved better.

(e) In Q2.2.2, which was a follow-up to Q2.2, learners that had Q2.2.1 incorrect also did not achieve here.

(f) In Q1.4.1 candidates opted for other terms besides *farm gate* as the marketing channel where a farmer sells at the point of production. This concept has been confused by many because they lack the basic terminology and understanding and responded with Farm Stall as their answer.

(g) In Q2.2.3 many candidates seemed to have misunderstood this question and gave definitions instead of explaining how the principles will benefit farmers in the marketing system as depicted in Q2.2.1.

(h) Q2.3 required candidates to draw a graph and interpret data from the graph. There were some successes; however, a large number of candidates struggled to identify the dependent and independent variable, thus swopping the X- axis and the Y-axis, which resulted in the loss of at least 4 to 6 marks.

(i) In Q2.4.1 most candidates identified *price elasticity of supply* and *price inelasticity of demand* correctly from the graphs. This can be attributed to a good knowledge on the format of a demand and supply curve

(j) In Q2.4.2 many candidates showed a lack of understanding on price elasticity of supply and price inelasticity of demand. They provided the *Law of Demand* and the *Law of Supply* instead of addressing *price elasticity* and *price inelasticity*. Candidates did not use the words *a small* change in price resulted in *a huge* change in the quantity supplied at (a). They also did not use the words *a huge* change in price resulted in *very little* change in the quantity demanded.

(k) In Q2.5.2 most candidates provided the personal characteristics of an entrepreneur instead of deducing entrepreneurial success factors from the scenario. They also alluded to Q2.5.3 by identifying strengths and threats from the scenario, leaving them with confusion in response to Q2.5.3.

Suggestions for improvement

(a) Learners must be taught that they need to understand the context and be able to interpret the data before they respond to questions set on them. They should be shown how the heading is derived from the given data and how to compose the heading.

(b) Learners must be made to understand that if data or a scenario is given, unless indicated otherwise, the questions will be based on the data or scenario. Furthermore, it is important to interpret the leading statement, which will guide learners on the questions to follow.

(c) Learners must be taught how to label and calibrate the axes correctly. This will help avoid the wrong curve being drawn. Teachers could use a number of examples to practically demonstrate the skills of labelling and calibrating axes.

(d) When dealing with graphs on demand and supply, learners should be taught that the *Price* is always on the Y-axis and *Quantity* demanded/supplied is always on the X-axis. This will prevent confusion when drawing these graphs.

(e) When teaching, emphasise the actual difference between elasticity and inelasticity of both demand and supply. Teachers should discuss examples of products that are elastic or inelastic and provide reasons why they are categorised as such.

QUESTION 3: PRODUCTION FACTORS

Common errors and misconceptions

(a) In Q3.1.1 most candidates performed poorly because they could not interpret and link the graph to production factors and functions of land. Furthermore, candidates were not able to differentiate between economic characteristics of land and the function of land as a production factor.

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(b) In Q3.2.1 and Q3.2.2 there is still confusion on terminology with regards to types of labour. The following terminology should be addressed: skilled/unskilled labour, permanent/part-time/temporary labour and casual/seasonal labour, each with its own description and function.

(c) In Q3.3 many candidates were not able to identify a violation or transgression of labourers' rights in the table and link it to a piece of legislation covered in the syllabus. Candidates might be conversant with legislative Acts governing the workers, but were not able to unpack or apply them to situations or scenarios.

(d) In Q3.4.1 and Q3.4.2 candidates performed poorly because they could not link capital items in the table with types of capital which resulted in then failing to provide examples of fixed and movable capital.

(e) In Q3.4.3 many candidates could not deduce the problem related to capital item A due to their inability to identify it as movable capital, as required in Q 3.4.1(b).

(f) In Q3.5.1 and Q3.5.2 most candidates could not identify the type of financial record because they did not know elements of a cash flow budget, namely, closing/opening balance, income and expenditure.

(g) Q3.6 is a typical example of an application-type of question. However, candidates could not link the content with the scenarios given.

(h) In Q3.7 many candidates could not apply knowledge to a given scenario as required in Q3.7.1.

Suggestions for improvement

(a) Many text books feature *types of farm labourers* under different headings. This can be confusing. Learners should be assisted to place them correctly by teaching them to always link *permanent*, *temporary*, *full-time* and *part-time* to TIME. Key words they must take note of should include *period*, *timespan*, *duration* and *time*.

(b) Informal assessment tasks should expose learners to activities which will enable them to analyse, comprehend and interpret information. Application of knowledge should also be enforced with appropriate examples and exposure to real-life situations.

(c) Case studies, diagrams and scenarios need to be included in assessment tasks at regular intervals during the school year, with the aim of exposing them to activities that would improve their skills in answering these types of questions. Such interventions could assist learners to improve their reading and understanding skills, the application of knowledge and an awareness of how to follow instructions.

(d) Content knowledge is vital. Learners must become familiar with the risk management strategies. Once this is in place, case studies can be used as a tool to help them practise applying the knowledge learnt to a specific situation and hereby identify the risk management strategy in any given scenario.

QUESTION 4: BASIC AGRICULTURAL GENETICS

Common errors and misconceptions

(a) Q4.1.1 was very poorly attempted. Many candidates could not identify the expected answer as ‘Genetics’ and some referred to *inheritance* or *heredity*.

(b) In Q4.2 some candidates did not know and understand *epistasis*. They wrote their own interpretation of the given genotypes, e.g. black with no colour (which is not possible) for BBLl.

(c) In Q4.4 many candidates earned marks for drawing a Punnet square. However, several could not identify the genotype of the parents of the first crossing, thus losing marks.

(d) In answering Q4.5.1 most candidates confused the required terms with breeding systems instead of terminologies and in Q4.5.2 they struggled to put in context that the parents or cultivars were chosen because of their superior/desired characteristics.

(e) In Q4.6.1 some candidates exhibited poor knowledge regarding breeding values. This was compounded by a lack of knowledge of criteria to improve hereditary characteristics. Many candidates could not make the association between the statement and what is indicated in the table (Q4.6.2).

(f) In Q4.7 some candidates were challenged by the examples presented and struggled to apply knowledge regarding breeding systems with given examples, while in Q4.7.2 they responded incorrectly as a result of wrong identification in Q4.7.1(b).

(g) In Q4.8.1 some candidates could not identify the technique used for genetic modification. There was confusion between *micro-injection* and *lipofection*.

(h) In Q4.8.2 many candidates did not understand the meaning of *conventional* hybrid cultivars; hence, they were unable to differentiate between such and GMOs.

Suggestions for improvement

(a) The key to mastering basic genetics is the understanding of terminology. Learners should be able to describe concepts and provide practical examples to illustrate their understanding of the terms and concepts.

(b) Teachers should give special attention to basic crossing, genetic concepts and terminology in their teaching of this topic. Teachers must teach learners monohybrids, di-hybrid, and F1 and F2 crosses as included in the *CAPS*.

(c) Teachers need to specify that any letter of the alphabet can be used to represent the alleles. However, if letters are given in a question, learners are advised to use them. It is therefore important for learners to ensure that they read and understand the preceding statements before answering questions on genetics.

(d) In teaching breeding systems, learners should be taught examples of crossings that could have negative implications, as well as those examples with desirable outcomes. Diagrams representing animal breeding systems should be used to illustrate basic types of breeding methods.

(e) Responses to questions on genetics suggest that there could be an underlying content gap amongst teachers. Subject advisers should convene workshops to address the shortcomings in content knowledge in this regard.

(f) The teaching of genetics should be enhanced by providing practical examples within the learning site as it applies to plants, flowers and livestock.

(g) There should also be integration with Life Sciences, as genetics is taught comprehensively in Life Sciences.

CHAPTER 4

BUSINESS STUDIES

The following report should be read in conjunction with the Business Studies Paper 1 and Paper 2 question papers for the NSC November 2021 examinations.

The year 2021 was the second in the move to 2 two-hour papers of 150 marks each. Each paper assesses separate and distinct disciplines as outlined in the *2021 Examination Guidelines*, as follows:

	MAIN TOPICS	SUBTOPICS
PAPER 1	Business Environments	Macro environment: Impact of legislation Macro environment: Business strategies Business sectors and their environments
	Business Operations	Human Resources function Quality of performance
PAPER 2	Business Ventures	Management and leadership Investment: securities/opportunities Investment: insurance Forms of ownership Presentation and data response
	Business Roles	Ethics and professionalism Creative thinking and problem solving Social responsibility (CSR/CSI) Human rights, inclusivity and environment Team performance; conflict management

4.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Business Studies examination in 2021 increased significantly by 36 798 compared to that of 2020, i.e. a 17,7% increase of the cohort.

There was a most encouraging improvement in the pass rate this year, while a steady upward trend in pass rates is evident from 2018–2021.

Candidates who passed at 30% (Level 2) improved from 77,9% in 2020 to 80,5% in 2021. There was a corresponding improvement in the pass rate at 40% (Level 3) from 57,0% to 60,4% over the past two years.

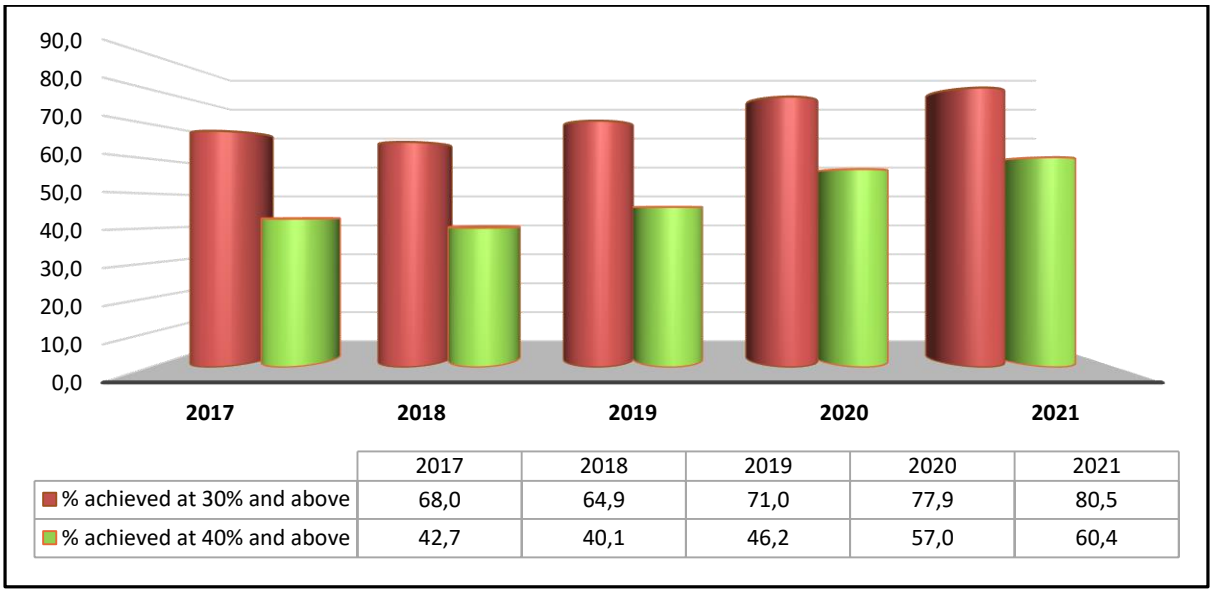
Given the increase in the size of the cohort, the number of passes achieved at 30% (Level 2) and at 40% (Level 3) increased considerably by 35 009 and 29 298 respectively. Furthermore, the percentage of distinctions (over 80%; Level 7) improved from 3,6% to 5,2% which converts into an increase in the total number of distinctions from 7 454 in 2020 to 12 680 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected the teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 4.1.1 Overall achievement rates in Business Studies

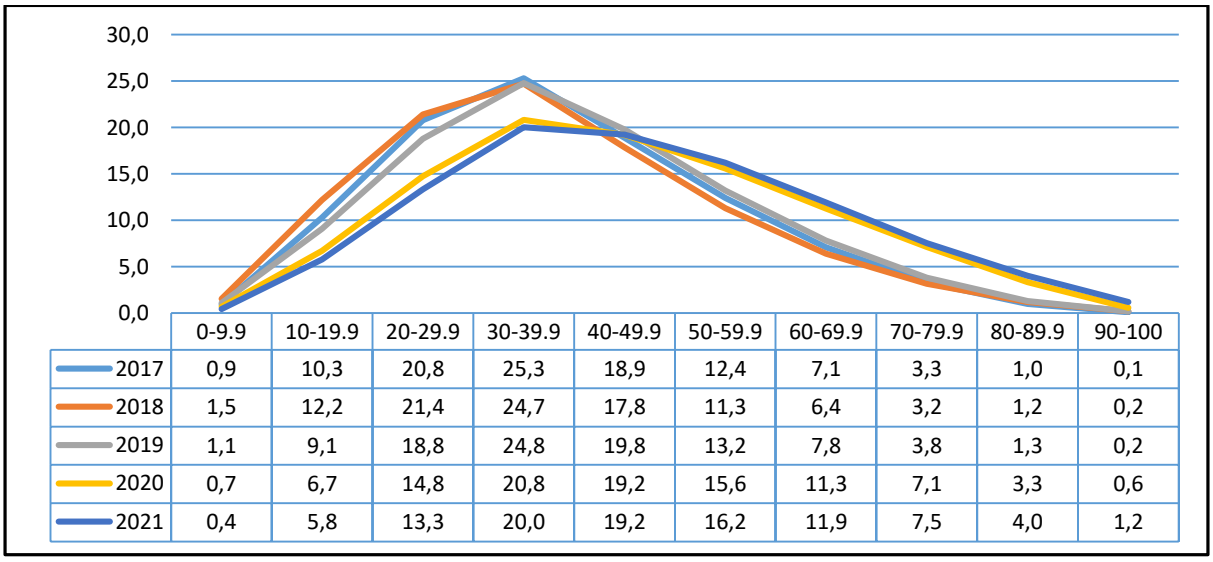
Year	No. wrote	No. achieved at 30% and above	% Achieved at 30% and above	No. achieved at 40% and above	% Achieved at 40% and above
2017	204 849	139 386	68,0	87 535	42,7
2018	192 139	124 618	64,9	77 105	40,1
2019	186 840	132 571	71,0	86 242	46,2
2020	207 045	161 224	77,9	118 100	57,0
2021	243 843	196 233	80,5	147 398	60,4

Graph 4.1.1 Overall achievement rates in Business Studies (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	68,0	64,9	71,0	77,9	80,5
% achieved at 40% and above	42,7	40,1	46,2	57,0	60,4

Graph 4.1.2 Performance distribution curves in Business Studies (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,9	10,3	20,8	25,3	18,9	12,4	7,1	3,3	1,0	0,1
2018	1,5	12,2	21,4	24,7	17,8	11,3	6,4	3,2	1,2	0,2
2019	1,1	9,1	18,8	24,8	19,8	13,2	7,8	3,8	1,3	0,2
2020	0,7	6,7	14,8	20,8	19,2	15,6	11,3	7,1	3,3	0,6
2021	0,4	5,8	13,3	20,0	19,2	16,2	11,9	7,5	4,0	1,2

4.2 OVERVIEW OF CANDIDATES' PERFORMANCE: PAPERS 1 AND 2

General comments

(a) The two-paper format was again well received. This format afforded candidates the opportunity to stagger their preparation according to the specific content that is relevant for each paper, as each paper is written on different days. It allows candidates to manage time more effectively as they have 2 hours to complete each paper of 150 marks each, as compared to 3 hours for a 300-mark paper in the past.

(b) Candidates also benefitted from the extensive intervention strategies of provincial departments, districts and schools in their attempt to minimise the impact of the pandemic and to bridge the gap between the well-prepared candidates and the average or weaker candidates.

(c) The general performance of candidates was noticeably better in Paper 1 than in Paper 2. This was primarily due to their responses in questions based on the *Human Resources function* and *Quality of Performance.*

(d) Candidates' performance ranges from poor to excellent in all three sections. The improvement in performance by well-prepared candidates can be attributed to the fact that some questions were assessed in past NSC papers.

(e) Many candidates were able to adequately respond to indirect questions that required application of knowledge. Good performance was observed in questions that required candidates to identify concepts from given scenarios and statements. They were able to understand the contents of scenarios and provided correct motivation for each concept.

(f) Some candidates continue to display language barriers when responding to middle- and high-order questions as noted by the vague and incomplete responses offered. However, they managed to score part-marks.

(g) It was pleasing to note that most candidates were able to effectively answer essay-type questions and to provide an appropriate introduction and conclusion to essay questions.

(h) However, many candidates, including stronger candidates, still struggled to provide relevant and valid examples of the latest developments in Business Studies to support their responses of Q5 and Q6 and subsequently lost the two marks allocated for originality in essay questions.

General suggestions for improvement

(a) Learners must be exposed to a variety of Section A type direct and indirect questions that focus on concepts, terminology and application of knowledge. These questions must cover aspects of all topics that were taught during the academic year.

(b) Teachers should explain the meaning of action or instructional verbs that are listed in points 12.1 and 12.2 of the 2021 notes to markers, and apply the national marking principles in both formal and informal assessment tasks. This basically enlightens learners on how marks will be allocated for these verbs, so that they can practise accordingly. Furthermore, it is recommended that points 12.1 and 12.2 be pasted in learners' activity books as a readily available reference.

(c) Learners must be encouraged to provide complete responses to questions that require middle- and higher-order thinking skills. Teachers should then mark these questions objectively using the 2021 notes to markers mentioned above. Ticks must be placed or allocated appropriately to avoid either lenient or stringent marking.

(d) Teachers should encourage learners to respond (i.e. verbally and written) in the languages of teaching and learning (LOTL) in the classroom. This should be the practice applied consistently throughout the teaching and learning process. They should also provide simple facts as alternative answers to enhance understanding.

(e) Practical examples of the different Acts, including newspaper clippings, can be used to enhance understanding of legislation. Learners must first understand the purpose of each Act to enable them to understand other aspects that must be covered in relation to each Act. They must be given an assessment task consisting of contextual and essay questions for each Act, and the marking of these tasks must be done according to the national principles of marking. Learners must also be requested to reflect on their strengths and weaknesses on the topic being discussed.

(f) Practical examples and video clips should be used when teaching the types of business strategies, especially *integration a*nd *diversification* strategies. Learners should be requested to conduct research on this content and present their findings in the classroom.

(g) *Business Ventures* must be adequately taught and assessed in Terms 2 and 3 of the academic year. Learners need to acquire a deeper understanding of this topic to allow them a wider option on the choice of questions to be answered.

(h) Learners must be encouraged to conduct research on topics that are dynamic in nature. They must realise that including recent developments and current trends, such as legislation and environmental issues to their responses will lead to better marks for originality.

(i) In placing greater emphasis on the learning of appropriate terminology related to the various topics, teachers are advised to include the following strategies:

- Introduce new terms in every lesson, elaborate on the meaning and context of each, and create a glossary.
- Illustrate the meaning of new terms by using them in context, in sentences and in short scenarios.
- Encourage learners to be attentive during lessons, to spot new terms and to find their meanings using a dictionary, a textbook or Google. This may form the basis of an informal class 'competition'.
- Always strive to include subject-specific terminology in all informal assessment tasks, as well as during teaching.
- The meanings and expectations of verbs that are commonly used in Business Studies should be pasted in learners' books.
- Copies of the *2021 Examination Guidelines* with specific reference to ‘elaborated content’ must be given to the learners. They must also be advised on the requirements or expectations of key verbs in each sub-topic.

4.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

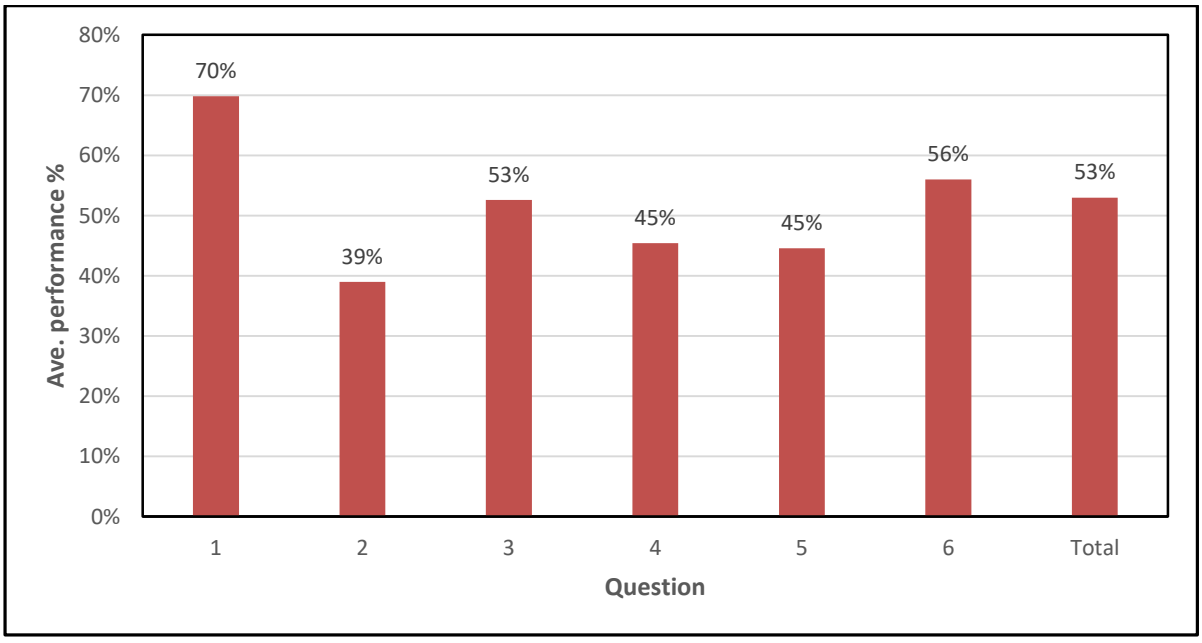
The graphs presented below are based on data from a random sample of candidates in the different provinces. While these graphs might not accurately reflect national averages, it is useful in assessing the relative degree of challenge of each question, as experienced by candidates.

Paper 1 consists of five sub-topics listed above that range from easy to high levels of complexity. Many candidates did not perform well in questions based on *Business Environments* Q2 assessed in Paper 1 even though all questions tested on this topic appeared in past NSC papers. They were expected to perform well in questions on *Business Strategies* as this topic was also assessed in Section C of the November 2020 NSC paper.

Candidates' performance in Q1 was very good. This question assessed the topics of *Business Environments* and *Business Operations*. Q2 assessed *Business Environments.* Performance in this question was relatively poor even though the level of difficulty of most of the sub-questions ranged from easy to medium.

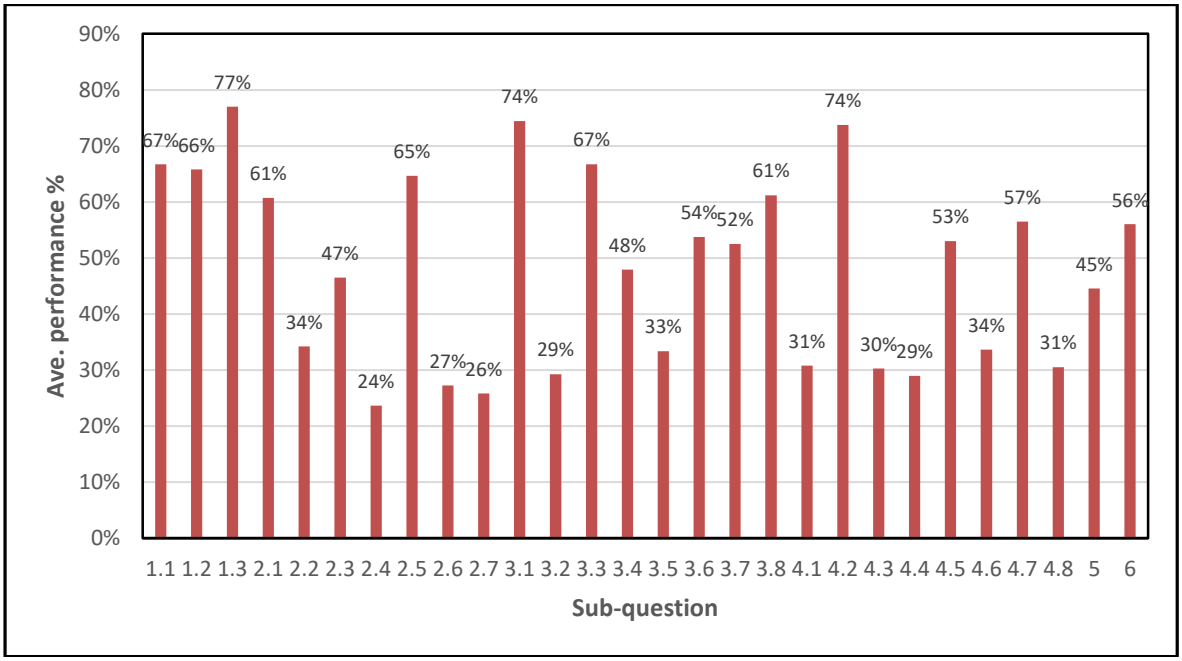
Good performance was noted in the *Business Operations* topics in Q3, and in the Q6 essay on *Human Resources* which appeared to be popular amongst candidates. However, Q4 and Q5 presented the greatest challenge for candidates. Q4 comprised miscellaneous topics of Q4 and in the essay on *Business Strategies* in Q5.

Graph 4.3.1 Average performance per question in Paper 1



Q	Topic
1	Short Questions
2	Business Environments
3	Business Operations
4	Miscellaneous Topics
5	Business Environments (Business Strategies)
6	Business Operations (Human Resources Function)

Graph 4.3.2 Average performance per subquestion in Paper 1



Sub-Q	Topic	Sub-Q	Topic
1.1-1.3	Short questions	3.6	Bus Opn: PDCA Model
2.1	Bus Env: Porter's Five Forces	3.7	Bus Opn: TQM implementation
2.2	Bus Env: Intensive strategies	3.8	Bus Opn: Quality control & assurance
2.3	Bus Env: Defensive strategies	4.1	Bus Env: Consumer rights / CPA
2.4	Bus Env: COIDA	4.2	Bus Env: Sectors & Environments
2.5	Bus Env: Types of leave	4.3	Bus Env: Funding of SETAs
2.6	Bus Env: Rights of employees / LRA	4.4	Bus Env: Evaluating strategies
2.7	Bus Env: BBBEE Pillars	4.5	Bus Opn: Internal recruitment
3.1	Bus Opn: Salary determination	4.6	Bus Opn: Implications of EEA
3.2	Bus Opn: Placement	4.7	Bus Opn: Quality management
3.3	Bus Opn: Selection procedure	4.8	Bus Opn: TQM elements
3.4	Bus Opn: Fringe benefits	5	Bus Env: Business Strategies
3.5	Bus Opn: Quality indicators / P.R.	6	Bus Opn: Human Resources

4.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 1

SECTION A: MULTIPLE-CHOICE/SHORT ANSWER QUESTIONS

QUESTION 1: COMPULSORY (MULTIPLE-CHOICE, CHOOSING CORRECT WORDS AND MATCHING ITEMS)

Performance of candidates in this question was generally excellent. However, some did not perform well in Q1.2 as they chose incorrect words from the list provided in the question. Others lost marks in Q1.2.1–1.2.5 for not writing the whole phrase from the text box, as requested by the question. In Q1.3 many candidates were able to choose the correct description of each concept stated in column A.

Common errors and misconceptions

(a) In Q1.1.1 some candidates confused the *Consumer Protection Act/CPA* with the *National Credit Act/NCA*. It appears that candidates were not conversant with how businesses should comply with the CPA; hence, an incorrect choice was made.

(b) Some candidates confused the *forward integration* strategy with the *backward integration* strategy in Q1.1.2 despite the improvement in teaching and learning on this content. It appears that candidates still struggle to interpret indirect questions in Section A.

(c) Q1.1.5 was poorly answered by many candidates as they confused the quality indicator of the public relations function with the marketing function. Candidates were expected to perform well in this content as it should be covered at length in Grades 10 and 11.

(d) In Q1.2.2 many candidates confused *market development* with *product development* as intensive strategies. This continues to be a challenge in spite of recommendations for improvement being offered in many past diagnostic reports.

(e) Many candidates confused the meaning of *quality management* with *quality performance* in Q1.3.5 even though this content was assessed in the Nov 2020 NSC paper as a contextual question.

Suggestions for improvement

(a) Practical examples of how businesses comply with each Act must be used during teaching and learning. Learners must be given a project-based learning task to investigate the impact, compliance, and non-compliance with each Act and present their findings in the classroom. Teachers should stimulate debates on each Act and clarify misconceptions and errors committed by learners.

(b) Teachers are advised to draw four columns consisting of four types of businesses strategies on the chalkboard/interactive whiteboard. A clear description of each type of business strategy, with practical examples, illustrations and video clips, must be used effectively. Learners must understand the reasons for businesses choosing to implement particular strategies; they must also be exposed to direct and source-based questions on this content.

(c) In addressing prior knowledge covered in Grades 10 and 11, proper recap of the meaning and quality indicators of each business function must be done. Teachers must make effective use of key words that will enable learners to remember the facts of each business function. Learners must be requested to visit any local supermarket and conduct research on quality indicators of each business function. This topic must also be assessed as an essay question during the academic year.

(d) All concepts related to 'quality' must be taught in detail, with emphasis being placed on activities that take place in each quality concept to achieve the desired outcome. To avoid confusion, teachers must provide a detailed description of each quality concept and explain the relationships between quality concepts.

(e) Teachers must consolidate questions on this topic from various NSC past papers and administer them as informal assessment activities, throughout the academic year. This will enable learners to enhance their knowledge.

(f) Learners must be made aware that each question in Section A will have a correct answer and some distractors. It is therefore important that they read the question/statement and all the options given, before choosing the correct answer.

SECTION B: LONGER AND PARAGRAPH QUESTIONS, USING CASE STUDIES AND INFORMATION

QUESTION 2: BUSINESS ENVIRONMENTS

Poor performance has been noted in this question as indicated by the average percentage of based on data from the random sample of candidates. Candidates who attempted this question did not perform well on subquestions that assessed three Acts, even though these were assessed in past NSC papers.

Common errors and misconceptions

(a) Good performance was noted in Q2.1 although some candidates did not write the full name of each Porter's Five Forces model. They forfeited marks for committing this error.

(b) In Q2.2 candidates explained the types of intensive strategies instead of outlining the advantages. Many candidates managed to get a maximum of two marks only as they simply wrote 'increase in sales/profitability'. The challenge in this content is persistent despite numerous interventions that have been put in place to improve learner performance.

(c) Poor performance was noted in Q2.3.1 as many candidates could not identify the type of defensive strategy from the given scenario. Other candidates could not quote appropriately from the scenario in motivating their responses and in addressing the question.

(d) Candidates did not perform well in Q2.4 as responses were based on either non-compliance with COIDA or the purpose of this Act instead of penalties for non-compliance. A common response to this question was 'businesses may close down' which was not the required answer.

(e) In Q2.5 many candidates were generally able to identify the different types of leave from a given scenario. However, some candidates lost marks by inappropriately interpreting quotes from the scenario.

(f) In Q2.6 candidates appeared to confuse the rights of employees in terms of the Labour Relations Act (LRA) with either human rights or economic rights of employees, which are covered in Paper 2. Some responses were limited to the right to 'join trade unions and embark on a legal strike'.

(g) In Q2.7 many candidates could not recommend ways in which businesses could apply ownership and Enterprise and Supplier Development (ESD) as BBBEE pillars. Other candidates confused ESD with ways in which businesses should overcome the challenges of the market environment that were covered in Grade 11. It appears that they misinterpreted the word 'supplier' which led to the incorrect responses provided.

Suggestions for improvement

(a) Learners must be able to name and write the Porter's Five Forces model in full to avoid losing marks unnecessarily. They must be able to explain how businesses should

apply each force to analyse their position in the market. It should be impressed upon learners that businesses apply this model when doing research on the challenges posed by the market environment.

(b) Learners must know that the advantages of intensive strategies are embedded in each type of intensive strategy. Teachers must show the relationship between the types of intensive strategies with the advantages of these strategies. Learners must be encouraged to give examples of businesses strategies and explain how they benefit businesses. It must be noted that with effect from 2022, learners will not be awarded two marks for only writing 'Increase in sales/income and profitability' without an elaboration such as 'due to a variety of advertising campaigns'.

(c) Learners must be made aware that penalties for non-compliance with each Act are punitive in nature and that businesses may lose a lot of money on heavy fines and legal costs. They must also understand that penalties for non-compliance with each Act are not the same, as this depends on the nature and context of each Act.

(d) Teachers are advised to provide a detailed recent description of each type of leave as per the 2020 NSC Marking Guideline and the DBE notes. This should include the types of parental leave. It should also be noted that adoptive leave forms part of parental leave. This content must be assessed in both direct and indirect questions including essay type questions.

(e) Teachers must focus on the purpose of the Labour Relations Act with special reference to how this Act protects the employer and employees, as this will enable learners to gain a better understanding of the rights of employers and employees in the workplace. Teachers should also alert learners to the fact that some of the rights of employees are not the same as the economic rights of employees as covered in Paper 2.

(f) Teaching and learning must focus on how businesses should comply with each of the five BBBEE pillars. Learners must first understand this content before moving on to the impact of BBBEE on businesses and other related aspects. This will ensure a logical flow of the content being addressed. Full marks will not be awarded for 'contribution can be monetary, e.g. loans/investments/donations' as a response to how businesses should comply with ESD. This has been revised to 'invest/support black-owned SMMEs by contributing loans/donations/consulting services/advice/ entrepreneurial programmes'.

QUESTION 3: BUSINESS OPERATIONS

Good performance was generally evident in this question. This was in line with the data from a random sample of candidates. Furthermore, many candidates chose this question as it consisted of only two sub-topics namely, *Human Resources* and *Quality Performance,* which were equally weighted, consisting of 20 marks each.

Common errors and misconceptions

(a) Most candidates were able to name the *piecemeal* and *time-related* salary determination methods in Q3.1 even though some gave an explanation instead of naming the salary determination methods. It was noticed that that few candidates wrote monthly and weekly salary even though this content has matured in terms of teaching and learning.

(b) In Q3.2 most candidates could not elaborate on the meaning of *placement* as a human resource activity and subsequently, did not obtain 4 marks. Many candidates confused

placement with induction and/or selection. This challenge has persisted since the inception of the *CAPS* despite recommendations made in all national diagnostic reports on this content.

(c) A good performance was noted in Q3.3.1 and Q3.3.2 on the selection procedure and the role of the interviewer during the interview. Some candidates however, did confuse this aspect with the role of the interviewee during the interview. Responses such as, 'ask clarity seeking questions and making eye contact' were common inappropriate responses.

(d) Many candidates performed poorly in Q3.4 even though this question was assessed in the 2020 NSC examination. They also confused the impact of fringe benefits on businesses with the impact of external recruitment. Others listed the types of fringe benefits which was not the required answer.

(e) Poor performance was recorded in Q3.5 as many candidates confused the quality indicators of the public relations function with those of the marketing function. Other responses were incorrectly based on the meaning of this function. This is despite recommendations having been made in previous diagnostic reports on suggested teaching approaches in the context of business functions.

(f) The majority of candidates were able to identify the PDCA steps from the given scenario in Q3.6 but were not able to motivate their responses by quoting correctly from the scenario. They were awarded marks only for the correct identification of the concepts.

(g) In Q3.7 the responses on 'TQM if poorly implemented' were vague and incomplete. Some gave positive instead of negative responses for poor implementation of TQM in the workplace. Others gave definitions of quality concepts. Candidates were expected to perform well on this question as it was assessed in 2020 NSC Examination. The poor performance on this question at that stage was also noted in the 2020 national diagnostic report.

(h) In Q3.8 some candidates confused the meaning of *quality assurance* with *quality control* even though this question has been asked many times before in previous question papers. Others provided incomplete statements on this question.

Suggestions for improvement

(a) The explanation of the terms *piecemea*l and *time-related* salary determination methods should be explained in terms of how businesses calculate the remuneration to be paid to employees. The amount paid will be informed by either the tasks to be completed (piecemeal) or a tariff based on time spend, such as per hour, per day or per week (time-related).

(b) Learners must be made to realise that *placement procedure* takes place after the recruitment and selection procedures. Teachers must emphasise the fact that businesses are responsible for assigning employees to a specific job where they will function properly.

(c) Learners must understand the difference between an *interviewer* and *interviewee* before proceeding to the role of each party. Teachers can use the three columns approach where they outline the roles of the interviewer before and during the interview and emphasise that the role of the interviewee is only during the interview. Role-playing and demonstrations are effective to enhance understanding in this regard.

(d) Learners must be requested to conduct research on the impact of fringe benefits on businesses. Teachers must consolidate learners' findings with content and advise learners to refrain from confusing this content with the impact of external recruitment. Learners must understand that fringe benefits are offered to existing employees while external recruitment focuses on prospective employees.

(e) Quality indicators for each business function will focus on activities that are conducted by the respective function. A clear distinction must be made between public relations and the marketing function. The latter aims at improving the image of a business, while the former aims at improving business sales. Practical examples of the public relations function should be given, and learners must be requested to give other examples of this function to illustrate their understanding of the concepts.

(f) Learners should be informed that the PDCA model forms part of continuous improvement to processes and systems. A detailed description of each step of this model should be given to prepare learners to answer direct and indirect questions on this content.

(g) Learners must be well conversant with the advantages of the five TQM elements that are stated in the *2021 Examination Guidelines* to enable them to understand the impact of TQM if poorly implemented by businesses. Teachers should award part- instead of full marks for vague and incomplete responses as this may encourage learners to write complete sentences on this content.

(h) It should be noted that *quality control* must first take place before *quality assurance* is done as businesses must set targets and check the quality of raw materials before the actual production is done. Quality assurance focuses on the production processes while quality control on the quality of the final product and corrective measures that must be done by businesses.

QUESTION 4: MISCELLANEOUS TOPICS

This question was chosen by many candidates. This question assessed both main topics namely, *Business Environments* and *Business Operations* consisting of 20 marks each. Although marks achieved were generally below average, improved performance was noted in parts of the question, particularly those on *Human Resources* functions and *Business Strategies*.

Common errors and misconceptions

(a) Some candidates failed to mention the consumer rights as stipulated in the Consumer Protection Act (CPA) in Q4.1. Others confused the consumer rights of the CPA with either human rights or consumer rights in terms of the National Credit Act/NCA. Others forfeited marks by not giving the complete name of each consumer right. Some provided an explanation of each right, which was not required.

(b) Good performances was recorded in Q4.2.1 and Q4.2.2 as many candidates were able to identify the business sector from the scenario and were also able to quote the businesses' challenges appropriately from the scenario. However, some candidates could not classify each challenge according to the relevant business environment. This challenge persists despite recommendations that were made in the 2019 and 2020 NSC Examination.

(c) Many candidates could not explain in Q4.3 how SETAs are funded. They confused the funding of SETAs with the functions of SETAs. Other responses were incomplete such

as ‘the employee pays 1% of his/her salary’. The reason for candidates’ poor performance in this question could be that it was asked for the first time in this NSC Examination.

(d) Poor performance was observed in Q4.4. Many candidates confused steps for evaluating strategies with problem-solving steps covered in Paper 2. Candidates were expected to perform well on this question as it has been assessed in past NSC papers either as a contextual or essay question.

(e) Many candidates performed well in Q4.5 even though some confused the sources of internal recruitment with the sources of external recruitment. Incorrect responses such as ‘headhunting and internet’ were popular in this question.

(f) In Q4.6.1 many candidates had difficulty in quoting the implications of the Employment Equity Act/EEA on the human resources function as some of the facts in the scenarios were placed as distractors. This affected their responses to Q4.6.2 as this was a follow-on question. Others confused this content with the purpose of the EEA which was not a required answer.

(g) In Q4.7 some candidates were not clear about the benefits of a good quality management system, often relating this to the impact of total client satisfaction as a TQM element. Many responses were based on customer satisfaction, increased market share and profitability. They were awarded only one mark each for incomplete responses such as these.

(h) Candidates did not perform well in Q4.8. Many responses were based on the description of the Skill Development Act instead of the impact of skills development as a TQM element. Candidates were expected to perform exceptionally on this content as it has reached maturity in terms of teaching and assessment.

Suggestions for improvement

(a) Teachers are advised to first recap the purpose of the Consumer Protection Act (CPA) and the National Credit Act (NCA) when addressing consumer rights according to each Act. Learners must realise that the consumer rights according to the CPA focus on information about the product in relation to the NCA which focuses on consumer rights in terms of ‘credit granting’. Learners must be advised to write only ‘the right to privacy’ instead of ‘the right to privacy and confidentiality’. It must also be noted that the ‘right to information about products and agreements’ has been replaced with the ‘right to disclosure and information'. Teachers are advised to amend DBE notes on these facts.

(b) The elements of each business environment as well as challenges posed by each environment on businesses must be recapped at appropriate times. Learners must be able to identify the elements of each business function from each challenge presented in the scenario. This will enable them to classify each challenge according to the relevant business environment.

(c) Learners must understand the relationship between the functions of SETAs and how they are funded. They should place emphasis on the different sources of funding and impress upon learners that various SETAs cannot perform their roles without funding. Differentiated methods are also suggested to assess this content.

(d) Practical examples, role plays, and demonstrations can be used to illustrate the steps in strategy evaluation. Learners must be taught the importance of evaluating strategies

to stimulate interest on how businesses discharge this process. It should also be noted that the main aim of strategy evaluation is to achieve the business mission and objectives that were reviewed during the initial stage of the strategic management process. Note that learners will no longer be awarded two marks for 'decide on the desired outcome' as they need to elaborate on this fact as follows: 'decide on the desired outcome as envisaged when strategies were implemented'.

(e) Learners must first be made aware of the meaning of internal and external recruitment to enable them to understand the differences. Learners should be provided with newspaper articles and magazine extracts on various sources of recruitment and then requested them to classify these sources either as internal or external recruitment with a motivation.

(f) The implications of the EEA on the human resources function are in line with the ways in which businesses should comply with this Act. Teachers must recap this before teaching the content. Teachers should take note that the following has been revised:
- 'The human resource manager must treat employees fairly and promote/provide equal opportunities in the workplace.'
- This means that learners will no longer obtain full marks for writing the following: 'The human resources manager must promote/provide equal opportunities in the workplace.'

Teaching and learning should focus on *what* the human resources function should do in order to comply with the EEA. This content must be adequately assessed using various methods during the academic year.

(g) Learners must be well conversant with the meaning of the quality concepts before they are taught the benefits of a good quality management system. The benefits of a good quality management system depend on the effective implementation of the quality concepts. Learners must be able to explain the relationship between each quality concept with the benefits of a good quality management system for enrichment purposes and to enhance understanding.

(h) Teachers are advised to teach the impact of TQM elements on large businesses focusing on the *how* part e.g. how large businesses implement these TQM elements and what the advantages and disadvantages are in implementing these elements. Teaching and learning should focus on five TQM elements stated in the *2021 Examination Guidelines*. Practical examples should be given on how each TQM element impacts on large businesses. Learners could be given a research project on this topic and be requested to critically evaluate their findings. Teachers should close content gaps by clarifying learners' misconceptions and errors in this regard.

SECTION C: ESSAY QUESTIONS

QUESTION 5: BUSINESS ENVIRONMENT: BUSINESS STRATEGIES

Few candidates chose to answer this question. Although marks were below average, marginal improvement was noted in this question, possibly due to the fact that this question was assessed in the topic *Business Strategies* which is perceived as 'low hanging fruits' by many teachers and learners.

Common errors and misconceptions

(a) In Q5.1 the introduction by many candidates was based on statements copied from the preamble. Others only wrote the word 'introduction' with no content. They forfeited one mark for this error.

(b) Poor performance was recorded in Q5.2 as many candidates' responses were inappropriately based on the evaluation of strategies while some wrote the problem-solving steps. Others repeated facts for option 1 and option 2 in the strategic management process.

(c) Q5.3 was well answered by many candidates even though some provided responses that were based on the types of intensive strategies and defensive strategies which were not required answers. Others were able to mention types of diversification strategies but confused the meaning of *concentric* with *horizontal* diversification strategies.

(d) Q5.4.2 was intended as a follow-on question to Q5.4.1. Many candidates who were able to explain challenges posed by PESTLE factors were not able to provide appropriate recommendations. In contrast, others presented valid recommendations, but were unable to explain challenges. Candidates were not penalised for being unable to link the challenges and recommendations.

(e) Many candidates were not able to provide recent information or current trends and developments to be awarded marks for originality.

Suggestions for improvement

(a) Teachers must stress the importance of a valid introduction and conclusion based on the specific topic chosen. They should not repeat facts or points given in the question as an introduction and/or conclusion. Learners must be trained on how to write an introduction and conclusion at the end of each topic that was treated in the classroom.

(b) Teachers are advised to focus on the first option of the strategic management process as it provides a detailed description of this process. This option also enables learners to understand the reason why businesses must formulate and implement different business strategies.

Note that learners will no longer be awarded 4 marks for the following facts in option 2:
- 'Review their vision/mission statement'
- 'Analyse/re-examine their mission statement'

The above facts have been combined as one fact as follows:
- 'Review/Analyse/Re-examine their vision/mission statement'

(c) Teachers must ensure that learners are aware that in all the diversification strategies a new product is introduced into existing products. The only difference is the target market and whether the new product appeals to existing or new customers.

The following fact will no longer be accepted as an explanation of a conglomerate diversification strategy as this fact is the same as the concentric diversification strategy i.e. 'Occurs when a business wants to increase its product range and target markets'.

(d) Learners must refrain from giving examples of each PESTLE factor as the focus is on *how* each factor poses challenges to businesses. They must also be able to link the

recommendations with each challenge. Teachers must ensure that this question is marked according to the national marking principles. They must also initiate class discussions for suggestions on how to deal with challenges.

(e) Learners must be made to realise that businesses use a PESTLE analysis to identify challenges in the macro environment with the aim of developing strategies to deal with each challenge. It is therefore imperative that each challenge be linked to each recommendation.

QUESTION 6: BUSINESS OPERATIONS: HUMAN RESOURCE FUNCTION

Candidates performed well in this question which proved to be popular. This aligns with the data from a random sample of candidates presented above. It appears that many candidates were well conversant with the topic *Human Resources* function as they seem to always perform better in this topic than *Quality of Performance*.

Common errors and misconceptions

(a) In Q6.2 some candidates provided incomplete responses although they were expected to write full sentences on the recruitment procedure. Some confused this content with the recruitment procedure. It was envisaged that candidates' performance will improve on this content as it was assessed many times in the NSC papers and 2021 provincial preparatory examinations.

(b) Good performance was noted in Q6.3 even though some candidates confused the impact of external recruitment with either the impact of internal recruitment or fringe benefits.

(c) Poor performance was recorded in Q6.4 as many candidates' responses were based on the purpose of induction and/or aspects to be included in the induction programme instead of the benefits of induction for businesses. This challenge is persistent despite the recommendations that were made in previous national diagnostic reports.

(d) Some candidates provided the aspects that should be included in an employment contract in Q6.5 instead of the legal requirements of the employment contract. This is possibly due to the fact that this question has not been asked many times in past NSC papers.

Suggestions for improvement

(a) Teachers must scaffold the activities of the human resources function and make learners aware that the recruitment procedure is the first human resources activity. Businesses must initially compile a job analysis, decide on the type of recruitment method, and advertise the vacant position in the appropriate media. The selection procedure is done after the recruitment procedure.

(b) Teachers must focus on *what* new employees will bring to the business and *how* businesses benefit from using external recruitment. A table on the differences between the impact of internal and external recruitment methods could be drawn to illustrate the differences between these concepts. Teachers should stimulate debates on this content to enhance understanding.

(c) Learners must first understand the purpose of induction before unpacking the benefits thereof. Teachers must explain the relationship between the purpose and the benefits

of induction focusing on how induction benefits both new employees and the business. Assessment on this topic should cover both direct and indirect questions.

(d) Learner responses on the legal requirements of the employment contract should focus on what makes the employment contract a legal document and not on the aspects that should be included in the employment contract. Teachers must focus on the role of the employer and employee in the contract. Learners must be requested to link some aspects of an employment contract with the legal requirements so that they are able to formulate full sentences on this content.

The following response on the legal requirements of the employment contract will no longer be accepted as it is merely a definition of the contract:

'An employment contract is a legally binding agreement between the employer and the employee.'

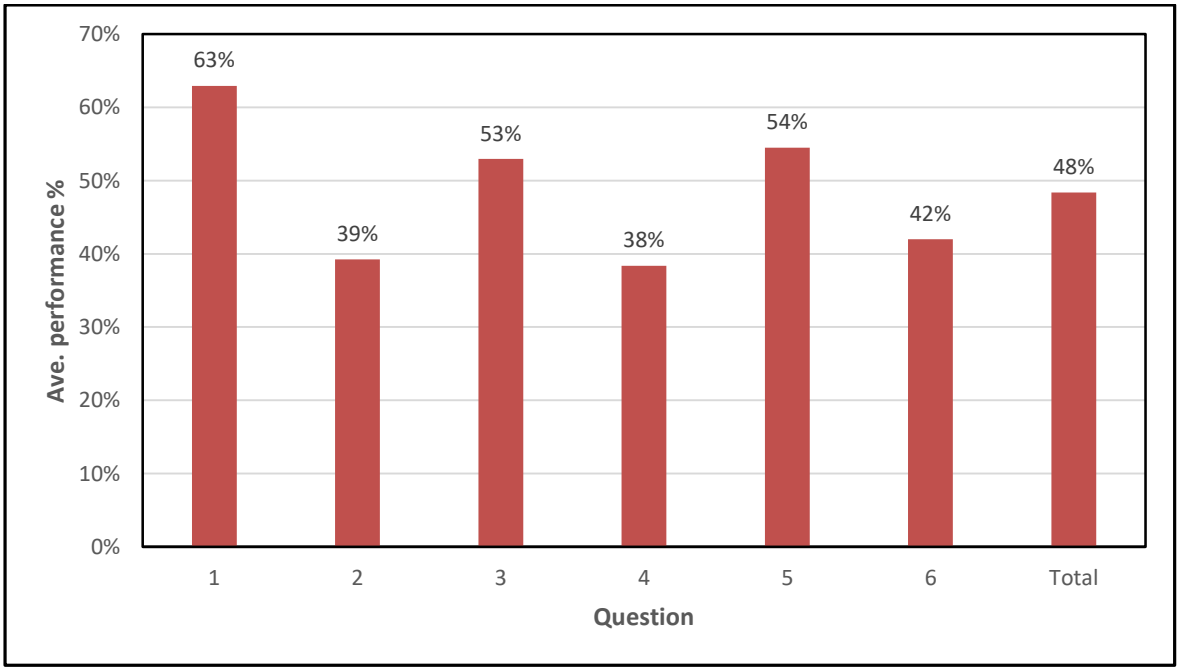
4.5 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 2

The graphs presented below are based on data from a random sample of candidates in the different provinces.

Many candidates did not choose Q3 and Q6 which were based on *Business Ventures* in Paper 2. These questions consisted of some relatively simple subquestions which would have improved the quality of results in Business Studies. The general performance in Q1 was good as this question consisted of ten subquestions that assessed *Business Ventures* and *Business Roles*. Candidates did not perform well in Q2 and Q4, especially on subquestions which assessed the topic *Business Ventures*.

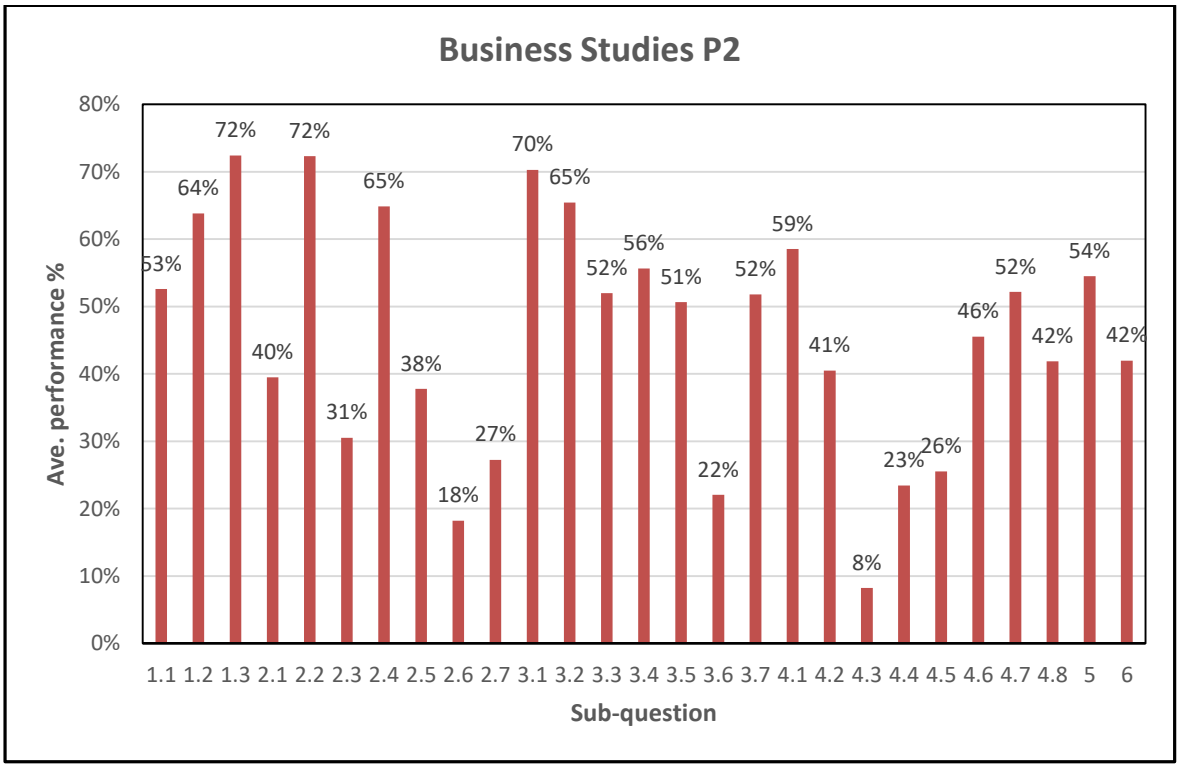
However, they performed well in Q3 which covered questions on *Business Roles* and Q5, and the essay question on *Business Ventures* which assessed the topic 'insurance'. Candidates did not perform well in Q6 (Section C). It appeared that candidates had neglected the sub-topic of *Ethics and Professionalism* in their preparation for the examination.

Graph 4.5.1 Average performance per question in Paper 2



Q	Topic
1	Compulsory
2	Business Ventures
3	Business Roles
4	Miscellaneous Topics
5	Business Ventures (Insurance)
6	Business Roles (Ethics and Professionalism)

Graph 4.5.2 Average performance per subquestion in Paper 2



Sub-Q	Topic	Sub-Q	Topic
1.1-1.3	Short questions	3.6	Bus Roles: Force-field analysis
2.1	Bus Vent: UIF benefits	3.7	Bus Roles: Cultural rights
2.2	Bus Vent: Presentation factors	4.1	Bus Vent: Functions of JSE
2.3	Bus Vent: Preference shares	4.2	Bus Vent: Leadership theories
2.4	Bus Vent: Leadership styles	4.3	Bus Vent: State-owned company
2.5	Bus Vent: Visual aids	4.4	Bus Vent: Unit trusts
2.6	Bus Vent: Forms of ownership	4.5	Bus Roles: CSR
2.7	Bus Vent: Leadership styles	4.6	Bus Roles: Problem solving & decisions
3.1	Bus Roles: Team development	4.7	Bus Roles: Difficult employees
3.2	Bus Roles: Causes of conflict	4.8	Bus Roles: Benefits of diversity
3.3	Bus Roles: CSI focus areas	5	Bus Vent: Insurance
3.4	Bus Roles: Creative thinking	6	Bus Roles : Ethics & professionalism
3.5	Bus Roles: Human rights		

4.6 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: COMPULSORY (MULTIPLE-CHOICE, CHOOSING CORRECT WORDS AND MATCHING ITEMS)

The performance of candidates in this question was good, even though some candidates did not perform well in Q1.1. This was the multiple-choice question which included indirect sub-questions that required application of knowledge. However, good performance was noted in Q1.3 as many candidates were able to choose a correct description from column B that matched a term in column A.

Common errors and misconceptions

(a) Many candidates confused the role of personal attitude in successful leadership with the characteristics of leaders and entrepreneurial qualities in Q1.1.1. The majority chose either option A or C even though this question has been asked many times in past NSC examinations.

(b) Q1.1.2 was poorly answered by many candidates as they could not identify legislation as a criterion for successful team performance. Most of their responses were based either on management or on division of profits.

(c) Many candidates did not do well in Q1.1.3 probably since this question was asked for the first time in the NSC examination in Section A.

(d) Candidates confused the meaning of *excess* with *shares* in Q1.2.1. This could also be attributed to the fact that this question was asked for the first time in the NSC examination.

(e) The meaning of *debentures* was confused with the meaning of *shares* in Q1.2.2. It appears that candidates did not carefully read the statement before answering the question.

(f) Many candidates performed well in Q1.2.3 even though some confused the application of brainstorming with a nominal group technique.

(g) Q1.3.1 was poorly answered as many candidates confused the meaning of leaders with general management which is covered in Paper 1. It appears that candidates did not read the description of the required answer carefully.

(h) Candidates confused the meaning of *limited* liability with *unlimited* liability in Q1.3.3 despite this question appearing in the 2020 Nov NSC Examination.

(i) In Q1.3.5 some candidates still confused the role of the health and safety representatives with the responsibilities of employers in protecting human health and safety in the workplace.

Suggestions for improvement

(a) Teaching and learning must focus on *how* personal attitude contributes to successful leadership. It must be emphasised that a 'positive attitude' leads to successful leadership which enables the overcoming of business challenges. Class discussions should focus on the words 'positive attitude' when teaching the role of personal attitude

as being vital to successful leadership. Examples of respected business leaders who embody these factors must be given.

(b) The meaning of each criterion that contributes to the success and/or failure of each form of ownership must first be taught before explaining how each criterion contributes to the ultimate success of an enterprise.

(c) Learners should be exposed to various ways of calculating the simple and compound interest on monthly and annual bases.

(d) All insurance concepts must be taught in detail using practical examples to enable learners to gain insight and apply acknowledge. Teachers are advised to administer source-based assessment tasks on this content.

(e) Learners should be advised to first identify the correct description and its distractor when answering questions such as Q1.3 which tests their knowledge of different concepts. This exercise will reduce guess work.

(f) Teachers should unpack the meaning of financial concepts that are highlighted on page 19 of the *2021 Examination Guidelines*. They should also emphasise the fact that debentures form part of the borrowed capital of businesses.

(g) Emphasis must be placed on the difference between brainstorming and the nominal group technique. The former is used when a group of employees sit together in a round-table discussion and generate as many ideas as possible. The latter is applied when employees first generate ideas silently and then share them with the team members, hence it is called nominal-group technique.

(h) A detailed description of the meaning of leadership and management must be given using demonstrations and practical examples. Learners must be made to realise that leaders have to communicate effectively with employees and that each line function is managed by leaders.

(i) Teachers must unpack the meaning of *limited* and *unlimited* as well as *liability*. They are advised to draw two columns on the chalk/Smartboard for this purpose. One column must consist of the forms of ownership and the other one for limited and unlimited liability. Learners must be made aware that only a sole trader and partnership have unlimited liability as they are not legal entities.

(j) Learners must be alerted to the fact that the health and safety representatives form part of the business' employees, hence they cannot provide personal protective clothing. They serve only as watchdogs for their fellow colleagues by ensuring that the employer complies with health and safety requirements in the workplace.

SECTION B: LONGER AND PARAGRAPH QUESTIONS, USING CASE STUDIES AND INFORMATION (THREE QUESTIONS TO BE ANSWERED)

QUESTION 2: BUSINESS VENTURES

The performance of candidates who attempted this question was generally average. Candidates were expected to perform exceptionally well since all subquestions were assessed in past NSC papers. Moreover, the level of difficulty of high-order questions was moderate as five subquestions consisted of direct questions.

Common errors and misconceptions

(a) Good performance was noted in Q2.1 as many candidates were able to name the benefits paid out by the Unemployment Insurance Fund (UIF) even though some continue to confuse this content with the types of fringe benefits. Some confused this content with the provisions of the Basic Conditions of Employment Act (BCEA) which is covered in Paper 2.

(b) Q2.2 appeared in past NSC papers and the 2021 preparatory examination paper. Some candidates' responses were based on how to handle feedback after rather than during a presentation as required by the question. Other candidates' responses were inappropriately based on factors to be considered when preparing for a presentation.

(c) Many candidates were able to identify the types of preference shares from a scenario given in Q2.3. However, some candidates simply provided other types of preference shares that were not applicable to the given scenario. Others did not quote appropriately from the scenario and consequently lost marks by not addressing the question.

(d) Some candidates provided vague responses on the difference between the democratic and autocratic leadership styles in Q2.4. Others explained situations in which each leadership style can be applied in the workplace, which was not the required answer.

(e) Poor performance was noted in Q2.5.1. Candidates were expected to perform well in this question as it appeared many times in the NSC papers. Candidates could not identify PowerPoint from the given scenario. Responses to this question were based on either 'slides' or 'overhead projector'. They automatically forfeited marks for the motivation. Others confused PowerPoint with Smartboards/interactive whiteboards. Some candidates did not even attempt answering this question.

(f) Many candidates did not perform well in Q2.5.2 as their responses were limited to 'can be used with video clips and captures the attention of the audience'. Some responses were based on the disadvantages of a PowerPoint which was not the required answer.

(g) Candidates performed poorly on Q2.6.1 as many responses were based on the contribution of a public company instead of a sole trader to the success and/or failure of a business. Some part of candidates' responses incorrectly included advantages/disadvantages of a sole trader with no bearing on taxation and division of profits as criteria that could contribute to the success and/or failure of a sole trader.

(h) Some candidates' responses were limited only to 'takes all profits', while others confused a sole trader with partnership in Q2.6.2. Other responses were based on the characteristics of the sole trader instead of explaining how each characteristic becomes an advantage.

(i) In Q2.7 many candidates confused the application of the transactional leadership style with either the meaning or the advantages of this leadership style.

Suggestions for improvement

(a) A clear distinction should be made between the types of benefits paid out by UIF and other types of fringe benefits. Teachers must explain the meaning of the word 'benefit' and outline conditions in which each type of UIF benefit is paid. Learners must be advised that they will forfeit marks for writing the word 'leave' instead of 'benefit'. They

must also be encouraged to write the correct terminology for each type of benefit paid by the UIF e.g. maternity instead of pregnancy benefit.

(b) Demonstrations and role play on the factors that should be considered while presenting could be used. Learners could be requested to critically evaluate the presenter while presenting and make recommendations for improvement. The main aim of this exercise is to enable learners to gain insight into this content and to avoid confusing factors that must be considered before, during and after a presentation.

(c) Learners must be requested to conduct research on different types of preference shares and present their findings in the classroom. Teachers should draw a table consisting of two columns for this purpose. The first column should consist of types of shares and the second column for the types of preference shares. The table will enable learners to make a clear distinction between the types of shares. This topic attracts a relatively high number of marks. It also includes rich content that requires differentiated teaching and assessment methods.

(d) Teachers are advised to first explain the meaning, application and impact of each leadership style. The differences between the democratic and autocratic leadership styles must be explained in terms of how each style takes decisions, the line of communication used and its impact on employees' confidence.

(e) Learners must be requested to give examples of the six types of visual aids stated in the *2021 Exam Guidelines*. Teachers must give practical examples and the impact of each visual aid during teaching and learning. The use of a collage depicting different types of visual aid should be incorporated in teaching and learning of this content.

(f) The meaning of each criterion that contributes to the success and/or failure of each form of ownership must first be taught before recapping the advantages and disadvantages. Learners must be requested to identify the criteria that contribute to success and/or failure of each form of ownership from the advantages and disadvantages of each.

(g) It is essential that the meaning and impact of each leadership style be clarified, before teaching the situations in which each leadership style can be applied in the workplace, as this will facilitate better understanding. Furthermore, various approaches could be used to assess all types of leadership styles that are highlighted in the *2021 Exam Guidelines.*

QUESTION 3: BUSINESS ROLES

Many candidates attempted this question. Performance of candidates ranged from average to good as all sub-topics that were assessed in this question appeared in past NSC papers. The phrasing of some of these questions was, however, different.

Common errors and misconceptions

(a) In Q3.1 some candidates were not able to name the stages of team development even though this content has reached its maturity level. Responses such as 'introduction intermediate and peak stage' were written as the stages of team development.

(b) Many candidates performed well in Q3.2 although some confused the causes of conflict with the examples of a grievance. Others simply mentioned the causes of conflict without providing an explanation, but they were not penalised for this error.

(c) Some candidates were able to name the Corporate Social Investment (CSI) focus areas from the scenario given in Q3.3.1. Others copied the whole paragraph from the scenario instead of naming the CSI focus areas. Others offered CSI focus areas that were not mentioned in the scenario.

(d) Poor performance was noted in Q3.3.2 as many candidates explained the impact of each CSI focus area which was quoted in Q3.3.1 instead of discussing the impact of CSI on businesses. Others confused the impact of CSI on businesses with communities.

(e) In Q3.4 some candidates were able to explain the advantages of creative thinking in the workplace. Others confused this question with the benefits of diversity in the workplace despite the fact that recommendations were made in the past national diagnostic report on this content.

(f) Some candidates could not identify the correct human rights from the scenario in Q3.5. Others incorrectly refer to *equality* instead of *equity*, while others did not write 'freedom of speech and expression' in full. Some incorrectly wrote 'the right to speak' as a human right.

(g) The majority of candidates had difficulty in responding to Q3.6 as they confused the advantages of force-field analysis with the Delphi technique. Other responses were based either on the application of force-field analysis or the advantages of creative thinking in the workplace, which were not required in this question.

(h) Candidates performed well in Q3.7 even though an incorrect response such as 'allow employees to practise their culture in the workplace' persists. Other responses were based on the right to 'dignity and equal pay for work of equal value' which were not the required answers.

Suggestions for improvement

(a) Teachers must recap the stages of team development as they were taught in Grade 11. Practical examples and demonstrations can be used to explain the meaning and the activities that take place in each stage of development. Learners could be given a project that requires them to work in teams. They must then be requested to reflect on their experiences in working with others, making special reference to the stages of team development. They must also be exposed to source-based questions on this content.

(b) A clear distinction must be made between the causes of conflict and examples of a grievance. The former occurs when two people in the workplace have different opinions. The latter only involves one person who wants to lodge a grievance in the workplace.

(c) Learners must be taught the meaning of action or instructional verbs and how to respond to each verb to avoid forfeiting unnecessary marks in both direct and indirect questions.

(d) The impact of CSI on businesses should not be confused with communities. Learners can be given a project-based task to conduct research on CSI projects that are undertaken by businesses for communities and present their findings in the classroom. Teachers should stimulate debates on the impact of CSR on businesses and communities to enable learners to gain insight in this content. It should be noted that

the following facts on the advantages of CSI on businesses will no longer be accepted as they are based on communities instead of businesses:

- Assists in solving socio-economic issues like poverty/unemployment
- MSM can become more community-based by working closely with the community to roll out skills development projects

(e) Teachers should focus on *how* new ideas benefit businesses, when explaining the advantages of creative thinking in the workplace. Teachers could use key words such as *solutions*, *competitive*, *motivation* and *confidence* to formulate statements on the advantages of creative thinking in the workplace. Learners must be advised to use these key words to remember facts on this content.

(f) Teaching and learning should focus on how businesses must apply human rights in the workplace. Learners must be able to name and identify the six human rights stated in the *2021 Exam Guidelines.* They must also be able to recommend ways in which businesses could deal with each human right in the workplace.

(g) Teachers should provide a detailed description and the application of each problem-solving technique stated in the *2021 Exam Guidelines*. Learners must have a conceptual understanding of all four problem-solving techniques before discussing the impact of each technique.

(h) Learners must be requested to write full sentences on ways in which businesses could promote cultural rights in the workplace. It must also be emphasised that employees are allowed to speak their own language only during their free time, and that employees are not allowed to practise their culture in the workplace.

QUESTION 4: MISCELLANEOUS TOPICS

This question assessed the TWO main topics of this paper consisting of direct short questions of 10 marks per topic. This question was popular as reflected by the large percentage of candidates who answered it. Candidates were expected to perform well in this question as all subquestions were previously assessed in past NSC papers.

Common errors and misconceptions

(a) Many candidates performed well on the functions of the Johannesburg Securities Exchange (JSE) in Q4.1 even though some provided vague and incomplete responses.

(b) Candidates were able to identify a situational leadership theory from a given statement in Q4.2. However, they could not identify the transformational leadership theory. They confused this theory with the transactional leadership style which was not a required answer.

(c) Poor performance was observed in Q4.3 even though it was assessed in the 2019 NSC Examination. Many candidates confused the advantages of a state-owned company with the advantages of either a public company or the public sector.

(d) Candidates' responses were limited to either one or two facts in Q4.4. Other candidates confused the impact of unit trusts with the RSA Retail Savings bonds. Some responses were vague and incomplete.

(e) Many candidates confused the meaning of corporate social responsibility (CSR) with the meaning of corporate social investments (CSI) and gave examples of CSI projects

in Q4.5. Other candidates explained the relationship between CSR and triple bottom line which was not asked in this paper.

(f) A good performance was noted in Q4.6 as many candidates were able to distinguish between problem-solving and decision-making even though some swapped the meaning of problem-solving with decision-making. Others provided incomplete responses on each concept.

(g) Poor performance was observed in Q4.7.2 as many candidates confused other ways of dealing with difficult employees with conflict resolution techniques. Other candidates provided negative strategies on dealing with difficult employees even though recommendations were made in the past national diagnostic reports that learners should refrain from suggesting punitive strategies when this content is assessed.

(h) Candidates' performance was satisfactory in Q4.8 even though some still confused the benefits of diversity in the workplace with the advantages of creative thinking in the workplace.

Suggestions for improvement

(a) Learners must be encouraged to write full sentences on the functions of the JSE to obtain two marks for each fact.

(b) A clear distinction must be made between leadership theories and styles. Learners must be taught that the former guides leaders on how to lead and manage people. Teachers need to define the word *transform* so that learners can have a conceptual understanding of the meaning of the transformational leadership theory. It must be emphasised that this theory provides guidelines on how leaders should manage their followers in a dynamic business environment that requires turn-around strategies.

(c) Learners must be made aware that a state-owned company is by nature also a profit company. Whilst rendering a service at an affordable price is important, the main aim is to make a profit to ensure sustainability. Learners must be requested to conduct research on the characteristics and impact of state-owned companies to enhance understanding.

(d) Teachers should use newspaper clippings in the classroom on the advantages and/or disadvantages of unit trusts. They must ensure that learners do not confuse the types of investment opportunities with the forms of investments as categorized in the *2021 Exam Guidelines.*

(e) A clear distinction must be made between the meaning of CSR and CSI. Learners should realise that businesses must first plan and develop CSR programmes before they embark on CSI projects. They must also know that CSR is a broad concept that focuses on business resources, employees, environment, stakeholders and communities. On the other hand, CSI projects focus only on community upliftment without making a profit.

(f) An in-depth analysis of the differences between problem-solving and decision= making is essential, especially with regards to the word *alternative*. Learners must know that decision-making considers only alternative solutions without a critical evaluation of each solution as compared to problem-solving.

(g) Learners must be informed that businesses are supposed to develop positive strategies to deal with difficult employees in the workplace. It must be emphasised that difficult employees usually exhibit behavioral problems rather than incompetency, hence businesses must develop positive strategies to deal with them. It is imperative that learners clearly understand that businesses implement specific strategies to deal with difficult employees and different strategies to deal with difficult personalities in the workplace.

(h) The benefits of diversity in the workplace should not be confused with the advantages of creative thinking. The latter focuses on positive strategies and ideas that diverse employees bring in the workplace, while the former focuses on the advantages of innovative ideas for businesses. Teachers must provide examples of the benefits of diversity in the workplace and request learners to conduct research on businesses that benefit from a diverse workforce.

SECTION C: ESSAY QUESTIONS

QUESTION 5: BUSINESS VENTURES: FORMS OF OWNERSHIP AND INVESTMENT

Many candidates did not choose Q5 even though it consisted of four subquestions that were assessed in past NSC examinations and the 2021 preparatory examination. Those who answered this question performed well. A possible reason for good performance is that candidates might have been well prepared for this topic since it has been moved to Term 2 in the ATP.

Common errors and misconceptions

(a) Many candidates repeated the second part of the statement that was used in the question paper as their introduction to an essay in Q5.1. Some candidates' responses were not relevant to any of the four subquestions that were asked in this question. This challenge persists as it was also reported in the 2020 national diagnostic report.

(b) Good performance was noted in Q5.2 as many candidates were able to outline the differences between over-insurance and under-insurance even though some provided vague and incomplete responses on this question. Some candidates simply repeated the words 'over-insured' and 'under insured' instead of explaining these concepts.

(c) Many candidates were able to name the principles of insurance, but they could not explain the meaning of each principle in Q5.3. Other candidates wrote incomplete names of the principles of insurance. Some wrote the words 'security guard' instead of 'security', while others confused the meanings of the different principles.

(d) In Q5.4 many candidates provided vague and incomplete responses on the advantages of insurance. Others provided limited responses to explain the meaning of insurance.

(e) Poor performance was observed in Q5.5 as many candidates confused the purpose of COIDA in the context of a Compensation Fund with COIDA as an Act whereby penalties for non-compliance are applied. Some candidates also confused COIDA with RAF and UIF as types of compulsory insurance.

Suggestions for improvement

(a) Impress upon learners that an introduction should reflect any one or two subquestions of the questions that were asked in the paper. Learners must be

advised to refrain from repeating words or statements that were used in the question paper. Instead, they must be encouraged to write creative responses that will not be repeated either in the body or conclusion.

(b) Teachers are advised to start introducing learners to the principles of insurance when teaching the differences between insurance and assurance. Learners must be able to write the full name of each insurance principle to avoid losing marks. It must be emphasised that the principle of 'indemnification' is based on a short-term insurance, while 'security' relates to long term insurance. Learners must acquire an in-depth understanding of all four principles of insurance and must be advised that these principles form part of an insurance contract.

(c) Learners must be advised that the key word 'protect' appears four times in this content and the word 'transfers' appears twice but in different contexts. The above-mentioned key words may assist learners to formulate statements on the advantages of insurance for businesses. Furthermore, teaching and learning should focus on the advantages of insurance for businesses instead of individuals.

(d) Learners must focus on the benefits offered by the Compensation Fund/ Compensation for Injuries and Diseases Fund to employees and how employers must comply with this fund.

(e) Teachers should assist learners on how to write a proper introduction and essay without repeating statements contained in the preamble.

QUESTION 6: BUSINESS ROLES: HUMAN RIGHTS, INCLUSIVITY AND ENVIRONMENTAL FACTORS

The responses of candidates to this question ranged from poor to average. Candidates were expected to perform exceptionally well in this question as all four subquestions were asked as either contextual or essay questions in past NSC papers.

Common errors and misconceptions

(a) Q6.2 was fairly well answered by many candidates even though some confused the meaning of professional behavior with ethical behaviour. Other candidates gave examples of professional behaviour instead of providing a detailed explanation of this concept.

(b) Poor performance was noted in Q6.3 as many candidates confused the types of unethical business practices with the types of unprofessional business practices. Some responses were based on the types of socio-economic issues. Other candidates were able to name the types of unethical business practices, but could not explain how each type poses challenges to businesses. Some candidates wrote 'false advertisement' instead of 'unfair advertising'.

(c) In Q6.4 some candidates provided incorrect strategies on how businesses could deal with each type of unethical business practice. Others provided punitive strategies on how businesses can deal with each type.

(d) Many candidates performed well in Q6.5. However, some responses were based on the application of the King Code principles for good corporate governance, which was not required by the question. Others inappropriately provided the advantages of ethics which are not part of Grade 12 content.

Suggestions for improvement

(a) Teachers should provide a detailed description of ethical and professional behaviour as essential pre-requisite knowledge for learners to understand this content. Learners must be taught that ethical behaviour has to do with business conduct, while professional behaviour with employee conduct.

The following statement on the meaning of professional behaviour will no longer be awarded two marks:

- 'Set of standards of expected behaviour'

This is revised to:

- 'Professional behaviour is a certain standard of behaviour/specific level of competence that adheres to an ethical code of conduct'

(b) Teaching and learning should focus on *how* each type of ethical and unprofessional business practice poses challenges to businesses. Teachers should refer to the *2021 Exam Guidelines* on this content. Learners must be exposed to different types of assessment approaches on how each type of unethical and unprofessional business practice poses challenges to businesses. Teachers should teach professional behaviour and unethical business practice in a tabular format. This will give learners an opportunity to understand the differences between the two concepts.

(c) Full marks will no longer be awarded for the following statement under challenges posed by pricing of goods in rural areas:

- 'Some consumers in rural areas have little economic power and are vulnerable to exploitation'

This is revised as follows:

- 'Some businesses in rural areas exploit their customers by adding much more than necessary to their prices'

(d) The recommendations on unethical and unprofessional business practices should be correctional/positive strategies that are developmental rather than punitive in nature. Learners must first have an in-depth understanding of the challenges posed by each unethical and unprofessional business practice to enable them to suggest strategies to deal with each type. They can be requested to conduct research on how businesses deal with the types of unethical and unprofessional business practices.

Teachers are advised to replace the following fact on dealing with unfair advertising: 'consumers must report unfair advertisement to ASA' with 'businesses must report unfair advertisements by competitors to ASA'. The reason for this change is that teaching and learning should focus on how the types of unethical business practices pose challenges to businesses.

(e) Learners must be able to suggest ways in which professional, ethical, and effective business practice should be conducted in terms of how businesses should deal with employees, take care of the environment and comply with relevant legislation.

CHAPTER 5

ECONOMICS

The following report should be read in conjunction with the Economics Paper 1 and Paper 2 question papers for the NSC November 2021 examinations.

5.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who wrote the Economics examination in 2021 increased by 20 707 compared to that of 2020 i.e. 17,4% of the cohort.

There was an increase in the number of candidates who passed at 30% (Level 2) from 81 536 in 2020 to 94 479 in 2021, and in the number of candidates who passed at 40% (Level 3) from 49 958 to 56 145.

There was a marginal decline in the pass rate at 30% (Level 2) from 68,8% in 2020 to 67,9% in 2021, with a corresponding decrease at 40% (Level 3) from 42,2% to 40,3%. The table below indicates no definite trend in pass rates over the past five years with improvements or declines within a narrow band of only four percentage points at Levels 2 or 3.

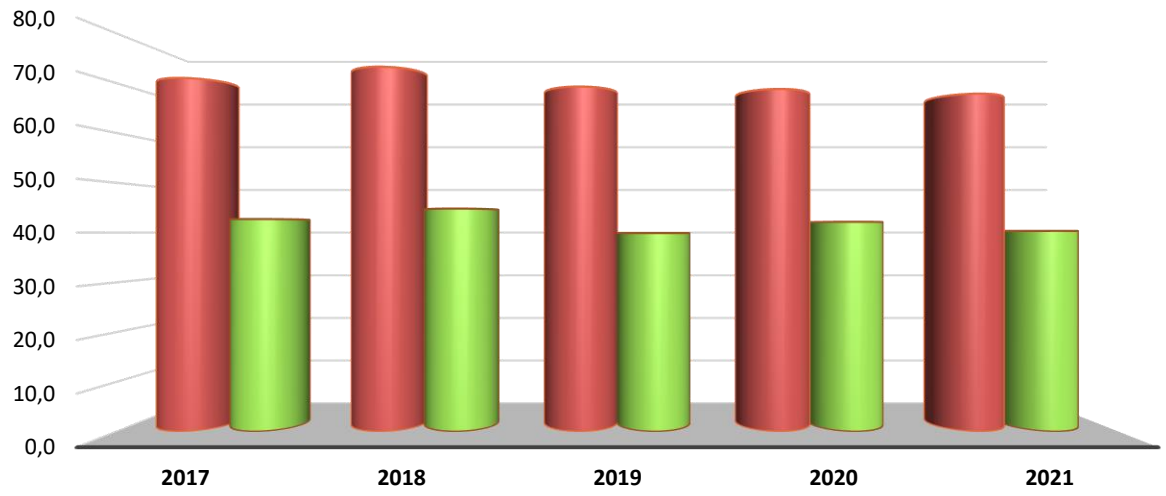
The percentage of distinctions (over 80%; Level 7) remained constant at approximately 1,1%. Given the increase in the size of the 2021 cohort, this converts into an increase in the total number of distinctions from 1 422 in 2020 to 1 531 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 5.1.1 Overall achievement rates in Economics

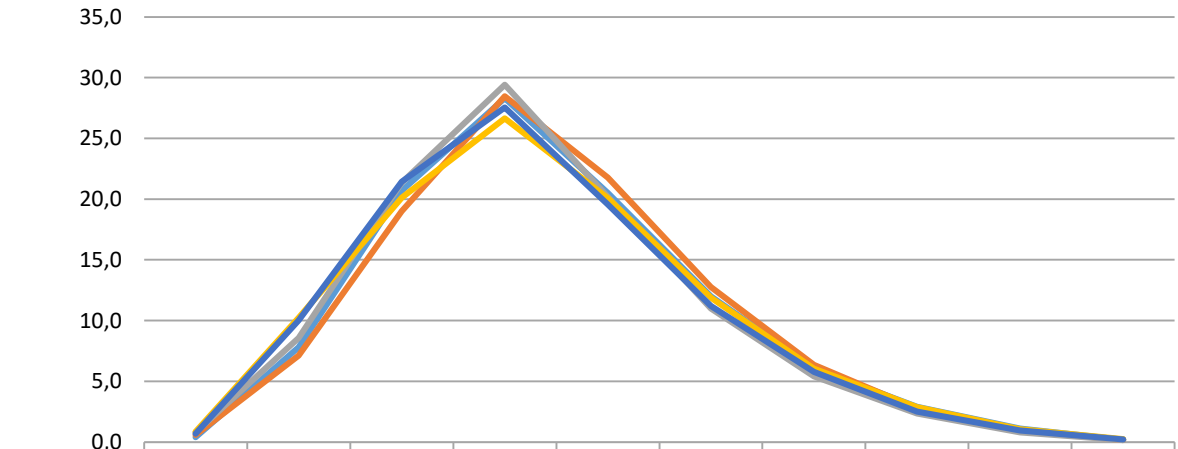
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	128 796	91 488	71,0	55 014	42,7
2018	115 169	84 395	73,3	51 609	44,8
2019	107 940	74 796	69,3	43 054	39,9
2020	118 484	81 536	68,8	49 958	42,2
2021	139 191	94 479	67,9	56 145	40,3

Graph 5.1.1 Overall achievement rates in Economics (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	71,0	73,3	69,3	68,8	67,9
% achieved at 40% and above	42,7	44,8	39,9	42,2	40,3

Graph 5.1.2 Performance distribution curves in Economics (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,4	7,8	20,7	28,3	20,5	12,0	6,1	2,9	1,1	0,2
2018	0,6	7,1	19,0	28,5	21,8	12,8	6,4	2,8	1,0	0,2
2019	0,8	8,6	21,3	29,4	20,2	11,0	5,4	2,4	0,8	0,2
2020	0,9	10,2	20,1	26,7	20,1	11,9	6,0	2,9	1,0	0,2
2021	0,7	10,0	21,4	27,5	19,6	11,2	5,8	2,5	0,9	0,2

5.2 OVERVIEW OF CANDIDATE PERFORMANCE: PAPERS 1 AND 2

General comments

Over the years, there has been an improvement in the writing of essays, but the 8-mark higher-order additional part of the essay and the drawing of graphs still present a challenge to learners. In addition, there are certain areas that require more attention for the results to improve in a meaningful and sustainable way.

A thorough understanding of concepts in all topics will greatly enhance performance in both papers, as they form the basis of understanding subquestions pitched at various cognitive levels. This has a direct impact on Section A, Section B where concepts are tested as definitions, and Section C where concepts form part of the introduction for the essays. An excellent knowledge of economic terminology will result in correct interpretation and answering of indirect questions in Section B and C. One of the challenges in achieving this is that teachers need to reinforce concepts through regular assessment in class.

It is imperative that the content of all topics be covered adequately and timeously to ensure sufficient opportunity for revision. When teachers fall behind in content coverage, topics under Economic Pursuits and/or Contemporary Economic Issues tend not to be taught thoroughly. Candidates who attempt questions on such topics perform poorly in comparison to other topics. Teachers should structure assignments, projects and case studies in Grades 10 and 11 in a manner that will develop learners' writing skills, thus preparing them to cope with the Grade 12 content. This is also an area in which teachers must be supported by subject advisors.

In Grade 10 and Grade 11, learners' knowledge of topics/content should be extended where possible so that a strong foundation is set to cope with the demands of the Grade 12 curriculum. Grade 10 topics such as the Circular Flow, Budget, Government Intervention, Business Cycles, Quantitative Elements and Grade 11 topics such as calculation of GDP, Market Structures, Cost and Revenue Curves, Income Inequalities, Indicators, North/South Divide, Globalisation and Environmental Sustainability have strong links to Grade 12 topics and should be emphasised.

While there has been a general improvement in the drawing of graphs over the years, the technical aspects need to be reinforced. This would include the correct shape, positioning and labelling of cost and revenue curves in the perfect and imperfect markets. Teachers need to address graphs with learners by drawing the cost and revenue curves step by step. As each step is done, it needs to be explained. After the teacher draws each step, learners should do likewise in their workbooks. Emphasis must be placed on the average cost curve (i.e. 'smile') which must always be drawn before the marginal cost curve (i.e. 'tick'). This will ensure that the MC always intersects the AC at its minimum point. It is extremely important that teachers recognise the integration of topics from Grade 10 to 12. Graphs relating to cost and revenue curves must be dealt with thoroughly in Grade 11 as this is the foundation for the more complex graphs in Grade 12. Learners still lack the skill of interpreting graphs they have drawn. Teachers should equip learners with interpretation skills whilst taking them through the steps of drawing graphs.

Simple calculations and formulae need to be reinforced and assessed regularly as these skills are tested frequently in the NSC examination papers e.g. national account aggregates, moving averages, tax burden, the multiplier, BoP, exchange rates, profit and loss, production cost, CBA, percentage changes and the inflation rate.

Specific findings

(a) A good understanding of tables, extracts, news articles, figures and graphs enabled many candidates to perform well.

(b) Although candidates were able to complete each paper within the allocated time, it seems that they had limited time to review their work as evidenced by some subquestions being left blank.

(c) The main reasons for underperformance were the following:

- **Skills:** Poor language skills made it difficult for candidates to understand the requirements of questions and to express themselves clearly, especially in

paragraph-type questions which formed a large part of the question paper. Most candidates were not able to solve problems, give their own opinions or evaluate data connected to their study material. Candidates also lacked basic knowledge of the general economic issues of the day.

- **Content coverage**: It is evident from the poor performance of many candidates that their teachers did not cover some of the topics. Basic economic concepts/terminology seemed to be lacking among many candidates and there was also a lack of knowledge on current economic issues, notably in the following subquestions:
  - Paper 1: Q2.3.5: How can income tax brackets influence taxpayers?
  - Paper 2: Q1.3.5: Monetary policy approach used by the SARB to keep price changes within 3 – 6 %.
    Q4.1.2: How does the Paris Agreement intend to reduce the impact of climate change?

- **Exposure to different types of questions:** Teachers play a crucial role in preparing their learners to deal with a variety of questions with different instruction verbs, such as *why*, *how* and *what* and the unlocking of knowledge in a variety of ways. This gives them the opportunity to develop a variety of higher-order thinking skills in the context of the subject content being taught. Skilled learners are better able to write essays and paragraphs and offer their opinions with confidence. Such learners are able to focus on the information that is relevant to the answering of each question.

- **Problem-solving skills:** Learners should be challenged to solve everyday problems experienced in their own communities, e.g.:
  - Paper 1: Q2.5: How can changes in *terms of trade* influence the South African economy?
    Q3.5: Analyse the environmental effects of economic activities of countries in the north.
  - Paper 2: Q2.5: Analyse measures that may be used by the government to promote competition in the economy.
    Q.5: Additional Part: How can market inefficiency be reduced by global markets?

- **Language ability:** Although proficiency in the language of assessment is still a drawback for many second-language candidates, some centres in deep rural areas produce good results compared to others experiencing similar circumstances. Teaching should take place in such a way that learners understand the content.

General suggestions for improvement

Teachers are advised to build the following practices into their work plan for the year:

(a) **Use of past NSC and *CAPS* aligned exam papers:** In preparation for the 2022 year-end examinations, all learners should have access to and make use of past NSC papers, which must include the final examinations papers (2017–2021) and the supplementary examination papers (2018–2022) for clear guidance on style, format and different questioning techniques. Teachers should reflect on their own confidence and their ability to deal with each topic in the classroom situation and to assist learners through their teaching. Furthermore, teachers should use the 2021 *Examination Guidelines* as support material when it comes to the scope and depth of content and on how to assess learners' understanding of the specific content matter. In cases where previous question papers are used for teaching and learning, these should be *CAPS* compliant and aligned to the

changes made in the 2021 *Examination Guidelines*. Previous question papers and marking guidelines should be used as revision tools but not as a teaching tool, as it encourages spotting of questions for the exams. Interpretation of questions is critical. Content should be continually assessed in line with the 2021 *Examination Guidelines*.

(b) **Basic concepts:** Teachers should ensure that learners understand basic concepts and terminology before engaging in in-depth applications. More time should be spent on improving the reading skills of especially the second-language learners. Learners' understanding of terminology should be assessed on a continuous basis. *Mind the Gap,* which explains relevant concepts in detail, is a useful resource. A quiz bowl, crosswords or team challenges may be interesting tools to assess knowledge of economic concepts. Regular classwork or homework on definitions will ensure that learners stay familiar with these basic concepts.

(c) **Requirements of questions:** Teachers should ensure that learners understand the requirements of questions that may appear in NSC examination papers. For example, if a question requires the drawing or analysis of a well-labelled graph, this must be done effectively to earn the relevant marks, e.g. Paper 1, Q2.4: With the aid of a well-labelled graph, explain the multiplier concept. Paper 2, Q4.4: With the aid of a graph, explain *shutdown point* in a perfect market.

Teachers should familiarise their learners with the new approach of phrasing questions, e.g. the *what*, *why* and *how* type of higher-order questions. However, the misconception that if a question begins with *How* then it constitutes a higher-order question, must be clarified. The following example is an illustration:

How many units are demanded at a price of R10?

This is of a middle-order cognitive level and an easy question. Learners should be guided by the mark allocation in terms of the depth of the answer required. With regard to higher-order questions (especially Q2.5, Q3.5, Q4.5 and the additional part of the essay questions), candidates need to read the question carefully and highlight the key issues required. Further, it must be noted that answers to these questions are not necessarily found in textbooks but will require an application of content studied within a particular context. Reading the question again will ensure greater accuracy in the candidates' response. Responses need to be formulated and the question should be checked constantly to ensure the response logically suits it. It is not wise to respond immediately after the initial reading of the question.

Higher-order questions place advanced cognitive demands on learners and encourage them to think beyond literal answers to questions. Higher-order questions promote critical thinking skills because these types of questions expect learners to apply, analyse, synthesise, and evaluate information instead of simply recalling facts.

Higher-order questions require learners to make inferences, draw relevant and insightful conclusions and use their knowledge in new situations. It also requires them to relate their thinking to other situations and to their own background knowledge. Issues from the real world can be used to either support or refute a point of view.

Time must be devoted to understanding the question clearly, for example:

- Paper 1, Q5: Discuss in detail the new economic paradigm in smoothing out business cycles. Some candidates discussed the new economic paradigm in too much detail. This led to limited time left to answer other sections/questions.
- Paper 2, Q2.5: Analyse measures that may be used by the government to promote competition in the economy. Many candidates referred to the aims of the

competition policy and the various institutions instead of focusing on how the government can promote competition in the economy.

Teachers need to realise that there are more interesting and creative ways to teach than by simply promoting rote learning. This includes teaching for understanding, decision making, problem solving, connecting a part to a whole, detail to concept, and concept to concept. There is also inference, prediction, analysis for bias and learning for transfer. Each of these techniques and processes require some form of critical thinking. Opportunities for learners to develop critical thinking processes will not be found in classrooms dominated by the regurgitation of factual content. They are found in classrooms where active learning is an essential component.

(d) **Comments and explanations:** Teachers should equip learners with the relevant skills needed to express themselves clearly where comments or explanations are required. Learners need guidance on how to express opinions that are relevant to the context of especially higher-order questions, e.g.:

- Paper 1, Q5: Additional part: Evaluate the South African government's initiatives to reduce the economic downturn caused by the Covid-19 pandemic.
- Paper 2, Q6: Additional part: How does foreign direct investment influence inflation in the economy?

(e) **The importance of formative testing:** Teachers should build the confidence of learners through the use of short informal formative tests and tasks. These tasks should be used to ascertain whether learners are able to apply their knowledge, placing emphasis on their own opinion and understanding. This will encourage learners to take ownership of the learning process.

(f) **The structure of the paper:**

- **SECTIONS A AND B:** The demands of these sections should be explained to learners to enable them to organise their answers properly. Leaving lines between subsections, using the correct numbering system, and not omitting question numbers are examples of issues that make assessment more effective. In Section A, learners must be made aware that no marks will be awarded when they provide more than one answer to a short question. It is important that they cancel an incorrect answer in Q1.1 and Q1.2 and write the correct one next to it, instead of writing over the incorrect answer. There is a misconception that answers to 1-mark questions in the Data Response items must come directly from the data. A question may require an application of knowledge when the answer appears in the data or it may be a simple question related to the data.

- **SECTION C (Essay):** Teachers must stress the importance of the layout of the essay, i.e. introduction, body (main and additional part) and conclusion. There should be a clear distinction between the various aspects with line spacing between them. Using subheadings is crucial as this earns marks and provides structure to the response. Learners should structure the essay according to the outline provided in the question paper. Learners must be made aware that no marks will be earned if any part of the introduction or body is repeated in the conclusion. Instead, it should include the learner's own opinion/an alternative viewpoint/any fact to support the body or a summary of the discussion.

  Teachers must allow learners the opportunity to practise the answering of essay questions. When a topic or chapter is finished, an essay question should be given

as a test or homework. If given as homework, the essay can be assessed in terms of the following important aspects (detailed assessment is not necessary):
- Relevant introduction
- Subheadings in the main part
- The appropriateness of the additional part
- Relevant conclusion

- Teachers are advised to use a variety of resources (including textbooks) to prepare notes that supplement material available to learners. This is necessary where a prescribed textbook does not adequately cover aspects stipulated in the 2021 *Examination Guidelines*.

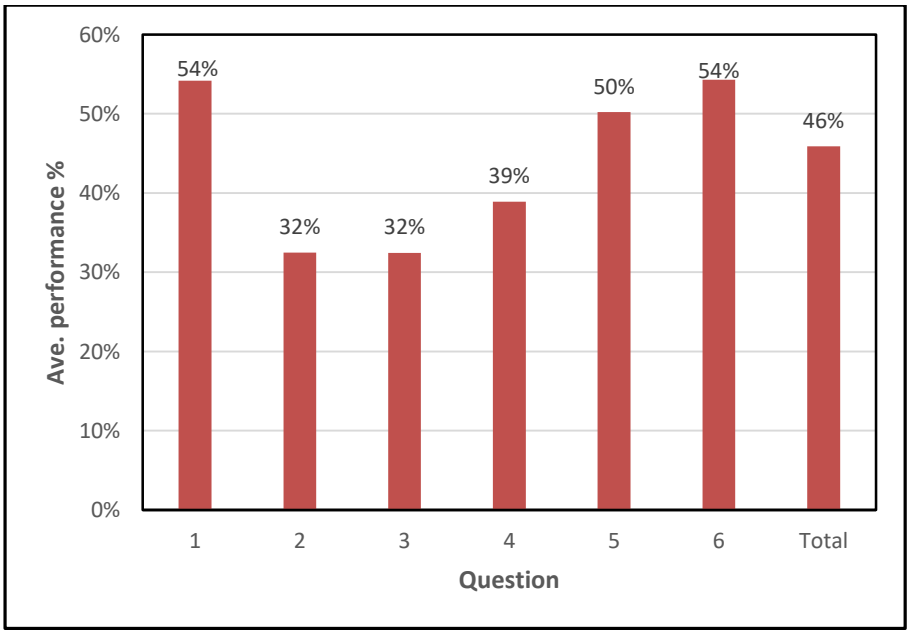
- Topics earmarked as possible essays in the 2021 *Examination Guidelines* should be thoroughly prepared for the examination. Spotting of questions underprepares candidates and leads to poor performance. In both Paper 1 and Paper 2, various essay topics were covered in lower-order and middle-order questions.
  - Paper 1 reflected a total of 49 marks on these questions (see Q1, Q3.2, Q3.3, Q4.2, Q4.4).
  - Paper 2 reflected 42 marks on these questions (see Q1, Q2.2, Q3.2, Q3.3 and Q4.3).

5.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

The average performance in Q2 and Q5 showed a decline from that in 2020. Candidates performed worst in Q3 (Economic Pursuits) in 2018-2020 with a slight improvement in 2021. There was also a slight improvement in Q4 (Macroeconomics & Economic Pursuits).

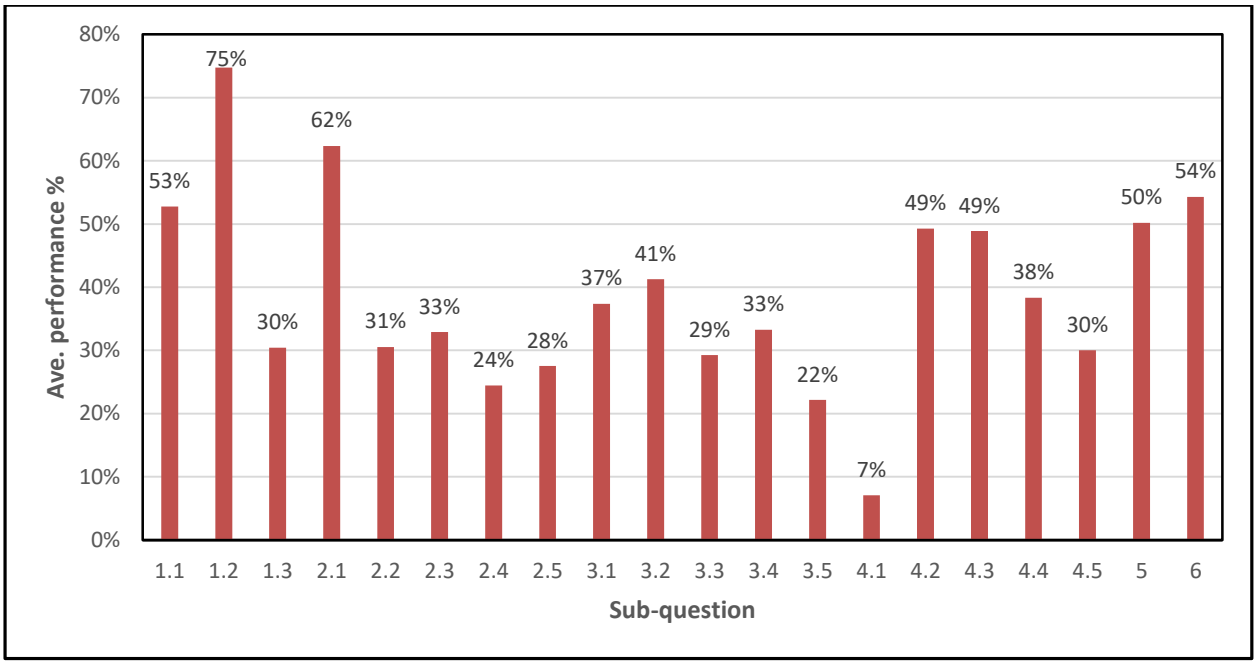
The following graph is based on data from a random sample of candidates. While this graph may not reflect national averages accurately, it is useful to assess the relative degrees of challenge of each question as experienced by candidates.

Graph 5.3.1 Average performance per question in Paper 1



Q	Topics
1	Objective questions
2	Macroeconomics
3	Economic pursuits
4	Macro & pursuits
5	Macroeconomics
6	Economic pursuits

Graph 5.3.2 Average performance per sub-question in Paper 1



Sub-Q	Topic	Sub-Q	Topic
1.1	Multiple choice	3.3	SA Endeavours in regional development
1.2	Matching	3.4	Aims of regional development
1.3	Give a term	3.5	North-South divide
2.1	Public sector failure	4.1	BoP financial account
2.2	National account aggregates	4.2	International trade / BoP
2.3	Fiscal policy	4.3	Economic growth and development
2.4	Multiplier	4.4	Macroeconomic objectives
2.5	Terms of trade	4.5	Unemployment as economic indicator
3.1	Land restitution	5	New economic paradigm
3.2	Economic and Social Indicators	6	Protectionism
3.2	Tourism	6	Consequences of inflation

5.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MACROECONOMICS AND ECONOMIC PURSUITS

Most candidates revealed a moderate performance in Q1. The performance of candidates ranged from excellent to poor. Some candidates attained full marks and others did not even attempt to answer some of the questions. This question was compulsory.

Common errors and misconceptions

(a) In Q1.1 candidates had to choose the answer from various options provided. Generally, the lack of content knowledge led to many candidates being unable to choose the correct alternative. Poor performance was recorded in Q1.1.4, Q1.1.5, Q1.1.6 and Q1.1.8.

(b) In Q1.2 candidates had to match an Economics term with given statements. In some cases, they changed their original answers without cancelling the first one, or left out certain answers by mistake. Generally, a lack of content knowledge impaired candidates'

performance. They could not match the correct answers for *cash reserve requirements*, *price discrimination* and *desirable mix*. Poor performance was recorded in Q1.2.3, Q1.2.4 and Q1.2.6.

(c) In Q1.3 candidates had to give an Economics term for a given statement, but they provided an abbreviation or acronym instead. Refer to 1.3.6 (IMS). The marking guidelines accepted only the correct answer with no acronyms, abbreviations or examples. When candidates provided more than one answer, they were awarded no marks. This was a poor overall performance compared to that in 2020, especially in Q1.3.2 and Q1.3.5.

(d) In Q1.3.1 many candidates confused *absolute advantage* and *comparative advantage*, and Q1.3.3 was a good example of typical answers from candidates reflecting broad knowledge rather than in-depth knowledge of the subject matter.

Suggestions for improvement

(a) It is imperative that learners first attempt to determine the correct answer to a multiple-choice question before considering the given options. Furthermore, the format of Section A should be explained to learners to enable them to organise their answers correctly. In light of this, learners need to follow instructions such as answering Q1 in the answer book, leaving lines between subsections, using the correct numbering system, and not omitting question numbers. This would facilitate the marking of scripts.

(b) The confidence of learners should be built by spending more time on the understanding of economic terminology, definitions and concepts to ensure expanded knowledge over the broad spectrum of the subject.

(c) Teachers should expose learners to all basic economic concepts covered in the various topics, e.g. Q1.1.4, where Financial derivatives form part of the financial account in the Balance of Payments. Learners should attempt to answer all items in Q1.1 and Q1.2 where the options are provided. Learners should also concentrate on more detailed preparation in respect of concepts and terminology, to ensure that they attain higher marks for Q1.3. It is advisable that teachers commence every lesson by testing terms and concepts addressed in the previous lesson.

(d) Although multiple-choice questions provide possible answers, they require full content knowledge. Constant revision of terminology is strongly advised.

QUESTION 2: MACROECONOMICS

Common errors and misconceptions

(a) In Q2.1.2 most candidates responded poorly on the reason why public sector failure led to social instability, and focused on the reasons for public sector failure, instead of the effects thereof.

(b) Many candidates could not briefly describe the term *gross value added* in Q2.2.3, as part of national income figures.

(c) In Q2.2.4 some candidates could not convert basic prices to market prices.

(d) Many candidates who performed poorly in Q2.3.2 lost marks because they could not give the benchmark percentage of public debt in relation to gross domestic product.

(e) In Q2.3.5 most candidates could not explain how income tax brackets influence taxpayers.

(f) In Q2.4 a large number of candidates struggled to draw a correctly labelled graph and explain the multiplier concept.

(g) Many candidates failed to analyse the influence, changes in the *terms of trade* could have on the South African economy (Q2.5).

Suggestions for improvement

(a) It is extremely important that learners should be prepared on the whole syllabus and not only parts thereof. Knowledge of the *latest* statistical data made available by SARB (on national account aggregates, Balance of Payments and foreign exchange markets) and Stats SA, should be studied in detail to ensure that learners know exactly how to prepare themselves thoroughly for the final examination. Learners should be able to use the information provided in these statistics to answer questions properly (Q2.2.4).

(b) There is a clear shift towards the learners' interpretation and problem-solving skills as demanded by data-response questions (Q2.2.5, Q2.3.4 and Q2.3.5). A variety of cartoons, extracts from newspapers and magazines, and graphs/tables should be discussed in class. Learners should be exposed to current economic issues and they should be guided in their answers. They should be encouraged and taught how to apply and contextualise their theoretical knowledge, general observation and critical thinking into real-life economic situations, e.g. How can income tax brackets influence taxpayers? (Q2.3.5).

(c) Teachers need to ensure that learners know how to calculate and derive figures from data given, as in Q2.2.4 and Q2.2.5 where candidates had to convert figures and give reasons why constant prices are used to measure economic growth.

(d) Teachers must ensure that the teaching of concepts, data response and correct economic terminology is adequately done. They should ensure that learners know what is expected of them, based on the various concepts and the depth of knowledge explained in the 2021 *Examination Guidelines* (EG) (see discretion on p.17 in EG and multiplier on p.15 in EG). Teachers must also make use of print media in the classroom to acquaint learners with contemporary economic issues. Subject advisors need to support teachers by developing content-based documents that address challenging topics in Economics.

QUESTION 3: ECONOMIC PURSUITS

Common errors and misconceptions

(a) Weaker candidates could not name the methods of import substitution in Q3.1.1. Instead they gave the methods to calculate GDP and focused on RDP and compensation paid by government. Language issues continue to be a barrier and many candidates lost marks due to a poor command of the language in not explaining concepts fully. Many responses were mainly generic and completely void of Economic reasoning.

(b) Many candidates misinterpreted the data-response questions (Q3.2 and Q3.3). Most subquestions demanded reading with understanding and interpretation.

(c) Some candidates found opinion-based questions challenging. In Q3.2.4 candidates could only supply generic facts like *overcrowding* and the differences between *rich and*

poor. In Q3.2.5 many candidates could not explain how renewable sources of energy would affect poor households in rural areas positively and failed to associate content learnt and its contextualisation. This indicated a lack of general knowledge and interpretation skills, which was also evident in Q3.3.4 and Q3.3.5.

(d) It would appear that current economic issues are not discussed on a regular basis in class. Candidates' responses were too generic and lacked factual knowledge (Q3.5). Many candidates could not analyse the environmental effects of economic activities of countries in the north in sufficient detail.

Suggestions for improvement

(a) The main problem seems to be a lack of applying factual knowledge to solving typical day-to-day problems experienced in economies worldwide. The reason might be an insufficient variety of classroom assessment tasks.

(b) Teachers should emphasise that data-based questions (Q3.2 and Q3.3) cover middle-order responses. The action verbs *how* or *why* in these cases, would not have the same expectations from the responses of candidates, as compared to Q3.5 (a higher-order type question).

(c) Additional learning material should be given to learners during the academic year. Data provided in data-response questions should be analysed thoroughly before learners attempt to answer any questions set.

(d) More case-study questions should be discussed in class and given as homework activities. Debates and presentations of certain topics should be conducted regularly. Teachers must endeavour to include the *why*, *which*, *how*, *when*, *whom* types of questions to enable learners to think beyond typical textbook knowledge.

(e) In Q3.5 most candidates merely explained the differences between *north* and *south,* without analysing the environmental effects of economic activities. Deeper thinking skills should be developed during teaching and learning, encouraging learners to ask *why* and *how* something can be achieved.

QUESTION 4: MACROECONOMICS AND ECONOMIC PURSUITS

Common errors and misconceptions

(a) Many candidates could not answer Q4.1.1 where they had to name any TWO international benchmark criteria for regional development (see 2021 *Examination Guidelines* p.28). Most candidates also performed poorly in Q4.1.2 where they had to give reasons why liabilities are added when calculating net direct investments in the financial account of the balance of payments (see 2021 *Examination Guidelines* p. 19).

(b) In Q4.2.4 many candidates could not give an appropriate reason why South African consumers import products that are available on domestic markets. Typical incorrect responses were job creation and production.

(c) Many candidates did not know how to link the effect of natural disasters on the trade balance (Q4.2.5).

(d) In Q4.3.4 most candidates found it difficult to explain the impact of an increase in consumer spending on the production of goods and services. Instead candidates explained the impact of an increase in consumer spending on prices and inflation.

(e) In Q4.3.5 many candidates' lack of grasping the economic concepts and relating them to real-life situations, resulted in their inability to explain how SMMEs could contribute to economic growth and development.

(f) In Q4.5 most candidates struggled to apply their knowledge to the analysis of the challenges of the South African government in reducing the unemployment rate in the economy. Candidates only listed certain facts and did not meet the requirements of the expected cognitive level.

Suggestions for improvement

(a) Teachers should use a variety of resource materials to prepare learners adequately for the examination. Current economic issues should be used as examples to illustrate the subject in context. Economics in the classroom should be linked to Economics in real life by exposing learners to actual data, graphs and statistics.

(b) Teachers should ensure that learners understand what is expected of them when instruction verbs such as argue, analyse, evaluate or differentiate are used in a question.

(c) Learners generally lack insight into current economic affairs. Teachers should provide learners with additional notes on the five sub-accounts of the financial account in the Balance of Payments (BoP) to ensure that learners are able to explain Direct Investments as part of the financial account in the BoP, with understanding.

(d) Learners should be guided on the process of selecting questions from both Section B and Section C, as part of exam-answering techniques. It is noted that often all of the questions in Section B are answered; this is a clear indication of poor planning and a waste of valuable time. Instructions need to be explained and reinforced to learners during their revision sessions so that they are clear about the requirements.

(e) Learners need to be trained to answer higher-order questions. Teachers should ensure that learners have a clear understanding of what is expected of them, based on the depth of knowledge explained in the 2021 *Examination Guidelines*.

QUESTION 5: MACROECONOMICS

Common errors and misconceptions

Many candidates wrongly explained the business cycle or features underpinning forecasting as introduction. This resulted in their forfeiting 2 marks for the introduction. They listed facts in broad, general terms in the main part of the essay and confused monetary and fiscal policies with generic information on a business cycle. In the additional part most candidates could not evaluate the South African government's initiatives to reduce economic downturn caused by the Covid-19 pandemic. They were unable to relate theoretical knowledge with current topical items.

Suggestions for improvement

(a) It is important that subject advisors supplement content on this topic through teacher development workshops, to address gaps in teachers' content.

(b) Teachers are urged to use the 2021 *Examination Guidelines* which clearly indicate all possible essay questions for the next three years. These essays should be prepared in advance to ensure excellent marks in the introduction and main parts of the essays. The fact that so many candidates are including topics not earmarked as essays, such as

different types of business cycles, features underpinning forecasting of business cycles, is concerning, in light of the fact that policy guidelines are provided.

(c) Teachers should expose learners to numerous question papers to enable wider awareness of different types of questions. Learners should be exposed to questions on all levels of difficulty during class activities, tests and internal examinations.

QUESTION 6: ECONOMIC PURSUITS

Common errors and misconceptions

(a) Most candidates could list the different arguments in favour of protectionism, but tended to be generic in their discussions. Candidates included detail on free trade and export promotion, which was not a requirement of the question.

(b) The additional part, which demanded higher cognitive thinking skills, was poorly answered by most candidates. They struggled to explain how South Africa benefits from trading in global markets.

Suggestions for improvement

(a) Teaching of these topics should be done holistically. Learners should be guided in discussing each fact in detail. This will ensure that they do not omit any crucial aspect of the answer. More attention should be given to areas that can cause confusion.

(b) Basic content should not only be covered but should also be linked to the creativity of learners in the practical implementation of each topic. Case studies and class discussions can be used gainfully in this regard. Learners need to improve their evaluation skills, and knowledge about recent developments can assist in making the module more interesting.

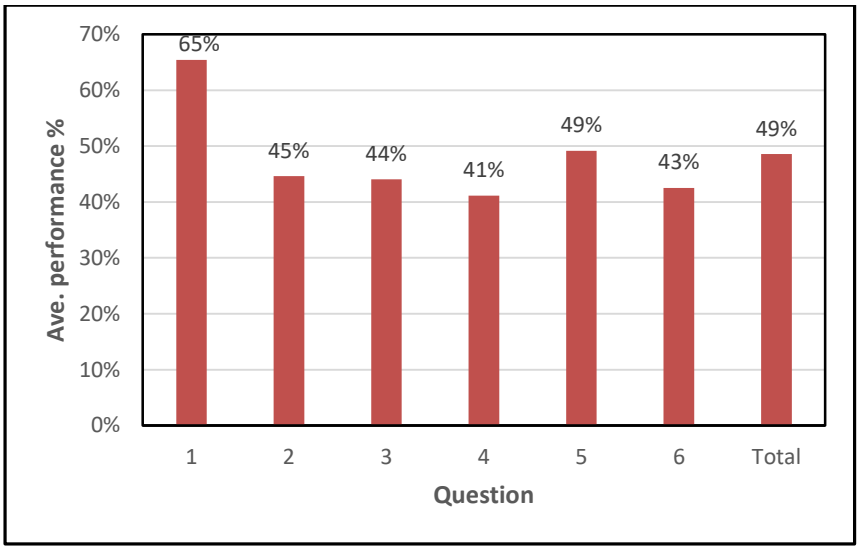
(c) Formative tests should be used to ensure that learners are able to understand and discuss all relevant topics asked as essays for the first time (Protectionism). Teachers should plan so that the relevant core content for the year is taught well in advance (of the suggested ATP) to ensure enough time for revision. Learners should keep abreast of current news pertinent to aspects of Economics and discuss these regularly in class.

5.5 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 2

The performance in Section A increased slightly when compared to that of 2020 with an increase in Q1.1 and Q1.2 and a decrease in Q1.3. In Section B, candidates generally performed better in Q2, Q3 and Q4. In Section C, there was a significant decrease of in Q5 when compared to 2020. There was a marginal increase in Q6. The performance in Microeconomics over the years has generally been poor to average.

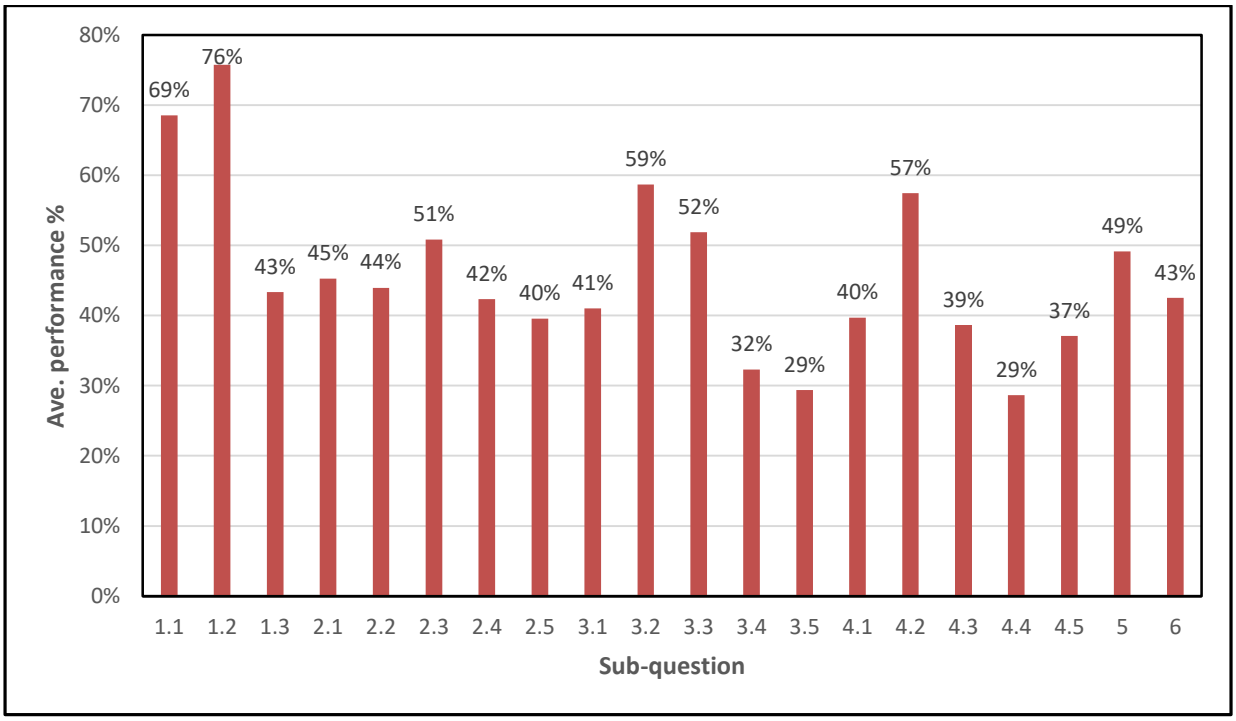
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 5.5.1 Average performance per question in Paper 2



Q	Topic/s
1	Objective questions
2	Microeconomics
3	Contemporary economic issues
4	Microeconomics and Contemporary economic issues
5	Microeconomics
6	Contemporary economic issues

Graph 5.5.2 Average performance per sub-question in Paper 2



Sub-Q	Topic	Sub-Q	Topic
1.1	Multiple choice	3.3	Environmental problems
1.2	Matching	3.4	Sustainability - failure of markets
1.3	Concepts	3.5	Market strategies to promote tourism
2.1	Competition policy/monopolistic	4.1	Fixed costs/Paris Agreement
2.2	Barriers to entry/monopoly	4.2	World heritage sites/tourism
2.3	Perfect market	4.3	Oligopoly/Collusion
2.4	Revenue curves for a monopoly	4.4	Shutdown-point in a perfect market
2.5	Measures to promote competition	4.5	Impact of population on the environment
3.1	Criteria for tourism activity /preservation	5	Market failures- government intervention
3.2	Tourism	6	Consequences of inflation

5.6 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MICROECONOMICS AND CONTEMPORARY ECONOMIC ISSUES

Most candidates performed well in Q1, especially the multiple choice and matching questions. In Q1.3 it was evident that candidates still struggle with concepts and often confuse related concepts. Overall, there was a slight improvement from the previous year. The performance of candidates ranged from excellent to poor. Some candidates attained full marks whilst a few did not even attempt to answer some of the questions.

Common errors and misconceptions

(a) In Q1.1 many candidates omitted to include some answers which resulted in incorrect numbering. In some cases, more than one answer was provided.

(b) Most candidates performed poorly on questions related to Microeconomics. Poor performance in Q1.1.1 can be attributed to the misunderstanding of *implicit* and *explicit*. Both were provided as answers.

(c) In Q1.3.1 some candidates' responses included *service delivery* and *customer satisfaction* instead of *allocative efficiency*. Many candidates indicated *Pareto optimum* which is technically incorrect in relation to the question. This implies that *efficiency* is a misunderstood concept.

(d) Inflation targeting was confused with inflation rate in Q1.3.4 and biodiversity was confused with biodegradable in Q1.3.6 by a fair percentage of candidates.

(e) Many candidates could not recognise the general manner in which Q1.3.6 was phrased, as it did not warrant a specific type of pollution as the answer. Answers related to the introduction of waste matter in a specific environment, e.g. water pollution, which was marked correctly.

Suggestions for improvement

(a) In Q1.1 learners are expected to write the letter of their choice (A, B, C or D) next to question numbers. However, if for some unknown reason, they decide to write the statements/option, then this would have to be the complete statement, as per the question paper. It is suggested that learners first attempt to determine the correct answer to multiple-choice questions before analysing the given options. Learners must be made aware that no marks will be awarded when they provide more than one answer to a short question. It is important that they cancel an incorrect answer in Q1.1 and Q1.2 and write the correct one next to it, instead of writing over the incorrect answer.

(b) Teachers should emphasise the difference between *implicit cost* and *explicit costs* and try to relate fixed and variable costs to explicit costs with examples. Teachers could go one step further and explain the difference between accounting profit and economic profit and how it relates to explicit cost and implicit cost. This will give learners a clear understanding of why normal profit in Economics is equated to break-even point (takes into account explicit and implicit costs). This is very different to Accounting profit where only explicit costs are considered in determining profit.

(c) Emphasis on distinguishing between the concepts of *allocative efficiency*, *technical/ productive efficiency* and *pareto efficiency* is essential when discussing market failures.

Pareto Optimum is a technically incorrect response to Q1.3.1. Pareto optimum is related to *Allocative efficiency* as both are linked as being on an optimal point on the *Production Possibility Curve* (a condition for *allocative efficiency*). For the attainment of a Pareto-efficient situation in an economy, the following three conditions must be satisfied:

- Efficiency of distribution of commodities among consumers (efficiency in exchange)
- Efficiency of the allocation of factors among firms (efficiency of production)
- Efficiency in the allocation of factors among commodities (efficiency in the product-mix)

(d) Definitions and concepts should be emphasised. Use of a glossary should form the basis of teaching and learning in Economics.

(e) Revision by means of short, regular formative tests on basic concepts is strongly recommended. Learners should be encouraged to make a list of the key concepts of each topic, especially in Microeconomics.

QUESTION 2: MICROECONOMICS

Common errors and misconceptions

(a) Q2.1.1 was answered poorly. Many candidates confused aims/objectives of competition policy with the Competition Act.

(b) In Q2.1.2 many candidates struggled with the concept, 'hybrid market structure'. They failed to supply the expected correct response. Some candidates were not able to differentiate between *monopolistic market* and *monopolistic competition.*

(c) Most candidates misunderstood the requirements of Q2.2.5 and proceeded to discuss the characteristics of monopoly.

(d) A lack of application and interpretation of a graph in a certain context was evident in Q2.3.5 as many candidates' responses related to the market/industry instead of the individual business. Candidates found it difficult to relate the impact of one variable on another.

(e) In Q2.4 most candidates were able to draw the graph, but failed to label it accordingly. The relationship between average revenue and marginal revenue was not well explained as many candidates simply mentioned what was shown in the graph instead of relating marginal revenue to the average revenue curve.

(f) Most candidates answered Q2.5 poorly. Many incorrectly referred to aims of the competition policy and the various institutions, instead of analysing measures to promote competition. Candidates appeared to be confused by the cognitive verb, 'analyse'.

Suggestions for improvement

(a) Teachers should emphasise the difference between the *competition policy* and the *Competition Act* when discussing the aims/objectives.

(b) While the characteristic of 'hybrid' is not explicitly indicated in the *2021 Examination Guidelines*, it is a characteristic that learners will come across under the characteristics of Monopolistic Competition. A clear distinction must be made between *monopolistic competition* and *monopolistic market* as the latter relate to a monopoly market structure. Teachers must be encouraged to mediate the content, especially related concepts, more effectively to learners.

(c) Teachers must emphasise that with regards to imperfect markets the marginal revenue (MR) curve will always lie below the average revenue (AR) or demand curve due to its negative slope, except at unit one where both curves touch. This is due to more units being sold at a lower price; hence the MR will be lower. This must be supported by a revenue table for learners to clearly see that the MR is less than AR at each quantity. In drawing the MR curve, stress the point that it should not touch the Y-axis, as the MR cannot have a positive value on the Y-axis, due to it being undefined at zero units. Teachers should also compare this to a perfect market where the demand curve (AR) is the same as the MR curve due to the horizontal demand curve.

(d) The practice of drawing and labelling graphs is essential to learners' understanding of various concepts and content related to the topic. Teacher should also encourage learners to provide explanations to given graphs. Regular assessment on the drawing of graphs in Microeconomics from Grade 10 to 12 is essential in reinforcing the various related concepts.

(e) Teachers must spend time to explain the cognitive verbs from the *2021 Examination Guidelines* to learners in detail so that learners are familiar and clear about the expectations of these verbs, especially in relation to higher-order questions.

(f) Learners need to be aware of the specific requirements of a higher-order question. In addition, teachers need to assess higher-order questions appropriately so that learners clearly understand the mark allocation. Mere listing of facts without an explanation in context will earn only 2 marks, instead of the full component of 8 marks.

QUESTION 3: CONTEMPORARY ECONOMIC ISSUES

Common errors and misconceptions

(a) Most candidates' responses in Q3.1.1 were based on the purpose of tourism, e.g. leisure and business, instead of the criteria.

(b) In Q3.1.1 many candidates' responses related to *conservation* instead of *preservation*.

(c) Many candidates' responses in Q3.2.3 related to *domestic* instead of *inbound* tourists.

(d) Many candidates experienced challenges with interpreting Q3.2.4. Their responses tended to repeat the question without explaining the actual role played by tourism in developing infrastructure. Incorrect responses included 'tourism creates jobs' and 'the role played by tourism in the economy'.

(e) International agreements were still a challenge for most candidates as they failed to link environmental problems to the international agreements in Q3.3.2.

(f) In Q3.3.4 some candidates explained soil erosion only but struggled to relate soil erosion to food security.

(g) A large percentage of candidates misinterpreted the words 'why markets fail' in Q3.4 and discussed reasons for market failure (microeconomics) instead. They failed to link it to environmental sustainability.

(h) In Q3.5 many candidates failed to analyse marketing strategies, instead they discussed reasons for growth in the tourism industry.

Suggestions for improvement

(a) The teaching of contemporary economic issues is imperative and basic concepts need to be emphasised. Sometimes these topics may not be covered in some centres, possibly due to poor time management. Teachers should cover Environmental Sustainability thoroughly in Grade 11, as a large part of the content overlaps with the Grade 12 topic on the environment. Assessment should also be comprehensive to give learners a head-start in Grade 12. This will allow for more time to cover other topics which are sometimes neglected.

(b) Learners must be exposed to more data-response questions i.e. 4-mark questions that require application skills. A thorough understanding of key concepts is necessary to interpret such subquestions. Such questions should be discussed in class, with the emphasis on using the relevant data to address the requirements of the question. Logical reasoning would enable learners to earn marks especially if they can show an understanding of the question.

(c) The importance of infusing current economic issues in lessons cannot be over-emphasised enough especially where content can be linked with real issues. Issues such as Covid-19 could be easily linked to tourism and inflation.

(d) In teaching Economics, a crucial element is to motivate learners to think laterally about the topic. Where possible, teachers must relate the different topics to real-world issues. This will help learners prepare for higher-order questions. Learners must gain practice in evaluating, assessing or critiquing issues or topics whenever possible. Teachers are encouraged to set their own higher-order questions, to extend their respective classes. They should realise that textbooks would not be adequate in providing all relevant and current responses to questions, but minimise an over-reliance on them.

(e) Sufficient informal activities on high-order questions are crucial in preparing learners for subsequent formal assessment tasks. Data-response questions should not merely require learners to re-produce answers from the given data. Learners should be able to apply the data in the appropriate context.

QUESTION 4: MICROECONOMIC/CONTEMPORARY ECONOMIC ISSUES

Common errors and misconceptions

(a) Many candidates' responses in Q4.1.2 did not address the question asked. Instead, they focused on climate change and global warming. The poor responses could be attributed to an additional inclusion in the *2021 Examination Guidelines* with regards to climate change. Many textbooks do not cover the basic content on this topic.

(b) Most candidates answered Q4.2.4 poorly. They confused *appreciation* with *depreciation* of the rand and failed to clearly show its effect on inbound tourism. A lack of pre-requisite knowledge and a lack of application of a concept in context waere clearly evident.

(c) Responses in Q4.3.3 clearly indicated a lack of understanding of the various market structures as many candidates referred to characteristics of other market structures instead of oligopoly.

(d) In Q4.3.5 some candidates were able to demonstrate knowledge of price fixing, but could not relate its impact on the market. They confused price fixing with *minimum prices* and *maximum prices*. Understanding and interpretating the requirements of a question was a challenge for most candidates.

(e) Drawing of graphs still presented a challenge as noted in Q4.4 which was poorly answered. Marks were lost for the following reasons:
- Cost curves were incorrectly drawn and/or labelled
- Shut-down point was incorrectly indicated
- Axes not labelled
- Inappropriate explanation of economic and normal profit instead of shut-down point

Suggestions for improvement

(a) It is essential that teachers closely follow the *2021 Examination Guidelines* and ensure that the content is researched where textbooks do not cover such topics. A case in point being the Paris Agreement which is an improvement on the Kyoto Protocol as it limits the impact of climate change. Essentially the goal of the Paris Agreement (2015) is to limit global warming to well below 2°, preferably to 1,5 degrees Celsius**,** compared to pre-industrial levels. The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.

(b) Teachers should be encouraged to compare and contrast the four markets in Grade 11 when they address *perfect* and *imperfect* markets. The basic characteristics of the four market structures (number of sellers, nature of product, price, quantities, market entry and examples) must be taught thoroughly and thereafter reinforced, together with other characteristics when dealing with this topic in Grade 12.

(c) There are many criteria outlined in the *2021 Examination Guidelines* that will assist learners to compare the various market structures. Teachers are encouraged to develop mnemonics so that it becomes easier to do a comparison in order to identify similarities and differences. This will help learners to master the content of the characteristics of the various market structures.

(d) Cost curves are considered pre-requisite knowledge when dealing with the various equilibrium positions in Grade 12. Cost and revenue curves must be thoroughly addressed in Grade 11. This will serve as a strong foundation when drawing graphs related to perfect and imperfect markets in Grade12.

(e) A major contributing factor for poor performance arises from incorrect interpretation of the question due to lack of a thorough understanding of a particular concept. This negatively influences its application in a context that is relevant to the question and compromises logical reasoning. Teachers should refrain from providing marking guidelines to learners before they attempt challenging questions, as this prevents them from thinking critically about the question themselves.

QUESTION 5: MICROECONOMICS

In general, the level of performance in response to the question was satisfactory. This particular essay was popular. The candidates, however, performed poorly in the additional part.

Common errors and misconceptions

(a) Many candidates made reference to the reasons for market failure instead of the state intervention as a consequence of market failure. Responses also related to market structures which indicate some confusion between market structures and market failures. Some candidates included graphs although it was not required. They were, however, credited for correct explanations.

(b) Most candidates performed poorly in the additional part of the essay. They struggled to interpret the question to explain how global markets can reduce market inefficiency.

(c) Although guided in the question paper as to what a conclusion should entail, the writing of a relevant conclusion was a challenge for most candidates.

Suggestions for improvement

(a) Teachers must ensure that learners are able to interpret questions correctly to avoid irrelevant information in their responses. They are advised to expose learners to different questions on the same topic and guide them on the interpretation of questions. In this regard, learners should practise how to structure responses to questions based on key issues.

(b) Learners must practise answering higher-order questions. Teachers must unpack questions in a way that guides learners to focus on the key issues demanded by the question. Learners should be engaged in classroom discussions, which will promote their ability to interpret content and to think critically because of the feedback they get from others.

(c) Essays must be given as practice to learners on a regular basis whereby teachers can focus on assessing the additional part and the conclusion of the essay, areas identified as problematic for many learners.

QUESTION 6: CONTEMPORARY ECONOMIC ISSUES

In general, the level of performance in response to this question was satisfactory.

Common errors and misconceptions

(a) Although a guideline was available, many candidates did not present their answers in terms of the structure expected by using suggested subheadings.

(b) The main part was answered fairly well. Candidates were credited for mentioning general consequences of inflation although it was not discussed under specific headings. Some candidates' responses related to other aspects of inflation such as causes and measures to combat inflation, which was not required in this instance.

(c) In the additional part, candidates found it difficult to relate *foreign direct investment* to inflation. Answers suggested a lack of understanding of the concept *foreign direct investment*.

(d) Many candidates wrote about the benefits of tourism instead of environmental problems. This suggested a lack of adequate preparation and spotting for the examination.

Suggestions for improvement

(a) The teaching of all content should be completed timeously so that more opportunities for revision are created. Poor planning and delivery often leads to some teachers rushing through the last few modules and not spending as much time on contemporary economic topics. Teachers need to ensure that each topic is given adequate attention, as outlined in the ATP.

(b) In their conclusions, learners should be taught how to structure a response in support of, or against the facts mentioned in the main part. Teachers should constantly remind

learners of the guideline in the question paper regarding the conclusion to the essay, during the revision sessions.

(c) Learners must be exposed to current affairs/news/events on a continuous basis from Grade 10. SBA tasks should be prepared on current issues to help learners to relate the content to the real world. Teachers must be encouraged to expose learners to the latest developments related to the Contemporary Economic Issues.

(d) Teachers should make the *2021 Examination Guidelines* available to all learners as this would help to check whether all aspects of the curriculum have been completed and to identify areas where the textbook is lacking the relevant information. This will prevent content gaps in the teaching-learning process.

CHAPTER 6

GEOGRAPHY

The following report should be read in conjunction with the Geography question papers of the November 2021 NSC examinations.

6.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who wrote the Geography examination in 2021 increased by 71 026 compared to that of 2020 i.e. 24,7% increase of the cohort.

There was an increase in the number of candidates who passed at 30% (Level 2) from 216 467 in 2020 to 266 402 in 2021, and in the number of candidates who achieved at 40% (Level 3) from 132 955 to 155 060.

There was a marginal decline in the pass rate at 30% (Level 2) from 75,3% in 2020 to 74,3% in 2021, with a corresponding decrease at the 40% (Level 3) from 46,2% to 43,2%. This follows a general downward trend in pass rates over the past three years. Pass rates over the past five years at Levels 2 or 3 have varied within a narrow band of only four percentage points.

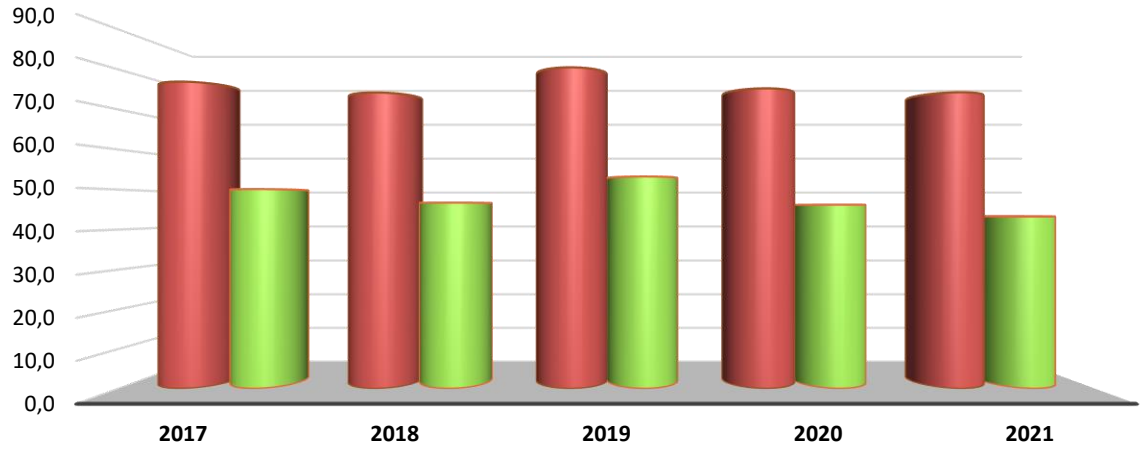
The percentage of distinctions (over 80%; Level 7) declined from 0,9% to 0,5%. The total number of distinctions decreased from 2 589 in 2020 to 1 793 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 6.1.1 Overall achievement rates in Geography

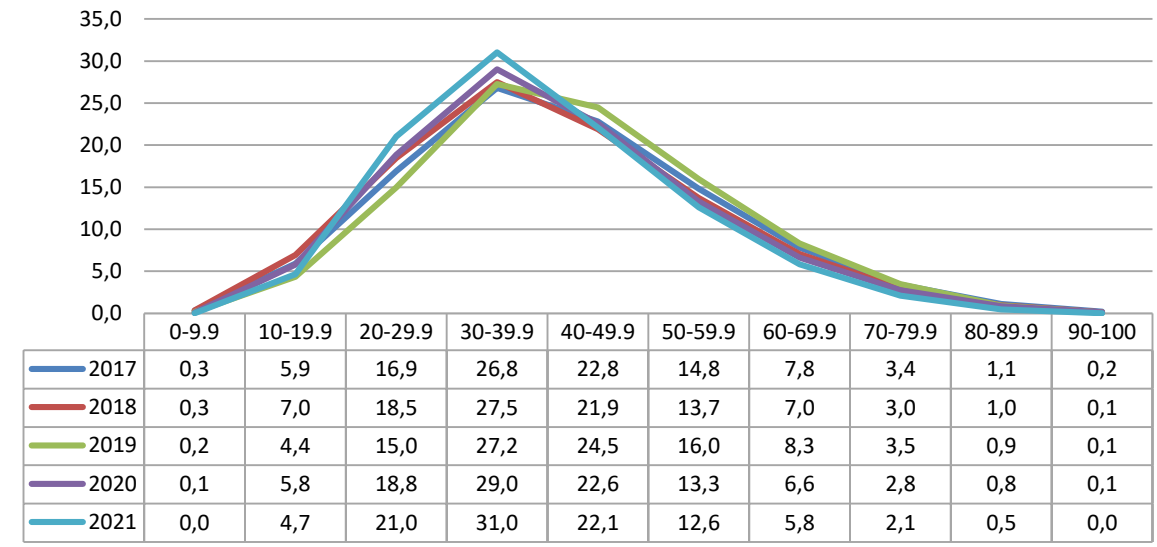
Year	No. wrote	No. achieved at 30% and above	% Achieved at 30% and above	No. achieved at 40% and above	% Achieved at 40% and above
2017	276 771	212 954	76,9	138 704	50,1
2018	269 621	200 116	74,2	126 011	46,7
2019	271 807	218 821	80,5	144 755	53,3
2020	287 629	216 467	75,3	132 955	46,2
2021	358 655	266 402	74,3	155 060	43,2

Graph 6.1.1 Overall achievement rates in Geography (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	76,9	74,2	80,5	75,3	74,3
% achieved at 40% and above	50,1	46,7	53,3	46,2	43,2

Graph 6.1.2 Performance distribution curves in Geography (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,3	5,9	16,9	26,8	22,8	14,8	7,8	3,4	1,1	0,2
2018	0,3	7,0	18,5	27,5	21,9	13,7	7,0	3,0	1,0	0,1
2019	0,2	4,4	15,0	27,2	24,5	16,0	8,3	3,5	0,9	0,1
2020	0,1	5,8	18,8	29,0	22,6	13,3	6,6	2,8	0,8	0,1
2021	0,0	4,7	21,0	31,0	22,1	12,6	5,8	2,1	0,5	0,0

6.2 RESTRUCTURE OF GEOGRAPHY PAPER 1 AND PAPER 2

The 2021 NSC Geography examination marks the first year of the move to two 3-hour papers of 150 marks each. The two papers reflect two Geography disciplines with Geographical techniques and skills (Mapwork) being tested in both papers:

- **Paper 1**: Physical Geography (Climate and weather and Geomorphology) and Geographical skills and techniques
- **Paper 2**: Human Geography (Rural and Urban Settlement and Economic Geography of South Africa) and Geographical skills and techniques

The decision to move to two equally weighted papers seems to have been well received by the 2021 Geography cohort. This is due to two factors:

- **Reduction in time-management pressure**: The two papers combined provide 6 hours for the completion of a 300-mark examination as opposed to the previous norm of 4½ hours.
- **Distribution of content over two days**: The decision to write the two papers on different days enables candidates to focus their last-minute preparations for each day on only 50% of the curriculum.

General comments on performance of candidates

In general, the overall performance was satisfactory, given the circumstances confronting the cohort. Candidates appeared to have found Paper 1 more challenging than Paper 2.

The inclusion of the source material in the question paper and the use of smaller topographic and orthophoto maps was well received.

It was pleasing to note that candidates in many centres have attempted more questions in both Paper 1 and 2 than in the past. As each question is subdivided into several subquestions, candidates should have been able to score some of the allocated marks for attempting the lower-order cognitive response questions.

There was some improvement in candidates' achievement in the paragraph questions regarding the need to respond in full sentences. The advice and recommendations suggested in past Diagnostic Reports seem to have been implemented by teachers to an extent, but there is still room for further improvement.

In the shorter response questions, candidates displayed an improved understanding of geographical processes and were able to provide appropriate explanations, at least in part. Topics that reflected the most improvement were Rural and Urban Settlements and Economic Geography of South Africa. Candidates do, however, continue to struggle in both Paper 1 and Paper 2 with the questions on Geographical Skills and Techniques, Map calculations, and particularly GIS, where candidates either answered only a few subquestions or did not attempt the question at all.

6.3 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

General comments

Areas of concern that were raised in the 2020 Diagnostic Report remain pertinent in the context of the 2021 NSC examination paper. They are emphasised here once again.

(a) There were sufficient lower-order questions to give all candidates a fair chance to pass. Most of these were found in the short objective questions at the start of each question. Based on the 100 script analysis from all provinces, candidates achieved an average score of above 60% in these questions.

(b) Although there were many high quality responses to the question paper which indicate good understanding of geographical processes, many candidates continue to struggle to answer some of the questions even at the lower-order level.

(c) Many candidates were still not aligning their responses according to the demands of the action/command words in the question. Words such as 'suggest', 'identify', 'account for', 'describe', 'determine', 'differentiate' and 'explain', require different types of responses. Candidates often simply 'list' or 'name' an item when discussion is required.

(d) **Short objective questions**: Candidates generally performed well in these questions. A variety of short objective-type questions were used, e.g. multiple-choice questions on mid-latitude cyclones and river profiles; choosing the correct answer from the words in brackets for valley winds and completing the statements in Column A with the options provided in Column B on waterfalls. Candidates were not familiar with the format of the questions in Q2.2 where they had to select either response X or Y to complete the statement. Candidates had difficulty discerning when to provide evidence directly from the source as was required in Q1.3.2 (2 marks), or giving the names of two pressure systems as in Q1.5.1 (2 marks).

(e) **Data response-type questions** (2, 4 or 6 marks): These data response-type questions, where an explanation and more detailed reference were required, were often poorly answered. Candidates were, in many cases, unsure whether a one-word answer or longer phrase was required as the response. It appeared that many candidates did not know when to give reasons, descriptions, explanations or impacts when responding to these questions. They were also unable to demonstrate an understanding of command/action words like 'suggest', 'explain' and 'describe'.

(f) **Paragraph-style questions** (8 marks): These questions were of middle- to higher-order as is the norm. In Q1.5.4 candidates struggled to consider the impact of berg wind conditions on the physical (natural) environment and erroneously included impacts on people and farming. Q2.4.4, which required the candidate to explain the physical (natural) impact of flooding on the floodplain, was not well answered. Candidates did not make the connection between the fluvial processes of deposition associated with a river overflowing its banks. It is evident that candidates were not taught the necessary content and skills to interpret and answer these types of questions. Candidates often did not provide answers in full sentences as was required. Some candidates did not always heed the command words used in these questions to formulate the correct response in line with the question asked.

(g) Many candidates did not have a sound knowledge of the basic geographic concepts and therefore were not able to answer questions of a high cognitive demand. Some examples are those that require candidates to suggest strategies to reduce the negative impact of berg wind conditions on the physical (natural) environment (Q1.5.4; 8 marks) and to explain the impact of flooding on the floodplain (Q2.4.4; 8 marks); to account for the increase in wind speed of tropical cyclone Eloise (Q1.3.4; 4 marks); to explain why the ridging of the South Atlantic high results in onshore winds (Q1.4.4; 4 marks); to describe the weather conditions of Port Elizabeth as a result of the onshore winds (Q1.4.5; 6 marks) and to explain the impact of the change on the captor stream (Q2.5.6; 4 marks).

(h) There continues to be a lack of practise to master the application skills in the Geographical Skills and Techniques section of the question paper. Candidates did not make good use of the topographic map and orthophoto map to assist them in answering questions. It appeared that the General Information page was also not consulted. It was also evident that there was not a thorough integration of map skills and theory. These two aspects of Geography need to be taught in an integrated manner. Regular practice of calculations is important for candidates to be prepared correctly for NSC examinations. This question produced the poorest results at 43%.

(i) Candidates continue to struggle with Geographical Skills and Techniques, a topic which is now examined in both question papers. Calculations such as Area (Q3.1.4) and Magnetic Bearing (Q3.1.7) and the measurement for True Bearing (Q3.1.6) are typical examples. A number of candidates did not use the given information (length in Q3.1.4 and the magnetic declination in Q3.1.7) which resulted in their attaining

answers outside of the range prescribed. Practical application skills using both the topographic map and orthophoto map to identify features as in Q3.2.3 and Q3.2.4 were lacking. Many candidates did not understand the terminology and the application thereof to answer questions on Geographical Information Systems (GIS).

(j) Most of the major topics mentioned in the *CAPS* document were tested with the exception of Travelling Disturbances, Urban Climates and River Grading.

General suggestions for improvement

(a) Candidates continue to struggle with action words that demand a higher cognitive level. Questions containing these action words should always be answered in full sentences, showing a clear knowledge and understanding of geographical content. Specific action words that were deemed difficult in this examination were: 'describe', 'differentiate ' and 'explain'. The *Examination Guidelines* for Grades 10–12 include a comprehensive list of typical action words used in Geography and the response required to meet the intention of the action word. Teachers are encouraged to make this list available to their learners and to use the words in class daily to illustrate how questions can be asked using these action words. They must also make use of these action words in formal and informal tests and examinations. Marking of learners' responses should be in keeping with that stipulated in the *Examination Guidelines*. This will assist the learners to know whether they must respond in full sentences or provide only a word or phrase.

(b) Two- to four-mark questions require some interpretation technique and understanding of geographical processes. Learners, therefore, cannot merely reproduce content knowledge gained in the classroom. Responses should be extracted from the source material given as well as the learners*'* own theoretical knowledge.

(c) Regular practice of paragraph writing in short informal and formal tests, as well as in internal examinations, will allow learners to improve their skills and confidence when attempting these questions. These questions usually require a degree of critical and analytical thinking, which places them on a higher level of cognitive demand. Learners will have to answer two paragraph questions, one on an aspect of Climate and W0eather and the other related to Geomorphology. The required responses to these questions must be presented in full sentences, should be to the point and should focus on the intent of the question. The recommended eight lines should be used as a guide to the length of the paragraph. This is to avoid long-winded answers and wasting of valuable time.

When planning a response, learners should underline or highlight the main topic of the question, the action word and the focus areas of the question. Good practice when writing paragraph responses would be to make at least four points and then elaborate on each point. Poor punctuation and sentence structure make it difficult for markers to assess these questions effectively. Bullet points are not an acceptable method of answering a paragraph question and could result in the learner not being awarded any marks.

(d) Teachers must ensure that learners know all the geographical concepts and definitions required. Learners should compile a glossary of terms in their notebooks for easy reference. This will assist them when describing and defining these concepts and definitions and in extending their geographical vocabulary. These definitions are asked as the first question on a particular topic and carry 2 marks each (Q2.5.1). As these are seen as concepts, they do not have to be explained verbatim.

(e) When a geographical problem (issue) is studied, learners should focus on the causes and effects, both negative and positive impacts, as well as possible solutions or sustainable strategies to be implemented. The focus of questions in Paper 1, which examines Physical Geography, will be on the physical (natural), environmental impact on a particular phenomenon in Geography. Questions that are regularly asked include: Q1.3.5 (6 marks), Q1.5.4 (8 marks), Q2.4.4 (8 marks) and Q2.5.6 (4 marks). Environmental justice issues could also be assessed. As in-depth knowledge of such issues is essential, this might well involve informal research on the part of the teacher. There are many reliable Geographical websites to visit that will provide up-to-date and valid information. Teachers are encouraged to highlight current local geographical events that are documented in the news and integrate this into classroom discussions. Q1.3 on Tropical Cyclone Eloise is a case in point.

(f) Geography is a dynamic subject and new information on numerous topics is updated regularly. Teachers are therefore encouraged to collect resources on an ongoing basis and to be aware of current events that should be taught in Grade 12. These should then be incorporated into lessons to ensure that lessons are topical and relevant to learners. As life-long learners, teachers must set the right example by staying abreast of new developments in their subject.

(g) Teachers are encouraged to include source-based questions in class assignments, tests and examinations. They should make use of relevant and recent reliable resources from the internet and avoid using sources that appear only in textbooks and are familiar to learners. Teachers should expose learners to a variety of sources e.g. diagrams, sketches, photographs, infographics and graphical data (line graphs, bar graphs and pie charts). Learners should be taught how to draw on and interpret information from these different sources. Teachers and learners must be aware that different sources may also be combined for examination purposes. Sources should be included in the question paper as was the case in the 2021 NSC examination.

(h) An infographic is a source that was used as a stimulus in both Q1.3 and Q1.5. It is a visual representation of information or data, e.g. as a chart or diagram, and contains both written information, tables, graphs and a sketch or map. All the information given should be considered when answering questions. The skill of integrating the visual and written information is one that should be practised regularly. Learners could be asked to quote or state directly from the text in the infographic which then needs to be verbatim and not paraphrased as in Q1.3.2. If learners are asked to provide evidence from the infographic, they are not expected to quote directly (Q1.3.1) as they can make use of either the text, map or table in their responses.

(i) Teachers should become proficient in adapting diagrams and combining resources to suit the questions they have set. The Paint App can be used to erase labels, add in extra content and combine more than one diagram to meet the needs of the questions set. PowerPoint is another tool that can be used to redraw diagrams and adapt them as required. This is the format that was used by the examining panel for the 2021 NSC examination. The internet has a plethora of Google images which teachers can download on specific topics in addition to the considerable printed media items available. Teachers should check the validity and accuracy of material from the internet as it is not guaranteed to be correct. Reliable geographical sources should be used where possible and these should be properly contextualised.

(j) Teachers should be fully aware of the relevant subject content to be taught by constantly referring to the *CAPS* document and the *Examination Guidelines*. For 2022 an updated *Examination Guidelines* will be in place. Details regarding the choice of

agricultural product, mineral, core industrial areas, spatial development initiatives (SDIs) and industrial development zones (IDZs) to be studied are included.

(k) As most prescribed textbooks do not cover all the subject content mentioned in the *CAPS* and the *Examination Guidelines* to the same degree, teachers should do additional research themselves. Teachers should consult more than one textbook if possible. Information provided in the various textbooks might not always be geographically sound and, when in doubt, additional research should be done on the topic.

(l) Teachers should provide each learner with a copy of the new *Examination Guidelines*, highlighting the content that will be taught. This can be used as a checklist to ensure that all content is covered, and to assist in preparing for tests and examinations. The format of each examination paper is also clearly spelt out.

(m) To improve learner performance, teachers must refer to previous examination papers as a guide to ensure that the standard of questions and the variety of questioning technique used in assessment at school level is appropriate. This would also assist teachers to show learners how scaffolding of questions occurs, from those testing lower-order cognitive skills, to the higher-order questions which address more advanced thinking skills. Previous question papers should not, however, be used as a tool for predicting future papers.

(n) Teachers must ensure that the distribution of marks in the internal assessment tasks is also according to the requirements in the *CAPS* document. Blooms' Taxonomy or a similar tool should always be supplied for formal tests, examinations and tasks. The weighting is 25% lower-order, 50% middle-order and 25% higher-order. If too many lower-order questions are asked in the internal assessment conducted at school, learners will not be exposed to questions addressing a higher cognitive demand as asked in the final NSC examination. This will give learners false notions of the level of performance required.

(o) Learners should always provide units of measurement or compass direction when giving answers about temperature i.e. °C, wind speed (knots), atmospheric pressure (hPa/mb) and direction of movement (e.g. eastwards). Q1.5.2 (1 mark) required candidates to determine the highest temperature recorded on 13 March 2021. In mapwork the final answer in all calculations requires a unit of measurement in order to be credited with a mark (Q3.1.4, Q3.1.6 and Q.3.1.7).

(p) With regard to improving mapwork results, teachers need to integrate mapwork skills and applied theory into their daily teaching. Learners need to practise their calculations regularly using the correct format and steps as given in the *Examination Guidelines.* Teachers must mark the calculations according to the stipulations in the *Examination Guidelines*. At every opportunity teachers must show learners how the theory being taught can be tested in the mapwork section of the examination paper.

(q) Teachers must note that the short 15-mark questions at the beginning of each of the four questions are not necessarily going to test lower-order thinking skills and straight-forward recall only. Some questions might involve a higher level of cognitive ability. Learners must read the instructions carefully before answering the objective questions. In the multiple choice (Q1.1 and Q2.1) or complete the statement in Column A with statement X or Y (Q2.2) questions, only the relevant letter next to the question number is required. Candidates who write down the words or terms might be penalised for not obeying the instructions.

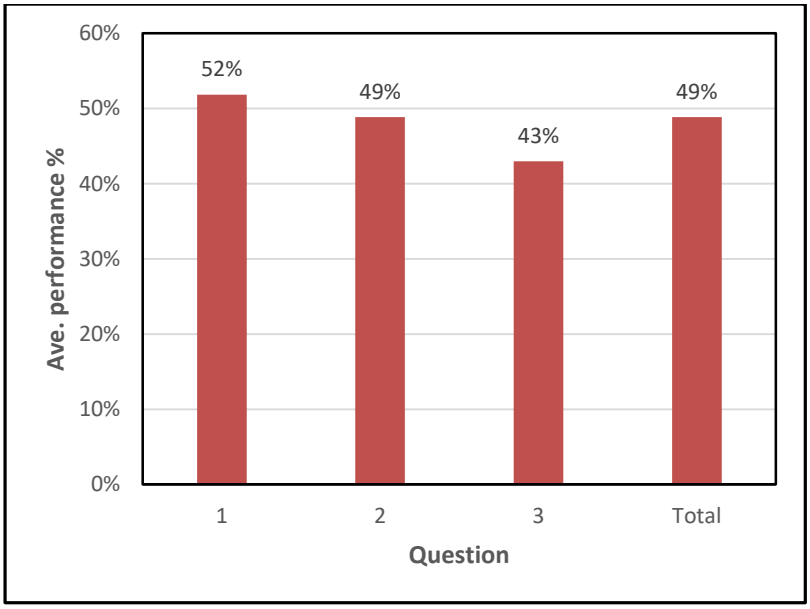
(r) In addition to making use of previous examination papers and SABC revision programmes to explain and revise important geographical concepts, other useful tools include *YouTube* live feeds, Xtremepapers.com, *Mind the Gap*, *Telematics* and *Teletutor*. *Teletutor* has embedded QR codes which when clicked on leads the learner to a short explanatory video of a section of Geography. Exemplar papers showing the new Geography paper format with the annexure included in the question paper will be available early in the year.

(s) Teachers are encouraged to refer to the new instructions and information page in the 2021 NSC examination paper and to include this in their formal tests and examinations. This will prepare the learners for the final examination. There are general instructions for Section A and specific instructions for Section B (Geographical skills and techniques) that should be highlighted. The annexure should also be incorporated into examination papers as was the case in the final 2021 NSC question paper. Teachers are also encouraged to implement the new format of testing the short objective questions using a number of related sources instead of just one source as in Q1.1.

6.4 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

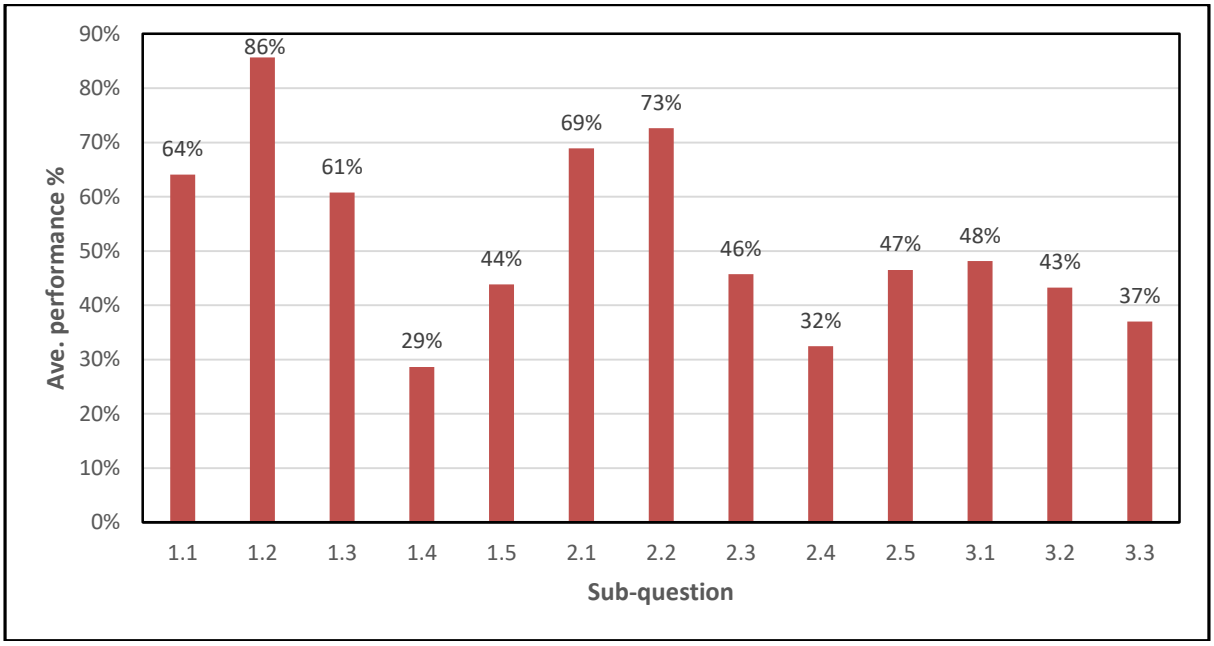
The following graph is based on data from a random sample of 100 candidates per province. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 6.4.1 Average performance per question in Paper 1



Q	Topics
1	Climate and Weather
2	Geomorphology
3	Geographical Skills and Techniques

Graph 6.4.2 Average performance per subquestion in Paper 1



Sub-Q	Topics	Sub-Q	Topics
1.1	Mid-latitude cyclones	2.3	Drainage patterns
1.2	Valley climates	2.4	Floodplain
1.3	Tropical cyclones	2.5	River capture
1.4	Synoptic weather map	3.1	Map skills and calculations
1.5	SA berg winds	3.2	Map Interpretation
2.1	Long and cross profiles of a river	3.3	Geographical Information Systems
2.2	Fluvial features-Waterfalls		

6.5 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

SECTION A

QUESTION 1: CLIMATE AND WEATHER

Common errors and misconceptions

(a) Many candidates struggled to select the correct answer in the multiple-choice questions (Q1.1; 8 marks). Instead of one source, the question used separate sources for Q1.1.4, Q1.1.5, Q1.1.7 and Q1.1.8. These were 1 mark each.

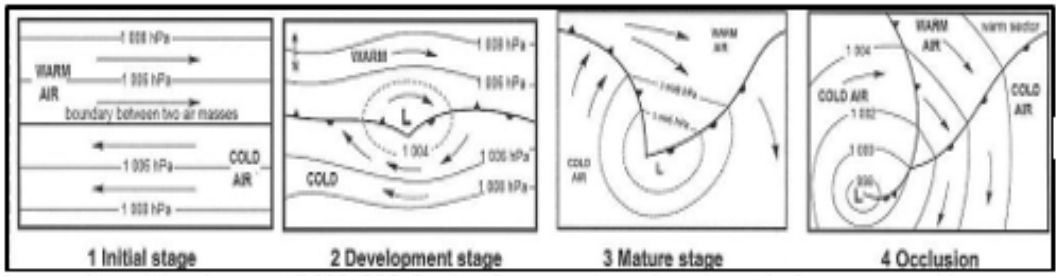
(b) Although Q1.2 was well answered, there is a need to clarify the difference between the concepts of inversion layer and thermal belt which resulted in both options being accepted.

(c) Many candidates struggled to identify the low-pressure cell located over the interior as well as the concept of ridging and the resultant winds. In Q1.4.5 (6 marks) where the question asked candidates to describe the weather conditions at Port Elizabeth as a result of the onshore winds, candidates erroneously interpreted the weather conditions on the station model without linking their answer to the onshore winds.

(d) In Q1.5 (15 marks) candidates did not make full use of the information in the infographic. The short text, synoptic weather map and graph needed to be utilised to answer the questions set. Q1.5.1 (2 marks) required candidates to name two pressure cells but most just identified them as either a high or a low pressure instead. Many candidates struggled to come up with two facts with regard to the role of the escarpment in increasing the temperature of the berg wind. The paragraph question Q1.5.4 (8 marks) on the impact of berg wind conditions on the physical (natural) environment was not well answered. Candidates were awarded marks only for explaining the impact of berg wind conditions on the physical (natural) environment. Most candidates did mention veld fires but needed to link it to the destruction of natural vegetation or loss of habitat and biodiversity to be credited. No marks were awarded for mentioning the impact on people, cattle or crops as these are not deemed part of the physical (natural) environment.

Suggestions for improvement

(a) It is not often that the topic of mid-latitude cyclones is tested in the short objective questions. In this examination, candidates needed to know specific information with regard to where these systems develop, how they move, identification of a particular front as in Q1.1.4 and determining the stage of development in Q1.1 and the station model associated with a cold front. Q1.1.7 and Q1.1.8 consisted of four diagrams from which the candidate had to select the occlusion. This was a more practical method of testing the mid-latitude cyclone than usual. Teachers need to cover the four stages of development diagrams when teaching this section as well as to integrate the content with weather station models ahead, at the passage and behind a mid-latitude cyclone on a synoptic weather map.



[source:https://docplayer.net/96884795-Grade-12-geography-p-1-study-guide-for-progressed-learners-page-1-of-91.html]

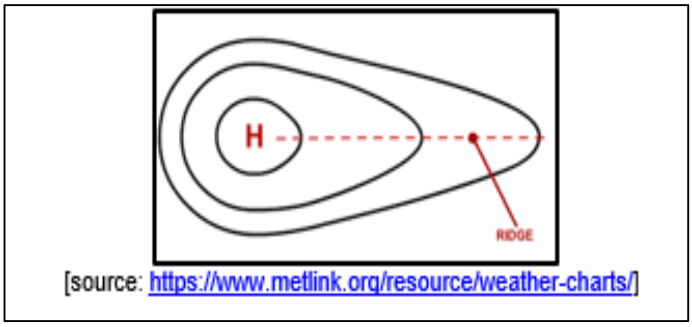
Teachers should use up-to-date synoptic weather maps as a teaching tool to show learners how each stage of a mid-latitude cyclone is represented. A good site is https://www.weathersa.co.za/home/historicalsynoptic.

(b) In Q2.1.6 two options given in the multiple-choice question were very similar. Teachers should ensure, when teaching specific terminology, that they use the terminology correctly and do not interchange terms as in this example: *an inversion is a layer of air in which the temperature increases with an increase in height. Where the inversion layer makes contact with the mountain slopes there is a relatively warm area which is known as the thermal belt*.

(c) Q1.4.1 (1 mark) and Q1.4.2 (2 marks) required candidates to identify the low-pressure system labelled A which was found over the interior of South Africa and to provide a reason for its formation. This is known as a thermal low- (heat low) pressure system and is located over the interior of South Africa during summer when more direct heating takes place. This content is covered in Grade 10 when a distinction is made between summer and winter synoptic weather maps by identifying

the changing position of pressure systems associated with South Africa. In Grade 12 the occurrence of a low-pressure system over the interior in summer is discussed when it forms a trough of low pressure which is associated with line thunderstorms. In Q1.4.3 (2 marks) learners had to understand the concept of ridging. A ridge is an elongated area of relatively high pressure extending from the centre of a high-pressure region on a synoptic weather map.

(d) To obtain full marks in Q1.4.4 (4 marks), the candidate needed to explain how air diverges in an anticlockwise manner from the South Atlantic high pressure over the ocean towards the thermal low pressure over the land. Due to the high pressure cell ridging towards the coast onshore winds develop. The 6-mark short response question Q1.4.5 was pitched as a middle-order difficult question where the station model for Port Elizabeth had to be used to describe the weather conditions for Port Elizabeth as a result of the onshore winds. Learners are encouraged to read the full question to understand what is being asked and not just read the first few words, which is what most candidates did, and merely stated the weather conditions of the station model.



[source: https://www.metlink.org/resource/weather-charts/]

(e) In Q1.5.1 (2 marks) candidates had to name the two pressure systems associated with berg wind formation. Learners must take note of the action word. In this case they had to actually name the two pressure systems which are the *Kalahari* high pressure and the *Coastal* low pressure and not just state a high and a low pressure. Teachers need to highlight this when covering this section. Q1.5.3 (4 marks) required a good understanding of how a berg wind forms and that elevation of the escarpment was the key factor. Learners needed to identify that the escarpment is an elevated area down which the air mass moves from the Kalahari high pressure to the coastal low pressure over the ocean. As the air moves down the escarpment it warms up due to compression at the dry adiabatic lapse rate of 1 °C per 100 m. The average height of the escarpment in South Africa is above 1 000 m. The movement of the wind from above 1 000 m on the plateau, down the escarpment to 0 m along the coast, is what causes the large increase in temperature.

(f) The paragraph question (Q1.5.4) required candidates to adapt their knowledge of the impact of berg winds to only giving responses pertaining to the physical environment. The skill is in discerning which facts pertain to the question that was set. Teachers need to cover both positive and negative factors when discussing the impact of berg winds in class. Two positive impacts of berg winds are that ash from veld fires can increase soil fertility, and veld fires do promote seed germination.

QUESTION 2: GEOMORPHOLOGY

Common errors and misconceptions

(a) Candidates did not understand the basic concepts and did not do well in Q2.3 (15 marks) which was based on drainage patterns and drainage density, despite this being an often tested topic. In Q2.3.2 (4 marks) many candidates confused the concept of underlying rock structure with underlying rock and merely gave examples of the type of rock. Q2.3.3 (2 marks) required interpretation of how the folded underlying rock created ridges (hard rock) and valleys (soft rock). The short

tributaries flow down the steep ridge and feed into the main stream at right angles. In Q2.3.6 (a) and (b) (4 marks) learners needed to describe how (a) low rainfall and (b) steep gradient influenced drainage density. Low rainfall decreases drainage density while a steep gradient will increase drainage density. This resulted in an average performance of only 46% in this question.

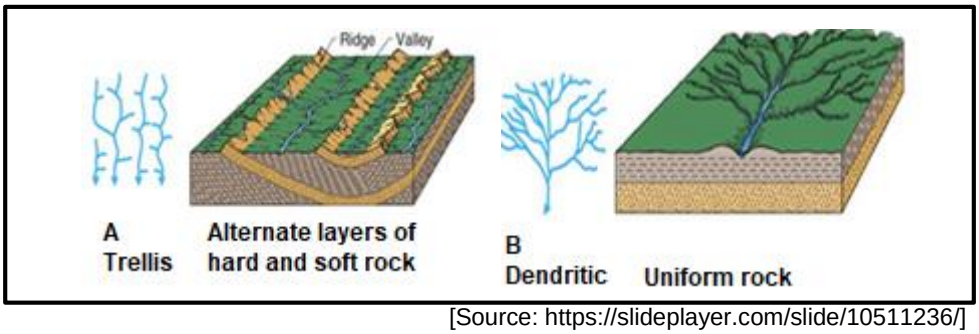
(b) Q2.4 (15 marks) recorded the lowest average performance in the Geomorphology section at 32%. Many candidates struggled to use the source material to guide them through the questions. The concept of a floodplain is not foreign to the candidates yet they struggled to apply their knowledge adequately in Q 2.4. In Q2.4.1 (1 mark) most candidates could not give deposition as the process that resulted in flood plains forming. Q2.4.3 (4 marks) required the candidate to explain how this deposition took place to widen the floodplain and that this occurred regularly due to constant overflowing of the river. The paragraph question (Q2.4.4; 8 marks) was set as a higher-order question which required an explanation of the physical impacts of flooding on the floodplain. Here candidates needed to refer to the impact on habitats, change in biodiversity, formation of levees, increased water table, formation of wetlands and level of infiltration.

(c) With regard to Q2.5.3 (4 marks), candidates could not use the original diagram before river capture and redraw it to show the process of river capture having occurred. This was a slightly different way of asking the question than in previous years. Identification and labelling of prescribed features on the diagram was not well done. Many candidates drew diagrams that were not based on the original diagram.

(d) Q2.5.6 (4 marks) was set as a middle- to higher-order question which required candidates to explain the impact of the increased volume of water (answer from Q2.5.5) on the captor stream. This is closely linked to the concept of rejuvenation. Candidates needed to link the increased volume of water to renewed vertical erosion, the formation of terraces, valleys within valleys, entrenched meanders and the possibility of increased flooding. Many candidates could not identify the captor stream correctly and aligned their answers instead to the misfit stream.

Suggestions for improvement

(a) Q2.3.2 refers to differentiating between the underlying rock structure which resulted in drainage basins A and B developing. This required the candidates to make the link between the drainage pattern given and the underlying rock which resulted in this pattern developing. Drainage pattern A is associated with folded rock which exposes alternative layers of hard and soft rock, and B is rock that is uniformly resistant to erosion.



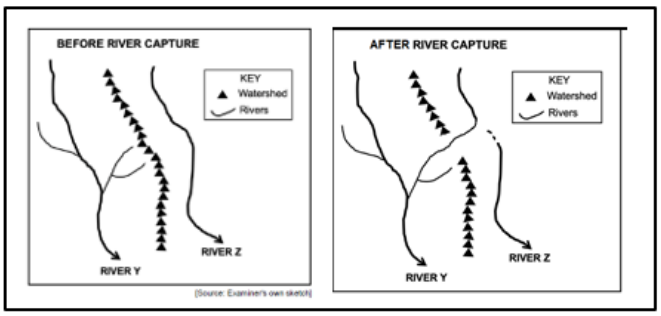
[Source: https://slideplayer.com/slide/10511236/]

Teachers are encouraged to use diagrams like those shown above when teaching drainage patterns. Learners must be able to link the resultant drainage pattern to the underlying rock structure that allowed it to develop.

(b) With regard to the topic on floodplains tested in Q2.4, teachers need to make the link between the flood plain and how it forms as a result of flooding. The flood plain is a fluvial depositional feature (landform) that develops in the lower course of some rivers due to the river overflowing its banks, regularly depositing alluvium. As this process continues, so a floodplain will increase in size over time. A floodplain is a habitat for plants and animals, the deposited alluvium improves soil fertility and it is a storage place for excess water. While there are many impacts on the floodplain this particular paragraph question (Q2.4.4; 8 marks) required candidates to refer only to the physical impact of flooding on the floodplain. Teachers should explain the difference between physical and human impacts when covering this section.

(c) Teachers must practise the skill of redrawing diagrams with their learners in class consolidation exercises and informal tests. This will prepare the learners when having to answer a question like Q2.5.3. Teaching with the use of visual aids will definitely assist learners to conceptualise the process.

It is suggested that teachers use a variety of examples of river capture from past papers and the internet to help learners become more confident with regards to identifying features of river capture and determining which river is the captor and captive.



SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

Common errors and misconceptions

(a) Calculations and Map Skills continue to be a challenge for many candidates. In the area calculation in Q 3.1.4 (4 marks) some candidates measured the length of feature 6 despite it having being given and then gave the final answer in km² instead of m². This resulted in low marks being attained. Q3.1.5 (1 mark) on map scale and Q3.1.6/Q3.1.7 (2 marks) which required using a given magnetic declination, were particularly poorly answered. Candidates still struggled to measure accurately with a protractor.

(b) In Q3.2 on map interpretation candidates did not use either the topographic map or the orthophoto map. Many candidates also could not integrate their Physical Geography knowledge to answer the questions asked in the mapwork section. The following questions were problematic: Q3.2.1 (a) (1 mark) on the season in which the lowest rainfall is recorded on the graph, candidates answered by giving the month of June instead of the season, winter, as was required. To answer Q3.2.1 (c) (2 marks), candidates needed to use the reference key on the topographic map in conjunction with block A2 to identify one strategy to overcome water shortages. Two skills were required which was challenging for some candidates. Q3.2.2 (2 marks) required candidates to provide evidence for a particular wind direction and Q3.2.5 (1 mark) required the identification of a fluvial landform by comparing the plan view of the feature with the cross-sectional profile proved challenging for many candidates. Many candidates did not use reference information on the topographic map to full potential.

(c) Most candidates struggled to answer Q3.3 (8 marks) on Geographical Information Systems. Q 3.3.2 (1 mark) and Q3.3.3 (2 marks) on buffering; and Q3.3.4 (2 marks) and Q3.3.5 (2 marks) on data layers proved to be beyond the scope of candidates.

Suggestions for improvement

(a) At the beginning of Section B in the examination paper (page 16), there is general information of the mapped area being tested. Learners are encouraged to read through this carefully as it provides context for the questions set. The small map of South Africa shows exactly where the mapped area (e.g. Phalaborwa) is located and the province is mentioned in the text. Some of the questions are set from the general information. There are also English terms and their Afrikaans translations provided as some topographic maps might use a combination of Afrikaans or English terms.

(b) Q3.1.4 (4 marks) was a calculation to determine the area of feature 6 on the orthophoto map. In the *Examination Guidelines*, this calculation carries 5 marks. Due to the limited number of marks available in this section, the measurement of length was given, hence the calculation earned only 4 marks. It must be noted that there is no range if the measurement is given. Formulae are provided in the question paper to assist the learner. The skill is in substituting the correct values, measuring accurately and using the correct scale of the map for the conversion. Marks are awarded for each step of the calculation and a final mark is given for the correct answer with the correct unit of measurement which in this case was m^2. For the correct calculation and mark allocation refer to the NSC Geography Paper 1 marking guidelines, Q3.1.4

Q3.1.5 (1 mark) required candidates to show an understanding of the fact that the orthophoto map scale is 5 times larger than that of the topographic map, which means that the same feature on the orthophoto map will be 5 times larger than on the topographic map. Candidates could not just quote the two scales in this case.

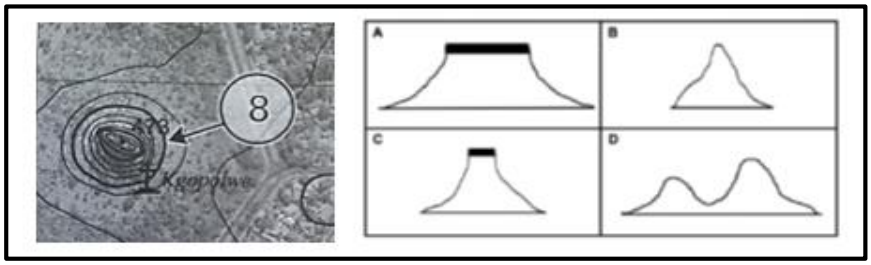
If the measurement of the true bearing in Q3.1.7 (1 mark) was incorrect then the answer would also be (1 mark). Learners must practise measuring accurately with a protractor and may be only 1 degree, out on either side of the given answer. The given answer was 190° (range 189°–191°). Teachers should mark mapwork tasks in this manner to improve accuracy. This section on mapwork should be used by teachers to show learners how questions can be asked in the NSC examination. When a value is given, as in Q3.1.4 (4 marks) and Q3.1.7 (1 mark), they must use the information given.

(c) Teachers must set tasks using the appropriate symbols to train learners to use them in conjunction with the maps provided. In Q3.2.1 (b) (1 mark) the candidate needed to link seasonal rainfall to a non-perennial river, which is normally clearly indicated on the extract of the topographic map provided as a blue dashed line.

(d) Q 3.2.1 (c) (1 mark) referred to the perennial water (dams) and reservoirs in block A2 on the topographic map of Phalaborwa. Learners need to use the reference symbols to identify these features.

One way to determine the prevailing wind direction is by using the orientation of a runway or landing strip found on the topographic map or orthophoto map as in Q3.2.2 (2 marks). Landing strips are almost always orientated in the direction of prevailing wind. In situations where there is more than one prevailing wind, a number of landing strips or runways may be found crossing over each other. Aeroplanes take off into the wind for uplift and land into the wind in order to slow down. This source provides illustration of this concept: https://www.youtube.com/watch?v=DtRViCEId_U

(e) The skill of using a plan view of a feature as in Q3.2.5 (1 mark) and matching it with the correct cross-profile is one that needs to be practised in mapwork tasks. Learners must be able to identify landforms on a topographic map and correctly match them with the relevant cross-profile. Teachers should revise the main characteristics used to differentiate each feature. Option B was the correct answer as a spot height is indicated on the profile meaning that the feature does not have a flat top. Even though these landforms are covered in the Grade 11 curriculum, they can be examined in the mapwork section of the NSC as is clearly stated in the *Examination Guidelines*.



(f) Geographical Information Systems (GIS) is a topic that is still not taught in a practical and applied manner. This is evident in the responses in this examination. Teachers must integrate the GIS concepts with the practical application using both topographic and orthophoto maps. In Q3.3.2 (1 mark) and Q3.3.3 (2 marks) the concept of buffering was tested. Learners need to be taught how to provide map evidence to show that buffering has taken place. A buffer zone is an area where in this case no building or development has been allowed to take place in order to protect the natural environment and the non-perennial rivers. No physical fence or wall is built but rather a natural demarcation is implied.

(g) Data layers which were tested in Q3.3.4 (2 marks) and Q3.3.5 (2 marks) continue to be a challenge. Teachers should educate learners about the different data layers and their significance using visual illustrations and GIS programmes. In Q3.3.4 and Q3.3.5 data layers were related to development of a landing strip. Candidates were asked to identify examples of data layers to be considered before developing a landing strip (e.g. roads), and in the follow-up question how these data layers were utilised (e.g. determining accessibility). Teachers should demonstrate the identifying and utilisation of data layers using other scenarios, e.g. location of a cemetery. In this case learners could look at contour lines where a gentle gradient is considered. Visual examples of different data layers and how they can be integrated should be used. Refer to the following source for images of data layers: https://www.sustainableplaceshaping.net.

6.6 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

Although the content distribution and structure of the papers changed in 2021, various areas of concern that were raised in the *2020 Diagnostic Report* remain pertinent in the context of the 2021 NSC paper. They are emphasised here once again.

(a) The nature of the paper allowed for a sufficient number of questions with a good level of predictability and a low level of difficulty to give all candidates a fair chance to pass. A significant number of these were found in the short objective subquestions at the start of each question. Many such subquestions at the start of each question required candidates to obtain answers from the source provided, e.g. an infographic.

(b) Regarding map application, a significant number of candidates gave general answers whereas the questions required specific answers with evidence from the general information, topographic maps and orthophoto maps (Q3.2.6; 2 marks and Q3.3.4; 2 marks).

(c) The requirements associated with certain action words were not clearly understood, and many candidates did not know how to approach these questions or understand what was expected of them, e.g. differentiating between 'explain' and 'explain why'. This resulted in candidates losing many marks in the middle- to higher-order questions. It must be noted that 75% of the marks covered these questions.

(d) Candidates generally performed well in the short objective questions. A variety of short objective-type questions were used, e.g. multiple-choice questions on settlement terminology and economic concepts; select a term on hierarchy of settlements; matching photographs with a description for small and large scale farming. However, it is concerning to note that some candidates experienced difficulty in answering questions that required correct quotations, or in identifying information on the sources provided e.g. Q1.5.1 (1 marks), Q1.5.2 (2 marks), 2.3.1 (1 mark), Q2.3.4 (4 marks), Q2.5.2 (1 mark) and Q2.5.3 (4 marks). Many of these questions tested simple comprehension skills.

(e) Regarding the paragraph questions, the performance was disappointing, with Q1.3.4 and Q2.5.4 being particularly poor. These data response-type questions, which required a discussion and linking of factors with a more detailed reference, were not well answered. Candidates were, in many cases, unsure whether factors should be explained separately or linked and whether a one-word answer or longer phrase was required as the response. It appeared that many candidates did not know when to give causes, effects, impacts and solutions when responding to these questions. They were also unable to demonstrate an understanding of command/action words like 'suggest', 'explain' and 'describe'. The action word, 'why' was used numerous times in the question paper and candidates struggled to provide answers to such questions.

(f) A significant number of candidates did not have a sound knowledge of the basic geographic concepts and therefore were not be able to explain/define these concepts and answer questions of a high cognitive demand linked to these concepts, e.g. the difference between Rural-urban Migration (Q1.3; 15 marks), Core Industrial Regions and Spatial Development Initiatives (Q2.4; 11 marks), Informal Sector (Q2.5; 15 marks), Intervisibility (Q3.1.4; 1 mark), Remote Sensing (Q3.3.3; 2 marks) and Attribute (Q3.3.4; 2 marks).

(g) Most of the major topics in Section A and all sections regarding Geographical Skills and Techniques mentioned in the *CAPS* document were tested. This advantaged the

candidates who studied their work comprehensively. The combining of the Core Industrial Region and SDI allowed for more topics to be tested. This style of questioning could be tested in future papers.

(h) A thorough analysis of both topographic maps and orthophoto maps was not done by many candidates. Candidates did use all the information provided on the topographic map, like the reference information and distances to routes outside the mapped area. Information found on the side of the mapped area was essential to answer Q3.1.1 (1 mark).

(i) Candidates lost marks for not indicating all the correct steps in calculations, e.g. in Q3.1.6 (2 marks).

(j) Candidates experienced challenges integrating their theory knowledge with the Geographical skills and techniques.

General suggestions for improvement

(a) Selective reading seems to be a perennial problem and many learners do not grasp the requirements of the question. Highlighting the action words and important aspects of the question will definitely assist learners in interpreting the question correctly.

(b) Learners continue to struggle with action words that demand a higher cognitive level. Questions containing these action words should always be answered in full sentences, showing a clear knowledge and understanding of geographical content. Specific action words that were deemed difficult in this examination were: 'explain how' and 'explain why'. These questions require answers that are qualified. Included in the 2021 *Examination Guidelines* is a comprehensive list of typical action words used in Geography and the response required to meet the intention of the action word. Teachers are encouraged to make this list available to their learners and to use the words in class daily to illustrate how questions can be asked using these action words.

(c) Proper understanding of all concepts, differentiating between concepts and application of concepts are of utmost importance. The structure and scaffolding of questions require the learner to understand the concepts as they relate to the concept being assessed. Learners should not only be given a list of concepts but it should be fully explained to them. Baseline assessments and other informal tasks which mirror the questions of the NSC Examination should be practised regularly focusing on concepts taught. This should be done after every sub-section taught.

(d) Besides paragraph questions, learners need to note that 2-, 4- and 6 mark questions also require some interpretation technique and understanding of geographic processes. Learners therefore, cannot merely reproduce knowledge gained in the classroom. Responses should be extracted from the source material given as well as the learners' own theoretical knowledge.

(e) Paragraph writing skills are essential. These questions usually require a degree of critical and analytical thinking, which places them on a higher level of cognitive demand. Learners need to be made aware of the following: write in a paragraph format and in full sentences; four points (if required) must be explained; answers in most instances require qualification; check if a question is double-barrelled, e.g. Q1.3.4 (8 marks) where two factors need to be linked in order to be credited; note the specific emphasis of the question, e.g. social and economic impact.

(f) When a geographical problem is studied, learners should focus on the causes and effects, both negative and positive impacts, as well as possible solutions or sustainable strategies to be implemented, e.g. negative impact: Q1.3.3 (4 marks) and negative economic impact: Q2.3.5 (6 marks). In-depth knowledge of such issues is essential. This might well involve informal research by teachers. There are many reliable geographical websites that will provide up-to-date and valid information.

(g) Some rotational topics like Spatial Development Initiatives and Industrial Development Zones are either briefly mentioned or are not found in textbooks. Teachers and subject advisors need to conduct additional research into these topics to share with teachers. The *Examination Guidelines* have divided these topics into sub-sections and it is essential that teachers provide sources based on these subsections to support learners.

(h) Geography is a dynamic subject and new information on numerous topics is updated regularly. The urban and economic environment is constantly changing. Teachers are therefore encouraged to collect resources on an ongoing basis and to be aware of current events that should be taught in Grade 12. These should then be incorporated into lessons to ensure that they are topical and relevant to learners. As life-long learners, teachers must set the right example by staying abreast of new developments in their subject.

(i) Source-based questions that are compliant with the NSC Examinations should be incorporated in classroom activities, informal tests and examinations. Teachers should use relevant and recent resources from the internet and avoid using sources that appear only in textbooks and are familiar to learners. Teachers should focus on the interpretation of diagrams, sketches, photographs, cartoons and graphical data (line graphs, bar graphs and pie charts). Learners should be taught how to draw on information from these different sources. Teachers and learners must be aware that different sources may also be combined for examination purposes. As the interpretation of cartoons remains a challenge for learners, the more practice they get, the more confident they will feel about answering a question based on a cartoon.

(j) An infographic was used as a stimulus in this examination (Q1.5, Q2.3, Q2.4 and Q2.5; 15 marks each). It is a visual representation of information or data, e.g. as a chart or diagram, and contains written information and a sketch or map. Texts used particularly in Section A (Q1 and Q2) contain valuable information to guide learners to appropriate answers. Learners could be asked to quote directly from the text which then needs to be verbatim and not paraphrased. If learners are asked to provide evidence from the text, they are not expected to quote directly.

(k) Learners need to orientate the topographic map to the orthophoto map before answering Section B on Geographical skills and techniques. They can look for an easily identifiable feature on both maps while roads, railway lines, larger features and the shape of built-up areas are some of the other ways to do map orientation. By using the area indicated by a red and black block on the topographic map, a learner can determine the location of the orthophoto map on the topographic map.

(l) Learners need to understand the importance of integrating their theory knowledge with Geographical Skills and Techniques. Although most of this integration is in Q3.2 (12 marks), it must be noted that it can be found in other questions. The frequent use of topographic maps and orthophoto maps as teaching aids in theory lessons will assist learners. Mapwork skills and interpretation exercises should be regularly practised in all types of questions, e.g. multiple choice, map calculations, map application and interpretation and GIS.

(m) The aim of Section B on Geographical Skills and Techniques is on deriving most answers from the maps provided. Regular revision using past papers from 2014 to 2021 will assist learners to master this skill. The focus, however, should be on the 2021 paper due to the new structure of this section.

(n) Learners need to be made aware that there are distractors in the options given in the multiple-choice questions. They must be taught to recognise subtle differences in the options given. The questions in some instances have important descriptive words which can lead learners to the correct answer, e.g. land-use zones (Q3.2.1; 1 mark). Learners must consider all four options before they make their choice. Teachers are advised to update their methods in setting compliant multiple-choice questions which can include lower-, middle- and higher-order cognitive skills of testing. Learners should be made aware of the principles underlying multiple-choice questions.

(o) Geographic Information Systems must be taught in detail. Teachers must emphasise the significance and purpose of GIS concepts and how to apply them (Q3.3.3–Q3.3.5), e.g. linking data layers and choice of location of a feature like a graveyard.

(p) Teachers should expose learners to the correct methods for calculations. The *2021 Examination Guidelines* and NSC marking guidelines clearly illustrate this. It must be noted that while certain methods may be correct in Mathematics they could be inappropriate in Geography.

(q) When practising and setting Mapwork exercises teachers are encouraged to use a variety of maps which reflect the different regions of South Africa, e.g. inland or coastal regions, and from different provinces. This will prepare candidates to answer questions on whichever map they receive in the NSC examination. A variety of maps are available to teachers and learners from past NSC examinations.

(r) Teachers need to refer to the *Examination Guidelines* and the *CAPS* document consistently to ensure that all relevant content is covered or unnecessary information is not emphasised to learners. Learners should also be exposed to or be given these guidelines as it would give them clear direction on what is important for them to focus on and they can then prepare accordingly.

(s) Teachers must set compliant tasks according to the requirements in the *CAPS* document. Blooms' Taxonomy or a similar tool should always be supplied for formal tests, examinations and tasks. The weighting is 25% lower-order, 50% middle-order and 25% higher-order. If too many lower-order questions are asked in the internal assessment conducted at school, learners will not be exposed to questions addressing a higher cognitive demand as asked in the final NSC examination. This will give learners false notions of the level of performance required. All tasks should be based on the new 2021 structure regarding structure and content distribution.

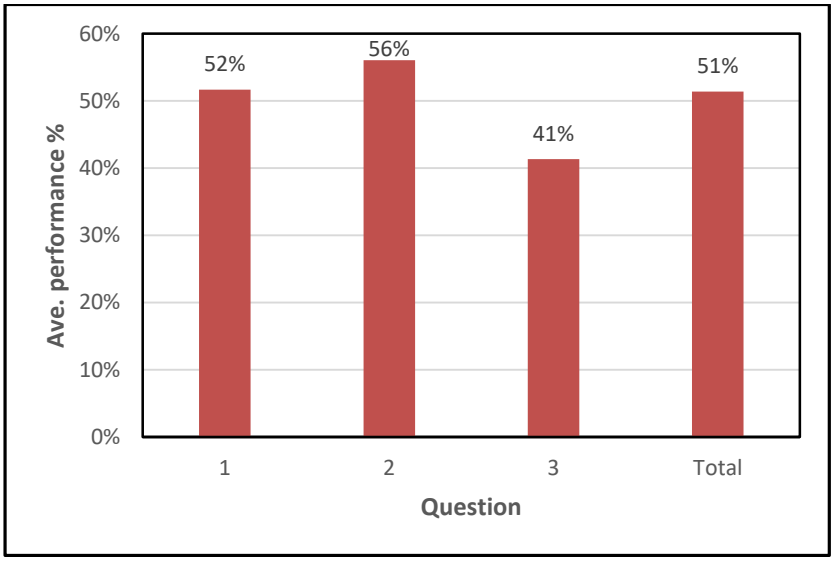
(t) Teachers need to emphasise the importance of units of measurement in the final answers where required. Marks will not be awarded if the correct unit of measurement is not provided in the final answer. Learners should be made aware that this instruction applies to both the theory and mapwork sections of the question paper.

(u) In addition using previous examination papers and SABC revision programmes to explain and revise important geographical concepts, other useful tools include *YouTube* live feeds. Teachers need to ensure that these programmes are correct and reliable before exposing learners to them.

6.7 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2

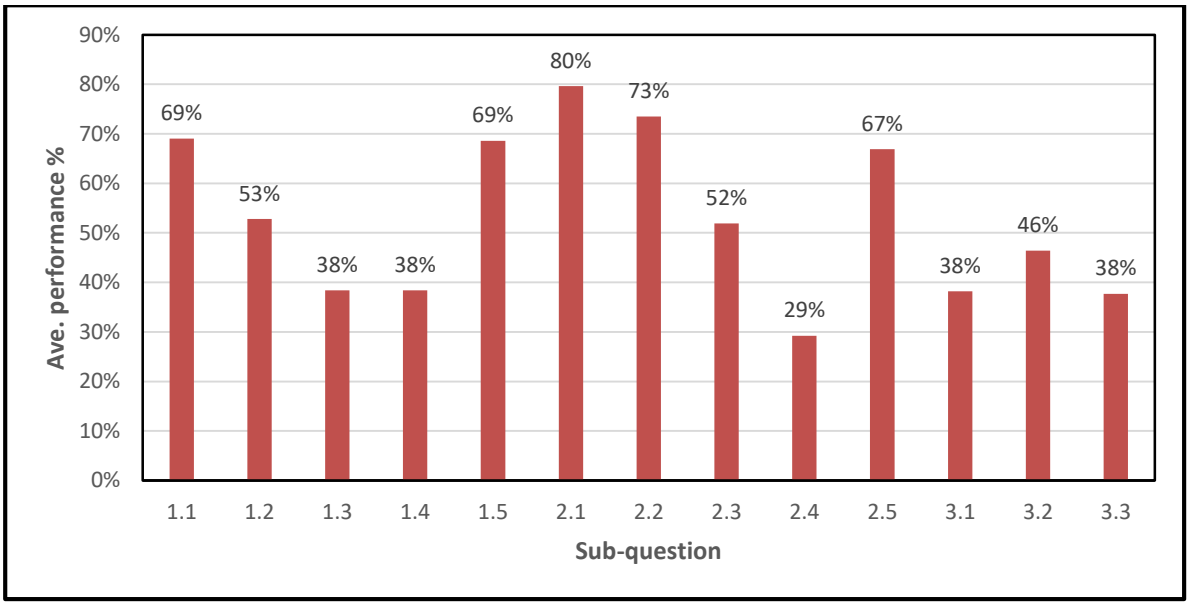
The following graph is based on data from a random sample of 100 candidates per province. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 6.7.1 Average performance per question in Paper 2



Q	Topics
1	Rural and Urban Settlements
2	Economic Geography of South Africa
3	Geographical Skills and Techniques

Graph 6.7.2 Average performance per subquestion in Paper 2



Sub-Q	Topics	Sub-Q	Topics
1.1	Settlement terminology	2.3	Coal mining
1.2	Hierarchy of settlements	2.4	SW Cape core industrial region and W. Coast SDI
1.3	Rural-urban migration	2.5	Informal Sector
1.4	Land-use zones	3.1	Map skills and calculations
1.5	Informal settlements	3.2	Map Interpretation
2.1	Small and large-scale farming	3.3	Geographic Information Systems
2.2	Economic terminology		

6.8 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: RURAL AND URBAN SETTLEMENTS

Common errors and misconceptions

(a) Although Q1.1 (8 marks) was well answered, Q1.1.3 (1 mark) created some challenges. Many candidates confused type of settlement with shape of settlement.

(b) In Q1.2 (7 marks) there were various subquestions that were not answered well. This question consisted mainly of lower-order questions and candidates should have performed better. Candidates seem to have been exposed to the hierarchy of settlements but lacked knowledge regarding the description of each type of settlement. It must be noted while most prescribed textbooks cover the hierarchy of settlements, they do not explain them fully.

(c) In Q1.3.1 (1 mark) most candidates did not read the action words properly. The question asked for environmental factors but many candidates gave social and economic factors instead.

(d) Q1.3.2 (2 marks) focused on a decrease of the rural population but instead candidates focused on reasons why people are moving from rural areas to urban areas.

(e) In Q1.3.3 (4 marks) the question required the candidates to relate the negative economic impact of rural urban migration on rural settlements. A significant number of candidates wrote about the social impacts and some wrote about reasons for rural-urban migration. There is a clear indication that candidates did not interpret the question correctly.

(f) The poor performance of candidates in Q1.3.4 (8 marks) is possibly due to the way the question was phrased. Candidates struggled to link the difficulty in finding employment and its impact on the quality of life. In the past, a two-part question required candidates to explain two factors and the implications thereof to be awarded the full eight marks. However, in this case, candidates were required to provide four facts and four implications to be awarded full marks.

(g) In Q1.4.2 (2 marks) a significant number of candidates did not clearly understand the concept of *decreasing accessibility* and the term *commuter*. A commuter is a person who travels to work. Many candidates, however, gave other answers related to travelling to school because they lacked an understanding of the term.

(h) Candidates did not interpret Q1.4.3 (4 marks) correctly and described the irregular shape, instead of giving reasons for the irregular shape.

(i) With regard to Q1.4.4 (4 marks), many candidates described the poor state of buildings in the transition zone instead of giving reasons for the buildings being in a poor state. Some candidates did not understand the word *dilapidated*. Once again, there was misinterpretation of the action word used.

(j) In Q1.4.5 (4 marks) candidates were supposed to base their answer on why area C will attract high income residential areas but they compared area C to other areas like the CBD and also focused on the location of area C compared to other land-use zones that may not be attractive.

(k) The slightly lower performance in Q1.5.4 (2 marks) was because candidates did not relate the poor building materials to the impact of the weather conditions. They mostly wrote about the poor building materials.

Suggestions for improvement

(a) Learners must be taught to differentiate between terms/concepts as assessed in Q1.1.3 (1 mark). *Linear* refers to shape and *wet-point* refers to type of settlement. They must know the difference between *rural-urban migration* and *rural depopulation* and how they impact on each other, as asked in Q1.3.2 (2 marks). Teachers must not only give explanations of terms/concepts but explain the differences. Using visual illustrations can help to create more clarity.

Source: [https://alchetron.com]
Linear settlement

Source: buddinggeographers.com
Wet-point settlement

(b) Prescribed textbooks do not always contain all the information prescribed in the *Examination Guidelines* and therefore the teacher needs to do further research. In most textbooks, the topic of hierarchy of urban settlements (Q 1.2) is given in table form without descriptions. Teachers must fully explain the descriptions of settlements according to size and complexity which need to be understood by learners.

(c) Words describing factor impacts, e.g. *environmental factor* (Q1.3.1; 1 mark) and *economic impact* (Q1.3.3; 4 marks), should be well explained to learners. Environmental factors relate to the natural environment, social factors to the well-being of the people and economic factors relate to wealth. In some cases, there are two describing words (e.g. Q1.3.3 *negative economic* impact). Both words need to be considered in order to get the correct answer. Encouraging learners to practise with similar types of questions will create more clarity and assist in them responding correctly in tests and examinations.

(d) Teachers and learners need to take cognizance of the alternative method and structure of the marking guideline for Q1.3.4 (8 marks). The question required a paragraph on rural migrants experiencing difficulty in finding employment in area B and the impact thereof on their quality of life. The word *thereof* links both factors, *difficulty in finding a job* and *quality of life*. Learners have to explain and link both factors in order to obtain two marks per linked fact.

1.3.4	In a paragraph of approximately EIGHT lines, explain why rural migrants experience difficulty in finding employment in area **B** and the impact thereof on their quality of life.	(4 x 2)	(8)

1.3.4	They do not have the necessary documentation required to be registered as an employee therefore cannot afford basic services (can give examples) (2) They are not qualified/Do not have the skills required for the jobs available in urban areas which results in an increase in poverty levels (2)

(g) Q1.4 (15 marks) requires a full study of the source to answer the questions. The sketch needs to be studied in conjunction with the key as this will allow learners to obtain correct responses to questions (Q1.4.1; 1 mark). Learners need to be made aware that questions make specific reference to certain land-use zones and answers must be put into context of what is being referred to and not generalised (refer to Q1.4.2 to Q1.4.5).

(h) The lack of understanding of important action words in a question can impact negatively on learner performance. Q1.4.2 (2 marks) used the terms *accessibility* (meaning the ease with which a place can be reached from one or several other places) and *commuter* (meaning a person who travels between place of residence and workplace daily). If candidates had a good understanding of these words, many more of them would have answered this question correctly. Teachers must not only explain the terms found in the *Examination Guidelines* but also explain the words used frequently in questions.

QUESTION 2: ECONOMIC GEOGRAPHY OF SOUTH AFRICA

Common errors and misconceptions

(a) In Q2.1 (7 marks) candidates performed very well in most of these questions. The poor performance in Q2.1.4 (1 mark) could be due to the candidates not understanding the term *monoculture*.

(b) Q2.3.3 (2 marks) produced a lower performance due to candidates not focusing on the key words in the question. In this case, it was *location* and *export*. Candidates wrote about the expense of transport instead of mentioning how the long distances to harbours increase costs.

(c) Q2.3.5 (6 marks) was an *explain how* question and it required a qualification. Candidates, in many instances, did not give a qualifier, e.g., they wrote about the mines closing down but did not indicate the qualifier which was increase in unemployment.

(d) In Q2.4.3 (a) (4 marks) the expected answer required the candidate to explain how the SW Cape core industrial region favoured the development of light industries. Q2.4.3 (b) (4 marks) expected an answer that required the candidate to explain how the SW Cape core industrial region limited the development of heavy industries. Most candidates lacked content knowledge on factors that favour industrial development in the South-West Cape. Many candidates wrote about general factors that influence the development of light and heavy industries. These were high-order difficult questions.

(e) Q2.4.4 (4 marks) was a higher-order, very difficult question that required candidates to relate how the West Coast SDI creates increased access for the SW Cape core industrial region to international markets. Most candidates struggled to connect these two factors.

(f) Q2.3, Q2.4 and Q2.5 used an infographic as the source. Many candidates lost marks as they experienced challenges with comprehension skills like quoting from the source or providing evidence from the source which are regarded as being of lower-order cognitive challenge and easy. Candidates had to quote from the infographic e.g. Q2.3.1 (1 mark), Q2.3.4 (4 marks), Q2.4.1 (1 mark), Q2.5.2 (1 mark), Q2.5.3 (4 marks). This added up to 11 marks which was 18.3% of Q2.

(g) With regard to Q2.5.1 (2 marks), some candidates could not differentiate between *informal sector* and *informal settlement* and defined an informal settlement instead of sector. Candidates gave characteristics of the informal sector instead of defining it. In other instances, definitions were vague.

(h) In Q2.5.4 (8 marks) the phrase *strengthens the informal sector* created a challenge for candidates with language barriers. Candidates assumed that they had to write about formalising the sector instead of how to improve the informal sector.

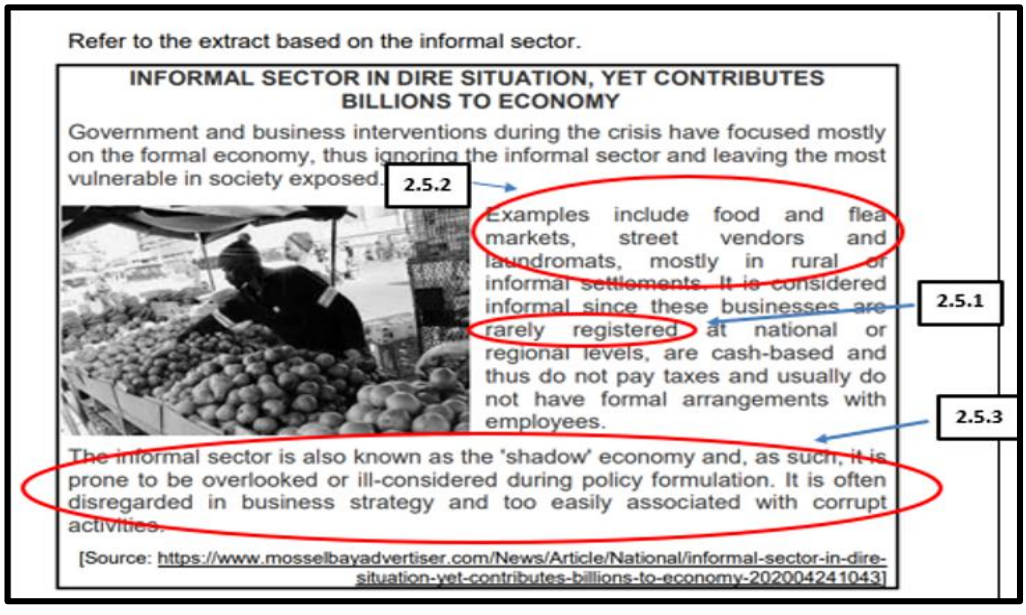
Suggestions for improvement

(a) Teachers must explain concepts related to different sections (e.g. Q2.1.4; 1 mark). Monoculture (large scale farming) is cultivation of a single crop over a large area.

(b) Learners need to be made aware of the different ways in which multiple-choice questions can be tested. For example, Q2.2.5 (1 mark) reflects four types of industries associated with bulk transport, i.e. (i) to (iv) while four options of combinations are provided, i.e. A to D.

In this scenario candidates had to choose the two correct options and then select an answer from the letters A to D. Learners should be taught to eliminate the incorrect answers from the combinations provided to arrive at the correct answer. In this case light industries (iii) do not require bulk transport and therefore any combination with (iii) is incorrect. While heavy industries (ii) and raw material oriented industries (iv) require bulk transport, and therefore a combination of the two is correct.

(c) Learners must note that answers and clues to answers can come from the infographic in Q2.5. For example, Q2.5.1 (2 marks) focuses on the term *rarely registered* in paragraph 2; Q2.5.2 (1 mark) focuses on paragraph 1 commencing *Examples include …* and Q2.5.3 (4 marks) focuses on paragraph 3 commencing *The informal sector is also* …



2.5.1	Define the concept *informal sector*.	(1 x 2)	(2)
2.5.2	Give an example of an informal activity in the extract.	(1 x 1)	(1)
2.5.3	Why is the informal settlement considered part of a 'shadow' economy? Quote from the extract.	(2 x 2)	(4)

2.5.1 Businesses that are not registered (and do not pay income taxes) (2)
[CONCEPT] (1 x 2) (2)

2.5.2 Food (1)
Flea markets (1)
Street vendors (1)
Laundromats (1)
[ANY ONE] (1 x 1) (1)

2.5.3 'Prone to be overlooked' (2)
'Ill-considered during policy formulation' (2)
'Disregarded in business strategies' (2)
'Easily associated with corrupt activities' (2)
[ANY TWO] (2 x 2) (4)

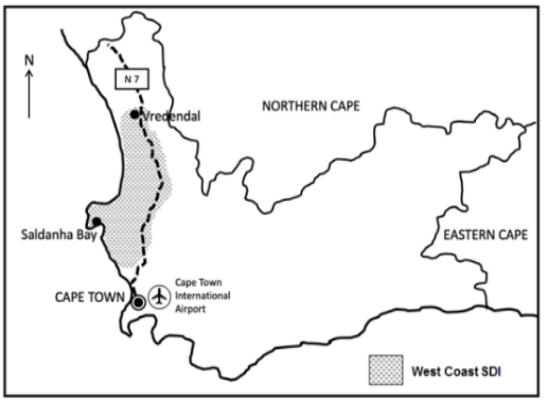
Note candidates were assisted by the infographic in all three questions.

(d) Definitions are now worth 2 marks and comprehensive definitions need to be given e.g. Q2.5.1 required the definition of the *informal sector* – Businesses are not registered and do not pay tax.

(e) When providing a quote, as in Q2.5.3 (4 marks), learners must write down exactly what is stated in the infographic to be awarded full marks.

(f) When reference is made to a source, as in Q2.4.2 (2 marks), only answers directly from the source must be given in order to be credited. Rail could not be accepted as a mode of transport as it was not indicated on the map.

(g) Q2.4.4 (4 marks) is an example of a higher-order, difficult question which involves linking various factors. The factors to be linked can be interpreted more effectively by highlighting important aspects of the question. This assists the learner to focus on them when answering the question. In this case the important focus is on *West Coast SDI*, *South-Western Cape* and *international markets*.



2.4.4 Explain how the West Coast Spatial Development Initiative (SDI) creates increased excess for the South – western Cape core industrial region to international markets.

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

Common errors and misconceptions

(a) In Q3.1.1 (1 mark) many candidates did not analyse the map thoroughly. If they had looked at the information on the side of the mapped area, they would have found that Camden was the closest to Ermelo.

(b) Q3.1.2 (1 mark), most candidates had a limited knowledge with regard to interpreting cross-sections and relating it to the topographic or orthophoto map, e.g. using the contour lines to determine the correct cross-section. Most candidates struggled to identify that there was a spot height inside the last contour line, indicating that height is still increasing.

(c) In Q3.1.3 (2 marks) candidates did not seem to understand the term *intervisibility* and therefore could not answer the question correctly. Some candidates chose options B and D where there was no Intervisibility.

(d) With regard to Q3.1.4 (1 mark), candidates experienced challenges with identifying height using contour lines and therefore answered the question incorrectly. Some candidates did not give the unit of measurement in the final answer of the calculation and so lost marks.

(e) In Q3.1.5 (2 marks), candidates used the incorrect point to measure the distance, e.g. the tip of the arrow instead of the dot at the spot height and therefore measured incorrectly. In some instances, candidates used 55 mm and multiplied by 500 m instead of 5,5 cm. Some candidates lost marks because they did not put the unit in the final answer.

(f) In Q3.1.6 (2 marks) the calculation of average gradient remained a perennial problem. Some candidates used the mathematical method of simplifying and lost marks. Mathematical methods are acceptable if they are geographically correct. A significant number of candidates did not know how to express the final answer as a ratio.

(g) With regard to Q3.1.7 (1 mark), calculating the grid reference of a feature was done thoroughly but finding the feature using the grid reference was not covered properly.

(h) In Q3.2.1 (1 mark) candidates experienced challenges with regard to application of theory to the map, e.g. the area being tested clearly shows the sewerage works which is characteristic of the rural-urban fringe. If the candidates had identified this feature, they would have gotten the answer easily.

(i) In Q3.2.2 (2 marks) a significant number of candidates did not know what a sewerage works is, and some even considered it a recreational facility. The question focused on the impact of sewerage works on the value of property, but candidates gave general answers for reducing the value of property and did not talk about the relationship between the two.

(j) Candidates experienced challenges in Q3.2.3 (2 marks) with regard to applying the theory to the Geographical Skills and Techniques. In some cases, candidates gave characteristics of the street pattern instead of naming the street pattern. The term *unplanned* was given instead of *irregular*.

(k) Candidates would have gotten Q3.2.4 (2 marks) incorrect because they answered Q3.2.3 (2 marks) incorrectly. The question focused on new developments but candidates gave general answers for a grid iron pattern not being popular, e.g. describing the pattern as *boring* is incorrect.

(l) In Q3.2.5 (1 mark) candidates seemed to lack knowledge of examples of economic activities and therefore chose *secondary* instead of *tertiary* to describe the main economic activity.

(m) Q3.2.6 (2 marks) was related to Q3.2.5 (1 mark) and if the candidate got Q3.2.5 wrong, they would have gotten this question incorrect as well. Candidates had to look at the suitability of the area for a hospital but candidates gave general answers, e.g. *trees* instead of *close proximity to residential areas*.

(n) In Q3.2.7 (2 marks) candidates also seemed to engage in selective reading and focused on the word *injustices* instead of *environmental injustices*. They gave social and economic injustices which was incorrect.

(o) Candidates could not differentiate between a *line feature* and a *polygon feature* in Q3.3.1 (1 mark) and Q3.3.2 (1 mark) and in other instances, candidates just gave a line feature, e.g. a *road* instead of the *natural line feature*, e.g. the *river* as was asked.

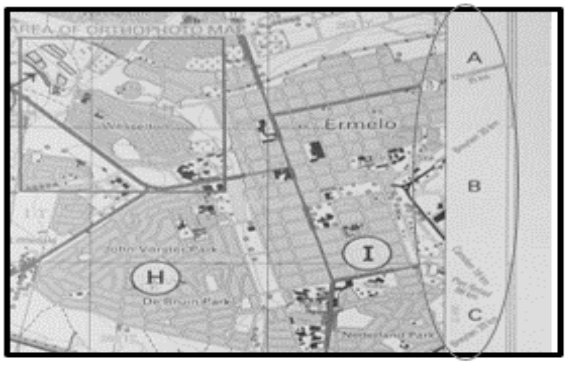
(p) In Q3.3.3 (2 marks) a significant number of candidates did not seem to have an understanding of the concept *remote sensing*. Remote sensing is taking images of the Earth without being in physical contact with the Earth's surface. Many candidates gave examples of remote sensing instead.

(q) Q3.3.5 (2 marks) which was based on the open-cast mine was poorly answered by many candidates. The question had unfair distractors, e.g. the use of the concept *environmental injustice* which could have impacted on the performance of the candidates. Q3.3.5 could have been rephrased in a straight-forward manner as it was simply dealing with the advantages of using an image of a topographic map.

Suggestions for improvement

(a) It is imperative that theory and mapwork be integrated during teaching and revision, as Q3 (30 marks) and especially Q3.2 (12 marks), are related to application of theory. For example, learners can be shown where the rural-urban fringe is on a map and its characteristics (sewerage works). It is also important to explain the characteristics of these land-use zones i.e. Q3.2.1 (1 mark) and Q3.2.2 (1 mark).

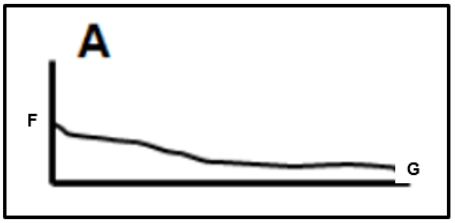
(b) It is important to analyse the map thoroughly including the details on the side of the map as was required in Q3.1.1 (1 mark).

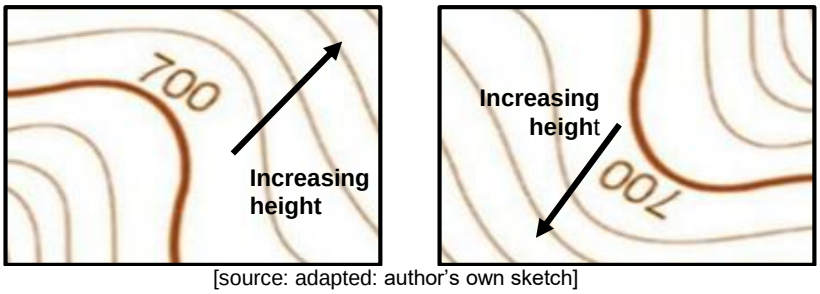


The answer for Q3.1.1 could be found by looking at the encircled area.

(c) It is important to show learners how to apply cross-sections to the topographic map, as was required in Q3.1.2 (1 mark)/Q3.1.3 (1 mark).

By analysing the contour lines between F and G it could be seen that F is at a higher level and the gradient between F and G is more gradual. Therefore, the choice for the cross-section would be A. The term 'intervisibility' can be defined as determining whether one point is visible from the other. It can be clearly seen that F is visible from G, as there is no obstruction between the two points. In order to determine in which direction the height is increasing or decreasing learners should look at the direction in which the figures indicating height are facing.

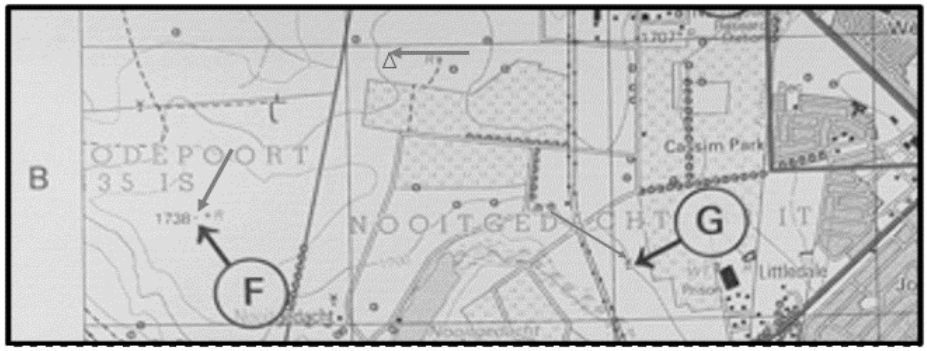




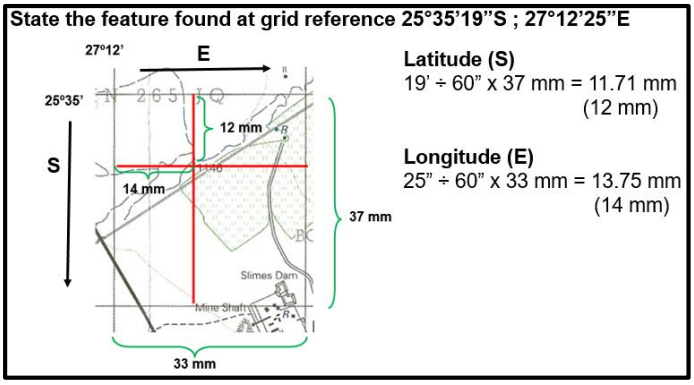
[source: adapted: author's own sketch]

Learners must note that calculations can be questioned in different formats, e.g. Q3.1.4–Q3.1.6 (5 marks). It is important when teaching average gradient to check whether the method being used is geographically correct. A suggestion is to use the method found in the NSC examination papers. The following DBE website could be used to source past papers and marking guides:
https://www.education.gov.za/Curriculum/NationalSeniorCertificate(NSC)Examinations/NSCPastExaminationpapers.aspx

(d) When teaching calculations, emphasis must be placed on where to take the measurement from: The apex of the triangle of the trigonometrical station, the dot of the spot height, the point where the feature touches the contour line (Q3.1). Arrows and the alpha-numeric grid are used to direct the learners to a particular feature.



(e) It is important, when identifying a feature using the grid reference, to visually illustrate it.



(f) Learners must be encouraged to read the entire question properly e.g. Q3.3.1 (1 mark) referred to a *natural line feature* and not just the *line feature*.

(g) Reading of the introductory statement above questions is very important. In Q3.2.5 (1 mark) and Q3.2.6 (2 marks) the statement reads *Refer to the hospital …* It tells the candidate what feature 6 is which will assist candidates in determining the economic activity. Learners must focus only on the blocks referred to and not the other blocks, as the responses outside of those blocks will not be considered.

(h) Clarity needs to be created between the characteristic of a feature/concept and the feature/concept. For example, in Q3.2.3 (2 marks) the street pattern is irregular and the characteristic is planned/unplanned.

CHAPTER 7

HISTORY

The following report should be read in conjunction with the History question papers of the November 2021 NSC examinations.

7.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who wrote the History examination in 2021 increased significantly by 53 950 compared to that of 2020, i.e. 31% of the cohort.

There was an increase in the number of candidates who passed at 30% (Level 2) from 159 737 in 2020 to 203 473 in 2021, and in the number of candidates who achieved at the 40% (Level 3) from 134 610 to 166 576.

There was a decline in the pass rate at 30% (Level 2) from 92,1% in 2020 to 89,5% in 2021, with a corresponding decrease at the 40% (Level 3) from 77,6% to 73,2%. This follows a steady upward trend in pass rates over the period 2017–2020.

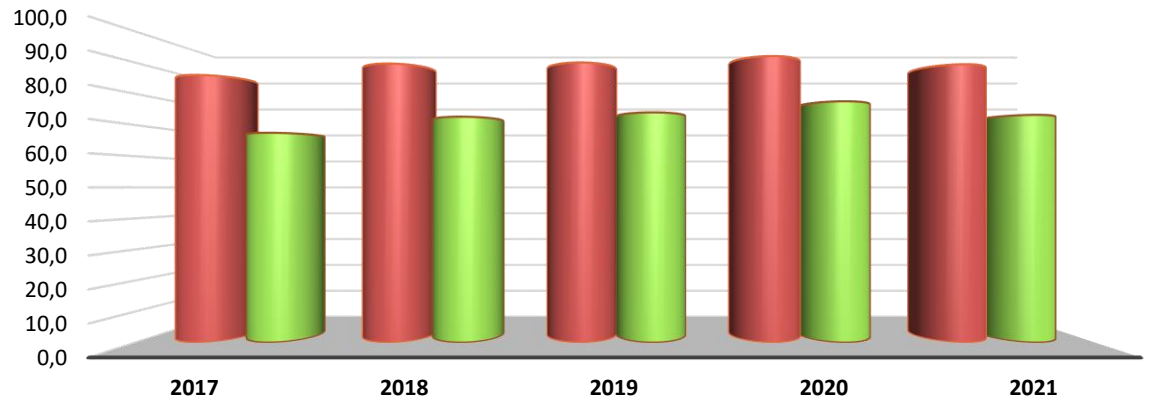
The percentage of distinctions (over 80%; Level 7) declined from 6,3% to 5,5%. Given the increase in the size of the 2021 cohort this converts into an increase in the total number of distinctions from 10 930 in 2020 to 12 510 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years that affected the teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 7.1.1 Overall achievement rates in History

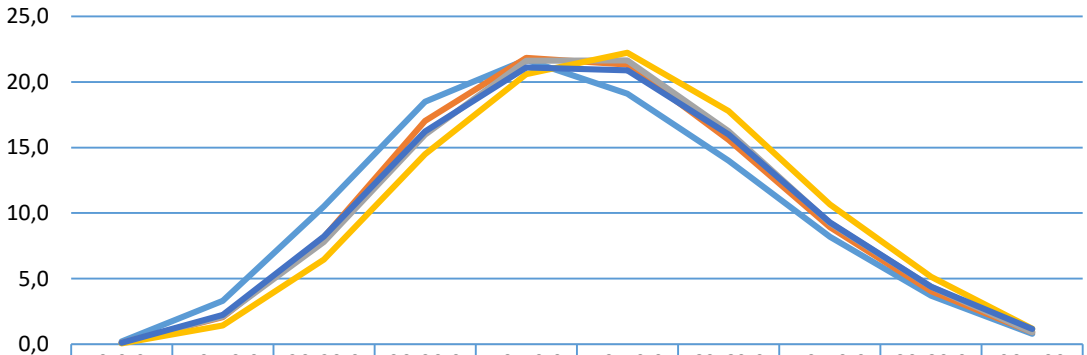
Year	No. wrote	No. achieved at 30% and above	% Achieved at 30% and above	No. achieved at 40% and above	% Achieved at 40% and above
2017	147 668	127 031	86,0	99 669	67,5
2018	154 536	138 570	89,7	112 266	72,6
2019	164 729	148 271	90,0	121 936	74,0
2020	173 498	159 737	92,1	134 610	77,6
2021	227 448	203 473	89,5	166 576	73,2

Graph 7.1.1 Overall achievement rates in History (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	86,0	89,7	90,0	92,1	89,5
% achieved at 40% and above	67,5	72,6	74,0	77,6	73,2

Graph 7.1.2 Performance distribution curves in History (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,2	3,3	10,5	18,5	21,7	19,1	14,0	8,2	3,7	0,8
2018	0,1	2,1	8,2	17,0	21,9	21,3	15,6	8,9	4,0	0,9
2019	0,1	2,1	7,8	16,0	21,6	21,6	16,2	9,2	4,4	0,9
2020	0,1	1,4	6,4	14,5	20,6	22,2	17,8	10,7	5,1	1,2
2021	0,1	2,2	8,2	16,2	21,1	20,9	16,0	9,3	4,4	1,1

General comments

The year 2021 marked the beginning of a new three-year cycle in the subject of History with the introduction of new topics in both papers.

Paper 1 included two new source-based questions, i.e. *Origins of the Cold War in Europe* and the *Civil Rights Movement,* as well as two new essays based on *Extension of the Cold War in Vietnam and Independent Africa (the Congo).*

Paper 2 included two relatively new items. These are the source-based question, i.e. *Internal Resistance* and an essay, i.e. the *Black Consciousness Movement (BCM)*.

Unlike the past four years (2017–2020) where candidates were exposed to the same content focus areas, the new content focus for 2021 could account for the decline.

Under these circumstances, it is likely that teachers and learners could have experienced uncertainty regarding the style of examining the new content, which would have affected the performance of candidates this year.

In Section A of both question papers (source-based questions), it was clear that a significant number of candidates were unable to answer middle- and higher-order questions. These questions required candidates to interpret, analyse, evaluate, compare and determine the usefulness, limitations and reliability of evidence in sources. Many other candidates also failed to write logical and coherent paragraphs based on the key question.

In Section B of the question papers (essay questions), most candidates displayed good content knowledge but were unable to take a stance and develop a balanced and independent line of argument. Several essays lacked relevant introductions and convincing conclusions. Nonetheless, performance in essays was far better than in source-based questions.

7.2 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

(a) Generally, candidates' performance in this question paper ranged from fair to very good. It was evident that some candidates opted for two essay questions and one source-based question. The popular choice questions were Q1, Q3, Q4 and Q6. Few candidates attempted Q2 and Q5.

(b) In Section A: Source-based questions, many candidates found it challenging to define concepts in their own words or explain concepts in the context of a section. They were unable to interpret statements from the sources effectively. It was also evident that many candidates lacked the ability to extract, select, interpret, analyse, evaluate and synthesise information from the sources that were provided. This resulted in unsatisfactory responses to specific higher-order questions, where candidates were unable to explain the limitations, reliability and usefulness of sources. Comparison of information between sources also proved to be challenging.

(c) A large number of candidates relied mostly on the relevant information in the sources with little or no reference to their own knowledge. They were unable to write a well-structured paragraph effectively. Learners copied information from the sources.

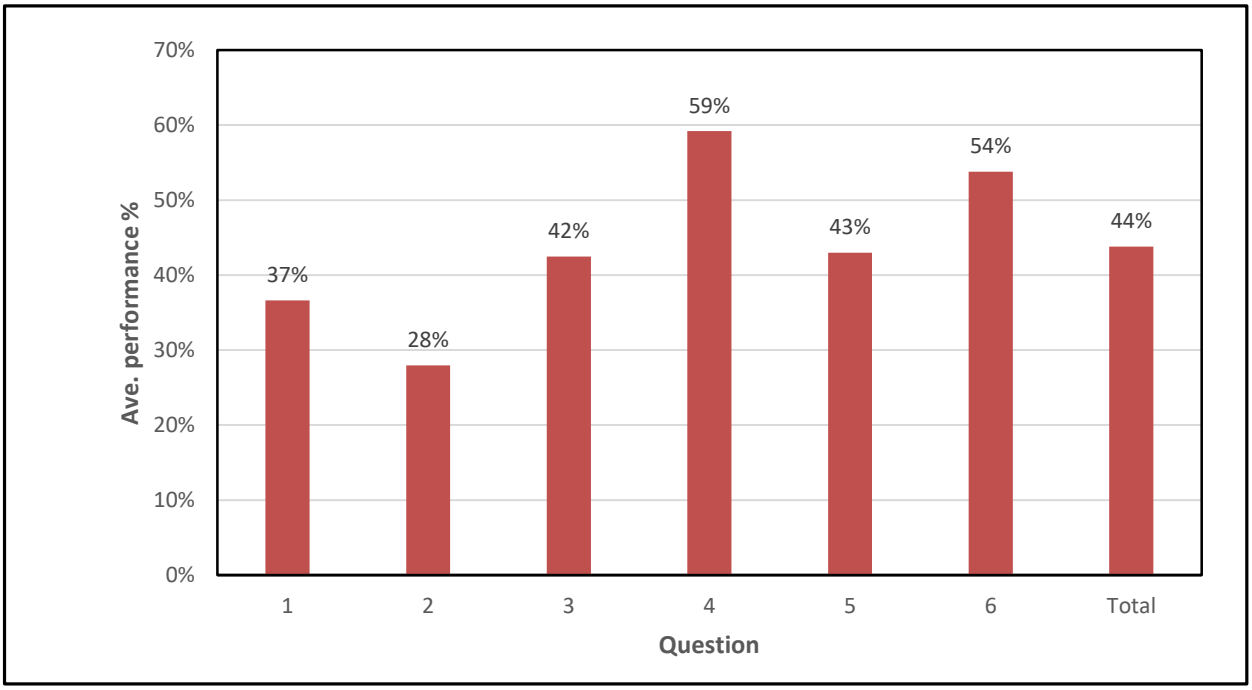
(d) Successful candidates were able to interpret, analyse, evaluate and synthesise evidence from the given sources and also use their own knowledge to consolidate their responses. They were also able to comment on the usefulness, limitations and reliability of the sources used.

(e) In Section B: Essay questions, there was a general improvement in essay-writing this year as most candidates could write and complete a comprehensive essay. Candidates demonstrated the required content knowledge in the essays but could not develop relevant introductions and conclusions, or take a stance and defend it with more persuasive lines of argument.

7.3 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

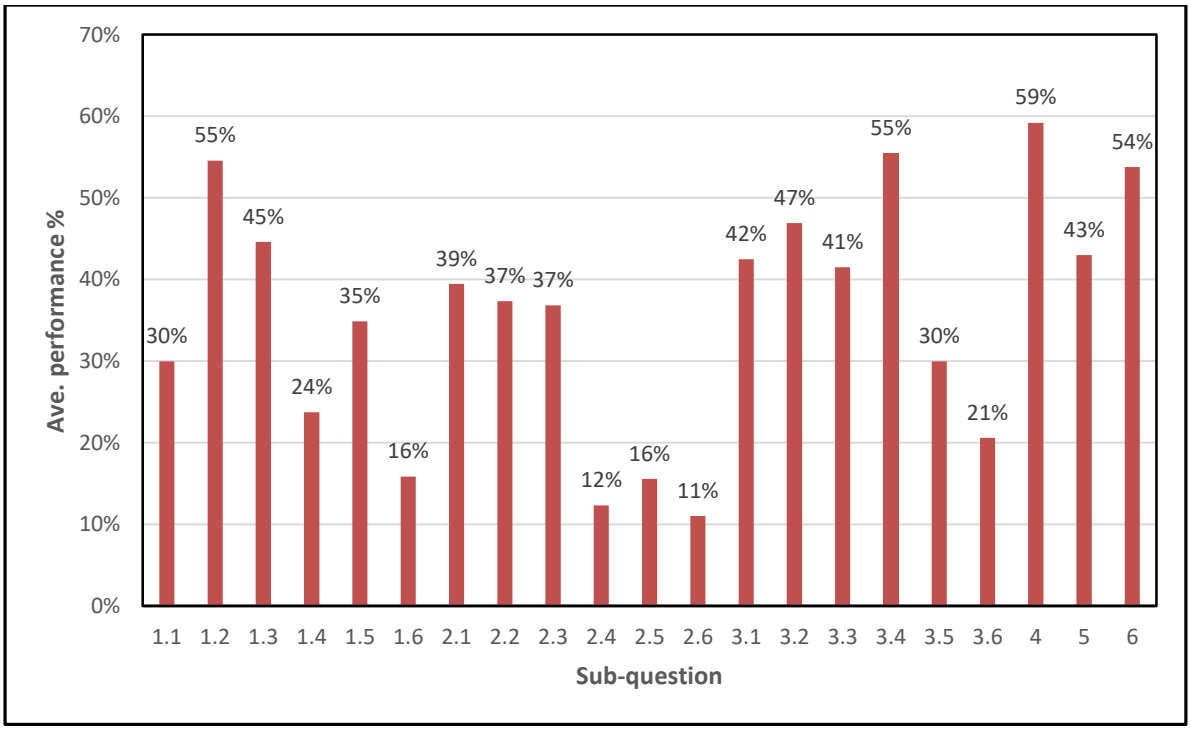
The following graph is based on data that was gathered from a random sample of candidates' scripts. While this graph might not accurately reflect the national averages, it serves as a useful tool to analyse how candidates performed in specific choice questions.

Graph 7.3.1 Average performance per question in Paper 1



Q	Topic/s
1	The Cold War: The Origins of the Cold War
2	Independent Africa: Africa in the Cold War: Case Study – Angola
3	Civil Society Protests from the 1950s to the 1970s: The US Civil Rights Movement
4	The Extension of the Cold War - Case Study: Vietnam
5	How was independence realised in Africa in the 1960s and 1970s? Case Study: The Congo
6	Civil Society Protests from the 1950s to the 1970s: The Black Power Movement

Graph 7.3.2 Average performance per sub-question in Paper 1



Q	Skills assessed	Q	Skills assessed	Q	Skills assessed	Q	Skills assessed
1.1	1.1.1 Extraction 1.1.2 Interpretation 1.1.3 Concept 1.1.4 Interpretation	**2.1**	2.1.1 Extraction 2.1.2 Concept 2.1.3 Extraction 2.1.4 Interpretation	**3.1**	3.1.1 Extraction 3.1.2 Concept 3.1.3 Interpretation	**4**	Essay:
1.2	1.2.1 Extraction 1.2.2 Interpretation 1.2.3 Extraction 1.2.4 Usefulness	**2.2**	2.2.1 Extraction 2.2.2 Concept 2.2.3 Extraction 2.2.4 Interpretation	**3.2**	3.2.1 Extraction 3.2.2 Interpretation 3.2.3 Extraction 3.2.4 Reliability	**5**	Essay
1.3	1.3.1 Extraction 1.3.2 Extraction 1.3.3 Concept 1.3.4 Interpretation	**2.3**	2.3.1 Extraction 2.3.2 Extraction 2.3.3 Interpretation 2.3.4 Interpretation	**3.3**	3.3.1 Interpretation 3.3.2 Interpretation	**6**	Essay:
1.4	Compare	**2.4**	Compare Sources	**3.4**	3.4.1 Extraction 3.4.2 Concept 3.4.3 Extraction 3.4.4 Extraction 3.4.5 Interpretation		
1.5	1.5.1 Interpretation 1.5.2 Interpretation	**2.5**	2.5.1 Interpretation 2.5.2 Limitations	**3.5**	Compare Sources to determine how they support each other		
1.6	Paragraph	**2.6**	Paragraph	**3.6**	Paragraph		

7.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

SECTION A: SOURCE-BASED QUESTIONS

QUESTION 1: THE COLD WAR: THE ORIGINS OF THE COLD WAR

Common errors and misconceptions

(a) In Q1.1.3 most candidates could not define the term *satellite states* in their own words. They provided generalised responses such as *a satellite is a colony*.

(b) A large number of candidates were unable to explain why the Soviet Union and its satellites states refused to join the Marshall Plan. They simply extracted the information provided in the source, which was not a requirement to answer the question.

(c) In Q1.2.4 several candidates struggled to comment on the usefulness of Source 1B to a historian researching the intention of the Marshall Plan. Responding to a question on the skill of usefulness remains a problem for most candidates.

(d) In Q1.3.3 most candidates could not define *economic imperialism* in the context of the Cold War. They provided generalised responses such as *It was the American freedom*.

(e) Candidates had difficulty with explaining how Source 1B differed from Source 1C regarding the assistance given to Europe by the US government (Q1.4). Most candidates only provided one comparison.

(f) Some candidates could not explain the messages that were conveyed in the cartoon. Many candidates responded by rewriting the message from the source without explaining it.

(g) Some candidates lacked the ability to explain the significance of the word, *EUROPE* in the context of the implementation of the Marshall Plan. They made general statements without providing relevant explanations.

(h) The majority of the candidates responded poorly to the paragraph question. Candidates copied information directly from the sources. They were, however, unable to use the information in the sources to write a comprehensive paragraph. The majority of candidates displayed an inability to interpret, evaluate and synthesise information from different sources.

QUESTION 2: INDEPENDENT AFRICA: AFRICA IN THE COLD WAR: CASE STUDY: ANGOLA

Common errors and misconceptions

(a) In Q2.1.2 most candidates could not define the term *decolonisation* in their own words.

(b) In Q2.1.4 a large number of candidates could not explain what led to the collapse of the Alvor Accord in 1975. They lacked basic interpretation skills. They had no knowledge of this accord.

(c) Most candidates could not explain the term *domino effect* in the context of the Cold War (Q2.2.2). The words, *in the context of*, were misunderstood and many candidates gave the definition of *domino effect*, instead.

(d) In Q2.2.4 some candidates could also not explain what is implied by the words, *American officials knew that the Angolan Civil War served as a real threat to its interests throughout all of Africa*. They lacked the ability to interpret the question.

(e) In Q2.3.4 many candidates found it difficult to explain why South Africa provided limited military aid and funding to both the FNLA and UNITA. This was mainly due to their lack of knowledge about the role that South Africa played in the Angolan Civil War between 1974 and 1976.

(f) The majority of candidates had difficulty with comparing the information in Sources 2B and 2C regarding the involvement of the USA and South Africa in the Angolan Civil War between 1974 and 1976 in Q2.4. Many of them could not link the information in both sources.

(g) In Q2.5.1 many candidates could not interpret the messages of the poster. Furthermore, they were unable to link the visual clues with the content at hand. The majority of the candidates copied the words found in the contextualisation of the source as answers.

(h) Many of the candidates could also not explain the limitations of Source 2D for a historian researching the Angolan Civil War between 1974 and 1976.

(i) A large number of candidates showed very poor competence in paragraph-writing skills and did not answer the question asked. Some candidates tended to look at sources in isolation. Candidates required the ability to utilise the sources to support their response to a question without a strong dependence on using direct quotes from the very source.

QUESTION 3: CIVIL SOCIETY PROTESTS FROM THE 1950s TO THE 1970s: THE US CIVIL RIGHTS MOVEMENT

This proved to be a popular question as it was attempted by a large number of candidates. The performance ranged from fair to good.

Common errors and misconceptions

(a) Q3.1.2 and Q3.4.2 were poorly answered because many candidates were unable to define the concept *boycott* in their own words (Q3.1.2) and to explain the term *integration* in the context of the Civil Rights Movement (Q3.4.2).

(b) A large number of candidates struggled to comment on what is conveyed by the words, *There's a Coloured library on Mill Street*. They lacked knowledge and interpretation of the question. They used information from the source verbatim and confused reliability with usefulness of a source.

(c) It was evident in Q3.3.1 that some candidates were unable to explain the messages that were conveyed in the photograph. Many candidates responded by rewriting the message from the source without explaining it.

(d) Many candidates could not provide historical facts on why McCain felt the *most relieving and most cleansing feeling that he ever felt*. Responses were too general, e.g. *He was happy*.

(e) Some candidates experienced difficulty with the comparison question (Q3.5). They could not explain how Source 3A supported Source 3D regarding the non-violent protest to desegregate facilities in the United States of America during the 1960s. Most candidates only provided one comparison.

SECTION B: ESSAY QUESTIONS

QUESTION 4: THE EXTENSION OF THE COLD WAR – CASE STUDY: VIETNAM

This question was the most popular and the performance of candidates who attempted this question ranged from satisfactory to good.

Common errors and misconceptions

(a) Some candidates provided an unnecessary and detailed background about Vietnam. Candidates needed to be able to address what was required by the question.

(b) A significant number of candidates were able to take a stance on the statement that *The tactics and strategies that the United States of America used between 1963 and 1975 against the Vietcong during the war in Vietnam were a dismal failure*.

(c) It was also noted that essays of weaker candidates lacked proper introductions and contained irrelevant background information. In addition, many could not sustain their line of argument or draw convincing conclusions.

(d) Chronology was expected to be stressed in this question since the line of argument depended on it.

QUESTION 5: INDEPENDENT AFRICA: HOW WAS INDEPENDENCE REALISED IN AFRICA IN THE 1960s AND 1970s? – CASE STUDY: THE CONGO

This question was attempted by a small percentage of candidates. Generally, the performance ranged from poor to satisfactory. After script analysis was conducted, it was clear that this question was not the best answered essay question, because candidates gave too much background information instead of answering the question by taking a line of argument and developing it with relevant evidence.

Common errors and misconceptions

(a) A large percentage of candidates who attempted this question were unable to critically discuss the statement with reference to the political, economic, social and cultural policies that Mobuto Sese Seko implemented in the Congo from the 1960s to the 1970s. The content presented was largely descriptive and there was little attempt to develop a line of argument.

(b) Many candidates simply discussed the policies without stating whether they met the expectations for a new and better life for all Congolese. Responses lacked relevant introductions and conclusions and did not develop a line of argument. Some candidates also gave a lot of irrelevant background information from before the 1960s.

QUESTION 6: CIVIL SOCIETY PROTESTS FROM THE 1950s TO THE 1970s –THE CIVIL BLACK POWER MOVEMENT

Most candidates answered this question and seemed to have prepared for the theme thoroughly. The marks obtained were marginally better than those for the other essays. Those who did not perform well enough appeared to be candidates who did not cover, or were not taught, this theme at school.

Common errors and misconceptions

(a) Many candidates were unable to explain *to what extent the philosophy of Black Power empowered African Americans to be assertive and do things for themselves during the 1960s*.

(b) Some candidates just gave a narrative account of Black Power, the philosophy, the leaders and the Black Panthers without mentioning the impact of how the philosophy of Black Power empowered African Americans to be assertive and do things for themselves (be self-reliant) during the 1960s.

(c) A few candidates wrote essays that lacked introductions, a logical and sequential body of events as well as persuasive conclusions.

7.5 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

(a) Generally, candidates' performance in this question paper ranged from fair to excellent. It was evident that some candidates opted for two essay questions and one source-based question. The popular choice questions were Q1, Q2, Q3, Q4 and Q5. Few candidates attempted Q6.

(b) In Section A: Source-based questions, many candidates found it challenging to define concepts in their own words or explain concepts in the context of a section. They were unable to interpret statements from the sources effectively. It was also evident that many candidates lacked the ability to interpret, analyse, evaluate and synthesise information from the sources that was provided. This resulted in unsatisfactory responses to specific higher-order questions, where candidates were unable to explain the limitations, reliability and usefulness of sources. Comparison of information between sources also proved to be challenging.

(c) A large number of candidates relied mostly on the relevant information in the sources with little or no reference to their own knowledge. They were unable to write a well-structured paragraph effectively. Candidates copied information from the sources.

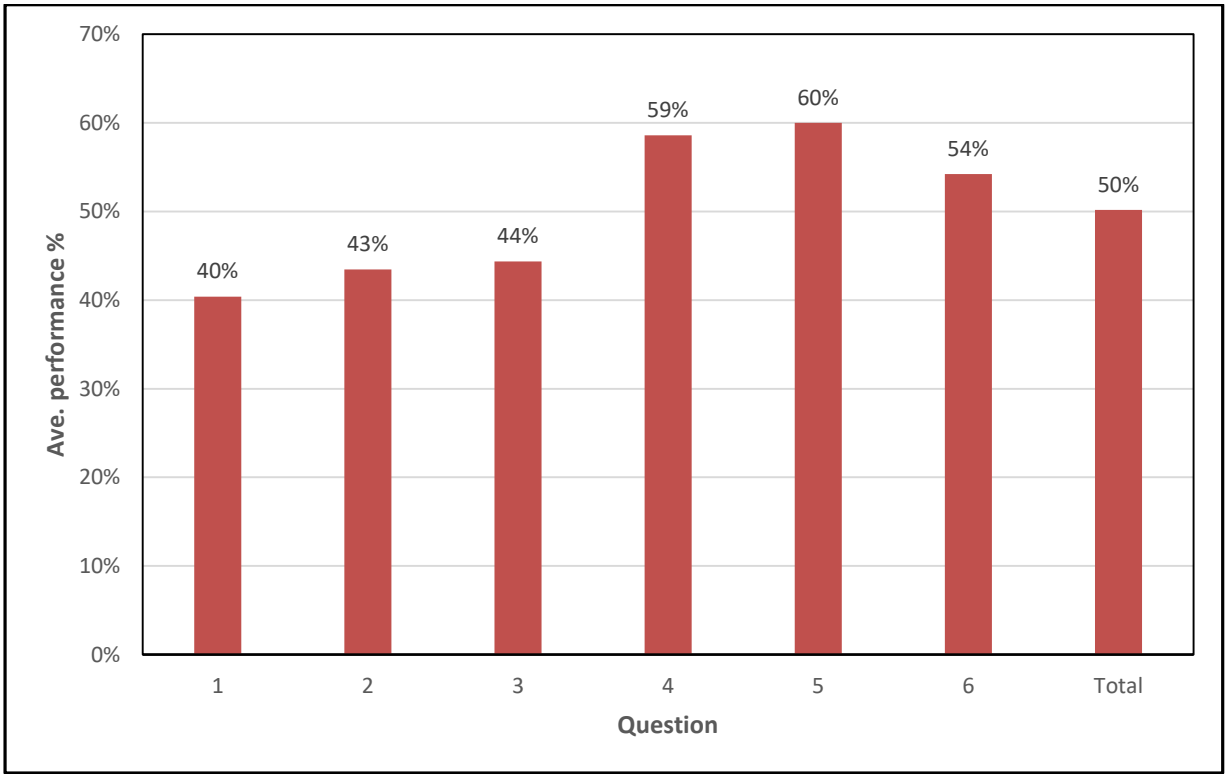
(d) Successful candidates were able to interpret, analyse, evaluate and synthesise evidence from the given sources and also use their own knowledge to consolidate their responses. They were also able to comment on the usefulness, limitations and reliability of the sources used.

(e) In Section B: Essay questions, there was a general improvement in essay-writing this year as most candidates could write and complete a comprehensive essay. Candidates demonstrated the required content knowledge in the essays but could not develop relevant introductions and conclusions, or take a stance and defend it with more persuasive lines of argument.

7.6 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2

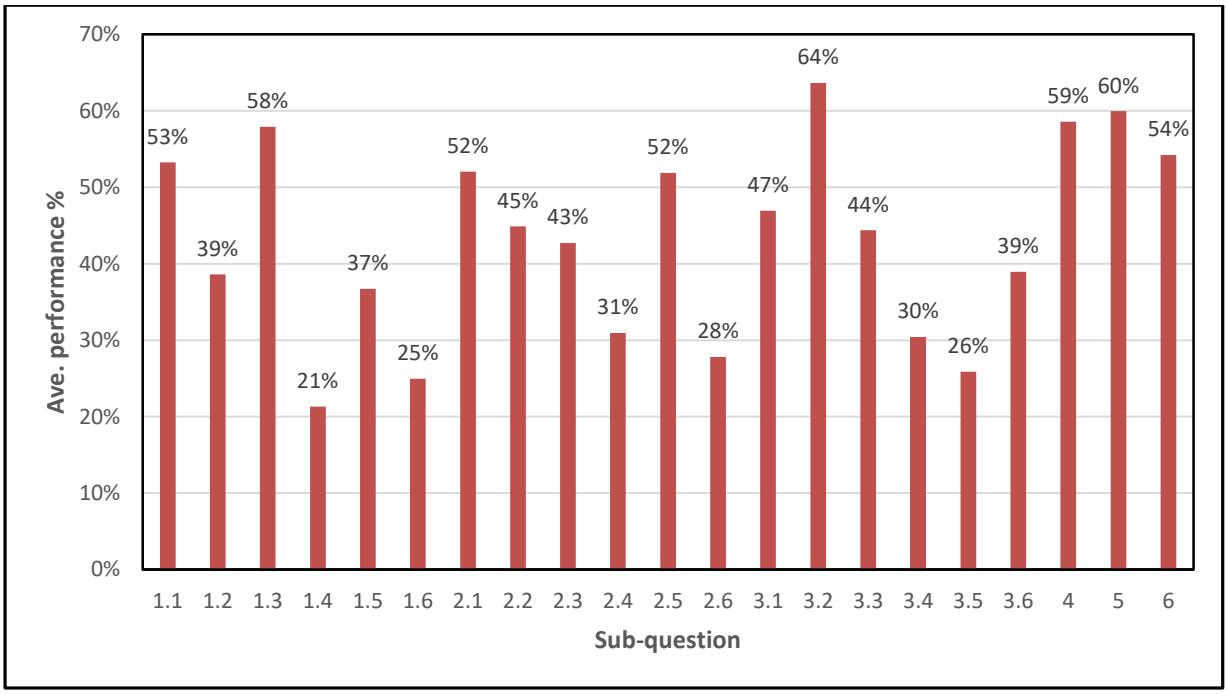
The following graph is based on data that was gathered from a random sample of candidates' scripts. While this graph might not accurately reflect the national averages, it serves as a useful tool in analysing how candidates performed in specific choice questions.

Graph 7.6.1 Average performance per question in Paper 2



Q	Topics
1	Civil Resistance, 1970s to 1980s: South Africa – The crisis of apartheid in the 1980s: Internal Resistance to Reforms
2	The coming of democracy to South Africa and coming to terms with the past – The TRC
3	The end of the Cold War and a New World Order, 1989 to the present – A new world order
4	Civil Resistance, 1970s to 1980s: South Africa: The challenge of the Black Consciousness to the apartheid state
5	The coming of democracy to South Africa and coming to terms with the past – Negotiated settlement and the GNU
6	The end of the Cold War and a New World Order: The impact of Gorbachev's Reforms on the Soviet Union and South Africa

Graph 7.6.2 Average performance per sub-question in Paper 2



Q	Skills assessed	Q	Skills assessed	Q	Skills assessed	Q	Skills assessed
1.1	1.1.1 Extraction 1.1.2 Interpretation 1.1.3 Concept 1.1.4 Interpretation 1.1.5 Extraction	**2.1**	2.1.1 Extraction 2.1.2 Concept 2.1.3 Interpretation 2.1.4 Extraction 2.1.5 Interpretation 2.1.6 Extraction	**3.1**	3.1.1 Extraction 3.1.2 Extraction 3.1.3 Concept 3.1.4 Interpretation	**4.**	Essay
1.2	1.2.1 Extraction 1.2.2 Extraction 1.2.3 Interpretation 1.2.4 Reliability	**2.2**	2.2.1 Interpretation 2.2.2 Interpretation 2.2.3 Concept	**3.2**	3.2.1 Extraction 3.2.2 Concept 3.2.3 Interpretation 3.2.4 Extraction	**5.**	Essay
1.3	1.3.1 Interpretation 1.3.2 Interpretation	**2.3**	2.3.1 Extraction 2.3.2 Interpretation 2.3.3 Usefulness	**3.3**	3.3.1 Extraction 3.3.2 Interpretation 3.3.3 Extraction 3.3.4 Extraction 3.3.5 Limitations	**6.**	Essay
1.4	Compare Sources	**2.4**	Compare Sources	**3.4**	3.4.1 Interpretation 3.4.2 Interpretation		
1.5	1.5.1 Extraction 1.5.2 Concept 1.5.3 Interpretation 1.5.4 Interpretation	**2.5**	2.5.1 Extraction 2.5.2 Extraction 2.5.3 Interpretation	**3.5**	Compare Sources		
1.6	Paragraph	**2.6**	Paragraph	**3.6**	Paragraph		

7.7 DIAGNOSTIC ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

SECTION A: SOURCE-BASED QUESTIONS

QUESTION 1: CIVIL RESISTANCE, 1970s TO 1980s: SOUTH AFRICA: THE CRISIS OF APARTHEID IN THE 1980s – INTERNAL RESISTANCE TO REFORMS

Common errors and misconceptions

(a) In Q1.1.2 some candidates could not explain what is implied by the statement, *what he (PW Botha) had in mind was not reform but rather a reformulation of apartheid*. Candidates gave irrelevant responses and showed a lack of content knowledge in this regard.

(b) In Q1.1.3 some candidates were unable to define the term *tricameral parliament* using their own words. Candidates did not mention all the races that formed part of the *tricameral parliament* in their definitions, e.g. they mentioned Whites and Indians only.

(c) In Q1.1.4 some candidates managed to respond to the first part of the answer which they could draw from the source but they could not provide a second answer. They apparently did not understand the inference to *new legislation*.

(d) In Q1.2.3 a few candidates struggled to explain the meaning of Boesak's statement.

(e) In Q1.2.4 most candidates could not determine the reliability of a historical source

(f) In Q1.3.1 many candidates struggled with this question as they could not explain the implication of the words, *DON'T VOTE IN APARTHEID ELECTIONS* in the poster.

(g) In Q1.4 most candidates could not explain how the evidence in Source 1C supported the information in Source 1B regarding the UDF's internal resistance against apartheid reforms in 1983. The skill of making comparisons remained a challenge in answering this question.

(h) In Q1.5.2 most candidates were unable to explain the term *boycott* in the context of the UDF's reaction to the elections for the tricameral parliament. Candidates used their own words to explain the term and did not contextualise as the question required.

(i) In Q1.5.3 a large number of candidates could not explain why they thought two-thirds of the white voters endorsed the constitution in a referendum held in November 1983. Candidates gave irrelevant responses and did not understand the meaning of *endorsed*.

(j) In Q1.5.4 many candidates failed to comment on why the United States' State Department believed that Botha's reforms were *a step in the right direction*. Candidates gave irrelevant responses.

(k) In Q1.6 many candidates could not write a paragraph explaining how the UDF responded to the apartheid reforms introduced by PW Botha in 1983. Some wrote in point or bullet form and copied/rewrote instead of using the information in the relevant sources. Some candidates extracted, instead of interpret, evidence from the sources.

QUESTION 2: THE COMING OF DEMOCRACY TO SOUTH AFRICA AND COMING TO TERMS WITH THE PAST – THE TRC

Common errors and misconceptions

(a) In Q2.1.2 a few candidates could not explain the concept *amnesty* in their own words. They gave one-word answers as if they were asked to give a synonym for *amnesty*.

(b) In Q2.1.3 many candidates could not explain why they thought the hearings at the TRC made international news. Candidates gave irrelevant responses and did not know the meaning of 'international'.

(c) In Q2.1.5 most candidates were unable to explain why they thought the Human Rights Violations Committee investigated human rights abuses. Candidates re-stated the question as their answer and disregarded the period (1960–1994) in their responses.

(d) In Q2.2.2 some candidates were unable to comment on why they thought the TRC used the words, *IF YOUR MOTHER WAS TORTURED, FATHER MURDERED … WOULD YOU BE SILENT*, on the poster in the context of the TRC hearings. They just repeated the phrase that they had to interpret and they were unable to see that the poster was appealing to the emotions of the victims.

(e) In Q2.2.3 many candidates were unable to explain the term *reconciliation* in the context of the TRC. They extracted sentences from the source as their responses.

(f) In Q2.3.2 many candidates could not explain why they thought Dirk Coetzee implicated ANC cadres in the murder of Griffiths Mxenge. They did not understand the operation of the *askari's* and policemen during the apartheid era. Candidates gave irrelevant responses and showed lack of content knowledge in this regard.

(g) In Q2.3.3 some candidates could not explain the usefulness of Source 2C to a historian researching the murder of anti-apartheid activist, Griffiths Mxenge.

(h) Comparing sources was still a challenge for many candidates in Q2.4.

(i) In Q2.5.3 many candidates were unable to use the information in the Source 2D and their own knowledge to explain why the Mxenge family was disappointed by the TRC's decision to grant amnesty for the murder of Griffiths Mxenge. Candidates extracted information from the source and failed to interpret.

(j) In Q2.6 many candidates could not write a paragraph explaining how the TRC dealt with the murder of political activist, Griffiths Mxenge. Some wrote in point or bullet form and copied instead of using the information from the relevant sources.

QUESTION 3: THE END OF THE COLD WAR AND A NEW WORLD ORDER, 1989 TO THE PRESENT – A NEW WORLD ORDER

Common errors and misconceptions

(a) In Q3.1.3 many candidates were unable to define *globalisation* in their own words. They extracted sentences from the source as their responses

(b) In Q3.1.4 some candidates could not use the information from the source and their own knowledge to explain how technological advancement contributed to Covid-19 becoming a global pandemic.

(c) In Q3.2.2 some candidates were unable to explain the term *pandemic* in the context of Covid-19. Candidates gave wrong responses and did not contextualise as the question required

(d) In Q3.3.5 many candidates were unable to answer the question on *limitations*. Some of them responded to *limitations* as if the question asked for *usefulness*.

(e) In Q3.4.1 many candidates could not explain what the cartoonist meant by the caption, *BETWEEN A ROCK AND A HARD PLACE*, regarding the position of the poor. The responses were mostly *a matter of life and death* and that became irrelevant to what the question required.

(f) In Q3.4.2 many candidates could not explain what messages were conveyed by the cartoonist regarding the Covid-19 pandemic. Candidates did not use the visual clues as the question required.

(g) In Q3.5 most candidates could not explain how the information in Source 3C supported the evidence in Source 3D regarding the impact that the lockdown has had on the poor. The responses they gave were irrelevant and showed a lack of content knowledge on the effects of Covid-19.

(h) In Q3.6 some candidates could not write a paragraph explaining the impact that the global Covid-19 pandemic has had on South Africa. Some wrote in point or bullet form and copied instead of using the information in the relevant sources.

SECTION B: ESSAY QUESTIONS

QUESTION 4: CIVIL RESISTANCE, 1970s TO 1980s: SOUTH AFRICA – THE CHALLENGE OF BLACK CONSCIOUSNESS TO THE APARTHEID STATE

Common errors and misconceptions

(a) A significant number of candidates could not take a line of argument in line with the question verb, *critically discuss*, instead they wrote a narrative or descriptive essay.

(b) Many candidates gave too much background information.

(c) A few candidates focused on the Soweto uprising and less on other forms of mobilising black South Africans

QUESTION 5: THE COMING OF DEMOCRACY TO SOUTH AFRICA AND COMING TO TERMS WITH THE PAST – NEGOTIATED SETTLEMENT AND THE GNU

Common errors and misconceptions

(a) Some candidates could not *explain to what extent* commitment and compromise played key roles in sustaining the negotiation process that ultimately led to a new democratic South Africa.

(b) A number of candidates lacked the skill to demonstrate the extent to which commitment and compromise played key roles in sustaining the negotiation process that ultimately led to a new democratic Republic of South Africa.

(c) Many candidates had the chronology of events in this essay flawed.

(d) A substantial number of candidates applied the *L* in the *PEEL* method incorrectly. They repeatedly ended each paragraph with the same concluding statement, e.g. starting with *It is clear that …*, that did not relate well to the information provided.

QUESTION 6: THE END OF THE COLD WAR AND A NEW WORLD ORDER – THE IMPACT OF GORBACHEV'S REFORMS ON THE SOVIET UNION AND SOUTH AFRICA

Common errors and misconceptions

(a) Some candidates struggled to link Gorbachev's reforms with the impact they had on the cooperation between the NP and the ANC.

(b) A few candidates focused on the impact of Gorbachev's reforms on the disintegration of the Soviet Union instead of South Africa.

(c) Some candidates wrote a narrative or descriptive essay.

7.8 SUGGESTIONS FOR IMPROVEMENT IN PAPER 1 AND PAPER 2

Teachers should:

(a) Ensure that the prescribed content, as contained in the *CAPS, Abridged Section 4 of CAPS* and the *2021 Examination Guidelines* document, is aligned to the Recovery Annual Teaching Plan (ATP) or any revisions to this plan and is comprehensively covered within the timeframes.

(b) Teach learners the relevant themes using interactive, user-friendly teaching methodology and relevant notes so that they have an in-depth understanding of the content focus areas.

(c) Refer to past NSC question papers for practical examples as to how the difficult historical skills (specific skills relevant for history learners, as outlined in below) can be tested and incorporate them in lessons.

(d) Expose learners to a variety of sources (e.g. visual, written, statistical, graphical and electronic) and provide opportunities to develop the related source-based skills such as extraction and selection of relevant information, interpreting, analysing, evaluating, comparing and contrasting sources, and ascertaining limitations, usefulness and reliability of sources.

(e) Equip learners with the necessary skills related to the definition or explanation of concepts in historical context, extraction, interpretation, analysis, ascertaining the reliability, limitations and usefulness of historical sources to improve their historical consciousness. These foundational historical skills must be underpinned by the teaching and learning of the prescribed content that has been delineated into source-based and essay questions. It is strongly advised that all historical concepts applicable to a specific topic be thoroughly unpacked and explained at the beginning of each topic, while the content focus is gradually unlocked.

(f) Develop user-friendly resource materials, especially for the new content areas such as Origins of the Cold War, Vietnam, Congo, Internal Resistance to Reforms and The Challenge of the Black Consciousness to the apartheid state.

(g) Develop a list of concepts pertaining to each theme that must be covered and apply these concepts throughout the year as the topic is being addressed. This will assist learners in refining skills to answer interpretative questions.

(h) Ensure that assessment, both informal and formal, is ongoing and assesses historical skills such as interpretation, analysis, evaluation and synthesis of evidence from the given sources. It is also advisable to go beyond the formal Programme of Assessment and give more assessment tasks.

(i) Capacitate learners with the necessary and essential skills on how to work with sources such as interpretation, analysis, usefulness, comparison as well as how to integrate information from both the sources and their own knowledge.

(j) Visit the DBE website as it has useful information on *Working with Sources* and the SBA document. Go to www.dbe.gov.za and follow the links for the NSC. Teachers and learners should not rely on one textbook only, and they should be alert to new resource materials such as media articles or newspaper supplements. Radio or TV features can also be used productively.

(k) Provide more exposure to the TRC, especially on how to work with sources and the use of case studies. It is advisable for teachers to visit the SAHO and the SAHA website, which uses case studies to highlight the workings of the TRC.

(l) Sharpen paragraph-writing skills by ensuring that learners do the following:
- Read the question and underline the key words.
- Study all sources to gain a thorough understanding of them.
- Underline the words in written sources and incorporate them in writing paragraphs.
- Start a paragraph with an opening statement that affirms or opposes the question and conclude the paragraph with a closing statement that supports the opening statement.
- Do not copy directly from the sources but use their own words, e.g. *According to Source 1A …*
- Ensure that responses are concise and to the point by structuring short sentences to frame the paragraph.
- Always refer to the question when writing a paragraph.

(m) Encourage learners to use the 5 W's in all historical inquiries, as listed below:

Question to ask	Purpose
Who?	To gain knowledge about historical figures
What?	To equip learners with historical knowledge
When?	To study historical periods
Where?	To learn where historical events took place
Why?	To learn why historical events took place

After completing a topic or specific content focus, learners should be trained to acquire historical skills by asking them to apply the 5 W's to the content being taught.

(n) Provide opportunities that expose learners to innovative, relevant and user-friendly resources as well as examination techniques.

(o) Set skills-focused tasks to assess specific cognitive levels, such as making comparisons between sources so that answers can be structured in the context of the question posed.

(p) Develop the requisite essay-writing techniques by:
- Coaching learners on how to unpack the question posed by identifying four key aspects namely, the action verb used (e g, explain to what extent, do you agree or critically discuss), content focus, context of the content focus and time frame.
- Underlining the key words in the question. If the question demands that a stance be taken, this must be stated in the introduction.
- Using the PEEL writing template listed below to teach learners how to write an argumentative essay:
  - **Point**: State the main point by indicating a line of argument.
    Each paragraph should include a point that sustains the major point (line of argument) that was made in the introduction.
  - **Explanation**: Explain the point or line of argument by demonstrating how it relates to the question posed (line of argument).
  - **Example** (Evidence): Select and provide appropriate evidence (examples) to support the line of argument.
  - **Link**: Ensure that the concluding statement in each paragraph is linked to the line of argument taken at the introduction.

(q) Guide learners to respond to an argumentative essay by focusing on a strong introduction (with a line of argument or an independent line of argument), paragraphs that sustain the line of argument and a conclusion that ties up the line of argument and links well with the introduction.

(r) Attend content and assessment workshops, subject meetings or subject briefing sessions to firstly familiarise themselves with the requirements and demands of the *CAPS* and the *2021 Examination Guidelines* document and, secondly, to use recent and relevant teaching and learning methods in classrooms.

(s) Undertake research on latest historical trends in the teaching and learning of history.

(t) Interact with relevant resources such as books, historical journals, internet sites, DVDs, YouTube videos, *Google*, *SA History Online (SAHO)*, the *History Channel*, television news channels, South African Society for History Teaching (SASHT) and newspapers in order to meaningfully convey the prescribed content to learners.

(u) Instil the following steps when teaching learners how to compare evidence in two sources to answer questions on either similarities or differences:
- Read the question thoroughly and underline the main point.
- Study the contextualisation of both sources and underline its main context.
- Check the author and the purpose of each source, after studying the contextualisation of the source. This will give a clue about the perspective and intention of the source, which could then be compared to the other source.
- Detect opposing viewpoints by identifying the rival organisations or ideologies that the two sources represent. If opposing viewpoints form part of the contextualisation of the two sources that are compared, learners must underline both viewpoints, because the different perspectives displayed by each source will already provide the learner with one option of the answer.
- Familiarise themselves with the information in the sources mentioned. The 5 W's stated earlier can be used in this regard.

- Have a clear understanding of what a visual source entails (what it is about) by finding dates, numbers, historical figures, facial expressions, text or any other object relevant to the question.
- Provide the required responses for the question in either of the following ways:
  - In answering a question about similarities, learners could use the following: *Both sources refer to …* or *Source 1A mentions …* and *Source 1B shows …*'.
  - When comparing information for differences or contrast, it is crucial that learners state: *Source 1A says … WHILE Source 1B states …* or *In Source 1A we read… WHILE Source 1B shows …* or *Source 1A is written from a communist perspective (Russian point of view) WHILE Source 1B is written from a capitalist perspective (US point of view)*.
- Highlight the point that will be credited for each response that makes reference to both sources, i.e. 2 (two) marks. To get full marks in a question with a mark allocation of (2 x 2) (4), learners should provide TWO responses that refer to both sources, but on two different aspects.

Subject Advisors should:

(a) Thoroughly study and understand the *2021 Diagnostic Report* provided.

(b) Plan, prepare and conduct intensive content and assessment workshops on problematic areas as identified in this report with FET History teachers.

(c) Conduct assessment training on how to mark higher-order source-based questions (usefulness, compare and paragraph writing) and essay questions. A sample of learner responses should be used to train teachers on how to use the levels of rubrics and matrix to assess paragraphs and essays correctly. Orientate teachers on the principles and criteria of how to mark source-based, paragraph and essay questions which are found on pages 2 to 6 of the NSC November 2021 Marking Guidelines.

(d) Workshop teachers on the findings of the *NSC November 2021 Diagnostic Report*.

(e) Vigorously monitor and quality assure the assessment tasks administered by teachers.

(f) Develop appropriate resource materials that both teachers and learners can interact with on an on-going basis.

(g) Workshop teachers on challenging topics from the NSC November 2021 examination.

(h) Train teachers on how to set quality assessment tasks in order to standardise tasks that constitute the Programme of Assessment.

Teacher development should:

(a) Identify teacher needs and gaps as outlined in the *Diagnostic Report*.

(b) Assist teachers on how to plan, prepare and present interactive History lessons.

(c) Ensure that new teachers are supported and guided on subject content and teaching methodology.

(d) Equip teachers with the latest teaching trends and techniques in History.

(e) Prepare teachers to apply the principle of Language Across the Curriculum (LAC) in their subject.

(f) Train school principals on the implementation of quality management systems (QMS) that, among others, would include management of curriculum implementation.

CHAPTER 8

LIFE SCIENCES

The following report should be read in conjunction with the Life Sciences question papers of the November 2021 NSC examinations.

8.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Life Sciences examination in 2021 increased significantly by 64 988 candidates compared to that in 2020, i.e. 20,4% of the cohort.

There was an improvement in the pass rate this year which halted the downward trend since 2018. The pass rates at 30% (Level 2) remained constant at approximately 71% of the cohorts for the past two years. However, there was an increase in the achievement level at 40% (Level 3) from 47,9% to 51,3% over this period.

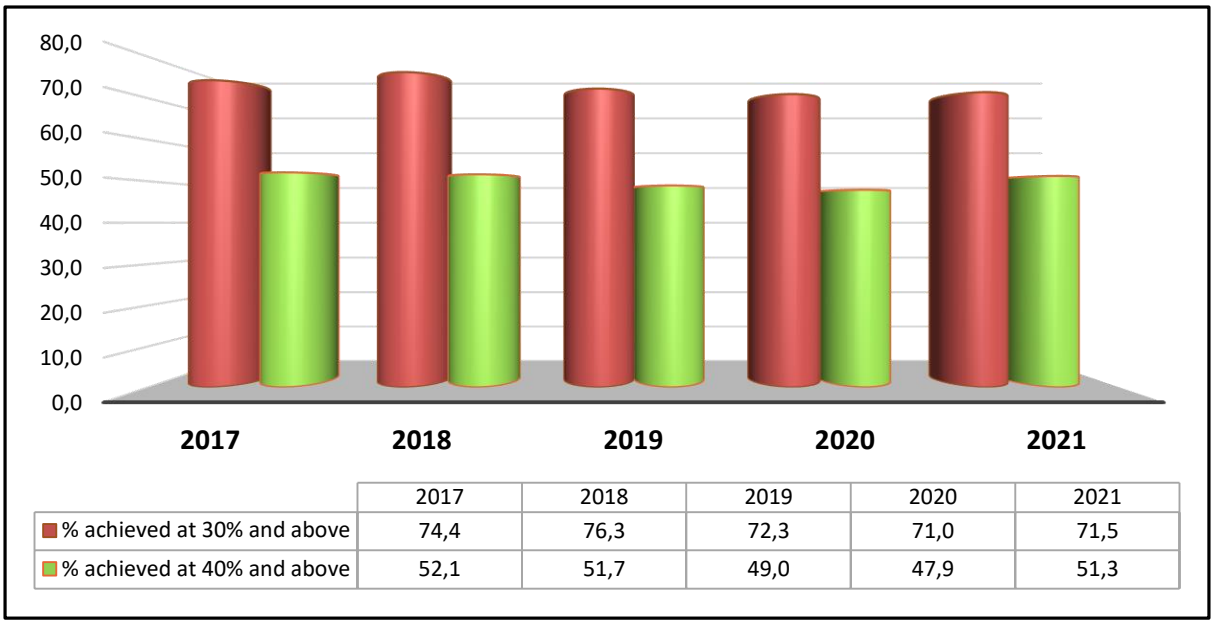
Given the increase in the size of the cohort, the number of passes achieved increased considerably at Level 2 by 47 884 and at Level 3 by 43 989. Furthermore, the percentage of distinctions (over 80%; Level 7) improved from 2,3% to 3,7% which converts into a pleasing increase in the total number of distinctions from 7 342 in 2020 to 14 216 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected the teaching and learning activities of the 2021 cohort. This appears to have been the result of creative intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 8.1.1 Overall achievement rates in Life Sciences

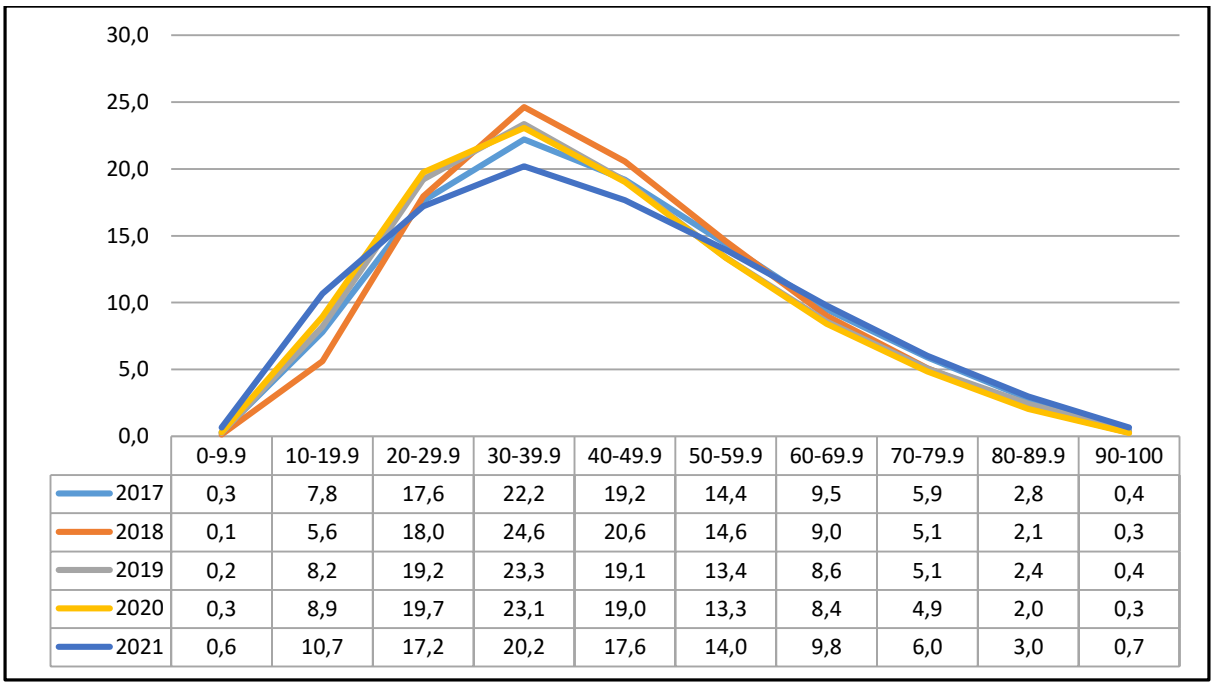
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	318 474	236 809	74,4	166 071	52,1
2018	310 041	236 584	76,3	160 208	51,7
2019	301 037	217 729	72,3	147 436	49,0
2020	319 228	226 700	71,0	153 028	47,9
2021	384 216	274 584	71,5	197 017	51,3

Graph 8.1.1 Overall achievement rates in Life Sciences (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	74,4	76,3	72,3	71,0	71,5
% achieved at 40% and above	52,1	51,7	49,0	47,9	51,3

Graph 8.1.2 Performance distribution curves in Life Sciences (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,3	7,8	17,6	22,2	19,2	14,4	9,5	5,9	2,8	0,4
2018	0,1	5,6	18,0	24,6	20,6	14,6	9,0	5,1	2,1	0,3
2019	0,2	8,2	19,2	23,3	19,1	13,4	8,6	5,1	2,4	0,4
2020	0,3	8,9	19,7	23,1	19,0	13,3	8,4	4,9	2,0	0,3
2021	0,6	10,7	17,2	20,2	17,6	14,0	9,8	6,0	3,0	0,7

Life Sciences: background information

The NSC examination in Life Sciences specifically sets out to assess the acquisition of scientific skills as outlined in the *CAPS*. It is therefore encouraging to note that the majority of candidates have developed the necessary skills in data analysis, data presentation (drawing of graphs) and calculations. The application of knowledge to practical situations is an area that appears to require strengthening, as does the evaluation and design of scientific investigations. This form of assessment is found in Papers 1 and 2 and it would serve the learners well if they could master it. Scientific investigations are introduced in Grade 10 and

should be thoroughly reinforced before Grade 12. Training and teacher support on these concepts must be given from Grade 10.

With the implementation of the amended section 4 of the *CAPS* (NSC November 2021), topics on Reproduction and Responding to the Environment in Paper 1 have a greater weighting than before. In Paper 2, there is a higher mark allocation (21 marks) toward the topic of meiosis. This section is assessed more rigorously than before. Teaching and support strategies should, therefore, devote more time and resources on these sections.

There is no longer an essay in Life Sciences examination papers, but the ability of candidates to successfully articulate their responses is still assessed in questions that require extended writing. The very nature of Life Sciences research is based on the ability to read and extract relevant information. Any valid assessment will involve lengthy texts. Learners need to be trained not to be intimidated by these questions and should practise active reading and comprehension skills.

8.2 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

General comments

(a) Teachers must make sure that candidates understand instruction verbs such as *state*, *describe*, *explain*, *tabulate* and *calculate,* and how to approach the requirements of the question. Misinterpretation of the instruction verbs reflects in low learner performance.

(b) Many candidates have serious problems with spelling. Sometimes if a spelling error shows ambiguity, candidates may lose marks. For example correct spelling is necessary when writing terms such as *ureter* and *urethra*, *epididymis* and *epidermis*.

(c) Some candidates gave more responses than those required by a question. If only two answers were required, only the first two answers will be marked according to Marking Principle 2 of Life Sciences.

(d) Poor performance is still evident in questions based on scientific investigations despite the support provided in the diagnostic reports of previous years.

(e) There was also poor performance in questions on the Endocrine System, Homeostasis and Reproductive strategies.

(f) Teachers need to identify the links between content in Grades 10, 11 and 12. Emphasis must be placed on content that requires deep understanding and that supports content in Grade 12. The negative feedback mechanisms must be dealt with properly in Grade 11 when teaching nutrition, gaseous exchange and excretion.

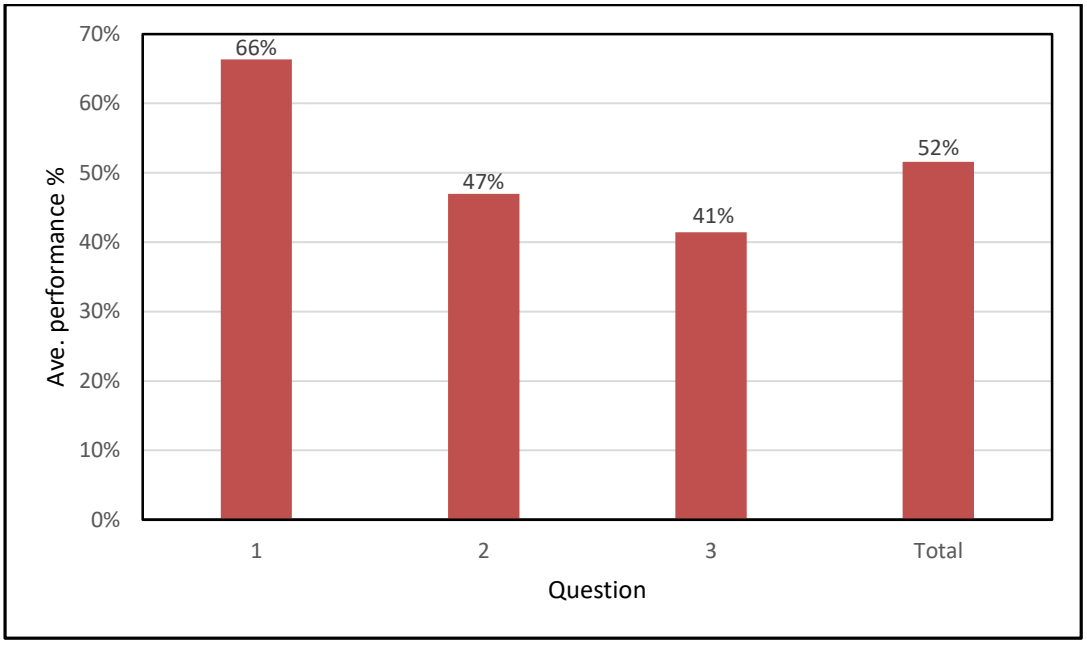
(g) When using past papers for revision, teachers must ensure that learners do not regard the marking guidelines as definitive or complete information on a particular topic. Scenarios might well be different depending on the demands of a question. Learners need to identify the requirements of a question to answer it appropriately.

8.3 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

The weakest performance by candidates was recorded in the subquestions on the Eye, Negative Feedback Mechanisms of Female Hormones (endometriosis), Thyroxin and TSH and Reproductive Strategies.

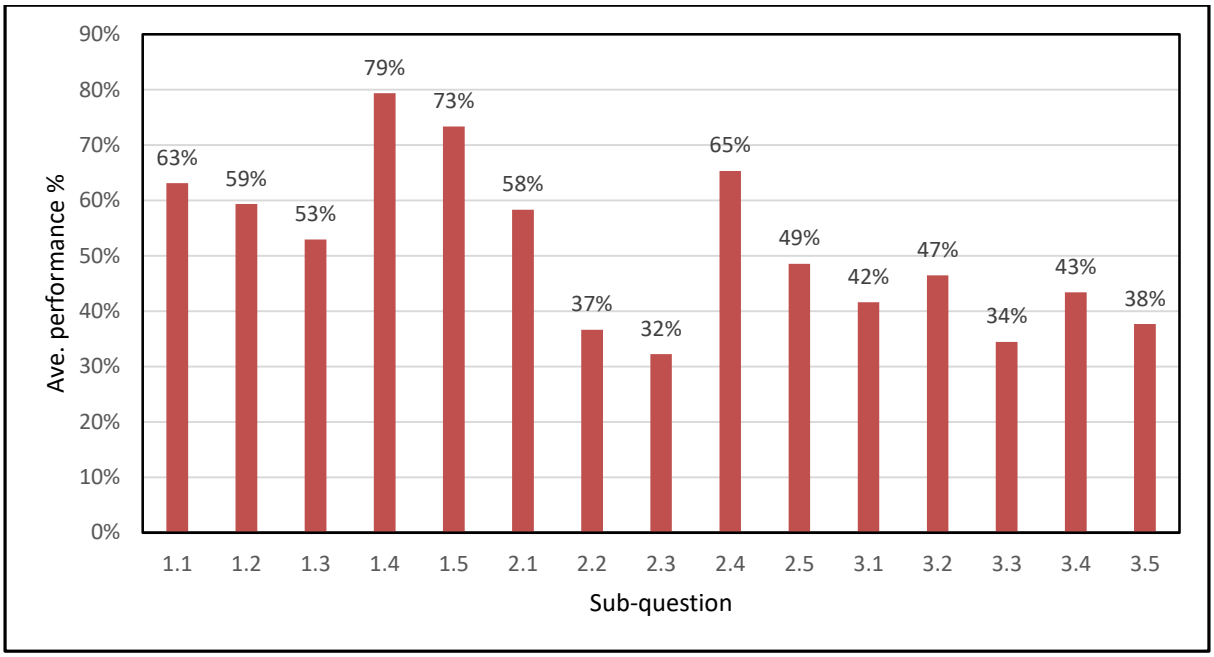
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 8.3.1 Average performance per question in Paper 1



Q	Topics
1	Multiple Choice, Terminology, Matching Items, Male Reproduction & Human Reproduction
2	Neurons, Sense Organs and Human Reproduction
3	Brain, Endocrine System and Homeostasis, Plant hormones and Reproduction Strategies

Graph 8.3.2 Average performance per subquestion in Paper 1



Sub-Q	Topic	Sub-Q	Topic
1.1	Multiple-choice Question	2.4	Hearing
1.2	Terminology	2.5	Reproduction (Developing Foetus)
1.3	Matching Items Question	3.1	Brain and Kidney
1.4	Reproduction (Male Reproductive System)	3.2	Temperature on blood flow
1.5	Reproduction (Sperm and Ovum)	3.3	Thyroxin (Negative Feedback)
2.1	The Neuron	3.4	Investigation (Bean Seeds)
2.2	The Eye	3.5	Reproduction (Vertebrates)
2.3	Endometriosis		

8.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MULTIPLE-CHOICE, TERMINOLOGY, MATCHING ITEMS, HUMAN REPRODUCTION AND NEURONS

Common errors and misconceptions

(a) In Q1.1 candidates performed well except for Q1.1.7 where they could not interpret the graphs correctly and Q1.1.9 where they had to determine the reason for a smaller volume of urine in a person.

(b) In Q1.2 performance in biological terms has improved but the following remains problematic for many candidates. In this regard, candidates:

- Provided the term *pregnancy* in Q1.2.3 instead of *gestation.* Gestation is the specific time period of development of the foetus while pregnancy includes all the changes that take place during this period. In Afrikaans the term *'draagtydperk'* was not accepted as it refers to pregnancy rather than gestation.
- Provided the terms *phototropism and geotropism* in Q1.2.4 when the required term was *tropism*.

- Wrote *chorion* or *amnion* instead of *allantois* and *seminal tubules* instead of *seminiferous tubules*. In Afrikaans the term '*spermbuisies'* was not accepted.
- Used the abbreviation ABA in Q1.2.8 instead of giving the correct term *Abscisic acid*. Some also just wrote *Abscisic* and left out *acid*.

(c) In Q1.3.1 many candidates did not know the difference between an *exocrine* and an *endocrine gland*. In Q1.3.2 most candidates did not consider the pancreas as an exocrine gland and that the *peripheral nervous system* is made up of both *cranial* and *spinal nerves*.

(d) Candidates lost marks in Q1.4 since they confused *urethra* with *ureter* and when asked to give both the letter and the name of a part, they wrote only the letter or the name.

(e) Marks were lost in Q1.5 due to candidates' inability to distinguish between an *ovum* and the *amniotic egg*; *mitochondria* and *mitochondrial DNA*; *oogenesis* and *ovulation*. They also wrote *jelly membrane/wall* instead of *jelly layer*.

Suggestions for improvement

(a) It is important to teach learners to write only one letter in multiple-choice questions. If a candidate gave more than one letter for a response, they were not awarded any marks.

(b) The abbreviation *ABA* for *Abscisic acid* was only marked as a concession for 2021 and will not be accepted in future. Spelling is also very important for terminology. Incorrect spelling often changes the meaning of the word and marks were consequently lost in this regard. Teachers should emphasize the difference between *pregnancy* and *gestation* as highlighted earlier. Teachers should use various strategies to improve the teaching of terminology. This has been outlined in the Diagnostic Reports of the previous years.

(c) Learners should be encouraged to read questions with proper understanding. Teachers must emphasise that learners must follow instructions correctly when answering questions.

(d) Certain sections of work, especially those that involve structure and function (such as the reproductive system in Q1.5 the ovum and the sperm) are best taught using diagrams. Teachers should give learners multiple opportunities to label drawings and write in the functions next to the labels.

(e) Teachers should use the information provided by the *Examination Guidelines* and not teach unnecessary content which might be provided in some textbooks.

QUESTION 2: NEURONS, SENSE ORGANS, ENDOMETRIOSIS AND HUMAN REPRODUCTION

Common errors and misconceptions

(a) In Q2.1.3 some candidates were not able to compare neurons. They did not always pick up that neuron 1 had a myelin sheath and neuron 2 did not, and therefore could not explain the transmission speed of the impulse. Both neurons were *motor neurons* as stipulated in the *Examination Guidelines,* but *multipolar neurons* were also accepted as a concession for 2021 only.

(b) In Q2.1.4 candidates understood the reason why a person could not respond if a motor neuron is damaged, but they did not explain the complete pathway. They described the *reflex arc* instead of explaining the *reflex action*. Also, they mentioned spinal cord only without mentioning the brain. They needed to mention the entire central nervous system.

(c) The following common errors were observed in Q2.2:
- In Q2.2.1 some candidates confused the *Choroid* in the eye with the *Chorion* in the developing foetus, and in Q2.2.5 *Circular muscles* with *Ciliary muscles*.
- In Q2.2.3 candidates needed to state why the yellow spot had the clearest image. It must be noted that the yellow spot consists of cones only and therefore has the highest concentration of cones. There are no rods in the yellow spot. If the candidates answered *rods and cones are in the highest concentration* they were not awarded a mark. Photoreceptors were also not accepted as an alternative for cones as it implies both rods and cones.
- In Q2.2.4 some candidates wrote a comparison of the functions of parts B (sclera) and F (lens), rather than a comparison of the structure. Candidates also lost marks as their comparisons did not refer to the same structural feature. If a candidate stated that *B is inelastic* then they should state that *F is elastic*. If they wrote *B is elastic* and *F is transparent* the two statements did not compare the same feature.
- Q2.2.6 was a higher-order question which, as expected, was poorly answered. Candidates understood that light focussed in front of the retina but failed to explain why this was so. They needed to state that both the spectacles and the lens were refracting the light inwards/converging. No marks were credited for refracting light outwards/diverging.

(d) Q2.3 was poorly answered. Questions 2.3.2 and 2.3.3 were higher-order questions and most candidates could not apply their knowledge in answering these questions.

Poor performance is Q2.3 can be attributed to the following factors:
- Candidates wrote *uterine wall* instead of *uterus* in Q2.3.1. The question asked for the structure where the endometrium develops. They were not credited for *baarmoeder* as it refers to the womb which was also not accepted in English.
- In Q2.3.3 the progesterone inhibits the pituitary gland from producing FSH. Most candidates were not aware of this negative feedback mechanism. The lack of FSH would then prevent a follicle from developing and because there is no developing follicle it would not produce oestrogen. This would then cause endometriosis. Candidates only wrote *progesterone inhibits FSH production* whereas in any negative feedback mechanism an endocrine gland must be inhibited or stimulated. Therefore, candidates that wrote the answer without mentioning that the *pituitary was inhibited from producing FSH* were not credited.
- In Q2.4 they had to describe the process of hearing. The performance of candidates was more encouraging in this question. Some candidates did not describe the process using full statements. They only used keywords and flow charts, and marks were consequently not awarded.

(e) Candidates generally performed well in Q2.5.1 and Q2.5.2. Some did not properly read Q2.5.3 to describe what happens after the zygote is formed. They inappropriately included the whole process leading up to fertilisation. Some did not mention that the zygote divides by mitosis or they incorrectly wrote meiosis. They also gave the term *blastocyte* (a type of blood cell) for *blastocyst/blastula*.

(f) In Q2.5.4 some candidates wrote all the functions of the placenta when the question required them to only write those functions that are involved in the protection of the

foetus. They also did not read this question clearly. Protective functions prevent harm from being done to the foetus. In Q2.5.5 some stated that the oviparous organism received nutrition from the egg rather than the egg yolk and albumen.

Suggestions for improvement

(a) Questions such as Q2.2.1, Q2.2.2, Q2.5.1, Q2.5.2 (labelling of diagrams and functions of parts), Q2.2.5 (the pupillary mechanism) and Q2.4 (hearing) are recall questions. This type of question should be practised regularly in class through daily testing to ensure that learners do not lose marks from level 1 questions.

(b) Learners must be guided and supported in the skill of *reading with comprehension.*

(c) Learners must follow instructions correctly when answering questions according to the verb of instruction, e.g. *name*, *state*, *describe*, *explain*, *calculate*.

(d) Teachers must expose learners to more questions that require comparison and differentiation in their teaching and assessment (both informal and formal).

(e) Teachers should continue to expose learners to higher-order questions that require the application of knowledge. They must use past papers for questions and focus on explaining answers in a step-by-step method so that learners can obtain full marks.

(f) Teachers must expose learners to extracts like the one on endometriosis. This question had a high cognitive demand requiring an application of knowledge. Learners must be exposed to such questions and teachers must assist learners with reading with understanding.

(g) When covering the process of hearing, teachers must emphasize or stress the point that sound is in the form of waves (in the outer ear); vibrations (middle ear) and pressure waves (inner ear), which are then converted into impulses.

(h) Teachers should emphasise the effects of too much or too little of a hormone on the body and allow learners to explain the effects.

(i) When explaining negative feedback mechanisms, emphasis must be on the stimulus (high/low), the endocrine gland involved and the effect (more/less).

A better understanding of negative feedback mechanisms can be achieved using the 7-step process which is also elaborated in the *Mind the Gap* study guide under the section on homeostasis. This study guide presents a useful format for recording, understanding, and recalling the different negative feedback mechanisms using a generic format. It consists of the following steps:

Step 1: An imbalance occurs
Step 2: A control centre is stimulated
Step 3: Control centre responds
Step 4: Message sent to target organ(s)
Step 5: The target organ responds
Step 6: It opposes/reverses the imbalance
Step 7: Balance is restored

An application for this process is:

GENERAL	SPECIFIC
IMBALANCE	Progesterone levels **increase** (above normal)
CONTROL CENTER STIMULATED	The pituitary gland is stimulated
CONTROL CENTER RESPONSE	The Pituitary gland produce **less** FSH
MESSAGE TO TARGET ORGAN	**Low** levels of FSH inhibits the follicle
TARGET ORGAN RESPONSE	The follicle on the ovary **do not develop**
IMBALANCE CORRECTED	Therefore, oestrogen will not be secreted

In the case of pregnancy this will continue for 9 months. In the case of endometriosis this will reduce oestrogen levels to prevent the formation of the endometrium in the wrong place.

(j) Subject advisors should organise workshops for Life Sciences teachers on the topics in which learners did not perform well, e.g. the nervous system including the eye and ear, the endocrine system and homeostasis, negative feedback mechanism of thyroxin and TSH, plant hormones and scientific investigations.

QUESTION 3: BRAIN AND KIDNEY, TEMPERATURE ON BLOOD FLOW, THYROXIN (NEGATIVE FEEDBACK) INVESTIGATION (BEAN SEEDS) AND REPRODUCTION STRATEGIES

Common errors and misconceptions

(a) In Q3.1.2 some candidates could not give the correct function of the *corpus callosum*. They wrote the corpus callosum *separates* or *divides* the two hemispheres of the cerebrum. Candidates had to state that it connects the hemispheres of the *cerebrum* since the cerebellum also has two hemispheres.

(b) Q 3.1.4 (b) was poorly answered. Candidates had to read and interpret text before answering this higher-order question and not just quote directly from the text for answers. They failed to write how high breathing rate and heart rate contribute to increased energy production. They neglected to explain that an increase in breathing rate will lead to inhalation of oxygen. An increase in the heart rate will cause blood to be pumped to the skeletal muscles faster to provide more glucose and oxygen to cells quicker, thereby increasing the rate of cellular respiration. Many candidates wrote that more blood will be pumped, which is scientifically incorrect. There is not more blood. The blood volume stays almost the same, except when there is bleeding or a blood transfusion is done.

(c) Q3.1.4 (c) candidates did not explain how the *medulla oblongata* is involved in carbon dioxide homeostasis. Some candidates wrote only that the CO_2 level decreased instead of writing the CO_2 decreased to its normal level.

(d) The following common errors were observed in Q3.2:

- In Q3.2.2 some candidates wrote that the high environmental temperature is directly proportional to the high average blood flow to the skin. The information in the table did not show such a relationship between the two.
- In Q3.2.3 candidates had difficulty with calculating the percentage increase in blood flow to the skin between 5 ℃ and 35 ℃ correctly.
- Many candidates could recall only the results and were unable to interpret and explain it in Q3.2.4. Some did not understand the meaning of *vasodilation* and referred to *bigger* or *larger* blood vessels.

- In Q3.2.5 many candidates could not explain in a cause-effect way why the tissue in the skin would die when frostbite occurs at exposure to very low temperatures. They did not link less blood flow to the skin with less supply of oxygen/nutrients to cells which leads to the tissue dying.

(e) In Q3.3.2 candidates could not explain that the lower concentration of thyroxin in the blood leads to the lower rate of metabolism; and also that a lower rate of metabolism contributes to the storage of more fat in the body.

(f) In Q3.4.1 some candidates were unable to identify the dependent variable for this investigation. The dependent variable is extracted from the aim of the investigation stated in the question. Candidates did not recognise the tip of the stem as the site of auxin production in Q3.4.2

(g) Q3.5.2 was poorly answered by many of the candidates as they were unable to explain the two reproductive strategies adopted by great white sharks to increase their reproductive success. Although some of the candidates identified the strategies correctly, they failed to explain the reason for adopting those strategies.

(h) In Q3.5.3 candidates were not familiar with recognising the production of a large of number of gametes as a strategy to increase the chances of fertilisation despite the threat of predation and other undesirable environmental factors during external fertilisation.

Suggestions for improvement

(a) Teaching of the different parts, functions and location of the brain should be taught with the use of diagrams. It must be emphasized that the corpus callosum connects the two hemispheres of the brain and not divide it.

(b) Teachers must give learners more activities with text extracts as a form of practice and on how to respond on the questions thereof.

(c) Teachers should use a diagram to illustrate the structure of the skin with emphasis on the parts involved in thermoregulation.

(d) Negative feedback mechanism of hormones also requires more in-depth teaching. Learners should not only know how to describe the negative feedback mechanism but should also be exposed to how these feedback mechanisms work in real situations.

(e) Teachers should pay more attention to the teaching of the effect of auxins in phototropism, geotropism and apical dominance. They must teach learners the role of auxins with reference to relevant diagrams.

(f) Teachers must place more emphasis on scientific investigations such as those assessed in Q3.4. Learners should be taught on how to identify variables using the aim of the investigation and not the results. Every formal assessment should assess Specific Aim 2, to familiarise learners with the scientific skills.

(g) Teachers must integrate scientific investigations into the teaching and learning process. Prescribed practical work in plant responses must be done. Previous examination papers are useful in exposing learners to the different types of investigations of this topic. Teachers must emphasise cause-effect relationships and teach learners the skill of formulating answers in a logical way.

(h) A greater emphasis on practical work and practical tasks of good quality in Grades 10 and 11 will also assist with preparing learners more adequately for questions based on scientific investigations. This is especially important since knowledge of scientific investigations is assessed in both Paper 1 and Paper 2.

(i) Teachers must expose learners to answering paragraph-type questions. Although the essay has been removed from the paper, learners are still required to answer questions of 7 to 8 marks.

8.5 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

General comments

(a) In general, candidates did not perform as well as expected in recall-type questions. Basic terminology was confused and where a description of processes was required, the sequence and accurate description of the steps were often confused. This is an indication that the candidates are not learning basic terms, laws, principles and definitions.

(b) Candidates performed well in questions requiring short answers and where responses were quoted directly from an extract. Performance was poor in questions requiring extended responses in the form of paragraphs or in questions where answers had to be substantiated.

(c) Candidates may learn and understand specific concepts, but perform poorly when they have to apply this knowledge and understanding to a new scenario.

(d) Many candidates had difficulties with the interpretation of tables, graphs, case studies and diagrams. They also found it challenging to phrase their responses correctly.

(e) Certain problem areas were mentioned in previous reports. For example, investigations which form part of the work throughout the year remain a challenge to some candidates.

(f) Candidates' performance indicates that they are still having trouble with certain aspects of meiosis, genetics and evolution.

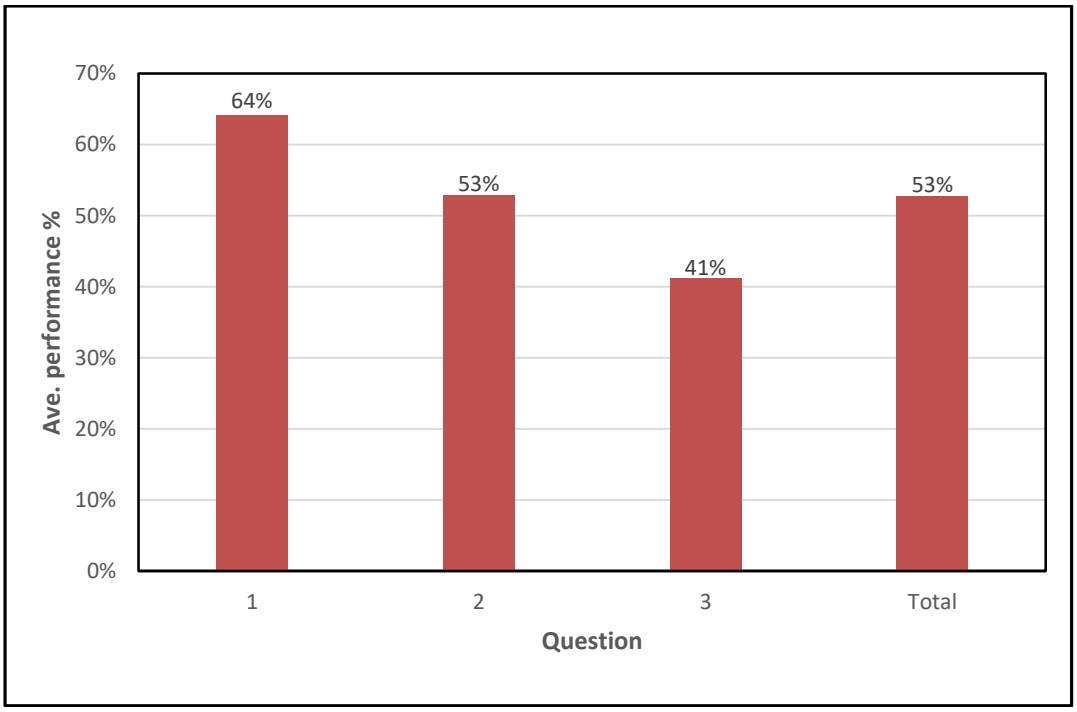
(g) Teachers should always be guided by the *CAPS* and the *Examination Guideline* documents for Life Sciences for elaboration on content and the correct phrasing of concepts.

8.6 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2

Candidates performed well in Q1, less so in Q2, with the weakest performance in Q3 which was largely based on the sections of Genetics and Evolution.

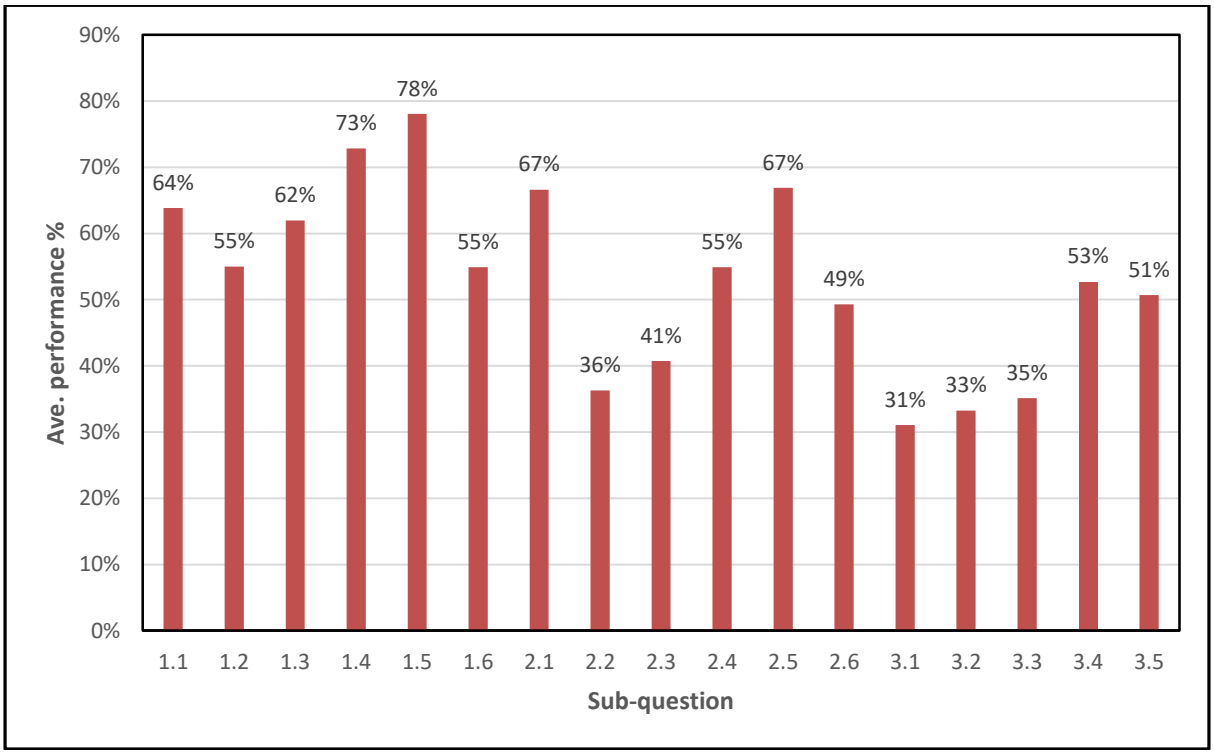
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 8.6.1 Average performance per question in Paper 2



Q	Topic
1	Multiple choice, terminology, matching items, DNA, Meiosis, Dihybrid cross
2	Protein synthesis, Meiosis, Genetics
3	Genetics, Evolution

Graph 8.6.2 Average performance per subquestion in Paper 2



Sub-Q	Topics	Sub-Q	Topics
1.1	Multiple-choice Questions	2.4	Genetics - Pedigree diagram
1.2	Terminology	2.5	Genetics - Genetic cross
1.3	AB matching	2.6	Genetics - Mutations
1.4	DNA	3.1	Genetics - Cloning
1.5	Meiosis	3.2	Evolution - Speciation
1.6	Genetics - Dihybrid cross	3.3	Evolution - Natural selection
2.1	DNA - Protein synthesis	3.4	Evolution - Scientific investigation
2.2	Meiosis - Non-disjunction	3.5	Evolution - Human evolution
2.3	Genetics - Karyotype		

8.7 ANALYSIS OF CANDIDATE PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MULTIPLE-CHOICE, TERMINOLOGY, MATCHING ITEMS, DNA, MEIOSIS, AND A DIHYBRID CROSS

Common errors and misconceptions

(a) The two multiple-choice questions in which candidates performed poorly were Q1.1.5 and Q1.1.7. A *DNA profile* was to be analysed in Q1.1.5 and this proved problematic for many candidates, as they may be familiar with DNA profiling for forensics, but not for paternity testing. Poor interpretation of the stem of the question in Q1.1.7 resulted in many candidates responding incorrectly. Candidates were supposed to select the option that represented all the missing stages, in the correct order, between the phases shown. This meant that the phases shown were not to be included in the response.

(b) Providing the correct biological terms in Q1.2 was problematic for many candidates. In this regard candidates:

- Provided partial responses, e.g. *phylogenetic*, instead of *phylogenetic tree* in Q1.2.1; *punctuated* rather than *punctuated equilibrium* in Q1.2.3 and *artificial* rather than *artificial selection* in Q1.2.5.
- Lost marks due to poor spelling. Although credit was given in general for phonetic spelling, some responses were a big departure from this.
- Confused similar sounding terms, e.g. *homologous* and *homozygous in* Q1.2.4 as well as *co-dominance* and *complete dominance in Q*1.2.6.

(c) Candidates fared poorly in Q1.3.2 where they were asked to identify the fossils found in South Africa. This performance was unexpected, since these fossil names are clearly listed in the *Examination Guidelines* (2021).

(d) Performance in Q1.4 was encouraging, with infrequent misconceptions being presented. Some candidates confused *hydrogen* bonds and *peptide* bonds in Q1.2.2 and Q1.4.1 (c). Candidates used colloquial language to describe the shape of the DNA molecule in Q1.4.3 instead of using the scientific terminology.

(e) Many candidates lost marks due to misinterpretation of the question. This occurred in the following questions:

- Q1.2.4 where candidates responded to the *type of evidence presented* rather than the *structures* that serve as evidence
- Q1.4.5 where the response was *type of DNA* rather than the *location of DNA*

- Q1.5.1 (b) and Q1.5.2 (a) where the *process of crossing over* and the *point of crossing over* were confused.
- Q1.6 where the *genotypes* were given when *phenotypes* were required, and vice versa.
- In Q1.6.2 (c) where a *genotype* was given when an *allele* was required

(f) In Q5.2 (b) and Q1.5.2 (c) candidates lost credit as they still confused similar terms that occur in this section. These are *chromatid, chromatin, centriole, centromere, centrosome* and c*hromosome.* Refer to page 156 of the *Diagnostic Report of November 2020* for elaboration https://www.education.gov.za/2021NSCExamReports.aspx

(g) Candidates gave the incorrect format of a *dihybrid genotype (e.g*. FHfh) in Q1.6. The two alleles of a gene must be written together, e.g. FfHh.

(h) When asked for a *phenotype* in genetics questions, too many candidates lost marks because they did not use the specific descriptions given in the question, e.g. Q1.6.2(d) and Q2.4.2.

Suggestions for improvement

(a) Curriculum advisors must provide all teachers in their charge with the links to the diagnostic reports. Where possible, hard copies of these must be distributed, more especially to novice teachers.

(b) Curriculum advisors must also ensure that all teachers have copies of the most recent *Examination Guidelines (2021)*. Learners must also have access to the *Examination Guidelines* and use it as a 'tick list' as they study and master each topic.

(c) Teachers must use the *CAPS* document and the *Examination Guidelines* to establish what content is examinable.

(d) The mechanics of how to analyse a DNA profile differs for *forensics* and *paternity testing* must be clarified with learners. Refer to the *Diagnostic Report of 2020* (page 160) on how to assist learners with this concept.
https://www.education.gov.za/2021NSCExamReports.aspx

(e) Where there is poor performance of candidates, it is mostly due to interpretation errors. Teachers must train learners in active reading. Learners must check whether the response requires the naming of a structure or a process; a phenotype or a genotype; a list or a description; a type or a location etc.

(f) Learners need to be trained to write down the various biological terms. Very often the spelling by learners is phonetic, which means that they have only heard the word and not written it down themselves. The importance of correct spelling cannot be overemphasised, especially in Q1.2.

(g) Teachers need to train learners to write the *phenotypes* in exactly the same way as they are described in the question paper and not introduce their own descriptions.

(h) Learners must use only the letters prescribed to represent specific *alleles* and not introduce their own symbols and letters.

(i) Curriculum advisors should draw up lists of similar sounding and confusing terminology, together with their descriptions and avail these to teachers and learners.

QUESTION 2: DNA, MEIOSIS, GENETICS AND GENE MUTATIONS

Common errors and misconceptions

(a) Q2.1 and Q2.2 were well answered as they had a lower cognitive demand with a lower degree of difficulty. A minority of candidates lost marks in Q2.1.3 because they could not differentiate between *transcription* and *replication*. Some candidates could only give a partial explanation of the effect of *non-disjunction* in Q2.2 and only described the effect up to the formation of *gametes* and did not include descriptions of *fertilisation* and *zygote* formation.

(b) Most candidates could list only two of the three required characteristics of *homologous chromosomes* correctly. This question had a high degree of difficulty within a high cognitive demand. Candidates who understood the processes of *meiosis, crossing over, gamete formation, fertilisation* and the *loci of genes* were able to score the maximum marks.

(c) Q2.3.4 posed a challenge for many candidates in that they could identify the difference between the two *karyotypes*, but could not accurately explain it.

(d) Although Q2.4 proved challenging to some candidates, it is encouraging to note that interpretation of *pedigree diagrams* is improving. Candidates were able to use the key to describe the *phenotype* correctly. Q2.4 was scaffolded and candidates who could not identify the *dominant phenotype* in Q2.4.2 were generally not able to respond correctly to Q2.4.3 and Q2.4.4. Candidates who were able to identify the dominant phenotype were, in many cases, unable to articulate how they arrived to that answer.

(e) Q2.5 required a genetic cross based on gender determination in humans. This question had a lower cognitive demand with a moderate degree of difficulty and should have been well answered. This was a separate question to Q2.4, which was based on deafness. Candidates assumed that these two questions were linked and therefore based their genetic cross on deafness and not on gender.

(f) Candidates are still confused as to which letters/symbols to use to represent the *alleles* in the different types of inheritance. Some candidates incorrectly assumed that since the genetic cross referred to gender, that it was based on a *sex-linked trait*, which was not the case. There is also confusion on when and how to use superscripts in *genotypes.*

(g) In Q2.6.2 many candidates, including those above average, failed to give a correct definition of a *gene mutation*. The correct response to this lower-order question was clarified in the *2020 Diagnostic Report on Life Sciences* Paper 2 (page 166). It appears that teachers may not be implementing the recommendations of the Diagnostic Report.

(h) The response to Q2.6.4 was not based on prior knowledge and required reading with comprehension. The high number of incorrect responses shows that candidates are unable to select relevant information from an extract.

(i) The skill in the calculation of percentages has improved substantially. Those candidates who did not score the maximum marks scored at least 2 of the 3 marks in Q2.6.5.

Suggestions for improvement

(a) The confusion between *DNA replication* and *transcription* is common. Both processes involve the same early steps, but that is where the similarity ends. Teachers must emphasise the differences between these two processes. The following similarities exist between the processes of DNA replication and transcription

- Occurs in the nucleus
- The DNA double helix unwinds
- The hydrogen bonds between the N-bases break/the DNA molecule unzips

The table below outlines differences in the processes of DNA replication and transcription.

DNA replication	Transcription
Both strands act as templates	Only one strand acts as a template
Free DNA nucleotides from the nucleoplasm attach to each strand	Free RNA nucleotides from the nucleoplasm attach to the template strand
Complementary base pairing occurs (A-T) and (G-C)	Complementary base pairing occurs (A-U) and (G-C)
Two identical DNA molecules are formed	An mRNA molecule is formed

(b) Concepts like *non-disjunction* (Q2.2), the types of *chromosomes* (Q2.3.2), the similarity of *homologous chromosomes* (Q2.3.3(b)) and the difference in male and female *gonosomes* (Q2.3.4) may all be clarified for learners by using a *karyotype*. An example is provided in the *Diagnostic Report of 2020* (page 157)
https://www.education.gov.za/2021NSCExamReports.aspx

(c) Pedigree diagrams are often used as an assessment tool in genetics. Curriculum advisors need to train teachers on how to facilitate the interpretation of these diagrams. The following steps are generally useful on how to interpret a pedigree diagram:

- Read the stem carefully to identify the inherited trait
- Check if information is given on which trait is *dominant* or *recessive*
- Identify if the trait is sex-linked
  - Use the letters **X** and **Y** in the genotype only if the trait is sex-linked
  - Only the **X** has a superscript and not the **Y**
- Check if there is a key and use it for the proper description of the phenotype
- Write in the phenotype of all the individuals as given in the key/question
- Fill in the genotypes
  - All individuals with the dominant phenotype will be homozygous dominant (e.g. AA) or heterozygous (e.g. Aa).
  - All individuals with the recessive phenotype will be homozygous recessive (e.g. aa)
- An individual with two recessive alleles will have obtained one from each parent
- Work backwards and fill in one recessive allele for each parent
- This will exclude one genotype for individuals with the dominant phenotype.

(d) When asked to explain inheritance of alleles in an individual/s, as in Q 2.4.3, learners must apply the following steps:

- Give the phenotype of the individual(s)
- State the genotype of the individual(s)
- State which allele is inherited from each parent or which each allele is passed on from each parent to the offspring.

(e) To train learners on which notations to use for each of the different types of inheritance, teachers could use the following table:

Type of inheritance	Brief description of the mode of inheritance
Complete dominance	One allele masks the expression of the other allele; e.g. B is dominant over b
Incomplete dominance	Neither of the alleles is dominant over each other. An intermediate phenotype is obtained when both alleles are present.
Co-dominance	Both alleles are equally dominant and both are expressed in the phenotype, e.g. I^A and I^B
Sex-linked	The allele causing the disorder is found on the X-chromosome, e.g. X^HX^h & X^HY
Dihybrid cross	Two characteristics are investigated and therefore there will be four letters in the individual's genotype, e.g. RRYy (two for each characteristic) Gametes will have two different letters, e.g. Ry

(f) To enable learners to develop the necessary skills in calculations and reading with comprehension, teachers should engage learners with past examination papers and their associated marking guidelines. The calculations are generally based on extracting data from a table, graph or extract and candidates must be trained on how to select the relevant data.

QUESTION 3: CLONING, BIOGEOGRAPHY, SPECIATION, EVOLUTION IN PRESENT TIMES, NATURAL SELECTION AND HUMAN EVOLUTION

Common errors and misconceptions

(a) Q3.1 was poorly answered as candidates did not understand the process of *cloning* and the significance of using a *somatic* cell inserted into an 'empty' *ovum*. Candidates also assumed that the *diploid* number of chromosomes in cows is 46.

(b) Candidates were challenged with Q3.2 in general, because it covered two separate concepts, namely *biogeography* and *speciation*. It also appears as if most candidates were familiar with the formation of only two species during speciation and this question had three species.

(c) Candidates used the terms *population* and *species* interchangeably, thereby losing credit. It has to be emphasised that only a population is separated by a geographical barriers and not a species.

(d) Q3.3 was based on *natural selection*. Candidates had a good idea of how natural selection works, but struggled to apply this knowledge to a new scenario.

(e) Q3.4 was based on a scientific investigation. This question had a high cognitive demand and a very high degree of difficulty. Most candidates were unable to provide correct responses to Q3.4.3 and Q3.4.4, as it required interpretation of an extract together with data analysis.

(f) In Q3.4.5 candidates were required to draw a line graph. It is encouraging to note that there is a marked improvement in this skill and most candidates were able to score maximum marks. Some candidates, however, lost marks for:
- Transposing of axes
- Selecting an incorrect scale
- Excluding the (%) sign in the label of the Y-axis.

(g) The performance of candidates in Q3.5 was more encouraging. Candidates seem to have mastered the interpretation of diagrams on human evolution.

Suggestions for improvement

(a) The question on cloning is very similar to one asked in the November 2020 examination. Previous examination papers had also outlined the process of cloning diagrammatically. Teachers should use these questions as teaching tools to clarify the need for the various steps in the process of cloning.

(b) Although learners need to know only the chromosome complement of humans, they must be made aware that different species have different chromosome numbers.

(c) Teachers need to clarify the following concepts in *speciation*:
- A population is separated, not a species
- Speciation occurs due to natural selection
- More than two species may be formed.

(d) Teachers need to clarify the following concepts in *biogeography*:
- *Biogeography* is used as evidence for evolution
- A *common ancestor population* becomes separated generally due to *continental drift* and this further leads to *speciation.*

(e) Teachers must advise learners on how to identify the favourable and unfavourable traits in questions on *natural selection*. They should be trained on how to include the exact description of these traits in their responses.

(f) Learners must also be trained to state the variables exactly as they are stated in the data provided and not to paraphrase.

(g) Curriculum advisors should prepare and distribute a composite document showing the assessment criteria for all the different types of graphs. These may be extracted from previous marking guidelines.

(h) The scientific process is frequently assessed in Life Sciences at a higher cognitive level. Questions on the scientific investigation will always be text and data-rich and learners must be sensitised to not be intimidated by this. Careful and repetitive reading of the stem and investigative process is required. Also, multiple exposures in a classroom situation can acclimatise learners to the style and format of these questions. The list below provides some terms associated with investigations and their meanings:

Term	Meaning
Observation	What the scientists saw, heard or encountered that encouraged them to investigate further.
Hypothesis	A possible prediction and/or explanation of the relationship between the two variables.
Aim	Usually starts with the words *to investigate …* and includes both variables. It describes what the investigation is trying to find out.
The independent (manipulated) variable	This is the variable that the scientists will control.
The dependent (responding) variable	This variable is what reacts or responds to the independent variable.
The controlled variables	All other variables that must be kept constant to ensure the validity of the investigation so that any effect is due only to the change in the independent variable.
The control	A second set up in the investigation that allows a comparison with the results of the experiment. The control is identical to the experiment except that it excludes the variable being tested.
Accuracy	Refers to the care taken when making measurements.
Validity	This refers to the experimental method and how appropriate it is in addressing the aim of the investigation. For example, keeping all other factors constant/identifying the controlled variables help in making an investigation valid.
Results	The evidence produced during the investigation that will either support or refute the hypothesis. These may be presented in the form of an extract, a table, a graph or a diagram.
Improving the reliability of results	Results can be made more reliable if: • The investigation is repeated • A bigger sample size is used • The samples are taken randomly • Many readings are taken to obtain an average reading (these depend on the nature of the investigation),
Conclusion	This is directly linked to the aim of the investigation and confirms or refutes the hypothesis

(i) There are numerous digital platforms available for training, development and support of teachers and learners. Curriculum officials must share the links with teachers and learners on a termly basis to ensure that if this information was missed it may be accessed in the next term.

(j) Teachers should consult all past diagnostic reports when they prepare their lessons to address misconceptions identified in previous years.

(k) The preparatory examinations set by provinces must mimic the NSC examinations as closely as possible in format, content and scope.

CHAPTER 9

MATHEMATICAL LITERACY

The following report should be read in conjunction with the Mathematical Literacy question papers of the NSC November 2021 examinations.

9.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Mathematical Literacy examinations in 2021 increased significantly by 99 704 compared to that of 2020, i.e. an increase of 29% in the cohort.

A decline in the pass rate was evident this year. This followed a steady positive trend in the pass rates over the previous four years. In 2021, candidates who passed at 30% (Level 2) declined from 80,8% in 2020 to 74,5% in 2021. There was a corresponding decline in the pass rate at 40% (Level 3) over the past two years from 57,7% to 49,1%.

Despite the decrease in pass rates, given the increase in the size of the cohort, the number of passes achieved at Levels 2 and 3 increased considerably by 52 698 and 19 561 respectively. Furthermore, the percentage of distinctions (over 80%; Level 7) improved from 1,7% to 2,3% which converts into a pleasing increase in the total number of distinctions from 5 803 in 2020 to 10 145 in 2021.

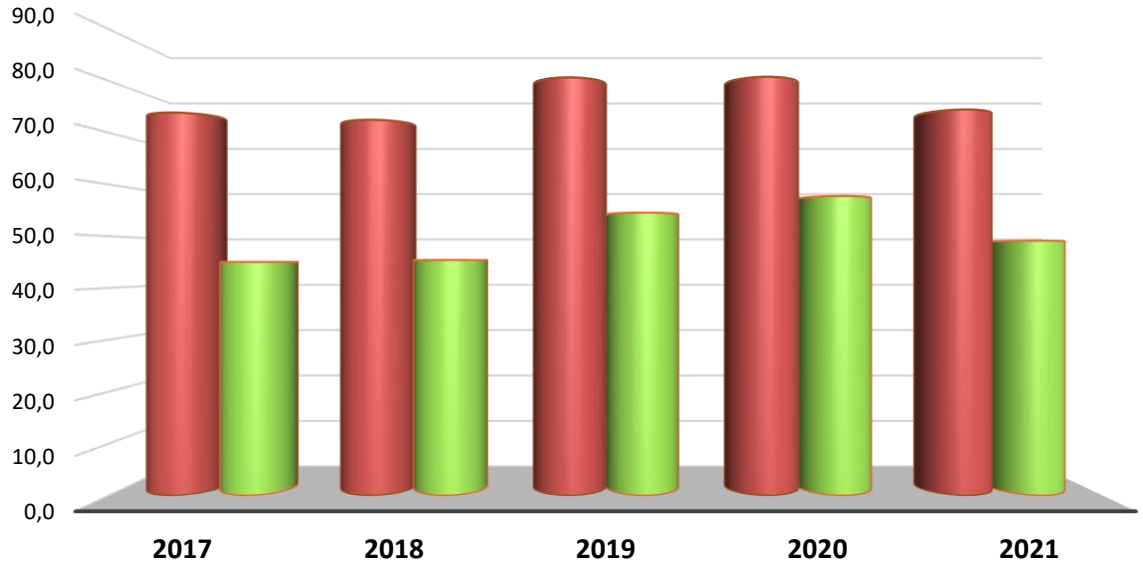
However, the challenging circumstances of the Covid-19 pandemic which affected teaching and learning activities over the past two years, clearly affected the Mathematical Literacy cohort more profoundly in 2021. This was particularly relevant in the case of weaker learners who tend to rely heavily on continuous practice and teacher contact.

The various commendable intervention strategies employed by teachers, subject advisors and provincial education departments were continued in 2021. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 9.1.1 Overall achievement rates in Mathematical Literacy

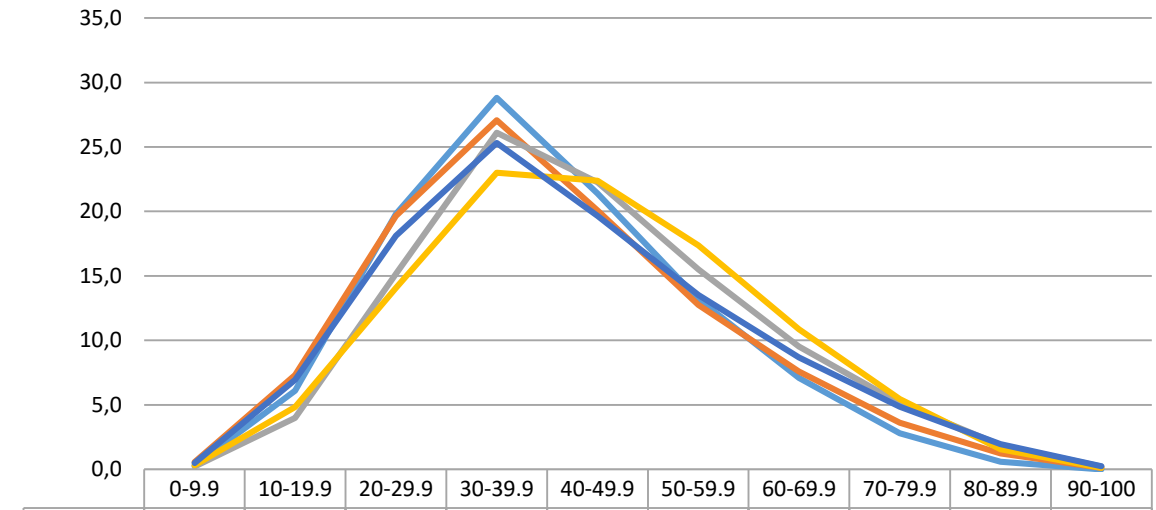
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	313 030	231 230	73,9	140 991	45,0
2018	294 204	213 225	72,5	133 568	45,4
2019	298 607	240 816	80,6	162 877	54,5
2020	341 363	275 684	80,8	197 131	57,7
2021	441 067	328 382	74,5	216 692	49,1

Graph 9.1.1 Overall achievement rates in Mathematical Literacy (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	73,9	72,5	80,6	80,8	74,5
% achieved at 40% and above	45,0	45,4	54,5	57,7	49,1

Graph 9.1.2 Performance distribution curves in Mathematical Literacy (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,3	6,1	19,8	28,8	21,4	13,2	7,1	2,8	0,6	0,0
2018	0,6	7,3	19,6	27,1	20,1	12,8	7,6	3,6	1,2	0,1
2019	0,2	4,0	15,2	26,1	22,2	15,5	9,5	5,1	1,9	0,2
2020	0,3	4,8	14,1	23,0	22,4	17,4	10,9	5,5	1,6	0,1
2021	0,5	6,9	18,1	25,3	19,6	13,5	8,7	4,9	2,0	0,3

9.2 GENERAL COMMENTS ON PAPER 1 AND PAPER 2

(a) The year 2021 marked a change in the splitting of the Mathematical Literacy topics and a redistribution in the weighting of the taxonomy levels.

The *2021 Examination Guidelines* reflect the following:

- **Paper 1 content:** Finance Data and Probability
- **Paper 2 content:** Maps and Plans
- **Weighting of taxonomy levels:** L1: 30%; L2: 30%; L3: 20%; L4: 20%

Exemplar papers were distributed to schools to support teachers and learners in their preparation for the 2021 NSC papers.

(b) **Terminology:** English Across the Curriculum should be emphasised. Learners should be taught the definitions of commonly used terms in Mathematical Literacy such as 'radius' and 'median'. Learners should compile a topic-wise glossary of terms at the back of their notebooks with a brief but clear definition next to each term. A separate notebook may also be kept for this purpose. By the end of the year, all learners should have a comprehensive glossary of all the relevant terms.

(c) **Enhance learners' skills in accurately interpreting specific questions and using information that is relevant:** Teachers are advised to read through and interpret the requirements of each question with learners. Learners should also be guided on how to extract relevant information and how to identify the information that is relevant to each subquestion. Tables are often used to reduce written text.

(d) **Use of past NSC papers:** Firstly, it must be noted that past examination question papers serve as one of many teaching and learning resources. They must be used for revision purposes only. Past papers cannot replace the *CAPS* document and *Examination Guidelines*. Teachers can adapt certain questions for use in class, especially those that include working with large numbers. Secondly, teachers should ensure that learners revise questions that define mathematical terms, especially in a given context.

(e) **The importance of formative testing:** Short, informal formative tests must be used to build the confidence of learners in all topics. If learners do their own corrections, it provides them with immediate feedback and an understanding of the mark allocation. The less challenging sections in each of the questions in the NSC Mathematical Literacy papers can be used as confidence-boosters. Formative tests can be used to great effect to introduce new subtopics in the *CAPS*, such as personal income tax and box-and-whisker plots.

(f) **Previous recommendations:** Teachers should consult past diagnostic reports to establish if there are topics or concepts that are repeatedly indicated as problematic to most learners. For example, it has been noted over time that learners' basic mathematical knowledge is problematic and this includes learners' inability to work with big numbers.

9.3 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

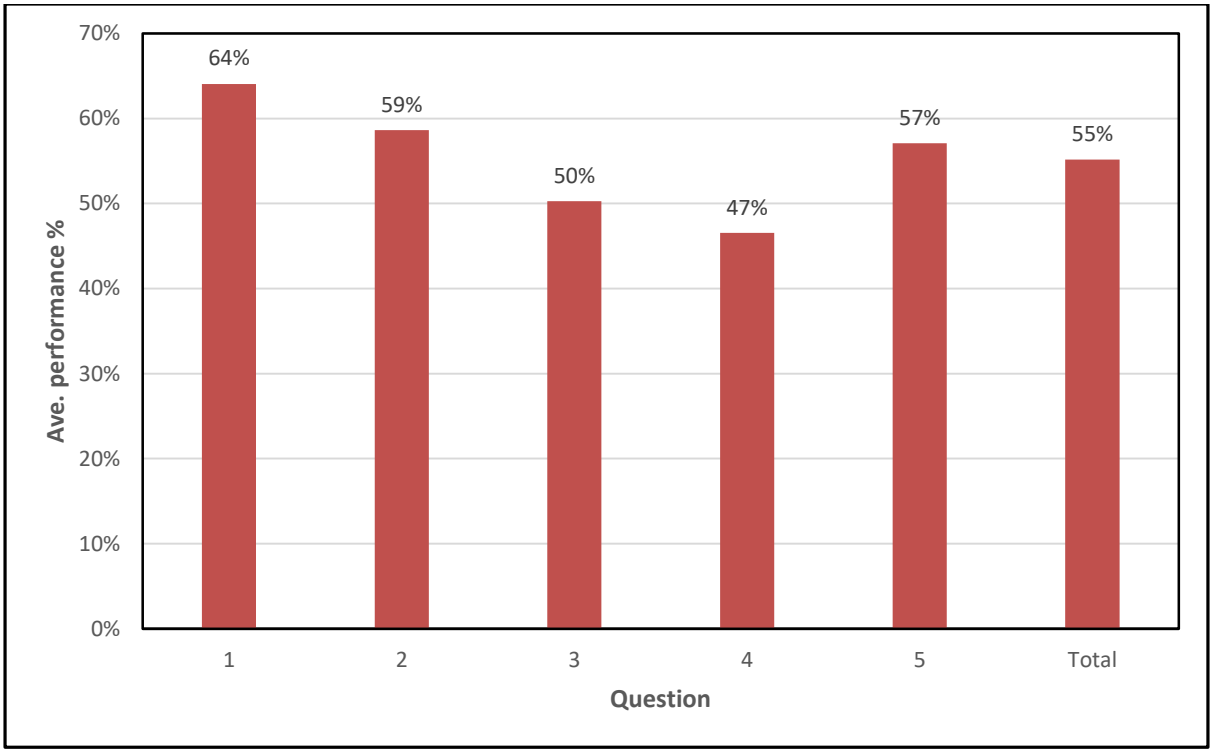
General comments

(a) The 2021 question paper was set according to the new *Examination Guideline*s. Consequently, Q1 was based entirely on short contexts with all questions pitched at Level 1. The Application topics tested in Paper 1 were reduced from 5 to 3 topics, i.e. Finance, Data Handling and Probability.

(b) Teachers are advised that the format of the 2022 examination paper will not change. Teachers are encouraged to read the new *Examination Guidelines* and use the exemplar papers of 2021 and November 2021 and the May/June 2022 papers as a guide.

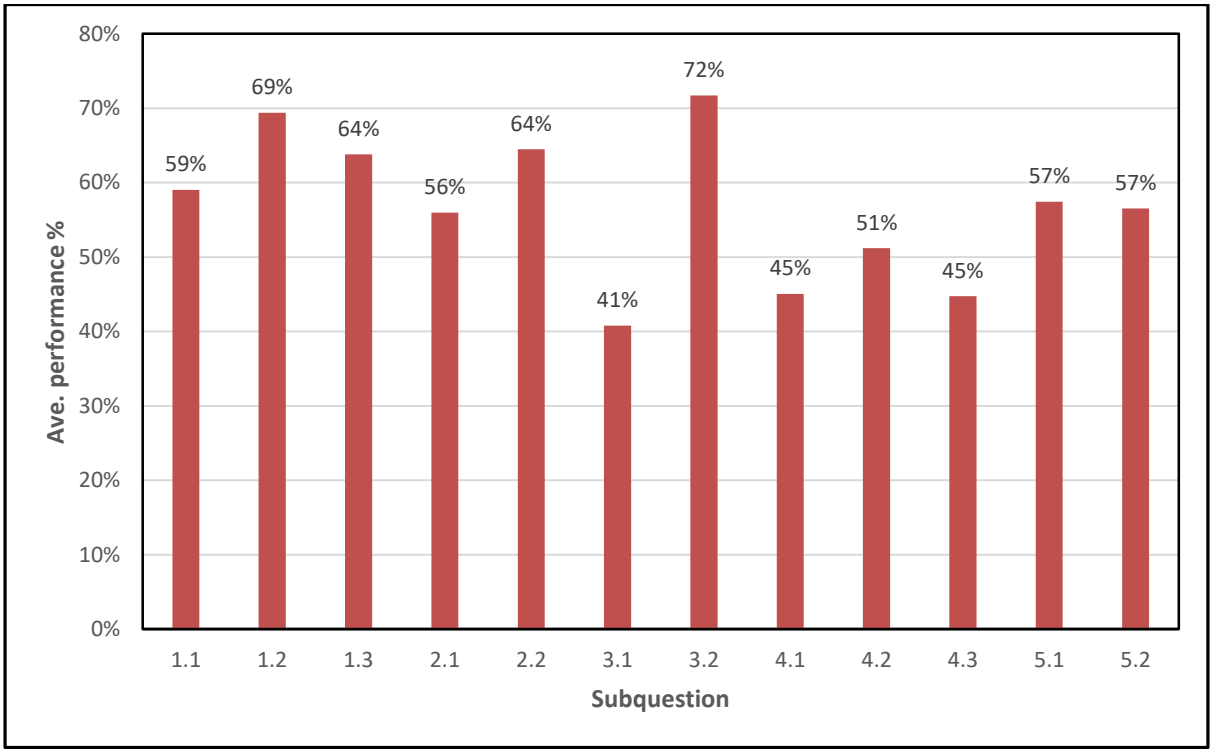
The following graph is based on data from a random sample of candidates. While this graph may not accurately reflect national averages, it is useful in assessing the relative degree of challenge of each question as experienced by candidates.

Graph 9.3.1 Average performance per question in Paper 1



Q	Topic
1	Finance, Data Handling & Probability
2	Finance & Probability
3	Data Handling & Probability
4	Finance, Data Handling & Probability
5	Finance & Data Handling

Graph 9.3.2 Average performance per subquestion in Paper 1



Subq.	Topic	Subq.	Topic
1.1	Finance, Data Handling & Probability	3.2	Data Handling
1.2–1.3	Data Handling & Finance	4.1-4.2	Finance
2.1	Finance	4.3	Data Handling & Probability
2.2	Finance & Probability	5.1	Finance
3.1	Data Handling & Probability	5.2	Data Handling

9.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

The reduction of the Application topics from five to three and the sequence of questions, where Q1 was based on short, Level 1 contextual questions, benefitted candidates. Q1 was the question answered best.

QUESTION 1: SHORT CONTEXTS (INTEGRATED LEVEL 1 QUESTIONS ONLY)

Common errors and misconceptions

(a) Candidates calculated the percentage increase and not the price increase in Q1.1.1.

(b) In Q1.1.2 some candidates could not read the correct table values to select the correct exchange rate. Others multiplied the exchange rate and some made rounding errors in the answer.

(c) In Q1.1.4 some candidates could not write the data in descending order while others struggled with decimal values where they concluded that 0,87 is less than 0,796 and 0,732 as well as 0,254.

(d) Some candidates in Q1.2.3a could not convert cents to rand.

(e) In Q1.2.3b a large percentage of candidates could not round off to the nearest rand.

(f) Candidates could not identify the next step in the data cycle in Q1.3.2. A large percentage of the candidates wrote data analysis which is the last step in the data cycle.

Suggestions for improvement

(a) Teachers should expose learners to different activities involving exchange rates within different contexts. Emphasis during teaching and learning should be placed on when to multiply and when to divide when converting from one currency to another currency.

(b) Teachers must revise the basic skills topics, i.e. percentages, converting and rounding (off, up, to the nearest and down) when Application topics are taught. When dealing with calculations within the topic of Finance, conversion from cents to rand and vice versa and rounding to two decimal places must be emphasised.

(c) The Application topic of Data Handling starts with the data cycle and all steps in the data cycle need to be covered during teaching time in class. Each step should be given equal status when planning for the teaching and learning activities.

(d) Mathematical terminology and definitions are as important as doing the basic Mathematical calculations. Therefore, a glossary of terms is an important tool in the learners' workbooks where they can write the definitions and use these as references when completing Mathematical Literacy activities.

(e) Mathematical definitions are an important part of basic Mathematics in the Mathematical Literacy curriculum. Definitions are covered in a range of DBE resource materials such as *Mind the Gap* and *The Revision Booklet*. These valuable and available resource materials should be used and integrated into the classwork and homework activities of learners.

QUESTION 2: FINANCE AND PROBABILITY

Common errors and misconceptions

(a) In Q2.1.3 most candidates could write the ratio but struggled or could not simplify the ratio.

(b) Most candidates could not understand the term 'cost effective' in Q2.1.4, which resulted in a large percentage of candidates not giving the correct answer.

(c) In Q2.1.5 candidates substituted the percentage value into the formula and not the calculated value of R69,58. Some candidates multiplied the monthly instalment by 48, ignoring the given information in the given context 'the last payment is the residual payment'.

(d) In Q2.1.6 most candidates struggled to calculate the second year's interest and could not work with different interest rates per year.

(e) Many candidates could not give the correct answer of 'three contracts' in Q2.2.1. Candidates wrote cellphone numbers instead of the number of contracts.

(f) In Q2.2.3 candidates could not do the simple VAT of 15% calculation while some candidates calculated the VAT on VAT.

(g) In Q2.2.4 candidates did not use the answer from Q2.2.3 to calculate the final amount as was expected from the follow-through calculation.

(h) Most candidates in Q2.2.5 expressed the probability using fractions or percentages, and they lost all marks. Some candidates could not recall that probability is expressed using the probability scale.

Suggestions for improvement

(a) Learners should be given time to work with ratios. Ratio is a basic skills topic in Mathematical Literacy. This means that learners' activities in class must integrate the topic of ratio across all Application topics.

(b) Teachers should focus on the language used in the financial section of budgets and financial documents. The skill of extracting information from the given context to do a basic mathematical calculation should be practised in class all the time.

(c) Subject advisors should conduct content workshops on how to calculate compound interest without using the compound interest formula. Teachers should provide examples of the interest rate to be used, which can change from one year to another.

(d) When learners calculate probability, they can compare their answers (fraction, decimal fraction or percentage form) with the probability scale.

(e) In formal and informal assessment, teachers should integrate questions on using the previous answers to calculate the current answer, i.e. this includes interpretation of the word 'hence'.

QUESTION 3: DATA HANDLING

Common errors and misconceptions

(a) In Q3.1.1 most candidates wrote 5 April 2021 directly from the question paper. Candidates could not count backwards and had a problem with the total number of days in March.

(b) Candidates struggled to write out the table value in words in Q3.1.2. 'Millions' was omitted in the final answer. Most learners could not convert the table value into the actual value.

(c) In Q3.1.5 candidates could not do the basic algebraic manipulation within an equation. Most candidates ignored the 2Ds in the calculation and divided by 7.

(d) Candidates could not relate the Net FSC of 15 657 million to the last week % in Q3.1.7. This suggests that candidates find it difficult to work with large numbers in complex tables.

(e) In Q3.2.2 candidates struggled with the interpretation of the percentage in context. When some got an answer above 100%, they changed their answer to fit between 0% and 100%.

Suggestions for improvement

(a) Teachers must provide learners with calendars to count back and forth to determine the date before and/or after a given date.

(b) Teachers should integrate large numbers when doing mathematical calculations. The difference of table values and actual values when dealing with large numbers should be regularly practised in class.

(c) Basic algebraic manipulation should be practised in class with all mathematical formulae across all Application topics. Informal and formal assessment should include these types of problems.

(d) Learners must be exposed to calculating a percentage with examples that show that percentage calculation can be greater than 100%.

QUESTION 4: FINANCE AND DATA HANDLING

Common errors and misconceptions

(a) Candidates did not convert the given quantities of grams to kilograms and they could not relate the cost rate to the mass of chicken in Q4.1.1.

(b) Some candidates in Q4.1.2 found different quantities challenging (e.g. 1 plate vs 8 ingredients) and added the plate too early in the calculation.

(c) In Q4.1.3 candidates calculated 50% of the selling price. They did not know that they could have subtracted the cost price from the selling price to calculate percentage profit.

(d) In Q4.2.1 candidates could not substitute values into the given formula and struggled with linear algebraic manipulation.

(e) Plotting points on a system of axes in Q4.2.2 is still a challenge for candidates. Candidates could not interpret the given scale on the axes and plotted points incorrectly.

Suggestions for improvement

(a) Learners need more practice in conversions in familiar and unfamiliar contexts.

(b) Teaching should also enhance the calculation of cost price and selling price when delivering the mathematical content in class. These subtopics should be tested on different cognitive levels and with multiset data.

(c) Learners need practice with the basic method of solving problems when a formula is given. This involves substituting values into a given formula, algebraic manipulation and, lastly, use of a calculator with BODMAS.

(d) Plotting points on a system of axes should be practised where the scale needs to be interpreted first before the points are plotted on the given system of axes.

QUESTION 5: DATA HANDLING AND FINANCE

Common errors and misconceptions

(a) In Q5.1.1 some candidates could not identify the correct tax bracket.

(b) In Q5.1.3 candidates could not link the person's age (i.e. 64-years-old vs 65-years-old) to subtract the secondary tax rebate.

(c) In Q5.1.4 most candidates did not add the second additional dependant for the medical credit; they simply added the three values from the given table.

(d) Most candidates in Q5.2.1 could not interpret the box-and-whisker diagram to answer the question. They simply gave the incorrect answer, 'Apple'.

(e) In Q5.2.2 candidates could not differentiate between range and IQR.

Suggestions for improvement

(a) Teachers must place emphasis on interpreting personal income tax tables. The personal income tax table is a tariff table. When delivering this content, teachers must scaffold the different steps, i.e. use taxable income to select the correct tax bracket, substitute values into the formula, calculate using BODMAS and subtract rebates according to age as well as medical credits, if applicable.

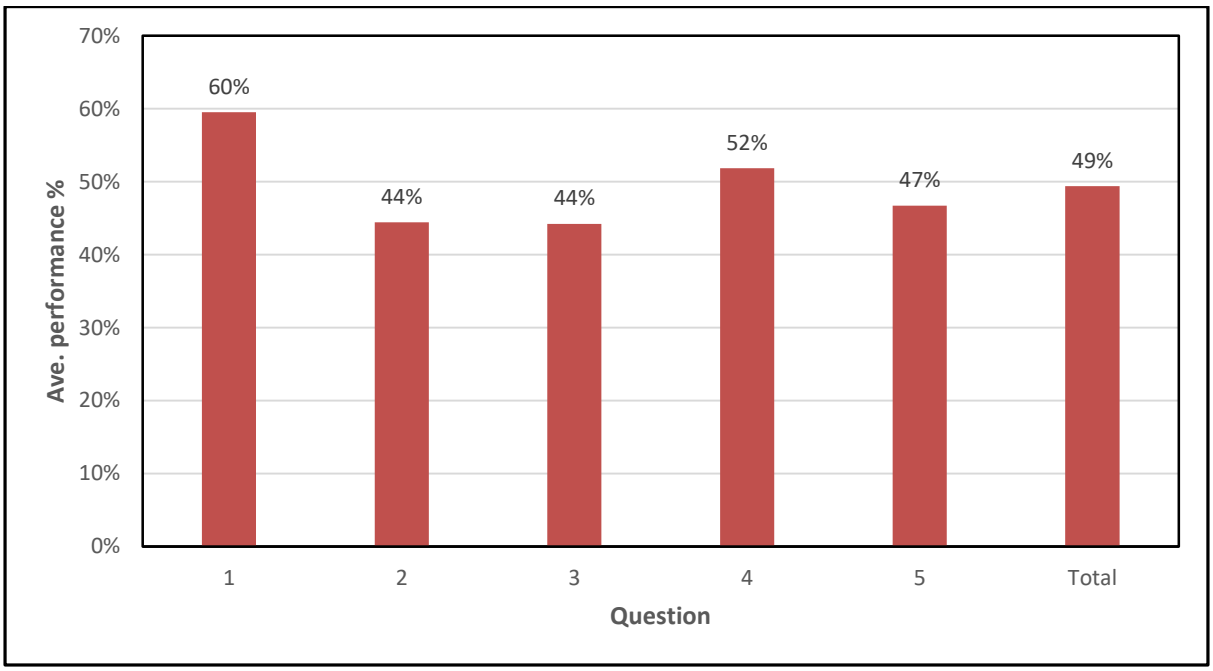
(b) Learners must practise the box-and-whisker plots in class with multiple sets of data as stipulated in the *CAPS*.

(c) Teachers must expose learners to a glossary of terms where the difference is in the definition of the Range and IQR.

9.5 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

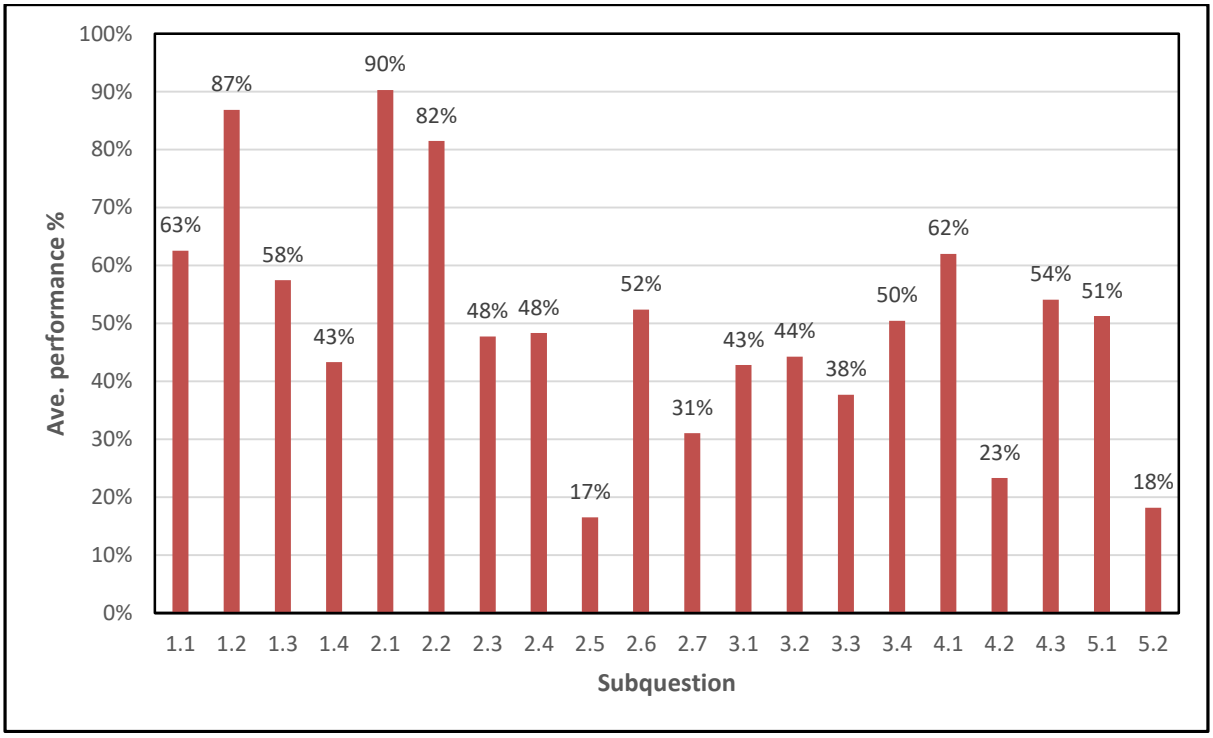
The following graph is based on data from a random sample of candidates. While this graph may not accurately reflect national averages, it is useful in assessing the relative degree of challenge of each question as experienced by candidates.

Figure 9.5.1 Average performance per question in Paper 2



Q	Topic
1	Measurement, Maps, Plans and Other, Probability
2	Probability, Maps, Plans and Other
3	Measurement and Probability
4	Measurement, Maps, Plans and Other
5	Measurement, Maps, Plans and Other

Figure 9.5.2 Average performance per subquestion in Paper 2



Sub-Q	Topic	Sub-Q	Topic
1.1	Measurement & Finance	3.4	Maps, Plans & Other, Probability
1.2-1.3	Measurement	4.1	Measurement, Maps, Plans & Other, Finance
1.4	Maps, Plans & Other, Probability	4.2	Measurement
2.1-2.3	Maps, Plans & Other	4.3	Measurement, Maps, Plans & Other
2.4	Probability	5.1	Measurement, Maps, Plans & Other, Finance
2.5-2.7	Maps, Plans & Other	5.2	Measurement
3.1-3.3	Measurement		

9.6 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: SHORT CONTEXTS (INTEGRATED LEVEL 1 QUESTIONS ONLY)

Common errors and misconceptions

(a) Q1.1.1 was well answered by most candidates but some candidates multiplied the price of R100 instead of the mass 110 g.

(b) In Q1.1.2 some candidates still confused radius and diameter and multiplied by 2 instead of dividing by 2.

(c) Many candidates in Q1.1.3 wrote mm^2 instead of mm^3 as the correct unit for volume.

(d) In Q1.1.4 many candidates did not know the number of days in January and February. Other candidates subtracted to count the days in January (31 – 11) = 20 instead of including the 11th January. Some candidates could not identify that 2021 was not a leap year.

(e) Some candidates in Q1.1.5 calculated the total for two promotions instead of two containers of Pringles @ R100 for 6.

(f) Many candidates in Q1.3.1 incorrectly converted m to cm by multiplying by 10, while others divided by 100 instead of multiplying by 100.

(g) Most candidates in Q1.4.1 could not define the term layout plan. Many candidates confused the layout plan with a floor plan.

(h) Many candidates in Q1.4.2 counted only the light-coloured seats and disregarded the dark seats, thinking that they were not available. Other candidates included the hostess seat and got to 29 seats instead of 28 seats.

(i) In Q1.4.4 most candidates simply added the eats and drinks and arrived at 5 options instead of working with the total options by multiplying.

Suggestions for improvement

(a) Learners must practise basic skills at the beginning of each year from Grade 10 to 12.

(b) Teachers must train learners to round off only the final answer in the given context.

(c) Basic definitions should be tested in the classroom regularly.

(d) Teachers should expose learners to irregular shapes when calculating perimeter.

(e) Learners should be drilled on conversions, especially cm to m where the conversion factor is 100 and not 1 000.

(f) Teachers should differentiate between the area and the volume using the explanations of the two concepts, their formulae, number of dimensions used to calculate each quantity and the units of measurement.

(g) When covering substitutions in formulae, teachers should emphasise that learners place values exactly where they are supposed to be according to the given formula.

(h) A glossary should be given to learners before they begin to work with every section under a topic, together with explanations of concepts in every activity or task.

QUESTION 2: MAPS AND PLANS AND PROBABILITY

Common errors and misconceptions

(a) Q2.2 was a challenge for many candidates, especially those who are Afrikaans speaking, since a room is mostly referred to as a ‘vertrek’ and a bedroom as a ‘kamer’. Thus, when candidates were asked about a ‘kamer’ they automatically assumed that it referred to a bedroom. Hence, Afrikaans candidates wrote the answer as ‘bedroom 1’ instead of ‘living room’.

(b) Many candidates in Q2.3 could not read the correct direction because the north line was facing at an angle.

(c) In Q2.4 some candidates struggled with the NOT version of probability. For the most part they simply provided the probability of the interior doors instead of NOT the interior doors.

(d) Q2.5 was poorly answered. The words ‘critically comment’ were new to candidates and they were unsure of how they should respond. It was also unclear what constituted ‘a lot’ of sunlight. Thus, candidates referred to the afternoon sun as ‘a lot’ of sunlight. Many candidates simply remarked that the sun comes up in the west and that the kitchen does get a lot of sunlight.

(e) Q2.6 was answered fairly well by many candidates, however, some candidates did not know how to interpret the floor plan correctly. Some failed to distinguish between the living room and dining room.

(f) In Q2.7.1 many candidates simply copied the scale from the text as they did not understand what number format meant. For example, 1 cm : 1 000 mm or 1 : 1 000 instead of converting the mm to cm and arriving at an answer of 1 : 100.

(g) In Q2.7.2 many candidates were unable to recognise that they could not continue using different units without converting first. Some candidates did not have a ruler to conduct measurements. Their values for the measurement of the inner wall ranged from 3,7 cm to 4,9 cm instead of 4,4 cm. They failed to convert to metric units after multiplying by the scale factor.

(h) Q2.7.3 was poorly answered. Many candidates completely misunderstood the question and referred to the machine making an exact copy and thus there should be no change in the scale. Many candidates did not know that a number scale is not accurate when copies of plans are made.

Suggestions for improvement

(a) Teachers should expose learners to different types of layout plans and not always use plans with north facing upwards.

(b) Teachers should emphasise that maps can be turned, so that the north line is facing forwards. This will allow learners to deal with questions on direction more successfully.

(c) Geography maps should be used to good effect in the Mathematical Literacy classroom.

(d) The concept of changing dimensions to the same unit should be reinforced by teachers. This is a skill that is first taught in Grade 10.

(e) Learners should be encouraged to know and comprehend the conversion factors of the metric system.

(f) Teachers should expose learners to advantages and disadvantages of each type of scale and include the assessment thereof in the tasks.

(g) Teachers should explain that NOT in probability is simply equal to 1 – the probability of an event happening.

QUESTION 3: MEASUREMENT AND PROBABILITY

Common errors and misconceptions

(a) Many candidates answered Q3.1.1 well. A few candidates added only one side and not both. Some candidates could not interpret the given sketch and added the outside measurements.

(b) Q3.1.2 was poorly answered. In determining the height B of the top shelf, candidates omitted one of the heights or the thickness of the base. The meaning of the word 'base' was also misunderstood. Examples of common errors were:

B = 80 cm – (40 + 4,5+1,5) cm = 34 cm

OR B= 80 cm – (40+1,5+1,5) cm = 37 cm

(c) Q3.2 was poorly answered. Candidates did not understand what a conversion factor was. Some candidates wrote down the conversion factor from memory without using the given information. Most candidates did not use the given conversion factor to determine the height of the bookshelf in inches.

(d) In Q3.3.1 many candidates used incorrect values to calculate the area. Some candidates could not link the outside length calculated in Q3.1.1 to this question in order to calculate the area. Candidates multiplied any two values given in the sketch. This clearly showed a lack of understanding of the concept area.

(e) Q3.3.2 was poorly answered. Candidates did not apply the squaring principle well. They did not divide by $(100)^2$ when converting cm^2 to m^2.

(f) Many candidates in Q3.3.3 did not understand the concept of spread rate of paint, hence multiplied by 6,9 instead of dividing. Many candidates also did not multiply the amount of paint needed by 3; instead, they multiplied by 2 ignoring the fact that the front of the bookshelf would be painted with two coats, and the back with only one coat.

(g) Most candidates answered Q3.3.4 well but some candidates could not convert 500 ml to litres.

(h) Some candidates in Q3.4.1 used the measurement of the file instead of the box. Concept of rounding down when dealing with packaging was a challenge to many.

(i) In Q3.4.2 candidates could not differentiate between files in the box and individual files placed on the shelf. Some candidates subtracted the loose files from the number of boxes of files. Hence this question was poorly answered.

(j) Q3.4.3 was well answered, while in Q3.4.4 many candidates could understand the concept of probability and the format in which the answer should be written. A number of candidates, however, omitted the percentage sign in the answer.

Suggestions for improvement

(a) Teachers are advised to encourage learners to read questions carefully, i.e. find out whether a question should be rounded to one or two decimal places.

(b) Real-life physical objects should be effectively used by teachers in the classroom, for example, boxes to show the difference between inside and outside measurements, height, width and length.

(c) In the context of probability, learners need to understand that the terminology 'outcomes' has the same meaning as the words 'choices' or 'combinations'.

(d) Learners need to practise writing answers with the correct units.

(e) Teachers must emphasise that all dimensions must be in the same unit before calculating.

(f) Learners should be exposed to activities which will require them to calculate spatial packing in various objects, for example, cupboards, boxes and crates.

(g) More multistep activities on area and volume should be given to learners for them to master these concepts.

(h) Learners must be made aware that the conclusion mark will not be given if there is no viable calculation.

QUESTION 4: MAPS AND PLANS AND MEASUREMENT

Common errors and misconceptions

(a) Q4.1.1 was answered well. Candidates were able to interpret the given information correctly. In some cases, candidates did not know what is meant by an irregular shape.

(b) In Q4.1.2 and Q4.1.3 some of candidates used their personal experiences instead of responding by using the given information.

(c) In Q4.1.4 some candidates substituted the hypotenuse of the triangle into the given formula instead of the height of the triangle.

(d) Q4.1.5 was poorly answered. Many candidates did not understand the 10 m roll was sold as a unit and not per metre. In the second option which was sold per metre, candidates wrote 18,852 m instead of rounding the answer up to 19 m.

(e) Q4.2 was challenging for most candidates for the following reasons:
- Candidates could not convert from litres to cm^3.
- Candidates substituted incorrectly.
- Candidates could not make the radius the subject of the formula.
- Candidates were unable to find the square root. Instead they divided by 2.

(f) Many candidates in Q4.3.1 swopped the values of the ratio. Other candidates used incorrect values when writing down the ratio.

(g) Q4.3.2 was poorly answered because it required a double conversion. Candidates had to convert from inches to feet and then from feet to mm. Some candidates converted from inches to feet and left the answer as feet.

(h) Q4.3.3 and Q4.3.4 were well answered, however, in Q4.3.5 some candidates struggled with the concept of transposing a 2D picture into a 3D sketch.

Suggestions for improvement

(a) Teachers should ensure that learners know how to convert square units.

(b) Learners must practise reading the information provided and the question posed before explaining to the teacher what is required in their expected responses.

(c) As the concept of 'structures' appears to be unfamiliar to some learners, they need to be exposed to urban and non-urban concepts, especially those that can be related to everyday life.

(d) Conversion between the metric scale and imperial units should be practised regularly by learners.

(e) Teachers should expose learners to various formulae whereby the unknown is not necessarily the subject of the formula, e.g. finding the radius using the formula for calculating the volume of a cylinder.

(f) Such questions should be frequently included in informal tasks so that learners can get familiar with changing the subject of the formula, i.e. in the formula $V = \pi r^2 h$ and in the operation involving the square root.

(g) Teachers should train learners to round off final answers only and not to do this in the intermediate steps in a calculation.

(h) Exposure to different types of assembly diagrams will benefit learners in visualising plans more effectively.

QUESTION 5: MAPS AND PLANS AND MEASUREMENT

Common errors and misconceptions

(a) Except for the candidates who could not convert minutes to fractions of hours, Q5.1.1 was well answered.

(b) Q5.1.2 was well answered. Some candidates only wrote the distances and not the names of the cities.

(c) Most candidates answered Q5.1.3 correctly. A few candidates could not give the correct sequence of the cities. Some candidates were unable to interpret the time difference between the cities on the map. They confused time with distance.

(d) Q5.1.4 was poorly answered. Many candidates struggled to convert using metric units. Some candidates confused the rate per litre with the amount of litres in a gallon.

(e) Q5.1.5 was challenging for most candidates for the following reasons:
- Candidates could not convert.
- Candidates could not grasp the concept of rate (18 miles per gallon).
- They did not understand what was expected of them and several determined how much petrol would be left from 2 full tanks; this is a misconception as the tank still had petrol in it when it was filled again.

(f) Candidates substituted incorrectly in Q5.2. Many of those who substituted correctly struggled to change the subject of the formula.

Suggestions for improvement

(a) Learners must be exposed to maps with measurements that are not in metric units.

(b) Before attempting measurement questions, learners must deliberately analyse the map or plan to present appropriate responses.

(c) Learners should be taught that some problem-solving questions must take reality into account, for example, 'petrol must be filled into the tank before the tank runs dry'.

(d) Manipulation of variables in formulae is a skill that learners must acquire through practice.

(e) Teachers should encourage learners to use the LOLT at all times during the lessons. Scenarios should be discussed and critically analysed during lessons in order to give learners the opportunity to think critically and develop analytical and problem-solving skills.

(f) Teachers should frequently interchange the use of the two formulae for temperature to determine the unknown, especially the one involving a fraction, i.e. $℃ = \frac{5}{9} \times (℉ - 32)$.

CHAPTER 10

MATHEMATICS

The following report should be read in conjunction with the Mathematics question papers for the NSC November 2021 examinations.

10.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Mathematics examination in 2021 increased by 25 828 compared to that of 2020, i.e. 11% of the cohort.

The table below indicates variations in the pass rates over the past five years within a band of six percentage points at 30% (Level 2) and three percentage points at 40% (Level 3). However, there was a pleasing improvement in the pass rate this year.

Candidates who passed at 30% (Level 2) improved from 53,8% in 2020 to 57,6% in 2021. There was a corresponding improvement at 40% (Level 3) from 35,6% to 37,6%. Given the increase in the size of the cohort, the number of passes increased considerably by 23 651 at 30% (Level 2) and by 14 597 at 40% (Level 3).

The percentage of distinctions (over 80%; Level 7) declined marginally from 3,2% to 2,9%. Given the increased size of the cohort, this converts into an increase in the total number of distinctions from 7 466 in 2020 to 7 515 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of constructive intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 10.1.1 Overall achievement rates in Mathematics

Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	245 103	127 197	51,9	86 096	35,1
2018	233 858	135 638	58,0	86 874	37,1
2019	222 034	121 179	54,6	77 751	35,0
2020	233 315	125 526	53,8	82 964	35,6
2021	259 143	149 177	57,6	97 561	37,6

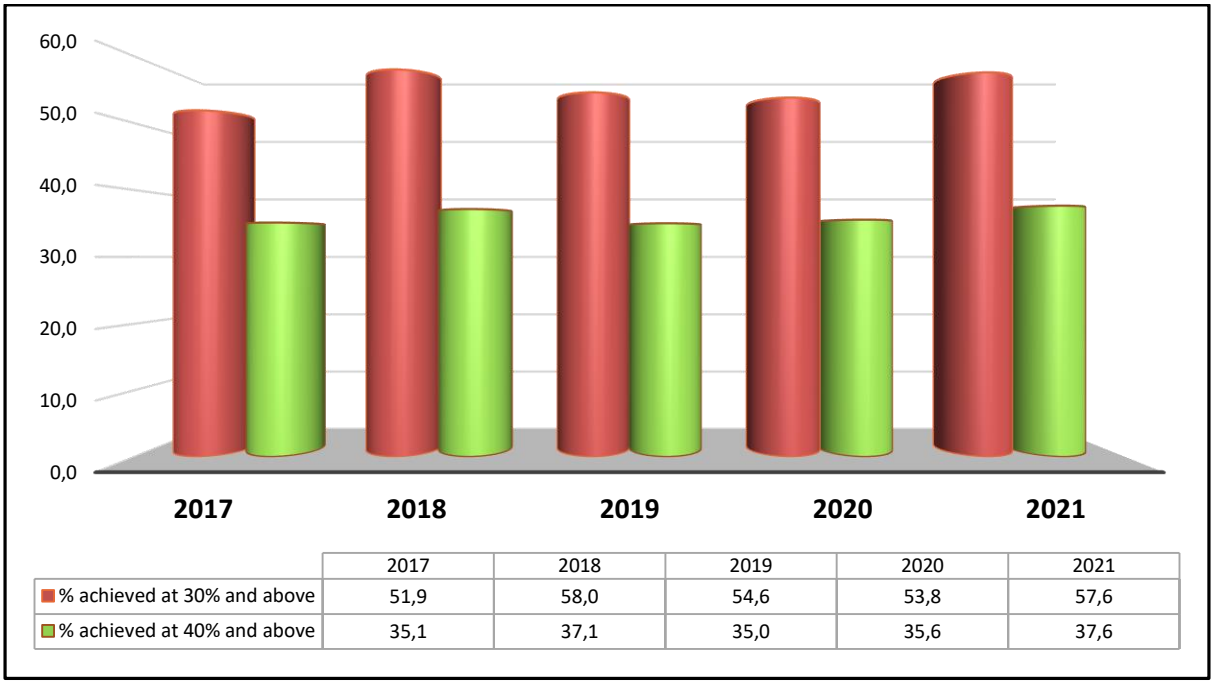
Performance in the 2021 examination revealed a slight improvement of candidates' understanding of basic concepts across some topics in the curriculum.

It appears that candidates are becoming over-reliant on past examination papers. While past examination papers may serve as a valuable resource for revision, the teaching and learning of basic concepts cannot be overlooked. It was pleasing to note that the candidates' answering of routine questions in Euclidean Geometry shows continuous improvement.

The *CAPS* states that the theory in Trigonometry is examinable. Teachers are reminded not to overlook this aspect when teaching solution of triangles and compound and double angles.

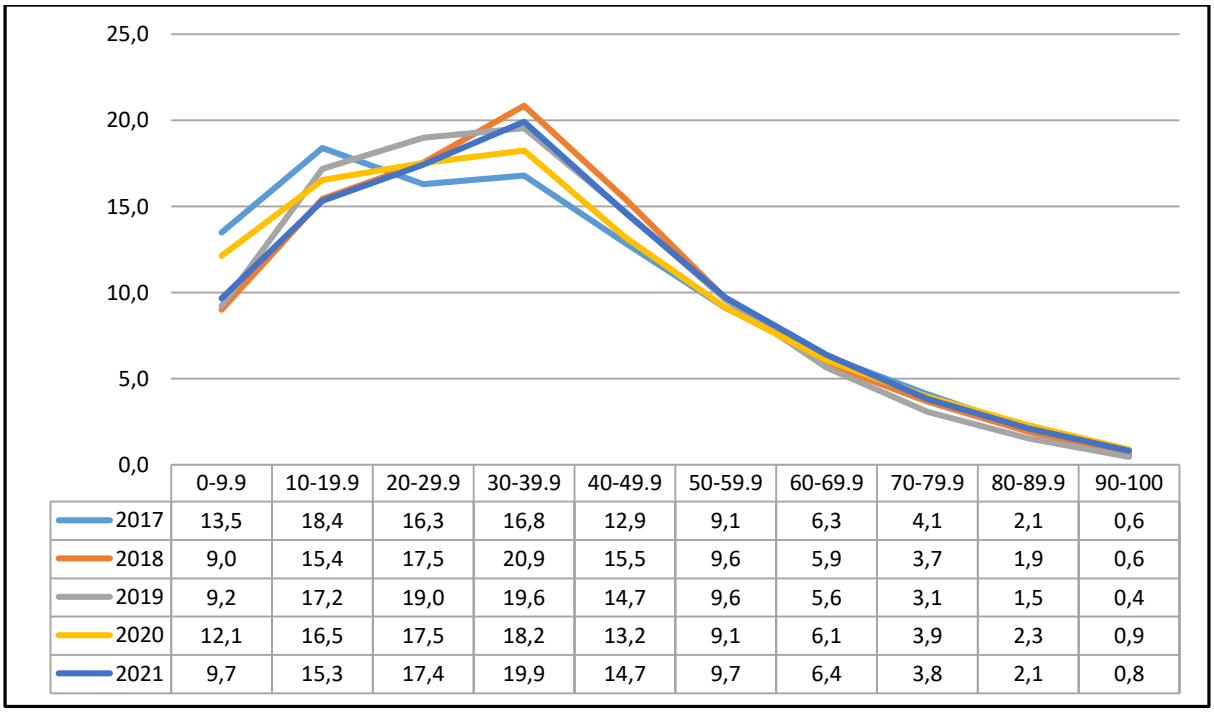
Performance will be further enhanced if attention is given to the following areas: strengthening the content knowledge in Trigonometry and learners' exposure to complex and problem-solving questions across all topics in the curriculum, starting in the earlier grades.

Graph 10.1.1 Overall achievement rates in Mathematics (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	51,9	58,0	54,6	53,8	57,6
% achieved at 40% and above	35,1	37,1	35,0	35,6	37,6

Graph 10.1.2 Performance distribution curves in Mathematics (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	13,5	18,4	16,3	16,8	12,9	9,1	6,3	4,1	2,1	0,6
2018	9,0	15,4	17,5	20,9	15,5	9,6	5,9	3,7	1,9	0,6
2019	9,2	17,2	19,0	19,6	14,7	9,6	5,6	3,1	1,5	0,4
2020	12,1	16,5	17,5	18,2	13,2	9,1	6,1	3,9	2,3	0,9
2021	9,7	15,3	17,4	19,9	14,7	9,7	6,4	3,8	2,1	0,8

10.2 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

(a) Many candidates were able to answer the knowledge and routine questions correctly and scored some marks in a majority of the questions. This suggests that the candidates were well prepared to deal with these questions in the paper.

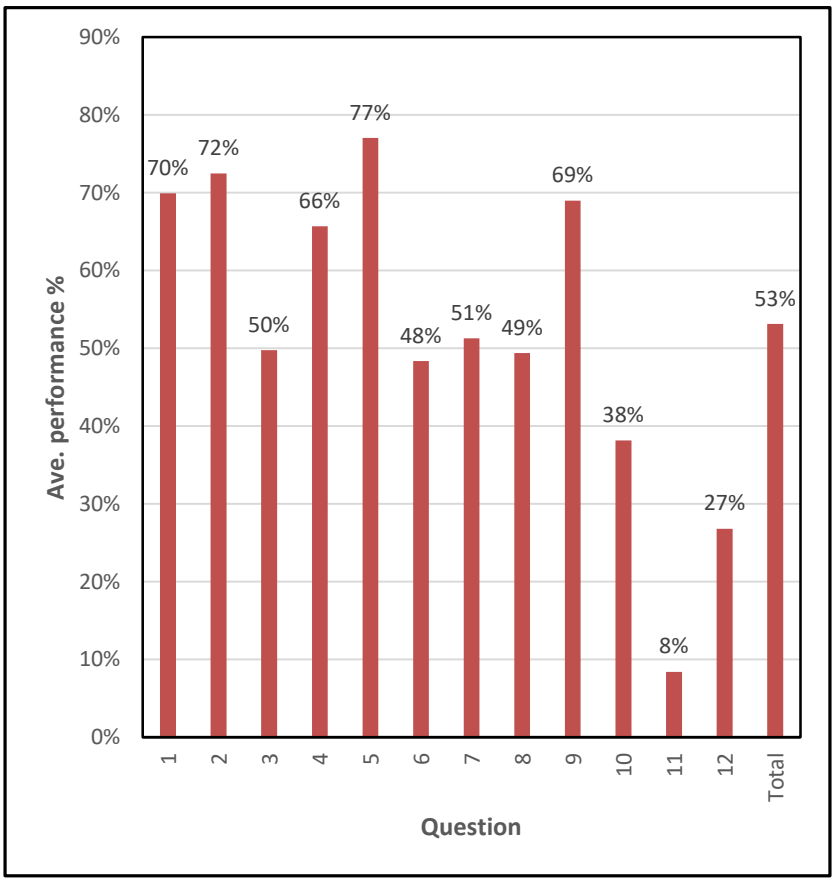
(b) The algebraic skills of the candidates are poor. Most candidates lacked fundamental and basic mathematical competencies which should have been acquired in the lower grades. This becomes an impediment to candidates answering complex questions correctly.

(c) While calculations and performing well-known routine procedures form the basis of answering questions in a Mathematics paper, a deeper understanding of definitions and concepts cannot be overlooked. Candidates did not fare well in answering questions that assessed an understanding of concepts.

10.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

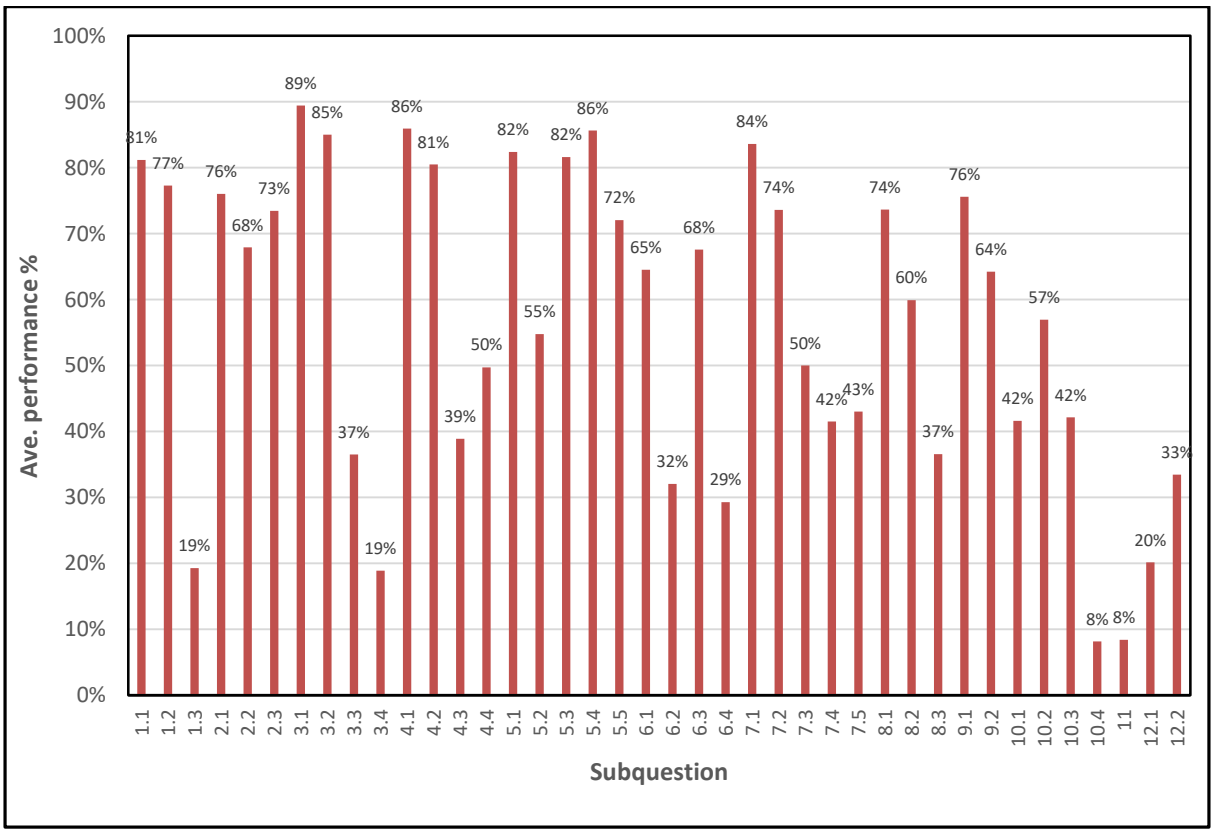
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 10.3.1 Average performance per question in Paper 1



Q	Topics
1	Equations, Inequalities & Algebraic Manipulation
2	Number Patterns & Sequences
3	Number Patterns & Sequences
4	Number Patterns & Sequences
5	Functions & Graphs
6	Functions & Graphs
7	Functions & Graphs
8	Finance
9	Calculus
10	Calculus
11	Calculus
12	Probability & Counting

Graph 10.3.2 Average performance per subquestion in Paper 1



10.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: ALGEBRA

Common errors and misconceptions

(a) Some candidates still factorised incorrectly in Q1.1.1.

(b) Rounding off the answers to two decimal places is still a problem for some candidates. For example, in Q1.1.2 some candidates rounded to –0,68 instead of –0,69. Others simply rounded to –0,6 despite the question stating explicitly to TWO decimal places.

Candidates made the following errors when entering the values into the calculator:

- Omitting brackets around the –3, i.e. $x = \dfrac{-3 \pm \sqrt{-3^2 - 4(2)(-3)}}{2(2)}$. This resulted in the following incorrect answers: $x = 0,22$ or $x = -1,72$.

- Creating the fraction for the part under the square root only, i.e. $x = -(-3) \pm \dfrac{\sqrt{(-3)^2 - 4(2)(-3)}}{2(2)}$. This led to the following incorrect answers: $x = 4,44$ or $x = 1,56$.

(c) In answering Q1.1.3 many candidates treated the inequality as an equation. Their answer would read: $(x+1)(x+4) \leq 0$ followed by $x \leq -1$ or $x \leq -4$. These candidates

did not realise that the question dealt with the product of two numbers and that the product of two negative numbers does not yield a negative result. In addition, the difference in the solutions: $x \geq -4$ or $x \leq -1$ and $x \geq -4$ and $x \leq -1$ were not understood by a number of candidates.

Many candidates struggled to interpret the correct answer from the inequality.

$x^2 + 5x + 4 \leq 0$		$x^2 + 5x + 4 \leq 0$
$(x+1)(x+4) \leq 0$	or	$(x+1)(x+4) \leq 0$
$\therefore x = -1$ or $x = -4$		$\therefore x = -1$ or $x = -4$
$\therefore x \leq -4$ or $x \geq -1$		$\therefore -1 \leq x \leq -4$

Some candidates drew a sketch but were unable to use it to write down the required answer.

(d) Most candidates had some idea that they had to square both sides of the equation in Q1.1.4. Few candidates were unable to square the binomial on the RHS correctly, for example, they wrote $x + 28 = 4 + x^2$ or $x + 28 = 4 - x^2$ instead of $x + 28 = 4 - 4x + x^2$. Very few candidates checked if the solutions obtained were valid in the original equation and consequently failed to reject $x = 8$ as a solution.

(e) In Q1.2 some candidates made the following error when rewriting the linear equation in terms of one variable: $x = 3 - 2y$. Other candidates overlooked the factor of y in the first term when substituting into the quadratic equation. They would write $2(2y-3) + 7 = (2y-3)^2 + 4y^2$ instead of $2(2y-3)y + 7 = (2y-3)^2 + 4y^2$. Some candidates used the quadratic formula to solve the equation $4y^2 - 6y + 2 = 0$. However, they wrote their answer as $x = \frac{1}{2}$ or $x = 1$ instead of $y = \frac{1}{2}$ or $y = 1$.

(f) Many candidates did not know how to answer Q1.3. Few candidates managed to arrive at $\Delta = -3n^2$, but could not explain why the roots were non-real. A fair number of candidates took arbitrary values for m, n and p and proved that $n^2 - 4mp$ was negative. This was not acceptable.

Suggestions for improvement

(a) Much of the work in this question is covered in Grade 11. It is therefore important for teachers to set revision tasks in these sections of work throughout the Grade 12 year.

(b) More thorough teaching of factorisation in Grades 9 and 10 is needed. Emphasis should be placed on how to identify the type of factorisation that is applicable to the given expression. Encourage weaker learners to use the quadratic formula instead of factorising.

(c) It is unacceptable for learners to write down the quadratic formula incorrectly. Therefore, they should be encouraged to copy the formula from the information sheet. Correct substitution, especially using brackets for negative values, should be emphasised in Grade 11. If this is done correctly, then learners should enter the values exactly as they have written it into their calculators to obtain the answers.

(d) Teachers should not take for granted that learners know how to round off a number to the required number of places. Where necessary, this skill should be retaught in Grades 11 and 12.

(e) Teachers should take some time, preferably in Grade 10, to focus on teaching learners how to represent inequalities (e.g. $-2 < x < 1$; $x < -2$ or $x > 1$) on a number line and also how to write an inequality from the illustration on a number line. This will benefit learners as they are required to write inequality solutions for a number of questions in both examination papers. Emphasise that correct notation is essential when writing down the solutions to inequalities.

(f) Teachers should explain the difference between *and* and *or* in the context of inequalities. Learners cannot use these words interchangeably as they have different meanings.

(g) When dealing with surd equations, learners should be reminded that they need to square both sides of the equation in order to maintain the balance. They should not square the radical parts of the equation only. Teachers must emphasise that implicit restrictions are placed on surd equations and that learners should continue to test whether their answers satisfy the original equation.

(h) Teachers should emphasise the difference between non-real and undefined numbers as these are two different groups of numbers.

QUESTION 2: PATTERNS

Common errors and misconceptions

(a) The question indicated that the given sequence was geometric. Despite this, when answering Q2.1, some candidates incorrectly assumed that it was arithmetic and calculated the value of *x* using a common difference between the terms:

$$T_2 - T_1 = T_3 - T_2 = d$$
$$90 - x = 90 - 81$$
$$x = 81$$

(b) Q2.2 required candidates to calculate the sum of the first *n* terms of a geometric series. This is a well-known concept. However, many candidates found difficulty in answering the question because they had to show that $S_n = 1000(1 - 0,9^n)$. Some candidates used the T_n formula for a geometric sequence, whilst others used the sum formula for an arithmetic series despite the question indicating otherwise.

(c) Candidates who assumed that the series was arithmetic, calculated the value of *r* to be -9 and subsequently used this value when calculating the sum to infinity. These candidates failed to realise that this value of *r* violated the condition for which a geometric series converges, namely –1 < *r* < 1. Other candidates used the incorrect value of $\frac{10}{9}$ for *r*.

Suggestions for improvement

(a) At some stage it is advisable to give learners an exercise that contains a mixture of quadratic, arithmetic and geometric sequences and series. Learners should analyse the type of sequence they are working with and which formulae are applicable to it.

(b) Teach learners how to identify whether the question requires them to calculate the value of the n^{th} term or the sum of the first n terms.

(c) While covering this section, teachers should emphasise the difference between the *position* and the *value* of a term in a sequence. Learners must read the questions carefully so that they know what is required of them.

(d) Remind learners that n cannot be a negative number, zero or a fraction. When solving for n, learners should arrive at a natural number solution. If this is not the case, then they should know that they have made a mistake in their working.

(e) Make learners acutely aware of which formulae in the information sheet apply to which type of sequence. It is good practice for learners to use the information sheet in class so that they become familiar with it.

(f) It is important to demonstrate, by way of example, the concept of a convergent geometric series, first by taking a value of $r > 1$ and then taking a value of $-1 < r < 1$. This should alert learners to the condition for which a geometric series will converge.

QUESTION 3: PATTERNS

Common errors and misconceptions

(a) In answering Q3.3, many candidates incorrectly assumed that –121 was a term in the quadratic sequence instead of it being a term in the sequence of first differences. Consequently, they tried to solve the equation $-n^2 + 26n - 170 = -121$. This was viewed as a breakdown. A fair number of candidates created this equation: $n = \frac{-26 \pm \sqrt{(26)^2 - 4(-1)(-170)}}{2(-1)} = 0$. These candidates had no clue that the value of n in a sequence cannot be 0.

(b) The crux to answering Q3.4 was to compare the value of the maximum terms in the given sequence and the new sequence. Many candidates failed to link quadratic number patterns with the quadratic function. Hence, this question was not answered by a large majority of candidates.

Suggestions for improvement

(a) Remind learners that n cannot be a negative number, zero or a fraction. When solving for n, learners should arrive at a natural number solution. If this is not the case, then they have made a mistake in their working.

(b) When teaching quadratic number patterns, it is essential to show learners how the formulae: $T_1 = a + b + c$, the first term of the first differences $= 3a + b$ and the second difference = $2a$, are deduced.

(c) The sequence of first differences of a quadratic number pattern form an arithmetic pattern. This implies that an arithmetic sequence is embedded within a quadratic number pattern. Learners must read the question very carefully in order to establish which pattern the question is making reference to. Glossing over words in the question leads to learners making incorrect statements.

QUESTION 4: PATTERNS

Common errors and misconceptions

(a) A small minority of candidates used incorrect formulae in Q4.1 and Q4.2.

(b) In Q4.3 a number of candidates successfully calculated the first three terms of the series but forgot to calculate the last term. However, the vast majority of the candidates did not write their answer as a sum of these terms. They wrote their answer as 5 ; 7 ; 9 ; … ; 10 003 instead of 5 + 7 + 9 + … + 10 003. Candidates failed to realise that sigma notation is a compact form of a series of terms.

(c) Many candidates failed to interpret the sigma notation correctly in Q4.4. They failed to see that some terms in the second expansion would cancel some terms in the first expansion. Further, candidates failed to realise that the question could have been solved as two separate sums.

Suggestions for improvement

(a) Teachers need to clarify that the sigma notation is a short-hand notation of a series of terms. Give learners enough examples where they have to expand the sigma notation. Use simple ones to start with, probably containing only a few terms. Also give them examples that do not represent arithmetic and geometric series.

(b) Learners should also be exposed to writing a series in sigma notation.

QUESTION 5: FUNCTIONS (HYPERBOLA)

Common errors and misconceptions

(a) In Q5.1, instead of the correct answer of $x = 3$ and $y = 2$, some candidates gave as the answer: $p = 3$ and $q = 2$, or $x \neq 3$ and $y \neq 2$. None of these were accepted as correct. Some candidates incorrectly wrote the equation of the vertical asymptote as $x = -3$.

(b) Candidates still confuse the domain with the range and consequently gave the incorrect answer of $y = 2$. Many candidates gave their answer as $x \in R$. This was not accepted as it is incorrect.

(c) Candidates were unable to correctly solve the equation $\frac{-1}{x-3} + 2 = 0$ on account of poor simplification skills. Hence, they could not calculate the x-intercept correctly.

(d) Many candidates were able to sketch the hyperbola having the correct increasing shape. However, they failed to label the asymptotes and the intercepts with the axes on their sketch graphs. They were not awarded marks for the asymptotes and intercepts with the axes because their sketches were not drawn to scale.

Suggestions for improvement

(a) Teachers should pay attention to the concepts and definitions when teaching functions.

(b) Teachers should spend some time discussing that all points on the *x*-axis have a *y*-coordinate of 0 and all points on the *y*-axis have a *x*-coordinate of 0. The domain is always a set of *x*-values and the range is always a set of *y*-values.

(c) When teaching the hyperbola, start with the 'basic graph' $y = \frac{a}{x}$ and develop the general hyperbola $y = \frac{a}{x+p} + q$. This will enable learners to understand the effect of the changes in the variables *a*, *p* and *q* on the graph, its asymptotes and axes of symmetry.

QUESTION 6: FUNCTIONS (EXPONENTIAL AND INVERSE)

Common errors and misconceptions

(a) Many candidates were unable to solve the logarithmic equation correctly in Q6.1. Some incorrect answers were:

$2 = \log_4 k$ $\therefore k = 2^4$ or $2 = \log_4 k$ $\therefore 2 = 4^k$ or $2 = \log_4 k$ $\therefore 4 = 2^k$

(b) In Q6.2 many candidates failed to interpret the question correctly, i.e. to determine the values of *x* when the value of *y* lies from –1 to 2. They did not realise that they had to determine an *x*-value when $y = -1$. Consequently, they were unable to state the correct interval in terms of *x*. A common incorrect answer was $0 \le x \le 16$.

(c) Many candidates understood that they had to swop x and y in order to obtain the inverse of the function *f* in Q6.3. However, poor conversion from logarithmic form to exponential form resulted in an incorrect answer in *y*-form.

(d) Candidates could not visualise the answer to Q6.4 because the sketch of the inverse of *f* was not given. Many candidates resorted to calculating the answer algebraically but their solutions were incorrect.

Suggestions for improvement

(a) Teachers should spend some time discussing logarithms as a topic. The skill of changing from the exponential form to the logarithmic form and vice versa must be emphasised. This skill is required for determining the equation of the inverse of an exponential graph as well as solving for *n* in financial questions that observe an exponential pattern.

(b) Teachers should discuss the meaning of mathematical statements: $x < 0$, $x > 0$, $y < 0$, $y > 0$, etc. and show where these regions are represented in the Cartesian plane.

(c) Teachers should remind learners that the product of two numbers is negative when one of the numbers is positive and the other is negative. Similarly, the product of two numbers is positive when both numbers are negative or when both numbers are positive.

(d) Basic interpretation of graphs should start in Grade 10. Learners should then be able to approach questions in Grades 11 and 12 with a little more confidence.

QUESTION 7: FUNCTIONS (PARABOLA AND STRAIGHT LINE)

Common errors and misconceptions

(a) While many candidates were able to determine the answers to Q7.1, they did not give their answers in coordinate form as required.

(b) In Q7.2 many candidates failed to use the most direct method of calculating the *x*-coordinate of the turning point C, i.e. using the *x*-intercepts calculated in Q7.1. Instead they performed additional calculations to arrive at this answer.

(c) When answering Q7.3 some candidates gave their answer in terms of *x* instead of *y*. These candidates confused the range with the domain. A number of candidates excluded the turning point in their answer. They gave the answer as $y > -25$ instead of $y \geq -25$. Some mistook G to be the turning point and gave the answer as $y \geq -24$.

(d) In Q7.4.1 some candidates confused the angle of inclination with the gradient. They incorrectly calculated the gradient of AE as $m = \tan^{-1}(14,04^o) = 85,93$.

(e) Many candidates incorrectly assumed that T was the midpoint of B and C when answering Q7.4.2. They were unable to make the link between the gradient of the tangent and the derivative of the function *f*. Of those candidates who used the derivative in their answer, some equated the derivative to 0 instead of equating it to the gradient of the tangent.

(f) In Q7.5 many candidates were unable to determine the equation of the straight line passing through K correctly. The challenge in this instance was that they were unable to establish the gradient of the line correctly. Consequently, they were unable to determine the *x*-coordinate of R by solving a set of equations simultaneously. Some candidates were able to calculate the equation of the line passing through K correctly but then took R to be the *x*-intercept of this line.

Suggestions for improvement

(a) Teachers should spend some time discussing the basic concepts of functions: all points on the *x*-axis have a *y*-coordinate of 0 and all points on the *y*-axis have a *x*-coordinate of 0. The domain is always a set of *x*-values and the range is always a set of *y*-values.

(b) Teachers should integrate the findings of the gradient of a tangent to a cubic function to a parabola. They should ensure that learners understand that the gradient of the tangent through the turning point of a parabola is zero.

QUESTION 8: FINANCE

Common errors and misconceptions

(a) In Q8.1 some candidates used the straight-line depreciation formula instead of the reducing-balance depreciation formula.

(b) It was evident in Q8.2 that the candidates were struggling with the application of logarithms in solving questions. In instances where candidates used *n* as the number of compounding periods, some of them had difficulty in interpreting the final answer.

$116\ 253{,}50 = 75000\left(1+\frac{0{,}068}{4}\right)^{n}$, was followed by:

$n = 25{,}99$

$\therefore n = 26$ years

The calculation is correct but *n* represented the number of quarters and not years. Some candidates rounded off their answers too early. This resulted in an error in the answer. A few candidates swopped the values of A and P when substituting into the formula.

(c) The most common error in Q8.3.1 was that candidates incorrectly selected the present value formula to answer this question. It would seem that candidates immediately use the present value formula to any question in which the purchase of a house is mentioned. Some candidates left out the '– 1' in the future value annuity formula.

(d) In Q8.3.2(a), where candidates used the Pv formula to calculate the outstanding balance, they used the incorrect value of *n*. They used *n* = 252, the number of payments made, instead of *n* = 48, the number of payments outstanding. In the case where candidates used the alternate formula to calculate the outstanding balance, they only calculated the value of the payments made inclusive of interest. They omitted to subtract this amount from the value of the loan inclusive of interest.

(e) Very few candidates had any idea how to respond to Q8.3.2(b). Many calculated the balance after 252 payments and subtracted this amount from the original loan amount. They failed to take into consideration the total amount repaid over the period.

Suggestions for improvement

(a) Learners should be exposed to an exercise in which they select the correct formula to each question.

(b) Teachers should explain the difference in meaning between the rate of interest and the amount of interest paid.

(c) It is essential for learners to be able to accurately change from exponential form to logarithmic form. Teachers should teach this concept thoroughly.

(d) Learners need deeper insight into the relevance of each of the formulae and under which circumstances each can be used. The variables in each formula must be explained. More practice in Financial Mathematics is necessary so that learners can distinguish among the different formulae.

(e) Discuss the two ways of calculating the outstanding balance of a loan. The first is when the number of payments made is known and the second is when the number of payments outstanding is known.

(f) Teachers should demonstrate all the steps required when using a calculator. Learners should be penalised in formal assessment tasks at school for rounding off early.

QUESTION 9: CALCULUS

Common errors and misconceptions

(a) In Q9.1 many candidates made the following notational errors:
$f(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ or $\lim_{h\to 0}=\frac{f(x+h)-f(x)}{h}$ or $\frac{\lim\ f(x+h)-f(x)}{h\to 0\qquad h}$. They lost a mark for these errors.

Some candidates made the following mistakes when removing brackets:
$2(x+h)^2=(2x+2h)^2$, $-(2x^2-3x)=2x^2-3x$, $2(x+h)^2=2x^2+2xh+2h^2$ or $f(x+h)=2(x+h)^2$.

In other instances, candidates did not use brackets in the numerator:
$f'(x)=\lim_{h\to 0}\frac{2x^2+4xh+2h^2-3x-3h-2x^2-3x}{h}$. This lead to a breakdown in the answer.

(b) The common error in Q9.2.2 was that candidates were unable to convert the two terms to the differentiable form, $a.x^n$, on account of the fractions.

Candidates wrote $-\frac{\sqrt[3]{x}}{2}$ as $-2(x)^{\frac{1}{3}}$ or $-2(x)^{\frac{2}{3}}$ or $-\frac{(x)^{\frac{2}{3}}}{2}$ instead of $-\frac{(x)^{\frac{1}{3}}}{2}$.

They also wrote $\left(\frac{1}{3x}\right)^2$ as $3x^{-2}$ or $9x^{-2}$ instead of $\frac{1}{9}x^2$.

Suggestions for improvement

(a) Emphasis should be placed on the use of the correct notation when determining the derivative, either when using first principles or the rules.

(b) Teachers should explain the need for brackets when determining the derivative from first principles. This prevents the incorrect simplification that follows.

(c) To apply the rules of differentiation, learners need a strong background in basic algebraic operations, e.g. factorisation, converting surds to exponential form and simplification of algebraic fractions. These skills should be revised before learners are expected to differentiate examples that contain surds or when algebraic manipulation is required.

QUESTION 10: CALCULUS

Common errors and misconceptions

(a) In determining *a* and *b* in Q10.1, candidates had to derive two linear equations and solve them simultaneously. Most candidates managed to substitute the coordinates of the turning point into the given expression and obtain the first equation. They were unable to derive the second equation because it required them to make use of the derivative. Some candidates took $a = -1$ and $b = 6$ as given and used these values in the given expression. They then calculated that the turning points of the function were (0; 0) and (4; 32). This is considered a circular argument and is not acceptable.

(b) Some candidates experienced difficulty in factorising the expression in order to calculate the coordinates of A.

(c) Many candidates failed to translate the words in Q10.3 into mathematical language. They were unable to link an increasing function to where the value of *y* increases when moving from left to right on the *x*-axis. Candidates had little idea that the change in concavity occurs at the point of inflection on the graph. Many did not calculate the *x*-coordinate of the point of inflection when answering Q10.3.2.

(d) Many candidates did not realise that they had to translate the given graph by 1 unit to the right to solve the question. A number of them attempted to solve the question algebraically but were unsuccessful in doing so because the value of $h(x-1)$ was not known.

Suggestions for improvement

(a) The focus when teaching cubic functions should not only be on calculating the critical points but also on interpreting the critical points on the graph. For example, what does it mean when we know that the *x*-coordinate of a turning point on a graph is 4?

(b) When teaching graphs of cubic functions, teachers should inform learners of both methods of determining the *x*-coordinate of the point of inflection: solving for *x* in $f''(x)=0$ as well as determining the *x*- value midway between the two turning points.

(c) Teachers should teach concavity in such a way that learners can visually identify where a graph is concave up or concave down. In this way, learners should deduce that the point of inflection is critical to establishing the concavity of a cubic graph.

QUESTION 11: CALCULUS

Common error and misconception

The vast majority of the candidates did not attempt this question because they were unable to derive the cost function from the given information.

Suggestions for improvement

(a) Learners appear to be dependent on the formulae being given when solving optimisation problems. It is advisable that learners interrogate the optimum function even when it is given in a question. This should help their conceptual development.

(b) Teachers should ensure that there is enough time for learners to understand the application of Calculus fully.

(c) Reading for understanding should be ongoing if learners are to improve their responses to word problems.

QUESTION 12: PROBABILITY

Common errors and misconceptions

(a) Many candidates could not provide a reason why events A and B were not mutually exclusive in Q12.1.1.

(b) In Q12.2.1(a) many candidates overlooked the fact that the events A and B were independent. In addition, candidates were not familiar with the concepts 'only A' and 'only B'.

(c) Many candidates could not visualise which region was represented by 'not A and not B'.

(d) Some candidates were confused about which books were being referred to in Q12.2.2, despite the question explicitly stating 'these 12 books'.

(e) Many candidates were able to calculate the options for the first and last place and how the three novels could be arranged together. However, they were unable to calculate how the novels together with the remaining books could be arranged in the 10 places between the first and last places.

Suggestions for improvement

(a) Teaching basic concepts cannot be overlooked. When learners understand the basic concepts well enough, then the more complex concepts are easier to grasp.

(b) Use Venn diagrams to teach probability. It helps with the understanding of the different areas that make up the events, e.g. only A, only B, A and B, A or B, not A, not B, not A and not B and not A or not B.

(c) Teach learners the Fundamental Counting Principle in such a way that they will be able to reason answers, instead of trying to remember rules.

10.5 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

(a) Individual performance in the paper varied from very poor to excellent.

(b) Integration of topics is still a challenge to many candidates. Mathematics cannot be studied in compartments and it is expected that candidates will be able to apply knowledge from one section to another section of work.

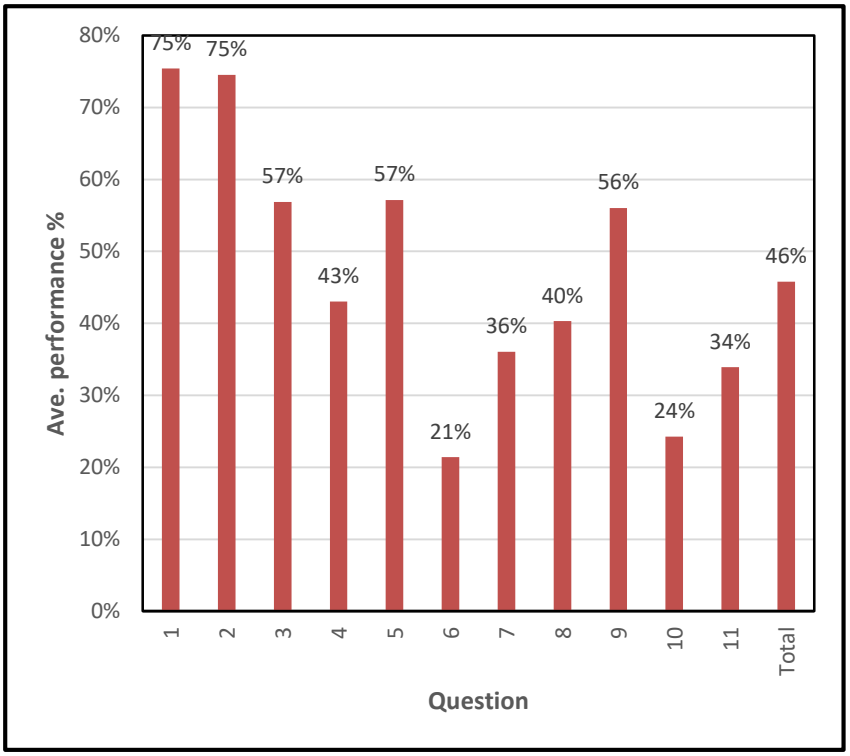
(c) It is evident that many of the errors made by candidates in answering the Trigonometry questions in this paper have their origins in a poor understanding of the basics and the foundational competencies taught in the earlier grades.

(d) In general, candidates need to exercise caution with algebraic manipulation skills since overlooking certain basic principles or practices results in the unnecessary loss of marks. Although the calculator is an effective and necessary tool in Mathematics, learners appear to believe that the calculator provides the answer to all their problems. Some candidates need to realise that conceptual development and algebraic manipulation are often impeded because of the dependence on a calculator.

10.6 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2

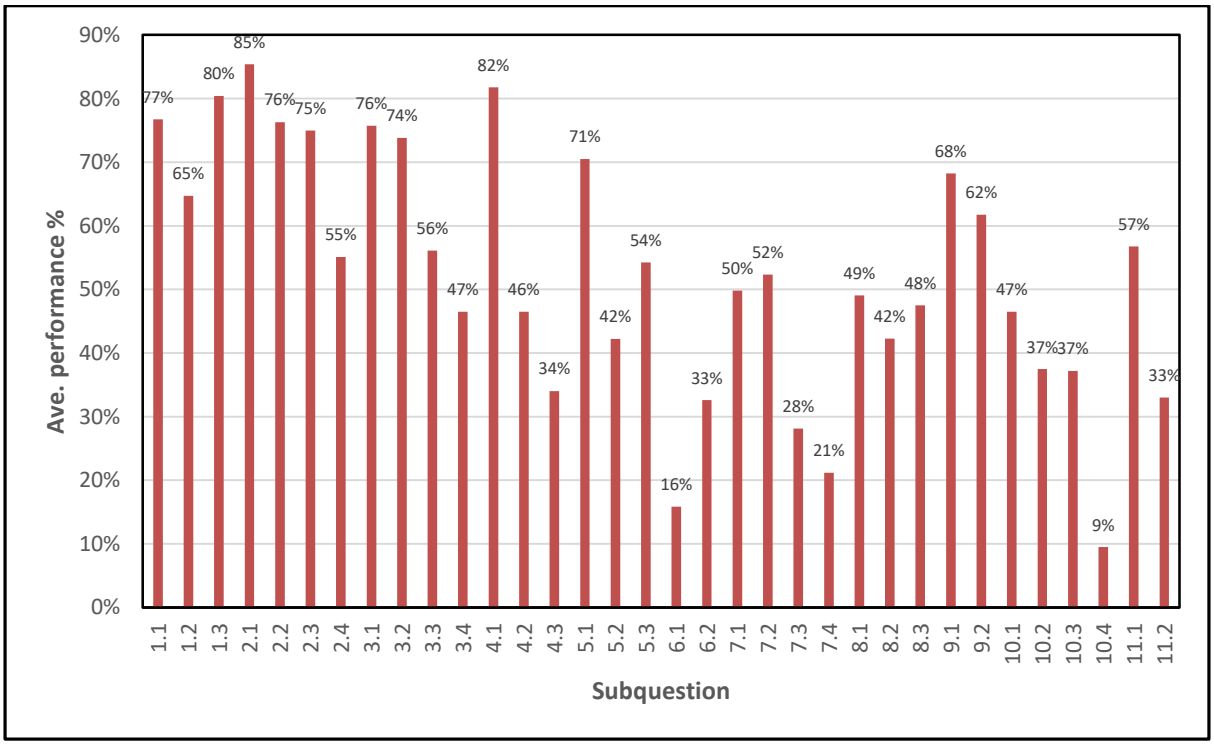
The following graph was based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 10.6.1 Average performance per question in Paper 2



Q	Topic(s)
1	Data Handling
2	Data Handling
3	Analytical Geometry
4	Analytical Geometry
5	Trigonometry
6	Trigonometry
7	Trigonometry
8	Trigonometry
9	Euclidean Geometry
10	Euclidean Geometry
11	Euclidean Geometry

Graph 10.6.2 Average performance per subquestion in Paper 2



10.7 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: DATA HANDLING

Common errors and misconceptions

(a) Candidates were not careful when capturing the data into their calculators. This led to incorrect answers for the mean and standard deviation.

(b) In Q1.1.1 some candidates calculated the median instead of the mean. Other candidates only added the top row of numbers as if the information given was a set of bivariate data. Some used the incorrect value of *n* in the denominator.

(c) In Q1.1.2 some candidates calculated the mean or the correlation coefficient instead of the standard deviation. Some candidates selected the incorrect function on their calculators, i.e. they used s_x instead of σ_x.

(d) When answering Q1.1.3 some candidates misread the question and calculated the number of days that fell between one standard deviation of the mean instead of one standard deviation above the mean. A few candidates only calculated the value of $\bar{x} + \sigma$ and did not calculate the number of days above this value.

(e) Poor understanding of the question resulted in many candidates not answering Q1.2 correctly. Some candidates only calculated the average number of loaves of bread not sold per day instead of the total number of loaves not sold over the period.

(f) In Q1.3.1 many candidates selected the correct box-and-whisker diagram that represented the data but they were unable to provide a reason for their choice. Candidates were unable to link the five-number summary to a box-and-whisker diagram.

(g) In Q1.3.2 candidates lacked knowledge of skewness and were unable to describe the skewness of the box-and-whisker diagram that they had selected in Q1.3.1.

Suggestions for improvement

(a) When teaching Statistics, the focus should not only be the calculations. Teachers should also pay attention to the meaning of the different concepts, e.g. mean, standard deviation, skewness, etc. The values obtained in the calculations should then become more meaningful for learners.

(b) The understanding of statistical terminology is developed by using these terms frequently in the class. The use of diagrams when explaining the concepts of standard deviation and deviation intervals from the mean should help learners in understanding these concepts.

(c) Practise calculator skills with learners. When calculating the standard deviation, the population standard deviation (σ_x) should be used and not the sample standard deviation (s_x). Learners are advised to become familiar with and use the same brand of calculator in the examinations.

(d) Graphs are an integral part of Data Handling. Learners should be able to draw graphs, read off from graphs and interpret graphs.

QUESTION 2: DATA HANDLING (BIVARIATE DATA)

Common errors and misconceptions

(a) A few candidates were unable to plot all the points correctly in Q2.1. Some candidates joined the points or drew the regression line. The question did not require candidates to do either.

(b) In Q2.2 some candidates did not calculate the values of *a* and *b* correctly. This was on account of entering incorrect values into the calculator. Some could not round off correctly to two decimal places. A few candidates swopped the values of *a* and *b* in the equation. Their equation was $y = 90,48x - 1,77$ instead of $y = 90,48 - 1,77x$. Some omitted the variable *x* in the equation and others did not start the equation with $y = ...$

(c) Some candidates substituted incorrectly in Q1.3, i.e. they substituted 5 for *x* instead of 38. Some candidates did not round off the answer to their calculation. These candidates failed to realise that it was not possible to sell 23,22 5-litre containers of milk.

(d) Many candidates calculated the value of the correlation coefficient and then commented on the strength of the relationship between the price of milk and the number of containers sold. This was incorrect as it did not answer the question. Other candidates described the trend in the data. This was also incorrect. Candidates were expected to use the correlation coefficient to comment about the accuracy of the prediction.

Suggestions for improvement

(a) Learners should be given multiple opportunities to practise calculator skills. Teachers should emphasise correct rounding procedures.

(b) Teachers should explain each definition or concept in detail. Statistical language should be used in class so that learners become familiar with the terminology.

(c) When determining the equation of the least squares regression line, it is advisable that learners write down the values of *a* and *b* and then write down the equation of the regression line. In this way, they can get the CA mark for the equation.

(d) The teaching of Statistics goes beyond mere calculation of values. Learners should be able to use the values of their calculations to make predictions and comments about the data.

QUESTION 3: ANALYTICAL GEOMETRY

Common errors and misconceptions

(a) Many candidates failed to recognise that B, C and E were collinear points and hence, when answering Q3.1, failed to realise that $m_{BE} = m_{CE}$. Some substituted the coordinates of B into the gradient formula and ended up with an answer as an expression containing *k*. Some candidates still write the gradient formula incorrectly, despite it being given in the information sheet. Some candidates incorrectly used BE as the notation for the gradient of BE instead of m_{BE}.

(b) In Q3.1.2 many candidates used $\tan^{-1}(81{,}87°)$ to calculate the gradient of AB instead of $\tan 81{,}87°$. This shows that candidates were confused between gradient and angle of inclination. Some candidates used the answers for *k* obtained in Q3.3.1 to calculate the gradient of AB. This was not accepted as the calculations for *k* were not done prior to answering Q3.1.2.

(c) When answering Q3.2, some candidates calculated the *y*-intercept of BE correctly but failed to write down the equation of BE. Their answer was incomplete and they were not awarded the mark for the equation of BE.

(d) In Q3.3.1 many candidates incorrectly assumed that C was the midpoint of BE. This information was not given and these candidates were not awarded any marks for their efforts.

(e) Many candidates correctly calculated the gradient of AC as –2 but did not realise that this implied that $A\hat{G}E$ was obtuse. Although some candidates were able to calculate $A\hat{G}E$ and $A\hat{F}G$ correctly, they were unable to relate these angles to $\hat{A}$ when answering Q3.3.2.

(f) The point S was not shown on the sketch. Many candidates failed to attempt this question because they lacked the visual skills to correctly place point S in the first quadrant.

(g) Many candidates did not substitute *p* for both *x* and *y* in the equation for BE. Consequently, they were unable to determine the coordinates of T as the equation contained two variables. Again, candidates lacked the visual skills to correctly place T in the first quadrant.

(h) The centre of the circle was given. Many candidates were able to use this information to write down the LHS of the equation correctly in Q3.4.2(a). However, they did not realise that BE was the radius of the required circle.

(i) Determining the equation of a tangent to a circle at the point of contact is a familiar question. However, many candidates lacked the visual skills to see that there was a circle passing through B and that they had to calculate the equation of the tangent passing through B.

Suggestions for improvement

(a) If learners are not sure, they should consult the information sheet for the correct formula.

(b) Substitution into the formula remains a problem. Learners should first write down the coordinates and then substitute them into the formula.

(c) Teachers should request learners to label the coordinates as $(x_1 ; y_1)$ and $(x_2 ; y_2)$ on the diagram. This should prevent learners from making mistakes when substituting the coordinates into a formula. The order of substitution must be consistent, especially when using the gradient formula.

(d) Emphasise to learners that it is not acceptable to make any assumptions, e.g. that a certain point is the midpoint of a line. Even if it looks as if the point is the midpoint, it

may not just be assumed and used. These need to be proved first before the results can be used in an answer.

(e) Teachers should encourage learners to write down the values that they have already calculated (lengths, angles and gradients) on the diagram. This will assist learners when answering follow-up questions.

(f) To answer questions in analytical geometry well, learners should master the properties of quadrilaterals and triangles. Constant revision of Analytical Geometry concepts taught in Grades 10 and 11 is essential, as much of the Grade 12 work revolves around these concepts.

(g) The different topics in Mathematics should be integrated. Learners must be able to establish the connection between Euclidean Geometry and Analytical Geometry.

(h) Learners have difficulty in visualising the figures and points not shown on a sketch. Teachers need to inculcate the skill of visualising and drawing the given information.

QUESTION 4: ANALYTICAL GEOMETRY

Common errors and misconceptions

(a) Many candidates used the distance formula to calculate the radius. This was not necessary since the centre and the point A have the same *x*-coordinate, and all that was required was to subtract the *y*-coordinates of these two points.

(b) In Q4.2.1 a number of candidates were unable to establish that BE and CD were both parallel to the *x*-axis and therefore these lines were perpendicular to CN, the radius of the circle. Consequently, they were unable to determine the coordinates of C.

(c) Candidates were unable to make the link between the coordinates of C and the distance of 6 units in order to calculate the coordinates of D in Q4.2.2.

(d) When answering Q4.2.3, many candidates had difficulty in identifying the height of ΔBCD. A number of candidates used BD as the base but were unable to calculate the height of the triangle.

(e) In answering Q4.3.1, some candidates could not recall the rule for reflecting a point about the line $y = x$. Many just swopped the signs without interchanging the *x*- and *y*-coordinates. Their coordinates of M were (1 ; –3), which was incorrect.

(f) Many candidates did not attempt Q4.3.2 because they could not place F on the diagram.

Suggestions for improvement

(a) Teachers should encourage learners to analyse the diagram before attempting any questions. They must first write down any given information on the diagram and then make deductions from the given information.

(b) Teachers need to revise the concept of perpendicular lines and gradients, particularly that the tangent is perpendicular to the radius at the point of contact. Teachers should also show learners why it is sufficient to subtract the *x*-coordinates to calculate the distance between two points in a horizontal plane and why it is sufficient to subtract the *y*-coordinates to calculate the distance between two points in a vertical plane.

(c) Teachers should revise the work done in earlier grades. The properties of all the special quadrilaterals, e.g. the parallelogram, rhombus and square, should be taught thoroughly in earlier grades so that whenever that knowledge is needed, learners will be able to use it.

(d) Learners should be reminded to refer to the information sheet for the relevant formula.

(e) Teachers should show learners how to visualise and make rough drawings of all extra information given in Analytical Geometry questions.

(f) Teachers should show learners different orientations of the base and the perpendicular height of a triangle. This should give learners more options when calculating the area of a triangle.

(g) Teachers should ensure that they expose learners to assessments that integrate Analytical Geometry and Euclidean Geometry. Learners must also be exposed to higher-order questions in class and in school-based assessment tasks.

QUESTION 5: TRIGONOMETRY

Common errors and misconceptions

(a) It was encouraging that many candidates had some knowledge to answer Q5.1. However, many candidates missed the minus sign in the reduction of $\tan(-x)$ and $\sin(360^\circ - x)$. When using the quotient identity to write $-\tan x$, some candidates used two negative signs, i.e. $-\tan x = \frac{-\sin x}{-\cos x}$ instead of $-\tan x = \frac{-\sin x}{\cos x}$. Some candidates omitted steps in their working, e.g. would simply state that $\frac{\sin 40^\circ}{\cos 50^\circ} = 1$ instead of writing $\frac{\sin 40^\circ}{\cos 50^\circ} = \frac{\sin 40^\circ}{\sin 40^\circ} = 1$. A small minority of candidates wrote $\frac{\sin}{\cos}$ instead of $\frac{\sin x}{\cos x}$, implying that they did not realise that a trigonometric ratio without an angle has no meaning.

(b) In Q5.2 a number of candidates did not realise that they could replace $\sin^2 x$ in the numerator $-2\sin^2 x + \cos x + 1$ with the trigonometric identity $\sin^2 x = 1 - \cos^2 x$. Some of those who attempted to use this identity made mistakes in substitution, primarily because they did not use brackets as shown: $-2\sin^2 x = -2(1 - \cos^2 x)$. This resulted in incorrect simplification. Many candidates made mistakes in the reduction of $\cos(540^\circ - x)$. They could not work correctly with an angle greater than 360°.

Many candidates could not factorise $2\cos^2 x + \cos x - 1$ correctly. Some did not recognise it as a trinomial and incorrectly took out $\cos x$ as a common factor.

(c) When answering Q5.3.1, many candidates opted to use $x^2 + y^2 = r^2$ instead of drawing the right-angled triangle. However, they made incorrect substitutions into this identity. Some candidates could not manipulate and simplify surds correctly. Some candidates gave the value of tan36° as $\frac{p}{\sqrt{1-p^2}}$ instead of $\frac{\sqrt{1-p^2}}{p}$.

(d) The biggest challenge to answering Q5.3.2 was that candidates were unable to reduce $\cos 108^\circ$ to $\sin 36^\circ$. Some candidates correctly established that $\cos 108^\circ = -\sin 18^\circ$ and then incorrectly stated that $\sin 18^\circ = \frac{1}{2}\sin 36°$. Some candidates wrote $\cos 108^\circ = \cos[3(36°)]$ and then didn't know how to proceed from there or 'invented' their own triple-angle formulae.

Suggestions for improvement

(a) Learners find it difficult to recall the Trigonometry taught in Grades 10 and 11. Revision of this work must be ongoing. It is better to revise small sections of work at a time than to give learners a comprehensive revision task.

(b) Teachers should ensure that all learners are very confident in applying the definitions of the three trigonometric ratios in triangles.

(c) Remind learners that the same simplification skills used in Algebra also apply to Trigonometry. Regular practice can remediate the poor algebraic and manipulation skills. Ensure that learners know how to correctly divide by a fraction, e.g. $\frac{A}{\tan x} = \frac{A}{\frac{\sin x}{\cos x}} = A \times \frac{\cos x}{\sin x}$.

(d) Remind learners of the value of drawing a diagram when answering questions. This diagram could be a right-angled triangle or a Cartesian plane. A diagram should eliminate unnecessary identification errors. It is helpful to calculate the third angle in the right-angled triangle.

(e) More emphasis should be placed on working with trigonometric ratios having angles greater than 360° and negative angles.

QUESTION 6: TRIGONOMETRY

Common errors and misconceptions

(a) In Q6.1.1 many candidates were unable to derive the formula for $\cos(\alpha + \beta)$. Instead they merely copied the correct expansion from the information sheet. They were not awarded any marks for their efforts.

(b) When answering Q6.1.2, many candidates did not pick up the clue from $2\cos 6x \cos 4x$ to write $\cos 10x$ as $\cos(6x + 4x)$. Many candidates wrote $\cos 10x$ as the double angle $\cos 2(5x)$, but this did not help in simplifying the given expression.

(c) In answering Q6.2, some candidates wrote $2\sin 2x = 2\sin x \cos x$, i.e. they omitted the coefficient of 2 at the front of the expression. Almost all the candidates who managed to correctly arrive at $\sin x = 4\sin x \cos^2 x$ made the mistake of dividing both sides of the equation by $\sin x$. Some candidates overlooked the restriction that $\cos x < 0$.

Suggestions for improvement

(a) The theory in Trigonometry cannot be overlooked. Teachers should ensure that this aspect is covered as stated in the *CAPS*.

(b) When teaching compound angles, teachers need to stress that the trigonometric function cannot be distributed over two angles, e.g. that $\cos 10x = \cos(6x + 4x) \neq \cos 6x + \cos 4x$.

(c) Teachers should explain to learners that dividing an equation by a trigonometric ratio results in the loss of possible solutions for equation. Moreover, a trigonometric ratio can be equal to zero for some values of the angle. By dividing an equation by a trigonometric ratio, the incorrect implication is that division by zero is permissible.

(d) The key to solving trigonometric equations lies in understanding in which quadrants a trigonometric function is positive or negative. Also, it must be stated that $k \in Z$ in the general solution as this qualifies the variable in the statement $+k.360^{\circ}$. It is advisable that learners be shown the graphical solution of trigonometric equations alongside the algebraic approach.

QUESTION 7: TRIGONOMETRY

Common errors and misconceptions

(a) In Q7.1 many candidates were unable to sketch the graph of $\cos(x - 60°)$ correctly. Their graphs had incorrect turning points and *x*-intercepts. It would appear that candidates were using a calculator to generate the points on the graph but that these were not the critical points required for the sketch.

(b) In Q7.2 some candidates multiplied 360° by 3 instead of dividing 360° by 3 when obtaining the period of $f(3x)$. In other instances, candidates incorrectly took the period of f to be 180° and, hence, incorrectly calculated the period of $f(3x)$ to be 60°.

(c) Despite Q7.3 being familiar, candidates performed poorly in this question. They paid no attention to the mark allocation and attempted to solve the equation algebraically instead of using the graphs.

(d) When answering Q7.4, many candidates gave the range of the original graph, *g*, instead of the transformed graph, *k*.

Suggestions for improvement

(a) When teaching the drawing of trigonometric graphs, it is strongly recommended that the approach should be to ensure that learners know the basic graphs, the 'mother graphs' very well. Thereafter, teachers should explain how to draw the required graph by applying knowledge of transformations.

(b) Although these concepts are discussed in Grade 10, it is necessary for learners to be constantly reminded of the meaning of concepts like period, domain, amplitude and range.

(c) When teaching trigonometric functions to emphasise the meaning and effect of each of the parameters *a, k, p* and *q* in the equation $y = a\sin(kx + p) + q$, for example.

(d) When discussing the transformed graphs, teachers should pay attention to how the characteristics of the original graph change and how the critical points of the original graph shift.

(e) Learners should be told that the period of a trigonometric function is the length of a function's cycle. Since this value is a length, it is a single number and not an interval of values.

QUESTION 8: TRIGONOMETRY

Common errors and misconceptions

(a) In Q8.1 some candidates incorrectly assumed that TQS was a right-angled triangle and used the definitions of trigonometric ratios instead of the sine rule to prove that $QS = 5\tan x$.

(b) Many candidates did not attempt Q8.2 because they had no idea where to start the answer. Those who correctly chose to use the cosine rule were unable to simplify their expressions to the final answer. Some candidates stated that $(5\tan x)^2 = 10\sin^2 x$ in their answer. This was incorrect.

(c) A number of candidates could not link QT with the calculation of the area of ΔTQR. Some candidates incorrectly attempted to calculate the area of ΔTQR by using the formula: area of triangle = $\frac{1}{2}\text{base} \times \text{height}$, where QR was the base and QT was the height. These candidates did not realise that QT was not perpendicular to QR.

Suggestions for improvement

(a) A careful analysis of the information provided will give learners some idea of the concepts required in solving a triangle.

(b) Teachers need to develop strategies to be used when solving right-angled triangles and triangles that are not right-angled. Teach learners the conditions that determine which rule should be used to solve the question.

(c) It might be a good idea to give learners an exercise in which they identify which rule is to be used to solve the question. The learners must also give a reason why they think that the rule that they have selected applies to the question.

(d) Learners should be encouraged to highlight the different triangles using different colours.

(e) Initially, expose learners to numeric questions on solving 3D problems. This makes it easier for them to develop strategies on how to solve such questions. Once learners have gained confidence with numeric type questions, they should then be exposed to non-numeric and higher-order questions.

QUESTION 9: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) Many candidates were unable to state the correct reason in Q9.1. Some stated that the chords from the same point were equal, whilst others just wrote down tangents. Neither of these were accepted as correct.

(b) While candidates were able to write down the correct values of the answer in Q9.2.1, they were unable to state the correct reason. The reason 'isosceles triangle' was not accepted as correct. The expected reason was 'angles opposite equal sides' as stated in the *Examination Guidelines*.

(c) In Q9.2.2 many candidates were unable to make correct relationships between the angles. Some candidates regarded $\hat{S}_2$ as an exterior angle of the cyclic quadrilateral instead of $\hat{S}_2 + \hat{S}_3$ being the exterior angle. Some candidates incorrectly stated that $\hat{Q} = \hat{S}_1$, i.e. that the opposite angles of the cyclic quadrilateral are equal. Some candidates refer to $R\hat{S}W$ as $\hat{S}_{2+3}$ instead of $\hat{S}_2 + \hat{S}_3$. The notation $\hat{S}_{2+3}$ is not accepted. Some candidates just gave the final answer as $\hat{S}_3 = 42^\circ$, without showing any steps or giving any reasons.

Suggestions for improvement

(a) The key to answering Euclidean Geometry successfully is to be fully conversant with the terminology in this section. To this end, teachers should explain the meaning of *chord*, *tangent*, *cyclic quadrilateral*, etc. so that learners will be able to use them correctly.

(b) Teachers must cover the basic work thoroughly. An explanation of the theorem should be accompanied by showing the relationship in a diagram.

(c) Teachers are encouraged to use the Acceptable Reasons in the *Examination Guidelines* when teaching. This should start from as early as Grade 8.

(d) Learners should be encouraged to scrutinise the given information and the diagram for clues about which theorems could be used in answering the question.

QUESTION 10: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) In Q10.1 many candidates did not provide a correct or complete reason for their statements. They failed to mention that CM was the line from the centre. Some mistook AE for a tangent. Some candidates gave the incorrect reason: line from centre bisects the chord.

(b) In Q10.2 some candidates confused the relationship between $\hat{M}_1$ and $\hat{A}_1$. They stated that $\hat{M}_1 = \hat{A}_1$, i.e. that the angles in the same segment were equal. The correct relationship was that $\hat{M}_1 = 2\hat{A}_1$ because the angle at the centre is twice the angle at

the circle. Some candidates stated that $\hat{C} = \hat{E}$ and supported this with the reason that these were angles in the same segment. This was incorrect as these angles were not subtended by the same chord.

(c) Many candidates provided the incorrect reason when answering Q10.3. They stated tan-chord theorem instead of converse: tan-chord theorem. Another concern was that candidates would make claims, e.g. AC is a diameter or $\hat{A}_2 = \hat{C} = x$, without providing a reason or calculation to justify their claim. It was not acceptable to state that $\hat{A} = 90°$ as there were two right angles at the vertex A.

(d) Only a few candidates were able to identify that the Midpoint Theorem has to be used in this question. Many candidates attempted to use proportionality and/or similar triangles but were unsuccessful in obtaining the correct answer.

Suggestions for improvement

(a) Teachers should develop the skill in learners to analyse the question and the diagram for clues on which theorems are required to answer the questions correctly.

(b) Learners should be forced to use acceptable reasons in Euclidean Geometry. Teachers should explain the difference between a theorem and its converse. They should also explain the conditions for which theorems are applicable and when the converse will apply.

(c) Learners should be discouraged from writing correct statements that are not related to the solution. No marks are awarded for statements that do not lead to solving the problem.

(d) Learners need to be told that success in answering Euclidean Geometry comes from regular practice, starting off with the easy and progressing to the difficult.

QUESTION 11: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) Some candidates did not show or state the construction in proving the theorem in Q11.1. No marks were awarded in this case. Other candidates made constructions that were not related to the proof. Some candidates stated that $\hat{F}_1 + \hat{F}_2 = 90°$ but failed to label the angles as such in the diagram. Again, no marks were awarded for this statement.

(b) In Q11.2.1(a) some candidates named the angles incorrectly, e.g. stating that $\hat{M} = \hat{S}$ instead of $\hat{M}_2 + \hat{M}_3 = \hat{S}_1$. Some candidates omitted the parallel lines when they used the reason that corresponding angles were equal.

(c) Q11.2.1(b) was not answered by many candidates as they were unable to identify the correct relationship between the angles for KLMN to be a cyclic quadrilateral. Of those who were able to identify the correct relationship, some gave the incorrect reason. They stated that the exterior angle of a cyclic quadrilateral is equal to the interior opposite angle instead of the exterior angle of a quadrilateral is equal to the interior opposite angle. There was confusion between the theorem and its converse.

(d) In Q11.2.2 some candidates assumed that there will always be one common angle between the two triangles, and therefore incorrectly assumed that the angles formed at the common vertex K were equal. Many candidates knew which angles they were supposed to prove equal, but couldn't give the reasons why the angles were equal.

(e) When answering Q11.2.3, some candidates wrote the correct statement, namely that $\frac{LK}{KS} = \frac{KN}{SM}$, but gave as reason the proportionality theorem instead of similar triangles. Some candidates incorrectly identified the corresponding sides of the similar triangles. Many candidates rewrote 3KN = 4SM as $\frac{KN}{SM} = \frac{3}{4}$, instead of $\frac{KN}{SM} = \frac{4}{3}$.

(f) Many candidates failed to answer Q11.2.4. Some candidates provided as the reason the proportionality theorem but failed to mention the parallel lines in the reason. Some candidates applied the proportionality theorem to ΔPSK instead of ΔLMN.

Suggestions for improvement

(a) Learners should be taught that a construction is required in order to prove a theorem. If the construction is not shown, then the proof is regarded as a breakdown and they get no marks. Teachers should reinforce theory in short tests and assignments.

(b) More time needs to be spent on the teaching of Euclidean Geometry in all grades. More practice on Grade 11 and 12 Euclidean Geometry will help learners to learn theorems and diagram analysis. They should carefully read the given information without making any assumptions. This work covered in class must include different activities and all levels of the taxonomy.

(c) Teachers should require learners to make use of the diagrams in the Answer Book to indicate angles and sides that are equal and record information that has been calculated.

(d) Learners need to be made aware that writing correct but irrelevant statements will not earn them any marks in an examination.

(e) Learners should be taught that all statements must be accompanied by reasons. It is essential that the parallel lines be mentioned when stating that corresponding angles are equal, alternate angles are equal, the sum of the co-interior angles is 180° or when stating the proportional intercept theorem.

(f) Learners need to be exposed to questions in Euclidean Geometry that include the theorems and the converses. When proving that a quadrilateral is cyclic, no circle terminology may be used when referring to the quadrilateral.

CHAPTER 11

PHYSICAL SCIENCES

The following report should be read in conjunction with the Physical Sciences Paper 1 and Paper 2 question papers of the NSC November 2021 examinations.

11.1 PERFORMANCE TRENDS (2017–2021)

The number of candidates who sat for the Physical Sciences examination in 2021 increased by 22 658 compared to that of 2020, i.e. 13% of the cohort.

The trend in pass rate reflected over the past five years reflected steady improvement in the period 2017–2019 followed by a decline in 2020. However, there was a pleasing improvement in the pass rate this year.

Candidates who passed at 30% (Level 2) improved from 65,8% in 2020 to 69,0% in 2021. There was a corresponding improvement at 40% (Level 3) from 42,4% to 44,8%. Given the increase in the size of the cohort, the number of passes increased considerably by 21 157 at 30% (Level 2) and by 14 182 at 40% (Level 3).

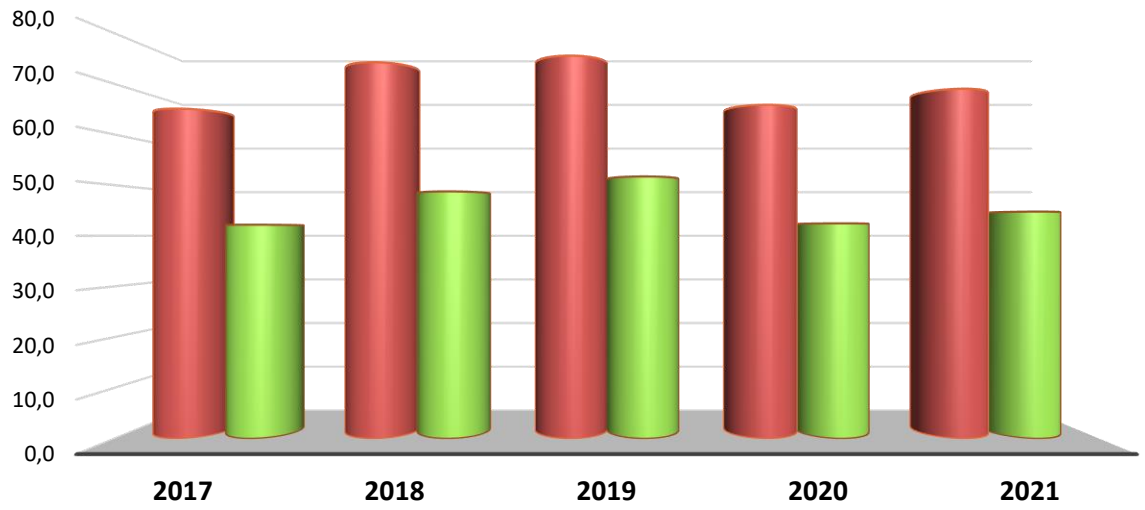
The percentage of distinctions (over 80%; Level 7) declined marginally from 3,6% to 3,3%. This converts into an increase in the total number of distinctions from 6 275 in 2020 to 6 500 in 2021.

The results reflected above were despite the challenging circumstances brought about by the Covid-19 pandemic over the past two years which affected teaching and learning activities of the 2021 cohort. This appears to have been the result of creative intervention strategies by teachers and subject advisors as well as schools and provincial education departments. The resourcefulness and diligence of the above-average candidates also contributed to the overall performance in the subject.

Table 11.1.1 Overall achievement rates in Physical Sciences

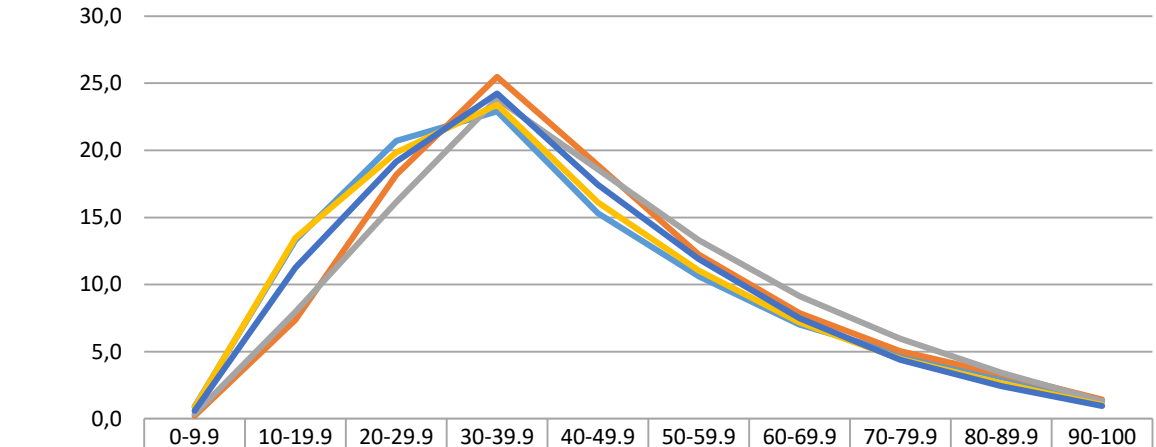
Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2017	179 561	116 862	65,1	75 736	42,2
2018	172 319	127 919	74,2	84 002	48,7
2019	164 478	124 237	75,5	85 034	51,7
2020	174 310	114 758	65,8	73 982	42,4
2021	196 968	135 915	69,0	88 164	44,8

Graph 11.1.1 Overall achievement rates in Physical Sciences (percentage)



	2017	2018	2019	2020	2021
% achieved at 30% and above	65,1	74,2	75,5	65,8	69,0
% achieved at 40% and above	42,2	48,7	51,7	42,4	44,8

Graph 11.1.2 Performance distribution curves in Physical Sciences (percentage)



	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100
2017	0,9	13,3	20,7	22,9	15,3	10,6	7,0	4,8	3,1	1,3
2018	0,2	7,4	18,2	25,5	18,9	12,2	7,9	5,0	3,3	1,4
2019	0,3	8,0	16,1	23,8	18,6	13,3	9,1	6,0	3,4	1,3
2020	0,8	13,5	19,8	23,4	16,1	11,0	7,2	4,5	2,6	1,0
2021	0,6	11,2	19,2	24,2	17,4	11,9	7,5	4,4	2,4	0,9

General comments on Paper 1 and Paper 2

The question in Paper 1 on the Doppler effect and the multiple-choice questions were generally well answered. Performance pertaining to organic nomenclature and physical properties of organic compounds in Paper 2 was good. The questions on electrolytic cells in Paper 2 were very poorly answered.

Questions pertaining to pure recall of content were very poorly answered because key words and phrases were omitted from definitions. Short informal assessment tasks relating to these

issues will greatly assist in improving these shortcomings. This can be used to good effect in content relating to definitions and laws listed in the *CAPS* and the *Examination Guidelines*.

Interpretation of graphs is still a challenge for many learners. Problem-solving exercises that involve graphs should be done in a variety of topics. Identification of the variables in relation to the equation describing the graph should be stressed. Practical work needs more attention in schools to ensure learners are able to apply practical skills, e.g. identification of variables, drawing of conclusions, interpretation of results and drawing and interpretation of graphs.

The application of mathematical principles is still a challenge for many learners. Learners should be given a variety of problem-solving activities that involve mathematical knowledge pertaining to simultaneous equations, quadratic equations, binomials, factorisation, trigonometry and graphs in classwork, homework, tests and examinations.

11.2 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 1

General comments

(a) Question 1 (multiple-choice questions – ALL topics) and the question on the Doppler effect were generally well answered.

(b) In many questions, candidates made the same errors and displayed the same poor conceptual understanding as in previous years. Provinces should mediate the effective implementation of the recommendations in this diagnostic report.

(c) Questions pertaining to pure recall of content were very poorly answered because key words and phrases were omitted from definitions. Short informal assessment tasks relating to these issues will greatly assist in improving these shortcomings. This can be used to good effect in content relating to definitions and laws listed in the *CAPS* and the *Examination Guidelines*.

(d) Interpretation of graphs is a challenge for many learners. Problem-solving exercises that involve graphs should be done in a variety of topics. Identification of the variables in relation to the equation describing the graph should be stressed. The scale of graphs, gradient, ordered-pairs and *x*- and *y*-intercepts need to be emphasised within problem-solving in science contexts.

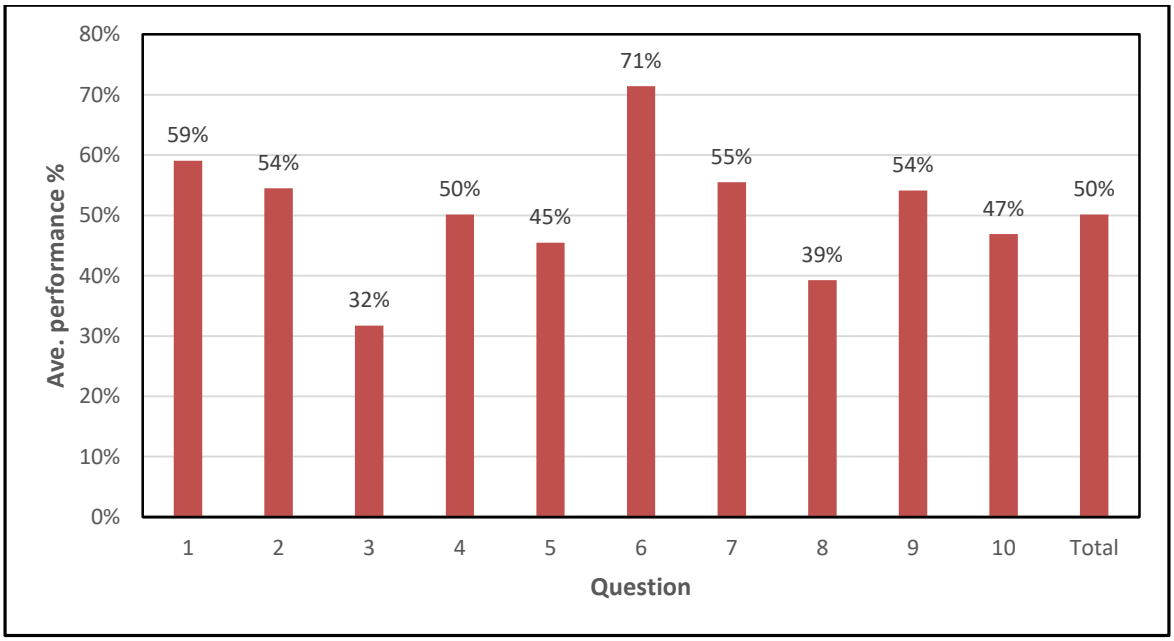
(e) It is critical that learners understand the concept of a variable that is kept constant in a particular equation and to use this information to find relationships between variables in that equation.

11.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

There was an improvement in performance in five questions, viz. multiple-choice questions (Q1), Doppler effect (Q6), electrostatics (Q7), electrodynamics (Q9) and photoelectric effect (Q10) as compared to 2020. There was a decline in performance in each of the other five questions.

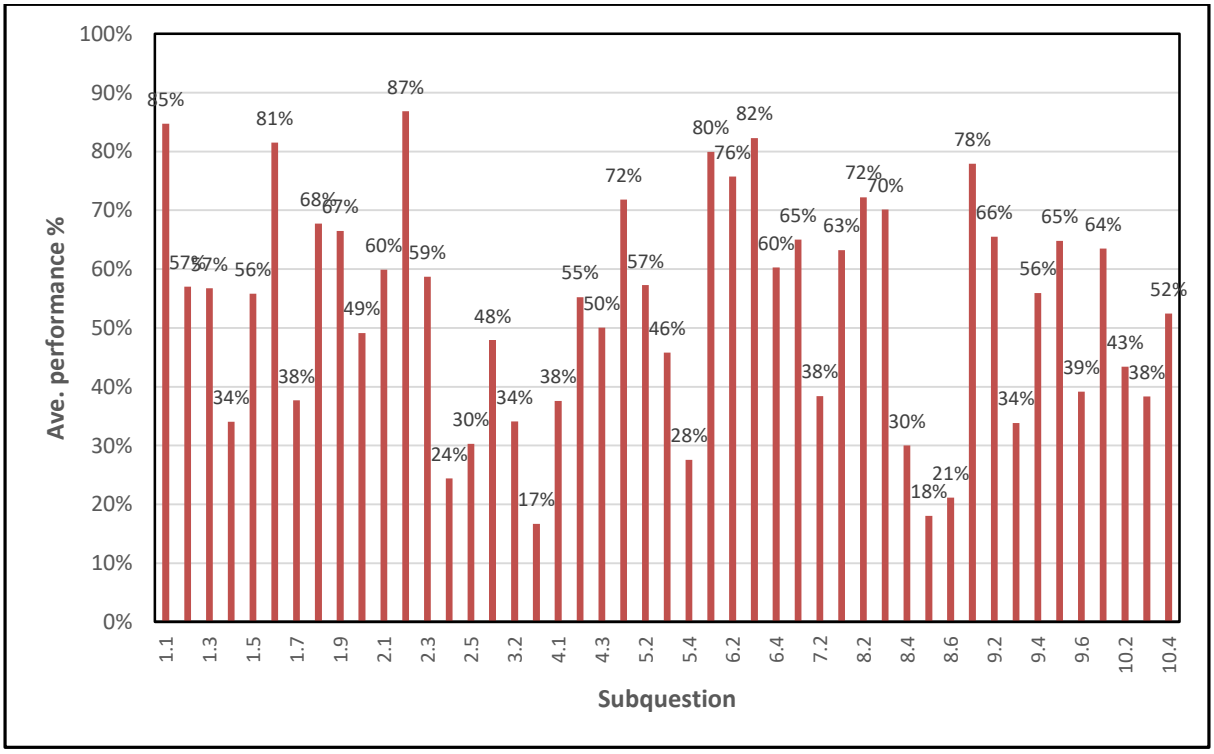
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 11.3.1 Average performance per question in Paper 1



Q	Topics	Q	Topics
1	Multiple-choice Questions	6	Doppler Effect
2	Newton's Laws of Motion	7	Electrostatics (Coulomb's Law & Electric Fields)
3	Vertical Projectile Motion	8	Electric Circuits
4	Momentum and Impulse	9	Electrodynamics: Motors, Generators & Alternating Current
5	Work, Energy and Power	10	Photoelectric Effect

Graph 11.3.2 Average performance per subquestion in Paper 1



SubQ	Topic	SubQ	Topic
1.1	Normal force – definition	5.4	Calculating change in kinetic energy
1.2	Free fall	6.1	Wavelength of detected sound
1.3	Rate of change of momentum	6.2	Stating Doppler effect
1.4	Conservation of mechanical energy	6.3	Distance and frequency: wave fronts
1.5	Doppler shift	6.4	Calculating speed of ambulance
1.6	Electric field	7.1	Electrons & electric fields
1.7	Coulomb's law	7.2	Calculating the magnitude of charge
1.8	Electric circuits	8.1	Reading on V_1.and V_2
1.9	Electrodynamics	8.2	Defining term power
1.10	Emission and absorption spectra	8.3	Calculating resistance of resistor X
2.1	Definition: Newton's First Law of Motion	8.4	External resistance of circuit
2.2	Drawing a free-body diagram	8.5	Calculating reading on V_2
2.3	Calculating force: Newton's 2nd Law	8.6	Explaining how V_1 affected
2.4	Net force; when applied force removed	9.1	Component: AC and DC generator
2.5	Calculating distance between X and Y	9.2	Direction of current in coil
3.1	Identifying if balloon is in free fall	9.3	Defining rms potential difference
3.2	Calculating speed of hot-air balloon	9.4	Calculating rms current
3.3	Sketching position-time graph	9.5	Calculating power in 25 Ω resistor
4.1	Explaining term elastic collision	9.6	Sketching V vs Δt graph
4.2	Calculating velocity of Y	10.1	Defining threshold frequency
4.3	Calculating magnitude net force X exerts on Y	10.2	Comparing $E_{k(max)}$ for M and N
5.1	Defining mechanical energy	10.3	Calculating f_x
5.2	Calculating speed of box	10.4	Y-intercept, No. of photo electrons, $E_{k(max)}$
5.3	Calculating frictional force		

11.4 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Common errors and misconceptions

(a) In Q1.3 many candidates did not realise that the net force is given by the gradient of the graph at different time intervals.

(b) In Q1.4 many candidates did not recall that the total mechanical energy is conserved in elastic collisions.

(c) In Q1.7 candidates did not realise that when Coulomb's law is applied, the charges exert forces of equal magnitude on each other.

(d) Candidates lacked an understanding of the basic concept of the *emission* and *absorption spectra* in Q1.10.

Suggestions for improvement

(a) Multiple-choice questions test learners' understanding of concepts, principles, laws and the relationship between the dependent, independent and constant variables. This must be demonstrated through logical reasoning and not by engaging in lengthy calculations. During teaching and learning, carefully selected concrete examples must be worked out to demonstrate these concepts, laws and principles, followed by generalisations and the making of predictions.

(b) Learners must also be encouraged to refer to the formula sheet because it gives the summaries of laws and principles as well as the relationship between the variables.

(c) Teachers must include the use of ICT in the teaching of the subject. Multimedia/Software such as *PhET* and *Edukite* as well as YouTube videos should be used to demonstrate the answers for multiple-choice questions through simulations (virtual experiments).

(d) It is recommended that a booklet containing multiple-choice questions from different topics, from different sources, such as previous NSC and provincial papers and text books, be prepared. The booklet should also have a step-by-step explanation of how to answer multiple-choice questions.

QUESTION 2: NEWTON'S LAWS OF MOTION

Common errors and misconceptions

(a) In Q2.1 candidates omitted key words in their definition such as:
- Straight line when referring to constant speed
- Net when referring to force
- State of rest
- Motion at constant velocity

(b) Many candidates labelled their free-body diagram incorrectly; they also omitted arrows and labels in the free-body diagrams and drew forces that were not in contact with the body.

(c) Some candidates failed to realise that $F_{net} = 0$ at constant velocity, due to the fact that acceleration equals zero.

(d) Many candidates did not realise that when the force F was removed, Newton's Second Law becomes applicable and the acceleration on the incline had to be calculated.

Suggestions for improvement

(a) Teachers should adhere to and emphasise the definitions in the *Examination Guidelines* and *CAPS*. Key words must be emphasised in these definitions.

(b) The importance of drawing free-body diagrams for each object correctly and their usefulness in problem-solving must be emphasised. A method of solving simultaneous equations can be used to solve for the unknown in the equation and this method should be taught thoroughly in class. Encourage learners to use different problem-solving strategies to solve the same problem to ensure that they gain a greater understanding of the problem and their solutions.

(c) Teachers should emphasise that the net force acting on an object is the sum of all the forces acting on the object parallel to the direction of motion of the object.

(d) Learners must be systematically exposed to different questions in which trigonometric relations must be applied.

QUESTION 3: VERTICAL PROJECTILE MOTION

Common errors and misconceptions

(a) Once again, many candidates failed to realise that the balloon was moving upwards at a constant velocity and therefore $F_{net} = 0$ and not $F_{net} = mg$.

(b) Candidates did not realise that the initial velocity of both stone A and stone B is the same as that of the balloon and also applied incorrect sign conventions to the vector quantities.

(c) Many candidates failed to interpret the motion of stone A and the balloon and therefore could not sketch the graphs correctly. Common errors noted were:
- The graphs did not start at the same point.
- The graphs were not labelled.
- The gradient of the graph of the balloon is higher than that of the stone until it reaches maximum height.

Suggestions for improvement

(a) Learners must be advised to start every calculation in mechanics, including vertical projectile motion, by indicating the sign convention at the beginning of the problem. Emphasise that the direction of gravitational acceleration does not change in a question but remains constant. Learners should be advised to keep to ONE sign convention when solving a problem and not to change their chosen sign convention within a problem as this could lead to confusion.

(b) Teach learners skills of interpreting and sketching graphs especially for projectiles, e.g. to have reference points and collect all relevant data before calculating any quantity.

(c) Learners should be exposed to several questions involving different scenarios of projectile motion, including two or three objects as was asked in this question.

QUESTION 4: MOMENTUM AND IMPULSE

Common errors and misconceptions

(a) In Q4.1 many candidates could not explain the concept of an *elastic collision*.

(b) Some candidates could not differentiate between the initial and final velocities in their substitution into the equation $F_{net}\Delta t = m\Delta v$.

Suggestions for improvement

(a) Teachers should integrate topics (as and when necessary) in addition to teaching each topic in isolation. Moreover, they should expose learners to problems that integrate the application of different concepts.

(b) The vector nature of momentum and impulse should be emphasised during teaching.

QUESTION 5: WORK, ENERGY AND POWER

Common errors and misconceptions

(a) The common error in stating the principle in Q5.1 was the omission of keys words 'total' and 'isolated'.

(b) Many candidates made use of the equations of motion in Q5.2 even though it was stipulated that the principle of conservation of mechanical energy should be used. Equations of motion cannot be used in this question as the motion from P to Q is not in a straight line.

Suggestions for improvement

(a) Use the statement $(E_p + E_k)_P = (E_p + E_k)_Q$ to demonstrate the principle of conservation of mechanical energy. If $W_{nc} = \Delta E_p + \Delta E_k$ make sure that learners realise that $W_{nc} = 0$ because of the absence of non-conservative forces.

(b) Work done by a force is always equal to the change in energy:
e.g. $W_{net} = \Delta E_k$, $W_{nc} = \Delta E_p + \Delta E_k$, $W_w = -\Delta E_p$

(c) When using $W_{nc} = \Delta E_p + \Delta E_k$ or $W_{net} = \Delta E_k$, the identification of forces acting on the object is very important and therefore the use of free-body diagrams is advised.

(d) Use *PhET* simulations for the identification of forces acting on objects.

QUESTION 6: DOPPLER EFFECT

Common errors and misconceptions

(a) Candidates used the equation for the speed of light ($c = f\lambda$) instead of the equation for the speed of sound in air ($v = f\lambda$) to calculate the wavelength of the detected sound.

(b) Several candidates omitted key words, i.e. 'change' and 'relative motion' in the definition of the Doppler effect.

(c) Candidates did not realise that they had to subtract the 0,05 m from the wavelength of the emitted sound (0,5 m) in order to calculate the frequency of the detected sound. Instead, they used the 0,05 m as the wavelength of the detected sound.

Suggestions for improvement

(a) Teachers need to source and expose learners to a variety of questions relating to the Doppler effect equation as the scope is very broad, given the number of variables in the equation.

(b) Revise the use of the wave equation: $v = f\lambda$,

(c) Teachers must emphasise the progression of knowledge since the work done in Grade 12 cannot be seen in isolation from work done in Grade 10 and Grade 11.

(d) Expose learners to *PHET* simulations, YouTube videos and the *Ten Fold* app to demonstrate the Doppler effect.

QUESTION 7: ELECTROSTATICS (COULOMB'S LAW AND ELECTRIC FIELDS)

Common errors and misconceptions

(a) Candidates described an electric field instead of defining the 'electric field at a point'.

(b) Candidates were not able to establish the superposition of electrostatic forces when there is a net electrostatic force.

(c) Candidates swopped/mixed the formulae for E and F as follows: $F = k\frac{Q}{r^2}$ and $E = k\frac{Q_1Q_2}{r^2}$.

(d) Candidates did not use the absolute value of the charges when substituting in the formula of Coulomb's Law or the electric field at a point.

Suggestions for improvement

(a) Teachers need to emphasise to learners that calculations of net electrostatic force and electric field are similar in terms of their vector considerations.

(b) Teachers need to clarify the distinction between the two equations, i.e. $E=\frac{F}{q}$ and $E=\frac{kQ}{r^2}$ and explain to learners what charge the 'q' in $E=\frac{F}{q}$ represents and what charge the 'Q' in $E=\frac{kQ}{r^2}$ represents.

(c) Teachers should emphasise the difference between electrostatic force and electric field as well as the equations thereof.

(d) Teachers should emphasise the application of the principle of superposition of electric fields and electrostatic forces.

QUESTION 8: ELECTRIC CIRCUITS

Common errors and misconceptions

(a) Many candidates had difficulty interpreting the circuit. They failed to identify which resistors were in series and which were in parallel and therefore could not apply the relevant principles of resistors in series and parallel.

(b) Many candidates failed to identify the series-parallel network in the circuit and calculated R_{ext} as: $R_{ext} = (\frac{1}{6}+\frac{1}{6})^{-1} + 2{,}4 + 4 = 9{,}4\ \Omega$

Suggestions for improvement

(a) Although the principles of series and parallel circuits are taught from Grade 9, the basic principles should be revisited and practised constantly. The critical features of series and parallel circuits with and without internal resistance must be emphasised.

(b) The effect of any short circuit or bridging of resistors in a circuit is:
A decrease in total resistance in the circuit, an increase in total current in the circuit and therefore an increase in $V_{internal}$.

(c) Use *PhET* simulations to demonstrate the relationship between V_{ext} and V_{int} and the effect of adding resistors or removing resistors in series and parallel can also be demonstrated.

QUESTION 9: ELECTRODYNAMICS

Common errors and misconceptions

(a) Many candidates had difficulty in defining the term 'rms potential difference'.

(b) Many candidates still omit the subscripts 'rms' and 'ave' in the equations $P_{ave} = V_{rms}I_{rms}$, $P_{ave} = I^2_{rms}R$ and $P_{ave} = \frac{V^2_{rms}}{R}$.

(c) Many candidates failed to recognise that doubling the speed of rotation of the coil would double the frequency (2f) and hence halve the period of the wave (½T) and double the output voltage.

Suggestions for improvement

(a) The Grade 11 work on electromagnetic induction must be revised in Grade 12 when motors and generators are discussed.

(b) Emphasis should be placed on the use of subscripts in the formulae when rms calculations are done.

(c) The differences and similarities between V_{rms} and V_{max}, I_{rms} and I_{max}, P_{ave} and P_{max} must be explained clearly and sufficient application type questions must be given to learners.

(d) Khan Academy, *PhET* and *Edukite* are also very useful resources for teachers especially for topics that have many practical aspects.

QUESTION 10: PHOTOELECTRIC EFFECT

Common errors and misconceptions

(a) Many candidates could not relate the straight-line graph to the equation: $hf = W_0 + E_{k(max)}$ and could not interpret f_x as the frequency of the incident light.

(b) Many candidates failed to realise that the intensity of light has no influence on the maximum kinetic energy of the emitted photoelectrons.

(c) Many candidates omitted the subscript 'max' in the equation: $E = W_0 + E_{k(max)}$.

Suggestions for improvement

(a) Teachers should use computer simulations (e.g. *PhET*) when teaching the photoelectric effect. This will assist in improving learners' understanding of the concept.

(b) Teachers must emphasise and ensure that learners understand what causes a change in the number of photoelectrons per unit time and the maximum kinetic energy of the emitted photoelectrons.

(c) Questions on new situations where an interpretation of graphs is required should be compiled and provided to the learners on the photoelectric effect. Also use graphs to highlight concepts such as work function and threshold frequency.

(d) The formula $hf = hf_0 + E_{k(max)}$ should be related to the equation of a straight line, $y = mx + c$. Dividing the whole equation by h yields $f = f_0 + \frac{E_{k(max)}}{h}$ where $\frac{1}{h}$ is the gradient of the straight line and f_0 is the threshold frequency (y-intercept of the straight line).

11.5 OVERVIEW OF CANDIDATES' PERFORMANCE IN PAPER 2

General comments

(a) As in previous years' performance pertaining to organic nomenclature and physical properties of organic compounds, (Q2, Q3) was good.

(b) The performance in the question pertaining to acids and bases (Q7) improved from previous years' performances.

(c) The questions on organic reactions (Q4), reaction rate (Q5) and electrolytic cells (Q9) were very poorly answered.

(d) Many candidates struggled to use their calculators correctly and failed to get the correct answer when calculating the acid concentration from the pH (Q7) and when performing calculations where small numbers are written in scientific notation (Q6).

(e) From the performance in Q5 it is evident that practical skills did not receive much attention in 2021. Candidates had trouble in interpreting the given graph.

(f) Lack of knowledge and skills to answer questions involving stoichiometry contributed to poor performance in Q5, Q6, Q7 and Q9.

(g) The writing of definitions correctly is a challenge to many candidates. Key words were often omitted or words in definitions were replaced with their own wording or explanations, resulting in partially correct definitions.

(h) Most candidates did not know how to use the Table of Standard Reduction Potentials correctly, which caused the poor performance in some of the subquestions in Q8.

(i) Rounding off answers to two decimal places in each step of a multistep calculation led to some candidates obtaining final answers that were different from the accepted ranges in those questions. Rounding off to two decimal places should only be done in the final answer to a subquestion.

(j) There is still a high percentage of candidates who performed poorly due to common consistent mistakes that can be avoided if they prepare well for the examination. These mistakes have no bearing on the difficulty level or the content tested. Many candidates

lost valuable marks due to these avoidable errors. This must be resolved through proper teaching and learning. Examples of mistakes are:

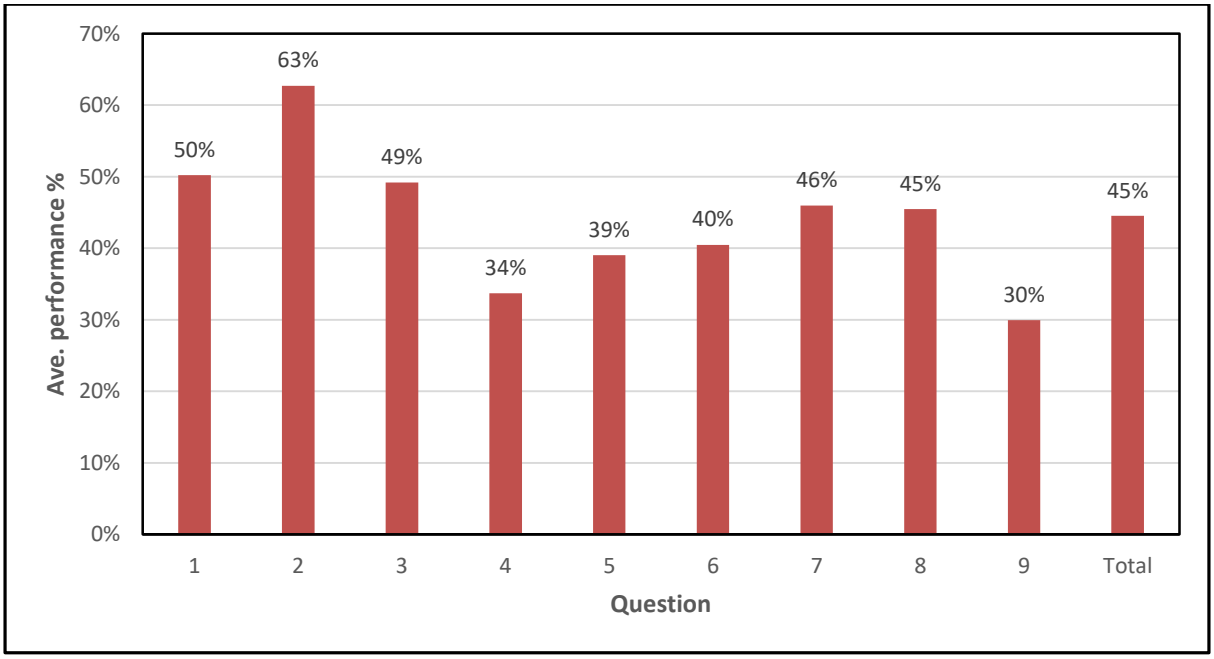
- Incorrect numbering of questions
- In calculations, using values incorrectly copied from the question paper
- Incorrect copying of formulae from the data sheet
- Substituting values different from those supplied on the periodic table or constant tables
- No units provided in final answers
- Omitting the minus sign in unit for concentration (mol·dm3 instead of mol·dm-3) or including a minus sign when writing unit of volume (cm-3 instead of cm3)
- Omitting H atoms and/or bond lines when drawing structural formulae of organic compounds.

11.6 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 2

Performance improved in only three questions, namely multiple-choice questions (Q1) nomenclature of organic compounds (Q2) and acids and bases (Q7), as compared to 2020. Whilst there was a significant improvement in the performance of Q7 (acids and bases), the performance in Q4 (organic reactions) showed a decline of more than 10%. Performance in electrolytic cells (Q9) is similar as in 2020.

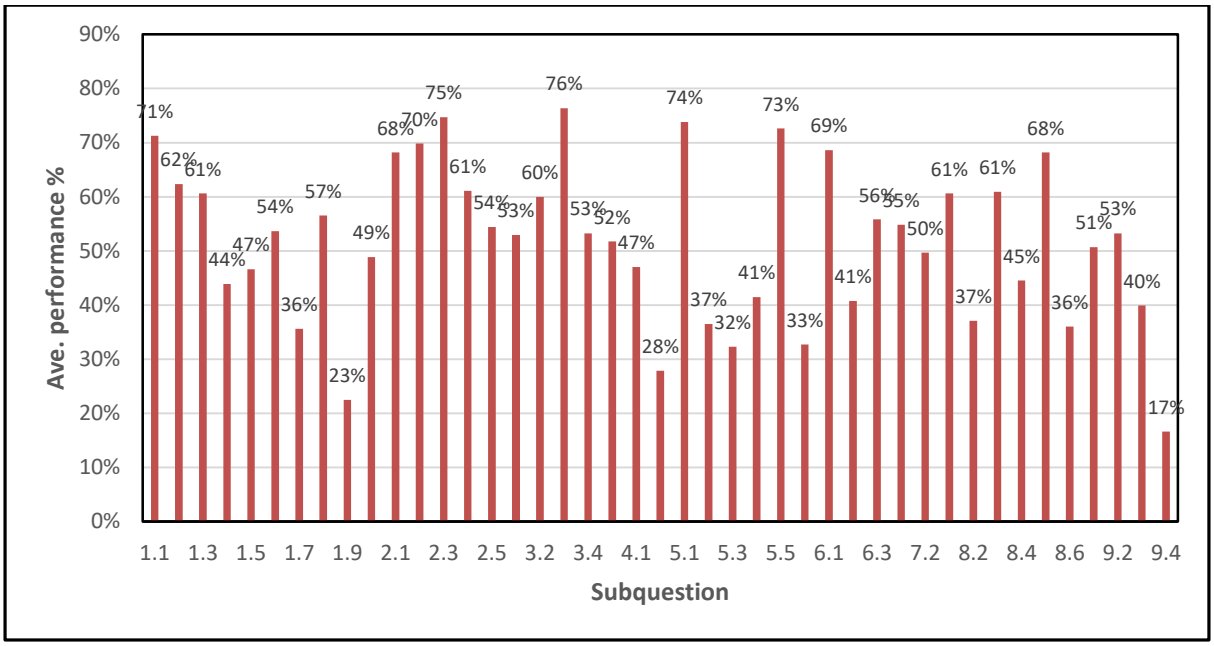
The following graph is based on data from a random sample of candidates. While this graph might not reflect national averages accurately, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 11.6.1 Average performance per question in Paper 2



Q	Topic	Q	Topic
1	Multiple-choice Questions	6	Chemical Equilibrium
2	Organic Nomenclature and Structures	7	Acids and Bases
3	Physical Properties of Organic Molecules	8	Galvanic Cells
4	Organic Reactions	9	Electrolytic Cells
5	Rates of Reaction		

Graph 11.6.2 Average performance per subquestion in Paper 2



SubQ.	Topic	SubQ	Topic
1.1	Defining condensed structural formula	5.1	Definition of reaction rate
1.2	Hydrogen bonding	5.2	Interpreting gradient of the graph
1.3	IUPAC name of a ketone	5.3	Explanation in terms of graph
1.4	Limiting reactants; effect on yield	5.4	Stoichiometric calculation, percentage purity
1.5	Boltzmann distribution curve	5.5	Effect of impurities on reaction rate
1.6	K_c expression	5.6	Effect of impurities on rate, collision theory
1.7	pH, rate, neutralisation	6.1	Definition of chemical equilibrium
1.8	Conjugate acid-base pairs	6.2	Le Chatelier's principle and K_c calculation
1.9	Migration of ions in the galvanic cell	6.3	Effect of reactant on yield of reaction
1.10	Refining of copper	7.1	Lowry-Brønsted theory, conductivity, K_a values
2.1	Definition of unsaturated compounds	7.2	Concentration from pH; Stoichiometric calculation
2.2	Ketones, chain isomer, IUPAC name	8.1	Energy conversion in a galvanic cell
2.3	Definition of functional isomers	8.2	Standard concentration of electrolyte
2.4	Ethanoic acid; functional isomer of ethanoic acid	8.3	Definition of a reducing agent
2.5	Dehydration of an alcohol	8.4	Reducing agent and cell reaction
3.1	Definition of melting point	8.5	Calculation of initial emf
3.2	Drawing a conclusion	8.6	Effect of change in concentration of emf
3.3	Type of intermolecular force	9.1	Definition of an electrolyte
3.4	Data to determine phases of compounds	9.2	Identify the cathode
3.5	Molecular mass and boiling point of two isomers	9.3	Half-reaction taking place at object to be plated
4.1	Products formed, NaOH, reaction of alkene & HBr	9.4	Total charge transferred
4.2	Synthesis of 1,2-dibromopropane		

11.7 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Common errors and misconceptions

(a) Q1.1 was the subquestion answered best. Most candidates were familiar with the term *condensed structural formula*.

(b) In Q1.2 many candidates failed to identify the alcohol from its molecular formula as the compound with hydrogen bonds between molecules. The most common incorrect answer was *C*. Such candidates most probably thought that $CH_3COOCH_2CH_3$ is a carboxylic acid.

(c) The most common incorrect answer in Q1.3 was *B*. These candidates, after identifying the position of the functional group, failed to number such that the substituent obtains the lowest number.

(d) Most candidates did not know that the yield (amount) of product formed (Q1.4) is determined by the limiting reagent which is magnesium and not the acid which is in excess. Many chose *D* as the answer, thinking that a higher acid concentration will increase yield. The difference between yield (how much) and rate (how fast) was not well understood.

(e) Those who got Q1.5 wrong, mainly chose *B* (increase in temperature) as the answer. Many candidates failed to link *more particles* shown on the *y*-axis to a *higher concentration*.

(f) In Q1.6 some candidates chose options that include pure liquids or solids in the K_c expression.

(g) Most candidates failed to relate the strength of acids to ion concentration and the effect on reaction rate in Q1.7. Of the two acids in question, the stronger acid has more particles per unit volume and will therefore react at the faster rate.

(h) In Q1.8 some candidates did not know that the conjugate base can be obtained by removing H^+ from the given ion. The most common incorrect answer was *C* which represents the conjugate acid, obtained by adding H^+ from the given ion instead.

(i) Q1.9 was the poorest answered multiple-choice question. Most candidates showed a poor understanding of the migration of ions between the half-cells and the salt bridge in a galvanic cell.

(j) Most candidates (Q1.10) failed to link the impure copper to oxidation and chose *C* as answer. The process of refining of copper is poorly understood.

Suggestions for improvement

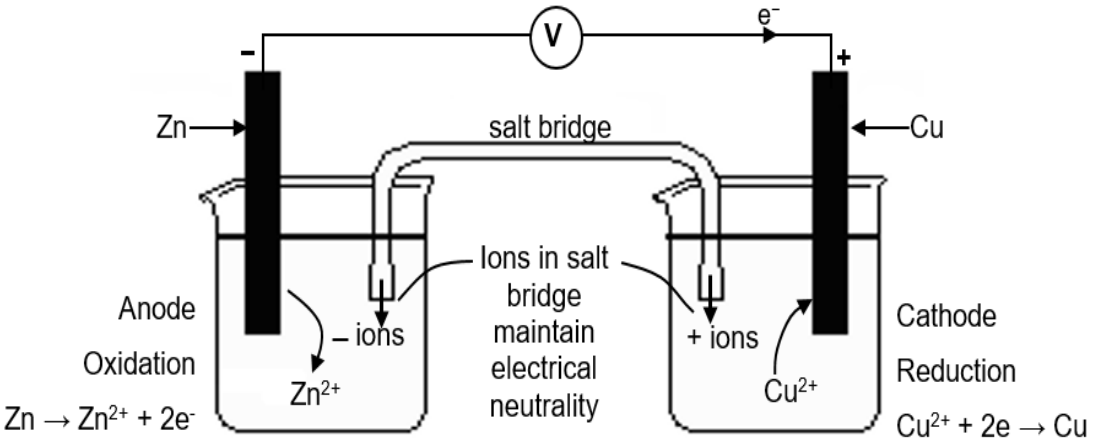
(a) The answering of multiple-choice questions is a skill that needs to be developed. Learners must be guided to eliminate the wrong answers through regular practice and assessment. Multiple-choice questions should be used in assessments on a regular basis for all topics covered.

(b) Subject advisors should compile a booklet of multiple-choice questions arranged according to topics for schools. These questions can be used for weekly assessments. Through discussions, learners can then be shown how to approach such questions.

(c) Learners should be taught how to determine the conjugate base or conjugate acid from a given species:
<u>Conjugate acid:</u> ADD H^+ to the given compound or ion
Example: Conjugate acid of $H_2PO_4^-$: $H_2PO_4^- + H^+ \rightarrow H_3PO_4$
<u>Conjugate base:</u> REMOVE H^+ from the given compound or ion
Example: Conjugate base of $H_2PO_4^-$: $H_2PO_4^- - H^+ \rightarrow HPO_4^{2-}$

(d) The migration of ion in a galvanic cell must be explained to learners:
The concentration of positive ions (cations) increases in the anode half-cell due to oxidation and therefore negative ions must migrate towards the anode half-cell to balance the excess positive charge.

The concentration of negative ions (anions) increases in the cathode half-cell due to reduction and therefore positve ions must migrate towards the cathode half-cell, as illustrated below, to balance the excess negative charge. When the solution in the salt bridge is saturated, ions will move from the salt bridge into the half-cells and not the other way round.



(e) Learners should be exposed to the different types of electrolytic cells prescribed for Grade 12. The functioning of each type of cell should be well explained to ensure that learners can apply their knowledge to unfamiliar situations. The types of electrolytic cells are:

- Electrolysis of a concentrated sodium chloride solution (inactive electrodes)
- Electrolysis of a concentrated copper (II) chloride solution (inactive electrodes)
- Refining of copper – electrolysis of a concentrated copper (II) chloride solution (active electrodes)
- Electroplating

QUESTION 2: ORGANIC NOMENCLATURE

Common errors and misconceptions

(a) Some candidates wrote that the *multiple bonds or double bonds are between carbon and hydrogen* atoms and forfeited both marks in Q2.1.1. Other common incorrect answers were:

- *Compounds with one or more bonds*
- *Compounds with no single bonds*
- *Compounds with triple, double and single bonds*

(b) In Q2.2.2 many candidates confused the name of the functional group (carbonyl group) with the name of the homologous series (ketones). Others identified compound C as a carboxylic acid and consequently gave the incorrect name for the functional group.

(c) Although Q2.2.4 was well answered, the naming of haloalkanes is still a challenge. Incorrect sequencing of substituents and/or omission or incorrect use of commas and

hyphens were often found in answers of candidates. Some candidates did not write substituents in alphabetical order and 3-methyl-2,5-dichlorohexane was a common incorrect answer. Another common error was the use of *chloro* instead of *dichloro* in the IUPAC name. Some candidates used *dichlorine* or *dichloride* instead of *dichloro*.

(d) Q2.2.5 was well answered but some mistakes were C_nH_{2n+2} or C_nH_n.

(e) When writing the definition of functional isomers in Q2.3, many candidates forfeited marks due to the use of incorrect words or terms. For example, *general formula* instead of *molecular formula* or *different positions of the functional group* instead of *different functional groups* were often found.

(f) Although Q2.4.1 was well answered, some candidates omitted the word *acids* and only wrote *carboxylic*. A few candidates wrote *carboxyl acid* instead of *carboxylic acid*.

(g) In Q2.4.2 many candidates did not know that carboxylic acids and esters are functional isomers. Many did not understand what functional isomers are, even though they know the definition.

(h) Some candidates wrote the structural formula of the functional group of esters instead of the structural formula of methyl methanoate.

(i) Most candidates knew that the answer is ethanol (Q2.5.1) but wrote it incorrectly, e.g. ethan-1-ol or 1-ethanol or ethanal. Some gave the homologous series, i.e. *alcohol* as the answer.

(j) A common incorrect answer in Q2.5.3 was *NaOH*. Another misconception was that H_2O is needed for dehydration.

Suggestions for improvement

(a) When writing IUPAC names, the following should be emphasised:
- Use hyphens and commas correctly.
- The prefixes, *di*, *tri* etc. are used to indicate more than one of the same types of substituents.
- When a compound has only two carbon atoms, numbering must not be used to indicate the position of the functional group, e.g. it should be ethanol and not ethan-1-ol.
- The position of functional group in the IUPAC name of haloalkanes must always be indicated for compounds containing two or more C atoms.
- Substituents must be written in alphabetical order in IUPAC names regardless of their position in the longest chain. Numbers of substituents cater for the position of substituents in the longest chain.

(b) When drawing structural formulae, learners should be encouraged to count the number of bonds drawn around atoms to eliminate unnecessary errors. They need to be reminded that a carbon atom cannot have less than or more than 4 bonds around it.

(c) Teachers must ensure that learners know that ketones and aldehydes are functional isomers, and that carboxylic acid and esters are functional isomers. Such questions occur in papers every year and should be easy for learners to answer.

(d) Frequent informal tests should be used to ensure that learners write definitions correctly. Often, learners write different interpretations of a definition, and they usually end up with incorrect or partially correct statements.

(e) Emphasise the difference between molecular formulae, structural formulae and condensed structural formulae. Use condensed structural formulae more often in exercises to assist learners to interpret such formulae.

(f) Practical work will assist learners to understand and remember certain chemical reactions. For example, the reaction of concentrated H_2SO_4 with sugar can be demonstrated to learners to explain to them that H_2SO_4 is a dehydrating agent.

QUESTION 3: PHYSICAL PROPERTIES OF ORGANIC COMPOUNDS

Common errors and misconceptions

(a) Omission of keywords in the definition of melting point (Q3.1) cost many candidates one or two marks. Some omitted the word *temperature* and others the word *equilibrium*. Some candidates wrote the definition of boiling point or vapour pressure.

(b) In Q3.2 some candidates forfeited two marks because they failed to identify the independent variable, i.e. the chain length. Some of those who identified the independent variable correctly, failed to state the correct relationship between the independent variable (chain length) and the dependent variable (melting point), i.e. the higher the melting point, the longer the chain length.

A common incorrect answer was that *an increase in chain length leads to a decrease in melting point*. Such candidates interpreted the values in the table as decreasing from pentane to octane.

Some candidates wrote conclusions irrelevant for the given situation, e.g. *as the number of carbons increases, the boiling point increases,* or *as the number of carbons increases, the melting point decreases,* or *the melting point is directly proportional to the number of carbon atoms*.

(c) Q3.3 was well answered. Some candidates wrote *Van der Waals forces* which is given in the question. Others incorrectly gave *dipole-dipole forces* instead of *induced dipole forces* as the answer.

(d) Lack of skills to interpret negative values for melting points (Q3.4) cost many candidates marks in this question. They did not know that -100 °C is between -130 °C and 36,1 °C and therefore pentane will be liquid at -100 °C. A similar error also caused them to answer Q3.4.1 incorrectly.

(e) In Q3.5.1 a few candidates failed to identify that hexane and 2,2-dimethylbutane are chain isomers and were only guessing the answer. This also affected their answers in the other two subquestions.

(f) In the explanation in Q3.5.3, a few candidates mentioned that the intermolecular forces in 2,2-dimethylbutane is hydrogen bonding and forfeited the second mark. Many candidates wrote *less energy is needed to overcome the bonds* and forfeited the third mark. Some referred to b*onds between atoms* instead of *intermolecular forces* or just stated that *hexane needs more energy* without stating what the energy is needed for.

Suggestions for improvement

(a) Most definitions are stated in the *Examination Guidelines* and teachers must ensure that learners study the definitions through regular informal tests.

(b) Practical skills need to be taught from Grade 10 to Grade 12. Learners lack skills such as identification of variables and writing of conclusions. The difference between an investigative question, a hypothesis and a conclusion should be thoroughly explained.

(c) Teachers must expose learners to tables with negative values for melting points and temperatures and explain to them that a greater negative value implies a smaller melting point or temperature.

(d) When discussing intermolecular forces, the concepts *atoms*, *molecules* and *ions* should be revised. Emphasise the difference between bonds between atoms in molecules (intramolecular) and forces between molecules (intermolecular) and that the strength of intermolecular forces are responsible for the different phases. Interatomic or intramolecular forces, which are much stronger than intermolecular forces, are formed or broken during chemical reactions when new compounds are formed. Intermolecular forces are overcome (not broken) during phase changes.

(e) When writing explanations related to physical properties of compound, learners should be taught to follow the following steps:
- Comparing two compounds from the same homologous series:
  - Compare the surface areas of the molecules.
  - Compare the strength of intermolecular forces.
  - Compare the energy needed to overcome intermolecular forces.
- Comparing two compounds from different homologous series:
  - State the type of intermolecular force in each compound.
  - Compare the strength of these intermolecular forces.
  - Compare the energy needed to overcome intermolecular forces.

QUESTION 4: REACTIONS OF ORGANIC COMPOUNDS

Common errors and misconceptions

(a) Although well answered, the difference between the reaction of a haloalkane with dilute NaOH (Q4.1.1) and the reaction with concentrated NaOH (Q4.1.4) was a challenge to some candidates and reaction II was identified as a substitution.

(b) Q4.1.2 was well answered. Common errors when giving a reason why the compound is a primary alcohol were:
- Referring to the - OH group as a hydroxide ion
- Using OH^- instead of - OH in explanations
- Stating that *oxygen is connected to the terminal carbon*
- Stating that an alcohol is bonded to the first carbon
- Not mentioning the functional group and just stating that the molecule has one carbon bonded to another carbon

(c) A common incorrect structural formula in Q4.1.3 was that of 1-bromopentane instead of 1-bromo-2-methylbutane. Such candidates ignored the product formed in reaction I before deciding on the structural formula compound P. The product of reaction I provided the key to identification of the structural formula.

Other common errors were:
- Placing the Br atom on C2 instead of C1 of the chain
- Using BR or br instead of Br as the symbol for bromine
- Drawing the structural formula for 2-bromopentane

(d) The most common incorrect answer to Q4.1.5 was *alcohol*. Candidates did not know that the reaction of a haloalkane with a concentrated strong base gives an alkene as product. The lack of this basic knowledge affected answers in Q4.1.4, Q4.1.5 and Q4.1.7.

(e) In Q4.1.6 candidates had to choose between the three types of reactions given in the question paper. Some deduced from the HBr given as reactant that the reaction should be a *hydrohalogenation* but did not link it to an addition reaction. Others incorrectly thought it is a *dehydrohalogenation*.

(f) Q4.1.7 was poorly answered and many candidates left it unanswered. The most common incorrect answers were *1-bromopentane* or *2-bromopentane*.

(g) In Q4.2 most candidates lacked the necessary skills to analyse the question and come up with a complete solution. Subquestions could not be answered in isolation without analysing the data given in the question.

Q4.2.2 (identification of the cracking reaction) was the best answered subquestion, followed by Q4.2.1 (hydrogenation of but-2-ene). Very few candidates obtained marks for Q4.2.3 and Q4.2.4, possibly because they did not see the link between the 4-carbon starting reactant and the final product containing only 3 C atoms.

Some candidates wrote only the condensed structural formula of either the reactant or product instead of a full equation in Q4.2.1 and Q4.2.4.

Other common errors were:
- Using molecular or structural formulae instead of condensed structural formulae when writing equations (Q4.2.1, Q4.2.4)
- Using incorrect condensed structural formulae for the compounds given in the question (Q4.2.1, Q4.2.4)
- Omitting the arrow when writing a chemical equation (Q4.2.1, Q4.2.4)
- Writing the IUPAC name of propene as propan-1-ene (Q4.2.3)
- Using HBr instead of Br_2 as reactant in step 3 to obtain 1,2, dibromopropane (Q4.2.4)

Suggestions for improvement

(a) Emphasise the difference between structural, condensed structural, molecular, general and empirical formulae.

(b) Ensure that learners know that the rules applicable to the writing of balanced equations are also valid when writing balanced equations using structural or condensed structural formulae. An equation must have a reactant or reactants followed by an arrow and then the product(s).

(c) Learners must be given more opportunities to solve flow diagrams related to organic reactions to improve analysing skills. Sometimes, working backwards from the final answer is needed to determine compounds/reactions in the first steps. The full diagram should be analysed before answering subquestions as all the questions are linked.

Learners need a thorough knowledge of the different prescribed organic reactions and their conditions to analyse such diagrams. They must be prepared to analyse given data and devise steps to prepare a given compound using the reactants supplied.

(d) Subject advisors should assist teachers in compiling summaries on the different types of reactions and their conditions to enable learners to memorise the required facts.

(e) Conditions under which reactions of organic compounds occur should be emphasised.

(f) Emphasise that cracking is an elimination reaction in which *LONGER hydrocarbon chains can be broken down into SHORTER MORE USEFUL molecules*. Unsaturated hydrocarbons of any length can undergo cracking to produce shorter more useful molecules such as ethene and propene which are used as starting materials in the production of different synthetic polymers. During a cracking reaction the number of C atoms per molecule can be reduced provided that the total number of C atoms before and after cracking remains equal.

QUESTION 5: REACTION RATE

Common errors and misconceptions

(a) Although well answered, some learners used both *rate* and *per unit time* in the same sentence and as a result forfeited a mark in Q5.1. Some candidates omitted key words such as *change* and forfeited one mark.

(b) The interpretation of the graph in Q5.2 was poorly answered. Many candidates confused the given reaction in the question with a reversible reaction and reasons such as *favours the forward reaction* or *favours the reverse reaction* were written.

(c) The explanation in terms of the graph (Q5.3.2) was poorly answered by most candidates. Incorrect explanations in terms of equilibrium were often used and many stated that *the reverse reaction will be favoured* and *the reaction reaches equilibrium at* t_3. Many candidates did not even refer to the graph as stated in the question. Another incorrect response was to state that *the graph increases* instead of *the gradient of the graph increases.*

It was also evident that most candidates did not understand that temperature changes within the liquid means that due to the reaction, the liquid is heating up or cooling down. They thought that an external source was changing the temperature.

(d) Most of the candidates did not fully understand Q5.4 and gave different incorrect answers. Stoichiometry was poorly understood. Some candidates did not even attempt the question.

Many candidates ignored the percentage purity of the sample and only calculated the number of moles of $CaCO_3$ followed by a calculation of the volume of CO_2 using the molar volume. Such candidates obtained only 3 of the 5 marks.

Other common errors were:

- Using incorrect formulae such as $c = \frac{n}{V}$ or even $\frac{c_a V_a}{c_b V_b} = \frac{n_a}{n_b}$
- Substituting the molar mass of CO_2 instead of that of $CaCO_3$
- Incorrect application of the molar ratio between $n(CO_2)$ and $n(CaCO_3)$
- Using the ratio between HCℓ and $CaCO_3$ instead of the ratio between HCℓ and CO_2
- Using 22,4 $dm^3 \cdot mol^{-1}$ as the molar gas volume and not the value given in the question paper.

(e) Most candidates deduced that the pure sample would result in a faster rate and were able to choose the correct answer from the options given in Q5.5. Some incorrectly deduced that the rate would *remain constant.* Such candidates probably based their choice on the mass of the sample that remained constant.

(f) In Q5.6 most candidates explained the answer to Q5.5 in terms of an increase in concentration of $CaCO_3$, which is a solid, instead of explaining in terms of the increased exposed surface area of $CaCO_3$.

Many candidates showed lack of understanding of the collision theory. Some used Le Chateliers' principle instead of the collision theory in their explanations thinking that it is a reversible reaction. Others omitted key words such as *effective* and/or *per unit time* and forfeited unnecessary marks.

Suggestions for improvement

(a) Practical skills should receive more attention in schools. Learners have a poor understanding of interpretation of graphs. Learners should be exposed to more exercises involving graphs and answers should be thoroughly discussed and explained in class. They must be taught how to interpret different gradients on a graph and to discuss the reason for the change in gradient regarding the factors affecting reaction rate.

(b) Emphasis should be placed on the difference between reversible and non-reversible reactions. Reversible reactions can reach equilibrium, whilst non-reversible reactions take place in one direction and cannot reach equilibrium. Furthermore, a reversible reaction can only reach equilibrium in a closed system. If gases are released it implies that the container should be closed to prevent the gases from escaping. When written, equilibrium reactions are indicated with double arrows. Single arrows indicate non-reversible reactions.

(c) Ensure that learners know the different scenarios, namely change in surface area, change in temperature, change in concentration and addition of a catalyst, that should be explained in terms of the collision theory. Use previous marking guidelines to assist learners in how to explain each of these scenarios in terms of the collision theory. Use simulations, e.g. *PHET* to illustrate the collision theory in class.

(d) Subject advisors need to support teachers with stoichiometry and worksheets should be designed involving calculations on percentage purity, percentage yield and limiting reactants. The revision booklet designed by the DBE can be valuable in this regard. Learners have a poor understanding of stoichiometry and are very uncertain when selecting formulae for a specific calculation.

(e) It should be emphasised that the molar gas volume of 22,4 $dm^3 \cdot mol^{-1}$ is only applicable to STP.

(f) In their teaching of topics involving concentration of solutions, teachers should emphasise that a solid does not have a concentration. The effect of a solid on, for example, reaction rate can only be explained in terms of the exposed surface area.

QUESTION 6: CHEMICAL EQUILIBRIUM

Common errors and misconceptions

(a) Although Q6.1 was well answered, some candidates omitted key words such as *rate* when defining chemical equilibrium. Such candidates stated that it is the *stage where the forward reaction equals the reverse reaction.*
Other incorrect answers were:
- The amount of products equals reactants
- The concentration of products equals reactants
- The stage where the reaction becomes constant

(b) In Q6.2.1 many candidates could not deduce that the increased temperature favoured the reverse reaction, hence they had $\Delta H > 0$ and chose *positive* as the answer.

(c) In their explanation in Q6.2.2, many candidates stated Le Chatelier's principle instead of using it. Interpreting questions involving two different equilibria (changes made in the first equilibrium until the second equilibrium was reached) proved to be a challenge to many candidates. They contradicted themselves when answering this question and they did not know the influence of temperature on the equilibrium.

(d) In the K_c calculation (Q6.2.3), some candidates did not use a table and forfeited marks because they did not include all steps in their calculations.

Several candidates who used + and - in the *change* column of the table did not realise that the reverse reaction took place and incorrectly placed the - at the reactants and + at the products. Such candidates then calculated values in the table incorrectly and forfeited 4 marks.

A considerable number of candidates calculated the equilibrium concentrations using the given number of moles at the 300 K and substituted in the K_c expression. Few candidates still wrote Kc.

Common errors were:
- No K_c expression (NOTE: $\frac{[\text{products}]}{[\text{reactants}]}$ is NOT a K_c expression)
- Incorrect K_c expression or omission of subscripts, e.g. $K_c = \frac{[PQ]^2}{[P]^2[Q]}$
- Using a correct K_c expression with round brackets instead of square brackets
- Using incorrect labels in the table, e.g. equilibrium concentrations are written next to the label for equilibrium number of moles

(e) In Q6.2.4 many candidates did not state that only temperature affects the K_c value, so any other changes will have no effect on the value of K_c.

(f) In Q6.3 most learners forfeited marks because they did not know:
- The effect of a change in amount of reactants on the yield of a reaction (Q6.3.1)
- That if one reactant is increased at equilibrium, the number of moles of the other reactant would decrease until a new equilibrium is established (Q6.3.2)

Suggestions for improvement

(a) Instead of only teaching learners to state Le Chatelier's principle, there should be more emphasis on explanations requiring Le Chatelier's principle. Learners struggle to express themselves when explaining in terms of Le Chatelier's principle. When

explaining in terms of Le Chatelier's principle, learners should be taught to use the following steps:

- Identify the disturbance.
- State that the system will act to oppose this disturbance.
- State which reaction (forward or reverse) will be favoured when opposing the disturbance.
- State the effect on, for example, the number of moles of products.

(b) Correct scientific language should be used in class. For example, it is better to state that the *reverse reaction will be favoured* instead of the *equilibrium position shifts to the left*. Although both statements are acceptable, the use of the latter should be avoided because learners inadvertently omit the word *position* in their explanations.

(c) When answering questions that require explanations in terms of a change in temperature of an equilibrium system, the first step should be to state how the change in temperature influences either an exothermic or an endothermic reaction, i.e. *an increase in temperature favours an endothermic reaction or a decrease in temperature favours an exothermic reaction*.

(d) Teachers should avoid the use of $K_c = \frac{[\text{products}]}{[\text{reactants}]}$ in class. Instead, use chemical equations to teach the writing of K_c expressions.

(e) When using a table to solve K_c calculations, learners should be taught to use correct labels [n(initial), n(change), n(equilibrium), c(equilibrium)] in the table and write the correct values next to each label. Use previous marking guidelines to show learners the labelling in such tables.

(f) Use the revision booklet designed by the DBE to support learners.

QUESTION 7: ACIDS AND BASES

Common errors and misconceptions

(a) Some candidates wrote the Arrhenius theory instead of the Lowry-Bronsted theory (Q7.1.1).
Other common errors were:

- Omitting the positive sign of the hydrogen ion, i.e. H ions instead of H^+ ions
- An acid is an electron donor

(b) In Q7.1.2 many candidates incorrectly chose H_2O as the ampholyte. Although H_2O can be an ampholyte, it does not act as ampholyte in the reactions given.

(c) Q7.1.3 was poorly answered. Most candidates failed to relate the K_a values given in the question to the ionisation and conductivity of the acids. Many candidates did not compare the given K_a values and only mentioned that HSO_4^- is a weaker acid and ionises only partially.
Other common errors were:

- Stating that a diprotic acid has a higher conductivity than a monoprotic acid
- Stating that the H_2SO_4 solution has the lower conductivity because it is a stronger acid

(d) Many candidates substituted the values correctly in the correct formula in Q7.2.1 but failed to find the concentration due to lack of calculator skills. Some candidates failed to copy the pH formula correctly from the data sheet.
Other common errors were:
- Using an incorrect pH formula, e.g. pH = - log [HCℓ] or pH = -log[H_3O] or pH = -log(H_3O^+) or ph = -log[H_3O^+] or [HCℓ] = -log[H_3O]
- Incorrect substitution of the pH value, i.e. pH = -log(1,02)
- Omitting the unit of concentration at the final answer or using an incorrect unit, e.g. mol·dm^3

(e) In Q7.2.2 most candidates managed to use the titration formula correctly to calculate the concentration of the acid used and obtained 4 of the 8 marks. Some candidates forfeited marks due to incorrect usage of the mole ratio between Na_2CO_3 and HCℓ.
Common errors when calculating the excess acid and the final answer:
- Subtracting the number of moles of Na_2CO_3 from the number of moles of HCℓ to obtain the number of moles of HCℓ in excess
- Using the final volume as 50 cm^3 instead of 50 + 25 = 75 cm^3
- Incorrect conversion from cm^3 to dm^3
- Omitting the unit of concentration at the final answer or using an incorrect unit, e.g. mol·dm^3

Suggestions for improvement

(a) Learners must be taught to interpret K_a values to obtain relative strength of acids which in turn will show their conductivity. In this case, the K_a value of HSO_4^- is lower than that of H_2SO_4 indicating that HSO_4^- ionises incompletely in water to form a low concentration of H_3O^+ ions. It is thus a weaker acid than H_2SO_4.

(b) Learners should be taught to copy formulae correctly from the data sheet.

(c) Learners should be taught to label formulae when doing multistep calculations, e.g. when calculating the number of moles of NaOH, the formula should be as follows: n(HCℓ) = cV.

(d) Ensure that stoichiometric calculations are properly taught in Grade 11. Expose learners to stoichiometric calculations involving limiting reagents from the beginning of their Grade 12 year to give them enough practice.

(e) Rounding off should only be done at the final answer of a calculation. Learners should be taught not to round off in each step as it leads to an incorrect answer.

QUESTION 8: REDOX REACTIONS AND GALVANIC CELLS

Common errors and misconceptions

(a) The common incorrect answer in Q8.1 was *electrical energy to chemical energy*. Candidates did not know the difference between a galvanic and an electrolytic cell. Another common incorrect answer was *mechanical energy to electrical energy*.

(b) In Q8.2 many candidates did not use 1 mol·dm^{-3} (standard condition for galvanic cells) as the concentration of $AgNO_3$. They used the formula $n = \frac{V}{V_m}$ (used only for gases at STP) to calculate the number of moles of $AgNO_3$.

Other common errors were:
- Incorrect or no conversion of units e.g. cm^3 to dm^3
- Substituting the molar mass of silver instead of the molar mass of silver nitrate

(c) When stating the definition of a reducing agent (Q8.3) some candidates wrote the definition of an oxidising agent or of reduction instead. There was also a tendency to define a reducing agent as *the place where reduction takes place*.

(d) In Q8.4.1 many candidates failed to use the Table of Standard Reduction Potentials to determine the reducing agent from the information given in the question paper. Some wrote the formula for the oxidising agent (Cu^{2+}).

There was also a tendency to write either the oxidation half-reaction or the reduction half-reaction for copper instead of the name or formula of the reducing agent.

(e) When writing the balanced equation for the reaction in Q8.4.2, many candidates failed to correctly identify the reducing and oxidising agents and hence a common incorrect answer was $Cu^{2+} + 2Ag \rightarrow Cu + 2Ag^{+}$.

Other common errors were:
- Not cancelling electrons when balancing the equation
- Using an incorrect copper half-reaction ($Cu^{2+} + e^{-} \rightarrow Cu^{+}$)
- Omitting charges of ions in the equation
- Leaving the equation as unbalanced

(f) When calculating cell potential (Q8.5) common errors were:
- Using abbreviations in the formula, e.g. $E_{cell} = E_{red} – E_{ox}$ or $E_{cell} = E_{oxidising} – E_{reducing}$
- Swapping the reduction potential of the anode with that of the cathode when substituting
- Substituting the reduction potential of $Cu^{+}|Cu^{2+}$ instead of $Cu|Cu^{2+}$
- No unit at the final answer

(g) Q8.6 was poorly answered. Those candidates, who provided either no cell reaction or an incorrect cell reaction as a response to Q8.4.2, failed to give a correct response to this question.

Suggestions for improvement

(a) Concepts such as reducing agent, oxidation, oxidising agent and reduction should be taught with understanding. Learners must be able to identify, for example, the reducing agent in a reaction. Regular assessment on this identification is needed to ensure that learners fully understand these concepts and how to identify them on the Table of Standard Reduction Potentials.

(b) Learners should be taught how to use the Table of Standard Reduction Potentials to identify the anode, cathode, reducing agent, oxidising agent, reduction half-reaction and oxidation half-reaction in a galvanic cell. Regular assessment on this identification is needed to ensure that learners understand the use of the Table of Standard Reduction Potentials.

(c) Teachers should ensure that learners study and understand the section on the effect of a change in concentration on the cell potential in the *Examination Guidelines*. The answer to a question like Q8.6 is provided in the phrase *V_{cell} decreases as the concentration of product ions increases and the concentration of reactant ions decreases until equilibrium is reached at which the $V_{cell} = 0$.*

QUESTION 9: ELECTROLYTIC CELLS

Common errors and misconceptions

(a) The definition of an electrolyte was poorly answered in Q9.1. Some candidates wrote the definition of electrolyses instead. Another common incorrect answer was *a substance that conducts electricity* instead of *a solution that conducts electricity* or *a substance that conducts electricity through the movement of ions*.

(b) Although many candidates correctly chose *anode* as the answer in Q9.2, most failed to give a correct reason for their choice. Some candidates chose *cathode* as the answer and gave the reason that *it was connected to the positive terminal of the cell* as is the case in a galvanic cell.

(c) In Q9.3 many candidates wrote the incorrect half-reaction ($Cr^{3+} + e^- \rightarrow Cr^{2+}$) or the oxidation half-reaction for chromium ($Cr \rightarrow Cr^{3+} + 3e^-$) instead of the reduction half-reaction ($Cr^{3+} + 3e^- \rightarrow Cr$). Other common errors were:
- Using terms such as *left-hand side and right-hand side* to refer to the anode and cathode implying that the anode should always be drawn on the left side
- Using a *double arrow* in the correct reduction half-reaction
- Using an *equal sign* instead of an arrow in the correct reduction half-reaction

(d) Q9.4 was the poorest answered question in the paper. Many candidates left the question unanswered without even converting mass of chromium to number of moles. Candidates showed poor understanding of stoichiometry. Common errors were:
- Using an incorrect or no mole ratio when calculating the number of electrons transferred
- Multiplying the number of moles of chromium with the charge on one electron instead of first using the ratio to calculate the number of moles of electrons followed by calculating the number of electrons using Avogadro's number
- Substituting number of moles of electrons as n in $n = \frac{Q}{q}$ (In this formula, only supplied in paper 1, n is the number of electrons.)

Suggestions for improvement

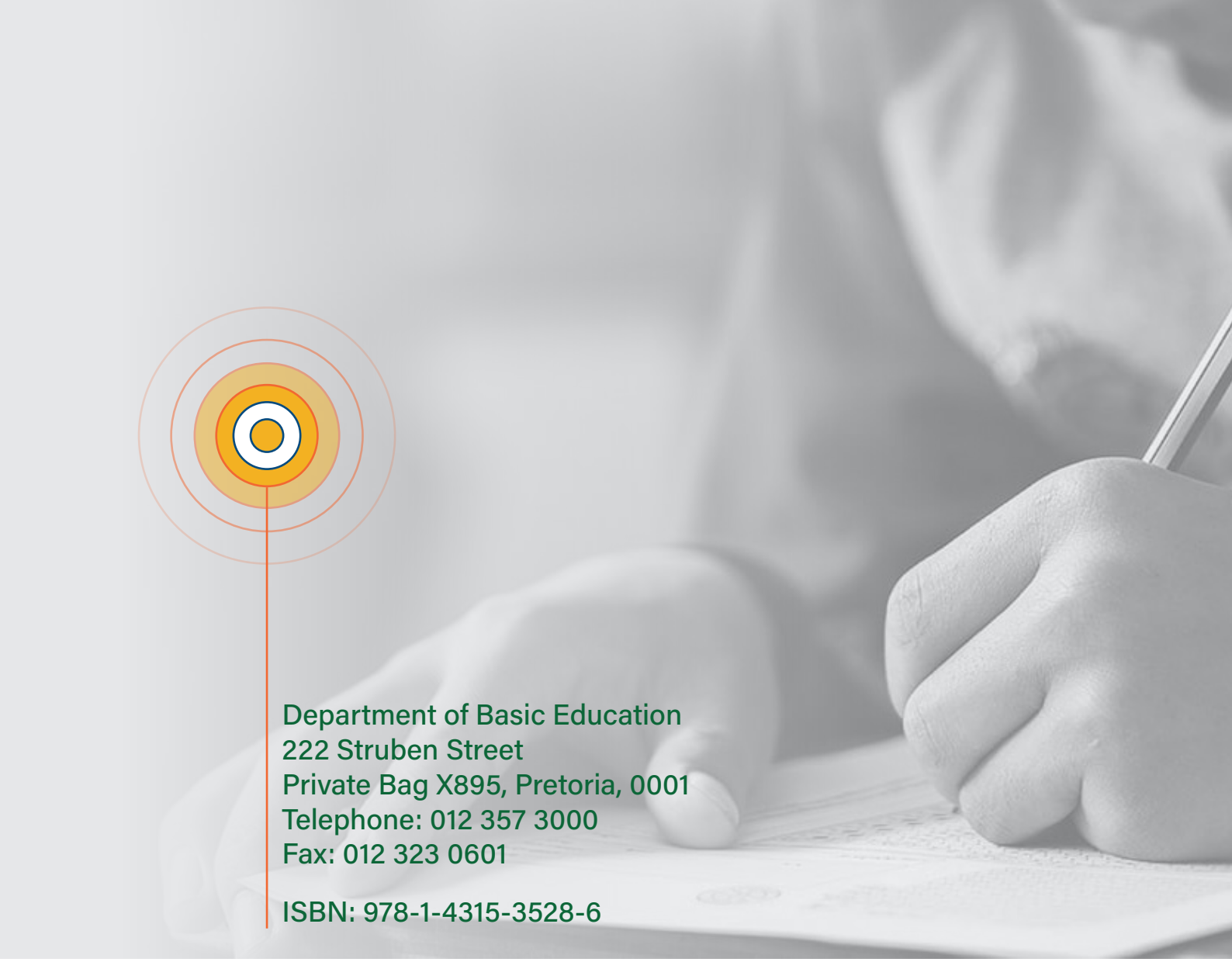
(a) The difference between the definitions of *electrolysis*, an *electrolytic cell* and an *electrolyte* should be emphasised. An electrolyte is a solution that conducts electricity through the movement of ions.

(b) When copying either the oxidation or the reduction half-reaction from the *Table of Standard Reduction Potentials*, single arrows should be used to represent either the oxidation or the reduction.

(c) Teachers should provide learners with a summary of the four types of prescribed electrolytic cells and thoroughly explain the functioning of each. This will enable learners to answer different questions on electrolytic cells with understanding rather than guessing.

(d) Teachers should prepare Grade 12 learners on how to answer questions that involve stoichiometry and should not assume that these calculations were taught in Grades 10 and 11. Learners should be made aware that stoichiometry is an integral part of Chemistry and could be assessed in any topic in the curriculum.

(e) Videos downloaded from different websites e.g. Khan Academy, should be used in class to ensure that learners understand how different electrolytic cells function.



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ISBN: 978-1-4315-3528-6

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