



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL CURRICULUM STATEMENT
GRADES 10-12 (GENERAL)**

SUBJECT ASSESSMENT GUIDELINES

AGRICULTURAL SCIENCES

JANUARY 2008

PREFACE TO SUBJECT ASSESSMENT GUIDELINES

The Department of Education has developed and published Subject Assessment Guidelines for all 29 subjects of the National Curriculum Statement (NCS). These Assessment Guidelines should be read in conjunction with the relevant Subject Statements and Learning Programme Guidelines.

Writing Teams established from nominees of the nine provincial education departments and the teacher unions formulated the Subject Assessment Guidelines. The draft copies of the Subject Assessment Guidelines developed by the Writing Teams were sent to a wide range of readers, whose advice and suggestions were considered in refining these Guidelines. In addition, the Department of Education field-tested the Subject Assessment Guidelines in 2006 and asked for the comments and advice of teachers and subject specialists.

The Subject Assessment Guidelines are intended to provide clear guidance on assessment in Grades 10 to 12 from 2008.

The Department of Education wishes you success in the teaching of the National Curriculum Statement.

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1. PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides guidelines for assessment in the National Curriculum Statement Grades 10 - 12 (General). The guidelines must be read in conjunction with *The National Senior Certificate: A Qualification at Level 4 on the National Qualifications Framework (NQF)* and the relevant Subject Statements. The Subject Assessment Guidelines will be applicable for Grades 10 to 12 from 2008.

The Department of Education encourages teachers to use these guidelines as they prepare to teach the National Curriculum Statement. Teachers should also use every available opportunity to hone their assessment skills. These skills relate both to the setting and marking of assessment tasks.

2. ASSESSMENT IN THE NATIONAL CURRICULUM STATEMENT

2.1 Introduction

Assessment in the National Curriculum Statement is an integral part of teaching and learning. For this reason, assessment should be part of every lesson and teachers should plan assessment activities to complement learning activities. In addition, teachers should plan a formal year-long Programme of Assessment. Together the informal daily assessment and the formal Programme of Assessment should be used to monitor learner progress through the school year.

Continuous assessment through informal daily assessment and the formal Programme of Assessment should be used to:

- develop learners' knowledge, skills and values
- assess learners' strengths and weaknesses
- provide additional support to learners
- revisit or revise certain sections of the curriculum and
- motivate and encourage learners.

In Grades 10 and 11 all assessment of the National Curriculum Statement is internal. In Grade 12 the formal Programme of Assessment which counts 25% is internally set and marked and externally moderated. The remaining 75% of the final mark for certification in Grade 12 is externally set, marked and moderated. In Life Orientation however, all assessment is internal and makes up 100% of the final mark for promotion and certification.

2.2 Continuous assessment

Continuous assessment involves assessment activities that are undertaken throughout the year, using various assessment forms, methods and tools. In Grades 10-12 continuous assessment comprises two different but related activities: informal daily assessment and a formal Programme of Assessment.

2.2.1 Daily assessment

The daily assessment tasks are the planned teaching and learning activities that take place in the subject classroom. Learner progress should be monitored during learning activities. This informal daily monitoring of progress can be done through question and answer sessions; short assessment tasks completed during the lesson by individuals, pairs or groups or homework exercises.

Individual learners, groups of learners or teachers can mark these assessment tasks. Self-assessment, peer assessment and group assessment actively involves learners in assessment. This is important as it allows learners to learn from and reflect on their own performance.

The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the School Management Team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered.

The results of these assessment tasks are not taken into account for promotion and certification purposes.

2.2.2 Programme of Assessment

In addition to daily assessment, teachers should develop a year-long formal Programme of Assessment for each subject and grade. In Grades 10 and 11 the Programme of Assessment consists of tasks undertaken during the school year and an end-of-year examination. The marks allocated to assessment tasks completed during the school year will be 25%, and the end-of-year examination mark will be 75% of the total mark. This excludes Life Orientation.

In Grade 12, the Programme of Assessment consists of tasks undertaken during the school year and counts 25% of the final Grade 12 mark. The other 75% is made up of externally set assessment tasks. This excludes Life Orientation where the internal assessment component counts 100% of the final assessment mark.

The marks achieved in each assessment task in the formal Programme of Assessment must be recorded and included in formal reports to parents and School Management Teams. These marks will determine if the learners in Grades 10 and 11 are promoted. In Grade 12, these marks will be submitted as the internal continuous assessment mark. Section 3 of this document provides details on the weighting of the tasks for promotion purposes.

2.2.2.1 Number and forms of assessment required for Programmes of Assessment in Grades 10 and 11

The requirements for the formal Programme of Assessment for Grades 10 and 11 are summarised in Table 2.1. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

Table 2.1: Number of assessment tasks which make up the Programme of Assessment by subject in Grades 10 and 11

SUBJECTS		TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language		4	4*	4	4*	16
Language 2: Choice of HL or FAL	HL	4	4*	4	4*	16
	FAL	4	4*	4	4*	16
Life Orientation		1	1*	1	2*	5
Mathematics or Maths Literacy		2	2*	2	2*	8
Subject choice 1**		2	2*	2	1*	7
Subject choice 2**		2	2*	2	1*	7
Subject choice 3		2	2*	2	1*	7

Note:

* One of these tasks must be an examination

** If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 13 tasks in total: 4 tasks in term 1 and 3 tasks in each of terms 2, 3 and 4.

Two of the assessment tasks for each subject must be examinations. In Grades 10 and 11 these examinations should be administered in mid-year and November. These examinations should take account of the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects, excluding Life Orientation, should be tests written under controlled conditions at a specified time. The tests should be written in the first and third terms of the year.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and varied ways. Examples of assessment forms are debates, presentations, projects, simulations, written reports, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3. Care should be taken to ensure that learners cover a variety of assessment forms in the three grades.

The weighting of the tasks for each subject is set out in Section 3.

2.2.2.2 Number and forms of assessment required for Programme of Assessment in Grade 12

In Grade 12 all subjects include an internal assessment component, which is 25% of the final assessment mark. The requirements of the internal Programme of Assessment for Grade 12 are summarised in Table 2.2. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

Table 2.2: Number of assessment tasks which make up the Programme of Assessment by subject in Grade 12

SUBJECTS	TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language	5	5*	4*		14
Language 2: Choice of HL or FAL	HL	5	5*	4*	14
	FAL	5	5*	4*	14
Life Orientation	1	2*	2*		5
Mathematics or Maths Literacy	3	2*	2*		7
Subject choice 1**	2	2*	(2*) 3*		(6 [#]) 7
Subject choice 2**	2	2*	(2*) 3*		(6 [#]) 7
Subject choice 3	2	2*	(2*) 3*		(6 [#]) 7

Note:

- * One of these tasks in Term 2 and/or Term 3 must be an examination
- ** If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 12 tasks in total: 5 tasks in term 1, 4 tasks in term 2 and 3 tasks in term 3.
- # The number of internal tasks per subject differs from 6 to 7 as specified in Section 3 of this document.

Schools can choose to write one or two internal examinations in Grade 12. Should a school choose to write only one internal examination in Grade 12, a scheduled test should be written at the end of the term to replace the other examination. Internal examinations should conform to the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects, excluding Life Orientation, should be tests written under controlled conditions at a specified time.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and focused ways. Examples of assessment forms are debates, presentations, projects, simulations, assignments, case studies, essays, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3.

2.3 External assessment in Grade 12

External assessment is only applicable to Grade 12 and applies to the final end-of-year examination. This makes up 75% of the final mark for Grade 12. This excludes Life Orientation which is not externally examined.

The external examinations are set externally, administered at schools under conditions specified in the *National policy on the conduct, administration and management of the assessment of the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF)* and marked externally.

In some subjects the external assessment includes practical or performance tasks that are externally set, internally assessed and externally moderated. These performance tasks account for one third of the end-of-year external examination mark in Grade 12 (that is 25% of the final mark). Details of these tasks are provided in Section 3.

Guidelines for the external examinations are provided in Section 3.

2.4 Recording and reporting on the Programme of Assessment

The Programme of Assessment should be recorded in the teacher's portfolio of assessment. The following should be included in the teacher's portfolio:

- a contents page;
- the formal Programme of Assessment;
- the requirements of each of the assessment tasks;
- the tools used for assessment for each task; and
- record sheets for each class.

Teachers must report regularly and timeously to learners and parents on the progress of learners. Schools will determine the reporting mechanism but it could include written reports, parent-teacher interviews and parents' days. Schools are required to provide written reports to parents once per term on the Programme of Assessment using a formal reporting tool. This report must indicate the percentage achieved per subject and include the following seven-point scale.

RATING CODE	RATING	MARKS %
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 – 79
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary achievement	30 – 39
1	Not achieved	0 – 29

2.5 Moderation of the assessment tasks in the Programme of Assessment

Moderation of the assessment tasks should take place at three levels.

LEVEL	MODERATION REQUIREMENTS
School	The Programme of Assessment should be submitted to the subject head and School Management Team before the start of the academic year for moderation purposes. Each task which is to be used as part of the Programme of Assessment should be submitted to the subject head for moderation before learners attempt the task. Teacher portfolios and evidence of learner performance should be moderated twice a year by the head of the subject or her/his delegate.
Cluster/ district/ region	Teacher portfolios and a sample of evidence of learner performance must be moderated twice during the first three terms.
Provincial/ national	Teacher portfolios and a sample of evidence of learner performance must be moderated once a year.

3. ASSESSMENT OF AGRICULTURAL SCIENCES IN GRADES 10 – 12

3.1 Introduction

Agricultural Sciences studies the relationship between soils, plants and animals to produce and process food, fibre, fuel and any other agricultural commodities that have an economic, aesthetic and cultural value.

The purpose of assessment in Agricultural Sciences is, therefore, to determine the competencies of learners in understanding the application of appropriate technology in commodity production (animal and plant) and processing of these commodities in a manner that will ensure sustainable agriculture. Assessment in Agricultural Sciences is driven by its four Learning Outcomes through their relevant Assessment Standards. When the Assessment Standards are achieved, the relevant Learning Outcomes will be considered to be achieved. The Assessment Standards can be attained through a variety of forms of assessment tasks.

The four Agricultural Sciences Learning Outcomes are weighted as follows and this should be reflected in the assessment tasks:

- Learning Outcome 1: 20%
- Learning Outcome 2: 50%
- Learning Outcome 3: 20%
- Learning Outcome 4: 10%
-

3.2 Daily assessment in Agricultural Sciences

The daily assessment activities in Agricultural Sciences provide learners with multiple opportunities to improve and master their scientific inquiry, problem-solving, critical thinking and application of knowledge competencies. Therefore, daily assessment is developmental in nature and a variety of daily assessment tasks can be used to develop learners' Agricultural Sciences competencies. Daily assessment tasks will not be marked for promotion purposes but will enhance understanding of various concepts in Agricultural Sciences, while engagement in practical experiments will provide grounding in scientific processes. Since the recording of performance in daily assessment is not required for the purposes of generating a year or promotion mark, the use of checklists, qualitative rubrics and rating scales will be valuable in monitoring learner progress.

Examples of daily assessment tasks:

FORMS OF ASSESSMENT	
1	<p>Case Study with accompanying worksheet: (A scenario is sketched and questions covering the relevant Learning Outcomes and Assessment Standards are prepared on the scenario. Some answers should be found in the case study, whilst others should be found in the theory covered by the Learning Outcomes) A case study could look at the effect of El Niño weather patterns on crop production in certain parts of South Africa.</p>
2	<p>Assignment: Conduct a short survey on the eating habits of the members of the learner's family. Comment on the eating habits and draw up a balanced nutritional programme.</p>
3	<p>Spot test: Test on the previous day's work or a certain aspect of a topic.</p>
4	<p>Debates: Does land redistribution contribute to agricultural development?</p>
5	<p>Simulation: Create a food garden and then look at the role of abiotic factors on the simulated ecosystem.</p>

The examples of daily assessment tasks provided in the above table are a guide. Teachers should use a variety of examples of each type of task in their assessment practice. Textbooks can be consulted for further information on these types of tasks.

3.3 Assessment in Grades 10 and 11

3.3.1 Programme of Assessment in Grades 10 and 11

The Programme of Assessment for Agricultural Sciences in Grades 10 and 11 comprises of seven tasks which are internally assessed. Of the seven tasks, the six tasks which are completed during the school year make up 25% of the total mark for Agricultural Sciences, while the end-of-year examination is the seventh task and makes up the remaining 75%.

Two of these tasks should be tests written under controlled conditions at a specified time and two should be written examinations. The three remaining tasks should not be exams or tests but should be carefully designed tasks like projects, practical investigations, simulations or research projects.

The table provides an example of a Programme of Assessment for Grades 10 – 11:

PROGRAMME OF ASSESSMENT				
TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Task 1: Practical investigation (20)	Task 3: Research project (20)	Task 5: Simulation (20)	Task 7: End-of-year exam (2 papers – 300)	7
Task 2: Test (10)	Task 4: Exam (20)	Task 6: Test (10)		

See Appendix 1 for guidance on how to link content to Learning Outcomes, assessment methods, time and possible resources in Grades 10 and 11.

Assessment tools should be appropriate to give an objective assessment of the learner's performance.

3.3.2 Midyear and end-of-year examination papers for Grades 10 - 11

The question papers should conform to the weighting given to the different Learning Outcomes as mentioned in Section 3.1.

There will be one midyear paper for Agricultural Sciences in Grade 10 and two examination papers at the end of the year. See the table below for guidelines on the length and content of the papers.

Suggested outline for examination papers in Grade 10:

PAPER 1			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	150
Agro-ecology Agri-industry Animal sciences	45	105 (35 marks/question)	

PAPER 2			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	150
Soil sciences Plant sciences Optimal resource use	45	105 (35 marks/question)	

There will be one paper for Agricultural Sciences in the Grade 11 midyear and two examination papers for the end-of-year examinations:

Suggested outline for the two examination papers in Grade 11:

PAPER 1			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	150
Basic chemistry Soil sciences	45	105 (35 marks/question)	

PAPER 2			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	150
Plant sciences Optimal resource use	45	105 (35 marks/question)	

The format of possible questions to be asked in Sections A and B should be in line with examples for Grade 12 examination papers (see Section 3.4.2).

Guideline for cognitive levels when setting questions:

COGNITIVE LEVEL	WEIGHTING (%)	MARKS
Knowledge	30	45
Comprehension	20	30
Application	30	45
Analysis, evaluation and synthesis	20	30

3.4 Assessment in Grade 12

In Grade 12, assessment consists of two components: a Programme of Assessment which makes up 25% of the total mark for Agricultural Sciences and an external examination which makes up the remaining 75%. The Programme of Assessment for Agricultural Sciences comprises seven tasks which are internally assessed. The external examination is externally set and moderated.

3.4.1 Programme of Assessment in Grade 12

The Programme of Assessment for Agricultural Sciences in Grade 12 comprises seven tasks which are internally assessed. Of the seven tasks, two tasks are examinations and two are tests. The remaining three tasks should be different forms of assessment such as an assignment (for example on malnutrition in the community), a project (for example on building a workable irrigation system) **or** a research task (for example on the effects of El Niño on crop production in Southern Africa).

Example of a Programme of Assessment for Agricultural Sciences in Grade 12:

PROGRAMME OF ASSESSMENT				
TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Task 1: Project / Research Task (20) Task 2: Test (10)	Task 3: Practical Investigation (20) Task 4: Midyear exam (10)	Task 5: Test (10) Task 6: Assignment (20) Task 7: Trial exam (10)		7

In Grade 12 one of the tasks in Term 2 and/or Term 3 must be an internal examination. In instances where only one of the two internal examinations is written in Grade 12, the other examination should be replaced by a test at the end of the term.

See Appendix 2 for guidance on how to link content to Learning Outcomes, assessment methods, time and possible resources in Grade 12. Appendices 3 and 4 provide examples of assessment tasks.

3.4.2 External assessment in Grade 12

In Grade 12 two external examination papers totalling 300 marks (75% of total mark) will be set. They will have the content, weighting and duration as indicated in the table below. This external mark will be added to the internal assessment mark (25% of total mark) to make up 400 for Agricultural Sciences.

Suggested outline for examination papers in Grade 12:

PAPER 1			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	
Soil sciences Plant sciences Optimum resource use	45	105 (35 marks/question)	150

PAPER 2			
DURATION: 2 HOURS			
CONTENT	SECTION A	SECTION B	TOTAL MARKS
	QUESTION 1	QUESTION 2 - 4	
Animal sciences Agricultural management Basic chemistry and genetics	45	105 (35 marks/question)	150

The question papers must reflect skills, knowledge and values. The papers should conform to the weighting given to the different Learning Outcomes as mentioned in Section 3.1.

To distribute content evenly in the paper, marks allocated to each component should conform to the following weighting:

PAPER 1		PAPER 2	
CONTENT	TOTAL MARKS	CONTENT	TOTAL MARKS
Soil sciences	60	Animal sciences	75
Plant sciences	60	Agricultural management	45
Optimum resource use	30	Basic chemistry and genetics	30

Section A

This section is made up of short questions where one or two marks are allocated for a correct answer.

All questions in this section are compulsory.

Section B

This section consists of three questions of 35 marks each. All the questions are compulsory. This section consists of various types of questions from different sections of the content and measures different skills. Each question will be subdivided and can include different types of questions. The following examples are given:

- Questions with short answers (even one word)
- Questions with longer answers (one sentence to one or more paragraphs)
- Drawings of graphs, tables, diagrams, etc.

The three questions will be structured to measure as many Assessment Standards as possible, placing the emphasis on high knowledge and skills as described in the Learning Outcomes of Agricultural Sciences.

Guideline for cognitive levels when setting questions:

COGNITIVE LEVEL	WEIGHTING (%)	MARKS
Knowledge	30	45
Comprehension	20	30
Application	30	45
Analysis, evaluation and synthesis	20	30

3.5 Promotion

For promotion and certification purposes learners should achieve at least a level 2 rating (Elementary achievement: 30-39%) in Agricultural Sciences.

Promotion in grade 10 and 11 level is based on internal assessment only but must meet the same achievements for the National Senior Certificate. The requirements, conditions and rules of combination are spelt out in line with the seven-point scale.

3.6 Moderation

All Grade 10 and 11 tasks are internally moderated, while Grade 12 tasks should be externally moderated.

Moderation at the school will be carried out at least once each school term by the head of department responsible for the subject. This moderation needs to take place before cluster, district, regional or provincial moderation. Teachers' portfolios and evidence of learner performance must be moderated to ensure that a variety of assessment tasks have been used to address the content and that assessment covered a range of cognitive levels.

APPENDIX 1: LINKING CONTENT TO LEARNING OUTCOMES, ASSESSMENT METHODS, TIME AND POSSIBLE RESOURCES IN GRADES 10 AND 11

GRADE 10						
WK	TOPIC	CONTENT	LEARNING OUTCOMES	LINK WITH LOS AND ASS	ASSESSMENT	RESOURCES
1 – 6	<ul style="list-style-type: none"> • Agro-ecology Ecological regions in the world Ecological regions in South Africa Adaptations to ecosystems 	Outline of various regions Geographical distribution and veld types Adaptations of animals to specific regions Effect of weather phenomena (e.g. El Niño and effects)	LO 1 LO 2 LO 3	10.1.1 10.1.2 10.2.3 10.2.7 10.4.4	Project Assignments Presentation Homework and class work Formal tests Informal tests Examinations Worksheets Portfolio Case study Research	Videos Resource books Charts Field excursions Brochures ARC – leaflets and personal Multimedia such as the Internet.
7 - 10	<ul style="list-style-type: none"> • Agri-industry Key importance Demand for food and food security Overview of agricultural development Organisations in the farming industry Agricultural acts 	Provider of food, raw materials, jobs, economic stability Effect of food and food security on HIV/Aids and other diseases Population growth and shift, LRAD, land ownership, industries, indigenous knowledge Role and examples Water and soil conservation	LO 2 LO 1 LO 2 LO 4	10.2.8 & 10.3.1 10.3.4 & 10.4.1 10.4.3 10.4.5		
11 – 15	<ul style="list-style-type: none"> • Soil science Basic alkaloids and components Soil-forming factors and process 	Components, rock minerals (primary and secondary), geographical factors, climate Weathering of rocks	LO 3	10.2.1		
16 – 22	<ul style="list-style-type: none"> • Animal sciences General classification and importance of animals 	Types and characteristics of cattle, pig, poultry, sheep, goats and indigenous breeds	LO 1 LO 2 LO 3	10.2.4		
23 – 27	<ul style="list-style-type: none"> • Plant sciences General classification and importance of plants 	Field, horticultural and fodder crops, forests and horticultural indigenous breeds Role and impact of indigenous plants in South Africa	LO 3 LO 2 LO 3	10.2.2		
28 – 35	<ul style="list-style-type: none"> • Optimum resource use Agricultural resources Control and conservation Water quality Agri-pollution 	Soil and water Principles of indigenous farming practices e.g. organic farming and permaculture	LO 3 LO 2 LO 3 LO 3 LO 4	10.1.3 10.4.1		

Grade 11						
WK	TOPIC	CONTENT	LEARNING OUTCOMES	LINK WITH LOS AND ASS	ASSESSMENT	RESOURCES
1 – 2	<ul style="list-style-type: none"> Basic chemistry Compounds 	Overview of general atomic structures of those most important to Agriculture. Formation of simple and organic compounds	LO 1 LO 2 LO 3		Projects Assignments Presentation Homework and class work Formal tests Informal tests Examinations Worksheets Portfolio Case study Research	Videos Resources books Charts Field excursions Brochures ARC – leaflets and personal Multimedia such as the Internet
3 – 12	<ul style="list-style-type: none"> Soil science Profile and characteristics Soil microbiology Chemical and colloidal properties Soil classification 	Physical and morphological characteristics Inorganic and organic, absorption and exchange, acidity, alkalinity and salinity (danger and reclamation) Organic matter and importance	LO 1 LO 2 LO 3	11.2.1 11.2.8 11.3.1		
13 – 20	<ul style="list-style-type: none"> Plant science Plant nutrition Fertilisation Propagation Protection 	Absorption and storage of water and nutrients Fertilisation practices Plant improvement Chemical weed control and plant diseases	LO 1 LO 2 LO 3	11.1.1 & 11.2.2 11.2.8 & 11.3.1 11.3.2 & 11.3.4 11.4.1 & 11.4.2 11.4.5		
21 – 28	<ul style="list-style-type: none"> Optimum resource use Soil surveying Planning Water use Soil cultivation Crop rotation Controlled agricultural production Veld management Subsistence farming 	Aim, principles, leading to precision farming Irrigation and scheduling Drainage Aims and methods (mulching, bare or minimum tillage, crop rotation, monoculture, etc.) Ploughing, discing, harrowing etc. Greenhouse, hydroponics, tunnels, aquaculture, etc. Foundation of livestock industry and principles of use Draught power minimum tillage and food security	LO 3 LO 4			
29 – 35	<ul style="list-style-type: none"> Agri management Production factors 	Soil Labour Capital Management process	LO 1 LO 2 LO 3			

APPENDIX 2: LINKING CONTENT TO LEARNING OUTCOMES, ASSESSMENT METHODS, TIME AND POSSIBLE RESOURCES IN GRADE 12

WK	TOPIC	CONTENT	LEARNING OUTCOMES	ASSESSMENT	RESOURCES
1 – 6	<ul style="list-style-type: none"> Animal sciences Nutrition 	Alimentary canal and digestion Components of feeds Digestibility Biological value, energy value Types of feed, supplements Planning a feeding programme Increase of production (shelters and behaviour)	LO 1 LO 2 LO 3	Projects Assignments Presentations Homework and class work Formal tests Informal tests Examinations Worksheets Case studies Research	Videos Resources Books Charts Field excursions Brochures ARC – leaflets and personal Multimedia such as the Internet
7 – 10	<ul style="list-style-type: none"> Reproduction 	Reproductive organs (male and female) Parturition Milk production	LO 1 LO 2 LO 3		
11 – 19	<ul style="list-style-type: none"> Agri-management Marketing Labour relations 	Price determination The market Methods of marketing Imports and exports Problems and challenges Legislation	LO 3 LO 3		
20 - 26	<ul style="list-style-type: none"> Entrepreneurial skills Concepts of sustainability Basic agricultural genetics <ul style="list-style-type: none"> Plants Animal Growth manipulation Genetic manipulation 	Entrepreneurship Business planning Use of equipment Sustainable use of resources Breeding and selection	LO 3 LO 4 LO 4 LO 1 LO 2 LO 3		

APPENDIX 3: AN EXAMPLE OF AN ASSESSMENT TASK

TASK 1: The value of crop and animal production

In agriculture the production of crops and other foodstuffs not only has economical advantage but also has nutritional value. Study the data below and answer questions that follow:

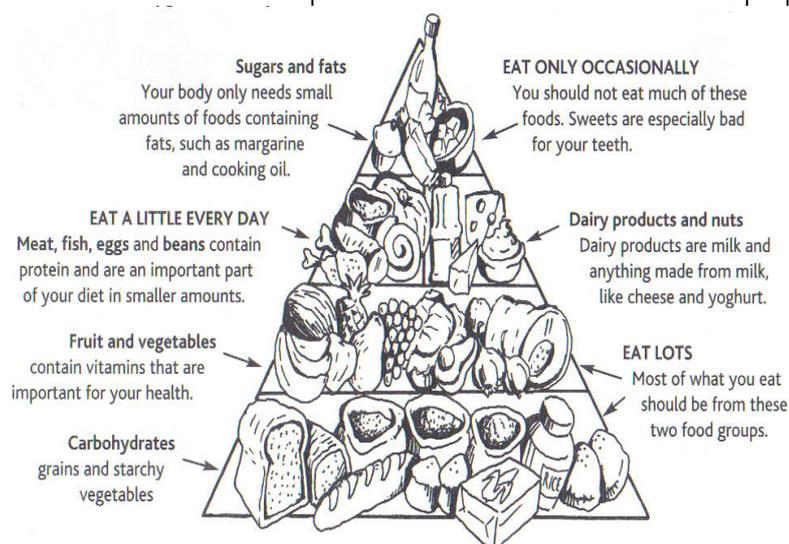
Hunger and disease

Sadly many people in the world do not eat a balanced meal. Others do not have enough to eat and starve to death or die of illnesses such as kwashiorkor which is caused by not getting enough to eat.

Kwashiorkor is a West African word that means 'the sickness that a child develops when another child is born'. This older child no longer receives protein-rich breast milk.



Food programmes for starving children often include peanut butter and milk powder because these are protein-rich foods. Growing children need more protein than adults.



ASSESS YOURSELF:

1. List the four main groups of food in the food pyramid.
2. Name three foods that are a good source of protein.
3. A lack of which organic compound causes kwashiorkor in children in poor socio-economic environments?
4. Name an agricultural product found in the pyramid that will produce the following:
 - a. Carbohydrates
 - b. Fats
 - c. Proteins
5. Give one example of secondary production that could take place with the following agricultural products:
 - a. Fruit
 - b. Dairy products
 - c. Wheat
6. Discuss why the different groups of food have been illustrated in a form of a pyramid.
7. Describe the benefits of any feeding programmes or schemes?

Possible assessment tools:

- Self-assessment (adapted to suit task content)
- Interpretation of data given in diagram form
- Attitude and value assessment

APPENDIX 4: EXAMPLES OF CASE STUDIES

CASE STUDY 1

In traditional farming each village has a few small fields. People grow a mixture of locally adapted crops in alternating rows. This provides a range of foods through the year for the small community. These **endemic** plant varieties have been naturally selected and are fairly resistant to the pests and diseases of that region. Each village keeps cattle and goats for meat and milk. The waste from these animals is used as fertilizer on the fields to replace the minerals needed for healthy plant growth. The fibre in this manure also improves the soil structure and water retention.

Modern farming is usually organised by commercial companies rather than village communities. Feeding an increasing population through artificially selected high yielding varieties and making a profit by using efficient methods are important. These needs encourage the ‘unnatural’ practice of planting a single, often alien, variety of crop plant over large areas of land. This enables the use of machines for planting and harvesting. These **monocultures** in large open fields are very ‘unnatural’ and provide an ideal environment for the rapid spread of plant **pathogens** (disease-causing organisms) able to destroy that variety of plant. Large quantities of chemical fertilizer and pesticides have to be used which damage other animals and plants and do not improve the soil structure.

Questions

- 1.0 Briefly explain the two types of farming practices mentioned in the Case Study.
- 2.0 What do you think are the advantages and disadvantages of each type of practice?
- 3.0 Which of these types of farming systems is more environmentally friendly?
- 4.0 Why was it necessary for a change in farming systems?
- 5.0 Is there a place for each of these farming systems in South Africa?
- 6.0 List words that you don't know the meaning of and discuss them.

CASE STUDY 2

Dr Martin Monk and Sally Johnson from King's College **London** did the following investigation. Their results are shown in Table 1.

Wheat has been cultivated for over 4500 years and grains were found in the tombs of the ancient Egyptians. It is an important source of food all over the world. For the last hundred years it has been artificially bred to produce high yielding varieties. This history has been characterised by the uptake and replacement of a succession of varieties, each lasting for a few years until devastated by new strains of disease.

Table 1: Height and yield according different grain varieties

Variety	Year variety was first grown	Height (cm) (Length of stem)	Grain yield (Tonnes per hectare)	Total biomass (Tonnes per hectare)
Little Joss	1908	142	6.0	16.5
Holdfast	1935	126	6.0	16.5
Capella Desprez	1953	110	6.7	15.9
Maris Huntsman	1972	106	7.5	16.3
Norman	1980	84	8.7	17.1

Questions

1. Plot bar charts to show height and grain yields of the five varieties.
2. Identify the pattern illustrated by the bar graphs.
3. State the relationship between the height and the yield in each variety of grain.
4. Is there any common pattern visible?
5. Use this information to suggest which variety of grain to plant and give reasons for your answer.