2017

2017

NATIONAL SENIOR CERTIFICATE

DIAGNOSTIC REPORT

PART 1

SHAPING FREEDOM THROUGH EDUCATION

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Read to Lead

A Reading Nation is a Leading Nation

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100 YEARS

2017

Shaping Freedom Through Education

NATIONAL SENIOR CERTIFICATE EXAMINATION

2017

DIAGNOSTIC REPORT
PART 1

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MESSAGE FROM THE MINISTER

The Class of 2017 sat for the National Senior Certificate examinations in an extraordinary year, affirmed by South Africans as the year of OR Tambo a centenary celebration of the birth of a profound struggle hero, peoples' president and astute academic who left an indelible mark on shaping the freedom we enjoy today.

I am pleased to release the 2017 National Diagnostic Report on Learner Performance. This report is in its seventh year of publication and serves as a comprehensive analysis of candidates' performance in the fourth National Senior Certificate Examinations based on the Curriculum and Assessment Policy Statements (CAPS).

This Diagnostic Report provides teachers, subject advisors, curriculum planners and social partners with insight into learners' performance in the Ten (10) key subjects, English First Additional Language and the eleven (11) official home languages currently offered in the NSC examinations. For the first time, the Department of Basic Education (DBE) is also offering a detailed analysis of learners' performance in each of the official home languages. In view of this, this diagnostic report is presented in two parts. Part 1 comprises the diagnostic reports of the ten key subjects and Part 2 contains the diagnostic reports for English First Additional Language and the eleven home languages, each offered in the target language.

The data and accompanying analyses prepared, post the writing of the 2017 NSC Examinations, have been used to identify strengths and weaknesses in candidates' knowledge and skills. The data gathered from this is intended to serve as a catalyst to improve the quality of teaching and learning through reflection and remediation at all levels of the system.

In this publication, a detailed per-question analysis of learners' responses is given for each of the 10 high enrolment subjects: Accounting, Agricultural Sciences, Business Studies, Economics, Geography, History, Life Sciences, Mathematics, Mathematical Literacy and Physical Sciences. In Part 2 of this publication, a detailed per-question analysis of learners' responses is given for English First Additional Language and a detailed qualitative analysis of learners' responses to questions is given for each of the home language.

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Analyses conducted show the weaknesses in learners' responses in the different subjects. An analysis of the misconceptions or error patterns uncovered in the learners' responses can inform instructional practice. In response to weaknesses identified, the report further suggests remedial measures that should be adopted at school level, allowing teachers to identify the problem areas hindering effective teaching and learning, identifying the knowledge gaps and refining teaching strategies accordingly. Teachers should consider information or approaches that can be integrated into teaching reform and academic improvement plans in the new academic year.

They are encouraged to conduct and integrate the diagnostic analysis into their everyday teaching and assessment, so that the performance of learners in classroom-based tests and designated school-based assessment tasks are also analysed and the outcomes utilised to inform remediation.

In conjunction with the National Diagnostic Report on Learner-Performance, the DBE will through targeted interventions – continue to capacitate teachers to develop responsive and appropriate instructional programmes that will successfully address the areas of weakness identified in the 11 subjects and the official home languages. I am confident that through this Diagnostic Report and the myriad of other interventions implemented in the system, we will see a positive impact on learner performance in 2018.

MRS AM MOTSHEKGA, MP
MINISTER OF BASIC EDUCATION

5 JANUARY 2018

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CHAPTER 1

1.1 INTRODUCTION, SCOPE AND PURPOSE

The 2017 Diagnostic Report serves as a teaching and learning resource tool in the ten high enrolment subjects, English First Additional Language and the eleven official home languages. This is the fourth year that the NSC examinations are based on CAPS. In view of this, it is imperative that the 2017 diagnostic report should be used in conjunction with the 2014, 2015 and 2016 diagnostic reports for the ten key subjects and English First Additional Language.

Like previous reports, this report presents an evaluation of learner performance in the selected subjects and home languages by highlighting the areas of weakness in each of the subjects/languages and articulating the remedial measures to be adopted at school level to improve performance in these subjects/languages. The findings and recommendations are based on qualitative data that are drawn from the subject reports compiled by the chief markers, internal moderators and subject specialists post the marking process. In the ten key subjects, quantitative data was also gathered from the analysis of 100 scripts per paper, per subject, randomly selected from each province.

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. The Diagnostic Report in each subject/language, commences by presenting comparative data on the performance trends observed over a five-year period in the subject/language. In the ten key subjects, it also provides an overall performance of candidates per question, in the respective question papers, in each subject. Common errors, misinterpretations and misconceptions identified during marking and suggestions for improvement are also provided. The poor quality of answers provided by some candidates in certain subjects continues to suggest gaps in the scope of content coverage, teaching methodology and the content knowledge of some of our teachers.

In Part 1, attempts have been made to track progress made in the subject and in content areas which were highlighted as problematic in previous years. Progress or lack thereof, in the said areas, should determine the extent to which further interventions are necessary in 2018. 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. It is these recurrent areas of weakness that must become the baseline for intervention by the Subject Advisory Services in the new academic year.

It is envisaged that subject-based diagnostic analysis will be institutionalised within the pedagogical practice not only at national level, but also at provincial, district and school levels. It is hoped that the diagnostic report will be seen as a key resource that will be utilised effectively by every Grade 12 teacher and subject advisor in 2018. Subject advisors are encouraged to mediate this key resource in their workshops with teachers in the new academic year.

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The DBE and Provincial Education Departments (PEDs) will monitor the distribution and utilisation of this report and feedback from teachers and subject advisors on the usefulness of these reports. Recommendations on how they could be improved will be solicited from all stakeholders.

1.2 METHODOLOGY

In the 10 high enrolment subjects and English First Additional Language, 100 scripts per question paper were randomly selected from each province during the marking process. 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/sub-question under the following three main titles:

Section 1: Performance Trends (2014 – 2017)

A comparative analysis of the performance of learners over the last four 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 2017 graph, relative to previous years. If the 2017 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 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 2017 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; 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

The diagnostic analysis of learner performance in this publication is only limited to the ten subjects with high Grade 12 enrolments, English First Additional Language and the eleven official home languages. 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.

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 2017 examination papers. While further quantitative data would have been useful in providing feedback for the purpose of test development, this is not the intention of this report.

This report, therefore, provides a national summary of the areas of weakness. District subject specialists should not only refer to the provincial report, but must be 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.

1.4 GENERAL FINDINGS AND AREAS OF CONCERN

The 2017 diagnostic reports for the ten key subjects covered in this publication (Part 1), indicate that the pass rate has improved in seven (7) of these subjects (Economics, Geography, History, Life Sciences, Mathematical Literacy, Mathematics and Physical Sciences) at the 30% and 40% levels. In Mathematical Literacy, the pass rate has increased at the 30% level. The pass rate has however declined to varying degrees at the 30% level in Accounting, Agricultural Sciences, Business Studies and English First Additional Language. In the home languages (Part 2) the pass rate has improved at the 40% level in IsiZulu Home Language, remained the same in four home languages (IsiXhosa, Sesotho, Setswana and SiSwati) and declined to varying degrees in the remaining six home languages (English, Afrikaans, IsiNdebele, Sepedi, Tshivenda and Xitsonga).

After 4 years of the implementation of the Curriculum and Assessment Policy Statement (CAPS) in Grade 12 the standard and quality of the NSC examinations, based on CAPS, is considered to be gradually stabilizing. In most subjects, there was an improvement in the quality of learners'

responses in the 2017 NSC examinations. Moreover, it is imperative that we reflect on and learn from the performance of candidates of 2017's NSC examinations.

The following areas of concern were identified in past diagnostic reports and they were, once again, highlighted as concerns in the 2017 NSC examinations.

- Although certain subjects have registered a decline in learner performance, it was noted that in a number of schools the quality of learners' responses had improved. However, it is a cause for concern that in many schools, learners had a mediocre understanding of the subject matter and this translated into poor quality responses and misconceptions. This diagnostic report is geared towards addressing these concerns.

- In line with policy requirements, all question papers cover the full range of cognitive levels. In 2017, once again, it was evident that candidates performed well in questions that required lower order thinking skills. However, 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.

- It was also observed that in subjects that require the use of mathematical and calculation skills, candidates were severely disadvantage by their lack of these cardinal skills.

- Poor language and poor reading skills have been flagged as stumbling blocks in learner performance. It was noted that learners did not understand the meaning of a range of cognitive verbs used in questions. Furthermore, in most subjects, there was a lack of understanding and an ability to apply subject terminology. In light of this observation, integrated language teaching across the curriculum must be reinforced in all schools.

- In 2017, new prescribed literature was introduced in the home languages, and it was evident in the marking of learners' scripts that they lacked a solid understanding of the themes, plot, motifs, characters and literary devices.

1.5 KEY RECOMMENDATIONS

Previous Diagnostic Reports

Previous diagnostic reports (published from 2011 to 2016) 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 2 of this diagnostic report will serve as a teaching and learning tool in the language classroom. Both Part 1 and Part 2 must be used in preparing the Class of 2018 for the 2018 NSC examinations.

(a) Past Question Papers

Past question papers should be used as a teaching and learning tool but teachers need to guard against teaching to the paper. A question paper serves as one of the resources 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

(b) Language in teaching

Language across the curriculum is a pivotal part of the learning experience. Teachers across all subjects are encouraged to work collaboratively to integrate a school-based language strategy that aims to improve learner performance. 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. In view of this, the DBE introduced a manual on the teaching of English Across the Curriculum as a means of strengthening LoLT from Grade 1 to Grade 12. Teachers are encouraged to integrate the ideas contained in the Further Education and Training (FET) manual into their teaching by referring to the provided list of language aspects that are used mainly in the subject. In summary, the following points serve as a guide to teachers:

- Focus on aspects of language competence and examination technique.

- Language and comprehension skills must be developed in each classroom, across subjects.

- Subject terminology and definitions must be clearly understood by learners.

- Learners need to have a solid understanding of action verbs that are used in the phrasing of questions and their specific meanings in the context

(c) Integrated intervention strategies

Real gaps in teaching and learning must be addressed by integrated intervention strategies. Among these could include:

- Regular revision of challenging topics is paramount;

- Study groups could be formed and learners who have firmly grasped topics can support those who have a poor grasp of topics;

- Teachers from different schools in a given circuit district could work closely together to support; one another in mediating challenging topics to learners

1.6 RESPONSIBILITIES

(a) Provincial Education Departments:

- The desired destination of this report is the classroom. Therefore this report must be cascaded from the provincial to the district level and finally to the school.

(b) Subject Advisors and district officials

- Subject advisers at the district level should convene workshops with the teachers under their jurisdiction and conduct on-site support visits.

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- 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 Annual Teaching Plan (ATP). This would 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.

(c) Teachers

- As indicated in the diagnostic reports for each subject, 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. Therefore, teachers should ensure coverage of the curriculum and the full range of cognitive levels in their teaching and assessment strategies.

- Teachers must prepare learners adequately by creating learning opportunities to reflect, analyse and evaluate the content, in order to develop their holistic understanding and applied competence.

CHAPTER 2
ACCOUNTING

The following report should be read in conjunction with the Accounting question paper of the November 2017 examination.

2.1 PERFORMANCE TRENDS (2014–2017)

The number of candidates who wrote the Accounting examination in 2017 decreased by 25 426 candidates in comparison to that of 2016. This year there was a decline in the performance of candidates as indicated by 66,1% of candidates achieving at the 30% level, with 42,6% achieving at the 40% level.

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
2014	125 987	85 681	68,0	55 837	44,3
2015	140 474	83 746	59,6	50 906	36,2
2016	128 853	89 507	69,5	57 914	44,9
2017	103 427	68 318	66,1	44 041	42,6

Over the past four years there has been a noticeable improvement in the performance of candidates in certain aspects of the curriculum that were previously regarded as challenging, particularly the calculation and interpretation of financial indicators.
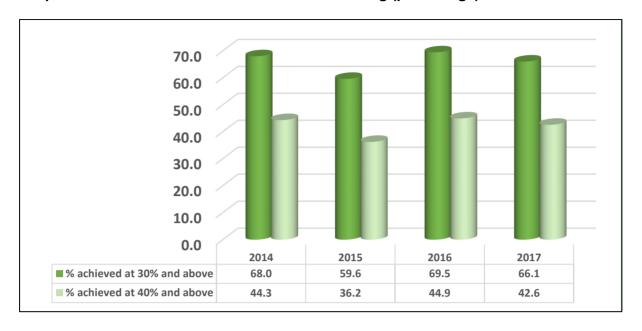
Candidates also appear to be confident in Grade 12 content that is not heavily dependent on prior knowledge from previous grades, particularly Manufacturing and Inventory Valuation. However, there are topics in Grade 12 that demand insight into content and procedures covered in previous grades, e.g. Reconciliations and Budgeting. In topics such as these, it is important that teachers devote sufficient time to consolidating the application procedures to enable them to analyse and interpret financial information, as is required in the Grade 12 curriculum.

It has also been observed that specific aspects introduced into the CAPS in recent years have been answered well by candidates. This could be due to the detailed attention that teachers devote to new content that has been incorporated into the curriculum. The repurchase of shares and inventory valuation methods are prime examples of this.
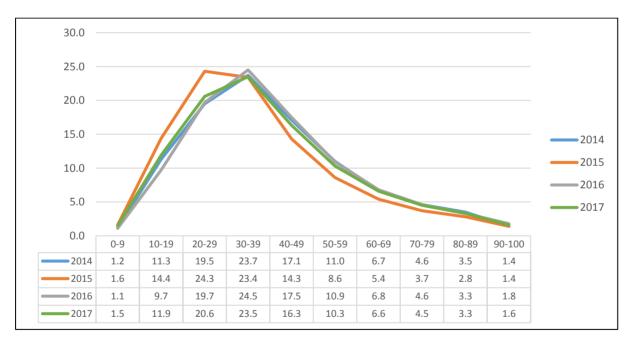
Graph 2.1.1 Overall achievement rates in Accounting (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	68.0	59.6	69.5	66.1
■ % achieved at 40% and above	44.3	36.2	44.9	42.6

Graph 2.1.2 Performance distribution curves in Accounting (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	1.2	11.3	19.5	23.7	17.1	11.0	6.7	4.6	3.5	1.4
2015	1.6	14.4	24.3	23.4	14.3	8.6	5.4	3.7	2.8	1.4
2016	1.1	9.7	19.7	24.5	17.5	10.9	6.8	4.6	3.3	1.8
2017	1.5	11.9	20.6	23.5	16.3	10.3	6.6	4.5	3.3	1.6

2.2 OVERVIEW OF LEARNER PERFORMANCE

General Comments

(a) The performance of the 2017 cohort was generally disappointing. This year there seemed to be a significant increase in the number of weaker candidates.

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(b) Since 2008 both the year-end and supplementary examination papers covered all topics outlined in the CAPS. Previous years' Diagnostic Reports also highlighted weaknesses and proposed strategies that teachers and learners could have used in their preparation for the 2017 NSC Accounting examination. Therefore candidates had access to extensive resource material which they could have utilised to assist them with the preparation for the November 2017 paper.

(c) The good performance of learners at a number of centres serves as evidence that some teachers have implemented the recommendations made in past Diagnostic Reports for Accounting.

(d) Candidates who attained good grades mastered the ability to address the specific requirements of each subquestion, focused on relevant information and used the allocated time effectively. However, there were many centres where candidates did not attempt certain subquestions.

(e) The poor quality of responses in some centres indicates that challenges in teaching and learning still prevail. It remains a concern that candidates from these centres offer inappropriate responses to questions that involve basic arithmetical calculations, explanations based on relevant information provided in the questions and/or the preparation of certain statements.

(f) Less challenging questions demanded that candidates have a basic understanding of concepts, which are to engage with more complex aspects of the content. The inability of weaker candidates to master more complex questions could be an indication that basic concepts were not properly addressed.

(g) Factors that contributed to poor performances by weaker candidates include:

- **Inability to master certain calculations**: Accounting examination papers contain a number of arithmetical calculations, e.g. positive/negative signs, rands/cents, percentages and ratios. Understanding the logic of these calculations is essential.

- **Inability to address the requirements of questions adequately**: In several subquestions, learners' responses were not in line with the requirements of the questions. Weaker candidates often provided incomplete or unclear responses, e.g. if an explanation is required, a one-word answer is insufficient.

- **Inability to identify relevant information**: Weaker candidates were unable to strategically identify relevant information. They tended to provide less important or immaterial information in supporting their explanations, while ignoring significantly more relevant and pertinent information.

General Suggestions for Improvement

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

(a) **Use past NSC papers**: Firstly, it must be noted that past question papers serve as one of many teaching and learning resources. It must be used for revision purposes only. Past papers cannot replace the CAPS document and Examination Guideline. Every learner must have access to past examination papers. Papers from November 2014 onwards would be

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appropriate for revision purposes as these are based on the current CAPS content including shares of no par value and the repurchase (buy-back) of shares. In addition, teachers should ensure that learners revise questions on Cash Budgets and Projected Income Statements in the context of companies (i.e. not simply in the context of sole traders) as this is stipulated for Grade 12 in the CAPS, and serves as further consolidation of these topics.

(b) **Basic Concepts and the Accounting Equation**: Learners need to understand and explain basic concepts and terminology before engaging in Accounting applications in each topic.

   i.   The most vital concepts are those contained in the expanded Accounting equation: **A**ssets + **E**xpenses + **D**rawings = **C**apital + **I**ncome + **L**iabilities. The process of conceptualizing and understanding these concepts is more than merely rote-learning definitions.

   ii. It is necessary that learners understand:

   - Current and non-current assets

   - Current and non-current liabilities

   - Operating, financing and investing activities

     This will enable them to prepare and interpret the different financial statements more effectively.

(c) **Revision of Relevant Grades 10 and 11 Content**: 20% of an examination paper may contain content from previous grades that is pertinent to Grade 12. Vital aspects from the previous grades that must be constantly reinforced in Grade 12 teaching include disposal of fixed assets, Cash Budgets, Projected Income Statements, cost accounting and reconciliation statements (i.e. bank, debtors and creditors). The tight time frames in Grade 12 do not allow for complete re-teaching of these topics. It is advised that weaker learners practice consolidation tasks at the end of Grade 11.

(d) **Understanding Basic Formats**: Basic formats of financial statements must be fully understood by learners.

(e) **Internal Control and Ethical Issues**: In addition to the logic and application of each Accounting process in the curriculum, teachers should focus on the internal control measures and ethical considerations that are relevant to each process. These could be integrated at strategic and relevant points of each topic.

(f) **Enhancing Learners' Skills in Accurately Interpreting Specific Subquestions 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 utilise prior knowledge of a topic to identify the information that is relevant to each subquestion. Tables are often used to reduce written text.

(g) **Time Management**: Learners must be trained in the art of managing their time and to adhere to the suggested time allocations provided in the paper. The mark allocation and the spaces provided in the answer book are good indicators of the amount of information needed.

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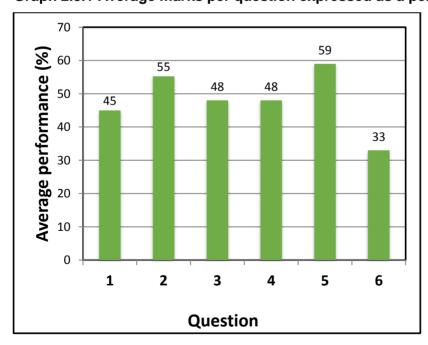
(h) **Comments, Evidence and Explanations:** Learners must be taught to express themselves clearly and succinctly where comments or explanations are required. Using bullet points and clear, concise sentences is acceptable. However, learners must not assume that a partial, simple or single-word response will be sufficient if an explanation is required. Language proficiency and learners' ability to express themselves clearly and precisely should not be seen as an obstacle to presenting correct responses. They should be made aware that they will often be required to quote figures or other evidence from the information provided, and that this cannot be omitted if full marks are to be awarded for an answer to a specific subquestion.

(i) **The Importance of Formative Testing:** Short, informal formative tests must be used to build the confidence of learners in all topics. Self-marking or peer-marking allows learners to benefit from immediate feedback by gaining an understanding of the mark allocation, and by enabling them to promptly identify errors or valid alternative responses. The less challenging sections in each of the questions in the NSC Accounting papers can be used as 'confidence-boosters'. Formative tests can be used effectively to introduce new subtopics in the CAPS, e.g. inventory valuations, repurchase (buy-back) of shares and reconciliation with creditors' statements.

(j) **Recommendations**: Consult past Diagnostic Reports.

DIAGNOSTIC QUESTION ANALYSIS

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.
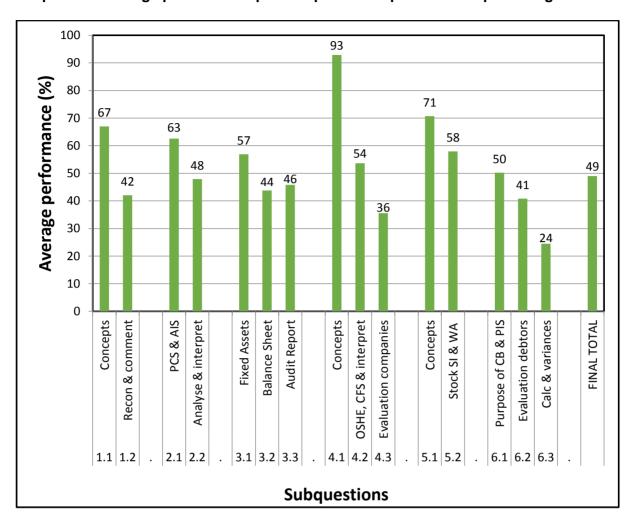
Graph 2.3.1 Average marks per question expressed as a percentage

Q1	Bank Reconciliation and Internal Control
Q2	Manufacturing
Q3	Fixed Assets, Balance Sheet and Audit Report
Q4	Cash Flow Statement and Interpretation
Q5	Inventory Valuation
Q6	Budgets

Graph 2.3.2 Average performance per subquestion expressed as a percentage

Bar chart — Average performance (%) per subquestion:

Subquestion	Label	Value
1.1	Concepts	67
1.2	Recon & comment	42
2.1	PCS & AIS	63
2.2	Analyse & interpret	48
3.1	Fixed Assets	57
3.2	Balance Sheet	44
3.3	Audit Report	46
4.1	Concepts	93
4.2	OSHE, CFS & interpret	54
4.3	Evaluation companies	36
5.1	Concepts	71
5.2	Stock SI & WA	58
6.1	Purpose of CB & PIS	50
6.2	Evaluation debtors	41
6.3	Calc & variances	24
	FINAL TOTAL	49

ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS

QUESTION 1: BANK RECONCILIATION AND INTERNAL CONTROL

Despite the bank reconciliation question appearing in many previous NSC papers, it was poorly answered. Aspects of this question were regarded as relatively easy. The focus of Q1.1 and Q1.2 covered Grade 11 content in processing entries in the cash journals and preparing the Bank Reconciliation Statement. Q1.2.3 covered identification of the problem of rolling of cash which related to internal control; this subquestion was either not well answered or it was unanswered.

Common Errors and Misconceptions

(a) Weaker learners were unable to:

- cancel the stale cheque no. 605 in the CRJ

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- correct the error on cheque no. 823

- correctly treat the correction on EFT 19 which was entered in the incorrect journal (many candidates did not appreciate that the figure had to be doubled to correct this error)

- process the correct service fees either by way of two separate entries in the CRJ and CPJ or one entry for the net amount in the CPJ.

(b) It would appear that many candidates were not aware of the acronym, EFT (i.e. electronic funds transfer).

(c) Many candidates were unable to calculate the bank account balance appropriately. Method marks were allocated to this calculation. However, some candidates did not take the opening totals of the journals into account. Many candidates did not treat the opening balance, which was a bank overdraft, correctly.

(d) Many candidates did not reflect the outstanding EFT in the Bank Reconciliation Statement. Although an EFT would normally appear immediately in a bank statement, in this case it is possible that the bank statement had been printed before the EFT was done.

(e) Few candidates earned full marks on Q1.2.3 relating to the internal control over deposits because they did not state the obvious evidence reflected in the question or did not offer two valid strategies.

Suggestions for Improvement

(a) Teachers are advised to inform their learners that the use of cheques is declining in practice. Although CAPS refers to 'direct transfers', learners should be taught that the terminology 'Electronic Funds Transfer' (EFT) is currently common practice.

(b) When teaching reconciliations, teachers should consistently refer to the internal control benefits. Learners must understand that documents received from or issued to another organisation play an important part in internal control and internal audit procedures. A reconciliation becomes necessary if information on those documents does not agree with the books of a business. The differences must be identified and addressed. This point was noted in previous Diagnostic Reports. This also applies to Creditors' Reconciliation and to reconciliations with control accounts.

(c) Even though the Bank Reconciliation process is taught in Grade 11, it needs to be thoroughly revised in Grade 12. It is important that Grade 12 learners practice the skill of completing the reconciliation at appropriate times.

(d) The CAPS stipulates basic bookkeeping in Grade 10, preparation of reconciliations in Grade 11, with the analysis and interpretation thereof in Grade 12. Learners cannot be expected to apply higher-order thinking skills relating to reconciliations if they have not acquired the necessary confidence in the lower- or middle-order application processes. The CAPS stipulates that examinations may comprise content from previous grades that has an impact on assessment in subsequent grades, to an extent of 20% of an examination. Teachers of Grade 12 learners must therefore ensure that there is adequate in-depth revision in all forms of reconciliations that

are covered in Grade 10 and11, i.e. Bank Reconciliations, Creditors' Reconciliations, and Reconciliations of Debtors'/Creditors' Lists to the Control Account.

QUESTION 2: MANUFACTURING

Candidates find this topic relatively easy as the Manufacturing section of work comprises content that is usually found to be predictable, understandable and manageable.

Some easily obtainable marks are available if candidates understand the formats of the Production Cost Statement (Q2.1.1; 14 marks) and the Abridged Income Statement (Q2.1.2; 14 marks).

The calculation of the break-even point (BEP), which was traditionally regarded as challenging (Q2.2.1; 4 marks), was correctly calculated by many candidates.

Many candidates were able to identify direct labour as the problem relating to the shirts and to offer reasons for the increase in this variable cost. Candidates were generally also able to provide explanations on the direct material and selling and distribution costs.

Many candidates were able to comment appropriately on the control of costs for the two products. The calculation of the % increase in the selling price of shoes (Q2.2.2; 3 marks) was regarded as an easy question; however, many candidates could not earn full marks in this sub-question. It is surprising that candidates could not do this basic, arithmetical calculation, yet most candidates were able to calculate the break-even point, which is a much more advanced calculation.

Common Errors and Misconceptions

(a) Weaker candidates did not treat the adjustments appropriately. They did not realise that the delivering of wood to the factory needed to be added to the Direct Material Cost. They were also unable to allocate the cost of the cleaning contract correctly to the factory and administration department.

(b) The calculation of cost of sales was a distinct problem for weaker candidates (Q2.1.2; 5 marks). This could have been calculated either by using the normal formula for calculating cost of sales or by using the unit cost of production and the number of units produced.

(c) The integration of FIFO appeared to confuse candidates, even though it was a simple, logical calculation.

(d) Many candidates were not able to provide the correct reason for the increase in the unit cost of production where fixed costs did not increase. They appeared to be unfamiliar with the 'economies of scale' concept.

(e) Many candidates were of the opinion that an increase in price would necessarily have a negative impact on the business (Q2.2.4; 4 marks). However, in this case the benefit to the business was noticeable through the increase in sales or net profit or the decrease in the break-even point.

Suggestions for Improvement

(a) Although this question did contain higher-order cognitive aspects, as in previous papers, it is acknowledged that it posed fewer challenges than most of the other questions in this paper. Teachers are advised to revise Cost Accounting questions to ensure that learners understand a variety of questioning techniques on this topic.

(b) Learners need to understand the different components of a manufacturing entity, i.e. storerooms, factory, administration and sales departments. The use of diagrams, video presentations or classroom demonstrations can be gainfully used to develop their understanding of the above processes. This should contribute to a better understanding of basic calculations relating to manufacturing concerns.

(c) Although no comment was required on the break-even point in this paper, learners must be reminded to consider the three essential aspects when commenting on the break-even point, depending on the requirements of a question. They should be taught to:

- Compare units produced to the break-even point to assess if a profit is made

- Compare the break-even point of the current year to that of the previous year

- Compare the units produced in the current year to that of the previous year

This will enable learners to assess whether the business has the ability to earn a profit, and whether or not this ability is improving.

(d) Short formative tests on various calculations are advised, e.g. material costs, labour costs and the splitting of costs across the different cost components (using fractions, ratios or percentages) are essential, particularly for weaker candidates. In addition, revise Grade 10 and 11 content on year-end adjustments and reversals.

(e) When teaching the Production Cost Statement, teachers are advised to refer to the unit cost of production and to unit costs for materials, labour and factory overheads. This can be done without requiring learners to calculate the unit costs at that stage, but it will serve to enhance understanding of the purpose and structure of this statement.

(f) Teachers should spend time on the analysis and interpretation of unit costs. Decreases in costs might not be beneficial to a business e.g. in cases where cheaper raw material might be inferior or could lead to a decline in potential sales.

(g) Teachers should expose learners to the concept of 'economies of scale', i.e. in cases where the fixed cost per unit will decline as production increases.

(h) The Manufacturing content lends itself to deep problem-solving questions whereby a variety of information is provided and candidates will be expected to engage with the figures to identify problems and offer valid explanations and solutions. Identifying the relevant and useful information from the question, forms part of the problem-solving skills that must be developed in learners.

QUESTION 3: FIXED ASSETS, BALANCE SHEET & AUDIT REPORT

The overall performance in this question was consistent with that of previous years. Although weaker candidates found the calculations in the Fixed Asset Note challenging, they were able to earn method marks in carrying their errors through to subsequent parts of the question.

Aspects of this question were well done by many candidates, particularly in processing the adjustments and using the financial indicators to calculate current assets and shareholders' equity.

Common errors and misconceptions

(a) Although candidates were generally able to calculate the depreciation on the new vehicle for part of the year (Q3.1b; 2 marks), many were not able to recognise that the old vehicle was about to be fully depreciated and could not be depreciated by more than its cost price (Q3.1b; 3 marks).

(b) Weaker candidates were not able to calculate the carrying value of the vehicles and equipment correctly (Q3.1c; 4 marks and Q3.1d; 6 marks). Weaker candidates appeared incapable of interpreting the extract from the fixed asset register.

(c) Despite the fact that the details of certain items in the Balance Sheet were provided in the answer book, weaker learners continued to misallocate items to the wrong categories.

(d) Many candidates were unable to process the increase in the provision for bad debts correctly. They did not appreciate that an increase in the provision for bad debts would need to be subtracted from the net debtors (Q3.2; 2 marks).

(e) It was disappointing that weaker candidates were not able to calculate the insurance prepaid correctly (Q3.2; 2 marks), particularly as this is an adjustment which has been covered since Grade 10.

(f) Most candidates could not calculate the rent received in advance correctly. This involved the identification of the monthly rent factoring in an increase of 15%.

(g) Many candidates were unable to calculate income tax for the year using the net profit after tax and the tax rate (Q3.2; 2 marks).

(h) Although many candidates were able to use the net asset value to calculate the shareholders' equity correctly, several candidates placed this in the incorrect position in the Balance Sheet as ordinary share capital instead of shareholders' equity.

(i) The questions on the Audit Report were poorly done (Q3.3; 6 marks). Although many candidates were able to explain concerns; not everybody could explain three distinct and different points.

Suggestions for improvement

(a) The recommendations noted below serve to re-emphasize similar comments noted in previous Diagnostic Reports.

(b) Refer also to the General Comments above for points on *Basic Concepts and the Accounting Equation.* It is essential that the expanded Accounting Equation (A+E+D=L+C+I) be fully understood from an early stage of studies in Accounting, i.e. from the GET phase, and particularly from Grade 10 in the FET phase. Learners should be provided with a comprehensive list of items in random order. They should then be required to identify whether an item would have a debit or credit balance, the applicable category from the accounting equation, and the category under which the item will be reflected in the financial statements.

(c) The Fixed Asset Note and the Fixed Asset Register should be thoroughly taught in Grade 10 and 11 and revised in Grade 12. The formats of financial statements are rooted in the basics of financial reporting, covered in Grade 10, which must be revised and reinforced in Grades 11 and 12. Learners must be familiarised with the basic formats and relevant notes of all financial statements from Grade 10. This can be achieved by formative testing of formats, with and without figures.

(d) The concept of a fully depreciated asset needs to be emphasized with learners. Learners need to be made aware of the process of recording such an asset at the nominal value of R1. Each fully depreciated asset should be recorded at R1 in the Fixed Asset Register and in the financial statements.

(e) Short, regular formative testing on calculations and/or complex adjustments, such as those mentioned above in the context of Q3, can be conducted without the need to prepare the financial statements. A collaborate learning approach can be conducted on a piecemeal basis, with a focus on one or two complex adjustments.

(f) With reference to the Audit Report, learners should first be required to engage meaningfully with each paragraph in a standard unqualified audit report, to understand the need for each paragraph, and to appreciate the differences that could exist if an independent auditor is not able to issue an unqualified opinion. In this way, learners will be exposed to the three different types of audit reports i.e. unqualified, qualified and a disclaimer of opinion.

QUESTION 4: CASH FLOW STATEMENT AND INTERPRETATION OF FINANCIAL INFORMATION

This question comprised basic concepts, notes to the financial statements, the Cash Flow Statement (CFS) and analysis and interpretation of financial indicators of two companies. Candidates generally find these topics challenging. Candidates generally performed well on certain aspects of this question. However, it is disappointing that the CFS was poorly answered since most of the figures were clearly evident from the question.

Most candidates understood the basic concepts (Q4.1; 4 marks) and many were able to satisfactorily complete the notes for Issued Share Capital (Q4.2.1; 7 marks) and Retained Income (Q4.2.1; 9 marks) and the calculation of financial indicators (Q4.2.3; 7 marks).

Candidates appeared to be well prepared to answer questions on the repurchase of shares.

With regards to the comments and calculations on the two companies, certain aspects were well answered, particularly the financial gearing (Q4.3.2; 6 marks) and liquidity (Q4.3.4; 6 marks).

Common Errors and Misconceptions

(a) With regard to the repurchase of shares, weaker candidates incorrectly entered the repurchase price of the shares (R437 500) in the Ordinary Share Capital Account instead of calculating the amount based on the average share price of R5,40 (Q4.2.1; 3 marks). These candidates consequently also lost marks in the Retained Income Note for the shares repurchased (Q4.2.1; 3 marks).

(b) Candidates once again performed poorly on the net change in cash and the cash equivalents section of the CFS (Q4.2.2; 4 marks). Most candidates earned only one or two marks on this part of the question. Many candidates were again not able to calculate the figure at the beginning of the year by offsetting the cash asset against the bank overdraft. Weaker candidates could not correctly calculate the income tax paid (Q4.2.2; 4 marks) or the purchase of fixed assets (Q4.2.2; 5 marks). Weaker candidates still do not know how to use brackets appropriately to indicate outflow of cash. These sections of the CFS clearly need greater revision.

(c) Weaker candidates did not follow the instruction of the question regarding the Cash Flow Statement (Q4.2.2; 19 marks). They were clearly told to insert only the missing figures indicated by a '?'; however, many attempted to fill in figures in the remaining shaded blocks, and as a result wasted valuable time.

(d) The calculation of dividends per share was extremely poorly done (Q4.2.4; 4 marks). Candidates were told that the repurchased shares qualified for dividends, yet many candidates deducted these shares in attempting the calculation. An interim dividend of 12 cents per share was given. Few candidates appreciated that the interim and final dividends had to be calculated separately due to the change in the number of shares during the year.

(e) In answering Q4.3 regarding the two companies, many weaker candidates attempted to compare one company with the other despite not being asked to do so. Such candidates were obviously not reading the questions carefully and might have been influenced by questions from previous papers.

(f) The scenarios relating to the two companies were quite different, i.e. Castro Ltd had issued more shares (by way of a rights issue to existing shareholders), while Ronki Ltd had repurchased shares from an existing shareholder. Weaker candidates were not able to comment effectively on the issue price of the shares issued by Castro (Q4.3.1; 3 marks) and the repurchase price paid by Ronki Ltd (Q4.3.5; 3 marks).

(g) Most candidates were unable to clearly express why the shareholder had made a mistake in not taking up the offer of purchasing shares under the rights issue (Q4.3.3; 6 marks). Many candidates were also unable to explain how the repurchase of shares benefited the shareholder (Q4.3.6; 6 marks).

Suggestions for Improvement

(a) Teachers are advised to conduct regular class discussions on the figures calculated by learners when undertaking tasks on preparation of CFS. This will serve to develop an understanding of the logic of this statement, which will further enhance learners' ability to understand and to

evaluate figures therein. For example, movement of bank balances from overdraft to positive would reflect an inflow of cash; and increases in loans and share capital would be used as sources of funding for expansion of the company.

(b) Most examination papers will include sections of a CFS or they may include calculations to assess learners' knowledge of the topic. Teachers are advised to focus on specific aspects in isolation in order to develop learners' confidence in identifying appropriate figures and in practicing the correct use of brackets to indicate outflows (i.e. when parts of a CFS are required).

(c) Candidates were required to calculate the final dividends per share using 1 050 000 shares which included the repurchased shares. The interim dividend per share and final dividend per share had to be added to arrive at the correct answer of 28 cents. Candidates would have earned two part marks on this calculation if they had used the correct number of shares of 1 050 000 shares. Teachers should expose learners to this kind of scenario where the number of shares changes during the financial year. In such cases, learners should be aware that the interim and final dividends should be calculated separately based on the number of shares applicable.

(d) Teachers must inform learners that questions covering interpretation of financial information could comprise:

- Evaluation of one company over time, in which case answers should involve comparing and quoting of trends from one year to the next; or

- Evaluation of a company's performance against set targets, e.g. gross profit %; or

- Evaluation of more than one company, in which case, answers could involve specific comparisons and quoting of indicators of each company, depending on the phrasing of the questions.

(e) Regarding the issue price and the repurchase price of the shares by the two companies, learners should be exposed to comparisons with the net asset value, market price on the JSE and the average share price.

(f) Learners need to understand the logic underlying each financial indicator. For example, solvency is the ability of a company to settle all debts, which means that all liabilities and all assets must be considered. It is a retrogressive step to expect learners to memorize formulae as the main priority, because these can easily be forgotten if the underlying logic is not understood. Inserting figures into a rote-remembered formula serves no positive educational purpose, as learners will not be able to offer meaningful interpretations of the results. It is therefore important that formative class tests should cover both the calculation and the purpose of the financial indicator.

(g) The different scenarios presented in respect of the two companies provide opportunities to consider a range of possible responses based on the information provided in the question. Class discussions on assessing and interpreting financial indicators of different companies will broaden learners' understanding to enable them to respond more effectively to questions of this nature.

QUESTION 5: INVENTORIES

Candidates generally performed well in this question, which comprised two products and two valuation methods. Many learners performed well in the calculation of stock according to the specific identification method (Q5.2.1; 7 marks) and the weighted average method (Q5.2.3; 9 marks). Most candidates were confident in calculating the number of products stolen and in providing valid advice to improve the control of stock (Q5.2.5; 8 marks).

Common Errors and Misconceptions

(a) Weaker candidates were unable to provide relevant advice regarding the three different models of motorbikes (Q5.2.2; 4 marks). Only two points were required. This could have included assessment of the unsold stock and the cost prices, selling prices or mark-up.

(b) The explanation on whether the weighted average method was appropriate in valuing the helmets was not well answered (Q5.2.4; 3 marks). Candidates could have offered a positive or negative stance to this method of stock valuation.

Suggestions for Improvement

(a) Teachers should expose learners to a variety of questions on all three valuation methods and should encourage discussion on which methods suit specific contexts or products.

(b) Questions on the topic of stock valuation and internal control lend themselves to problem-solving questions. Past papers from 2008 have regularly incorporated problem-solving scenarios relating to the valuation and control of inventories.

QUESTION 6: BUDGETING

It was disappointing that a question on budgeting was yet again poorly answered. The focus of this question was on analysis and interpretation of the information rather than application aspects. For example, the Debtors' Collection Schedule was provided in this question paper and candidates were required to analyse and interpret the information.

Common errors and Misconceptions

(a) Candidates could not explain the main purpose of a Cash Budget and that of a Projected Income Statement (Q6.1; 2 marks). This indicates poor conceptual understanding of this topic.

(b) Many candidates were unable to use figures from the Debtors' Collection Schedule to calculate the % of debtors complying with the credit terms, and the % of bad debts (Q6.2.1; 9 marks).

(c) The appropriate place to locate information on the actual collections from debtors is the Debtors' Age Analysis (Q6.2.2; 4 marks). Many candidates appeared to be unaware of this; instead they inappropriately referred to information in the Debtors' Collection Schedule, which indicates projected collections.

(d) Many candidates were also unable to calculate the loan repaid using the interest rate and the interest expense before and after the repayment (Q6.3.1; 4 marks).

(e) In Q6.3.2 most candidates were able to provide simple comments on the variances i.e. as to whether they were under or over budget. However, this question required further insight as candidates were required to explain the problems for this business. In the context of this question, all three of the expenses provided are related to sales in one way or another.

Suggestions for Improvement

(a) Content in the Grade 11 CAPS relates to the preparation and presentation of the Cash Budget and the Projected Income Statement. However, in Grade 12 the emphasis is on the analysis and interpretation of that information. Whilst it is essential that the Grade 11 content be consolidated in Grade 12 in order to develop learners' proficiency in identifying and calculating relevant figures, teachers are encouraged to improve learners' confidence in interpreting the figures, as stipulated in the Grade 12 content.

(b) Teachers must reinforce the difference between a Debtors' Collection Schedule   (i.e. expected collections) and a Debtors' Age Analysis (i.e. actual amounts still owing, classified according to the periods outstanding). The age analysis would therefore have been the appropriate source to assess the performance of the debtors control clerk.

(c) Basic calculations must be practised to ensure that learners master the application of arithmetical logic. With regard to the topic of budgeting, the calculation and interpretation of percentages is particularly vital.

(d) Quite often weaker candidates cannot interpret a question or given information. Teachers are advised to read a specific question and the relevant information with their classes. Learners can then answer the question and corrections should be done in class. It is recommended that questions such as Q6 be used for discussions in class so that learners are exposed to the logic and variety of possible responses.

(e) Teachers are advised to impress upon learners that in the assessment of variances, they should not simply restrict themselves to comments on whether or not an item is over or under budget. Instead, they should also assess the impact of the item on business operations.

Shaping Freedom
Through Education

CHAPTER 3
AGRICULTURAL SCIENCES

The following report should be read in conjunction with the Agricultural Sciences question papers of the November 2017 NSC examinations.

3.1 PERFORMANCE TRENDS (2014 – 2017)

The number of candidates who wrote the Agricultural Sciences examination in 2017 decreased by 7 932 in comparison to that of 2016. The performance of the candidates in 2017 reflects a marked decline at the 30% level to 70,4% as well as at the 40% level to 39,9% compared to the last four years. Over the last four years the performance has declined by 12.2 percentage points at the 30% level and 13 percentage points at the 40% level, and this trend needs to be halted and reversed.

Table 3.1.1 Overall achievement 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
2014	78 063	64 486	82,6	41 280	52,9
2015	104 251	80 125	76,9	46 895	45,0
2016	106 454	80 225	75,4	47 362	44,5
2017	98 522	69 360	70,4	39 353	39,9

Despite the declining trend in the performance of candidates, encouraging signs of improvement were noticed in certain content across the two papers that were previously regarded as challenging for most candidates, which indicates that teachers are taking note of points raised in previous diagnostic reports.

These areas of content were: Animal production, protection and control; Management and marketing; Supply and demand; and Labour as a factor of production. Improved responses to questions on graphs were also noticed in certain centres.

However, poor performance was noticeable in Agricultural management and genetics; Animal nutrition; Animal reproduction; and the short questions focusing on terminology and basic concepts.

The general decline in performance can be attributed to a number of factors. These include poor understanding of subject terminology and basic concepts, inability to respond to specific requirements of questions, lack of skill in basic calculations, and inability to analyse and interpret data from scenarios or schematic representations. These factors are covered further in further detail in this report.
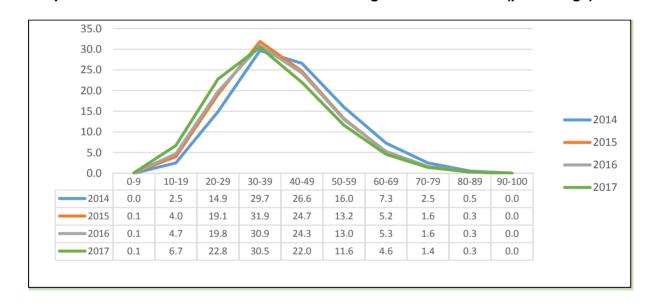
Graph 3.1.1 Overall achievement in Agricultural Sciences (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	82.6	76.9	75.4	70.4
■ % achieved at 40% and above	52.9	45.0	44.5	39.9

Graph 3.1.2 Performance distribution curves in Agricultural Science (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0.0	2.5	14.9	29.7	26.6	16.0	7.3	2.5	0.5	0.0
2015	0.1	4.0	19.1	31.9	24.7	13.2	5.2	1.6	0.3	0.0
2016	0.1	4.7	19.8	30.9	24.3	13.0	5.3	1.6	0.3	0.0
2017	0.1	6.7	22.8	30.5	22.0	11.6	4.6	1.4	0.3	0.0

3.2 GENERAL COMMENTS FOR PAPER 1 AND PAPER 2

This report contains comments on specific questions that proved difficult for candidates, as well as suggestions to rectify these. However, there are several factors that generally contribute to poor subject knowledge and poor performances by many candidates in the NSC Agricultural Sciences papers. These factors include a lack of basic knowledge of concepts and terminology applicable to the subject; the inability of candidates to address the specific requirements of each question and a lack of arithmetical, application and analytical skills.

The following general recommendations are applicable to both papers.

(a) **The importance of formative testing:** Short, informal formative tests must be used to build the confidence of learners in all topics. Self-marking or peer-marking allows learners to benefit from immediate feedback by gaining an understanding of the mark allocation and by enabling them to promptly identify errors or valid alternative responses.

(b) **Basic concepts & terminology:** Learners need to understand and explain basic concepts and terminology in order to engage effectively with each topic. The process of conceptualizing and understanding these concepts is more than merely rote-learning definitions. Terminology needs to be emphasised on a regular basis and should form an integral part of teaching and learning. Teachers are advised to make the teaching of terminology interesting to learners by integrating word puzzles in the teaching, learning and assessment process. Learners should also be encouraged to prepare a glossary or concept bank of subject terminology. Teachers are advised to use the following strategies to improve the teaching of basic concepts and terminology:

- Illustrate the meaning of new concepts and terms by using them in sentences and in short scenarios.

- Identify new terms in every lesson, write them on the board and elaborate on the meaning and context of each.

- Encourage learners to be attentive during lessons, to spot new terms and to find the meaning in a dictionary or textbook.

- Learners should compile a glossary at the back of their notebooks i.e. a list of new terms per topic, with a brief, but clear definition next to each term. 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.

- Include Agricultural Sciences terminology in all informal assessment tasks daily.

- The distinction between challenging or confusing terminology could be illustrated or explained on class posters so that learners could be exposed to this 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 these verbs. This is emphasised in the *Examination Guidelines*. It is very unfortunate that weaker candidates under-achieve in the NSC examinations because they do not properly answer the specific questions and subquestions that are asked. Learners must be taught the meaning of the action verbs that are commonly used in the papers. Teachers are strongly advised to expose learners to the key verbs such as 'comment' and 'justify' and 'suggest'. Teachers are advised to use several past NSC papers that assess the same topic using different action verbs. These verbs should be included in both informal and formal assessment. This will enable learners to form a better understanding of the requirements of each question.

(d) **Skills to be assessed**: Assessment should be such that it challenges the learners' ability to think beyond that which is simply presented in the textbooks. Learners need to be skilled in the

application of knowledge. Analytical skills of learners need to be developed through data response questions.

(e) **Real-life scenarios**: Learners show a serious lack of application skills which indicates a lack of depth in their subject knowledge. Learners need to be exposed to more real-life agricultural situations to enhance deep learning. Where a practical demonstration is not possible, videos, magazines or internet articles can be productively used to illustrate aspects of the various topics more meaningfully. Teachers are advised to include scenarios and short statements in administering informal and formal assessment. They should first read and analyse scenarios with the learners before reading and analysing the follow-on questions. Learners may be requested to formulate their own questions based on the scenario which would help them to have a better understanding of the rationale behind scenarios. Teachers should then develop structured follow-on questions.

(f) **Enhancing arithmetical and mathematical skills**: Examination papers in Agricultural Sciences contain many arithmetical or mathematical processes, e.g. drawing graphs, calculating percentages or calculating units of measurement. Learners also seem to lack appreciation of the magnitude of the various units such as tons and kilograms. Regular informal tasks on calculations incorporating these concepts is essential. It is very disappointing that some Grade 12 candidates cannot confidently handle these basic applications or calculations such as dividing by 1 000 to convert kilograms into tons. Teachers must not assume that learners have successfully engaged with these skills in other subjects or that learners have successfully transferred these skills from other subjects into the study of Agricultural Sciences.

(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 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*.

(h) **Reference to the *CAPS, Examination Guidelines* and previous Diagnostic Reports:** Teachers must teach and assess all content prescribed in *CAPS* and the *Examination Guidelines.* There might be topics that have not been covered in recent question papers, but they remain important content topics to be taught holistically. It is also imperative that teachers take note of comments and recommendations in previous Diagnostic Reports.

3.3 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

General comments

(a) The performance of candidates in Q1 has declined in comparison to that of 2016. Candidates performed the worst in Q1.2 and Q1.3.

(b) Performance has declined in Q2 in nutrition, in this case relating to mineral and vitamin deficiency symptoms and energy value of feeds. Poor performance could be due to candidates' inability to respond to questions on energy value of feeds, minerals, vitamins and their deficiency symptoms.

(c) Q3 on animal production, protection and control was well answered.

(d) Q4 was not well answered due to misinterpretation of the synchronization of oestrus.

(e) Follow-up questions requiring motivation or justification are still poorly answered by most candidates, indicating that candidates are not really exposed to these types of questions in class.

General suggestions for improvement
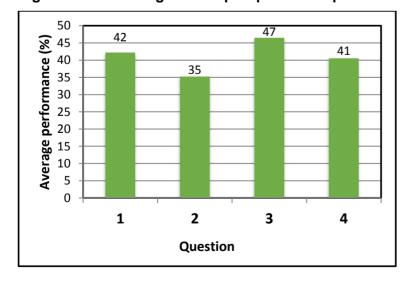
(a) Teachers should use the *CAPS* and *2017 Examination Guidelines* when teaching and assessing formally and informally.

(b) Informal assessment tasks should include sub-questions where a selection of correct and incorrect statements is included with the instruction written in upper case to emphasise the instruction.

(c) Teachers should utilise the electronic media resources at their disposal, such as smart boards and the internet, when teaching concepts to improve learner spelling abilities.

(d) Teachers need to be empowered on the English Across the Curriculum (EAC) programme to integrate English skills in the teaching, learning and assessment of the subject.

(e) Teachers are advised to integrate data response questions in their informal assessment so that learners are enabled to respond appropriately.

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 degrees of challenge of each question as experienced by candidates.

Figure 3.4.1: Average marks per question expressed as a percentage in Paper 1

Q1	Short questions
Q2	Animal nutrition
Q3	Animal production, protection & control
Q4	Animal reproduction
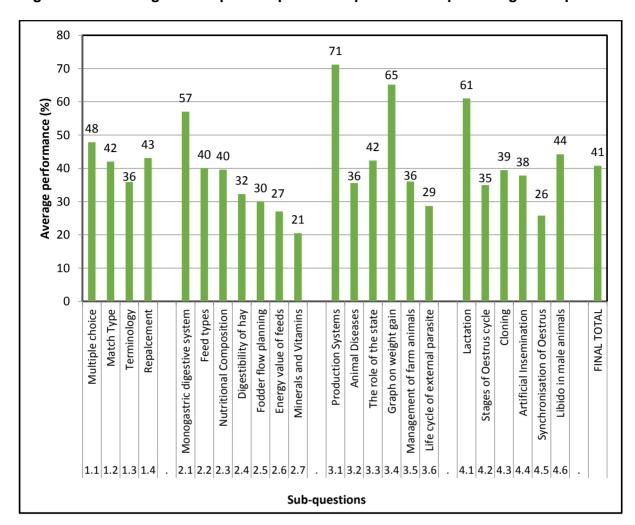
Figure 3.4.2: Average marks per subquestion expressed as a percentage in Paper 1

Bar chart showing Average performance (%) on the vertical axis (0 to 80) against Sub-questions on the horizontal axis.

Sub-question	Label	Value
1.1	Multiple choice	48
1.2	Match Type	42
1.3	Terminology	36
1.4	Replacement	43
2.1	Monogastric digestive system	57
2.2	Feed types	40
2.3	Nutritional Composition	40
2.4	Digestibility of hay	32
2.5	Fodder flow planning	30
2.6	Energy value of feeds	27
2.7	Minerals and Vitamins	21
3.1	Production Systems	71
3.2	Animal Diseases	36
3.3	The role of the state	42
3.4	Graph on weight gain	65
3.5	Management of farm animals	36
3.6	Life cycle of external parasite	29
4.1	Lactation	61
4.2	Stages of Oestrus cycle	35
4.3	Cloning	39
4.4	Artificial Insemination	38
4.5	Synchronisation of Oestrus	26
4.6	Libido in male animals	44
.	FINAL TOTAL	41

3.5 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 1

QUESTION 1: SHORT QUESTIONS (ANIMAL SCIENCES)

Q1.1 and Q1.2 were well answered. Learners seem to be familiar with these questions. The fact that candidates did not have to formulate their own responses might have helped. Q1.3 and Q1.4 are based on subject terminology and it is evident from their responses that candidates still do not know the terminology. This might also have an influence on the rest of the paper, since learners are struggling to express themselves in writing.

Common errors and misconceptions

(a) In Q1.1.3, candidates had a challenge on the compounding of rations for production purposes while in Q1.1.6, candidates were unable to identify the signs of stress in farm animals.

(b) In Q1.1.7, candidates lost marks due to their inability to categorise diseases, in this case 'contagious bacterial diseases'.

(c) Candidates failed to associate the clotting of blood in fowls to Vitamin K, and hence they wrote 'none' as the correct response in Q1.2.1.

(d) In Q1.2.2, learners displayed a lack of knowledge and understanding of the purpose and the requirements of the feed flow programme.

(e) In Q1.3.1, candidates could not relate to the context of the question which was on improving the digestibility of grains by dry heating causing them to expand. They provided irrelevant responses such as boiling, chopping, soaking and grinding.

(f) In Q1.3.3, candidates confused super-ovulation with synchronisation of oestrus while in Q1.3.4, their responses indicated that they concentrated on dilutants of semen and on control of pH and hence they randomly gave responses such as glycerol, egg white, milk or antibiotics.

(g) In Q1.4.1, candidates provided inappropriate responses such as 'pylorus', which is a portion of the stomach, instead of 'cardiac sphincter'.

(h) In Q1.4.3, hypoplasia was mistakenly associated with bulls only. Consequently, learners wrote 'cryptorchidism' and 'semen'.

Suggestions for improvement

(a) In-depth explanation of rations should be emphasised to enable learners to apply this in their learning.

(b) Teachers need to emphasise different types of diseases as indicated in the *Examination Guidelines* with learners.

(c) In the teaching of a fodder flow programme, the purpose of the fodder requirements of farm animals should be emphasised. Learners should be exposed to practical situations, particularly with visits to nearby farms.

(d) A comparison between factors determining digestibility of feeds and factors improving digestibility of feeds, should be emphasised through assignments and practical investigations.

(e) Key differences between reproductive processes and techniques should be addressed through charts, posters and other visual aids to enhance understanding.

(f) In the teaching of the different alimentary canals of farm animals, emphasis should not only be on the major parts, but also the glands together with the functions of the digestive juices they secrete.

QUESTION 2: ANIMAL NUTRITION

Common errors and misconceptions

(a) In Q2.1.3, candidates were challenged by the functions of the bile. Some incorrectly provided functions of the 'pancreatic juice' as their response. Others incorrectly offered the response 'changing acid pH to alkaline' as 'changing alkaline to acid'.

(b) In Q2.1.4, candidates did not specifically write 'lipase' as the fat-digesting enzyme in the pancreas; instead they wrote 'lipolytic enzymes' which is a group of fat-digesting enzymes.

(c) In Q2.2.1 candidates classified feed type B correctly (roughage) but failed to provide the reason for feeding roughage to a ruminant in Q2.2.4. Instead, they provided functions of roughage and its characteristics as the response.

(d) In Q2.3.2, candidates were unable to justify their identification of the feed. Some candidates justified suitability of feed B for growing animals as having a 'small', 'less' or 'low' nutritive ratio, instead of a narrow nutritive ratio.

(e) In Q2.3.3, candidates used a formula to calculate the digestible non-nitrogen nutrients which was already provided in the data table. Most added the fat, carbohydrate and protein components. This was a clear indication that they did not know the meaning of non-nitrogen nutrients (carbohydrates and fats).

(f) In Q2.4.2, candidates were unable to respond to the instruction 'comment with a reason' on the suitability of hay for feeding high-producing milk cows. Some indicated that hay is not suitable but could not provide a reason for the non-suitability.

(g) In Q2.5.1, candidates' responses indicated an inability to analyse data correctly. They identified the shortage of feed as a challenge the farmer might encounter, however, they indicated pregnancy and lactation as problems instead of coupling the two aspects with increased consumption.

(h) In Q2.5.2, some candidates responded by indicating that the 'buying of feed' is a precautionary measure for shortage of fodder in the dry season. This is an indication that the purpose of fodder flow was not understood.

(i) In Q2.5.3, candidates lacked the basic skill of converting an amount in 'kg' to 'tons'. Some calculated the figures correctly but expressed their answers in tons without converting or dividing by 1 000.

(j) In Q2.7.1, candidates could not link the minerals with their deficiency symptoms especially in B (deficiency of selenium), which was specific to pregnant cows. Responses such as dystocia, mastitis, swollen udder and sterility were incorrectly provided. These do not relate to the pregnancy period of a cow.

Suggestions for improvement

(a) It is advised that different digestive glands of alimentary canals should be taught simultaneously with the major parts. A variety of resources with similar information should be used.

(b) Teachers should use the flow diagram of the types of feed and indicate the characteristics of each feed type. Based on the characteristics of each feed type, it is advised that each feed type should be linked to the type of farm animal as they are also classified according to the digestive system.

(c) In the teaching of a nutritive ratio, teachers are encouraged to emphasise implications of both a narrow and wide ratio and its suitability regarding growth, production and maintenance.

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(d) In the teaching of total digestible nutrients (TDN), it is advised that teachers should indicate that a protein is a nitrogenous nutrient while carbohydrates and fats are classified as non-nitrogenous nutrients. This will assist learners with subtracting the protein from the total digestible nutrients (TDN).

(e) Teachers need to integrate data response questions when assessing learners on fodder flow so that they can become familiar with the terminology and key verbs in the questions, thereby gaining confidence in responding appropriately to questions such as Q 2.5.1.

(f) Teachers should impress upon learners that buying feed is not an economical way to ensure that there is sufficient supply of feed. A viable precautionary measure would be to plan in advance to avoid shortages in fodder requirements. This might involve selling livestock or changing the production cycle of the farm animals.

(g) Regular informal assessment on calculations and units of measurement is essential. Learners must be required to undertake regular practice of even the most basic calculations.

(h) Teachers are advised to use a table to list examples, deficiencies, sources and forms of supplements in order to consolidate learners' knowledge on the topic of mineral and vitamin supplementation.

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Common errors and misconceptions

(a) In Q3.1.2, candidates compared the density of the sheep population to other farm animals instead of the number of sheep to the area they occupy.

(b) In Q3.1.4, some candidates did not show how they calculated the total number of farm animals before obtaining the percentage of sheep on the farm.

(c) In Q3.2.1, candidates could not identify the missing details in the table analysing three animal diseases.

(d) In Q3.2.2, candidates were required to refer to the table to identify the roles of the state in controlling the specified diseases. They included general state services such as 'quarantine' instead of referring to those in the table.

(e) In Q3.4.1, candidates were expected to provide the range of the number of days it would take the lambs to gain 1,8 kg. Many candidates inappropriately provided a specific number of days instead of the range of days, i.e. 8-24 days.

(f) In Q3.4.2, candidates were expected to tabulate the information from a graph. A general mistake was that they did not provide a heading for the table, while some candidates lost marks due to wrong grouping of weight and days.

(g) In Q3.5.3, candidates could not appropriately name the apparatus used to castrate young rams.

(h) In Q3.5.4, some candidates wrote 'shelter' instead of 'shed' as a structure to protect sheep against adverse weather conditions.

(i) In Q3.6.1, most candidates gave an incorrect identification of the parasite since they did not analyse the introductory statement in Q3.6. A clue was given that the parasite was not a tick as it was referred to as microscopic.

(j) In Q3.6.4, some candidates did not earn full marks because they could not indicate two economic influences of the parasite on animal production.

Suggestions for improvement

(a) Teachers are encouraged to ensure that the specific roles of the state are demarcated from any other measure to control diseases and parasites.

(b) In teaching graphs, it is advised that all basics of drawing, plotting, analysing and interpretation are thoroughly taught, revised and assessed.

(c) In the teaching of animal handling, teachers should emphasise the different techniques, tools or structures utilised to handle farm animals. Learners should also be exposed to demonstrations of the actual devices.

(d) Besides simply focusing teaching on the types of diseases and parasites, teachers should also emphasise the impact these have on production enterprises.

QUESTION 4: ANIMAL REPRODUCTION

Common errors and misconceptions

(a) In Q4.1.2, candidates could not interpret the requirements of the question to identify visible stimuli during milking. Some responses referred to non-visual factors, e.g. the sound of the milking machine or the sound of the calf.

(b) In Q4.2.2, candidates were unable to apply the content knowledge of each stage of the oestrus cycle to the characteristics that were provided in the flow diagram. Instead, they matched the characteristics with one another or simply listed the stages in chronological order.

(c) In Q4.3.2, candidates incorrectly indicated that the cell represented by D is a 'cloned cell'. Others incorrectly indicated that it was a 'zygote' or referred to it as a 'fertilised cell' instead of a 'fused cell'.

(d) In Q4.4.2, candidates were unable to identify the apparatus represented by C, which is a nitrogen flask.

(e) In Q4.4.3, some candidates responded incorrectly by giving characteristics and qualities of good semen other than the basic requirements for the collection of semen, while others provided the characteristics of a bull.

(f) In Q4.5.1, candidates confused synchronization of oestrus with superovulation or artificial insemination. They failed to interpret that the injection of prostaglandin is only applied to the technique of synchronizing oestrus.

(g) In Q4.5.2, candidates were required to state the disadvantages of synchronization of oestrus. Responses indicated that they were guessing by providing disadvantages of artificial insemination, embryo transfer and cloning.

(h) In Q4.6, some candidates could not differentiate between the lack of libido and permanent sterility.

Suggestions for improvement

(a) In the teaching of milk production, milk ejection and milking, learners should be taught that anything that is visible is what can be seen in a real-life situation. Teachers are also encouraged to take learners on educational excursions to observe these and other related processes.

(b) In presenting the oestrus cycle, synchronization of oestrus cycle, artificial insemination, stages of pregnancy, embryo transfer, parturition and other reproductive processes, teachers should use flow diagrams, projections and schematic representations to identify key characteristics, hormones and processes.

(c) Teachers must clearly differentiate between 'sterility' and 'infertility' in male and female animals.

3.6 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

General comments

(a) There was a remarkable decline in the performance of candidates in Q1. Candidates were generally confident in this question in past years, but the decline this year is mainly due to a lack of knowledge of subject terminology.

(b) Q2 and Q3 reflected encouraging improvement, while the performance in Q4 was satisfactory.

General suggestions for improvement

(a) The teaching of genetics should be enhanced by providing practical examples within the learning site, such as plants, flowers and livestock. There should also be integration with Life Sciences, as genetics is taught comprehensively in Life Sciences.

(b) Teachers must ensure that all topics stipulated in the *CAPS* are comprehensively covered. Learners should also be encouraged to undertake a questioning approach, to learn from real-life situations and to undertake informal extra research.

(c) Strategies to enhance learners' skills in understanding terminology, and mathematical and arithmetical calculations and procedures have been covered in this report. These strategies are particularly relevant to topics covered in this paper.
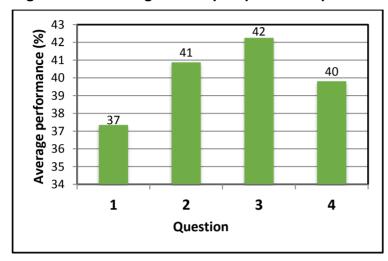
3.7 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2
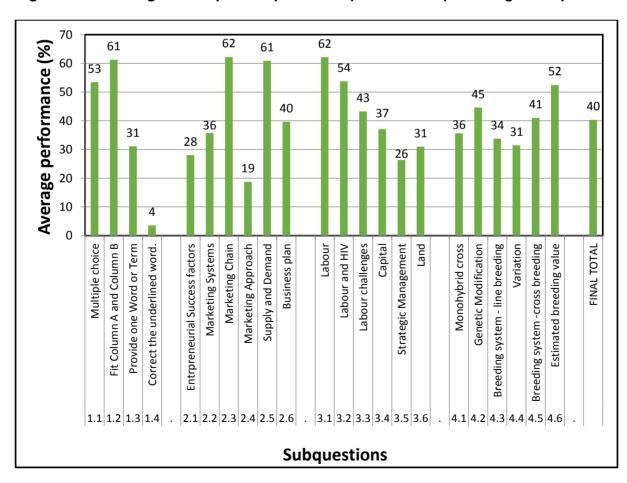
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Figure 3.7.1: Average marks per question expressed as a percentage in Paper 2

Q1	Short questions
Q2	Agricultural Management & Marketing
Q3	Production Factors
Q4	Agricultural Genetics

Figure 3.7.2: Average marks per subquestion expressed as a percentage in Paper 2

3.8 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 2

QUESTION 1: SHORT QUESTIONS (AGRICULTURAL MANAGEMENT & GENETICS)

Common errors and misconceptions

(a) In Q1.1.4, candidates provided random answers and could not give the correct combination of statements applying to the supply of a product.

(b) In Q1.1.7, candidates could not provide the correct combination of statements applying to the Unemployment Insurance Act.

(c) In Q1.1.10, most candidates were unable to provide the correct response regarding mutagen.

(d) In Q1.2.4, candidates could not interpret that a 50 kW tractor is too small to cultivate 1 500ha of land. They therefore could not associate this with undercapitalisation.

(e) In Q1.3.1, candidates were required to provide a term for the financial statement that summarises the assets and liabilities of a farming enterprise. They confused a 'balance sheet' with an 'income statement' or 'cash flow statement'.

(f) In Q1.4, most candidates failed to provide relevant substitutes for the underlined words.

Suggestions for improvement

(a) In the teaching of supply and demand, teachers should always integrate both the demand and supply curves in determining the price of a product.

(b) Subject terminology is a serious challenge and this has been the case for many years. It is therefore recommended that it should form part of daily teaching, learning and assessment. This will also assist in the understanding of concepts such as balance sheets, income statements, cash flows and budgets.

(c) Learners should be taught the conditions that are addressed in the various Acts of labour legislation. This should be done through case studies and scenarios.

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Common errors and misconceptions

(a) In Q2.1.1, candidates could not identify the entrepreneurial success factors to link them to the different options in the diagram. Some candidates misinterpreted the diagram and responded inappropriately by giving the success factors associated with the personal characteristics of a manager, such as ability to plan and coordinate, implementation, monitoring and decision making.

(b) In Q2.2.1, candidates had difficulty in linking the descriptions provided in the diagram with the marketing functions even though the answers were embedded in the descriptions. This clearly

indicated an inability to use knowledge of the marketing functions, namely transport, storage, packaging and processing, to answer the question.

(c) In Q2.2.4, candidates failed to apply knowledge of the disadvantages of the marketing system in advising the farmer on how to improve his marketing strategy.

(d) In Q2.3.1, candidates might have had knowledge of the concept of marketing chain but could not link it to marketing process.

(e) In Q2.3.4, candidates failed to respond to the question specifically regarding transport; instead they referred to general factors that could hamper marketing, such as packaging.

(f) In Q2.4, candidates failed to identify both marketing approaches using the examples given.

(g) In Q2.5.1, candidates generally responded well to the drawing of the graph although some candidates reflected various shortcomings such as an incorrect heading, a histogram instead of a bar graph, manipulation of the axes, especially the y-axis, and confusing the x and y-axes.

(h) In Q2.6.1, some candidates could not define the term 'business plan'. Instead, they provided long descriptions of what a business plan is used for.

Suggestions for improvement

(a) Teachers are advised to clearly demarcate entrepreneurial success factors from managerial skills.

(b) Learners should be taught to analyse diagrams, sketches, flow charts and to look for relevant information in the question, rather than attempting to recall answers from textbooks, notes or past papers.

(c) It is very important to teach content holistically and not per topic in a vacuum, therefore making it possible for learners to see the connection between different topics relating to the same content. For example, the marketing chain should be taught in conjunction with marketing functions such as packaging, transportation, processing and storage (retailing).

(d) Using real-life scenarios in the teaching of marketing approaches (i.e. niche, mass and multi segment) will enable learners to describe the size of the target market.

(e) When teaching the drawing of a graph, it is important that learners be made aware that the independent variable should always be on the x-axis and the dependent variable should be on the y-axis. When drawing the graph, the following criteria should be taken into consideration:

- Correct heading

- Type of graph (bar/line)

- X-axis correctly labelled

- Y-axis correctly labelled

- Correct units on both axes

- Accuracy

(f) Teaching of a business plan should be done by emphasising the fact that it is a document. Furthermore, it should be emphasised that it is the basis and intention of the business.

QUESTION 3: PRODUCTION FACTORS

The improved performance can be attributed to candidates doing well in questions relating to labour. However, there were subquestions where candidates did not respond appropriately.

Common errors and misconceptions

(a) In Q3.1.1, some candidates linked Job 1 with a leader, supervisor and even a managing director. This indicates that candidates have limited skills in using terminology related to the farming industry and positions.

(b) In Q3.1.4, candidates failed to identify the type of temporary labourer and gave the job performed by the temporary labourer instead.

(c) In Q3.2.1, candidates failed to identify the trend of HIV/Aids infections given in the graph. Some responded only to the one side of the trend omitting the rest, losing marks due to lack of interpretation skills.

(d) In Q3.2.3, candidates had difficulty in naming the results of a HIV/Aids infection on the productivity of farm workers. They responded by stating how it is spread.

(e) In Q3.4.2, candidates could not calculate the interest on the loan and therefore could not calculate the amount of money that needs to be repaid after a year.

(f) In Q3.4.3, candidates found it very difficult to identify exactly what they had to calculate. They could not convert the weeks into months and link the eggs that are sold to the selling of broilers for three months.

(g) In Q3.5.1, candidates' responses indicated they did not understand what a business strategy is; instead, they provided reasons for the development of a business plan.

(h) In Q3.6.1, candidates did not know the term 'no-till practice' and most of them responded by indicating that there was low water surface movement, which is actually a result of the 'no-till practice'.

(i) In Q3.6.2, candidates provided answers that do not relate to the given case study. They provided answers such as 'irrigation', instead of 'water management' and 'adaptation measures', to increase the land productivity.

Suggestions for improvement

(a) In the teaching, learning and assessment of labour as a production factor, all aspects pertaining to labour (i.e. term, types, problems, increasing labour productivity, legislation and labour contract) should be considered as prescribed.

(b) Interpretation of graphs and application of knowledge should be emphasised through regular integration into informal assessment.

(c) Learners should be taught to interpret calculations based on scenarios and to be able to identify figures which relate to different items like profit and loan. They should also be taught basic rules in performing calculations.

(d) Learners should be taught how to interpret and extract information from scenarios and case studies. This could be done by infusing such data response questions in their informal assessment.

QUESTION 4: BASIC AGRICULTURAL GENETICS

Common errors and misconceptions

(a) In Q4.1.1, candidates failed to identify the type of dominance illustrated in the diagram. In their responses, candidates confused 'incomplete dominance' with 'co-dominance'. They consequently had difficulty in providing the two reasons for their answers in Q4.1.2.

(b) In Q4.1.3, candidates performed poorly because they did not know the gender symbols for male and female. Their responses were inappropriate as they did not arrange the phenotype in accordance with the gender of the parents.

(c) In Q4.2.1, candidates lost marks because they presented general benefits of genetic modification (GM) without considering the crop given in the case study.

(d) In Q4.2.3, candidates performed poorly because they could not differentiate between the negative effects of GM to the environment, and social and health issues.

(e) In Q4.3.2, candidates failed to provide the benefits of upgrading. They also confused 'upgrading' with 'cross-breeding'.

(f) In Q4.4.1, some candidates could not identify the phenomenon of variation.

(g) In Q4.4.2, candidates could provide only one reason for the possible external causes.

(h) In Q4.4.3, candidates failed to state the importance of variation in plant breeding; instead they provided the importance of cross-breeding.

(i) In Q4.5.2, candidates performed poorly because they were not able to justify a reason for the type of breeding (i.e. cross-breeding) in Q 4.5.1.

(j) In Q4.5.4, candidates failed to understand that the question called for disadvantages of inbreeding, because they could not identify the breeding system (i.e. inbreeding).

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Suggestions for improvement

(a) Teachers should pay special attention to basic genetic concepts and terminology and unpack them through practical examples.

(b) The different breeding systems should be taught to learners using real-life agricultural examples. Learners should also be taken to breeding stations for practical exposure. Teachers are also encouraged to teach these systems concurrently. In this way, learners will be able to understand the concepts better and to differentiate between the different systems.

(c) Visual media should be integrated into the teaching of phenomena such as variation, to enhance understanding.

CHAPTER 4
BUSINESS STUDIES

The following report should be read in conjunction with Business Studies question paper of November 2017 examinations.

4.1 PERFORMANCE TRENDS (2014 – 2017)

The number of candidates who wrote the Business Studies examination in 2017 decreased by 30 045 candidates compared to that of 2016. The Performance of candidates in Business Studies has been on a decline in the past four years and has dropped from 77.9% in 2014 to 68% in 2017 at the 30% level; and from 53.8% to 42.7% at the 40% level. This declining trend in performance is a cause for concern and needs to be halted and reversed.

Table 4.1.1 Overall achievement 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
2014	207 659	161 723	77,9	111 743	53,8
2015	247 822	187 485	75,7	127 453	51,4
2016	234 894	173 195	73,7	116 225	49,5
2017	204 849	139 386	68,0	87 535	42,7

A major contributory factor is the lack of ability of candidates to interpret requirements of questions, and to appropriately formulate their responses.

Some candidates still lack the ability to incorporate original and recent examples to support their arguments and viewpoints. It is important that teachers use practical, recent and relevant examples to explain the nature, purpose, impact, discriminatory actions, rights and/or compliance to the Acts. Learners should be able to gain insight and highlight the the impact of these Acts on businesses and not confuse the Acts.
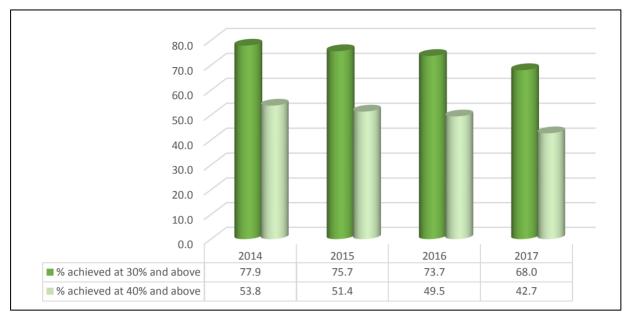
Many candidates did not understand the rationale for scenarios in section C and were inclined to repeat words from these scenarios either in the introduction, body or conclusion. Some candidates could not interpret scenarios in section B and could therefore not adequately respond to follow-on questions. It is imperative that problem solving and analytical skills receive special attention in teaching and learning to enable learners to respond to the requirements of these questions.

However, in spite of these shortcomings, there has been a noticeable improvement in essay writing, an aspect of the paper that was previously regarded as challenging. Candidates seem to be well prepared in the layout of their essays and the ability to respond to the requirements of subquestions, especially in Business Ventures, Business Roles and Business Operations.

Graph 4.1.1 Overall achievement in Business Studies (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	77.9	75.7	73.7	68.0
■ % achieved at 40% and above	53.8	51.4	49.5	42.7
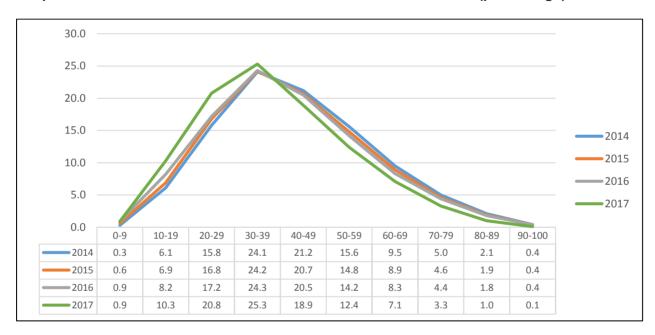
Graph 4.1.2   Performance distribution curve in Business Studies (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0.3	6.1	15.8	24.1	21.2	15.6	9.5	5.0	2.1	0.4
2015	0.6	6.9	16.8	24.2	20.7	14.8	8.9	4.6	1.9	0.4
2016	0.9	8.2	17.2	24.3	20.5	14.2	8.3	4.4	1.8	0.4
2017	0.9	10.3	20.8	25.3	18.9	12.4	7.1	3.3	1.0	0.1

4.2 OVERVIEW OF LEARNER PERFORMANCE

General comments

(a) The Candidates performed well in the Section A questions. However, performances varied from average to poor in Section B, and good to average in Section C essay questions. Candidates appeared to be better prepared in the writing and presenting of essays.

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(b) The inability to analyse and interpret scenarios in Section B questions resulted in the misinterpretation of the requirements of scenario-based questions. This also negatively impacted on the candidates' ability to respond to follow-on questions.

(c) Due to poor understanding of the requirements of particular verbs, many candidates misinterpreted questions. Key verbs such as *quote*, *outline*, *identify*, *elaborate*, *analyse* (the effectiveness) and *discuss* (the implications) posed a challenge. Many candidates could not quote from the scenarios and only included key words or their own summaries based on information in the scenarios.

(d) Although they performed well in some essay questions, some candidates simply copied words from pre-amble statements into their introductions and/or conclusions. At times, facts from the introduction and/or conclusion were repeated in the essay. The 'originality' marks (2) could not always be awarded, as candidates either did not support their arguments with relevant or original examples, or could only supply examples from the scenario given in the questions.

(e) Poor performance was recorded in questions that were phrased differently from past papers. Some candidates used words that were in the paper to answer the questions. Some candidates did not read subquestions in full which impacted negatively on the manner in which they responded to questions such as Q2.3.3, Q3.5, Q4.4.3, Q5.3, and Q6.4 and Q10.3.

(f) Many candidates had difficulty in answering middle- and higher-order questions that required application of knowledge and insight. Questions such as Q2.5, Q2.7, Q4.5, Q4.7, Q6.2, Q7.3, Q7.5, Q9.2 and Q9.4 have been asked many times in past papers. It appears as if learners were not properly prepared on how to respond to direct and indirect higher-order questions during the academic year.

(g) Candidates did not perform well in four questions that were asked for the first time, even though they were pitched at a relatively low cognitive level. It appeared that these sub-topics were not adequately assessed during the academic year. Furthermore, adequate resources for these topics may not have been readily available. Some candidates could have lost marks due to incorrect numbering of subquestions in Section B.

General suggestions for improvement

(a) Section A questions should form an integral part of both informal and formal assessment. Teachers should ensure that the level of difficulty of these questions range from low to high. Learners should not assume that short questions are easy as this may discourage them from reading the questions carefully.

(b) Teachers are advised to include scenarios and short statements when administering informal and formal assessment. They should first read and analyse scenarios with the learners before reading and analysing the questions that follow. Learners may be requested to formulate their own questions based on the scenario which would help them to have a better understanding of the rationale behind scenarios. Teachers should then develop structured follow-on questions.

(c) Learners must be taught the meaning of the action verbs that are commonly used in the Business Studies papers and the *2017 Examination Guidelines*. Teachers are advised to use as many past papers as possible that assess the same topic using different action verbs. These

verbs should be included in both informal and formal assessment. This will enable learners to form a better understanding of the meaning and scope of cognitive verbs. Teachers are requested to refrain from using the words *what, how, why* during informal assessment as this does not prepare candidates for formal assessment.

(d) It should be noted that, although past papers may cover the same content, they may have different foci, e.g. the answer to *analyse the effectiveness* will include positive and/or negative facts depending on the nature and context of the question.

(e) All types of assessment both formal and informal should include the three levels of cognitive demands and levels of difficulty, e.g. lower, middle and higher order. The *CAPS* requirements of 30% (low), 50% (middle) and 20% (higher) order verbs should be adhered to. Teachers should ensure that these verbs are also included in both direct and indirect questions.

(f) Teachers are requested to refrain from over-reliance on past papers when setting informal and formal assessment. Learners should be exposed to different ways of asking questions. Teachers are advised to adjust past NSC marking guidelines according to questions in their own papers.

(g) Teachers should teach and assess all content prescribed in *CAPS* and the *2017 Examination Guidelines.* Subject advisors are requested to monitor the quality of assessment tasks during on-site visits. They should also support teachers in developing quality assessment tasks that assess all Grade 12 prescribed content.

(h) Teachers and learners should acquaint themselves with various types of questions in recent exam papers. They should explain the meaning of new instructions so that leaners will be able to present a well-designed answer.

(i) Learners must be instructed to number questions both in correctly as they will be loose marks if answers are numbered incorrectly in both formal and informal assessment. They should be advised to read instruction number 3 in the November 2017 NSC paper before answering questions.

(j) There needs to be a greater emphasis on the learning of appropriate terminology related to the various topics. Teachers should use the following strategies to improve the teaching of terminology:

- Illustrate the meaning of new terms by using them in sentences and in short scenarios.

- Identify new terms in every lesson, write them on the board and elaborate on the meaning and context of each.

- Encourage learners to be attentive during lessons, to spot new terms and to find the meaning in a dictionary or textbook. This may form the basis of an informal class 'competition'.

- Learners should compile a glossary at the back of their notebooks, i.e. a list of new terms per topic, with a brief but clear definition next to each term. A separate notebook for this
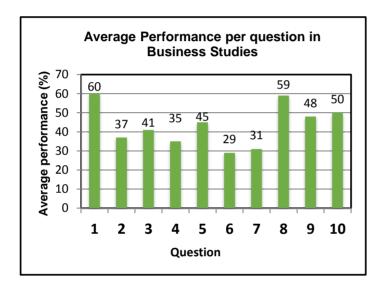
purpose may also be kept. By the end of a year, all learners should have a comprehensive glossary of all the relevant terms.

- Include Business Studies terminology in all informal assessment tasks on a daily basis.

4.3 DIAGNOSTIC QUESTION ANALYSIS

The graph below 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 4.3.1 Average marks per question expressed as a percentage

Average Performance per question in Business Studies

Question	Average performance (%)
1	60
2	37
3	41
4	35
5	45
6	29
7	31
8	59
9	48
10	50

Section A: Compulsory	
Q1	Compulsory (Multiple choice, choosing correct words and matching columns)
Section B: Choice questions (Any three)	
Q2	Business Environment
Q3	Business Ventures
Q4	Business Roles
Q5	Business Operations
Q6	Miscellaneous
Section C: Choice questions (Any two)	
Q7	Business Environment: Legislation
Q8	Business Ventures: Insurance
Q9	Business Roles: Human rights and Diversity
Q10	Business Operations: Human Resources
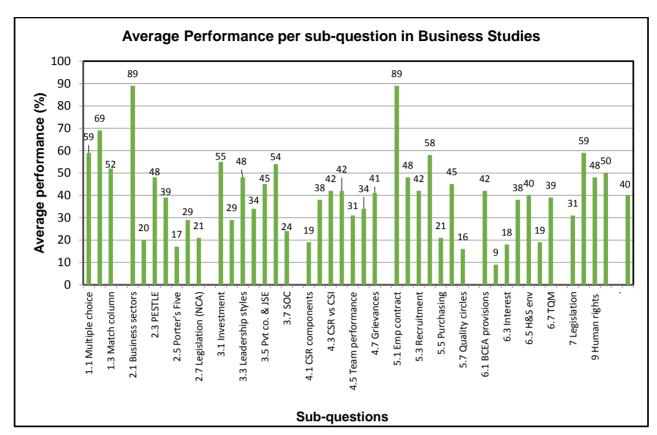
Figure 4.3.2 Average marks per subquestion expressed as a percentage

Average Performance per sub-question in Business Studies

4.4 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS

SECTION A: MULTIPLE CHOICE/SHORT ANSWER QUESTIONS

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

The performance of candidates in this question ranged from excellent to moderate. Some candidates chose incorrect answers because they did not read the instructions and each subquestion carefully.

Common errors and misconceptions

(a) Some candidates presented two options as answers in Section A questions, especially in Q1.1 and Q1.2. No marks were awarded for these answers.

(b) In Q1.1.1 many candidates did not know the role of SETAs and confused it with the Skills Development Act (SDA).

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(c) In Q1.1.2 some candidates confused the Consumer Protection Act (CPA) with the National Credit Act (NCA).

(d) Many candidates did not know the meaning of a prospectus in Q1.1.3 as it is covered in Grade 11 and recapped in Grade 12.

(e) In Q1.1.9 candidates confused the definition of *quality management system* with *quality control.*

(f) Many candidates did not know the placement procedure in Q1.1.10 as they confused it with the recruitment procedure.

(g) Many candidates did not rewrite the full statement/word(s) as given in Q1.2 and therefore did not obtain any marks.

(h) Some candidates found it difficult in Q1.2.3 to identify the stages of team development from a given statement.

(i) In Q1.2.5 many candidates could not identify the backward integration strategy and confused it with either the forward or horizontal integration strategies.

Suggestions for improvement

(a) Section A (Q1) assesses all four main topics equally in content and cognitive levels, therefore teachers should align their teaching and assessment accordingly.

(b) Teachers should emphasise the fact that only one answer per question is acceptable in Section A. Learners should therefore refrain from presenting more than one option as no marks will be awarded even if one of these options is the correct answer.

(c) A clear distinction should be made with regard to the role of SETAs and the Skills Development Act. It should be noted that SETAs are responsible for the implementation of the SDA and can appoint accredited service providers. SETAs do not train employees.

(d) The differences between NCA and CPA also forms part of Grade 10 content. Learners should know that the NCA is applicable to the purchasing function and the CPA to the marketing function.

(e) All topics related to quality should be taught using practical examples. Teachers should regularly identify key words that are applicable to each concept.

(f) The placement procedure takes place after the recruitment procedure has been completed and is done to ensure that the skills and qualifications of new employees are in line with the requirement of the job.

(g) Teachers should emphasise that word(s) or statements given in Q1.2 should be used as given in the question to obtain full marks.

(h) Various verbs should be used when assessing the stages of team development. Case studies and scenarios should be used to consolidate the required knowledge of the various stages.

Team stages should be taught and assessed thoroughly in Grade 11 so that it can be recapped and adequately assessed in Grade 12.

(i) Teachers should teach the different types of strategies using practical and recent examples taken from news articles and other relevant resources. Once learners understand each strategy, they should be able to explain, discuss and/or apply all the types of business strategies from given scenarios/short statements.

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

QUESTION 2: BUSINESS ENVIRONMENT

The performance of candidates who attempted this question varied from average to poor, as content in this main topic tends to be abstract e.g. legislation and strategies.

Common errors and misconceptions

(a) In Q2.1 some candidates confused the business sectors with the business environments. This question was a lower-order question and candidates were expected to perform well as this subtopic progresses from Grade 10 to 12.

(b) Many candidates confused the steps in the development of a strategy in Q2.2 with either the steps in strategy evaluation or problem-solving steps. This question had not appeared in recent NSC question papers, so candidates were not adequately prepared for it.

(c) In Q2.3.1 some candidates could not quote the challenges given in the scenario. They also had difficulty in Q2.3.2 to link a PESTLE element to each quoted challenge. It appears that candidates were unable to read the scenario with understanding and insight.

(d) In Q2.3.3 many candidates provided vague or negative recommendations on how businesses could deal with the identified challenges in Q2.3.1 due to poor understanding and insight of the scenario.

(e) In Q2.5 many candidates found it difficult to apply the given forces of the Porter's Five Forces model. They either explained the meaning of the force or recommended strategies to deal with these forces. Candidates were expected to perform well in this question as a similar question appeared in the 2016 NSC examination.

(f) Some candidates confused the Labour Relations Act (LRA) with the Basic Conditions of Employment Equity Act (BCEA) in Q2.6. This could be attributed to the fact that they could not read the scenario with the necessary understanding and insight.

(g) In Q2.6.2 some responses from candidates were based on either the functions of trade unions or ways in which businesses can comply with the LRA. These responses were not expected as this question has appeared frequently in past papers.

(h) In Q2.7 many candidates confused ways in which businesses can comply with the National Credit Act (NCA) with strategies on how businesses can manage credit. They either explained the purpose of the NCA or the implications of consumer rights which were not part of the question.

Suggestions for improvement

(a) A clear distinction should be made between business environments and business sectors. Learners should know that businesses can be part of the primary, secondary and/or tertiary sectors (classification of businesses). However, every business has internal and external factors that affect its operations at various levels, i.e. micro, market and/or macro environments.

(b) Learners should first be taught the rationale behind a strategy before they can be taken through the steps of developing a strategy. It should also be noted that strategy evaluation is part of the process of strategy development. Therefore the steps for strategy development should not be confused with the steps for evaluating a strategy.

(c) Teachers should ensure that learners know the meaning of each force, i.e. define the force and explain how businesses apply/use it to analyse their position in the market environment. Practical examples should be used to explain each force e.g. buyers who buy in bulk have more power to dictate the terms and conditions of sales (power of buyers). Learners should not merely list strategies to deal with the challenges of the market environment, but should focus on how businesses can analyse the market environment in order to identify their competitive advantage.

(d) Teachers should use past NSC papers to demonstrate how learners should quote in full, analyse and interpret scenarios to be able to answer the follow-on questions.

(e) The functions of trade unions are covered in Grade 11 and therefore do not form part of the LRA in Grade 12. It should be noted that this Act provides for the establishment of trade unions and employer organisations.

(f) Learners should be able to explain the differences between the NCA and CPA in terms of their nature, purpose and impact on businesses. This will enable learners to suggest practical ways of complying with each Act.

(g) A differentiated approach to regular informal and formal assessment should reinforce learners' skills of responding to direct and indirect questions.

QUESTION 3: BUSINESS VENTURES

Leaner performances ranged from average to poor, even though only two subquestions appeared for the first time in this exam paper.

Common errors and misconceptions

(a) Many candidates merely listed or explained the different types of shares in Q3.2 instead of outlining the rights and/or limitations of preference shareholders. They were not previously exposed to this question as it was asked for the first time.

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(b) In Q3.3.1 and Q3.3.3 many candidates could not identify the relevant leadership style from each given statement. Candidates confused the leadership styles with theories for management and leadership.

(c) Some candidates had difficulty in Q3.4 to explain the role of personal attitude in successful leadership. They confused the role with either the qualities of a good entrepreneur or simply made general statements on leadership. This question appeared frequently in past papers, but it remains a challenge to many candidates.

(d) In Q3.5 many candidates did not read the scenario with understanding as they confused the private company with the public company. This could be attributed to the fact that language across the curriculum is still a challenge. It also seems that many candidates did not read the scenario to the end.

(e) Many candidates performed well in Q3.6.1 but some confused factors to be considered before doing a presentation with those during and after the presentation. Candidates were expected to perform well in this question as this sub-topic often appears in past papers.

(f) In Q3.6.2 many candidates could not suggest aspects to be considered when designing a multimedia presentation. They confused it with factors to be considered before doing a presentation. They might not have been exposed to this subtopic as this is the first time it appears in the NSC examination.

(g) In Q3.7 some candidates confused the importance of a state-owned company (SOC) with the role of the government. Candidates might not have studied the details of all the forms of ownership as this topic was supposed to be recapped in Grade 12 as it is Grade 10 and 11 content. Moreover, it is the first time this question appeared in the NSC examination.

Suggestions for improvement

(a) Learners should not only be able to list or name the different types of preference shares but also their rights as indicated in the *2017 Examination*.

(b) Teachers should take note of the listed leadership styles and theories of management and leadership in the *2017 Examination Guidelines*, as textbooks may differ in their classification of styles and theories. Learners should not confuse a transactional leadership style with a transformational theory of management and leadership.

(c) The role of personal attitude in successful leadership should focus on the impact of the leader's positive attitude in motivating his/her followers/employees. Therefore, learners should be taught that personal attitude has to be explained in terms of the relationship between the leader and employees as well as the leader's potential in achieving the desired results.

(d) Teachers should clearly distinguish between factors to be considered *before*, *during* and *after* a presentation. When making class notes on presentations three columns for *before*, *during/while* and *after* on one page should enable learners to understand the various processes of presentations. Learners must use full sentences when suggesting factors to earn full marks. Vague or one word answers should be avoided as it cannot be clearly linked to the *before*,

during or *after* stages of the presentation. Verbs that must be used when assessing presentations should include *outline*, *explain*, *discuss*, *describe*, *suggest* and/or *recommend*.

(e) Teachers should make extensive reference to the *2017 Examination Guidelines* to ensure that all subtopics are taught and assessed during the academic year. It should be emphasised that designing a multimedia presentation is completed before making a presentation and not during or after the actual presentation.

(f) Learners should know that state-owned companies (SOCs) are conducted in the same way as public companies. Learners should be able to give practical examples of SOCs to illustrate their understanding of this form of ownership. Teachers should penalise learners who confuse public institutions, e.g. public hospitals and schools, with SOCs.

QUESTION 4: BUSINESS ROLES

This question was answered satisfactorily and learner performance ranged from average to poor. This was a very popular choice in Section B.

Common errors and misconceptions

(a) Candidates found it difficult in Q4.1 to name the components of CSR as it was confused with the focus areas of CSR. This is a new question in the NSC examination.

(b) In Q4.2 some candidates provided vague responses on the benefits of CSI for businesses. They confused this with the benefits of CSI for the community. They were expected to perform well in this question as it appeared in past NSC exam papers.

(c) Many candidates listed examples of corporate social responsibility (CSR) and corporate social investments (CSI) programmes/projects in Q4.3 instead of distinguishing between these concepts. Some confused CSR with CSI. It seems as if candidates had limited understanding of these two concepts.

(d) In Q4.4, some candidates found the instruction to redraw the table confusing, and some even repeated their strategies below the table with different answers. It was the first time this instruction was used to guide candidates through the process of answering follow-on questions.

(e) Many candidates could not quote the unethical business practices from the scenario given in Q4.4.1. They either summarised or rephrased the business practice in their own words.

(f) In Q4.4.2 some candidates were unable to identify the *types* of unethical business practices linked to the quoted practices in Q4.4.1. It appears that some candidates did not read the question nor the scenario properly as many responses included types of unethical practices that were not relevant to the scenario.

(g) Many candidates provided negative strategies in Q4.4.3 on how business can deal with the identified types of unethical business practices. Candidates are under the incorrect impression that unacceptable or unethical behaviour should be addressed by negative strategies.

(h) In Q4.5 many candidates could only explain the criteria for assessing successful team performance but they could not name the criteria. It appears that they confused the characteristics of a successful team with the criteria for assessing successful teams.

(i) Some candidates could not identify force-field analysis from the given scenario in Q4.6. It seems as if candidates were better prepared in problem-solving techniques that were recently assessed rather than all the techniques as required in the 2017 exam guidelines.

(j) In Q4.7 candidates provided incomplete or vague answers on the correct procedure to deal with grievances. Some confused it with the problem-solving steps and/or the conflict resolution steps. This question appeared frequently in past papers, so candidates should have been well prepared on this sub-topic.

Suggestions for improvement

(a) A clear distinction should be made between the components and focus areas of CSR as the latter informs the former. The community may be an example of a component, and housing would be the focus area thereof.

(b) Learners should not confuse the benefits of corporate social investments (CSI) on businesses with those for communities. Key words such as 'increased sales', 'attract investors' and 'more qualified employees' should be used to explain the benefits of CSI on businesses. The positive impact of CSI on communities should focus on human factors, e.g. job creation and increasing the standard of living.

(c) It should be noted that CSI projects are informed by CSR programmes, which means that the latter (CSR) is a plan and the former (CSI) is the implementation of the plan. Teachers should use various sources when teaching the differences between CSR and CSI to stay abreast with recent developments in this field.

(d) Teachers should ensure that learners refrain from suggesting negative strategies on dealing with unethical business practices. The focus should be on correcting the behaviour rather taking punitive measures.

(e) The criteria for successful teams are clearly outlined in the ATP and *2017 Examination Guidelines*. Teachers should ensure that learners do not confuse these criteria with the characteristics of successful teams. Learners should also understand that some of the characteristics of successful teams are embedded in the criteria for successful teams.

(f) Teachers should teach and adequately assess all the problem-solving techniques in the *2017 Examination Guidelines*, using scenarios and short statements. Learners should know the definition, application and impact of each problem-solving technique on businesses. Teachers are advised to develop new and relevant questions on this topic, rather than over-relying on past papers.

(g) Learners should be able to clearly distinguish between the problem-solving, conflict resolution and grievance procedures and the steps applicable to each procedure. The marking guidelines of past papers and the *2017 Examination Guidelines* may be supportive in this regard.

QUESTION 5: BUSINESS OPERATIONS

Performance of candidates in this question ranged from average to poor, although this topic only consists of two subtopics.

Common errors and misconceptions

(a) In Q5.2 some candidates confused the selection procedure with the recruitment procedure. They had difficulty with the demands of the cognitive verb *outline* and gave one-word answers instead of writing full sentences.

(b) Some candidates could not identify the examples of job description and job specification from the scenario in Q5.3.1 even though a similar question appeared in November 2016 exam paper. They also confused job description with job specification.

(c) In Q5.3.3 many responses included the benefits of medical aid and pension fund to employees instead of the impact of fringe benefits on businesses. It appears as if some candidates misinterpreted this question by referring only to the fringe benefits mentioned in the scenario.

(d) In Q5.4 some candidates were not able to explain the meaning of time-related and piecemeal salary determination methods. They interpreted time-related remuneration as full-time, well-paying employment and piecemeal as part-time, low-paying employment.

(e) In Q5.5 many candidates could not describe the quality indicators of the purchasing function. Their responses included quality indicators of the production function, the stages of product development or a description of the purchasing function.

(f) In Q5.6.2 many candidates had difficulty in explaining the advantages of monitoring and evaluating quality processes as a Total Quality Management (TQM) element. They either provided general and vague responses or discussed the impact of TQM in general. They also confused this with the benefits of a good quality management system that was required in Q5.6.3. This could attribute to the fact that this question was asked for the first time in the NSC examinations. Candidates may have relied heavily on past exam papers and might not have studied this TQM element thoroughly.

(g) In Q5.7 some candidates could not explain the importance of quality circles. Candidates might not have been adequately prepared for this question as it appeared for the first time in Section B.

Suggestions for improvement

(a) Learners should understand that the selection process can only start once the recruitment process is completed. Businesses cannot select the best employees without having advertised the vacancy. Teachers should emphasise the meaning and scope of action verbs such as *outline*, which requires more than *name/list* but less detail than *explain/discuss*. One-word answers are therefore not acceptable when facts have to be outlined.

(b) Teachers should explain the components of the recruitment process. Job analysis can only be successfully executed by compiling a clear *job description* (list of duties etc.) followed by a *job*

specification (list of qualifications and skills) in accordance to the requirements of the vacancy. Practical examples should be used to illustrate the differences between these concepts.

(c) Learner responses to the impact of fringe benefits should not be based on examples of fringe benefits mentioned in scenarios or short statements. The emphasis should be on the advantages and/or disadvantages of fringe benefits on businesses. Teachers and learners should research this topic and give feedback in class to stay abreast with the latest developments in this regard.

(d) The differences between piecemeal and time-related salary determination methods should be explained in terms of how businesses determine 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 (per hour/per day/per week, etc.).

(e) It is imperative that learners know the quality indicators for each business function and how these indicators can contribute to the success or failure of business operations. Quality indicators are practical plans or strategies that are implemented, executed and monitored to ensure quality in the respective business department or function.

(f) The impact of monitoring and evaluation of quality processes forms an integral part of this TQM element. Learners should be able to explain how large businesses use this element to ensure that things get done properly the first time. This is only possible through regular monitoring and evaluation of all systems in the business. Learners should be discouraged from giving general responses such as *increase customer satisfaction*, *increase customer base* and *business image* as these are benefits of a good quality management system.

(g) The benefits of a good quality management system should rather be explained from a business point of view than that of employees. Learners should be encouraged to write full sentences to show the benefit/advantage/positive aspects of their facts.

(h) Teachers should teach quality circles when teaching *continuous improvement to processes and systems* and *team work* as TQM elements. Both these elements focus on improving the quality in the business through human influences. Quality circles will ensure that employees and employers are well informed about quality measures to be implemented to improve all processes and systems in a business. Teachers could refer to the November 2017 NSC marking guidelines to compile class notes on quality circles.

QUESTION 6: MISCELLANEOUS

This question covered all four main topics. This posed a challenge to candidates who did not study the entire curriculum. Responses ranged from average to poor as candidates could not answer all the sub-questions.

Common errors and misconceptions

(a) In Q6.1.2 some candidates did not read the statement correctly as they confused family responsibility leave with maternity leave or leave. It appears as if they only read the statement *three days' leave* without analysing the statement in context. Some candidates misinterpreted

the requirements of the question by giving additional examples of the provisions of the Basic Conditions of Employment Act (BCEA) or merely offered *yes* or *no* responses.

(b) In Q6.2 many candidates defined or explained the types rather than the advantages of intensive strategies as required by the question. Candidates were expected to perform well in this question since it appeared for the first time in the November 2016 NSC paper and they could have used the marking guidelines as a resource in preparing for this exam.

(c) Some candidates used mathematical formulae to differentiate between compound and simple interest or very vague explanations in Q6.3. It appears as if teaching and learning focused only on calculations and not the description of these concepts.

(d) Many candidates found it difficult to identify the public company from the given scenario in Q6.4.1. Some copied *partnership* from the scenario instead of *public company* due to the lack of an in-depth analysis of the scenario. This indicated that they did not study the characteristics, advantages and disadvantages of all the forms of ownership. The incorrect identification of the form of ownership resulted in incorrect responses for Q6.4.2, the follow-on question.

(e) In Q6.5.2 many candidates could not describe other roles of health and safety representatives in the workplace which were not included in the scenario. They confused these roles with methods businesses can use to protect the environment and human health. This question was asked for the first time and candidates were expected to perform well as some answers were included in the *2017 Examination Guidelines* and covered in Grade 11.

(f) In Q6.5.3 many responses were vague and based on compliance with the Compensation for Occupational and Injuries Diseases Act (COIDA). It is also partly covered in Business Environments and it appeared for the first time in this exam paper.

(g) Many candidates could not identify the TQM elements from the statements given in Q6.6. Incomplete phrases (e.g. *skills development*) or names of Acts (e.g. *Skills Development Act)* were presented as answers which cannot be regarded as TQM elements. They also confused *employee involvement* with *top management involvement* as TQM elements. Some candidates attempted to explain rather than identify the TQM elements.

Suggestions for improvement

(a) Teachers should use different approaches/methodologies and assessments in teaching the provisions of the BCEA. Learners should be discouraged from memorising these provisions without understanding the nature and context of each provision. They could also be given scenarios depicting flawed provisions and be required to evaluate these provisions and make recommendations for improvement.

(b) Teachers should first teach the different types of strategies using practical examples. Once learners understand each strategy, they will be able to discuss or explain the advantages and/or disadvantages of each business strategy.

(c) Whilst it is imperative that learners know how to calculate simple and compound interest, they should also be able to explain the differences. Learners should be discouraged from giving the relevant formulae when differentiating between these concepts.

(d) It is important that teachers recap the characteristics, advantages and disadvantages of each form of ownership. *Recap* topics indicated in the CAPS and exam guidelines are also examinable. Teachers should also emphasise certain logical facts,(e.g. a partnership cannot be changed to a state-owned company, or no new CCs can be established.

(e) Health and safety representatives in the workplace are responsible for ensuring that workers are safe in the workplace. They inform employers about possible health/safety issues/hazards so that businesses can act pro-actively and ensure that safety measures are in place in compliance with COIDA. However, they are not responsible for buying safety equipment for employees as this is the responsibility of the business.

(f) Teachers should formulate many statements and short scenarios when assessing TQM elements. Scaffolding of questions using different cognitive levels of demand should be considered in this regard.

SECTION C: ESSAY QUESTIONS (TWO QUESTIONS TO BE ANSWERED)

QUESTION 7: BUSINESS ENVIRONMENT: BUSINESS STRATEGIES

Candidates who attempted this question performed poorly. The question contained four bulleted subquestions. One was asked for the first time, i.e. to analyse the effectiveness of the SDA in supporting the successful implementation of BBBEE.

Common errors and misconceptions

(a) In Q7.2 many candidates provided only one difference between Black Economic Empowerment (BEE) and Broad Based Black Economic Development Act (BBBEE). The majority of candidates failed to explain the main difference. Some candidates stated that both BEE and BBBEE aim at empowering previously disadvantaged people, which is not a difference.

(b) Many candidates confused the impact of BBBEE with the pillars of the Act in Q7.3. It seems as if teaching and learning mainly focused on the pillars and neglected the impact of BBBEE on businesses during the academic year. Candidates presented explanations of the BBBEE pillars as impact of BBBEE on business.

(c) In Q.7.4 some candidates focused more on *supplier* development and less on *enterprise* supplier development (ESD), which implied that their preparation focused on the old pillars of BBBEE. This limited their responses and reduced chances of obtaining more marks in this question. Some candidates also did not understand what was required by the instruction *discuss the implications* (of the required pillars). They also confused ownership with management.

(d) Many candidates did not attempt to answer Q7.5. Those who did answer this question provided vague responses on the effectiveness of the Skills Development Act (SDA) on businesses. Some discussed the disadvantages of SDA instead of advantages. It appears as if they did not read this subquestion in full.

Suggestions for improvement

(a) Teachers should ensure that learners understand the rationale behind the introduction of BBBEE so that they are able to differentiate between BBBEE and BEE. The aim of BBBEE as an Act is to ensure that a wider group of previously disadvantaged people participate in the economy as compared to the BEE approach which only focuses on a few designated individuals. This is why this Act is called '*Broad* Based Black Economic Empowerment Act'.

(b) Teachers are advised to teach the pillars of BBBEE before they introduce the impact of BBBEE on businesses. Practical examples and demonstrations may be used to enhance an understanding of the nature of the pillars. This will enable learners to understand the reasons why businesses will get good BBBEE ratings or face penalties for non-compliance.

(c) Teachers are advised to teach learners the new pillars of BBBEE to increase their scope of knowledge. Learners must be taught the nature and context in which the word *implication* is used in this sub-topic. This means that they should be able to explain the positives and negatives of implementing the pillars.

(d) Skills development is one of the BBBEE pillars and the SDA regulates and supports skills development, which clearly shows a link between SDA and BBBEE. The successful implementation of labour legislation requires the implementation of the SDA to redress the imbalances of the past.

QUESTION 8: BUSINESS VENTURES: MANAGEMENT AND LEADERSHIP

This question was a popular choice in Section C. Performance ranged from excellent to fair. All sub-questions had appeared in various past papers.

Common errors and misconceptions

(a) In Q8.2 many candidates were familiar with *insurance*, but not *assurance* as this was perceived as compulsory insurance. They could not present a clear distinction between the two concepts and merely gave one-word answers, e.g. *short* vs *long*.

(b) In Q8.3 many candidates were able to name three types of compulsory insurance but they could not describe them. Some candidates confused the types of compulsory insurance with examples of long-term insurance or assurance. It was also evident that COIDA as an example of compulsory insurance was unfamiliar to many candidates. Some reference was made to the *workman's compensation fund* instead of the new term *compensation fund*. UIF was confused with pension fund. Candidates were expected to perform well in this question as it has been asked many times in past papers.

(c) In Q8.4 many candidates were able to explain how the average clause is calculated, however, they could not elaborate on the meaning of average clause. Responses included both under- and over-insurance which indicated a lack of understanding this concept. Some candidates explained the meaning of average clause with an incorrect formula.

Suggestions for improvement

(a) It should be noted that *insurance* and *assurance* are both classified as non-compulsory insurance. Insurance refers to short-term and assurance to long-term insurance, therefore one word answers cannot provide detail when making distinctions.

(b) A clear distinction must be made between the examples of compulsory insurance and long-term non-compulsory insurance. Teachers should visually reflect two columns on the board to show the differences between these concepts. Learners should know that there are only three types of compulsory insurance that are enforced by the government.

(c) The average clause applies only to property/assets that are underinsured. Learners should be penalised where they include over-insurance in this clause. It should be noted that reinstatement is only applicable to over-insurance.

(d) Teachers should explain all insurance concepts using practical examples. Learners should be encouraged to visit or research insurance companies and enquire about different types of insurance, long- and short-term insurance or compulsory and non-compulsory insurance. Insurance concepts should be reinforced through formal and informal assessment.

QUESTION 9: BUSINESS ROLES: CREATIVE THINKING

Reponses to this question ranged from fair to poor. The question consisted of four subquestions that all appeared in past NSC exams.

Common errors and misconceptions

(a) Although candidates were able to indicate that workers have rights in Q9.2, some were not able to explain how these rights should manifest in the business. Many responses were general and not related to the implications of human rights in the workplace. The right to information was confused with the consumer right to information in the CPA. The right to privacy was incorrectly associated with the allocation of office space. It appears that candidates did not understand the meaning of the word *implication*. Some candidates offered negative examples of businesses that do not observe human rights.

(b) In Q9.3 some candidates could not name the diversity issues instead they recommended how businesses can deal with diversity issues in the workplace. Some confused diversity issues with ways of promoting cultural rights. This question was asked in the November 2016 NSC exam paper. Candidates were expected to perform better in this question.

(c) In Q9.4 many candidates could not elaborate on the benefits of diversity in the workplace. They provided vague and incorrect responses. Some simply described the meaning of diversity without explaining how it benefits the business. Some discussed types of diversification strategies that are covered in Business Environments.

Suggestions for improvement

(a) Teachers are advised to use practical examples of how businesses can observe human rights in the workplace. Learners should be requested to visit businesses and interview employees to establish the extent to which businesses observe these rights. They should be penalised if they

describe the meaning of each human right without making recommendations on how they can be observed in the workplace.

(b) Learners should not only define the meaning of diversity, but also recommend/suggest ways in which businesses can deal with diversity issues in the workplace. Class debates and group discussions, focusing on the ways businesses could deal with each diversity issue will stimulate application and analytical thinking.

(c) Teachers should first ensure that learners are fully conversant with how businesses can deal with diversity issues, before understanding the benefits of diversity in the workplace. Teachers can use key aspects, e.g. *effective problem-solving*, *increased employee morale* to formulate benefits of diversity.

QUESTION 10: BUSINESS OPERATIONS: HUMAN RESOURCES

The responses of candidates to this question ranged from excellent to poor. This question consisted of four subquestions which appeared in various past papers.

Common errors and misconceptions

(a) In Q10.2 many candidates were not able to explain the meaning of recruitment. Instead, they explained and gave examples of two methods of recruitment. Some repeated the responses that they provided in the introduction.

(b) In Q10.4 many candidates confused the role of the interviewer with the interviewee. Some candidates did not read the entire question, as responses were based on the role of the interviewer either before or during the interview.

(c) In Q10.5 many candidates could not suggest ways in which the human resources function could comply with the Employment Equity Act (EEA). The responses were limited to *equal opportunities*, *inclusivity* and *fair treatment*. It appears as if this topic was not adequately assessed during the academic year. Candidates could not link this Act with compliance which was taught in Business Environments.

Suggestions for improvement

(a) Learners should know the reason why businesses recruit people. It should be noted that before businesses decide on using either internal or external recruitment, they should first determine the purpose of recruitment. This will enable them to elaborate on the meaning of recruitment rather than to simply explain the methods of recruitment.

(b) Learners should clearly understand the concept of *interviewer* and *interviewee*. Teachers are advised to use a two-column table with the role of interviewer in one column and that of the interviewee in the other column. The roles for both parties *before* and *during* the interview should be highlighted in separate rows. Role play should also enhance learners' understanding and insight in this topic. Note that responses such as 'dress code' and 'research on the business' will not be accepted as roles of the interviewee *during* the interview.

(c) Teachers should ensure that learners know how to recommend ways in which businesses can comply with the EEA. This is the first topic in the Grade 12 Annual Teaching Plan (ATP). If EEA compliance is taught well, learners should be able to suggest ways in which the human resources function could comply with this Act.

CHAPTER 5
ECONOMICS

The following report should be read in conjunction with the Economics question papers 1 and 2 of the November 2017 Examination.

5.1 PERFORMANCE TRENDS (2014–2017)

The number of candidates who wrote the Economics examination in 2017 decreased by 27 112 candidates in comparison to that of 2016. The 2017 performance is the best performance since 2014. Seventy one percent (71%) candidates achieved at the 30% level and 42.7% achieved at the 40% level.

Table 5.1.1: Overall achievement rates in Economics Papers 1 & 2

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
2014	137 478	94 779	68,9	53 294	38,8
2015	165 642	112 922	68,2	64 780	39,1
2016	155 908	101 787	65,3	56 794	36,4
2017	128 796	91 488	71,0	55014	42,7

Over the years there has been an improvement in the writing of essays, the open-ended questions that involved the application of knowledge and in the drawing of graphs. However, there are certain areas that require more attention for the results to improve in a meaningful way.

A thorough understanding of all concepts in all topics will greatly enhance performance in both papers, as they form the basis of understanding questions in the various cognitive levels. This has a direct impact on Section A, Section B where concepts are tested as definitions and in Section C where concepts form part of the introduction of the essay. An excellent knowledge of economic terminology results 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 testing in class.

It is imperative that the content of all topics are covered adequately and timeously to ensure sufficient time for revision. It has been found that where most teachers who lag behind in content coverage in topics under economic pursuits and/or contemporary economic issues are not taught thoroughly. Candidates who attempt questions on these topics perform poorly in comparison to other topics. Teachers should structure assignments, projects and case studies in Grades 10 and 11 on difficult topics of Grade 12, e.g. competition and collusion, tourism, economic and social indicators, to promote acquisition of some basic knowledge when these topics are discussed in Grade 12. This is also an area in which teachers must be supported first.
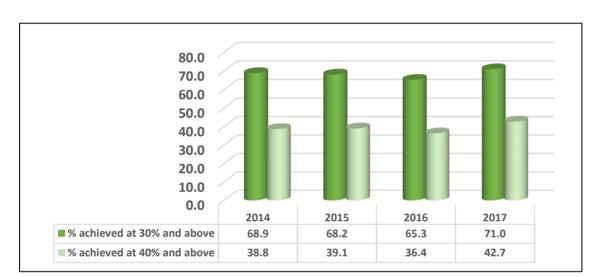
While there has been an improvement in the drawing of graphs, the technical aspects need to be reinforced, for example the correct shape, positioning and labelling of cost and revenue curves in
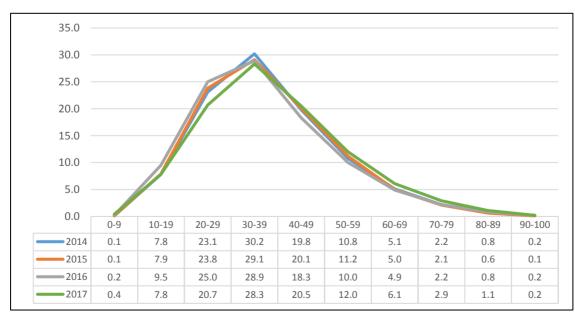
the perfect and imperfect markets. Teachers need to teach graphs by drawing the cost and revenue curves step by step. As each step is done it needs to be explained.   While the teacher draws it first, learners draw step by step in their work books. Emphasis must be placed on the average cost curve (i.e. '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 realize that there is an integration of topics from Grade 10 to 12. Graphs should already have been discussed in the necessary detail in Grades 10 and 11 to ensure a full understanding thereof in Grade 12.

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

Graph 5.1.1: Overall achievement rates in Economics Papers 1 & 2 (percentage)

	2014	2015	2016	2017
% achieved at 30% and above	68.9	68.2	65.3	71.0
% achieved at 40% and above	38.8	39.1	36.4	42.7

Graph 5.1.1: Performance distribution curves in Economics (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0.1	7.8	23.1	30.2	19.8	10.8	5.1	2.2	0.8	0.2
2015	0.1	7.9	23.8	29.1	20.1	11.2	5.0	2.1	0.6	0.1
2016	0.2	9.5	25.0	28.9	18.3	10.0	4.9	2.2	0.8	0.2
2017	0.4	7.8	20.7	28.3	20.5	12.0	6.1	2.9	1.1	0.2

5.2 OVERVIEW OF LEARNER PERFORMANCE: PAPERS 1 & 2

General Comments

(a) A good understanding of tables, extracts, news articles, figures and graphs assisted with the improvement in the performance of many candidates. Candidates were able to complete each paper within the allocated time.

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

- Poor language skills made it difficult for candidates to express themselves, 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 lacked basic knowledge of the general economic issues of the day.

(c) General reasons for poor performance could be attributed to the following:

- **Content coverage:** It is evident from the poor performance of many candidates that many teachers did not cover some of the topics. Basic economic concepts/terminology seemed to be lacking among many candidates and there was a lack of knowledge on current economic topics. For example:

  - Paper 1: Q1.3.6: Return of land to those who have lost it due to discriminatory laws of the past; Q3.2.3: Briefly explain urbanisation as a social indicator.

  - Paper 2: Q3.3.3: Briefly describe the term indigenous knowledge system; Q4.2.4: What does interdependency of businesses in this market structure imply?

- **Exposure to different types of questions:** Skilled learners can write essays and paragraphs and offer their opinions with confidence. These learners have the ability to focus on the information that is relevant to the answering of each question. Teachers play a crucial role in the moulding of their learners to deal with a variety of questions with different cognitive verbs, such as *why*, *how* and *what* and the unlocking of knowledge in a variety of ways. A variety of higher-order thinking skills should be developed in the context of the subject content being taught. Learners should be challenged to solve everyday problems experienced in their own communities. For example:

  - Paper 1. Q3.5: How can the implementation of regional development policies improve the standard of living in South Africa? Q4.5: How can productivity be used more effectively to benefit the South African economy?

  - Paper 2. Q3.5 How effective has inflation targeting in South Africa been to ensure price stability? Q4.5: Explain, by means of a neatly labelled graph, the impact of maximum prices on the market.

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- **Language ability**: Although language deficiency is still a drawback for many second-language candidates, many centres in deep rural areas have excellent 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 the work plan for the year:

(a) **Use of past NSC and CAPS exemplar papers:** In preparation for the 2018 year-end papers, all learners should use past papers for the final examinations (2014–2017) and supplementary examinations (2015–2018) for clear guidance. Teachers should build their own confidence in their ability to deal with each topic in the classroom situation and to assist learners through their teaching. Furthermore, teachers should use the *Examination Guidelines* and *Mind the Gap* as support material when it comes to the scope and depth of content and how to assess learners' understanding of the specific content matter. In cases where old question papers are used for teaching and learning, these should be CAPS compliant and aligned to the changes made in the latest *Examination Guidelines*. Using previous marking guidelines is good as a revision tool but not as a teaching tool. Interpretation of questions is critical; content should be assessed in line with the *Examination Guidelines* continually.

(b) **Basic concepts:** Teachers should ensure that learners understand basic concepts and terminology before engaging in their applications. More time should be spent to improve the reading skills of second-language learners. Learners' understanding of terminology should be assessed on a continuous basis. *Mind the Gap* explains all relevant concepts in detail. A quiz bowl, crosswords or team challenges may be interesting tools to assess knowledge of economic concepts. 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 common questions in future NSC examination papers. For example, if a question requires the drawing or analysis of a well-labelled graph, this must be done to earn the relevant marks for example:

- Paper 1: Explain, by means of a neatly labelled graph, the effect on the value of the rand if there is a sharp increase in the number of South African tourists visiting the USA.

- Paper 2: Explain, with the aid of graphs, the short-run equilibrium positions in the perfect market.

Teachers should familiarise their learners with the new phrasing of questions, e.g. the *what*, *why* and *how* type of higher-order questions. Learners should be guided by the mark allocation in terms of the depth of the answer required. With regard to higher-order questions (especially questions 2.5, 3.5, 4.5 and the additional part of the essay questions), a candidate needs to read the question carefully and highlight the key issues required. Reading the question again will ensure greater accuracy in the candidates' response. Responses need to be formulated and the question should be checked again constantly to ensure the response logically suits it. It is

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not wise to respond immediately after the initial reading of the question. Time must be taken to understand the question clearly, for example:

- Paper 1: Most candidates explained productivity as an economic indicator instead of AA, as requested in the question paper.

- Paper 2: Leaners had to calculate the percentage change in the inflation rate, but instead calculated the change only.

(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 the opinions that are relevant to the context. Refer to the *Examination Guidelines* where typical higher-order questions are provided for example:

- Paper 1: Discuss in detail the New Economic Paradigm.

- Paper 2: How does South Africa use conservation to ensure a sustainable environment?

(e) **The importance of formative testing:** Teachers should build the confidence of learners through the use of short informal formative tests and tasks. Small formative assessment tasks should be used to ascertain whether candidates are able to apply their knowledge, placing emphasis on their own opinion and understanding. This will force learners to take ownership of the learning process (see *Examination Guidelines*: Use of a diagram and discuss the cycle length, amplitude and the trend line as features underpinning forecasting*).

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

- **SECTION A & B:** 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.

- **SECTION C (Essay):** Teachers must stress the importance of the layout of the essay: introduction, body (main and additional part) and a conclusion. There should be a clear distinction between the various aspects with line spacing between them. Using subheadings is crucial as this earns marks. 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 included in the conclusion. 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
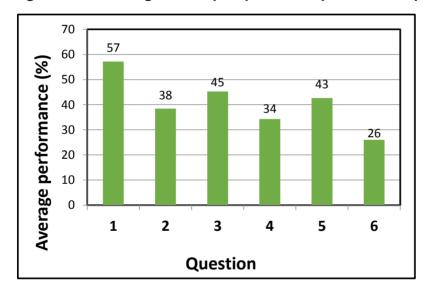
- Subheadings in the main part

- The appropriateness of the additional part

- Relevant conclusion

- Teachers are advised to use a variety of textbooks to prepare notes that supplement material available to learners.

5.3 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

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.

The average performance in question 2, 4 and 6 was very poor. Compared to 2016, the average performance in question 1(section A) was lower. Most candidates answered Questions 3 and 5, where there was an increase in the performance of candidates compared to 2016.

Figure 5.3.1: Average marks per question expressed as a percentage

1	Objective questions
2	Macroeconomics
3	Economic pursuits
4	Macro & Pursuits
5	Macroeconomics
6	Economic pursuits
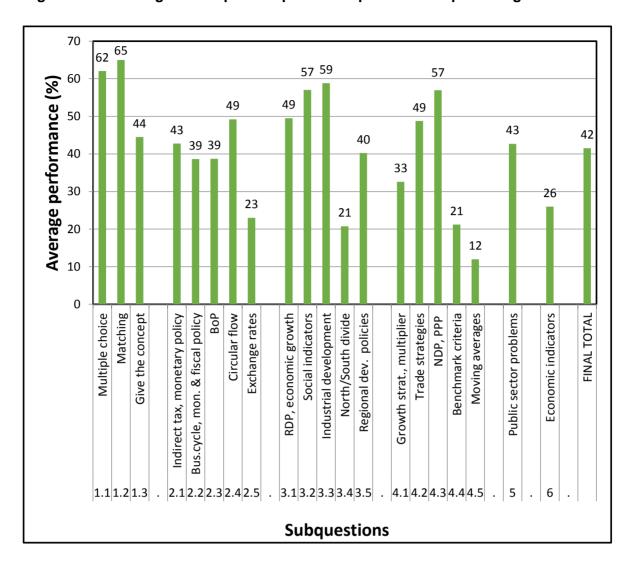
Figure 5.3.2: Average marks per subquestion expressed as a percentage

5.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MACROECONOMICS AND ECONOMIC PURSUITS

Most candidates performed well in Q1. The performance of learners 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) Many candidates used the answer sheet for Q1.

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

could not match the correct answers for *free-floating*, *World Bank* and *repo rate*. Poor performances were recorded for Q1.2.2, Q1.2.3 and Q1.2.4.

(c) In Q1.3, candidates had to give an Economics term for a given statement but they provided an abbreviation instead. Overall the performance was very poor and the marking guidelines accepted only the correct answer with no abbreviations or examples. When candidates provided more than ONE answer they were subsequently awarded no marks.

(d) In Q1.3.2 candidates confused Laffer and Lorenz curves and Q1.3.4 was a good example of typical answers from candidates reflecting broad knowledge, and not in-depth knowledge, of the subject matter. In Q1.3.6, candidates did not know the difference between land restitution and land redistribution.

Suggestions for improvement

(a) Q1 assesses both *Macroeconomics* and *Economic Pursuits.* Candidates' performance in this question gives a clear indication of their subject knowledge. It is imperative that learners first attempt to determine the correct answer to multiple-choice questions 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 the light of this, candidates need to follow instructions like answering Q1 in the answer book and leaving lines between subsections, using the correct numbering system, and not omitting question numbers. This would facilitate the marking of scripts. 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.

(b) Teachers should expose learners to basic economic concepts through short formative tests on basic concepts. Candidates should 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. Teachers should start lessons by testing the previous day's concepts.

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

(d) Difficult topics should be the centre of discussions, e.g. graphs reflecting movement on foreign exchange markets and different strategies and policies.

QUESTION 2: MACROECONOMICS

Common errors and Misconceptions

(a) Candidates could not give two examples of indirect taxes in Q2.1.1 and wrote taxes on income instead. In Q2.1.2, candidates focused on cash reserve requirements rather than aggregate money supply.

(b) Many candidates could not describe open-market transactions as a monetary policy instrument in Q2.2.3 correctly and failed to understand the mechanism of open-market transactions, which is critically important in understanding how monetary policy influences the entire economy.

(c) In Q2.3.3, candidates were not able to explain how South Africa can ensure a net inflow of capital. This question reflects on the movement of capital flow in the financial account of the BoP.

(d) Candidates performed poorly in Q2.3.4 where they were expected to calculate the trade balance. Many candidates were awarded no marks because they just copied the data given in the question paper. This was also true for Q2.4.

(e) Candidates failed to present the correct graph in Q2.5 and give a brief explanation thereof.

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 BoP) and Stats SA, should be studied in detail to ensure that learners know exactly how to prepare themselves thoroughly for the final examination. Candidates should be able to use the information provided to answer questions appropriately (see Q2.3.4 in the calculation of the trade balance). Teachers should provide learners with additional notes on the financial account of the BoP. Learners should note that SDR payments still form part of reserve assets under the financial account.

(b) There is a clear shift towards the candidate's own opinion, interpretation and problem-solving skills as part of data response questions (Q2.2.3, Q2.2.4, 2.3.3 and Q2.3.4). 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. Learners 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. the reaction of the South African rand to the US$ and other stable currencies of the world (see Q2.5).

(c) Learners should be exposed to advanced paragraph-type questions (see Q2.5) and guided on how to express their opinions and to support their responses if required to do so. Full exposure to all the required content is essential. The importance of monetary and fiscal policy in stimulating or dampening the economy must be clearly explained during the teaching and learning process (see Q2.1.2, Q2.2.3 and Q2.2.4). Small formative assessment tasks should be used to ascertain whether candidates are able to apply their knowledge, place emphasis on their own opinions and understanding.

(d) Candidates should read questions carefully to determine what is expected from them (refer to Q2.4 where candidates repeated the question as part of the answer).

QUESTION 3: ECONOMIC PURSUITS

Common Errors and Misconceptions

(a) Many candidates misinterpreted the data-response questions. Most questions demanded thorough reading and interpretation. Candidates found opinion-based questions challenging. They could not list the areas addressed by the RDP (Q3.1.1) and placed the focus on the word areas (in context meaning a range of activity RDP got engaged in). Instead they related to

geographical areas, totally out of context. Language still seems to be a barrier and candidates lose marks due to a poor command of the language and not explaining concepts fully. Many responses are mainly generic and absolutely void of Economics.

(b) Weaker candidates could not explain *urbanisation* as a social indicator (see Q3.2.3) and failed to associate content learnt and its contextualisation. This indicated a lack of general knowledge and interpretation skills (see Q3.2.4, Q3.3.3 and Q3.3.4).

(c) It could be assumed that current economic issues are not discussed in many classes. Candidates' responses were too generic and lacked factual knowledge (see Q3.4). Candidates could not briefly discuss *poverty*, *growth* and *trade* as globalisation challenges that face developing countries (North/South divide). The same question was asked in 2016 and it got the same poor responses.

(d) Candidates were unable to describe topics in sufficient detail to earn marks and gave generic information with no relevance to the implementation of regional development policies used to improve the standard of living in South Africa (see Q3.5).

Suggestions for Improvement

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

(b) Formative tests should be used to ensure that learners are able to understand and define what is meant by *social indicators*, *economic growth*, the *IDC*, *globalisation* and how regional development policies are used to improve the standard of living.

(c) Additional learning material should be given to learners during the academic year. Data provided in data-response questions should be read thoroughly before candidates attempt to answer any questions. A general complaint is that candidates do not know whether the answer appears in the extract or whether they should give their own opinions. If candidates had studied the extracts in Q3.2 and Q3.3, they would have been able to find possible answers to questions Q3.2.1, Q3.2.2, Q3.3.1 and Q3.3.2.

(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 ought to include the why, which, how, when, whom types of questions to teach learners to think beyond typical textbook knowledge.

(e) In Q4.5, most candidates merely listed facts to be implemented by regional development policies to improve the standard of living in South Africa, but ignored how it should be done. They did not answer the 'how' part, they merely listed some facts irrespective of relevance and were awarded a maximum of 2 marks for listing of facts/examples. 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) Most candidates performed poorly in Q4.1.1 where they listed international trade policies instead of growth strategies. Some candidates wrote the formula for determining the size of the multiplier instead of the mpc (see Q4.1.2).

(b) Many candidates could not give the benefits of import substitution for developing countries (see Q4.2.3), and answered Q4.2.4 poorly, although some of the answers appeared in the extract.

(c) Most candidates could not answer the database questions, Q4.3.3 and Q4.3.4, correctly. Interpretation of data seems to be a major stumbling block for learners. Learners lack insight into current economic affairs and questions on issues concerning everyday life (see Q4.3.4).

(d) The responses to Q4.4 were poor mainly because candidates showed a general lack of content knowledge on *good governance* and *competitiveness* as appropriate regional development measures in terms of benchmark criteria. This middle-order question was cited in the *Examination Guidelines of 2017* as a possible essay.

(e) In Q4.5, most candidates included only a brief description of moving averages in the forecasting of business cycles. This question is based on a possible essay mentioned in the *Examination Guidelines of 2017* and therefore candidates should have performed extremely well in Q4.4 and Q4.5.

Suggestions for improvement

(a) Learners need to be prepared to answer higher order questions. Teachers should ensure that learners know what is expected of them, based on the depth of knowledge explained in the Examination Guidelines of 2017.

(b) 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. Teachers should ensure that learners know what is expected of them when a command verb (e.g. argue, analyse, differentiate) is part of a question. Learners lack insight into current economic affairs and should be guided to answer questions on issues concerning everyday life.

(c) Learners should be prepared to select questions from both Section B and Section C. It happens too often that all of the questions in Section B are answered. Instructions need to be explained to learners.

QUESTION 5: MACROECONOMICS

Common errors and misconceptions

Most candidates could provide only general discussions of the problems experienced in the public sector provisioning in South Africa and failed to discuss the problematic nature of each of the

relevant problems (accountability, inefficiency, assessing needs, pricing policy, parastatals and privatisation) in sufficient detail to earn full marks. The additional part of the essay, where candidates had to present methods to resolve unfair distribution of income in South Africa, was not dealt with in sufficient detail.

Suggestions for improvement

(a) Teachers are urged to use the *Examination Guidelines* for 2017 which clearly indicated all possible essay questions for the next 3 years. These essays should be prepared in advance to ensure excellent marks in the introduction and main parts of the essays.

(b) Teachers should encourage learners to read questions carefully before they respond in writing.

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

(d) Over and above literal reading of texts, learners need to be guided to read between the lines, infer and evaluate texts, and use their own words to express their views.

QUESTION 6: ECONOMIC PURSUITS

Common errors and misconceptions

(a) Many candidates focussed on foreign trade and money supply only, but even these topics were poorly discussed.

(b) Production as economic indicator was discussed as productivity. Although production and its subheadings (GDP, real GDP and per capita real GDP) were given in the *Examination Guidelines* and discussed in enough detail in Macroeconomics Topic 1 (for the candidates to earn full marks), candidates could not supply these headings.

(c) The additional part, which demanded higher cognitive thinking skills, was poorly answered by most candidates and referred to a more effective use of productivity to benefit the South African economy.

Suggestions for improvement

(a) Teaching should be done *holistically.* In *CAPS*, page 37, it is clearly stated that '...quantitative elements should be incorporated across all the topics'. Although production as an economic indicator was omitted from being listed as an economic indicator in CAPS, it was added to the *2017 Examination Guidelines* to be discussed under 3 subheadings: GDP, Real versus Nominal GDP and Per Capita Real GDP. Production and all levels of GDP was discussed in enough detail in Macroeconomics, Topic 1, to ensure a top score in this part of the question. Learners must know these concepts in Grade 10, topic 1 unit 3, Grade 11, topic 2 unit 2 and Grade 12 Topic 1, unit 1.
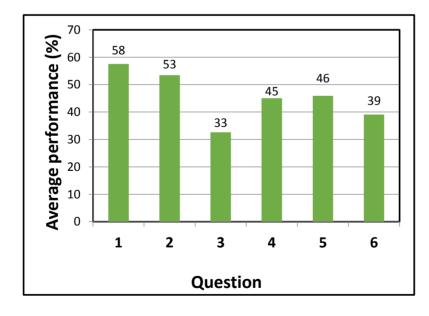
(b) Learners should be guided to analyse the requirements of each question. This will ensure that they do not omit any crucial aspect of the answer. Focus should be on areas that can cause confusion.

(c) 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. Candidates need to improve their evaluation skills. Knowledge about recent developments can assist in making the module more interesting.

(d) Formative tests should be used to ensure that learners are able to understand and discuss all relevant topics. All content for the year should be taught well in advance to ensure enough time for revision. Learners should keep abreast of current news pertinent to aspects of Economics and discuss these regularly in classes.

5.5 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.

A decline in performance in Section A was noted compared to 2016. In Section B, candidates generally performed better in all questions in Sections B and C compared to 2016, except for question 6. Question 6, which was based on Contemporary Economic Issues, showed a marginal decrease in performance.

Figure 5.5.1: Average marks per question expressed as a percentage

Q1	Micro-economics & Contemporary economic issues
Q2	Micro-economics
Q3	Contemporary economic issues
Q4	Micro-economics & Contemporary economic issues
Q5	Micro-economics
Q6	Contemporary economic issues
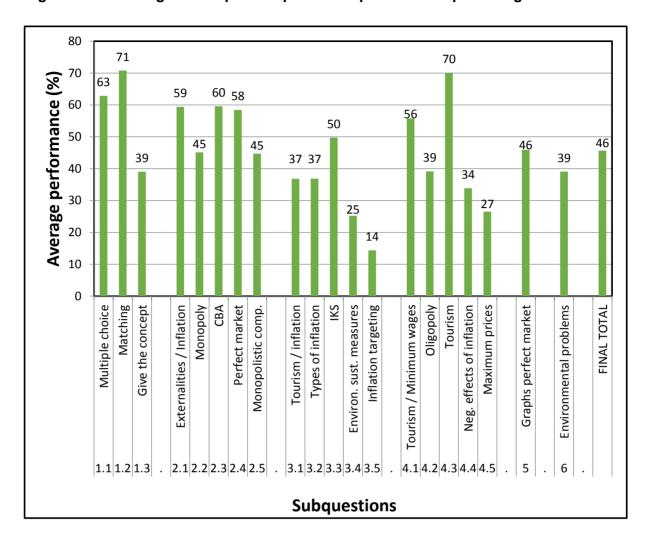
Figure 5.5.2: Average marks per subquestion expressed as a percentage

5.6 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MICRO-ECONOMICS & CONTEMPORARY ECONOMIC ISSUES

Common errors and misconceptions

(a) In Q1.1, candidates omitted answers which resulted in incorrect numbering. In some instances more than one answer was provided. Some questions were poorly answered, for example:

- In Q1.1.1. Candidates were unable to link the average variable cost with the shutdown point.

- In Q1.1.3 answers suggested a lack of understanding of the difference between allocative and productive efficiency.

- In Q1.1.7 candidates failed to differentiate between conservation and preservation.

(b) In Q1.3, candidates had to identify an economic term from a given statement. In Q1.3.2, many candidates confused *external cost* with *social cost*. Social cost is made up of external cost + private cost. The poor performance points to a lack of basic knowledge in subject terminology.

Suggestions for improvement

(a) In Q1.1, learners should write down only the letter (A, B, C or D) of their choice next to the question number. If they prefer to write the answer out in full, they should not omit any part of the response. It is imperative that learners first attempt to determine the correct answer to multiple-choice questions before considering the given options. Candidates must be made aware that that no marks will be awarded when they provide more than one answer to a short question. It is important that candidates 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) Revision by means of short, regular formative tests on basic concepts is advised. Learners should be encouraged to make a list of the key concepts of each topic.

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

QUESTION 2: MICRO-ECONOMICS

Common errors and misconceptions

(a) In Q2.1.1 some candidates listed any public sector institution instead of the institutions regulating competition.

(b) In Q2.2.3 some candidates described the product as differentiated instead of unique and confused this with monopolistic competition. In Q2.2.4 some candidates named curves directly from the graph, e.g. MR and AR Curves or MC and AC curves instead of pairing a cost curve with a revenue curve to determine profit, e.g. (MR /MC, AC/AR, TR/TC). In Q2.2.5 some responses included that 'consumers will be forced to buy the product as there are no close substitutes' instead of explaining why one would discourage a monopolist from increasing his/her prices. Candidates also confused *monopoly* with *monopolistic competition*.

(c) In Q2.3.3 candidates were unable to link the mechanic to only private cost and private benefits whereas CBA takes into account the external cost and benefits too. This indicates a lack of a thorough understanding of the concept CBA and how it is used in practice. There were some candidates who could not identify an external cost from the data given, which demonstrates a lack of conceptual understanding.

(d) In Q2.5 many candidates merely listed the various ways of non-price competition instead of relating them to competition in the fast-food chicken outlets. This is a higher-order question which required application within a certain context. Candidates lost 6 marks by merely listing non-price competition measures.

Suggestions for improvement

(a) Teachers should focus on the content and graphs in micro-economics in order to explain the various concepts covered. The various cost and revenue curves under the various market structures and the purpose and shape of the curves must be emphasised.

(b) Teachers should develop confidence in the teaching of graphs. Regular practice and tests on the drawing of graphs is essential to understand the content of the topic.

(c) Learners need to practice the drawing of graphs. Class and homework exercises could assist in this regard. In addition a spot test (formal/informal) on the drawing of graphs could be conducted to improve the understanding of graphs.

(d) Teachers need to focus on the application of knowledge in their assessment tasks. Learners should not merely recall information but should be able to apply critical thinking skills.

(e) 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. A mere listing of facts without an explanation in context will earn only 2 marks.

QUESTION 3: CONTEMPORARY ECONOMIC ISSUES

Common errors and misconceptions

(a) In Q3.1.1 some candidates confused transport infrastructure with the modes of transport. In Q3.1.2 candidates were not able to draw a relationship between a reduction of income tax and its effect on demand pull inflation. Instead they just explained demand pull inflation.

(b) In Q3.2.3 candidates struggled to describe the concept core inflation. Instead they described CPI or headline inflation. In Q3.2.4 candidates were unable to link the monetary policy instruments as a means to maintain the 3-6% inflation rate. Some candidates confused the answer with fiscal policy over which the SARB has no influence. In Q3.2.5 it was evident that candidates have major challenges with percentage calculations. Instead of calculating the percentage change from one year to another, they merely calculated the change in inflation rates without expressing the change as a percentage.

(c) In Q3.3.3 the concept Indigenous Knowledge Systems was poorly answered by a fair number of candidates. In Q3.3.4 the majority of responses addressed export earnings from the Aloe Ferox plant instead of the government earning tax from production and the sale the plants. In Q3.3.5 some candidates only focussed on employment reduction in only the urban or rural area instead of both as required by the question.

(d) In Q3.4 candidates could not link subsidies and permits to environment sustainability. Instead, they referred to subsidies given to producers to lower the cost of production in general.

(e) In Q3.5 candidates failed to explain inflation targeting and hence the difficulty in assessing its effectiveness in maintaining price stability. Candidates gave a general description of monetary policy instruments instead.

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Suggestions for improvement

(a) The teaching of contemporary economic issues is imperative and basic concepts need to be emphasised.

(b) Calculations, especially percentage calculations must be practiced regularly from various data sources as this skill is tested frequently.

(c) Topics such as inflation, tourism and environmental sustainability relate to newspaper articles and statistics. Teachers are encouraged to make reference to this data when teaching the topics. Data response questions should not merely require learners to copy answers from the given data. Learners should be able to apply content in context.

QUESTION 4: MICRO-ECONOMIC/CONTEMPORARY ECONOMIC ISSUES

Common errors and misconceptions

(a) In Q4.2.1 candidates interpreted minimum wages as being *low wages* and hence a decrease in the supply of labour was given as an answer. Some candidates described the supply of labour as being influenced by the producer instead of the workers. This was confused with the supply of goods and services which is influenced by the producers. The distinction between supply of goods and supply of labour needs to be stressed.

(b) In Q4.2.2 candidates were not able to deduce the correct answer from the data provided. Many candidates gave *imperfect market* as the answer instead of *oligopoly*. This was due to a lack of understanding the distinction between a market and a market structure. Imperfect markets is a broad concept which involves three market structures, viz. monopolistic competition, oligopoly and monopoly. The phrase in the data response 'a few companies dominate … relates only to one market structure, i.e. oligopoly. In Q4.2.4 candidates confused the word *interdependency* with *independence*, hence the poor response. Poor answers to Q4.2.3, Q4.2.4 and Q4.2.5 could be attributed in some cases to candidates giving *imperfect market* as an answer to Q4.2.2. Poor answers in Q4.2.5 were also due to poor question comprehension as responses were vague.

(c) In Q4.4 many candidates' answers were vague and they did not fully answer the negative impact on investors and those with a fixed income.

(d) In Q4.5 the drawing of the graph posed a major challenge to candidates. It is very evident that they do not understand the concept of maximum prices. Some candidates drew a graph showing shifts in the demand curve. Others indicated the *maximum price* above equilibrium instead of below.

Suggestions for improvement

(a) Teachers must emphasise the difference between types of markets and market structure together with examples of each market structure.

(b) Teachers must continuously assess the drawing and interpretation of graphs via data response questions in order to improve understanding and performance of these challenging aspects of Micro-economics.

QUESTION 5: MICRO-ECONOMICS

Common errors and misconceptions

(a) **Introduction**

While candidates gave a good introduction by focusing on an explanation of a key concept within the question there were many instances where the introduction was vague or had little relevance to the specific topic.

(b) **Main Part**

- Many candidates did not present their answers in terms of the structure expected and therefore lost marks, i.e. a clear distinction was not made between the introduction, the main part of the body, the additional part and the conclusion.

- Many candidates could not draw graphs accurately. Cost and revenue curves were labelled incorrectly which resulted in incorrect explanations.

- A common error in the graphs was the drawing of the MC curve in relation to the AC Curve. Many graphs did not show the MC curve intersecting the AC curve at its minimum point. This can sometimes distort the interpretation of the graph.

- Some candidates drew correct graphs but either gave no explanations or gave explanations that did not correlate with the graph.

- In the explanation of graphs, a common starting point would be profit maximizing point (MR=MC). Many candidates indicated the profit maximizing point as MC=AC. This resulted in the incorrect area of profit and loss being shaded.

(c) **Additional Part**

A solid interpretation of the question was a major challenge for most candidates as they merely discussed objectives of the competition policy without evaluating the success of the policy. They were unable to relate the role of the Competition Commission in investigating collusion to the success of the competition policy.

(d) **Conclusion**

Although guided in the question paper as to what a conclusion should entail, the writing of a relevant conclusion is challenge for most candidates. Most candidates could not give conclusions that reflected an opinion, a summary of the discussion or an alternative viewpoint to support the body. Most candidates repeated aspects of the body in the conclusion.

Suggestions for improvement

(a) Teachers must test learners regularly on essay questions by focusing more on the structure.

(b) Teachers are encouraged to get learners to practice the drawing of graphs and assessing for accuracy in labelling of curves, profit maximising point and the shading of economic profit and economic loss. Learners must be reminded that there is no shading for normal profit.

(c) In the drawing of the various equilibrium positions, irrespective of whether it is a perfect or imperfect market, the following steps must be emphasized and followed:

- Draw the revenue curves (demand, AR, MR)

- Thereafter draw the cost curves. The AC curve must be drawn first followed by the

  MC curve. Thus it would be easier to ensure that the MC curve will cut the AC curve at its minimum point.

- In the explanation of the graph the following key points should be focused on:

  o Profit maximizing point (MR=MC). This is an important reference point as it influences the explanation of the graph.

  o The quantity produced and the price.

  o Compare AR to AC to work out the whether a profit or loss is being made.

  o Indicate this profit or loss in the graph by shading the area.

(d) Subject Advisers/Cluster leaders must provide adequate support and materials that would help teachers to deal with challenging topics such as graphs.

(e) Teachers must ensure that learners are able to interpret questions correctly to avoid irrelevant information in their responses. Teachers are encouraged to expose learners to different questions on the same topic and guide them on the interpretation of questions. In this regard, learners should practice how to structure responses to questions based on key issues.

QUESTION 6: CONTEMPORARY ECONOMIC ISSUES

In general, the level of performance in response to the question was poor to satisfactory. This particular essay was identified in the new exam guideline and was the first time it was asked, hence the generic response from many candidates as it was not expected.

Common errors and misconceptions

(a) **Main Part**

- Many candidates did not present their answers in terms of the structure expected, i.e. a clear distinction between the Introduction, the main part of the body, the additional part and the conclusion. Candidates lost marks unnecessarily.

- Many candidates' answers related to the environmental problems only and not the international measures. This was evident where learners discussed other environmental problems outside the exam guideline. While they were credited for the other problems, information regarding international measures was limited or non-existent in textbooks.

- Some candidates discussed international agreements regarding sustainability without relating it to a specific environmental problem.

(b) **Additional Part**

The interpretation of the question was a major challenge for most candidates as they explained the concept *conservation* only, and at times confused *conservation* with *preservation*. They were not able to explain how South Africa uses conservation to ensure a sustainable environment.

(c) **Conclusion**

Most candidates could not come up with appropriate responses that reflected an opinion/a summary of the discussion or an alternative or additional viewpoint to support the body of the essay. Many candidates repeated aspects of the body.

Suggestions for improvement

(a) All content should be completed timeously so that there is time for revision. There is a tendency for teachers to rush through the last few chapters and not to spend as much time on contemporary economic topics. Teachers need to plan properly so that each topic is given adequate attention.

(b) It is imperative that teachers consult the latest exam guidelines (2017) and familiarise themselves with Topic 14 where two possible essays have been identified. This particular identified essay was assessed for the first time. The guideline should inform teaching and learning with regard to environmental problems and the international measure taken to address them.

(c) In the conclusion, learners should be taught how to structure a response in support of or against the facts mentioned in the main part.

(d) Basic content should not only be covered, but also linked to the creativity of learners in the practical application of each topic.

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CHAPTER 6
GEOGRAPHY

The following report should be read in conjunction with the Geography question papers of the November 2017 (NSC) Examinations.

6.1: PERFORMANCE TRENDS (2014 – 2017)

The number of candidates who wrote the Geography examination in 2017 decreased by 25 829 candidates in comparison to that of 2016. Since 2014, the performance in Geography has been declining and unstable. Although there was a marginal improvement in 2017 as indicated by 76,9% of candidates achieving at the 30% level and 50,1% achieving at the 40% level, the performance is still below the expected level, given the array of interventions implemented in this 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
2014	236 051	191 966	81,3	127 358	54,0
2015	303 985	234 208	77,0	153 212	50,4
2016	302 682	231 641	76,5	145 726	48,1
2017	276 771	212 954	76,9	138704	50,1

There are a number of areas where candidates appear to struggle, especially in the Physical Geography questions such as the processes associated with mid-latitude and tropical cyclone formation, river capture and identifying superimposed drainage. Teachers need to teach these topics using real examples, and then spend sufficient time consolidating the processes associated with these topics. Candidates also found it challenging to link topics together due to compartmentalised teaching. For example, the topic of the water table is linked to both groundwater and factors influencing infiltration and should be taught in such a manner.
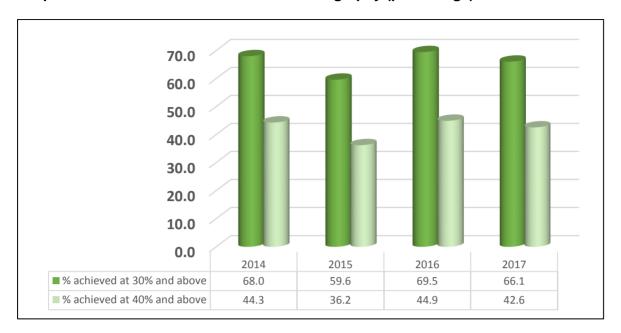
Certain Industrial Development Regions and Spatial Development Initiatives have been identified for study each year in the Examination Guidelines to allow for a more detailed study of the specific areas to be made.

However, there has been an improvement in the performance of candidates in certain aspects of the curriculum that was previously regarded as challenging. In Paper 1, the paragraph questions (8 marks) which previously were not fully attempted by many candidates, shows an improvement. In Paper 2 there has also been a marked improvement of candidates' response to the GIS questions.
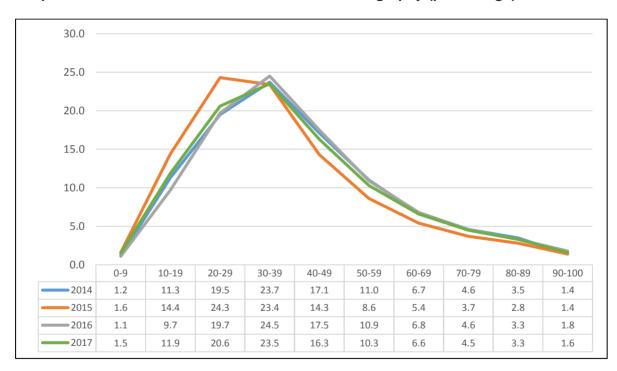
Graph 6.1.1 Overall achievement rates in Geography (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	68.0	59.6	69.5	66.1
■ % achieved at 40% and above	44.3	36.2	44.9	42.6

Graph 6.1.2 Performance distribution curves in Geography (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	1.2	11.3	19.5	23.7	17.1	11.0	6.7	4.6	3.5	1.4
2015	1.6	14.4	24.3	23.4	14.3	8.6	5.4	3.7	2.8	1.4
2016	1.1	9.7	19.7	24.5	17.5	10.9	6.8	4.6	3.3	1.8
2017	1.5	11.9	20.6	23.5	16.3	10.3	6.6	4.5	3.3	1.6

6.2: OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

General comments

Many similar points were raised in the Diagnostic Report of 2016, yet it is felt that these remain areas of concern in the context of the 2017 NSC paper and should be emphasised once again.

(a) **General performance of candidates:** In general, there were poorer than good performances. There were a number of quality responses to the question paper where good levels of understanding of geographical processes were evident. However, at the other end of the scale, many of the candidates struggled to answer some of the questions set.

(b) **Responses to questions:** In their responses, many candidates are still not applying command/action words such as 'analyse', 'outline', 'discuss' and 'comment on'. Many candidates simply list or name items when a discussion is required.

(c) **Short objective questions:** Candidates performed satisfactorily in these questions. A variety of short objective-type questions were used, for example multiple-choice questions, matching items, choose the correct term in brackets and matching the descriptions to the labels.

(d) **Two- to four-mark questions:** Most of these questions were of the data-response type. Questions where a discussion and detailed reference were required were often poorly answered. In many cases candidates were unsure whether a one-word answer or longer phrases or sentences was required as the response. Only a handful of answers demonstrated an understanding of command/action words such as 'evaluate', 'comment on' and 'outline'.

(e) **Paragraph-style questions:** In most cases, these questions were very poorly answered. It is evident that candidates were not taught the necessary skills to interpret and answer this type of question. Many command/action words were used in paragraph-style questions. Some candidates did not heed the command words used in these questions, thus offering poor answers. Many paragraph questions contained two components that needed to be answered. A number of candidates only focussed on the first component, and therefore could not achieve full marks. In some cases, the paragraphs were very long and sometimes the correct content was only found in the last few lines after sifting through much irrelevant information.

(f) **Labelled diagrams of candidates:** Diagrams drawn were generally not of a high standard.

(g) **Basic concepts:** Most candidates do not have a sound knowledge of the basic concepts. For that reason many candidates experienced difficulty in answering questions that included concepts such as *water table* (Q1.5), *superimposed stream* (Q2.5.1), *rejuvenation* (Q2.6), *urban land-use* (Q2.6.4), *urban blight* (Q3.4.1), *sphere of influence* (Q4.3), and *tertiary activities* (Q4.6).

(h) **Variety of topics:** A good variety of topics were covered. It is important that the topics in the *CAPS* be spread over the four questions. Learners were prepared for questions on SDIs which were not incorporated in this paper. However, this topic must be prepared for future papers in this cycle.

General suggestions for improvement

(a) Candidates continue to struggle with those action words that demand a higher cognitive level of thinking. Questions containing these action words should be answered in full sentences, showing a clear knowledge and understanding of geographical content. The action words listed in the table below are commonly used in Geography examination papers. Note that this is not a comprehensive list of action words. Comprehensive lists were provided in the 2014, 2015 and 2016 diagnostic reports, and teachers should refer to those reports.

Table 6.2.1 Action words and their expected responses

VERB	MEANING
Account	to answer for - explain the cause of - so as to explain why
Analyse	to separate, examine and interpret critically
Annotate	to add explanatory notes to a sketch, map or drawing
Comment	to write generally about
Compare	to point out or show both similarities and differences
Construct	to draw a shape
Describe	to list the main characteristics of something - give an account of
Develop	to successfully develop and create a new method/idea
Differentiate	to show the difference between things
Discuss	to examine by means of argument, presenting both sides and reaching a conclusion
Distinguish	to recognise the difference between things
Draw	to show by means of a sketch
Evaluate	to make an appraisal or express an opinion concerning the value - to define, analyse and discuss
Explain	to make clear, interpret and spell out the material you present
Illustrate	to show what something is like - to show that something is true
Justify	to prove or give reasons for decisions or conclusions, using logical argument
Outline	give a summary, using main points and leaving out minor details
Predict	to say what you think will happen - to foretell - to say in advance
Prioritise	to place in order of importance
Propose	to suggest a plan - to make a formal suggestion
Recommend	to advise that something should be done
Report	to produce an official statement or written document
Sketch	to illustrate with a simple drawing
Solve	to find a solution to something that is causing difficulties
Suggest	to propose an explanation or solution
Support	to show that an idea/statement is true
Verify	to check/prove that something is correct
Write	to create a formal document

(b) Learners should be taught paragraph-writing and interpretation techniques. These questions usually require critical and analytical thinking, which places them on a higher cognitive level. Therefore candidates cannot merely reproduce knowledge gained in the classroom. Responses should be well thought through and adapted to the source given. Although it is expected of candidates to answer these questions in full sentences, the answer should be to the point and must focus on the intent of the question. Teachers must insist that the candidates limit their answers to the prescribed eight lines. Many paragraph questions contain two components that must be referred to, and this should be done in equal parts. It is useful in a paragraph-style

question for learners to underline the following: the *main topic* of the question, the *action word* and the *focus areas* of the question. Areas which need to be avoided are repetition of facts and poor punctuation. Regular practice of these in short informal and formal tests, as well as in internal examinations, will allow the learners to improve these skills and become confident in attempting these questions.

(c) Regular testing should include drawing of sketches. Drawing of diagrams should be included in standardised tests and examinations. Learners must be made aware that an *annotated* diagram is a diagram with explanatory labels.

(d) Teachers must ensure that learners know all the geographical concepts/definitions required by having the learners compile a glossary of terms in their notebooks for easy reference. Learning geographical concepts/definitions will assist learners in attaining a geographical vocabulary. These should be mastered through repetitive formative tests and regular homework exercises to reinforce the content knowledge. Where alternative terms exist for a specific concept, learners must be provided with all possible terms and not only the term preferred by the teacher.

(e) When a geographical problem is studied, learners should study the *causes* and *effects* of the geographical problem, as well as possible *solutions* to it. An in-depth knowledge of such issues is required by the teacher, and this might have to involve informal research.

(f) Teachers are encouraged to collect resources on an ongoing basis and be aware of current events that are being taught in Grade 12. This is especially true for human geographical issues; for example changes in the urban and economic environments. These should then be incorporated into lessons to ensure that lessons are topical and relevant to learners. As life-long learners, teachers must stay abreast of new developments in their subject.

(g) Teachers are advised to research the topics that are commonly examined and ensure that content is taught accurately. Teachers should set questions on a particular topic from a variety of different perspectives to prepare learners to be competent in approaching a particular topic from any angle.

(h) Teachers must use source-based questions in class assignments, tests and examinations. They must use relevant and recent resources from the internet and avoid using only sources that appear in textbooks and are familiar to learners. Teachers should focus on the interpretation of diagrams, sketches, photographs, cartoons and graphical data. 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.

(i) Teachers should be fully aware of the relevant subject content to be taught by constantly referring to the *CAPS* document and the *Examination Guidelines*. Prescribed textbooks do not always contain all the subject content mentioned in the above documents. Teachers should therefore consult more than one textbook, if possible. Information provided in the various textbooks is not always geographically sound and, when in doubt, research on the topic should be done.

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(j) Teachers should provide each learner with a copy of the *Examination Guidelines*, highlighting the content that will be taught. This can be used as a checklist to ensure all content is covered and to assist with preparation for tests/examinations.

(k) To improve learner performance, teachers must refer to previous examination papers as a guide to ensure that the standard of questions used in assessment at school level is appropriate. This would also assist teachers to acquaint candidates with the style of question-setting and how questions are scaffolded, from those testing lower-order cognitive skills, to higher-order questions, testing more advanced thinking skills. However, previous question papers must not be used as a predictability tool. When using previous examination papers, teachers are advised to change the questions to avoid perpetuating a plethora of expected questions in which only the concepts are changed. Similar topics may be regularly covered, but may be tested from different perspectives. Teachers are reminded that all content must be taught and sections of content should never be left out.

(l) Teachers must ensure that the distribution of marks in the internal assessment tasks is according to the requirements in the *CAPS*. 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 the higher-order questions that are asked in the final examination and will therefore have a false notion of the level of performance required to achieve.

(m) Teachers are encouraged to use a variety of new, interesting and current sources on which to base their questions. If sources are derived solely from the textbook in use at a particular school, learners are not exposed to unseen new sources that they might come across in an external examination. Continually exposing learners to new sources enables them to critically analyse any sources to which they are exposed.

(n) Many candidates do not read the questions properly. They see familiar common words and fail to determine what the question actually requires. Learners should be guided in developing techniques for the interpretation of questions, e.g. the practice of underlining key words. The above action-word guide (a) should be reinforced by teachers when marking candidates' responses. No credit should be given for simple single-word responses when a full explanation is required.

(o) Teachers must note that the short subjective questions (15 marks) at the beginning of each of the four questions are not necessarily only going to test lower-order thinking skills and straight-forward recall. Some questions might require a higher level of cognitive thinking.
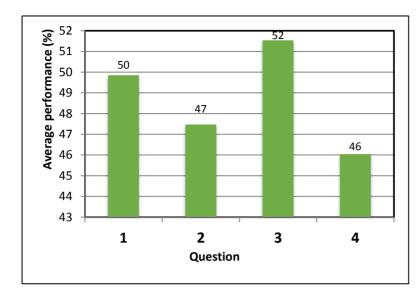
6.3: DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

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 degrees of challenge of each question as experienced by candidates.
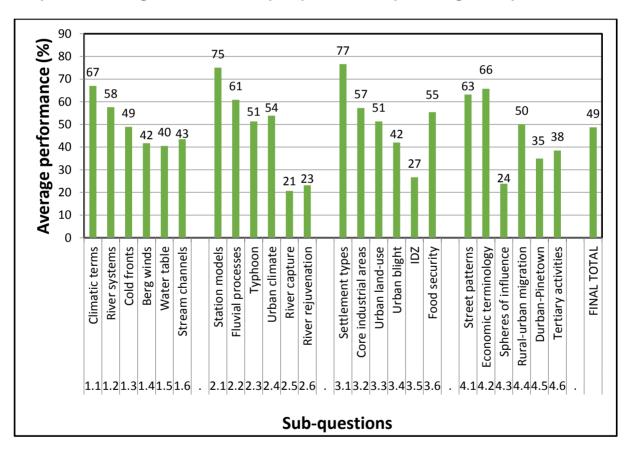
Graph 6.3.1 Average performances attained per question as a percentage in Paper 1

Q1	Climate and Weather, and Geomorphology
Q2	Climate and Weather, and Geomorphology
Q3	Rural and Urban Settlements, and Economic Activities of South Africa
Q4	Rural and Urban Settlements, and Economic Activities of South Africa

Graph 6.3.2 Average marks attained per question as a percentage in Paper 1

6.4: ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: CLIMATE AND WEATHER, AND GEOMORPHOLOGY

Common errors and misconceptions

(a) In Q1.3 candidates struggled with predicting the change in air temperature and air pressure with the arrival of the cold front. Candidates merely mentioned the weather conditions associated with a cold front, and not how these weather conditions will change as the cold front approaches, for example *cold* and not *gets colder*. Most of the candidates failed to elaborate on the impact of cold front weather conditions on human beings (beachgoers in this case, Q1.3.4) and how human beings should minimise the said impact (Q1.3.5).

(b) Q1.4 reflected average performance by candidates. Many candidates could not interpret the graph that was provided. The month of October is misleading as it is not winter in South Africa, the season of berg winds. Candidates did not indicate the unit for temperature and lost marks. Learners focused on the development of berg winds and not the cause of the high temperature. In Q1.4.5 candidates interpreted the question as long-term precautionary measures and not the immediate precautions that should be put in place as the berg wind is approaching.

(c) In Q1.5 Figure A and B, the land surface does not have the same shape. Candidates' interpretation of this diagram was poor. Candidates could not define the term *water table*, and confused it with the term *groundwater*. Candidates could not link urban development to the position of the water table. Q1.5.4 was poorly answered as candidates could not differentiate between *groundwater* and the *water table*.

Suggestions for improvements

(a) Learners must have a clear understanding of weather conditions associated with a cold front. However, learners must be able to make predictions regarding weather changes as the cold front approaches. In the latter, the descriptions must be descriptive, for example temperature *will drop*, air pressure *will increase* or cloud cover *will increase*. Learners must be able to describe the impact of a cold front on human activities. Where negative impacts are involved, learners should be able to provide precautionary measures to minimise the impact.

(b) The use of graphs in all content must be emphasised. This is apparent from the poor interpretation of the graph in Q1.4. A deeper understanding of processes should also be emphasised, for example a clear understanding of the process involved in high temperatures associated with berg winds.

(c) Learners must have a clear understanding of the terms *water table* and *groundwater*. These two terms are linked, but there is a definite difference between the two. Groundwater refers to all water that is found below the earth's surface. The water table is the upper/top layer of the groundwater. Reasons for the rise and drop in the water table must be studied in relation to factors influencing infiltration, impact of urban development on infiltration, and strategies to maintain drainage basins.

(d) Candidates must be able to draw annotated (labelled) diagrams to explain the development of geographical phenomena. Teachers must apply this technique when teaching in class by insisting on learners' drawing various diagrams, and not merely referring to and examining annotated diagrams in textbooks.

QUESTION 2: CLIMATE AND WEATHER, AND GEOMORPHOLOGY

Common errors and misconceptions

(a) Generally Q2.3 was well answered. Learners did, however, struggle with the term *super typhoon*. When asking for factors why Meranti developed into a super typhoon, candidates merely gave the factors for the development of a typhoon.

(b) Candidates performed poorly in Q2.5. The combination of factors such as superimposed streams, abstraction and river capture increased the difficulty level of this question. Q2.5.4 was incorrectly interpreted by many candidates, as they could not identify the section of the captured stream downstream of the elbow of capture. Thus they could not describe the changes in the stream after river capture occurred.

(c) Q2.6 was poorly answered. Candidates generally struggled with the questions on rejuvenation. Candidates could not describe the impact of rejuvenation on a meander, or the negative impact of rejuvenation on the development of infrastructure. Q2.6.6 was a high-order question, and candidates could not give reasons why terraces are not always suitable for farming, even though they are flat.

Suggestions for improvement

(a) River capture and all its characteristics should be thoroughly covered with the use of relevant and clear diagrams, e.g.

- The misfit stream is the *lower course* of the captured stream. It is called misfit because of the fact that the former valley of the captured stream becomes too large and wide for the beheaded stream, because of substantial decrease in the volume of water due to diversion of its water to the captor stream.

- A decapitated or beheaded stream refers to the *lower part* of the stream whose headwaters have been captured by another stream.

(b) Rejuvenation is often examined; therefore, a deep understanding of this topic is needed. Rejuvenation will result in deepening of the meander, as rejuvenation will result in increased downward erosion. The meander will therefore become incised or entrenched. The constant deepening and widening of the river valley hampers the development of infrastructure such as building bridges. The development of infrastructure will be costly.

(c) The adjacent diagram clearly shows that the terraces are flat. The intention of this question was not to test the *shape of the slope* which is commonly done in Paper 2. It was expected of candidates to provide evidence why terraces are not always suitable for farming even though they are flat. Accessibility to water and the width of the terraces had to be determined and established by studying and interpreting Figure 2.6.
(http://thebritishgeographer.weebly.com/river-landforms.html)

QUESTION 3: RURAL AND URBAN SETTLEMENTS, AND ECONOMIC GEOGRAPHY OF SOUTH AFRICA

Common errors and misconceptions

(a) Q3.4 on urban renewal was poorly answered. Candidates could not define the term *urban blight* and state a cause of urban blight. Furthermore, candidates struggled to explain why urban renewal will increase the status of a residential area.

(b) Q3.5 posed various problems. Candidates could not give examples of IDZs or what the main aim of an IDZ is. Linking IDZ's with industrial decentralisation was beyond the capacity of most candidates.

Suggestions for improvement

(a) The term *urban blight* refers to buildings becoming run-down and dilapidated as they are not being maintained. The use of a synonymous term, *urban decay*, might assist learners in class to better understand the concept. However, learners must be familiar with both terms. If learners do not understand the term *urban blight*, they will not be able to give the reasons why it takes place. Urban blight is a general problem in urban centres, and therefore learners must understand why it is taking place. Common reasons for urban blight taking place is lack of maintenance of buildings by landlords, future expansion of the CBD, overcrowding of properties, illegal occupation of buildings, subletting and poor service delivery. After urban renewal the status of the residential area will increase as it will now cost more to live there. Only high-income earners will be able to afford the higher rental costs, or to buy property with a higher value. Furthermore, the upkeep of the property will increase, and higher levels of safety and security will increase the value of the property.

(b) Only the five nationally recognised IDZs were accepted in the marking guidelines. These are: Coega, East London/ELIDZ, Richards Bay/RBIDZ, Dube Trade Transport/DTP and Saldanha Bay. The aim of an IDZ is to attract foreign investments and increase exports. These two issues regarding the aim of IDZ cannot be separated and must be given as one. As IDZs are new

industrial development zones, they provide ample opportunities for industrial decentralisation away from the core industrial areas. These opportunities include the availability of open land, a well-developed infrastructure, access to harbours and transport links, close proximity to export markets, duty free benefits on importing raw materials and the availability of foreign investors.

QUESTION 4: RURAL AND URBAN SETTLEMENTS, AND ECONOMIC GEOGRAPHY OF SOUTH AFRICA

Common errors and misconceptions

(a) Candidates lacked knowledge of the topic of sphere of influence, and Q4.3 was poorly answered. Candidates could not define the term *sphere of influence*, and were therefore not able to answer the majority of questions set on this topic. They were not able to mention the factors that determine the size of the sphere of influence, and did not understand the concept of overlapping spheres of influence, and could therefore not give reasons for the overlap. Candidates do not know the relationship between the number of settlements of a specific order and the order of cities according to the urban hierarchy.

(b) Candidates struggled with Q4.5. They could not differentiate between *industrial products* and *economic activities*. Furthermore they did not know which factors favoured the development of the Durban-Pinetown Industrial Region. The use of terms such as *agricultural zone* and *cargo terminal* were foreign to many candidates, and Q4.4.4 was poorly answered.

(c) Q4.6 was controversial. It was based on whether construction is a secondary or tertiary activity. This resulted in various answers given. Candidates could not explain why it is important for a country to have a stronger tertiary sector than a primary sector. The role that transport plays in strengthening the tertiary sector in Gauteng could not be answered.

Suggestions for improvement

(a) The concept of *sphere of influence* is taught alongside two other important concepts, i.e. *range of goods* and *threshold population*. Learners often confuse these three terms and use them interchangeably. During teaching, the differences between these three related terms must clearly be pointed out. The above resulted in candidates not being able to list the factors which determine the size of the sphere of influence of an urban settlement. These factors include the order of goods/services offered, the number of goods/services offered, the types of goods/ services offered, the variety of goods/services offered and the price of goods/services offered. The term *overlap of sphere of influence* refers to that zone which is included by the spheres of influence of two or more settlements. This is the result of various factors, of which the following are only but a few examples: a zone of competition where people can choose where to shop; personal choices on where to shop en route to work or home; the cost of using a service provided in either one of the settlements; and the variety of goods offered in the settlements. Within a city, spheres of influence will also exist. Urban inhabitants will travel a short distance for low-order goods, therefore those goods will have a small sphere of influence. The opposite can be said for high-order goods. There are more low-order centres in the urban hierarchy as they sell mainly low-order goods for which people are not prepared to travel great distances. The frequency of travel to these centres is therefore greater. As people are prepared to travel

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greater distances for high-order goods, the high-order centres will be further apart and therefore occur less frequently.

(b) In studying any one of the core industrial regions, learners must be made aware of the raw materials supporting industrial development in the region, as well as the industrial products manufactured there. The factors that favour the development of any one of the core industrial areas must be studied. Geography is a continually changing subject. Teachers must be aware of changes taking place by constantly doing research. As South Africa's economy is growing, so is the context in which growth is taking place. New terms such as *agricultural zones* and *cargo terminals* are therefore emerging. An agricultural zone is a specific area set aside for agricultural activities. A cargo terminal is where cargo (goods) are handled and loaded onto ships or aeroplanes. The development of a cargo terminal facilitates the loading on and off of goods for exporting or importing.

6.5: OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

General comments

(a) Candidates did not seem to perform as well as in previous years, especially in Q2 and Q4. However, there has been a pleasing increase in the candidates' scores in Q3.

(b) Candidates continue to be challenged when it comes to responding to middle- or high-order questions. There is a definite lack of depth in the candidates' responses.

(c) Candidates had difficulty with action words that required a particular answer to questions. The following were noted as examples: 'evaluate', 'suggest', 'describe', 'account' and 'predict', to mention a few. This resulted in incorrect or inappropriate answers resulting in a decrease in performance.

(d) Candidates must provide full responses in sentences when asked to discuss, evaluate, analyse or account for.

(e) Candidates are disadvantaged because they do not read instructions thoroughly, use the given information or provide evidence from the topographic map or orthophoto map to support their responses.

(f) In Q1 some candidates still left out some of the objective multiple-choice questions without attempting any options.

(g) In Q2 there is still a lack of knowledge of calculation techniques and methods. Not enough time is spent consolidating this aspect of mapwork on a regular basis.

(h) Candidates do not follow logical steps when completing calculations. They also continue to leave out the correct unit of measurement in their final answers. This is mandatory in order to get a full mark for the final answer.

(i) In response to Q3, where practical application and interpretation were required, candidates often did not consult and provide evidence from the topographic map or the orthophoto map in

their answers. When candidates had to provide evidence in support of Parys being a tourist/resort town, they were found wanting.

(j) It is evident that many teachers' knowledge of GIS, examined in Q4, is still poor. It seems that teachers, who are not familiar with GIS, merely teach definitions and not the application of the techniques and skills required. This section of the question paper has become more practical over the past few years and learners need to be prepared to answer these questions. Candidates are now required to use their theoretical knowledge to complete practical aspects of GIS such as a 'paper GIS'.

(k) Q2.1, the gradient calculation, was tested using a different type of format for the first time this year which unsettled some candidates.

General suggestions for improvement

(a) In Q1 learners must be taught to recognise the subtle differences in the options given in a multiple-choice question. Usually there are two options that are completely incorrect and then two options that are possible options. Teachers and learners should be aware that the multiple-choice questions are not only testing simple recall, but can include middle- and higher-order cognitive skills testing. Multiple-choice questions can also require of candidates to use both the topographic map and orthophoto map, and even do simple calculations and measurements. Learners must attempt all questions as there is no negative marking.

(b) The importance of integrating the theory and mapwork skills cannot be emphasised enough. Learners must be made aware that Geography Paper 1 and Geography Paper 2 are interrelated and not two separate entities. When certain concepts are taught in the theory section of Geography, this knowledge can also be applied in the mapwork paper.

(c) The correct geographic terminology should be used at all times in classroom activities, tests and examinations. For example candidates often use words such as 'left' and 'right' instead of 'north', 'south', 'east' or 'west'.

(d) Learners are reminded that regularly shaped features on an orthophoto are most likely a human-made feature, whilst an irregular shaped feature is most likely to be a natural feature.

(e) Learners must know that, in order to identify a human-made and/or natural feature on an orthophoto map, the same feature must be located on the topographic map first. It is therefore important that the orthophoto map and the topographic map should be correctly orientated. Once this has been done, learners must find similar-looking features on both the orthophoto map and the topographic map as points of orientation. Learners must be reminded that the distances between features on the orthophoto map will be much greater than the distances between the same two features on the topographic map, as the scales of the two maps differ.

(f) All schools should have a variety of topographic maps and orthophoto maps available from past Grade 12 examinations. Teachers should use these resources and examination papers for the purpose of practising the skills taught in class. All NSC examination papers can be used for revision in CAPS as the content remains the same. Teachers are cautioned not to use previous question papers as a predictability tool. Paper 2 allows for creativity, and teachers and learners alike must expect new approaches to some of the questions in the examination.

(g) Teachers must give learners regular tasks to practice map reading and interpretation skills. Constant consolidation will assist learners to remember how to do the calculations and identify features on both maps.

(h) The area covered by the orthophoto map is usually indicated as a red demarcated area on the topographic map. Learners must be made aware that even though the orthophoto map and the topographic map are similar in size, the orthophoto map represents a much smaller landscape in reality than the topographic map. Understanding the concept of scale is important. The topographic map has a scale of 1 : 50 000 and the orthophoto map a scale of 1 : 10 000. This means that the orthophoto map will show a feature to be five times larger than the same feature on the topographic map.

(i) The level of predictability regarding certain topics in mapwork is low, therefore teachers and learners' need to cover all the content comprehensively. This must not only be done theoretically but with the use of maps for application.

(j) Teachers should advise learners to use a magnifying glass when studying a topographic map to make a detailed examination of an area on the map. A magnifying glass forms part of the standard equipment needed for mapwork and may be brought into the examination venue.

(k) Included below is a 10-point checklist to assist candidates in making a thorough study of the topographic map and orthophoto map, before commencing a mapwork exam. This will assist learners in gaining a broad idea of the mapped area before even looking at the question.

- Locate the given map within South Africa using the lines of latitude and longitude. This will help to determine the rainfall season, major agricultural crops grown, type of animals farmed and minerals mined.

- The amount of rainfall and the season in which it is received can be determined by looking at the types of rivers on the map, presence of dams, wind-pumps, etc.

- Identify the change in topography in the mapped area. To determine whether the land is flat or steep, contour lines must be studied, e.g. whether contour lines are far apart or closely spaced. Trigonometrical beacons and spot heights are also important tools to use in determining the topography.

- The primary activity that dominates the mapped area: farming, mining, fishing or forestry.

- The secondary activities associated with the raw materials available in the area.

- The services that are provided to allow the various activities to function.

- The level of connectivity between the mapped area and the rest of South Africa. Take note of the national roads, main roads, airports, railway lines and harbour locations.

- Determine the settlement type and pattern of the dominating settlement in the mapped area. This indicates if the settlement is rural or urban and whether, if rural, it is nucleated or dispersed. Identify the street pattern in various urban areas.
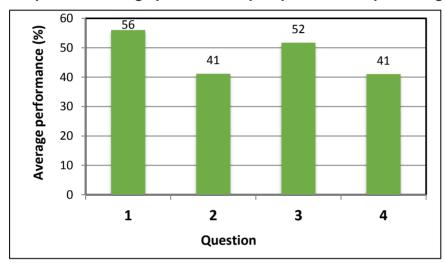
- Identify the different land-use zones visible on the map i.e. identify the CBD, residential zones, light and heavy industrial zones and the rural-urban fringe.

- Identify various recreational features such as a golf course or rifle range.

6.6: DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 2
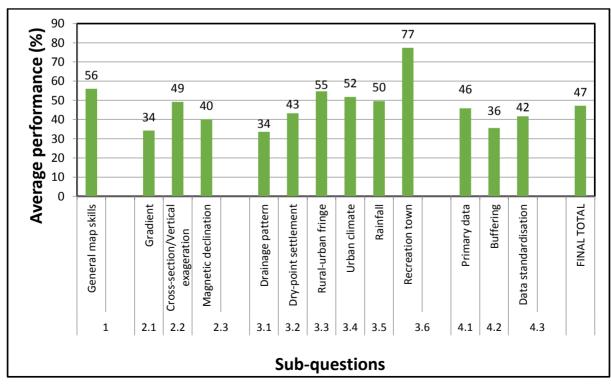
The following graph is based on data from a random sample of candidates. While this graph might not accurately reflect national averages, it is useful in assessing the relative degrees of challenge of each question as experienced by candidates.

Graph 6.6.1 Average performance per question as a percentage in Paper 2

Q1	Multiple Choice
Q2	Map Calculations and Techniques
Q3	Application and Interpretation
Q4	Geographical Information Systems

Graph 6.6.2 Average marks per subquestion as a percentage in Paper 2

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6.7: ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Common errors and misconceptions

(a) In Q1.2 many candidates could not determine between which two lines of latitude Parys is situated.

(b) In Q1.3 candidates were not familiar with the concept 'index' contour line and experienced problems identifying it.

(c) In Q1.5 candidates showed a lack of knowledge on how to apply the concept water table to the question asked. This was a higher-order question.

(d) In Q1.6 candidates seemed to confuse the lines of latitude with lines of longitude and therefore confused the south and east co-ordinates.

(e) In Q1.9 candidates experienced difficulties in reading the contour lines in order to identify the 'V' pointing to increasing height.

(f) In Q1.10 poor performing candidates seemed to guess this answer. They experienced problems identifying why the land has an elongated shape. This was evident in the fact that different incorrect answers were given in the same centre.

(g) In Q1.13 candidates struggled to select the correct time for the taking of the aerial photograph based on the shadows of buildings in area 15 on the topographic map. Some candidates had difficulties in identifying time based on direction of shadows.

Suggestions for improvement

(a) Teachers need to make learners aware that multiple-choice questions are application questions and they must use the resources provided to answer these questions.

(b) Teachers must make learners aware that many of the answers to the multiple-choice questions are found in the resources, for example in Q1.1 the answer was found in the general information. Teachers and learners might need to make a paradigm shift as it is a misconception that multiple-choice questions are only lower-order questions. Q1.5 is an example of a higher-order question. Learners need to analyse all four options and see which option applies to the map. The level of predictability regarding certain topics in mapwork is low, therefore teachers and learners need to cover all the content comprehensively. This must not only be done theoretically but with the use of maps for application.

(c) Candidates must familiarise themselves with the latitudinal and longitudinal parameters of the topographic map which are clearly indicated on the map.

(d) The index contour line is the darker line that indicates the whole number value, for example the 1 200m line. Every 5th line is an index line as the contour interval on a topographic map is 20m.

(e) The question regarding the access to groundwater using a wind-pump referred to two concepts with regard to the water table and its varying position over different seasons. During the wet season the water table will be high if infiltration takes place, and during the dry season one would expect it to be lower. It is, however, possible for the water accumulated to remain underground during the dry season resulting in a higher than normal water table.

(f) Candidates must have a good knowledge of aerial photography which covers identifying features on the orthophoto map using texture, tone, shadow and shape.

(g) Candidates need to be able to interpret the length and direction of shadows from buildings/trees on the orthophoto map to determine the time of day the aerial photograph was taken. Candidates have to understand that the closer to midday the photograph is taken, the shorter the shadow will be as the sun is almost directly overhead. The direction in which the shadows fall indicates whether the photograph is taken before or after 12:00 (midday). Shadows fall south-west if the photograph is taken before 12:00, and north-east if the photograph is taken after 12:00.

(h) Candidates must be able to use their knowledge of contour patterns from Grade 10 to identify the various courses along a river: where the contour lines are closer together the middle course is identified and where the contour lines are further apart that would indicate the lower course.

(i) Theoretical concepts are always tested in Paper 2. These concepts must be applied to both topographic maps and orthophoto maps as they are taught. Different topographic maps and orthophoto maps must be used to ensure that learners are well-prepared for the Paper 2 examination.

QUESTION 2: MAP CALCULATIONS AND TECHNIQUES

Common errors and misconceptions

(a) In Q2.1.1 to Q2.1.4 candidates struggled to calculate the gradient of a part of the mapped area as it was asked in a different way.

- In Q2.1.1 candidates experienced difficulties in reading the height of contour lines on the map.

- In Q2.1.2 candidates experienced problems measuring the distance between M and spot height 1395. They also confused the multiplication of the different units, for example cm x m.

- In Q2.1.3 candidates experienced difficulties with regard to the calculation to determine a ratio. They incorrectly divided the VI by the HE.

- In Q2.1.4 many candidates did not know how to interpret the gradient that they had correctly calculated. Candidates gave answers related to the topographic map, but actually had to interpret the calculation.

(b) In Q2.2.1 to Q2.2.2 although candidates' performance in Q2.2.1 was good in that they knew how to complete the cross-section, they did not know how to find the position of the Pilgrimsrus farmstead using the measurement between 6 and 7. Candidates were also unsure of how to indicate Pilgrimsrus on the cross-section.

(c) In Q2.2.3 the vertical exaggeration calculation is still a big challenge for most candidates. They do not understand the sequencing of steps to reach the final answer. Candidates experienced problems converting the vertical scale from the cross-section to a ratio scale. Many also used the topographic map scale instead of the orthophoto map scale for the horizontal scale.

(d) In Q2.3.2 the comparison of the magnetic declination between the topographic map and the orthophoto map was confusing to candidates. They looked for this evidence on the orthophoto map, despite the magnetic declination for the orthophoto map was given in the opening statement of the question.

Suggestions for improvement

(a) The gradient calculation was divided into three parts in order to try and simplify the steps required for calculation. It is important to note that at each step the unit of measurement must be included, as each part of the calculation is a final step. The interpretation of the final answer of 1 : 7.14 would deem this slope to be steep and this in turn would allow for the stream velocity to be high. The gradient of 1 : 7.14 means that that for every 7.14 m one moves horizontally, one rises by 1 m. The further one moves horizontally to rise by 1 m, the more gentle the slope. Besides teaching the calculation, the relevance of doing the calculation must be taught to the candidates. This can be done by using examples found in reality. Candidates must be taught how to apply these calculations, for example explaining the steepness of the gradient and its relationship to stream flow (Q2.1.4) and the interpretation of gradient (Q2.3.2b).

(b) Cross-sections can be done without using a loose strip of paper. Teachers must ensure that learners know how to construct a cross-section using the paper method, as well as the measurement method examined this year. The candidate was required to find the line 6-7 on the orthophoto map. The value of each contour line could be read off and filled in at the appropriate space below the cross-section. Once all values have been captured it was a case of using a ruler to measure from the horizontal axis to mark off the height of the contour line at the correct spot. Once all heights were indicated, a curved line joining all the dots completed the cross-section. The location of Pilgrimsrus was a higher-order question which required the candidate to return to the orthophoto map and establish the height and position of the farmstead. This now could be indicated at the correct spot on the cross-section using an arrow, line or bracket.

(c) Vertical exaggeration is calculated to show the difference in relief. If a cross-section is not vertically exaggerated it will almost appear as a flat line.

$$Vertical\ Exaggeration = \frac{vertical\ scale}{horizontal\ scale}$$

The vertical scale is taken from the scale of the cross-section and has to be changed to a ratio scale.

The cross-section in the question paper was drawn to a vertical scale of 1 cm represents 10 m. The vertical scale must be converted to a ratio scale. In order to determine the ratio of the vertical scale, 10 m must be converted to centimetres (as there are 100 cm in 1 m; 10 must therefore be multiplied by 100).

Therefore: vertical scale = 1 cm represents 10 m

                            = 1 cm: (10 x 100) cm

                            = 1 : 1 000

The horizontal scale is scale of the orthophoto.

Therefore: horizontal scale = 1 : 10 000

To substitute the vertical scale and the horizontal scale into the formula, both must be converted to fractions. Therefore:

$$\text{Vertical Scale} = \frac{1}{1\,000}$$

$$\text{Horizontal Scale} = \frac{1}{10\,000}$$

The calculation can now be done by substituting the vertical and horizontal scales into the formula.

$$\text{Vertical Exaggeration} = \frac{\text{vertical scale}}{\text{horizontal scale}}$$

$$\text{Vertical Exaggeration} = \frac{\frac{1}{1\,000}}{\frac{1}{10\,000}}$$

$$= \frac{1}{1\,000} \text{ x } \frac{10\,000}{1}$$

$$= 10 \text{ times}$$

Learners are reminded to show all calculations as marks will be awarded for the correct steps. The unit of measurement for vertical exaggeration is *times*, as it shows by how much the vertical scale has been enlarged in relation to the horizontal scale.

(d) Teachers should use real life examples, for example when doing a cross-section of an area, a photograph of the area should be used. The area around the school can be used to illustrate steep and gentle gradients. Linking the calculations with real life situations when teaching, will make understanding easier for learners.

(e) The question testing how the magnetic declination changes over time was not a foreign concept, but just a different way of asking the question. This was done by using the different dates of compilation of the topographic map (read off the map) and the orthophoto map (given), to show the change in the magnetic declination over time.

QUESTION 3: APPLICATION AND INTERPRETATION

Common errors and misconceptions

(a) In this section there are a number of linked questions. Candidates who did not get the first part of the question correct, could not be awarded any marks for subsequent questions as they are linked by having to provide evidence or give a reason for the originalcorrect answer. Many candidates did not fare well in these questions.

(b) Candidates still do not follow instructions to provide full sentences when an explanation is required. Marks cannot be awarded for one-word answers. The answer usually requires providing evidence from either the topographic map or the orthophoto map and must be as specific as possible. Questions in which theoretical knowledge is combined with map evidence are also commonly asked.

(c) Q3.1.1 and Q3.1.2 were linked questions that required candidates to combine their theoretical knowledge of drainage patterns and identify the drainage pattern in the stipulated block. Candidates struggled with this as they confused *drainage pattern* with *stream channel pattern.*

(d) In Q3.2.1 candidates battled to discern whether the farmstead at O on the topographic map was a wet- or dry-point settlement. As this was a linked question, they then had to give a reason for their answer.

(e) In Q3.2.2 candidates struggled to determine what a human-made factor was; therefore they could not state how it influenced the choice of site of the farmstead.

(f) Q3.4.2, which required the candidate to describe a climatological disadvantage for people living in West End, was not well answered. Many candidates mentioned flooding on its own which is actually a geomorphological disadvantage, and could therefore not be accepted as stand-alone answer.

(g) In Q3.6.2 candidates did not perform well as they did not read the question correctly, which asked for the positive impact of Parys on the local economy. They simply gave a general impact and therefore could not be credited.

Suggestions for improvement

(a) Candidates must look at the mark allocation which generally gives them an idea regarding the length of the answers required for a question.

(b) In a mapwork examination, learners must be taught to work with the information provided on both the topographic map and the orthophoto map. Questions are directed at the information for the specific settlement visible on the topographic map.

(c) When teaching the section of work on drainage patterns, teachers should do so using topographic maps so that learners can see how the different drainage patterns are shown on the map.

(d) In Q3.2.1 the farmstead refers to the farmhouse and surrounding buildings only, and does not include the irrigated land that stretches all the way down to the river. It is therefore the position of the farmhouse, above the flood line, that results in the farmstead being classified as a dry-point settlement.

(e) A human-made factor is something that is constructed/built by humans; in this case, such as the road that provides a transport link between the farmstead and the town of Parys.

(f) Flooding on its own is a geomorphological disadvantage and is a consequence of a climatological event such as rainfall or a thunderstorm.

(g) Candidates should be able to distinguish between positive and negative impacts. They must read the question clearly before answering.

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

Common errors and misconceptions

(a) In Q4.1.1 and Q4.1.2 many candidates did not understand the concepts *primary* and *secondary data*. In many cases they seemed to guess the answer. They therefore struggled to give reasons for their answer resulting in poor performance in Q4.1.2.

(b) In Q4.1.3, instead of explaining how remote sensing can further assist geologists with research, candidates either gave the definition of remote sensing or gave general advantages of remote sensing without referring to geologists.

(c) In Q4.2.2 and Q4.2.3 candidates seemed to be able to define *buffering*, but experienced great difficulty in applying it. A significant number of candidates gave reasons as to why buffering was occurring, and not why buffering was not occurring.

(d) In Q4.3.1 candidates misinterpreted the question. The question asked for a reason why the data is not standardised. They explained the answer with reference to non-compliance to the map symbols. Some candidates did not understand the concept data standardisation.
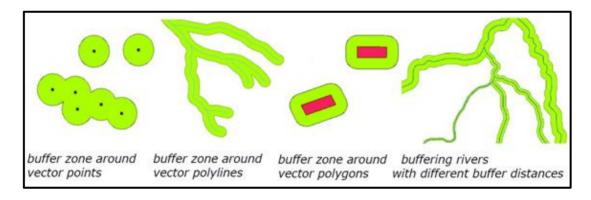
(e) In Q4.3.2 candidates drew their own symbols instead of using the standardised conventional signs (map symbols), or used incorrect map symbols. Many candidates inappropriately used blocks instead of dots for orchards and vineyards.

Suggestions for improvement

(a) Learners must be conversant with GIS terminology. Definitions are often asked as part of GIS. Teachers should encourage learners to make a glossary of GIS terms. It is not only important to know the terminology, but also how to use it practically in questions based on both maps and real life situations. Teachers must therefore be aware of the fact that GIS will not consist solely of theory and definitions, but can be practically applied to the map being examined.

(b) It is important to understand the difference between *primary* and *secondary data*. Primary data refers to data that are collected directly or on a first-hand basis, for example a survey. Secondary data refers to data collected by someone else or that which has already been processed, for example information that has been collected by a survey that has now been processed and published.

(c) Buffering is a very important GIS process and was fully tested in a practical way in 2017. Buffering is used to demarcate an area around a particular feature in order to protect it. Buffer zones take on different shapes depending on the shape of the feature around which a buffer zone is being drawn. Buffering can occur around point features, line features and area (polygon) features as illustrated below.

buffer zone around vector points   buffer zone around vector polylines   buffer zone around vector polygons   buffering rivers with different buffer distances

(*http://www.tankonyvtar.hu/hu/tartalom/tamop425/0032_terinformatika/ch07s02.html*)

(d) Paper GIS is the most basic concept that should be taught in GIS. Learners must be made aware of a variety of GIS processes when producing a paper GIS, for example data layering, data manipulation, data integration and data standardisation, which was examined in Q4.3. Teachers should explain to learners what it means to plot. Plotting can be tested by way of a sketch map on which learners need to be able to fill in various required *attribute data* from the topographic map as in Q4.3.

(e) In the 2017 exam, candidates had to use the accepted standardised conventional symbols to standardise data. Orchards and vineyards (●) and cultivated lands (II) had to be drawn on the sketch map provided. Only the standard conventional signs/symbols for a 1 : 50 000 topographic map were accepted.

(f) GIS is now part of our daily lives and there is a sufficient amount of real-life examples to use, for example stored learner information in a school. Using examples that learners can identify with, makes learning of GIS concepts easier. Teachers should use more visual material when teaching GIS as it brings out a clearer understanding of the content, for example pictures and maps of buffering.

CHAPTER 7
HISTORY

The following report should be read in conjunction with the History question papers of the November 2017 NSC examinations.

7.1 PERFORMANCE TRENDS (2014–2017)

The number of candidates who wrote the History examination in 2017 decreased by 9 926 candidates in comparison to that of 2016. This year there was an improvement in the performance of candidates as indicated by 86,0% of candidates achieving at the 30% level, with 67,5% achieving at the 40% level.

Table 7.1.1 Overall achievement 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
2014	115 686	99 823	86,3	76 904	66,5
2015	154 398	129 643	84,0	97 646	63,2
2016	157 594	132 457	84,0	101 347	64,3
2017	147 668	127 031	86,0	99 669	67,5

It is evident from the statistics that the numbers of learners taking History as a subject in the FET phase has increased significantly since 2014. Simultaneously there has been a significant consistent and gradual improvement in the quality of learners' performance. It is gratifying to note that candidates are being taught the prescribed content in both Papers 1 and 2 and this is apparent in how many learners have responded to specific choice questions.
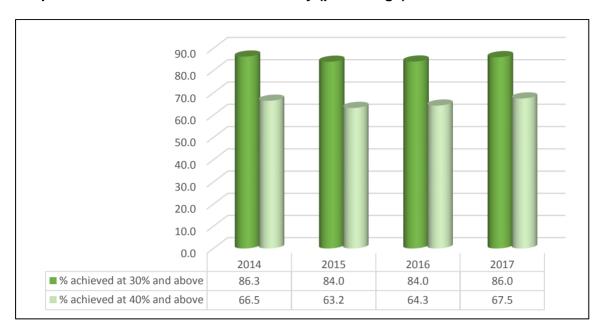
However, in Section A of both question papers (source-based questions) it was clear that many candidates were still unable to answer high-order questions (e.g. interpretation, analysis, compare, contrast, usefulness and reliability of evidence in sources). Furthermore, a significant number of candidates could not write coherent paragraphs. In Section B of the question papers (essay questions) a large number of candidates displayed good content knowledge but were incapable of taking a stance and developing an independent line of argument. Many essays lacked an introduction and a conclusion.

Teachers must make a concerted effort to ensure that the prescribed content is taught in a user-friendly manner and this must be underpinned by the requisite historical skills to ensure a further improvement in the overall pass rate.
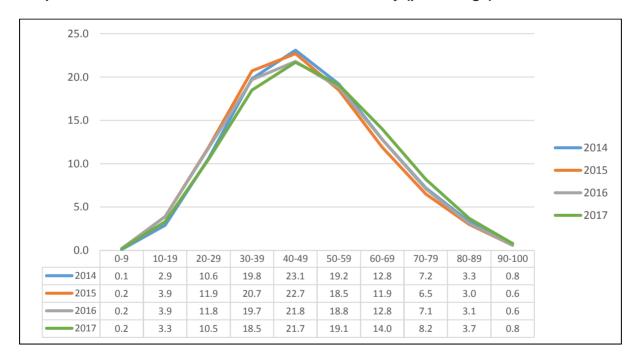
Graph 7.1.1 Overall achievement in History (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	86.3	84.0	84.0	86.0
■ % achieved at 40% and above	66.5	63.2	64.3	67.5

Graph 7.1.2 Performance distribution curves in History (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0.1	2.9	10.6	19.8	23.1	19.2	12.8	7.2	3.3	0.8
2015	0.2	3.9	11.9	20.7	22.7	18.5	11.9	6.5	3.0	0.6
2016	0.2	3.9	11.8	19.7	21.8	18.8	12.8	7.1	3.1	0.6
2017	0.2	3.3	10.5	18.5	21.7	19.1	14.0	8.2	3.7	0.8

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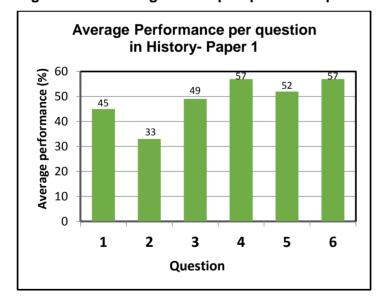
7.2 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

(a) In the main, candidates' performance in this question paper ranged from fair to good. It was evident that some candidates lacked content knowledge in specific topics.

(b) Many candidates were unable to interpret, analyse and synthesise information from the sources that were provided. As a result, responses to specific higher-order questions, where candidates were required to compare and ascertain the usefulness of sources, were poor.

(c) A significant number of candidates were unable to use the relevant information from the sources to write a logical and coherent paragraph.

(d) Generally candidates demonstrated an understanding of the content knowledge but were unable to address the demands of the essay questions.

7.3 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

The following graph is based on data that was gathered from a random sample of candidate's 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.

Figure 7.3.1: Average marks per question expressed as a percentage: Paper 1

Q1	The Cold War: Containment and Brinkmanship: The Cuban Missile Crisis
Q2	Independent Africa: Case Study – Angola
Q3	Civil Society Protests from the 1950s to the 1970s: The Black Power Movement
Q4	Case Study – China
Q5	Independent Africa: Comparative Case Study – The Congo and Tanzania
Q6	Civil Society Protests from the 1950s to the 1970s: The Civil Rights Movement
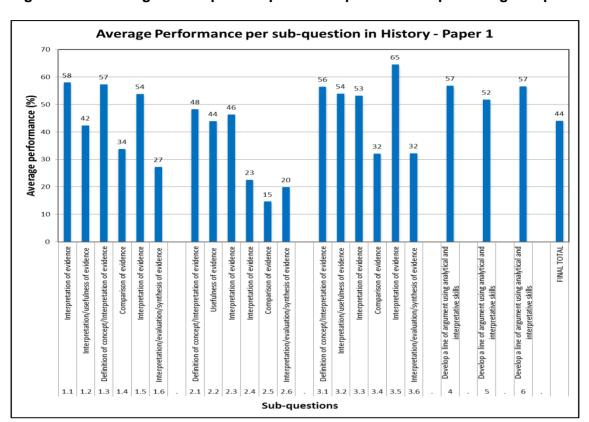
Figure 7.3.2: Average marks per subquestion expressed as a percentage: Paper 1

Average Performance per sub-question in History - Paper 1

7.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

SECTION A: SOURCE-BASED QUESTIONS

QUESTION 1: THE COLD WAR: CONTAINMENT AND BRINKMANSHIP: THE CUBAN MISSILE CRISIS

This question was attempted by many candidates. Generally, performance ranged from fair to satisfactory.

Common errors and misconceptions

(a) In Q1.2.2, many candidates were unable to take a stance and explain to what extent the source was useful.

(b) In Q1.3.2, a significant number of candidates could not explain the concept *blockade* in the context of the deployment of missiles in Cuba.

(c) In Q1.4, a large number of candidates were unable to compare evidence in sources and demonstrate how they supported each other regarding the deployment of Soviet missiles in Cuba.

(d) In Q1.6, several candidates lacked the ability to use the information in the relevant sources and their own knowledge to write a coherent paragraph on the question posed.

QUESTION 2: INDEPENDENT AFRICA: CASE STUDY – ANGOLA

Many candidates did not attempt this question. Generally performance was poor.

Common errors and misconceptions

(a) In Q2.1.1, a large number of candidates were unable to explain the concept *coalition government* in the context of the 1975 Alvor Agreement.

(b) In Q2.4.1, many candidates could not explain the messages in the cartoon. In addition they were unable to use the visual clues from the cartoon to support their answer.

(c) In Q2.4.2, a large number of candidates could not comment on the significance of the hammer and sickle in the source.

(d) In Q2.5, a significant number of candidates were unable to explain how the evidence in the sources differed regarding the role that the Soviet Union and Cuba played in Angola.

(e) In Q2.6, the majority of candidates could not use the relevant information from the sources and their own knowledge to write a logical paragraph on the question posed.

QUESTION 3: CIVIL SOCIETY PROTESTS FROM THE 1950s TO THE 1970s: THE BLACK POWER MOVEMENT

This question was attempted by a significant number of candidates. Generally, performance was satisfactory.

Common errors and misconceptions

(a) In Q3.1.1, many candidates were unable to define the concept *Black Power* in their own words.

(b) In Q3.3.2, the majority of candidates could not comment on the role that the *Black Panther* newspaper played in African American communities.

(c) Q3.4 was poorly answered by a large number of candidates. They were unable to explain how the evidence in the sources supported each other regarding the influence that the philosophy of Black Power had on African American communities.

(d) Q3.6 was generally poorly answered by a significant number of candidates. Candidates were unable to effectively use the evidence from the sources and their own knowledge to write an organised paragraph on the question posed.

SECTION B: ESSAY QUESTIONS

QUESTION 4: CASE STUDY – CHINA

Candidates who attempted this question performed satisfactorily.

Common errors and misconceptions

(a) The majority of candidates were unable to take a stance and sustain a line of argument throughout the essay with relevant evidence. Very little attempt was made to draw a conclusion.

(b) A large number of candidates wrote essays that contained far too much background information and were generally irrelevant to the question posed. In addition most essays contained content but did not necessarily address the demands of the question.

QUESTION 5: INDEPENDENT AFRICA: COMPARATIVE CASE STUDIES – THE CONGO AND TANZANIA

This question was attempted by few candidates. Generally, the performance ranged from poor to satisfactory.

Common errors and misconceptions:

(a) Most candidates were unable to critically discuss how Mobutu Sese Seko and Julius Nyerere promoted economic, social, and cultural developments in their respective countries after the attainment of independence in the 1960s.

(b) Candidates merely wrote narrative accounts on the Congo and Tanzania instead of giving a comparative analysis. Most essays lacked an introduction and conclusion.

(c) Several candidates wrote essays that did not address the question posed. Essays lacked information on the social and cultural aspects of the Congo and Tanzania.

QUESTION 6: CIVIL SOCIETY PROTESTS FROM THE 1950s TO THE 1970s: THE CIVIL RIGHTS MOVEMENT

A significant number of candidates answered this question. Performance ranged from satisfactory to good.

Common errors and misconceptions

(a) Some candidates were unable to take a stance. They were incapable of demonstrating how the various forms of protests by civil rights activists were successful in ensuring that all Americans were treated equally in the USA in the 1960s.

(b) A few candidates lacked an appropriate introduction, body and a convincing conclusion.
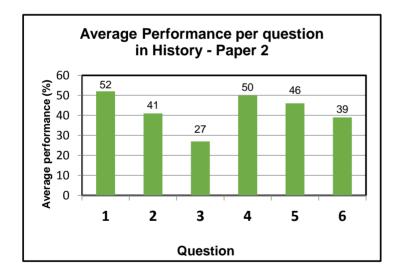
7.5 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

(a) Generally the candidates' performance in this question paper ranged from poor to good.

(b) A significant number of candidates were incapable of interpreting, analysing, and synthesising evidence from the sources. In addition, candidates were unable to define historical concepts, compare information and ascertain the reliability/ usefulness of evidence in the sources provided.

(c) Several candidates were unable to use the relevant information from the sources and their own knowledge to write a logical and coherent paragraph.

(d) In the essay questions, most candidates were unable to address the demands of the question posed. Many essays lacked content, structure and a relevant line 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 candidate's 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.

Figure 7.6.1: Average marks per question expressed as a percentage: Paper 2

Q1	Civil Resistance, 1970s to 1980s: South Africa
Q2	The coming of democracy to South Africa and coming to terms with the past
Q3	The end of the Cold War and a New World Order, 1989 to the present
Q4	Civil Resistance, 1970s to 1980s: South Africa: The crisis of apartheid in the 1980s
Q5	The coming of democracy to South Africa and coming to terms with the past
Q6	The end of the Cold War and a New World Order: The events of 1989
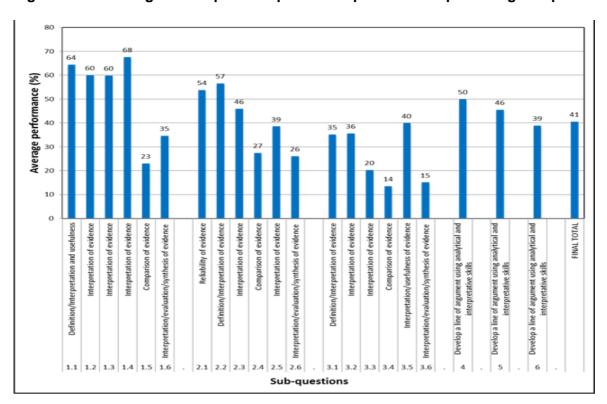
Figure 7.6.2: Average marks per sub-question expressed as a percentage: Paper 2

7.7 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

SECTION A: SOURCE BASED QUESTIONS

QUESTION 1: CIVIL RESISTANCE, 1970s TO 1980s: SOUTH AFRICA

In the main, many candidates attempted this question. Performance ranged from fair to good.

Common errors and misconceptions

(a) In Q1.1.4, several candidates were unable to comment on the usefulness of the information in the source.

(b) In Q1.3.2, a significant number of candidates could not explain the significance of (a) the clenched fist and (b) the broken chain in the poster.

(c) In Q1.5, many candidates lacked the knowledge to compare sources and explain how they support each other in respect of the death of Steve Biko.

(d) In Q1.6, a number of candidates were unable to extract relevant information to write a coherent paragraph explaining lessons that South Africans can learn from Bantu Stephen Biko who died forty years ago.

QUESTION 2: THE COMING OF DEMOCRACY TO SOUTH AFRICA AND COMING TO TERMS WITH THE PAST

This question was popular and was satisfactorily answered by most candidates.

Common errors and misconceptions

(a) In Q2.1.4, candidates found it extremely difficult to explain to what extent evidence given by police interrogators was reliable regarding how Timol was killed. Many candidates did not take a stance and defended it.

(b) In Q2.2.2, many candidates were unable to define the term *amnesty* in the context of the TRC. Candidates gave vague and generalised responses.

(c) In Q2.2.4, candidates were unable to explain why the democratic government opted for *restorative* justice rather than *retributive* justice. Some candidates merely explained the terms *restorative* and *retributive*.

(d) In Q2.4, several candidates were unable to compare how Sources 2B and 2C supported each other regarding how the TRC dealt with the murder of Ahmed Timol.

(e) In Q2.6, it was evident that many candidates were unable to write a logical paragraph explaining how the TRC dealt with the murder of political activists such as Ahmed Timol.

QUESTION 3: THE END OF THE COLD WAR AND A NEW WORLD ORDER, 1989 TO THE PRESENT

Very few candidates answered this question. Performance in this question was generally fair.

Common errors and misconceptions

(a) In Q3.3.1, a large number of candidates were unable to use the visual clues in the cartoon to explain the messages that were conveyed.

(b) In Q3.3.2, candidates could not comment on why 'Cheap Imports' was portrayed as larger than 'Local Producers' in the cartoon.

(c) In Q3.5.4, several candidates failed to explain why a historian would find this source useful.

(d) In Q3.6, a significant number of candidates were unable to write a coherent paragraph explaining how South Africa's poultry industry was affected by globalisation.

SECTION B: ESSAY QUESTIONS

QUESTION 4: CIVIL RESISTANCE, 1970s TO 1980s: SOUTH AFRICA –

THE CRISIS OF APARTHEID IN THE 1980s

Most candidates who attempted this question performed satisfactorily.

Common errors and misconceptions

(a) Generally, candidates were unable to analyse and interpret the question posed.

(b) Most candidates' essays lacked an introduction and a conclusion. They were unable to effectively use the learnt content to answer the question posed. Hence, they simply wrote narrative essays and could not take and sustain a coherent line of argument on how international anti-apartheid movements led to the downfall of the apartheid regime.

QUESTION 5: THE COMING OF DEMOCRACY TO SOUTH AFRICA AND COMING TO TERMS WITH THE PAST

This was a very popular question and candidates' performances ranged from weak to good.

Common errors and misconceptions

(a) Some candidates could not explain to what extent political leadership and commitment by key South African role players paved the way for the birth of a non-racial democratic South Africa in 1994.

(b) Candidates were unable to develop and sustain a relevant line of argument on the question posed.

(c) Several candidates simply wrote narrative essays which lacked an introduction, a cohesive body of knowledge and a compelling conclusion.

QUESTION 6: THE END OF THE COLD WAR AND A NEW WORLD ORDER: THE EVENTS OF 1989

Not many candidates attempted this question. Candidates' performances ranged from poor to satisfactory.

Common errors and misconceptions

(a) Candidates were unable to state whether they agreed or disagreed with the statement and support their lines of argument with relevant historical evidence.

(b) Some candidates merely wrote narrative essays, without taking or sustaining a line of argument.

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(c) Candidates did not show how Gorbachev's policies of Glasnost and Perestroika led to the disintegration of the Soviet Union in 1989 which had a direct impact on South African politics.

7.7 SUGGESTIONS FOR IMPROVEMENT IN BOTH PAPER 1 AND PAPER 2

Teachers should:

(a) Teach learners the necessary historical skills such as the definition of historical concepts, extraction, interpretation, analysis, ascertaining the reliability, limitations and usefulness of historical sources. These foundational historical skills must be underpinned with the teaching and learning of the prescribed content.

(b) Expose learners to a variety of sources and the related source-based skills such as interpreting, analysing, evaluating, comparing, contrasting and ascertaining the limitations, usefulness and justification of such sources. Learners should be taught the relevant themes, using interactive, user-friendly teaching methodology and the relevant notes.

(c) Teach paragraph writing skills using writing frames.

(d) Expose learners to how to write a coherent essay by taking a stance and supporting it with relevant historical evidence.

(e) Ensure that the prescribed content, as contained in the *CAPS* and the *2017 Examination Guideline* document, is covered extensively.

(f) Make an effort to expose learners to innovative, relevant and user-friendly resources as well as examination techniques.

(g) Practice source-based, paragraph and essay writing skills by working with past NSC (*CAPS*) complaint question papers.

(h) Attend content and assessment workshops, to firstly familiarise themselves with the requirements and demands of the *CAPS* and the *2017 Examination Guideline* document and secondly to use recent and relevant teaching and learning methods in classrooms. They should follow the newly released *National Examination Guidelines (2017–2019)* during the teaching and assessment of the prescribed sections. The *Examination Guidelines* are designed to provide clarity on the scope that needs to be taught, studied and assessed.

(i) Undertake the necessary research on the latest historical trends in the teaching and learning of history.

(j) Interact with relevant resources such as books, historical journals, internet sites, DVDs, SA History Online (SAHO), the History Channel, South African Society for History Teaching (SASHT) and newspapers in order to meaningfully convey the prescribed content to learners.

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Subject Advisors should:

(a) Plan, prepare and conduct intensive content and assessment workshops on problematic aspects of the Grade 12 curriculum with History teachers.

(b) Develop relevant resource material that both teachers and learners can interact with.

(c) Workshop teachers on source-based, paragraph and essay writing skills, specifically on strengthening the 'new' content areas that are stipulated in the *2017 Examination Guideline* document.

Teacher development should:

(a) Ensure that new teachers are supported and guided on pedagogical, content and teaching methodology.

(b) Assist teachers on how to plan, prepare and present interactive History lessons.

(c) Develop educators on how to teach and assess 'new' content focus areas.

CHAPTER 8
LIFE SCIENCES

The following report should be read in conjunction with the Life Sciences question papers of the November 2017 Examination.

8.1 PERFORMANCE TRENDS (2014 – 2017)

The number of candidates who wrote the Life Sciences examination in 2017 decreased by 29 339 in comparison to that of 2016. The performance of the candidates in 2017 reflects a marked improvement at the 30% level to 74,4% and at the 40% level to 52,1%.

Table 8.1 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
2014	284 298	209 783	73.8	139 109	48.9
2015	348 076	245 164	70.4	160 204	46.0
2016	347 813	245 157	70.5	157 224	45.2
2017	318 474	236 809	74,4	166 071	52,1

Over the years there has been an improvement in the writing of essays and the drawing of graphs. There are, however, certain areas that require more attention in order for the results to improve in a meaningful way.

A strengthening of content knowledge in topics, such as Genetics and Evolution, will greatly enhance the performance in especially Paper 2. These two topics comprise approximately 110 of the 150 marks in Paper 2. One of the challenges in improving performance is that there are many teachers who are not confident in these two topics. Teacher workshops should focus strongly on these topics. In addition, Evolution is scheduled for late in the third term. Most teachers who lag behind in the teaching of other topics in the year end up with too little time to do justice to this topic.

Another area of poor performance remains the questions on scientific investigations which appear in Paper 1 and Paper 2. If this area can be strengthened from the earlier grades, performance can improve. This is also an area in which teachers must first be supported.

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Graph 8.1.1 Overall achievement rates in Life Sciences (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	73.8	70.4	70.5	74.4
■ % achieved at 40% and above	48.9	46.0	45.2	52.1

Graph 8.1.2 Performance distribution curves in Life Sciences (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0.1	6.5	19.6	24.9	19.2	13.1	8.1	5.2	2.8	0.5
2015	0.1	8.3	21.1	24.4	18.2	12.5	7.9	4.8	2.3	0.4
2016	0.1	7.7	21.7	25.3	18.5	12.0	7.5	4.5	2.3	0.4
2017	0.3	7.8	17.6	22.2	19.2	14.4	9.5	5.9	2.8	0.4
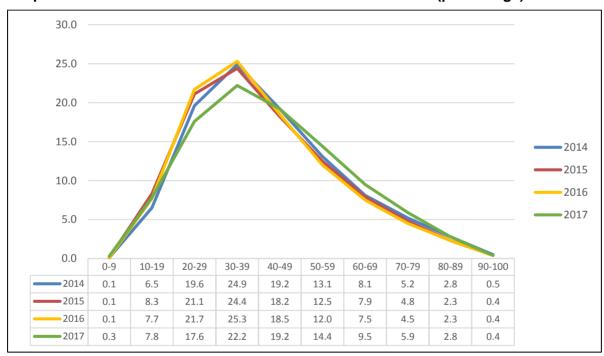
8.2 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

General comments

(a) Some candidates were not familiar with basic terminology in the different topics. This resulted in poor performance, even in the lower-order questions.

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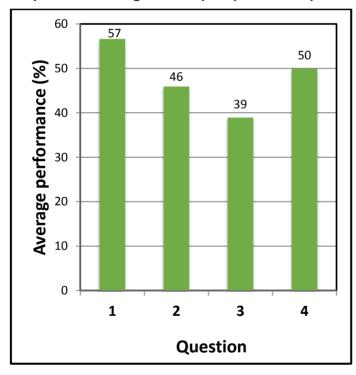
(b) Some candidates had problems distinguishing between action verbs, especially between *describe* and *explain*.

(c) Certain problem areas mentioned in previous reports, e.g. investigations which form part of the work throughout the year, remain a challenge to some candidates.

(d) The candidates' performance indicates that the work on environmental studies, which was taught in Grade 11, was not revised properly or covered again in Grade 12.

(e) Since textbooks do not always carry accurate information, teachers should always be guided by the *CAPS* and *Examination Guideline* documents for Life Sciences.

8.3 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 degrees of challenge of each question as experienced by candidates.
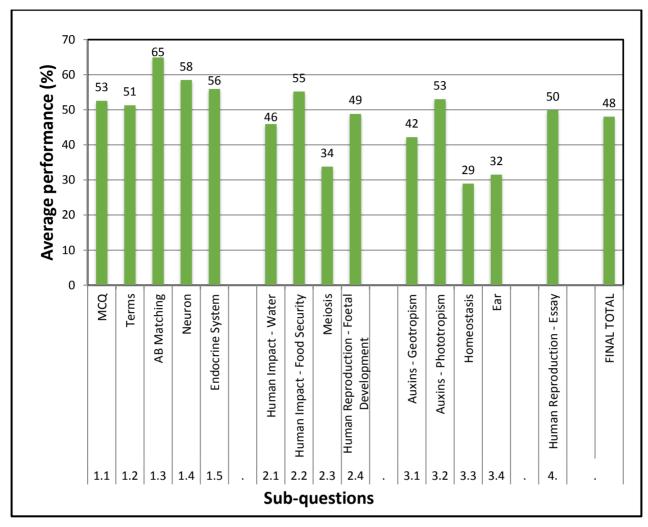
Graph 8.3.1 Average marks per question expressed as a percentage: Paper 1

Q1	Multiple Choice, Terminology, Matching Items, the Neuron and Homeostasis
Q2	Human Impact (Water Availability and Food Security), Meiosis and Foetal Development
Q3	Plant Hormones, Endocrine System, the Ear
Q4	Spermatogenesis, Formation and Transport of Semen, Structural suitability of Sperm

Graph 8.3.2: Average performance per sub question: Paper 1

The worst performance by candidates was recorded in the sub questions on Homeostasis (scientific investigation), the Ear, Meiosis, Geotropism and Human Impact on the Environment.

8.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MULTIPLE CHOICE, TERMINOLOGY, MATCHING ITEMS, THE NEURON AND HOMEOSTASIS

Common errors and misconceptions

(a) Poor performance in Q1.1 showed that candidates lacked a basic knowledge of terminology. Candidates lost marks since they were unable to:

- Correctly identify correct functions for different parts of the eye

- Differentiate between receptors and effectors; the cerebrum and the cerebellum

- Apply knowledge in multiple-choice items that assessed higher cognitive skills.

(b) In Q1.2, biological terms remain problematic for many candidates. Candidates were not able to differentiate between *internal* and *external* fertilisation; *aldosterone* and *ADH*; *LH* and *progesterone*. In addition, candidates were not able to differentiate between the process of crossing over and the *chiasma* as the point of crossing over.

(c) In Q1.3, candidates were not able to differentiate between *vivipary* and *ovovivipary* or between *precocial* and *altricial* development. This once again attests to the poor attention paid to the teaching and learning of terminology.

(d) Many candidates lost marks in Q1.4 either because they could not differentiate between a *motor neuron* and a *sensory neuron* or they could not correctly match functions to the relevant parts of the neuron represented.

(e) It is also evident from Q1.2.7, which required a disorder related to the eye (astigmatism), and from Q1.4.4, which required a disorder related to the neuron (multiple sclerosis), that the relevant disorders are not being taught and learnt effectively.

(f) In Q1.5.3, candidates confused the hormone *glucagon* with the carbohydrate *glycogen*.

Suggestions for improvement

(a) There needs to be a greater emphasis on the teaching and learning of appropriate terminology related to the various topics, together with the correct spelling of these terms. Teachers should use various strategies to improve the teaching of terminology which have been outlined in the Diagnostic Report of the previous years.

(b) Learners must follow the instructions as prescribed in Q1.3. Answers should be written as *A only* (not A), *B only* (not B), *both A and B* (not A + B; A, B; A and B or A/B). Teachers should enforce this in all assessment activities at school.

(c) Learners should be given sufficient practice to understand the instructions contained in questions. Some questions prescribe that only a LETTER is required, whereas at other times a LETTER and a NAME is required.

(d) Teachers should give learners multiple opportunities to label drawings and write in the functions next to the labels. The blank diagrams found in the *Mind the Gap* study guide will prove useful in this regard.

QUESTION 2: HUMAN IMPACT (WATER AVAILABILITY AND FOOD SECURITY), MEIOSIS AND FOETAL DEVELOPMENT

Common errors and misconceptions

(a) In Q2.1.3, many candidates were not able to perform the required calculation on percentage increase in the amount of water in the dams in the North West.

(b) In Q2.1.5, which required strategies to reduce the water shortages, many candidates lost marks because they:

- Provided strategies related to water restrictions when the question specifically asked for strategies *other than* water restrictions.

- Provided strategies relevant to individuals or households rather than providing strategies relevant to the level of the provincial government, as required by the question.

- Stated strategies without stating how they contribute to a reduction in the water shortage. In other words, candidates stated rather than explained the strategies.

(c) In Q2.1.6, candidates did not express their answers in a cause-effect sequence which is what is required in a question that asks one to *explain*. They listed issues that are outcomes from building a dam without linking them to how they negatively impact on the environment.

(d) In Q2.2.1, many candidates did not get full credit since they provided incomplete definitions of *food security*.

(e) In Q2.2.2, candidates provided a *word* or a complete *sentence* rather than a *phrase* and therefore did not receive credit.

(f) In Q2.2.4, many candidates did not realise that they had to select the correct answer from the three options provided in the brackets despite this format having been used in past examination papers.

(g) In Q2.2.5, just as in Q2.1.6, candidates did not express their answer in a cause-effect sequence which is what is required in a question that asks one to *explain*. They listed issues which are related to the armyworm and its activities without linking them to how they negatively impact on the economy.

(h) Q2.3.2, which required visible reasons for the identification of Telophase II, was very poorly answered. Many candidates provided general characteristics of Telophase II. Some of these characteristics did not receive credit since only characteristics that are unique to Telophase II and which do not apply to any other phase, could receive credit. See below for some examples of answers that did not receive credit, with a corresponding reason.

Reason for identification of Telophase II	Reason for not receiving credit
Cells are genetically different	The cells are genetically different in all phases from Telophase I onwards not just in Telophase II
The resulting cells are haploid	The cells are haploid in all phases from Telophase I onwards not just in Telophase II

(i) In Q2.3.4, most candidates were able to identify *crossing over* as one source of variation. Many candidates were not able to identify the *random arrangement of chromosomes* as another source of variation. They often cited *random assortment* or *independent assortment* instead and therefore did not receive credit.

(j) In Q2.4.4, which asked about the negative impact on foetal development, many candidates simply said that development would be affected or that there would be underdevelopment which was a repetition of what was in the question and therefore they did not receive credit. They were required to explain an example of such underdevelopment. Here again, candidates did not express their answers in a cause-effect sequence which is what is required in a question that asks one to *explain*.

Suggestions for improvement

(a) Calculating the method to increase or decrease a percentage should be emphasised as follows:

- For the two values provided, find the numerical difference (if not already given).

- Then divide this difference by the original or first value.

- Then multiply by 100 to obtain a percentage increase or decrease.

(b) Give learners more practice in questions that need an explanation. Answers to explanation questions from past marking guideline documents should be used to show learners how these answers should be formulated and how marks are allocated.

Learners must express their answers in a cause-effect sequence which is often what is required in a question that asks one to *explain*. In Q2.1.6, for example, the question required a learner to first state the immediate outcome of building a dam and then linking it to how it negatively impacts on the environment. Two possible answers from the marking guideline document below illustrate this.

Immediate outcome of building a dam	Negative impact on the environment
Habitats are destroyed✓	which will lead to a loss in biodiversity✓
When flood gates are opened, flooding may occur in the areas downstream from the dam✓	resulting in erosion✓/loss of top soil

(c) Learners should be taught how to write full definitions to receive full credit. A full definition of *food security*, for example, involves the following elements:

- Access by all people
- To good quality food
- In sufficient quantities
- At all times

(d) Using extracts, teachers should allow learners to distinguish between a *word*, a *phrase* and a *sentence*. In relation to Q2.2.2, for example, which asks about alien species, the following applies:

Word: Endemic

Phrase: Endemic to North and South America

Sentence: A crop-destroying caterpillar species (commonly known as the army worm) endemic to North and South America is spreading rapidly in Africa, including South Africa, and is raising concerns about food security.

(e) In addition to knowing the general characteristics of each phase of meiosis, learners should also learn which of those characteristics are unique to that phase and no other phase. Only then can these characteristics be used as reasons for the identification of a phase. For example, a *correct answer* for the identification of Metaphase I is that the 'chromosomes arrange at the equator in homologous pairs'. This happens only in Metaphase I and in no other phase. An *incorrect answer* would be that the 'chromosomes arrange at the equator'. Even though it is characteristic of Metaphase I, it is not a unique characteristic of Metaphase I since it is also true for Metaphase II. The difference is that in Metaphase II, the chromosomes arrange at the equator in a single row and not in homologous pairs.

(f) Teachers should unpack the following terms for learners: random arrangement of chromosomes, random assortment of chromosomes and independent assortment. Although these terms are related, each has a different meaning.

Random arrangement of chromosomes

- This is characteristic of Metaphase I and II of meiosis.

- The chromosomes could come to lie at the equator randomly/in different combinations.

- In humans, where the diploid number of chromosomes is 46, there are more than 8 million combinations.

- This will result in genetic variation in the gametes produced at the end of meiosis.

Random assortment of chromosomes

- The chromosomes or chromatids move away from the equator during Anaphase I and II until they reach the poles during Telophase I and II respectively.

- The combination in which the chromosomes or chromatids move to the poles depends on the random arrangement of chromosomes at the equator during Metaphase I or II.

- The random assortment of chromosomes in itself is not a source of variation since it is dependent on the random arrangement of chromosomes at the equator.

Independent assortment

- A pair of alleles of a gene, which controls each characteristic, is found on homologous chromosomes.

- Each pair of chromosomes arranges at the equator independently of another pair because of the random arrangement of chromosomes.

- The way in which one pair of chromosome therefore assorts into the resulting gametes will not influence the way in which another pair assorts into the gametes.

- The inheritance of any characteristic therefore occurs independently of any other characteristic.

- This is independent assortment and is due to random assortment of chromosomes caused by the random arrangement of chromosomes at the equator.

QUESTION 3: PLANT HORMONES, ENDOCRINE SYSTEM, THE EAR

Common errors and misconceptions

(a) In Q 3.1.1, candidates provided very poorly constructed definitions and therefore lost marks. Many gave definitions of *phototropism* or *geotropism* instead of the general term *tropism*.

(b) Candidates lost marks for the drawing in Q3.1.2, because they did not:

- Have a caption or had an incorrect caption

- Provide appropriate labels

- Show the new direction of growth of the radicle and plumule

(c) In Q3.2.2, many candidates provided an *explanation* rather than a *description*. It was also clear that some candidates did not know the meaning of *unilateral light*.

(d) There was a general problem to identify the *independent variable* and the *dependent variable* and how the dependent variable was measured in Q 3.3.2.

(e) In Q3.3.5, candidates lost marks because they could not:

- Interpret information in the table

- Relate thyroxin to metabolism

- Relate metabolism to oxygen consumption

- Relate metabolism to weight loss

(f) It is evident that there is still confusion between *reliability* and *validity* in Q3.3.6.

(g) In Q3.4.1, part D was often identified as the *oval window* instead of the *round window*.

(h) In Q3.4.3, due to poor reading and interpretation of the question, many candidates included an account on the role of the *sacculus* and *utriculus* in balance when the question only asked for the role of the semi-circular canals. In addition, many learners indicated that impulses would be transmitted to the cerebrum instead of the cerebellum. The question asked 'how balance is maintained'. Many candidates stopped at the impulses reaching the cerebellum and did not speak about impulses then being sent to the muscles to restore balance.

(i) Many candidates found it difficult to apply their knowledge in Q3.4.4. This may be due to either a lack of the required knowledge, or difficulty in unpacking the question.

(j) In Q3.4.5, candidates provided a function of structure A rather than indicating the consequence of the fusion of part A. Although the consequence can be gauged from the function, the answer must be formulated to meet the requirements of the question. Many candidates were not able to arrange their answers appropriately in a cause-effect sequence.

Suggestions for improvement

(a) *Tropism* should be defined as a growth movement of plant organs in response to an external stimulus. Take note of the following in the definition:

- *Growth* movement is important in the definition as there are other movements known as nastic movements that are not accompanied by growth and is therefore not a tropism.

- *Plant organs* are mentioned since the entire plant may not respond to the external stimulus. For example, unilateral light will only influence the growth movement of the stem and not the root.

- *External* stimulus is mentioned since movements caused by internal stimuli in plants are called nastic movements and not tropisms. Many candidates did not address one or more of the aspects required by the question or did not address all three aspects adequately and were therefore not awarded the synthesis mark for comprehensiveness.

(b) Many candidates gave irrelevant information, for example a detailed description of fertilisation when this was not required, and hence lost the mark for relevance.

(c) When candidates provided accounts on spermatogenesis or the formation and transport of sperm that were out of sequence, they lost a mark for logical sequence.

(d) For spermatogenesis, many candidates provided information in excess of what is required by the examination guideline document.

(e) Many candidates provided incomplete answers for the structural suitability of the sperm. They often mentioned the name of the part without stating the role it plays and hence only received 1 of the 2 marks for each answer. Other candidates provided more than three adaptations. Only the first three were marked since the question asked for just THREE adaptations. Even if their fourth answer was correct, it did not receive credit.

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Suggestions for improvement

(a) Teachers should offer more opportunities for learners to write answers in essay form. Teachers should inform learners that the essay in Life Sciences does not require an introduction and a conclusion.

(b) Greater exposure to answering paragraph-type questions will be a useful step to prepare learners for the writing of essays.

(c) Teachers should use the current and past examination essay questions as examples to deliberately teach learners the skill of interpreting the question to determine what is required. Key words in the question should be underlined.

(d) Learners should be reminded that synthesis is made up of three parts: relevance, logical sequence and a comprehensive answer. The allocation of the synthesis marks should be explained to them and used from Grades 10 to 12.

(e) Learners should be advised that two marks are generally allocated to each structural adaptation of the sperm, one mark for the part/structure and the second mark for the role it plays, as shown in a few of the answers below:

Structure	The role it plays
The acrosome✓	contains enzymes to dissolve a path into the ovum✓
The tail✓	enables sperm cells to swim✓ to the ovum
Many mitochondria✓in the middle piece	to provide energy✓ for the sperm movement

Subject advisors should train teachers on the application of the criteria for synthesis. This can be done by giving different teachers the same sample script to mark to which synthesis marks are allocated. This should be followed by a discussion with reasons on whether the answer in the sample script should be awarded a mark for each aspect of synthesis.

8.5 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

General comments

(a) Many candidates lost marks for not following the instructions in the questions.

(b) Many candidates were not familiar with basic terminology in the different topics. This resulted in poor performance even in lower-order questions.

(c) Some candidates had problems distinguishing between action verbs, especially between *describe* and *explain*.
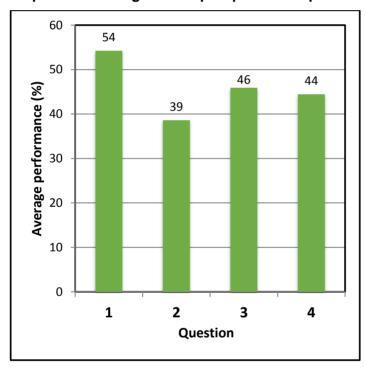
(d) Certain problem areas mentioned in previous reports, for example investigations which form part of the work throughout the year, remain a challenge to some candidates.

(e) Candidates' performance indicates that they are still experiencing difficulty in certain aspects of genetics and evolution.

(f) Since textbooks do not always carry accurate information, teachers should always be guided by the *CAPS* and *Examination Guideline* documents for Life Sciences.

8.6 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.
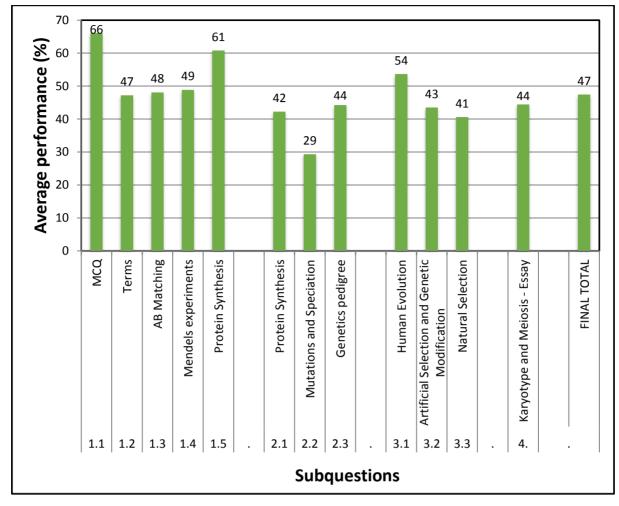
Graph 8.6.1 Average marks per question expressed as a percentage: Paper 2

Q1	MCQ Terms
	AB Matching
	Mendel's experiments
	Protein Synthesis
Q2	Protein Synthesis
	Mutations and Speciation
	Genetics pedigree
Q3	Human Evolution
	Artificial Selection and
	Genetic Modification
	Natural Selection
Q4	Karyotype and Meiosis -
	Essay

Graph 8.6.2 Average performance per subquestion: Paper 2

The worst performance by candidates was in Q2 on mutations and speciation and protein synthesis. In Q3 performance in natural selection, artificial selection and genetic modification were problematic.

8.7 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MULTIPLE CHOICE, TERMINOLOGY, MATCHING, MENDEL'S EXPERIMENT AND PROTEIN SYNTHESIS

Common errors and misconceptions

(a) Poor performance in some items in Q1.1 was evidence that candidates:

- Were not familiar with the concept of *multiple alleles* in blood group in humans

- Did not recall the various reproductive isolating mechanisms

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- Could not use given information and interpret a key to identify the required genotypes and phenotypes

(b) In Q1.2, biological terminology once again posed a great challenge to many candidates. They also had trouble with the correct spelling of the terminology. They could not differentiate between *continuous* and *discontinuous variation*, *biogeography* and *biodiversity*, *genetic modification* and *artificial selection*.

(c) In Q1.2.2, some candidates incorrectly referred to the use of biological processes, organisms or systems to improve the quality of human life, as 'genetically modified organisms' instead of genetic modification. The question clearly referred to a *process* and not the *result* of the mentioned process.

(d) In Q1.2.9, many candidates were not familiar with the difference between a family name, a species name and a common name. Hominidae was confused with hominids, *Homo sapiens* and hominins.

(e) In Question 1.4.1(a), candidates failed to give the correct term for the inherited factors and incorrectly used the term *genetics* instead of *genes* or *alleles*.

(f) In Question 1.4.2, candidates had to give the female structure of the flower where meiosis occurs. Many candidates wrote *ovum* or *oogenesis* instead of *ovary*.

(g) In Question 1.4.3 (a) and (b), some candidates could not interpret information from the table and therefore could not give the correct number of the characteristics of the pods used. They incorrectly wrote the names of the characteristics (texture colour) and the variation of these characteristics (round, wrinkled, yellow and green) instead of the *number* and lost marks for not following the instruction in the question. Some could not differentiate between a *characteristic* and an *allele*.

(h) In Q 1.4.5 again, candidates lost marks since they provided the actual phenotypes rather than the *number* of different phenotypes that will result.

(i) In Q1.5.1, candidates identified the process as protein synthesis whereas the question asked them to identify a process that occurs during protein synthesis and some also incorrectly identified it as *transcription* instead of *translation*.

(j) In Q1.5.2(c), candidates incorrectly answered *hydrogen bond* instead of *peptide bond* as they were clearly confused between the bonds (peptide) that exists between amino acids with the bond that exists between nitrogenous bases in a DNA molecule (hydrogen bond).

(k) In Q1.5.3, some candidates still gave names when letters were asked for.

Suggestions for improvement

(a) There needs to be a greater emphasis on the learning of appropriate terminology related to the various topics, together with the correct spelling of these terms. Poor spelling often changes the meaning of the term and hence learners lose marks. Teachers should use the following strategies to improve the teaching of terminology:

- Learners must be made aware of the principles of marking, e.g. poor spelling often changes the meaning of the term, and learners will not be credited.

- Identify new terms in every lesson and write them on the board. Teachers should also pronounce the terminology correctly.

- Instruct learners to take down terms at the back of their notebooks, noting the correct spelling.

- Clarify the difference between related terminology, e.g. *biogeography* and *biodiversity*.

- Encourage learners to write down the meanings of these words by being attentive during the lesson or by finding the meaning in a dictionary or textbook.

- Make learners aware of the meanings of new terms by using them in sentences.

- Include biological terms in all daily assessment tasks.

- Ensure that by the end of the year, all learners have a comprehensive glossary of all terms.

(b) Teachers should also highlight the differences between different concepts, e.g. *characteristic* and *allele, ovum, ovule* and *ovary; peptide bond* and *weak hydrogen bond* and state clearly where each is applicable.

(c) Teachers should give learners multiple opportunities to answer questions based on data provided. Guidance should be provided to learners on how to read/interpret the data given in order to use the clues provided to answer the questions set, such as in Q1.4 on genetics and 1.5 on protein synthesis.

(d) Teachers should teach learners to read questions with understanding to enable them to follow the instructions in the question papers. If they are required to give the 'letter only', then they should do just that.

QUESTION 2: NUCLEIC ACIDS, GENETICS AND MEIOSIS

Common errors and misconceptions

(a) In Q2.1.1, some candidates could not differentiate between *codons* and *nitrogenous bases*. This was evident as some candidates gave the answer for the number of codons for phenylalanine as 3, showing that they counted the number of nitrogenous bases in one codon for phenylalanine.

(b) It is evident from Q2.1.2 and 2.1.3 that candidates still have a problem differentiating between a *codon* and an *anticodon*. In addition, they are not able to use information from a table to identify the required amino acid using a given codon or anticodon.

(c) In Q2.1.4, some candidates could not describe the mutation that occurred and failed to explain the effect of the mutation. Action verbs such as *describe* and *explain* are problematic for

candidates. Candidates are also still giving 'point mutation' as an answer. This is no longer in the *CAPS* and *Examination Guideline* but is obviously still being taught.

(d) Candidates did not use the given table to find out if the new codon formed after the mutation codes for a different amino acid. Most candidates were of the opinion that a mutation will always lead to a formation of a different protein, which was not the case in this question.

(e) The majority of the candidates failed to apply their knowledge in Q2.2. In fact, Q2.2 was the most poorly answered question in Paper 2. This question was on speciation and mutation and it was a higher-order question. Candidates provided a general account on speciation without contextualizing it to the specific example given in the question.

(f) In Q2.2.1, many candidates could not give the correct definition of a *population*. They said it is a group of organisms that could interbreed, but failed to add that they could produce fertile offspring and found in the same area at a particular time.

(g) In Q2.2.2, candidates used the term 'random assortment of chromosomes' instead of 'random arrangement of chromosomes'.

(h) In Q2.2.3, candidates gave a generic description of speciation through geographical isolation without applying it to the given example in the question. The question did not require the entire account on speciation anyway.

(i) Most candidates referred to organisms *adapting* to the environmental conditions which makes this deterministic. However, these organisms already possessed the favourable characteristics that arose through mutation that made them better suited to the environment.

(j) In Q2.2.5, candidates could not give a correct description to confirm that squirrels belong to different species. They could not link the concept that different species cannot interbreed to produce fertile offspring.

(k) In Q2.3, the interpretation of a pedigree diagram with a sex-linked disorder is still a challenge for many candidates. They did not mention the gender of Senzo as part of the phenotype. They did not give the correct recessive allele, i.e. some wrote $X^H X^h$ instead of using the letter $X^D X^d$ as given in the question. They also failed to explain why males are mostly affected by the disease.

Suggestions for improvement

(a) Learners must be taught to read questions carefully, noting what exactly is required of them. They should be taught what it means when the words *describe* and *explain* are used (refer to suggestions for improvement in the report for P1). They must also take note of the mark allocation for a question.

(b) Learners should be given sufficient exercises on how to do 'base pairing in protein synthesis' i.e. from DNA to mRNA (codons) to tRNA (anticodons) to amino acids, and the reverse process.

(c) Teachers and learners must closely consult the *Examination Guidelines* and the *CAPS* document where the two types of mutations given are 'chromosome' and 'gene' mutations. Further details on gene mutations such as point and frame-shift mutations are not required.

(d) Learners must be taught to apply protein synthesis to the context of the question asked, for example a mutation may or may not result in a change to the protein manufactured. This is the result of an amino acid sometimes having more than one codon or anticodon that codes for it.

(e) Teachers need to clearly distinguish among 'allele', 'chromosome' and 'characteristic/trait'.

(f) Learners must have copies of the *Examination Guidelines* and teachers should also interpret the *Guidelines* and indicate the relation of some topics, for example, speciation, variation, mutation and meiosis to learners.

(g) When learners are required to give THREE causes of variation, the principle of marking the first three only applies.   Teachers must apply this rule in their class tests and school-based assessments so that learners become familiar with this principle.

(h) Teachers need to explain the difference between 'random assortment', 'random arrangement' and 'independent assortment' to prevent confusion in the classroom and in assessments. See report for Paper 1 where these terms have been clarified.

(i) Teachers should provide multiple opportunities for learners to answer questions based on an application of the concept of speciation. Guidance must be given on how to contextualize the general account to the specific example stated in the question.

(j) The Y chromosome in males must specifically be referred to as being shorter than the X chromosome and as such unable to carry the full complement of alleles found on its gonosome partner (X chromosome) and that the allele for some traits does not appear there. The Y chromosome therefore, has an absence of some alleles, especially in sex linked disorders studies.

QUESTION 3: HUMAN EVOLUTION, ARTIFICIAL SELECTION AND GENETIC MODIFICATION AND NATURAL SELECTION

Common errors and misconceptions

(a) In Q3.1, the interpretation of data on human evolution has improved compared to previous years. Most candidates knew the types of evidence used to support human evolution in Q3.1.1. However, some gave examples of cultural evidence, such as tools and this was not credited as the question asked for types of evidence and not examples.

(b) In Q3.1.3, candidates had difficulty in giving the correct response on how the brain volume of a fossil could be estimated. They could not distinguish between the *skull* and the *cranium*. Instead of measuring the *volume* of the *cranium,* they referred to *size* of the *skull.*

(c) In Q3.1.5 (a), candidates could not interpret what was given in the table. They only gave the period of existence of *Homo habilis* and *Homo erectus* from the table. From this information, they were required to deduce and state that there was a period of overlap of their existence.

(d) In Q3.1.6, when drawing of the graph, candidates did not provide the correct caption although it could be extracted from the question easily. They did not read the question well as they plotted all the data in the table instead of just plotting the data for the genus *Homo*. Candidates did not adhere to plotting bars of the same width with equal spacing between the bars. They also lacked the skill of providing the correct scale, e.g. in the Y axis, some learners would just transcribe the data as found in the table, as a result some had 1500 first and then 1400. There is still some confusion between a bar graph and a histogram.

(e) In Q3.2.4, candidates showed poor application of knowledge. They did not understand the extract resulting in them just copying from the text. Even though the process of marcotting was explained in the text, they could not link the marcotting process to artificial selection. They also failed to explain how the marcotting process differs from genetic modification.

(f) In Q3.3.1, some candidates mentioned beach and mainland the variable instead of stating that the variable is the habitat, similarly, for fur colour, they wrote light or dark fur. When a variable is asked for, learners are expected to provide a single term, not the specific variations of that variable.

(g) In Q3.3.3, candidates did not understand that reliability had already been ensured in various ways. They therefore gave generic answers instead of looking for the correct information in the experimental procedure. The focus was on what was done and not what can be done.

(h) In Q3.3.4, candidates confused the answer and instead of giving a conclusion they gave the result.

(i) In Q 3.3.6, candidates failed to identify the shortcomings of a simulation. This shows that learners are lacking practical skill no 7 which deals with designing investigations and includes identifying the shortcomings of an experimental design.

Suggestions for improvement

(a) Drawing of graphs in grade 10, 11 and 12 cannot be over-emphasised. Teachers should provide learners with the marking criteria that will be used to mark the graph. In this way, learners will become familiar with the different components of graph drawing for which they will receive credit.

(b) Teachers should provide multiple opportunities for learners to interpret textual and other information. Special attention should be given to strategies that will assist learners with identifying the key information in the text so that it could be used as clues in the answering of the questions. Teachers must select appropriate material from other sources, for example newspapers and science journals, and not only from textbooks.

(c) Teachers must encourage learners to read the given text with understanding, and even underline the important information to note, before attempting to answer the questions. Learners *must study the information and data first before attempting the questions.*

(d) Independent and dependent variables should be identified from the aim of the investigation. For example, in Q3.3, scientists investigated the relationship between the chances of mice having been attacked and the colour of the fur of mice in two different habitats. The independent

variables are *fur colour* and *habitat* and the dependent variable is *the chances of mice having been attacked*. See the Paper 1 report for a clear difference between *independent* and *dependent* variable.

(e) Teachers need to teach learners to differentiate between *validity* and *reliability* in scientific investigations, because the principles of validity and reliability are fundamental cornerstones of the scientific method. See the Paper 1 report for a clear distinction between these two concepts.

QUESTION 4: KARYOTYPE AND MEIOSIS

Common errors and misconceptions

(a) Most learners performed fairly well in the part dealing with behaviour of chromosomes during Meiosis I but description of the arrangement of chromosomes in a normal karyotype was poorly answered.

(b) Some candidates did not understand that the question asked for the *behaviour of chromosomes* in Meiosis I and gave a full description of the process of Meiosis I, e.g. nucleolus disappearing in Prophase I and cytokinesis occurring in Telophase I.

(c) Candidates were able to state that there are 46 chromosomes and that males have XY and females XX chromosomes and that chromosomes are arranged in homologous pairs. Many candidates failed to mention that homologous chromosomes are similar in length, carry genes for the same characteristics and have alleles of a particular gene at the same loci.

(d) Candidates stated that a chromosome consists of chromatids and the centromere but did not state that a chromosome is made up of a pair of chromatids *joined* by centromere.

(e) Candidates stated that there are 23 chromosomes in a karyotype rather than 23 *pairs* of chromosomes. They made the same mistake with the autosomes saying that there are 22 autosomes instead of 22 *pairs* of autosomes.

(f) Instead of focusing on a normal karyotype, candidates described what happens in an abnormal karyotype and mentioned nondisjunction which leads to Down's Syndrome. This led to candidates not being awarded the mark for relevance.

(g) Some candidates also described Interphase and DNA Replication which were irrelevant to the essay since Interphase is not a part of meiosis, but occurs in preparation for meiosis.

Suggestions for improvement

(a) Teachers need to emphasize to learners that the format of the Life Sciences essay is not similar to that of a 'language essay', i.e. there is no need for an introduction and conclusion and synthesis refers to the style/format of the 'essay' and not to a process that needs to be described.

(b) The skill of writing an essay should start from Grade 10. Teachers must give essay questions on each chapter as practice and also discuss corrections until the skill is mastered.

(c) Teachers should emphasize the importance of *logic* in essays where *processes* are involved. Events must be presented in the correct sequence to get credit for logical sequence.

(d) Teachers should use the current and past examination essay questions to deliberately teach learners the skill of interpreting the question to determine what is required. Key words in the question should be underlined.

(e) The events of the different phases of meiosis should be taught using annotated diagrams to clearly show what happens during each phase.

(f) Teachers must emphasise that the phases of Meiosis I start from prophase and not interphase.

(g) Teachers must refrain from using words like *middle/centre* for the word *equator* in Metaphase.

(h) Teachers must use the *Mind the Gap* study guide to assist learners in the use of mind maps in the planning of an essay.

(i) Learners should be reminded that synthesis is made up of three parts: relevance, logical presentation and a comprehensive answer. The allocation of marks for synthesis should be explained to them and used from grades 10 to 12.

CHAPTER 9
MATHEMATICAL LITERACY

The following report should be read in conjunction with the Mathematical Literacy question papers of the November 2017 Examination.

9.1 PERFORMANCE TRENDS (2014 - 2017)

The number of candidates who wrote the Mathematical Literacy examination in 2017 decreased by 48 918 in comparison to that of 2016. The performance of the candidates in 2017 reflects an improvement at the 30% level to 73,9% but a decline at the 40% level to 45,0%.

Table 9.1.1 Overall achievement rates in Mathematical Literacy from 2014 – 2017

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
2014	312 054	262 495	84,1	185 528	59,5
2015	388 845	277 593	71,4	172 214	44,3
2016	361 948	257 926	71,3	167 811	46,4
2017	313 030	231 230	73,9	140 991	45,0

The change in format of the Mathematical Literacy P1 as indicated in the 2017 Examination Guideline document did not appear to have a significant effect on the performance of candidates. However, there appears to have been noticeable improvement in the performance of candidates in certain aspects of the curriculum that were previously regarded as challenging, particularly Measurement. This could be attributed to the efforts made by the subject advisors in supporting the development of teachers in this topic.

Candidates also appear to be confident in Grade 12 content that is not heavily dependent on prior knowledge from previous grades, particularly Finance. However, there are topics in Grade 12 that demand insight into content and procedures covered in previous grades, e.g. interpretation of statistical Graphs. In topics such as these, it is important that teachers devote sufficient time to teaching learners how to interpret bar graphs and pie charts.

It has also been noticed that specific aspects introduced into the CAPS in recent years have been answered well by candidates. This could be due to the detailed attention that teachers devote to new content that has been incorporated into the curriculum. Calculations involving Personal Income tax and interpretation of financial documents are prime examples of this.

Figure 9.1.1 Overall achievement rates in Mathematical Literacy (percentage)

	2014	2015	2016	2017
% achieved at 30% and above	84,1	71,4	71,3	73,9
% achieved at 40% and above	59,5	44,3	46,4	45,0

Figure 9.1.2 Performance distribution curves in Mathematical Literacy (percentage)
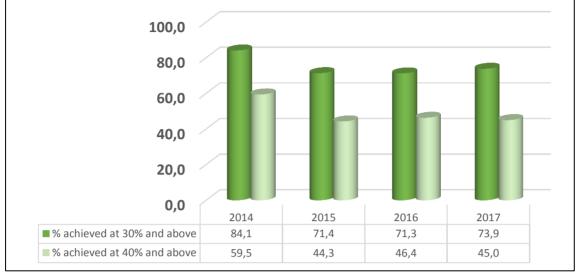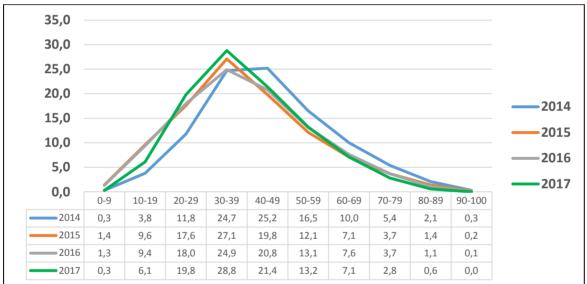
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0,3	3,8	11,8	24,7	25,2	16,5	10,0	5,4	2,1	0,3
2015	1,4	9,6	17,6	27,1	19,8	12,1	7,1	3,7	1,4	0,2
2016	1,3	9,4	18,0	24,9	20,8	13,1	7,6	3,7	1,1	0,1
2017	0,3	6,1	19,8	28,8	21,4	13,2	7,1	2,8	0,6	0,0

9.2 GENERAL COMMENTS ON PAPER 1 AND PAPER 2

(a) **Terminology**: Learners must be taught definitions of common terms used in Mathematical Literacy, e.g. 'profit' and 'income'. Learners should compile a glossary at the back of their notebooks, i.e. a list of new terms per topic, with a brief, but clear definition next to each term. A separate notebook for this purpose may also be kept. By the end of a year, all learners should have a comprehensive glossary of all the relevant terms.

(b) **Enhancing 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 utilise

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prior knowledge of a topic to identify the information that is relevant to each subquestion. Tables are often used to reduce written text. Learners must be able to analyse table data to enable them to appropriately use information to answer questions.

(c) **Use past NSC papers**: Firstly, it must be noted that past question papers serve as one of many teaching and learning resources. It must be used for revision purposes only. Past papers cannot replace the *CAPS* document and *Examination Guidelines*. Every learner must have access to past examination papers. Teachers can adapt certain questions, especially questions that include calculations involving measurement; financial documents; statistical graphs; maps and plans and probability.

(d) **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 allows them to have immediate feedback and gain 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 *CAPS*, such as personal income tax and box-and-whisker plots.

(e) **Previous recommendations**: 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; this includes learners' inability to work with big numbers.

9.3 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

(a) The 2017 question paper was set according to the new guideline document; consequently, Q1 is entirely based on short contexts with all questions at taxonomy   level 1.

(b) Teachers are advised to use the SC Mathematical Literacy Paper 1 (June 2017) and NSC Mathematical Literacy Paper 1 (November 2017) as exemplars for 2018 Mathematical Literacy learners.
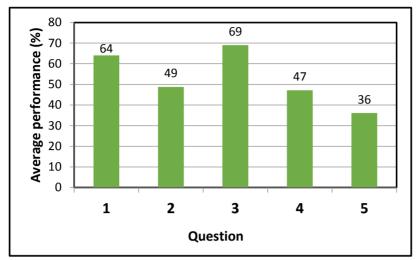
9.4 DIAGNOSTIC QUESTION ANALYSIS FOR PAPER 1

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.
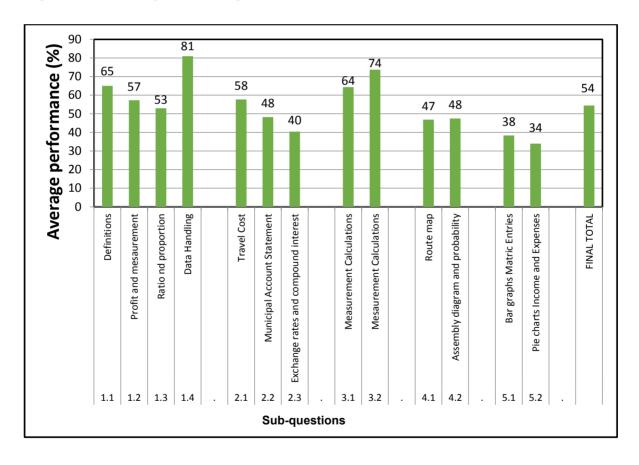
Figure 9.4.1 Average percentage performance per question for Paper 1

Q1	Short contexts
Q2	Finance
Q3	Measurement
Q4	Maps and Plans
Q5	Data Handling

Figure 9.4.2 Average percentage performance per sub question for Paper 1

9.5 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 1

The change in the sequence of questions seemed to benefit learners with Q1 based on short context questions, all set at taxonomy level 1. This improved the overall results in Mathematical Literacy in 2017.

QUESTION 1: SHORT CONTEXTS (INTEGRATED LEVEL 1 QUESTIONS ONLY)

Common errors and misconceptions

(a) In Q1.1.1 the majority of candidates confused profit with income.

(b) In Q1.2.1 some candidates incorrectly added the income and expenditure to calculate the profit. They did not understand that *profit = income – expenditure.*

(c) In Q1.2.2 candidates confused the 12-hour format (am and pm) with the 24-hour format.

(d) In Q1.2.3 candidates continue to confuse the concepts of radius and diameter. Candidates also could not calculate the distance D. They only did one of the two calculations, either subtracting or dividing, without doing both.

(e) In Q1.3.2 many of the candidates wrote the ratio as 2 : 14 instead of 2 : 12. Some candidates incorrectly switched the values around.

(f) In Q1.3.1 many candidates did not understand the meaning of what '*cost per litre'.* They were not able to correctly divide the total cost of the juice by the total volume. Candidates also used any volume that was mentioned in the question.

(g) In Q1.4.1 the candidates determined the mean, instead of just writing it in ascending order.

Suggestions for improvement

(a) Teachers are advised to use concrete examples of an analogue watch and a digital watch to demonstrate the difference between the 12-hour and 24-hour format. When adding or subtracting units of time, learners should understand that 60-minute increments must be converted to hours.

(b) Teachers need to expose learners to 2017 question papers which implemented the new format for Mathematical Literacy P1.

QUESTION 2: FINANCE (BUS FARES; MUNICIPAL STATEMENTS; EXCHANGE RATES)

Common errors and misconceptions

(a) In Q2.1.1 many candidates indicated the names of the towns instead of the fare.

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(b) In Q2.1.3 a large number of candidates were not able to interpret the question correctly as the use of Town X confused candidates. This had a negative impact on the answering of Q2.1.3 (b).

(c) In Q2.1.4, the majority of candidates calculated the VAT-Inclusive instead of VAT-exclusive price. In this case, candidates incorrectly used the calculation of 14% × R365.

(d) In Q2.1.5 many candidates lost marks because they calculated only the cost for one month and not for a year. Others calculated the cost correctly for the year but did not calculate the return cost.

(e) In Q2.2.1 the format of writing the date/month/year was poor. Short answers in the wrong format cost the learners valuable marks.

(f) In Q2.2.2 candidates were expected to identify services. Some incorrectly provided property rates as an answer, however, this not a service.

(g) In Q2.2.4 candidates failed to show how the average water consumption of 0,522 kl was calculated. Most wrote 6,264 ÷12 and hence lost a mark.

(h) In Q2.2.5 candidates still find explaining concepts challenging. They could identify the variable service (i.e. water-usage) but could not explain why it is a variable expense.

(i) In Q2.2.8 some candidates wrote down the total due instead of the unpaid amount for December.

(j) In Q2.2.9 candidates were requiredto explain the rounding-off principle, and incorrectly stated 'rounded to the nearest whole number' instead of 'to the nearest R10'.

(k) In Q2.3.2 candidates used the incorrect operation, multiplying instead of dividing.

(l) In Q2.3.3 the calculation of the ½ year's interest was problematic for many candidates. Some used the incorrect interest rate.Some candidates who used the compound-interest formula made mistakes and consequently lost marks.

Suggestions for improvement

(a) Learners must be exposed to a variety of financial documents, not only the pay slip and salary advice slip. This will assist them in reading and extracting relevant information when responding to questions.

(b) The difference in calculating a VAT-inclusive cost and a VAT-exclusive cost should be emphasised. Learners must understand that the 100 divided by 114 is the factor to use in determining the price excluding VAT.

(c) Learners should be trained to identify the specific information reflected in tables, graphs or financial documents. Teachers must enhance learners' skill to interpret and filter the information given in the question in order to select the correct information to be used in calculations. In

order to do this, teachers are advised to periodically read through and interpret the requirements of questions with learners.

QUESTION 3: MEASUREMENT (PERIMETER; AREA; VOLUME; TIME)

Common errors and misconceptions

(a) In Q3.1.1 many candidates calculated the number of tables and not the number of balloons.

(b) In Q3.1.2 candidates substitued the values correctly into the formula but changed the addition to multiplication or they could not apply BODMAS.

(c) In Q3.1.3 some candidates mixed up the concepts of radius and diameter. They also used the value of π on the calculator instead of 3,142 which is the value stipulated in the CAPS document.

(d) Candidates found Q3.1.4 challenging as they had to do three operations within one problem.

(e) In Q3.2.2 candidates did not apply BODMAS correctly.

(f) In Q3.2.3 candidates correctly divided 30 by 20 but the conversion from minute to   seconds was incorrect. Instead of multiplying 1,5 by 60, they wrote 1 minute 5 seconds.

Suggestions for improvement

(a) Teachers must reinforce mathematical terms such as radius and diameter on a regular basis.

(b) Learners should be taught to copy the formula as it is given and substitute carefully to avoid mistakes.

(c) Teachers must spend more time on teaching conversions between units.

(d) Time conversion must be emphasized with learners.

(e) Teachers must use different types and combinations of shapes in their teaching and not only focus on basic shapes.

QUESTION 4: MAPS AND PLANS (ROUTE MAP; ASSEMBLY DIAGRAM; PROBABILITY; PACKAGING)

Common errors and misconceptions

(a) The compass direction given with an arrow pointing downwards indicating north (N) seemed to be have confused some learners.

(b) In Q4.1.1, candidates were expected to convert the scale provided into a unit scale, but appeared to be unfamilar with this type of question.

(c) In Q4.1.2 most candidates were not familiar with the type of view, i.e. the top view, commonly known as aerial view.

(d) In Q4.1.3 because north was not pointing in the usual direction, i.e. upward, many candidates wrote down the incorrect direction, i.e. east instead of south-east.

(e) In Q4.1.5 candidates were required to name all the suburbs at the half-way point, but many candidates provided only one suburb.

(f) In Q4.2.2 (a) some candidates incorrectly reflected probability as a ratio.

(g) In Q4.2.3 (a) many of the candidates provided a fraction $\frac{0}{130}$ as the answer, not realising that $\frac{0}{130} = 0$

Suggestions for improvement

(a) Teachers are strongly advised to use maps, plans and other representations of the physical world as much as possible so that the interpretation can be easily understood.

(b) Teachers must consolidate different types of scales and views in the classroom.

(c) Learners must be taught direction and the different ways in which it can be assessed i.e. from A to B, or from B to A.

(d) Emphasis should be placed on interpreting diagrams from different views.

(e) Teachers are encouraged to expose learners to practical demonstrations of the logistics of packaging tins in a rectangular box.

QUESTION 5: DATA HANDLING (BAR GRAPHS; PIE CHARTS)

Common errors and misconceptions

(a) In Q5.1.1 candidates appeared to be unfamilar with horizontal bar graphs and therefore were not able to interpret the questions.

(b) In Q5.1.2 candidates added all the subjects for that year instead of only Mathematics and Mathematical Literacy.

(c) In Q5.1.3 candidates did not read the extensive information correctly, and were not able to identify the relevant information needed to answer the question.

(d) In Q5.1.6 candidates did not express themselves clearly and did not know the definition of categorical data.

(e) In Q5.2.1 candidates did not understand income and expenses of tertiary institutions. Instead, they provided irrelevant answers based on schools.

(f) In Q5.2.2 candidates only worked up to R11,11 billion, and did not continue to calculate the percentage.

(g) In Q5.2.3 candidates struggled to write 54,1 billion in number order. This lead to incorrect calculations.

(h) In Q5.2.4 candidates could calculate the amount in billion but could not convert to million.

Suggestions for improvement

(a) Teachers must expose learners to questions on classifying and organising representation of data.

(b) Teachers must teach learners how to analyse and interpret information from graphs and tables.

(c) Learners must be provided with numbers in billions and millions in their daily exercises and not only in examination papers.

(d) Learners should be provided with further practice in converting between numbers and words and vice versa.

9.6 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

General comments

(a) The performance of candidates is similar to that recorded in the past.

(b) Candidates performed best in the first question but very poorly in the last question. This seemed to be the general trend. This indicates that learners need to be advised on how to manage their time appropriately in answering 3-hour papers.
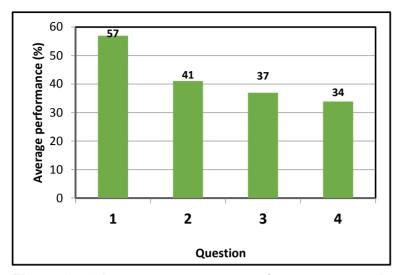
9.7 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 2

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.
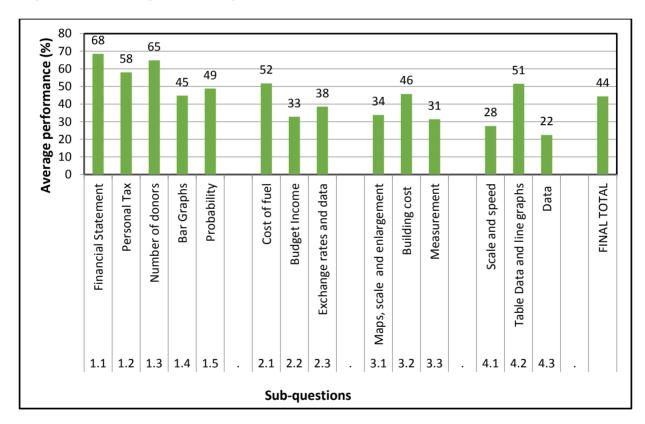
Figure 9.7.1 Average percentage performance per question

Q1	Financial statements, bar graphs &probability
Q2	Cost of fuel, data & exchange rates
Q3	Scale, measurement & building costs
Q4	Maps and measurement, line graphs &data

Figure 9.7.2 Average percentage performance per subquestion in Paper 2

9.8 ANALYSIS OF LEARNER PERFORMANCE IN INDIVIDUAL QUESTIONS IN PAPER 2

QUESTION 1: FINANCIAL STATEMENTS; BAR GRAPHS; PROBABILITY

Common errors and misconceptions

(a) In Q1.1.1 most candidates worked out the 4,402% and did not continue to calculate the decreased value for 2016. Most candidates could not round to the nearest 1 000 and did not understand the meaning of R'000 as indicated on the table.

(b) In Q1.1.2 candidates were unable to explain the impact that a weakening rand would have on the profit.

(c) In Q1.1.3 incorrect values were used to calculate percentage profit. Some candidates did not compare 2015 and 2016 percentage profits. Others did not provide the conclusion.

(d) In Q1.2 candidates used the incorrect tax bracket to calculate income tax. Most candidates did not calculate the tax amount correctly; instead they used the total taxable income. Some candidates worked with the primary rebate only and left out the secondary rebate.

(e) In Q1.3 most candidates approached the question as if they were calculating simple interest rather than compound interest. Candidates incorrectly used 9,6% on the original capital value and added it twice.

(f) In Q1.4.1 some candidates used people instead of race in their explanation which led to incorrect reasoning. Candidates were also unable to express their opinions clearly.

(g) In Q1.4.2 most candidates did not understand the word 'trend' and simply wrote the word 'increase' without giving a time period of several years.

(h) In Q1.4.3 most candidates did not understand the nuances of using data expressed as a percentage, i.e. that the actual number could be different. As a result, candidates could not explain the percentages appropriately.

(i) In Q1.4.4(a) most candidates were not able to use the given percentage to work backwards from a particular number to identify the original number. Some candidates also rounded off the answer to a whole number, and not to 10 as per the instruction.

(j) In Q1.4.4 (b) most candidates read the vertical value corresponding to white donors in 2015 without considering the percentage for the white donors.

(k) In Q1.5.1 most candidates did not consider distribution of percentages. They worked out the answer by counting the number of blood groups.

(l) In Q1.5.2 and Q1.5.3 candidates were unable to interpret the table.

Suggestions for improvement

(a) Teachers should reinforce questions where learners are required to decrease or increase values by a percentage. Questions on how to determine the original value when given the value to which the percentage has been added or subtracted should also be practised and assessed. The nuances of expressing data as a percentage should be explained when teaching analysis and interpretation of data.

(b) The skill of rounding off to the nearest 10, 100 or 1 000 as required by a question should be emphasised regularly.

(c) Learners must be taught to recognise the meaning of the terms 'strong' and 'weak' with regard to relationship between different currencies.

(d) Learners must master substitution skills through regular practise.

(e) Learners must be taught the skill of deliberately reading information with meaning.

(f) Teachers should train learners on how to respond to questions with key words such as explain, justify with reasons, justify with calculations, verify, determine, calculate or identify. Teachers should use these key words frequently when setting informal tasks.

(g) Learners must be taught how to read and interpret two-way tables.

QUESTION 2: COST OF FUEL; DATA; EXCHANGE RATES

Common errors and misconceptions

(a) In Q2.1.1 some candidates could not explain why inland and coastal fuel prices differed from one another.

(b) In Q2.1.2 some candidates did not know how to interpret the infographics provided.

(c) In Q2.1.3 candidates were unable to work with the consumption rate.

(d) In Q 2.2.1 candidates struggled to work out the percentage increase because a formula was not given.

(e) In Q2.2.2 although candidates are familiar with ratios, they could not effectively use the ratio given to work backward in calculating an amount. Working with billions was also a challenge to most of the candidates.

(f) In Q2.3.2 some candidates used rankings instead of percentages. There were candidates who calculated range as Range = maximum – minimum, instead of the interquartile range, IQR = Q_3 - Q_1.

(g) In Q2.3.3 and Q2.3.4 candidates were not able to interpret the table. Some did not understand the word 'unbiased'.

(h) In Q2.3.4 most candidates calculated the difference between mean fuel prices for China and South Africa instead of the difference between the mean daily wages. Some candidates multiplied by percentages instead of dividing by percentages.

(i) In Q2.3.5 candidates who struggled with exchange rate simply copied the solution provided on the question paper without doing their own calculation and hence could not identify any mistakes.

Suggestions for improvement

(a) Teachers should ensure that learners are able to solve problems independently without relying on input from the teacher.

(b) Learners must be taught how to calculate a percentage increase using logical reasoning rather than relying on a formula.

(c) Learners should be made aware of the impact that the choice of a sample has on the reliability of the data.

(d) Learners should be taught how to summarise and compare multiple sets of data.

(e) Teachers should expose learners to ratio problems that involve finding the original value using the given ratio.

(f) Learners should be taught how to convert units between different systems. They must also be made aware that some conversion factors may not be provided especially for metric system.

QUESTION 3: SCALE; MEASUREMENT; BUILDING COSTS

Common errors and misconceptions

(a) In Q3.1 candidates were provided with a map and an enlargement of a section of the map. In Q3.1.1 some candidates incorrectly used the enlarged map which was not relevant to the question.

(b) In Q3.1.2 candidates used the dimensions of the house and not that of the entire property as required by the question. Some candidates also could use a ruler to measure the size of the property.

(c) In Q3.1.3 candidates could not understand the term '5 times bigger' and therefore could not use the enlarged map to answer this question.

(d) In Q3.2.1 some candidates did not subtract the thickness of the wall on all sides of the room to get calculate the floor dimensions. Some candidates subtracted the width of the wall only once, instead of twice.

(e) In Q3.2.2 most candidates did not round up the number of cornices. Some candidates calculated only the area of the ceiling board and left it as a final answer.

(f) In Q3.2.3 most candidates worked with the original dimensions without subtracting the thickness of the wall in calculating the number of ceiling boards.

(g) In Q3.2.4 candidates could not interpret the cost of cornices and ceiling boards from the table provided.

(h) In Q3.3.1 there were candidates who interpreted the tank as a geyser and gave reasons relating to the geyser. Some candidates gave reasons for having a tank to save water and not for having it underground. Most candidates were unable to express their opinions clearly.

(i) In Q3.3.2 candidates did not convert cm^3 to m^3 and could not substitute the value of the volume correctly. Those who managed to substitute correctly, were not able to manipulate the formula in order to make the radius the subject of the formula. Therefore, they were unable to calculate the diameter.

Suggestions for improvement

(a) Learners should be exposed to a variety of contexts when dealing with calculations of surface area, perimeter, volume and costs.

(b) Teachers should make learners aware that the way in which a value has to be rounded off is determined by the context given in the question.

(c) Learners should be exposed to different methods of conversion in order to understand the concept.

(d) 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

QUESTION 4: ANALYSIS

Common errors and misconceptions

(a) In Q4.1.1 candidates were unable to determine the answer since the conversion factor was not in its simplest form.

(b) In Q4.1.2 candidates could not determine the distance between P and Q because the scale was not a number scale. Candidates were unable to find the time taken because they did not read the note provided below the map.

(c) In Q4.2.1 candidates found it difficult to read the value from the graph since the years were written in descending order.

(d) In Q4.2.3 candidates were unable to use the graph with the horizontal axis in decreasing years and hence identified the incorrect region as required by the question.

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(e) In Q4.2.4 most candidates incorrectly included the 2010 data instead of starting from 2011. This led to incorrect totals.

(f) In Q4.3 most candidates had a problem working with the negative rate. Candidates added 1,9 per 1 000 instead of subtracting it.

Suggestions for improvement

(a) Teachers should reinforce conversion of units between different systems. Learners must also be made aware that some conversion factors may not be provided, particularly for the metric system.

(b) Learners must be taught how to estimate, particularly where no scale is provided.

(c) Learners should be trained on how to analyse and interpret various types of graphs.

(d) Teachers should use various types of maps to give learners experience in converting from a scale provided in words to a number scale.

(e) Teachers should emphasise that the + or – signs preceding a number can indicate a direction, e.g. a -6% inflation rate indicates a negative trend.

CHAPTER 10
MATHEMATICS

The following should be read in conjunction with the Mathematics question papers of the November 2017 Examinations.

10.1 PERFORMANCE TRENDS (2014–2017)

The number of candidates who wrote the Mathematics examination in 2017 decreased by 20 809 in comparison to that of 2016. The performance of the candidates in 2017 reflects a slight improvement at the 30% level to 51,9% and at the 40% level to 35,1%.

Table 10.1: 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
2014	225 458	120 523	53,5	79 050	35,1
2015	263 903	129 481	49,1	84 297	31,9
2016	265 912	136 011	51,1	89 119	33,5
2017	245 103	127 197	51,9	86 096	35,1
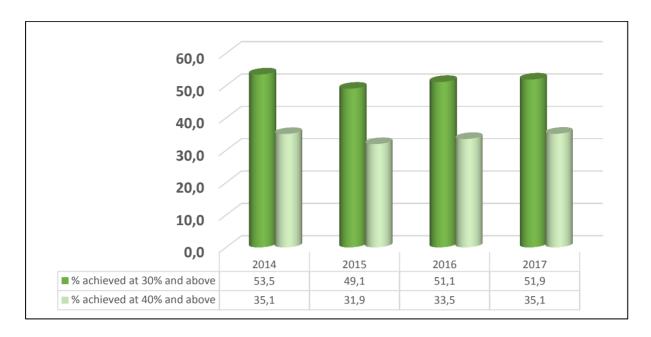
There has been steady improvement in performance over the last few years, suggesting that there is now some degree of stability in the subject after the introduction of the CAPS curriculum. The increase in the number of candidates who answer the knowledge and routine questions correctly indicate that teachers and candidates are familiar with the manner in which the curriculum will be assessed and the degree of challenge expected in the examination. Also pleasing to note is the improved performance in answering routine questions in the new topics, namely, Probability and Euclidean Geometry.

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 problems solving type questions. Learners need to be exposed to complex questions and problem solving across all topics in the curriculum. This should start in earlier grades.

Graph 10.1.1: Overall achievement rates in Mathematics (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	53,5	49,1	51,1	51,9
■ % achieved at 40% and above	35,1	31,9	33,5	35,1

Graph 10.1.2: Overall achievement rates In Mathematics (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	9,3	18,8	18,5	18,4	12,7	8,9	6,1	4,1	2,3	9,0
2015	11,2	21,3	18,4	17,1	11,6	8,3	5,4	3,7	2,1	0,8
2016	12,1	18,4	18,4	17,6	12,2	8,7	5,7	3,8	2,2	0,8
2017	13,5	18,4	16,3	16,8	12,9	9,1	6,3	4,1	2,1	0,6

10.2 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

(a) Candidates' performance was marginally better than in 2016. This was evident from the marking process where more candidates managed to pass and get some marks in majority of the questions. It is encouraging to note that many candidates were better prepared to answer the routine questions.
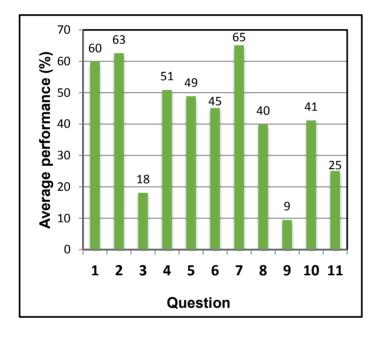
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(b) The algebraic skills of the candidates are poor. Most candidates lacked fundamental and basic mathematical competencies which could have been acquired in the lower grades.

(c) Whilst calculations and performing well-known routine procedures form the basis of answering questions in a Mathematics paper, deeper understanding of definitions and concepts cannot be overlooked.

10.3 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 degrees of challenge of each question as experienced by candidates.

Figure 10.3.1 Average percentage performance per question for Paper 1

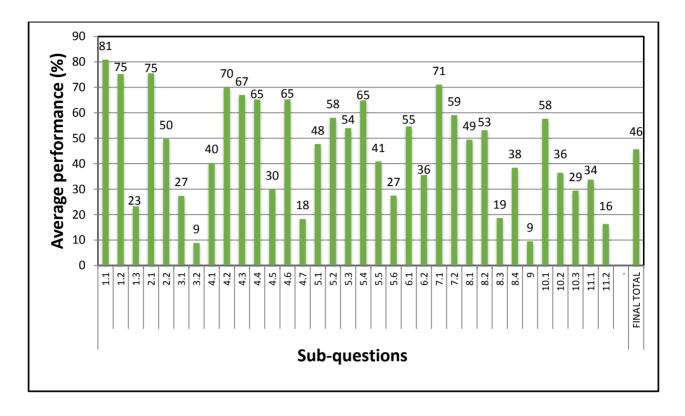| Q1	Equations, Inequalities and Algebraic Manipulation
Q2	Number Patterns & Sequences
Q3	Number Patterns & Sequences
Q4	Functions and Graphs
Q5	Functions and Graphs
Q6	Finance
Q7	Calculus
Q8	Calculus
Q9	Calculus – Application in optimisation
Q10	Probability
Q11	Counting Principles

Figure 10.3.2 Average percentage performance per sub question for Paper 1

10.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: ALGEBRA

Common errors and misconceptions

(a) Writing down the quadratic formula correctly and correct substitution therein remain problematic among some candidates. Some candidates wrote the quadratic formula incorrectly, for example, $x = \dfrac{b \pm \sqrt{b^2 - 4ac}}{2a}$ or $x = \dfrac{-b \pm \sqrt{b^2 + 4ac}}{2a}$ or $x = -b \pm \dfrac{\sqrt{b^2 + 4ac}}{2a}$. Such candidates lost marks for an incorrect formula. Incorrect rounding still poses a problem.

(b) In Q1.1.3, candidates did not square the RHS of the equation correctly and arrived at the following: $x^2 - 5 = 2x$ or $x^2 - 5 = 2x^2$ or $x^2 - 5 = 4$. In general, many candidates neglected to check their answers when solving surd equations.

(c) In Q1.2, some candidates wrote $-y = 4 - 3x$, and then substituted y with $4 - 3x$. Many candidates made mistakes in simplifying $-(3x - 4)^2$.

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(d) In Q1.3.1, many candidates were able to factorise the expression but could not solve the inequality. Many treated the inequality as an equation. This led to them writing answers that do not make sense: $x > -4$ or $x > -4$ or $4 < x > -4$. Candidates also showed little or no understanding of the set builder or interval notation.

(e) The use of the words 'and' and 'or' are not understood.

(f) Candidates had very little idea on how to answer Q1.3.2. The mention of 'negative roots' resulted in many candidates making the assumption that $\Delta < 0$ which resulted in a breakdown. Many candidates opted for the algebraic route and that made the solution much more difficult. Very few used the much shorter and more direct graphical route.

Suggestions for improvement

(a) Constant practise of fundamentals cannot be over-emphasised. Whilst a calculator may provide learners with the answers to a question, it is imperative that the learners understand the background to these answers. Answers, on their own, are meaningless in the context of concepts.

(b) Teachers should teach factorisation intensively. Writing a quadratic equation in standard form means to make the RHS of the equation equal to 0.

(c) When dealing with surd equations, learners should be reminded that we need to square both sides of the equation in order for the balance to maintain. We do not only square the radical parts of the equation. Teachers must emphasise that implicit restrictions are placed on surd equations and learners should continue to test whether their answers satisfy the original equation. Learners must master this concept in Grade 11.

(d) In teaching inequalities, integrate algebra with functions so that learners have a visual understanding of inequalities. Stress the meaning of the inequality signs in the teaching of both algebra and functions. Demonstrate different methods to solve inequality problems so that learners can choose the method they understand best.

(e) Teachers should explain the difference between *and* and *or* in the context of inequalities. Learners cannot use these words interchangeably as they are very different in meaning.

(f) Rounding off should be clearly understood by learners and rounding off instructions should be emphasised in class-based assessments. Teachers are advised not to condone errors due to rounding in school-based assessment tasks.

(g) Teachers should explain the meaning of roots of an equation and show the graphical representation of the different scenarios.

QUESTION 2: PATTERNS

Common errors and misconceptions

(a) Candidates could not subtract two negative numbers correctly. This resulted in them obtaining a positive second difference instead of the required negative value. Some candidates wrote down the next three terms as the answer to Q2.1.1. This was not required.

(b) Some candidates calculated b = 0 but then wrote the general term as $T_n = -3n^2 + n + 8$ instead of $T_n = -3n^2 + 8$. In spite of the question stating that number pattern is quadratic, some candidates wrote the general term as being linear: $T_n = -3n + 8$.

(c) Some candidates regarded the given value -25939 as n instead of T_n. Many candidates accepted n = -93 as a solution to Q2.1.3. This shows that they have little understanding of the value of n in the context of number patterns.

(d) Many candidates made mistakes in Q2.2.1 because they did not use brackets, i.e. they wrote $k + 8 - 2k - 7 = 2k - 1 - k + 8$ instead of $k + 8 - (2k - 7) = 2k - 1 - (k + 8)$. They obtained an answer for k that did not satisfy the requirements of an arithmetic sequence and resulted in a breakdown. Some candidates treated the sequence as geometric instead of arithmetic and applied $\dfrac{T_2}{T_1} = \dfrac{T_3}{T_2}$.

(e) Many candidates failed to extract the sequence comprising of only even terms but proceeded to calculate the sum of the first 30 terms of the original sequence.

Suggestions for improvement

(a) While teaching 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 do not confuse what is required of them.

(b) Learners need to analyse the type of sequence they are working with and which formulae are applicable to it.

(c) Teachers need to expose learners to patterns where other patterns need to be created within the given pattern. Teachers are encouraged to formulate their own questions and include them in their informal and formal tasks. This will encourage learners to think logically.

(d) Teachers need to expose learners to number patterns in which terms include variables and not only numeric values. Learners should establish a pattern on their own if given diagrams or pictures.

(e) Teachers should use the correct notation and mathematical language on a daily basis in the classroom. Encourage learners to speak the mathematical language in the classroom.

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Teachers also need to realise that learners' understanding of the concepts is more important than them merely doing routine procedures in a section.

QUESTION 3: PATTERNS

Common errors and misconceptions

(a) Many candidates did not know how to approach Q3.1. Some correctly wrote that $a + ar = 2$ but could not proceed further. Some candidates used the sum formula and this complicated matters even further.

(b) Most candidates found difficulty in engaging with Q3.2. Many candidates could not interpret the given sigma notation, i.e. $\sum\limits_{n=3}^{\infty} T_n = \frac{1}{4}$, which implied that the sum to infinity from the third term onward equalled $\frac{1}{4}$. Candidates mistakenly used $T_n = \frac{1}{4}$ or $\frac{a}{1-r} = \frac{1}{4}$, resulting in a breakdown. Although the question specified that the sequence comprised only positive terms, candidates failed to exclude negative values of a and r as solutions.

Suggestions for improvement

(a) Attention needs to be paid to the basics in number patterns. The concept of sum of terms needs to be explained. This topic is not merely using a formula to obtain an answer but it requires a deeper understanding of concepts.

(b) Teachers need to clarify that sigma notation is a short-hand notation of a series of terms and that this does not always include the first term of a series.

(c) Expose learners to 'unseen' type questions where unfamiliar patterns are formed. Convince them that these are generally easy to solve.

(d) Teachers should consult the array of different questions in sequences, as tested in the last 9 years. Contextual examples where reading is required should be emphasised.

QUESTION 4: FUNCTIONS (PARABOLA AND STRAIGHT LINE)

Common errors and misconceptions

(a) In Q4.1, candidates did not realise that they needed to solve for a and b by using simultaneous equations. The integration of calculus contributed to poor performance. Candidates who made the connection with calculus then equated the derivative to zero when $x = -1$, in other words, they assumed that the given point was a turning point.

(b) Some candidates used the given values of a and b to show that $a = 0{,}5$ and $b = 2$.

(c) Although the values of *a* and *b* were given in Q4.1, candidates used other values for *a* and *b* in Q4.2. Some candidates used $f(x) = \dfrac{1}{2}x^2 + 2x + 6$ due to the confusion of the negative sign in $f(x) = -ax^2 + bx + 6$.

(d) Some candidates calculated the turning point to be (2 ; 6) and this conflicted with the fact that the *y*-intercept is (0 ; 6). In Q4.4, some candidates sketched a cubic function instead of a parabola. In Q4.6, some candidates drew an exponential curve instead of a straight line.

(e) Q4.5 and Q4.7 were higher-order questions that involved reading off intervals from the graph(s). However, many candidates attempted to answer these questions by algebraic manipulation. This approach only compounded matters: not only did they have to deal with complex inequalities, but they spent a lot of time in answering using this method.

Suggestions for improvement

(a) Learners should be exposed to questions that integrate different topics in class-based assessment tasks. In this way, they will move away from the idea that topics must be learnt in isolation.

(b) Where the values of coefficients are given in a question, learners should be informed that they must use these values in subsequent questions. In general, learners should be trained that if they fail to prove certain values in a question they are allowed to use these values in subsequent questions.

(c) Emphasise the drawing of graphs as well as the interpretation of functions.

(d) It is important for teachers to emphasise that learners must do thorough revision of Grade 11 work on Functions. Learners have to know and understand the basic shapes, properties etc. of each type of graph very well before they can go on to more difficult questions.

(e) Learners need to be made aware that algebraic manipulation is not the only method to solve questions. Some questions can be solved more efficiently with the use of graphs.

QUESTION 5: FUNCTIONS (HYPERBOLA, LOGARITHMIC GRAPH AND INVERSES)

Common errors and misconceptions

(a) Most candidates could not state the range of the hyperbola. Candidates were unable to differentiate between $y \in R$ and $y \in R$, $y \neq -1$. Some gave the answer in terms of *x*, i.e. these candidates confused the domain with the range.

(b) Candidates did not use the fact that OB = BE and could not establish the vertical asymptote of the hyperbola. Many candidates gave the equation as $y = \dfrac{2}{x+2} - 1$ instead of $y = \dfrac{2}{x-2} - 1$ as it should be with an asymptote of $x = 2$.

(c) Whilst candidates may have used the accuracy of the sketch to intuitively write down the answer for t, they were expected to show their working steps. Candidates opting to use the function for g had greater difficulty in arriving at the answer than those who used the function for f. Some candidates obtained a negative value for t but could not see that this answer could not have made sense. Some candidates tried to solve $\dfrac{2}{x-2} - 1 = \log_3 x$ but were unsuccessful.

(d) Some candidates did not realise that $f^{-1}(x) < 3$ means that the y-value of the inverse graph has to be less than 3 (below 3 on the sketch). Many candidates presented the incorrect answer of $x \geq 1$.

(e) Few candidates were able to determine the equation of the axis of symmetry. Some of those who were able to determine the equation of the axis of symmetry, did not realise that the x-intercept of the axis of symmetry passes through B. Very few candidates used the fact that OB=BE in solving for the answer. A number of candidates tried to solve the two equations simultaneously.

Suggestions for improvement

(a) The focus of teaching functions should not only be on sketching the graph. The characteristics and features are also important aspects of a graph. Transformations and interpretation of graphs should also be covered in some depth.

(b) Learners need to get enough practice in determining the equations and drawing the graphs of the inverses of the prescribed functions. Emphasis should be placed on the fact that the inverse of a function is the reflection of the original function about the line $y = x$.

(c) More time must be spent on the meaning of inequalities, what they represent and how to write a domain or range in the correct notation. This includes the emphasis on interval notation and using the inequality signs to represent the same interval.

(d) Teachers should expose learners to questions involving two graphs on one system of axes, incorporating interpretation questions.

QUESTION 6: FINANCE

Common errors and misconceptions

(a) Candidates got confused because they had to work in months. Many struggled to use the correct value of n and divide r by 12. Furthermore, calculating $\sqrt[36]{\dfrac{12146{,}72}{10000}}$ was a huge challenge. Some candidates even introduced logarithms in this question. Many candidates used an inappropriate formula e.g. $A = P(1-i)^n$, $F = \dfrac{x\left[(1+i)^n - 1\right]}{i}$ or $P = \dfrac{x\left[1 - (1+i)^{-n}\right]}{i}$. Some swopped the values of A and P.

(b) In Q6.2.1, candidates were not aware of the standard terms of loan repayment and therefore treated the question as if payment was deferred by one month. Candidates often multiplied 54 by 12 and hence used $n = 628$. Some candidates lost a mark for using the calculator incorrectly.

(c) Most candidates had no clue on how to approach Q6.2.2 and consequently did not attempt this question. Some calculated the rate of interest rather than the amount of interest.

Suggestions for improvement

(a) Finance should be taught with more insight and not merely the substitution of values into a formula only.

(b) Learners need deeper insight into the relevance of each of the formulae and under which circumstances it can be used. More practice in Financial Mathematics is necessary so that learners can distinguish between the different formulae.

(c) Financial Mathematics requires two crucial skills which are often neglected by learners. These are reading skills and calculator skills. The learners must read the Financial Mathematics question very carefully and make sure that they understand what is asked. Calculator work is essential when doing financial maths and this should be practised.

(d) The use of correct English in the teaching of Financial Mathematics is essential.

QUESTION 7: CALCULUS

Common errors and misconceptions

(a) In Q7.1, candidates made simplification or notational errors.

Many candidates made the following notational errors: $f(x) = \lim\limits_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ or $\lim\limits_{h \to 0} = \dfrac{f(x+h) - f(x)}{h}$ or $\dfrac{\lim f(x+h) - f(x)}{h \to 0 \quad h}$. Some candidates made incorrect substitution for $f(x+h)$. They wrote $f(x+h)$ as $2(x+h)^2 - x$ instead of $2(x+h)^2 - (x+h)$. Other errors were made in the factorisation of the numerator: $4xh + 2h^2 - h = h(4x + 2h)$ instead of $h(4x + 2h - 1)$.

(b) The most common error in Q7.2 was when to leave out the derivative notation. Candidates wrote $D_x(3x^2 - 4x - 7) = D_x(6x - 4)$ instead of $D_x(3x^2 - 4x - 7) = 6x - 4$

(c) Candidates struggled to convert from surd form to exponential form: $\sqrt{x^3}$ was written as $x^{\frac{1}{3}}$ instead of $x^{\frac{3}{2}}$. Candidates failed to recognise that $\dfrac{1}{2}\pi$ is a constant and its derivative is equal to zero.

Suggestions for improvement

(a) Emphasis should be placed on the use of correct notation when determining the derivative, either when using first principles or the rules.

(b) Revision of basic algebraic manipulation is essential in ensuring that learners simplify expressions competently in Grade 12.

(c) Basic exponential laws should be taught properly in earlier grades and revised continuously in Grades 11 and 12.

QUESTION 8: CALCULUS (GRAPHICAL APPLICATION)

Common errors and misconceptions

(a) Candidates did not realise that there must be a change in concavity in the neighbourhood of a point if such a point is to be regarded as a point of inflection. Many merely provided the following answer: $f''(x) = 6x - 12 = 0$ and therefore $x = 2$. This was insufficient to show that a point of inflection exists at $x = 2$.

(b) Candidates did not realise that information about the critical values of the graph were given in the question. Many of them went about calculating these critical values again before sketching the graph. Some candidates joined the points with straight lines instead of curves.

(c) The concept of concavity and the interval for which a function is *concave up* or *concave down* on is not understood well by candidates. Many did not realise that they had to answer about the concavity of the reflection of *f* in the *x*-axis.

(d) Candidates tried to answer this question by performing algebraic manipulation instead of transforming the graph. This approach was not only tedious but many candidates made errors along the way and could not answer the question correctly.

Suggestions for improvement

(a) In teaching any function, teachers should expose learners to all aspects of the function. This includes sketching, interpretation of the equation and the graph, as well as finding the equation from given information and transformations. The teaching should also include concepts such as roots, points of intersection, intervals where graphs are relative to one another under a given condition, gradients and equations of tangents.

(b) Learners should be taught to distinguish between the function and its gradient, in other words, the difference between the meanings of $f(x)$ and $f'(x)$.

(c) Expose learners to higher-order thinking questions and interpretation of graphs. Initially teachers should assist learners in understanding what is being asked, what it looks like on the picture and which *x*-values are relevant to the interval required in the solution.

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(d) Teachers must be aware that concavity of functions is explicitly mentioned in *CAPS*. It is important for teachers to discuss the concepts of *concave up*, *concave down* and the intervals for which these occur. The concavity of a graph should also be linked to the second derivative. If a function is concave up on an interval then $f''(x) > 0$ and if a function is concave down on an interval then $f''(x) < 0$.

(e) In a cubic graph, the concavity always changes at the point of inflection. This, however, is not true for all functions, for example $f(x) = x^4$. It is therefore necessary that learners must demonstrate the difference in concavity on either side of the point of inflection (the change of sign in the second derivative).

(f) The cubic function in relation to its first and second derivatives or the quadratic function in relation to its first derivative needs to be taught with great insight. Learners who understood the connection between the function, the first derivative and the second derivative answered this question well.

QUESTION 9: CALCULUS (OPTIMISATION APPLICATION)

Common errors and misconceptions

(a) Many candidates did not see this question as an optimisation question. The most common incorrect answer was that BP = 1 unit. The other common mistake was to take random points for P and to calculate the length of BP.

(b) Few candidates managed to establish that $BP^2 = x^4 - x^2 + 1$ *or* $BP = \sqrt{x^4 - x^2 + 1}$ but could not differentiate these expressions. Candidates did not realise that BP is a minimum if BP^2 is a minimum. The majority of these candidates then used trial and error to establish the minimum distance of BP.

Suggestions for improvement

(a) Optimisation should not only be seen in the context of measurements, learners also need to be exposed to optimisation of functions.

(b) This section of calculus is often taught towards the end of the year and therefore learners do not get enough opportunity to practise. Teachers should ensure that there is enough time for learners to understand the application fully.

QUESTION 10: PROBABILITY

Common errors and misconceptions

(a) Some candidates could not interpret the given information correctly. For example. they did not realise that the 12 learners using Instagram and Twitter should be split up between two parts of the diagram, with 8 in the one area and 4 in the other. Also amongst the 61 learners using Instagram, there were some who used some of the other applications as well.

(b) Some candidates took the intersection of the three events to be *x*.

(c) In Q10.2, many candidates could not set up the correct equation because they omitted the 14 learners who used none of the applications. Some candidates obtained answers that were negative numbers or fractions.

(d) Candidates included parts of the intersection, even though 'ONE of the applications' was emphasised.

Suggestions for improvement

(a) An in-depth explanation of the Venn diagram will clarify the number of events that occur in the various sections, in particular where exactly 1 event occurs, where two events occur simultaneously and where three events occur simultaneously.

QUESTION 11: COUNTING PRINCIPLE

Common errors and misconceptions

(a) The language in this question could have been a barrier to the candidates. Candidates did not read the question carefully. Some used all 26 letters in the alphabet while others excluded 0 as a digit.

(b) Candidates did not know the difference between 5 x 5 and 5! x 5!

(c) Many candidates did not have any idea of how to solve Q11.2. They had difficulty in performing the reverse calculations.

Suggestions for improvement

(a) The section on the fundamental counting principle needs to be taught as clearly and simply as possible. Steer away from formulae and reasoning out scenarios, using diagrams where needed.

(b) The difference between *repeating* and *not repeating* should be explained to learners.

10.5 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

(a) Individual performance in the paper varied from very poor to excellent. However, there seems to be a slight improvement in the overall performance in this paper.

(b) Candidates performed well in data handling and analytical geometry.

(c) It seems like candidates are struggling with trigonometry and Euclidean geometry. The number of candidates who did not attempt these questions is a cause for concern. It is encouraging to note that some candidates are making progress, albeit limited, in answering questions on Euclidean geometry.
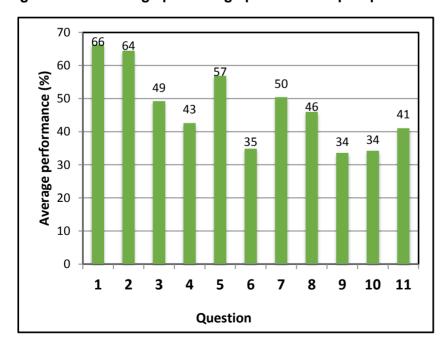
(d) Integration of topics is still a challenge to many candidates. Mathematics cannot be studied in compartments and it is expected that candidates must be able to apply knowledge from one section to another section of work.

(e) It is evident that many of the errors made by candidates in answering this paper have their origins in a poor understanding of the basics and foundational competencies taught in the earlier grades.

(f) Candidates struggled with concepts in the curriculum that required deeper conceptual understanding. Questions where candidates had to interpret information or provide justification, presented the greatest challenge.

(g) 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 as a result of the dependence on the calculator.

(h) Candidates need to read the questions with due diligence. By glossing over questions, candidates are overlooking the critical information about the questions.

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.

Figure 10.6.1 Average percentage performance per question for Paper 2

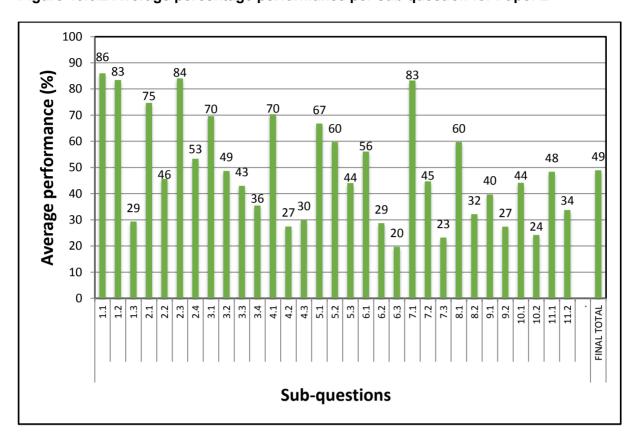| Q1 | Data Handling |
Q2	Data Handling
Q3	Analytical Geometry
Q4	Analytical Geometry
Q5	Trigonometry
Q6	Trigonometry
Q7	Trigonometry
Q8	Euclidean Geometry
Q9	Euclidean Geometry
Q10	Euclidean Geometry
Q11	Euclidean Geometry

Figure 10.6.2 Average percentage performance per sub question for Paper 2

10.7 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: DATA HANDLING

This question was answered fairly well by most of the candidates. It was disappointing to note that candidates are still unable to round off their answers correctly.

Common errors and misconceptions

(a) In Q1.1, many candidates were able to calculate the values of *a* and *b* correctly but then interchanged these values in the equation $y = a + bx$. A fair number of candidates made errors when rounding. Some candidates selected two points in the data set and applied the algebraic method of calculating the equation of a straight line. This is not acceptable.

(b) Some candidates substituted 11,7 for *y* instead of *x*. Others read off from the graph in spite of the question stating that they should use the equation of the least squares regression line.

(c) In Q1.3, candidates merely wrote "increase" as the answer without any motivation or provided incorrect motivation. Others stated that 7,6 is an outlier. Many candidates did not comment on the impact that the new point will have on the regression line.

Suggestions for improvement

(a) Teachers and learners need to be aware that there is a marked difference between the line of best fit and the least squares regression line. The least squares regression line is the line such that the sum of the vertical distances between the data points and the line is a minimum. Calculating the equation of the straight line between two random points in the data set does not meet this criterion and is therefore unacceptable.

(b) Learners should be given multiple opportunities to practice calculator skills. Learners need to be made aware that the operation procedure varies from one brand of calculator to the next. It is in their interest to use the same brand regularly.

(c) Data Handling is not confined to performing certain routine calculations. Making predictions is an important aspect of this topic. Learners must be challenged with "What if …" type of questions in class. Such questions will force learners to think critically and creatively in response to a situation.

QUESTION 2: DATA HANDLING

Candidates' performance in this question was good.

Common errors and misconceptions

(a) In Q2.1.1, candidates spent a lot of time adding the individual values and then divided by 30 instead of 23.

(b) A fair number of candidates calculated the range or semi-interquartile range instead of the inter-quartile range as required in Q2.1.2.

(c) Many candidates calculated the number of girls that were within one standard deviation of the mean. They did not realise that the question required the number of girls that took longer than one standard deviation of the mean.

(d) Some candidates did not understand Q2.4.2. They focussed on the number of boys whose times were between the minimum and the lower quartile. Many ignored the data for the girls in response to this question.

Suggestions for improvement

(a) Teachers must use correct statistical vocabulary and terminology. These concepts must be explained in detail before so that learners may to relate to them. Learners must be made aware that range, inter-quartile range and semi-interquartile range are different in meaning.

(b) Exposure to questions of an interpretive nature cannot be over-emphasised. This should form an integral part of the teaching and learning of this topic. Learners are encouraged to answer different types of questions in data handling to improve their performance.

QUESTION 3: ANALYTICAL GEOMETRY

Common errors and misconceptions

(a) The most common error was using the coordinates of A that was given in Q3.2 in the calculation of the gradient. Some candidates used the coordinates of B and C to calculate the gradient of AC. Candidates made errors when using the calculator and arrived at the gradient of $-\dfrac{11}{10}$. Candidates did not realise that A, F and C were collinear points and that the gradient of FC was equal to the gradient of AC.

(b) Some candidates assumed that G was the midpoint of AC. Other candidates calculated the *x* and *y*-intercepts of BG instead of the coordinates of G.

(c) In Q3.2, candidates used the given coordinates to show that A was (2 ; 5). Some substituted the coordinates into the equation of AC. These candidates were confused as they were trying to prove that (2 ; 5) lies on AC.

(d) In Q3.3, candidates were able to determine the gradient of BG but were unable to link this answer to the gradient of EF. This was on account of them not recalling the midpoint theorem from Grade 10. Some assumed that E was the midpoint of AB.

(e) The properties of quadrilaterals are still not understood by some candidates. This was evident in Q3.4 as many were not able to use properties of a parallelogram to answer the question. Some candidates made the assumption that EF is perpendicular to AC. Very few candidates realised that translation may be used to determine the coordinates of D.

Suggestions for improvement

(a) To answer analytical geometry well, learners should master the properties of quadrilaterals and triangles. These ideas should be included in class based assessment tasks.

(b) Teachers should first revise work done in earlier grades in a specific topic before starting with the same topic at Grade 12 level. In particular, the equation of a straight line and gradients of parallel and perpendicular lines must be revised in Grade 12.

(c) Learners should be encouraged to show all the steps in the working. Continual practice should remedy the basic errors that learners make.

(d) Learners should refrain from making assumptions about features in a question. These need to be proved first before the results can be used in an answer.

(e) The different topics in Mathematics should be integrated. Learners must be able to establish the connection between Euclidean geometry and analytical geometry.

QUESTION 4: ANALYTICAL GEOMETRY

Common errors and misconceptions

(a) In Q4.1.1, some candidates used the gradient formula incorrectly e.g. $m = \dfrac{x_2 - x_1}{y_2 - y_1}$ instead of $m = \dfrac{y_2 - y_1}{x_2 - x_1}$. Others made incorrect substitution into the correct formula.

(b) Some candidates were guessing the coordinates of S in order to calculate the equation of RS.

(c) Some candidates could not determine the coordinates of M, the centre of the circle. Others were confused as to whether they should use r or r^2 in the equation of the circle.

(d) In Q4.1.4, many candidates calculated the angle adjacent to θ. They then used this angle as the needed angle for the area rule instead of $S\hat{M}K$.

(e) Some candidates could not visualise "t" as it was not given in the diagram. Candidates could not determine the limits of the values of $\underline{t}$.

(f) A large number of candidates assumed that SM was the perpendicular height of the triangle. Some candidates assumed that SMK was a right-angled triangle. Other candidates assumed that $S\hat{M}K = 180° - \theta$.

Suggestions for improvement

(a) Teachers need to revise the concept of perpendicular lines and gradients, in particular that the tangent is perpendicular to the radius at the point of contact.

(b) Learners must be taught to refrain from assuming facts that are not given. The order in which learners answer questions is important. You cannot use a result that you have not already shown to be true in an answer.

(c) Teachers should ensure that they expose learners to assessments that integrate Analytical Geometry and Euclidean Geometry.

(d) Algebraic manipulation is required in both Mathematics papers. This is a skill that learners need to master.

QUESTION 5: TRIGONOMETRY

Common errors and misconceptions

(a) In Q5.1, candidates struggled with reduction formulae, especially with the signs of the reduced trigonometric ratios. Some complicated matters by applying compound formulae unnecessarily and made mistakes in the process. Some learners could not apply co-functions correctly.

(b) Some candidates did not realise that the angle is in the fourth quadrant and the *y*-value or *t*-value should be negative, working from $t^2 = \left(\sqrt{34}\right)^2 - (3)^2$ and $t = \pm 5$ they chose the wrong value $t = 5$ instead of $t = -5$. In Q5.2, incorrect trigonometric ratios were used. In Q5.2.2, the ratio of was mostly incorrectly written as $\dfrac{3}{5}$ instead of $-\dfrac{5}{3}$

(c) Incorrect substitution was also a challenge. E.g. in Q5.2.3 $\cos 2\beta = 1 - \sin^2 \beta$ was substituted as $\cos 2\beta = 1 - \sin^2\left(-\dfrac{5}{\sqrt{34}}\right)^2$ instead of $\cos 2\beta = 1 - \left(-\dfrac{5}{\sqrt{34}}\right)^2$.

(d) Candidates wrote the expansions for $\cos 2\theta$ and $\sin 2\theta$ incorrectly even though these are given on the formula sheet.

(e) Errors in Q5.3.1 resulted from the incorrect simplification after expanding the compound angles.

(f) In Q5.3.2, the challenge was realising that $\sin 77^0$ and $\sin 43^0$ can be expressed as compound angles that include special angles, e.g. $\sin\left(60^0 + 17^0\right) - \sin\left(60^0 - 17^0\right)$. Some candidates removed sin as a common factor: $\sin 77^0 - \sin 43^0 = \sin\left(77^0 - 43^0\right)$

Suggestions for improvement

(a) Learners need to learn the reduction formulae and know which formula to use in the given situation. They must take cognisance of the quadrants when determining the signs of trigonometric ratios.

(b) Learners must be advised to show all steps when working with reduction formulae. Marks are not awarded to candidates who make errors with the signs.

(c) Learners need exposure on the simplification of expressions containing double and compound angles. Examples should include variables for angles as well as specific angle values. Learners need to be encouraged to use brackets, especially when there is a difference of two trigonometric ratios containing compound angles.

QUESTION 6: TRIGONOMETRY

Common errors and misconceptions

(a) Candidates were unable to draw the graph of *y* = 2sin*x* - 1 correctly. Many struggled with the shape as they were unsure of the location of the *x*-intercepts. Some even joined the points with a ruler. Candidates did not observe the domain of the graph and drew arrows at the end of the graph. Candidates did not indicate the co-ordinates of the critical values on the graph.

(b) Very few candidates were able to answer Q6.2 as they did not realise that they needed to use the quadratic formula to solve a trigonometric equation.

(c) Many candidates did not make the link between Q6.2 and Q6.3. As there was no mention of a general solution, candidates were unable to answer this question. Some of those who were able to solve for the value of *x* failed to calculate the *y*-coordinate for the points of intersection.

Suggestions for improvement

(a) When teaching trigonometric graphs, teachers should start first with the original graphs: $y = \sin x$, $y = \cos x$ and $y = \tan x$ using point by point plotting and identify important features of these graphs, then introduce *a*, *p* and *q* as well as their effects.

(b) It is common practice for learners to use calculators to sketch graphs. Hence, they do not pay attention to certain critical features of these graphs. Although learners are expected to produce a sketch graph, there is still a high degree of accuracy required of them.

(c) When discussing the transformation of trigonometric graphs, learners must be alerted to how the critical features and characteristics of the basic graph change for each transformation. In this way, they will be able to visualise the effect of *a*, *p*, *q* and *k* on the basic function.

QUESTION 7: TRIGONOMETRY

Common errors and misconceptions

(a) Candidates had difficulty in seeing the different planes in the sketch.

(b) In Q7.2, candidates failed to link the two right-angled triangles. Further, candidates stated the incorrect trigonometric ratios in these triangles. Candidates often mixed up the sides and angles.

(c) Many candidates were confused with the 3-D orientation of the shape. Some were unable to apply the cosine rule correctly.

(d) Candidates demonstrated poor algebraic manipulation skills when squaring fractions and removing common factors.

Suggestions for improvement

(a) Teachers need to develop strategies to be used when solving right-angled triangles and triangles that are not right-angled.

(b) Unless there is something stated to the contrary, trees, poles, buildings, etc. are assumed to be perpendicular to the ground.

(c) Learners must refer to the formula sheet to ensure that formulae are copied correctly.

(d) In Grades 10 and 11, learners should be exposed to problems that involve a combination of shapes in 2-D. This should develop the skill of identifying common sides and angles in composite shapes.

(e) Learners should be encouraged to highlight the different triangles using different colours. This would allow them to identify the common sides and angles.

(f) Teachers should show learners how to deconstruct composite shapes into several triangles.

(g) Initially, expose learners to numeric questions on solving 3-D problems. This makes it easier for learners 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 8: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) Generally, candidates either lost marks for incorrect or incomplete reasons or for naming angles incorrectly.

(b) In Q8.1, many candidates failed to connect $\hat{E}$ to $\hat{D}_2$. They only wrote $\hat{B} = \hat{D}_2 = 50°$ and could not go any further. Many also assumed that CD was parallel to AB and interpreted $\hat{D}_2$ and $\hat{A}$ as alternate angles. Some interpreted $\hat{D}_2$ and $\hat{E}$ as corresponding angles. Some candidates still omit to state the parallel lines when dealing with corresponding angles, alternate angles or co-interior angles. Candidates used the whole of $\hat{C}$ instead of $\hat{C}_2$. Some candidates assumed that F is the centre of the circle.

(c) In Q8.2, many candidates gave the reason as tan-chord theorem instead of the converse of the tan chord theorem.

Suggestions for improvement

(a) Learners need to be informed that merely writing a number of correct statements and reasons will not necessarily earn them marks. The statements must be logical and lead to solving the problem.

(b) Learners should be encouraged to scrutinise the given information and the diagram for clues about which theorems could be used in answering the question. Learners must not make any assumptions about the diagrams as these are not drawn to scale.

(c) Teachers must cover the basic work thoroughly. An explanation of the theorem should be accompanied by showing the relationship in a diagram.

(d) Teachers need to insist that learners name the angles correctly. The fact that learners are naming angles incorrectly at Grade 12 level indicates that this issue has not been dealt with effectively in earlier grades.

(e) Learners should be taught that all statements must be accompanied by reasons. It is important to state which lines are parallel when using corresponding angles, alternate angles and co-interior angles as a reason.

QUESTION 9: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) In Q9.1.1, candidates used incorrect ratios to prove that FG || BC. Candidates omitted the reasons or provided incorrect reasons for their statements.

(b) Candidates showed little understanding of the difference between a *theorem* and its *converse*. They did not understand when to use the theorem and when the converse would apply.

(c) In Q9.1.2, candidates could not identify the correct ratios. This was on account of the number of different pairs of parallel lines.

(d) In Q9.2, many candidates confused the ratios with the lengths of the sides in the diagram. Most candidates could not link this question with Q9.1.1.

Suggestions for improvement

(a) 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.

(b) Diagram analysis must be emphasised.

(c) 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 10: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) Many candidates could not provide the correct reason in Q10.1. They were confused about when to use *perpendicular* and when to use *midpoint* in the statement.

(b) In Q10.2.1, candidates again failed to identify the angles that will result in MN || TS. Some provided a reason that did not correspond with the statement.

(c) In 10.2.2, candidates often made several correct statements but could not prove that TMNS is a cyclic quadrilateral. Again, either the reason for TMNS being a cyclic quadrilateral was missing or the theorem was given instead of the converse.

(d) Many candidates could not make the necessary links to solve Q10.2.3. Majority of the candidates had no idea where to start.

Suggestions for improvement

(a) More time needs to be spent on the teaching of Euclidean geometry in all grades.

(b) Learners need to be told that there is no short-cut to mastering the skills required in answering questions on Euclidean geometry. This requires continuous and deliberate practice.

(c) Learners need to be made aware that writing correct, but irrelevant, statements will not earn them any marks in an examination.

(d) Learners must refrain from making assumptions. If they make a statement about the relationship between sides or angles, then they must prove such a statement as true before they can use it.

(e) The teaching of theorems should be done with the relevant understanding.

QUESTION 11: EUCLIDEAN GEOMETRY

Common errors and misconceptions

(a) Some candidates did not do the constructions or made incorrect constructions but went on to prove the theorem. This was considered a breakdown and these candidates were not awarded any marks.

(b) In Q11.2.1 (b), candidates wrote the reason as *exterior angle of cyclic quadrilateral* instead of its converse.

(c) In 11.2.2(a), candidates assumed that $\hat{D}_2 = \hat{A}_2$. Some used $\hat{D}_2 = \hat{E}$ with the reason tan-chord theorem. This was not the case as BC was the only tangent in the diagram. Some candidates confused similarity with congruency in Q11.2.2(b).

(d) Many candidates could not make the necessary link with Q11.2.2(b) in answering Q11.2.3(a). Some attempted to use the theorem of Pythagoras but were unsuccessful at solving the problem. Candidates did not realise that they needed to use similarity to answer this question.

(e) Many candidates had no idea where to start answering Q11.2.3(b). They did not realise that they needed to use trigonometry to answer this question.

Suggestions for improvement

(a) Learners need to be made aware that writing correct, but irrelevant, statements will not earn them any marks in an examination.

(b) Attention must be paid to reasons. Teachers should not condone the use of incorrect reasons in classwork and class based assessment tasks.

(c) Learners must refrain from making assumptions.

(d) Learners need to be exposed to questions in Euclidean geometry that integrates trigonometry. Learners need to revise their Euclidean geometry throughout the year.

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CHAPTER 11
PHYSICAL SCIENCES

The following report should be read in conjunction with the Physical Sciences question paper of the November 2017 examinations.

11.1 PERFORMANCE TRENDS (2014–2017)

The number of candidates who wrote the Physical Sciences examination in 2017 decreased by 13 149 in comparison to that of 2016. The performance of the candidates in 2017 reflects a marked improvement at the 30% level to 65,1% and at the 40% level to 42,2%.

Table 11.1.1 Overall achievement rates in Physical Sciences

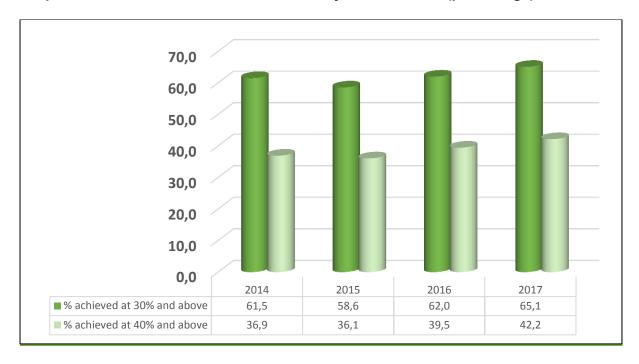| Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2014	167 997	103 348	61,5	62 032	36,9
2015	193 189	113 121	58,6	69 699	36,1
2016	192 710	119 467	62.0	76068	39.5
2017	179 561	116 862	65,1	75 736	42,2

The improvement in performance of candidates in 2017 can be attributed to the stability in the curriculum and both teachers and candidates becoming familiar with the assessment style of the subject.

However, there is still room for improvement in the performance of the candidates if the challenges surrounding problem-solving skills, mathematical skills, conceptual understanding and integration of topics are addressed. In this regard, integrated problem solving must become an integral part of teaching and learning.
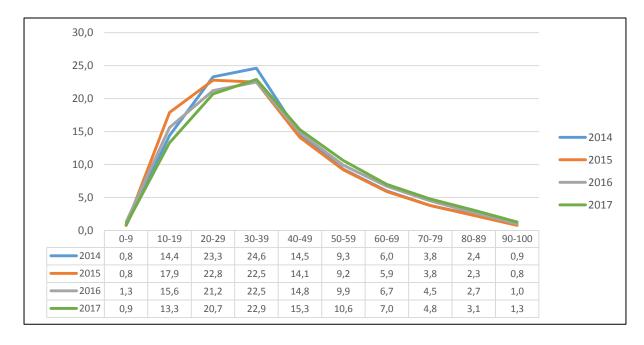
Graph 11.1.1 Overall achievement rates in Physical Sciences (percentage)

	2014	2015	2016	2017
■ % achieved at 30% and above	61,5	58,6	62,0	65,1
■ % achieved at 40% and above	36,9	36,1	39,5	42,2

Graph 11.1.2 Performance distribution curves in Physical Sciences (percentage)

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100
2014	0,8	14,4	23,3	24,6	14,5	9,3	6,0	3,8	2,4	0,9
2015	0,8	17,9	22,8	22,5	14,1	9,2	5,9	3,8	2,3	0,8
2016	1,3	15,6	21,2	22,5	14,8	9,9	6,7	4,5	2,7	1,0
2017	0,9	13,3	20,7	22,9	15,3	10,6	7,0	4,8	3,1	1,3

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11.2 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 1

General Comments

(a) Questions on Newton's Laws of Motion, Momentum, Doppler Effect and Electric Circuits (Q2, Q4, Q6 and Q9) were generally well answered.

(b) Grade 11 work is poorly understood. Grade 11 work should be included in classwork, homework and tests in Grade 12.

(c) Questions pertaining to pure recall of content were very poorly answered. Teachers are advised to use short informal assessment tasks to a greater extent in order to reinforce basic concepts and principles, e.g. short speed tests (± 10 minutes). This can be used to good effect in content relating to definitions and laws listed in CAPS and the Examination Guideline.

(d) Learners are still struggling with drawing and labelling free-body diagrams correctly. The drawing of free-body diagrams is central to solving problems involving forces acting on objects and therefore teachers should ensure that learners are able to draw free-body diagrams for such problems in classwork, homework and tests.

(e) Interpretation of graphs is a challenge for many learners. Each learner should be provided with a graph book or graph paper. Problem-solving exercises that involve graphs should be done in a variety of topics and the graph book or graph paper should also be utilised for some of these problems. However, learners should also be given the opportunity to sketch graphs without the use of graph paper. The scale of graphs, gradient, ordered-pairs and x and y-intercepts need to be emphasised within problem-solving in science contexts.

(f) Some learners still cannot work with scientific formulae correctly. Teachers should emphasise the use of the relevant formula provided on the formula sheet, correct substitution and providing the answer with the correct unit and direction if required.

(g) The application of mathematics 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, factorization, trigonometry and graphs in classwork, homework, tests and examinations.

(h) Many learners have poor problem-solving skills. Problem-solving activities where different knowledge areas are integrated should be given to learners.
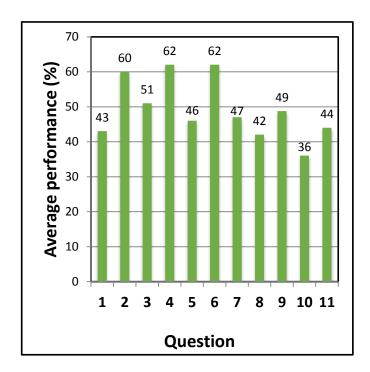
11.3 DIAGNOSTIC QUESTION ANALYSIS OF PAPER 1

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 11.3.1 Average marks per question expressed as a percentage in Paper 1

Q1	Multiple choice questions - all topics
Q2	Newton's laws of motion
Q3	Vertical projectile motion
Q4	Momentum
Q5	Work, energy and power
Q6	Doppler effect
Q7	Electrostatics (Coulomb's Law)
Q8	Electrostatics (Electric Fields)
Q9	Electric circuits
Q10	Electrodynamics: Motors, generators and alternating current
Q11	Photo-electric effect

There was an improvement in performance in six topics, viz. Newton's Laws (Q2), Momentum (Q4), Work Energy Power (Q5), Electrostatics – Coulomb's Law (Q7); Electrostatics – Electric Fields (Q8); Electric Circuits (Q9) and Photo-electric Effect (Q11) as compared to 2016. Q10 on Electrodynamics was the question in which the candidates performed the worst.

Graph 11.3.1 Average marks per sub question expressed as a percentage for Paper 1

A bar chart titled with y-axis "Average performance (%)" (0 to 100) and x-axis "Sub-questions". Values per sub-question:

Sub-question	Value
1	44
2.1	64
2.2	51
3.1	84
3.2	57
3.3	43
3.4	32
4.1	79
4.2	73
4.3	49
5.1	62
5.2	82
5.3	55
5.4	23
6.1	70
6.2	90
6.3	48
7.1	64
7.2	66
7.3	42
7.4	29
8.1	31
8.2	56
8.3	37
9.1	40
9.2	57
10.1	44
10.2	38
11.1	41
11.2	51
FINAL TOTAL	53

11.4 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 1

QUESTION 1: MULTIPLE CHOICE

Common errors and misconceptions

(a)   In Q1.1, many candidates could not establish the correct relationship between gravitational acceleration, weight and mass.

(b)   In Q1.4, candidates associated the sign of the velocity with a decrease in velocity and not the direction of motion.

(c)   Most candidates did not understand that the work done on an object in Q1.5 is independent of time.

(d)   In Q1.9, many candidates failed to apply Fleming's left-hand motor rule to determine the direction of the force experienced by the conductor.

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(e)   In Q1.10, candidates could not relate the maximum kinetic energy of the ejected photo-electron to threshold frequency (work function) when incident photon energy is constant.

Suggestions for improvement

(a)   Teachers must use multiple-choice questions in every assessment activity so that content can be mastered and misconceptions addressed.

(b)   During the revision of multiple-choice questions, learners must be given an opportunity to explain or demonstrate the choices they made so that misconceptions can be identified and corrected.

(c)   The relationship between variables in formulae should be emphasised,

e.g. $E = W_0 + K_{max}$

QUESTION 2: NEWTON'S LAWS OF MOTION

The question was well-answered.

Common errors and misconceptions

(a)   Candidates omitted key words in their definition, e.g. 'at rest' or 'constant velocity', 'net' force. They also mixed their definitions by defining the second or third law instead of the first law.

(b)   Many candidates used incorrect labels for their forces, omitting arrows and drawing force diagrams instead of free-body diagrams.

(c)   Many candidates omitted units in the final answer.

(d)   Many candidates failed to convert km to m before substituting in the correct formula and did not square the radius.

Suggestions for improvement

(a)   Teachers should stick to and emphasise the definitions in the *Examination Guidelines*.

(b)   The importance of drawing free-body diagrams correctly and their usefulness in problem solving must be emphasised.

(c)   Similarities and differences between related formulae should be highlighted, referring to the different contexts where each law can or cannot be used.

QUESTION 3: VERTICAL PROJECTILE MOTION

Common errors and misconceptions

(a)   Many candidates failed to choose a direction for the vector quantities.

(b)   Many candidates failed to recognise that two free-falling bodies, although one is moving upward and the other downward, have the same gradient.

Suggestions for improvement

(a)   Expose learners to a variety of contexts in which the equations of motion can be applied. More complex contexts must first be broken down into simpler scaffolding questions to develop the cognitive skills of the learners.

(b)   Provide learners with translation tasks in which information is converted from one form to another (e.g. statements equations, graphs).

QUESTION 4: MOMENTUM

Common errors and misconceptions

(a)   Some candidates defined the law of conservation of energy instead of linear momentum and omitted key words in their definition e.g. "total" linear momentum.

(b)   Use of the formula $\Delta p_{bullet} = \Delta p_{block}$ instead of $\Delta p_{bullet} = -\Delta p_{block}$ and $\Sigma E_{k(before)} = \Sigma E_{k(after)}$ instead of $\Sigma p_{(before)} = \Sigma p_{after}$

Suggestions for improvement

(a)   Expose learners to a variety of contexts for problem solving, focusing on one or a few skills at a time, such as interpreting the context and identifying relevant formulae while explaining why others cannot apply.

(b)   Use the data sheet and formula sheet throughout the year. Integrate related topics during problem-solving activities, such as 'momentum and its conservation', 'equations of motion' and 'work, energy and power'.

QUESTION 5: WORK, ENERGY AND POWER

Common errors and misconceptions

(a)   Many candidates used the incorrect equation $W_w = Ep = mgh$ instead of $W_w = -\Delta Ep = -mg\Delta h$

(b)   Some candidates used the conservation of mechanical energy, which was not applicable as this was not an isolated/closed system.

(c)   Many candidates did not show/choose their sign convention. They were confused regarding the sign of the weight, tension and acceleration in their equations.

Suggestions for improvement

(a)   Teachers are urged to integrate Newton's laws of motion, and work, energy and power so that these concepts can be reinforced.

(b)   A systems approach can be used when solving a two-body problem using energy principles.

QUESTION 6: DOPPLER EFFECT

Common errors and misconceptions

(a)   Many candidates failed to copy the equation correctly from the formula sheet.

Suggestions for improvement

(a)   Teachers need to provide learners with a variety of questions involving the use of the Doppler Effect equation. It seems teachers tend to focus on the calculation of either f_L or f_s, whereas the scope is much broader given the number of variables in the equation.

QUESTION 7: ELECTROSTATICS (COULOMB'S LAW)

Common errors and misconceptions

(a)   Calculator skills are severely lacking.

(b)   Candidates lacked integration skills related to the vector diagram and to the Theorem of Pythagoras.

Suggestions for improvement

(a)   Expose learners to vector diagrams (1D and 2D) and vector triangles when working with forces (electrostatic, gravitational and when determining the resultant of forces acting on a body).

(b)   Remind learners of the vector nature of physical quantities when answering questions.

QUESTION 8: ELECTROSTATICS (ELECTRIC FIELDS)

Common errors and misconceptions

(a) Many candidates wrote the formula from the formula sheet as $F = \dfrac{kQ}{r^2}$ instead of $E = \dfrac{kQ}{r^2}$.

(b) Candidates failed to contextualise the definition in Q8.1 in context.

Suggestions for improvement

(a) Revisit vector diagrams in 1D and 2D when revising this section

(b) Clarify the distinction between the two equations $E = \dfrac{kQ}{r^2}$ and $E = \dfrac{F}{q}$

(c) Learners confused the negative sign of the charge with vector characteristics.

QUESTION 9: ELECTRIC CIRCUITS

Common errors and misconceptions

(a) Many candidates failed to identify the series and parallel connections from the graph which indicates their lack of understanding of the differences between series and parallel connections in a circuit.

(b) Many candidates could not establish the relationship between resistance, current and potential difference between points a and b.

(c) Some candidates failed to apply Ohm's law to different sections of the circuit.

Suggestions for improvement

(a) Although the principles of series and parallel circuits are taught from Grade 9, the basic principles have to be revisited constantly.

QUESTION 10: ELECTRODYNAMICS

Common errors and misconceptions

(a) Sketching a graph of the output of a DC generator proved to be a challenge for many learners.

(b) Many candidates failed to read the question properly as they calculated the average power or the generator instead of the device, ignored the power dissipated in the wires and omitted subscripts in their equations.

Suggestions for improvement

(a)   Proper analysis of the question must be encouraged. Learners must learn to understand questions before answering them.

(b)   Learners must be taught the differences between generators and motors and how to draw the graphs of a DC and a AC generator. They must be made to understand why the graphs differ in shape and direction.

QUESTION 11: PHOTO-ELECTRIC EFFECT

Common errors and misconceptions

(a)   The principle that a quantum of energy (photon is formed) when energy is emitted by an electron that makes a transition from a higher energy state to a lower one and that the change in energy relates to the frequency of the photon, is not understood by many of the candidates.

(b)   Many candidates could not differentiate between the absorption and emission spectra.

(c)   Some candidates failed to integrate concepts learnt under electromagnetic radiation with the photo-electric effect.

Suggestions for improvement

(a)   Teachers must teach the conditions leading to each type of spectrum. Conditions influencing the ejection of electrons from a metal surface must be clearly given to learners.

(b)   Learners must be given various problems to solve so that they can use the equations involved in a wide range of problem-solving situations.

11.5 OVERVIEW OF LEARNER PERFORMANCE IN PAPER 2

General Comments

(a)   The question on organic nomenclature (Q2) was answered the best by candidates. Performance in organic reactions (Q4) has improved compared to previous years.

(b)   Performance in questions on reaction rate (Q5), chemical equilibrium (Q6) and electrolytic cells (Q9) was very poor.

(c)   There was a steady improvement in performance in galvanic cells (Q8) over the years and the question on fertilisers (Q10) was answered much better than in previous years.
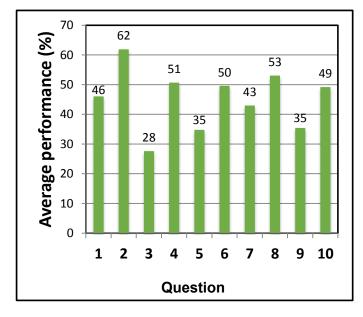
(d)   Questions pertaining to pure recall of content were answered very poorly. Teachers are advised to use more short informal assessment tasks in order to reinforce basic concepts and principles, e.g. short speed tests (± 10 minutes). This can be used to good effect in content relating to definitions and laws listed in *CAPS* and the *Examination Guidelines*.

(e)   Grade 11 work (Stoichiometry) is poorly understood. Grade 11 work should be included in classwork, homework and tests in Grade 12.

(f)   Interpretation of graphs is a challenge for many learners. Problem-solving exercises that involve graphs should be done in a variety of topics. The scale of graphs, gradient, ordered-pairs and *x* and *y*-intercepts need to be emphasised within problem solving in science contexts.

(g)   Some learners still cannot work with scientific formulae correctly. Teachers should emphasise the use of the relevant formula provided on the formula sheet, correct substitution and providing the answer with the correct unit and direction, if required.

11.6 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 degrees of challenge of each question as experienced by candidates.

Graph 11.6.1 Average marks per question expressed as a percentage: Paper 2

Q1	Multiple-choice questions; all topics
Q2	Organic nomenclature
Q3	Physical properties of organic compounds
Q4	Organic reactions
Q5	Reaction rate & stoichiometry
Q6	Chemical equilibrium
Q7	Acids and bases & stoichiometry
Q8	Galvanic cells
Q9	Electrolytic cells
Q10	Fertilisers

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Graph 11.6.2 Average marks per sub question expressed as a percentage: Paper 2

11.7 ANALYSIS OF LEARNER PERFORMANCE IN EACH QUESTION IN PAPER 2

QUESTION 1: MULTIPLE Choice Questions

Common errors and misconceptions

(a) In Q1.3, candidates failed to understand that after the cracking process, the number of atoms of hydrogen and carbon remains the same.

(b) In Q1.5, candidates showed a poor understanding of the interpretation of a given K_c value.

(c) In Q1.6, candidates had a misconception regarding the effect of the addition of a solid to an equilibrium mixture of gases.

(d) In Q1.7, candidates could not identify the given compounds as either acid or base. Na_2CO_3 was the only base given and therefore had the highest pH. The highest pH was incorrectly associated with the strongest acid.

(e)   In Q1.9, candidates were not familiar with the products of the electrolysis of NaCℓ and as a result they expected sodium to be part of the products.

Suggestions for improvement

(a)   The application of Le Chatelier's principle to the addition of more of a solid reactant was not well understood. The concentration of a solid is a constant and does not change when more solid is added. Therefore addition of more HgO(s) to the equilibrium mixture at constant temperature will have no effect on the equilibrium position.

(b)   The meaning of a low and high value of the equilibrium constant should be addressed. Learners should be given the opportunity to interpret given or calculated K_c values.

$K_c = 1$	[products] = [reactants]
$K_c > 1$	[products] > [reactants]
$K_c < 1$	[products] < [reactants]

(c)   Electrolytic cells need more attention in class. Learners have a poor understanding due to too little time spent on this topic in most schools. Learners should be supplied with summaries on electrolytic cells and then guided on how to study and distinguish among the different electrolytic cells prescribed.

QUESTION 2: NOMENCLATURES OF ORGANIC COMPOUNDS

Common errors and misconceptions

(a)   Candidates included numbers in the IUPAC name of the ester in Q2.1.2 and the IUPAC name of the acid in Q2.1.3.

(b)   Many candidates showed a poor understanding of the term *functional isomer* and wrote the structural formula of an ester (positional isomer) in Q2.1.4.

(c)   When drawing structural formulae in Q2.1.4 and Q2.2, there was still a tendency to place too many bonds around a C atom or to omit bonds and/or H atoms in the structure.

(d)   Q2.3.1 was not read properly. Instead of giving the general formula to which the compound belongs, most of the candidates gave the homologous series (alkynes) to which the compound belongs.

(e)   In Q2.3.2, hyphens and commas are still not correctly used in IUPAC names and many candidates also failed to arrange the substituents in alphabetical order.

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Suggestions for improvement

(a) The different types of structural isomers should be emphasised. Learners must be made aware that *positional*, *chain* and *functional isomers* are all different types of structural isomers and learners should be exposed to examples of such isomers.

(b) When writing IUPAC names, substituents should be placed in alphabetical order. However, learners should be taught that the prefixes, di, tri, etc., are not considered when arranging substituents in alphabetical order.

QUESTION 3: PHYSICAL PROPERTIES OF ORGANIC COMPOUNDS

Common errors and misconceptions

(a) Merely stating that alkanes have single bonds between C atoms in Q3.1 is not enough because alkanes and alkynes also have single bonds between C atoms.

(b) Candidates experienced difficulty to provide a definition of vapour pressure in Q3.2.

(c) Interpretation of the graph in Q3.3.2 was a challenge for many candidates. They failed to see that the boiling points of the compounds are the temperatures at which each of the graphs cuts the dotted line which represents atmospheric pressure.

(d) In Q3.3.3, many learners failed to refer to the variables (labels on the axes of the graph) in their explanations. Most learners failed to compare the vapour pressures of the four compounds at a particular temperature.

(e) In Q3.4.1, some candidates found the drawing of the chain isomer of pentane challenging.

Suggestions for improvement

(a) The safest and easiest reason why alkanes are considered saturated is that alkanes have no multiple bonds.

(b) Ensure that learners understand the meaning of a particular definition. For example, the definition of vapour pressure is about the pressure exerted by a vapour in equilibrium with its liquid phase (liquid $\rightleftharpoons$ vapour) in a closed system.

(c) When using a graph to answer a particular question, learners should be taught to refer to the variables.

QUESTION 4: REACTIONS OF ORGANIC COMPOUNDS

Common errors and misconceptions

(a) Although Q4.1.1 was answered moderately well, many candidates could not supply a correct reason why compound **P** is a secondary alcohol.

(b)   Although Q4.2 was well answered, the analysis of the flow diagram to identify types of reactions was a challenge to some candidates.

(c)   In Q4.3.2, differentiation between the conditions for substitution (dilute strong base) and elimination (concentrated strong base) was a challenge for many candidates.

(d)   In Q 4.4, most candidates failed to write the correct formula for the inorganic reactant needed for the elimination reaction (D) of a halo-alkane to form an alkene.

(e)   When writing a balanced equation using structural formulae in Q4.5, many candidates used molecular formulae.

(f)   The IUPAC name in Q4.6 was often written as but-1-ane. Some wrote platbutane or Pt-butane or platinumbutane, not knowing that Pt is only a catalyst.

Suggestions for improvement

(a)   In alkanes, numbers are only used to indicate the position of alkyl groups (substituents) on the parent chain. Numbering within the parent name, for example but-1-ane, is incorrect.

(b)   A flow diagram should be used in class to show the difference between elimination, substitution and addition reactions.

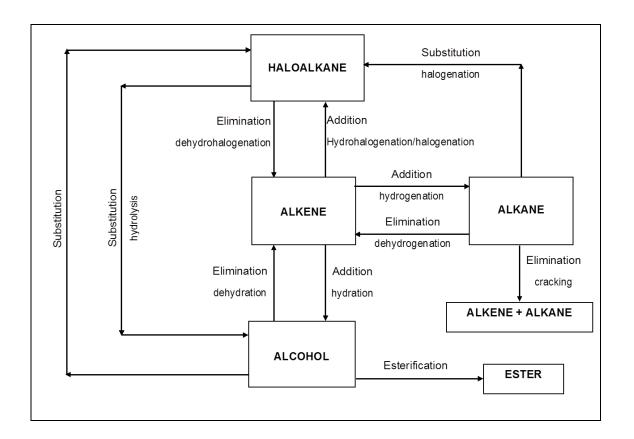**ADDITION:** Compounds with DOUBLE BONDS (alkenes) form compounds with SINGLE BONDS (alcohols, alkanes or haloalkanes).

ELIMINATION: Compounds with SINGLE BONDS (alcohols, alkanes or haloalkanes) form compounds with DOUBLE BONDS (alkenes).

SUBSTITUTION: Compounds with SINGLE BONDS (alcohols, alkanes or haloalkanes) form compounds with SINGLE BONDS from a different homologous series (alcohols or haloalkanes)

QUESTION 5: REACTION RATE

Common errors and misconceptions

(a)   The definition of reaction rate in Q5.1 is still a challenge to many candidates.

(b)   In Q5.2, many candidates failed to identify the dependent and independent variables correctly.

(c)   In Q5.3, most candidates identified graph Q correctly but failed to give a correct explanation.

(d)   Common errors in Q5.4 are: Ignoring the reaction rate and the time to calculate the volume of H_2 produced; substituting 22,4 dm^3 instead of the given 24 000 cm^3; using the ratio between Zn and HCℓ (1:2) instead of that between Zn and H_2 (1:1) and using

formulae not applicable to the problem e.g. $c = \dfrac{n}{V}$ and/or $c = \dfrac{m}{MV}$

(e)   Many candidates did not know how an increase in temperature would influence the heat of reaction of a reaction in Q5.5.1.

(f)   A poor understanding of the use of the collision theory to explain why the rate in experiment III is higher in Q5.6 was evident.

Suggestions for improvement

(a)   When stating a definition that can be expressed as a mathematical equation, learners should be taught to define in terms of the quantities in the expression. For example, reaction rate has the unit of concentration per second/volume per second/moles per second/mass per second.

(b)   When stating an investigative question, learners should be taught that when the answer to the question can be 'YES' or 'NO', the question does not ask for a relationship between the variables. The best way to formulate an investigative question, after identification of the dependent and independent variables, is to start with 'What is the relationship between ...'.

(c)   Learners should get more exposure to reading, interpretation as well as drawing of graphs.

QUESTION 6: CHEMICAL EQUILIBRIUM

Common errors and misconceptions

(a)   When stating the definition of chemical equilibrium Q6.1, many candidates omitted the word *rate* and therefore stated that 'the forward reaction is equal to the reverse reaction'.

(b)   The K_c calculation in Q6.2.1 was answered better than expected. Common errors were:

No K_c expression (Note that $\dfrac{[\text{products}]}{[\text{reac tan ts}]}$ is NOT a K_c expression!)

(c)   In Q6.2.2 many candidates did not use the answer obtained in Q6.2.1 to answer this question.

(d)   In Q6.4, candidates failed to explain using Le Chatelier's principle, the effect of decreasing pressure on a system at equilibrium.

Suggestions for improvement

(a)   Place more emphasis on explanations requiring Le Chatelier's principle. Learners struggle to express themselves when explaining in terms of Le Chatelier's principle. They should be exposed to more exercises to practise such explanations involving all the factors that influence equilibrium namely concentration, pressure and temperature.

(b)   Teachers should avoid using ($K_c = \dfrac{[\text{products}]}{[\text{reac tan ts}]}$ in class. Use chemical equations to teach the writing of K_c expressions.

(c)   Ensure that learners know that square brackets are used to indicate concentration.

QUESTION 7: ACIDS AND BASES

Common errors and misconceptions

(a)   Although Q7.1.1 was well answered, many candidates thought ammonia is a strong base. Those who knew it is a weak base supplied an incorrect reason, such as 'completely ionised'.

(b)   Although Q7.1.2 was well answered, some candidates omitted the charge of NH_4^+.

(c)   The interpretation of the graph in Q7.2.1 was a challenge to many candidates. They could not deduce from the graph that the soil is acidic.

(d)   Common errors made in the pH calculation in Q7.2.2 were: Mixing the pH and pOH formulae, e.g. pH = -log[OH⁻] or pH = -log[H₃O] or pH = -log(H₃O⁺); omitting the pH formula and just starting with 6 = -log[H₃O⁺] and using formulae not applicable to the calculation e.g. $c = \dfrac{n}{V}$ and/or $c = \dfrac{m}{MV}$.

(e)   Common errors in Q7.3 were: Using an incorrect molar mass for sodium carbonate; using an incorrect formula e.g. $n = \dfrac{c}{V}$ or using $n = \dfrac{V}{V_m}$ when calculating n(Na₂CO₃); incorrect substitution of volumes e.g. 495 cm³ instead of 500 cm³ and substituting 5 cm³ instead of 50 cm³ to calculate the concentration of the dilute acid; incorrect or no conversion from cm³ to dm³ when substituting volumes into $c = \dfrac{n}{V}$ and using dilution factors without showing how it was obtained.

Suggestions for improvement

(a)   Learners should be made aware that the square brackets in the pH formula indicate concentration and that the use of round brackets is incorrect.

(b)   The pH scale is poorly understood by many learners. A high pH was often linked to an acid instead of a base.

(c)   Learners should be taught to label formulae when doing multistep calculations, e.g. when calculating the number of moles of Na₂CO₃, the formula should be as follows:

n(Na₂CO₃) = $\dfrac{m}{M}$

(d)   Ensure that stoichiometric calculations are properly taught in Grade 11. Expose learners to stoichiometric calculations from the beginning of their Grade 12 year to give them enough practice.

(e)   Use the *Examination Guidelines* to ensure learners study the correct definitions, such as the definitions of strong and weak acids and bases.
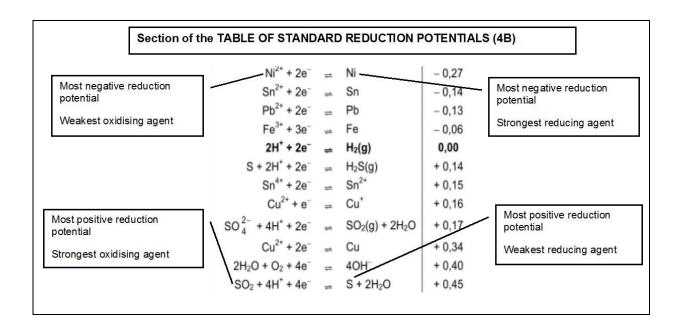
QUESTION 8: GALVANIC CELLS

Common errors and misconceptions

(a)   Many candidates failed to name component Y in Q8.1.1.

(b)   The writing of the cell reaction in Q8.1.3 proved challenging for the candidates.

(c)   Common errors in Q8.1.4 were: Failing to copy the correct equation from the formula sheet; swapping the reduction potential of the anode with that of the cathode when substituting; substituting the reduction potential of the $A\ell$ half-reaction as a positive value instead of -1,66 V and omitting / providing the unit at the final answer.

(d)   In Q 8.2.1, most candidates did not know that an *inert electrode* should be used because $C\ell_2$ is a gas and $C\ell^-$(aq) a solution.

(e)   When writing the standard conditions under which the half-cells function in Q8.2.2, many candidates omitted units or used incorrect unit for example 25 ° and $mol\cdot dm^3$.

(f)   The use of the Table of Standard Reduction Potentials to determine the strongest reducing agent in Q8.2.3 is still a major problem.

(g)   In Q8.2.4 many learners again showed that they do not understand how to use the Table of Standard Reduction Potentials.

Suggestions for improvement

(a)   Emphasis should be placed on the difference between cell potential, the cell reaction and cell notation.

(b)   Ensure that learners use formulae on the formula sheet. This will prevent the use of an incorrect formula for the calculation of the cell potential.

(c)   More time should be spent to ensure that learners understand how to use the Table of Standard Reduction Potentials. Learners should be taught that, for example, Zn^{2+} can never be a reducing agent because it cannot undergo oxidation (lose electrons). Oxidising agents are listed to the left in the Table of Standard Reduction Potentials and reducing agents to the right (see the section of Table 4B below).

Most negative reduction potential	$Ni^{2+} + 2e^- \rightleftharpoons Ni$		$-0,27$
	$Sn^{2+} + 2e^- \rightleftharpoons Sn$		$-0,14$
Weakest oxidising agent	$Pb^{2+} + 2e^- \rightleftharpoons Pb$		$-0,13$
	$Fe^{3+} + 3e^- \rightleftharpoons Fe$		$-0,06$
	$2H^+ + 2e^- \rightleftharpoons H_2(g)$		$0,00$
	$S + 2H^+ + 2e^- \rightleftharpoons H_2S(g)$		$+0,14$
	$Sn^{4+} + 2e^- \rightleftharpoons Sn^{2+}$		$+0,15$
	$Cu^{2+} + e^- \rightleftharpoons Cu^+$		$+0,16$
Most positive reduction potential	$SO_4^{2-} + 4H^+ + 2e^- \rightleftharpoons SO_2(g) + 2H_2O$		$+0,17$
	$Cu^{2+} + 2e^- \rightleftharpoons Cu$		$+0,34$
Strongest oxidising agent	$2H_2O + O_2 + 4e^- \rightleftharpoons 4OH^-$		$+0,40$
	$SO_2 + 4H^+ + 4e^- \rightleftharpoons S + 2H_2O$		$+0,45$

Most negative reduction potential — Strongest reducing agent

Most positive reduction potential — Weakest reducing agent

QUESTION 9: ELECTROLYTIC CELLS

Common errors and misconceptions

(a) In Q9.1 many candidates failed to link the increase in mass of electrode **P** to reduction and therefore **P** is the cathode.

(b) In Q9.3, most candidates could not explain why zinc ions will not influence the quality of the pure copper.

Suggestions for improvement

(a) More time should be spent to ensure that learners understand how to use the Table of Standard Reduction Potentials to compare relative strengths of two oxidising agents or of two reducing agents.

QUESTION 10: FERTILISERS

Common errors and misconceptions

(a) In Q10.1.1 many candidates wrote the formula instead of the name.

(b) In Q10.1.2 many candidates wrote NO_3 instead of NO_2 as the formula of the gas.

(c) In Q10.1.3 most candidates did not know that the name of the process

(d) In Q10.1.4 most candidates did not know the catalyst used in the catalytic oxidation of ammonia

(e) In Q10.1.7 many candidates wrote the incorrect formula for ammonium nitrate.

(f)   Many candidates did not know how to use the given data in Q10.2 to calculate the mass of phosphorus (Q10.2.1) and the mass of filler in the bag (Q10.2.2).

Suggestions for improvement

(a)   Teachers should provide learners with more flow diagrams of the processes to practice.

(b)   Expose learners to more calculations involving the NPK ratio.

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