

SACAI

EXAMINATION GUIDELINES

AGRICULTURAL SCIENCES

GRADE 12

2015/2016



1. INTRODUCTION

The purpose of these Examination Guidelines is to:

- Provide clarity on the depth and scope of the content to be assessed in the Grade 12 SACAI Year-End Examination in Agricultural Sciences.
- Assist teachers to adequately prepare learners for the examinations.
- Provide guidelines to all SACAI examiners as well as internal and external moderators.

This document deals with the final Grade 12 external examinations. It does not deal in any depth with the School-Based Assessment (SBA).

These Examination Guidelines should be read in conjunction with:

A. *The National Curriculum Statement (NCS):*

- *Curriculum and Assessment Policy Statement (CAPS):
Agricultural Sciences*
- The National Protocol for Assessment Grades R – 12.
- The National Policy pertaining to the programme and promotion requirements of the National Curriculum Statement, Grades R-12

B. *The Revised SACAI/CAPS Subject Guidelines (2015)*

2. ASSESSMENT GUIDELINES

(Please also refer to the Revised SACAI CAPS Guidelines)

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment.

Assessment involves:

- Teaching;
- Generating and collecting evidence of achievement;
- Evaluating this evidence;
- Recording the findings and using this information to understand and thereby assist the learner's development in order to improve the process of learning.

FORMAL ASSESSMENT (SBA) REQUIREMENTS

All assessment tasks that make up a formal programme of assessment for the year and contribute to the progression or certification mark of the learner are regarded as formal assessment.

- Formal assessment tasks are marked and formally recorded by the teacher / facilitator for progression and certification purposes.
- All formal assessment tasks are subject to moderation for the purpose of quality assurance and to ensure that appropriate standards are maintained.
- Formal assessment provides teachers/facilitators with a systematic way of evaluating how well learners are progressing in a grade and in a particular subject.

Examples of formal assessments include:

- Tests;
- Examinations;
- Practical tasks;
- Projects / Research;
- Oral presentations;
- Demonstrations; etc.

Formal assessment tasks form part of a year-long formal programme of assessment in each grade and subject and are made up in two parts:

- The SBA: 25%
- End-of-year Examination: 75%

In Grade 12 the SBA is set and marked internally and moderated externally. Sections of the SBA tasks will be provided by the examination board (SACAI) in order to ensure a proper standard of assessment at all centres.

The remaining 75% of the final mark for certification in Grade 12 is set, marked and moderated externally by SACAI.

EXAMINATION GUIDELINES: AGRICULTURAL SCIENCES 2015/16

The following *Assessment Programme* gives a detailed outline of the components of formal assessment and their weightings.

Grade 12

Formal Assessment: Grade 12 (7 tasks)			Certification mark
Term 1	Term 2	Term 3	
Task based assessment 1: 25% Controlled test 1: 75%	Task based assessment 2: 25% Mid-year Examination: 75%	Task based assessment 3: 25% Controlled test 2: 25% Trail Examination: 50%	<p><u>SBA (internal): 25%</u></p> <p>Task based assessment: (Weighting) Practical investigation 1: 20 marks Practical investigation 2: 20 marks Assignment: 20 marks</p> <p>Test based assessment: (Weighting) Controlled test 1: 5 marks Controlled test 2: 5 marks Mid-year Examination: 10 marks Trail Examination: 20 marks</p> <p>Total: 100</p> <p><u>End-of-year examination (external): 75%</u> Paper 1: 150 Paper 2: 150 Total 300</p>
100	100	100	Total certification mark: 400

TYPES OF FORMAL ASSESSMENT

Practical investigation (Grade 10 - 12)

(See detail of GR 10-11 programme in the Revised SACAI CAPS Subject Guidelines)

The purpose and focus of a practical investigation is to develop and assess a learner's science investigative skills and can take the form of *hands-on activities* or *hypothesis testing*.

TWO **practical investigations** must be assessed formally and recorded in Grade 12.

Learners should be given enough *contact time* to conduct a practical investigation and obtain results. Learners should use *non-contact time* to prepare for the practical investigation and also to write it up.

In a practical investigation *Agricultural Sciences* learners will be assessed on their ability to cope with the following skills:

SKILLS	ELABORATION
<i>Follow instructions</i>	
<i>Making accurate observations</i>	<ul style="list-style-type: none"> • Matching of objects or processes or items which are similar and identifying differences. • Describing objects. • Describing processes. • Identifying differences and similarities in diagrams, objects, words and data. • Identifying problems. • Classifying an object or process from given information. • Observing features and differences in given situations with minimal information.
<i>Work safely</i>	<ul style="list-style-type: none"> • Taking precautions.
<i>Manipulate and use apparatus effectively</i>	<ul style="list-style-type: none"> • Assembling common apparatus. • Handling equipment, apparatus and chemicals.
<i>Measure accurately</i>	<ul style="list-style-type: none"> • Reading linear and two-dimensional scales. • Scaling. • Measuring out quantities. • Making valid measurements of variables, repeating measurements to obtain an average where necessary in all quantitative work. • Recognizing, or supply the correct units for common measurements • Counting systematically.
<i>Handling materials appropriately</i>	<ul style="list-style-type: none"> • Preparing materials and staining slides. • Handling materials.
<i>Gather data</i>	<ul style="list-style-type: none"> • Collecting data (information).
<i>Record data appropriately - drawings, graphs, etc</i>	<ul style="list-style-type: none"> • Collecting and organising data in: <ul style="list-style-type: none"> - Diagrams; - Tables; and - Graphs. • Constructing a pie chart, line graph, histogram or bar chart as suited to the data, choosing suitable axes and scales.

Assignments

(See detail of GR 10-11 assignments in the Revised SACAI CAPS Subject Guidelines)

An assignment is a *short task* of 1 to 1½ hours and includes activities such as the analysis and interpretations of data, and the drawing / justifying of conclusions. It could further include an activity that the learners do that simulates an agricultural activity or action. This could

include the building of *models, computer simulations, planning documents, data gathered from experiments*, etc. These tasks are based on a specific agricultural activity.

Examples of an assignment for Gr 12:

Grade 12

Find out more about the outbreak affecting animals especially pigs in South Africa (2009): symptoms, mode of transmission, control / preventative measures, treatment, etc. Data is provided to the learner and a set of questions based on the reading is set up.

Examples of a practical task for Gr 12:

Grade 12

1. Dissecting a chicken and identifying various organs / structures and functions.
2. Extracting DNA from wheat / onion / banana, etc.

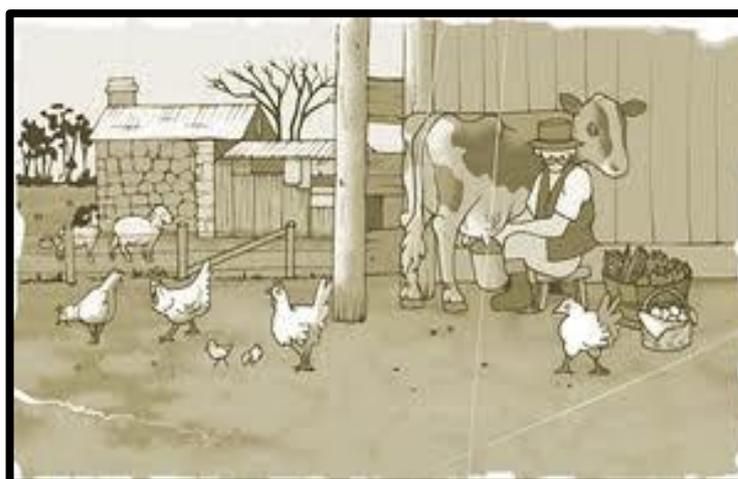
The design of any tasks should cover the content of the subject and include a variety of tasks designed to achieve the objectives of the subject.

Controlled tests

A controlled test in the programme of assessment should not be made up of several smaller tests. Each test should cover a substantial amount of content and should be set for 60-90 minutes each.

The marks for tests is prescribed by SACAI (*Please see prescribed mark sheets to be used that will be available on the SACAI web as well as sent to all assessment centres*).

■ **Formal assessment tasks/tests/examinations must cater for a range of cognitive levels and abilities of learners.** See the section on “*The importance of balanced papers*”.



3. FORMAT OF EXAMINATION PAPERS

FORMAT OF CONTROLLED TESTS AND EXAMINATION PAPERS

■ Controlled tests

1. A test in the programme of assessment should not be made up of several smaller tests. Each test should cover a substantial amount of content and should be set for 60 to 90 minutes each.
2. The marks for tests is prescribed by SACAI (*Please see prescribed mark sheets to be used that will be available on the SACAI web as well as sent to all assessment centres*). In the **FET phase it is recommended that controlled tests should be papers of 1½ hours for 100 marks.**

The following format for controlled tests is recommended:

Duration: 1½ hours	Content	Marks
Section A:	Short, objective type of questions covering the whole term's work.	30
Section B:	Interpretive type of questions	70
TOTAL		100

3. Each task, test and examination must cater for a range of cognitive levels and abilities of learners. See the section on "*The importance of balanced papers*".

■ Mid-year examinations

At mid-year ONE paper each for Grade 10 to 12 is prescribed covering the work done during the first half of the year. The format will be exactly the same as that of the final exam papers. (See the following section: *End-of-year Examinations*).

■ End-of-year NSC examination

Grade 12

Paper 1			
Duration: 2½ hours			
Content	Section A*	Section B	Total Marks
<ul style="list-style-type: none"> • Animal Nutrition • Animal Production, Protection and Control • Reproduction 	Question 1	Question 2-4	150
	45	105 (35 marks / question)	

Paper 2			
Duration: 2½ hours			
Content	Section A*	Section B	Total Marks
<ul style="list-style-type: none"> • Agricultural Management and Marketing • Production factors • Basic Agricultural Genetics 	Question 1	Question 2-4	150
	45	105 (35 marks / question)	

Basic format and outline of the national question papers for Agricultural Sciences:

INSTRUCTIONS IN PAPER 1:

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 TO 4) must be answered in the ANSWER BOOK.
4. Start each question in SECTION B on a NEW page.
5. Read ALL the questions carefully and answer ONLY what is asked.
6. Number the answers according to the numbering system used in this question paper.
7. Place your answer sheet for SECTION A (QUESTION 1) inside your answer book.
8. Write neatly and legibly.

SECTION A for PAPER 1:

This section consists of multiple-choice questions, column/match-type questions, terminology questions and term replacement questions. There must be an equal distribution of marks between the main topics (*Animal Nutrition, Animal Production, Protection and Control and Reproduction*) for these questions. Each of these main topics will be allocated 15 marks.

The following provides an indication of the format, outline, instruction, number of questions per sub-questions and mark allocation for SECTION A:

SECTION A

QUESTION 1

There will be four different types of short questions that will be based on the following sequence:

Multiple-choice questions:

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 → 1.1.10 (10 x 2) (20)

FOUR possible answers are provided per question and indicated as follows:

- A
- B
- C
- D

Column/Match-type questions:

1.2 Indicate whether each of the descriptions in COLUMN B applies to A ONLY, B ONLY, BOTH A AND B or NONE of the items in COLUMN A. Write A only, B only, both A and B or none next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

TWO possibilities are given: one in **COLUMN A** and a description indicated in **COLUMN B**.

EXAMPLE:

COLUMN A		COLUMN B
A	Capital	Amount paid for money borrowed.
B	Interest	

Answer (on attached answer sheet):

The statement refers to:			
A only	B only	A and B	None
A	B	C	D

1.2.1 → 1.2.5 (5 x 2) (10)

Terminology questions:

1.3 Write the agricultural term/phrase for each of the following descriptions next to the question number (1.2.1–1.2.5) in the ANSWER BOOK.

1.3.1 → 1.3.5 (5 x 2) (10)

Term replacement questions:

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the correct word(s) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 → 1.4.5 (5 x 1) (5)

[45]

INSTRUCTIONS for PAPER 2:

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTION 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read ALL the questions carefully and make sure you answer only what is asked.
6. Number the answers according to the numbering system used in this question paper.
7. Write neatly and legibly.

SECTION A for PAPER 2:

This section consists of multiple-choice questions, column/match-type questions, terminology questions and term replacement questions. There must be an equal distribution of marks among the main topics (*Agricultural Management and Marketing, Production Factors and Basic Agricultural Genetics*) for these questions.

Each of these main topics will be allocated 15 marks.

The following provides an indication of the format, outline, instruction, number of questions per sub-questions and mark allocation for **SECTION A:**

SECTION A

There will be four different types of short questions that will be based on the following sequence:

QUESTION 1

Multiple-choice questions:

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 → 1.1.10 (10 x 2) (20)

FOUR possible answers are provided per question and indicated as follows:

- A
- B
- C
- D

Column/Match type questions:

1.2 Choose a term/phrase from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 K.

1.2.1 → 1.2.5 (5 x 2) (10)

****Only ten items marked A to J are added in COLUMN B as distractors for the descriptions in COLUMN A****

Terminology questions:

1.3 Write the agricultural term/phrase for each of the following descriptions next to the question number (1.2.1–1.2.5) in the ANSWER BOOK:

1.3.1 → 1.3.5 (5 x 2) (10)

Term replacement questions:

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the correct word(s) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 → 1.4.5 (5 x 1) (5)

[45]

All questions are completed by candidates and in each question it is indicated that the candidates must start this question on a new page (*Start this question on a NEW page*).

QUESTION 2: ANIMAL NUTRITION

Questions covering most of the following main content areas and numbered as 2.1, 2.2, 2.3, etc. with sub-questions numbered as a three-digit numbering system (example 2.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Questions covering most of the following main content areas and numbered as 3.1, 3.2, 3.3, etc. with sub-questions numbered as a three-digit numbering system (example 3.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]

QUESTION 4: ANIMAL REPRODUCTION

Questions covering most of the following main content areas and numbered as 4.1, 4.2, 4.3, etc. with sub-questions numbered as a three-digit numbering system (example 4.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]

GRAND TOTAL: 150

SECTION B for PAPER 2:

All questions are completed by candidates and at each question it is indicated the candidates must start this question on a new page (*Start this question on a NEW page*).

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Questions covering most of the following main content areas and numbered as 2.1, 2.2, 2.3, etc. with sub-questions numbered as a three-digit numbering system (example 2.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]

QUESTION 3: PRODUCTION FACTORS

Questions covering most of the following main content areas and numbered as 3.1, 3.2, 3.3, etc. with sub-questions numbered as a three-digit numbering system (example 3.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Questions covering most of the following main content areas and numbered as 4.1, 4.2, 4.3, etc. with sub-questions numbered as a three-digit numbering system (example 4.1.1).

Content is indicated in the annual teaching plan of the Revised SACAI CAPS Guidelines for Agricultural Sciences. [35]



4. ELABORATION OF THE CONTENT FOR GRADE 12 (CAPS)

The following tables provide a brief outline of the content coverage for PAPER 1 and PAPER 2.

ANIMAL STUDIES: PAPER 1

Animal Nutrition

MAIN TOPIC	SUGGESTED CONTENT
Animal nutrition	<ul style="list-style-type: none"> • Compare the external structure of the alimentary canal of a ruminant (cow and sheep) and non-ruminant (fowl and pig) • Functions and adaptations of various structures of the alimentary canal • Description of the internal structure of the rumen, reticulum, omasum, abomasum and small intestines
Digestion in the non-ruminant (pig/fowl) and ruminants (cow)	<p>Digestion in non-ruminants</p> <ul style="list-style-type: none"> • A brief explanation of the intake of feed • The mechanical and/or chemical (enzymes) digestion processes in the mouth, stomach, small intestine and the large intestine: • Functions of the salivary glands, the liver, pancreas and intestinal glands (accessory glands). <p>Digestion in ruminants</p> <ul style="list-style-type: none"> • Definitions of rumination, regurgitation and peristalsis • Explanation of the intake of food and the chewing of the cud • The differences in size and functionality of the four stomach compartments of a mature ruminant compared to a young ruminant <p>Digestion in the rumen</p> <ul style="list-style-type: none"> • Describe rumen microbes as single celled organisms found in the reticulo-rumen • Briefly classify the different types of rumen microbes • Describe the most important requirements for normal functioning of rumen microbes/microorganisms • Name the functions of the rumen microbes • Explain the absorption of food in the rumen directly by osmosis and diffusion into the blood stream
Components of feed	<p>Briefly describe the functions (importance) of water, proteins, carbohydrates (sugar, starch and crude fibre) and fats/oils (ether extract) in animal production and growth</p> <ul style="list-style-type: none"> • Indicate the basic bio-chemical functions, importance and deficiencies of the macro-elements (calcium, phosphorus, magnesium, sodium, chlorine, potassium, sulphur) and trace-elements (iron, iodine, zinc, selenium, copper, cobalt) • Briefly indicate the basic functions and two deficiencies of water-soluble vitamins (B1; B2 ; B6 and B12 /Vitamin B complex) and fat-soluble vitamins (A, D, E and K)

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MAIN TOPIC	SUGGESTED CONTENT
Digestibility of feeds	<p>Define the digestibility and digestibility coefficient of feeds</p> <ul style="list-style-type: none"> • List the factors that affect/influence/determine the digestibility of feeds • Describe the methods used to improve/increase the digestibility of feeds • Calculate and interpret the digestibility coefficient of a feed
Quality of feed, energy value of feeds and nutritive ratio	<p>Quality of feed: biological value of proteins</p> <ul style="list-style-type: none"> • Define the concept of biological value (BV), essential amino-acid index and ideal proteins • Explain the importance of animal proteins in rations • Evaluate a feed protein in terms of biological value (egg protein and milk protein] <p>Energy value of feed</p> <ul style="list-style-type: none"> • Name the units in which energy value is expressed • Define and outline gross energy, metabolic energy, digestible and net energy • Describe the purpose/aims of calculating energy value of the feed • Identify and draw a schematic representation of feed energy flow • Calculate the feed energy flow and interpret the results <p>Nutritive ratio</p> <ul style="list-style-type: none"> • Define the concept of nutritive ratio (NR) • Describe the purpose/aims of the nutritive ratio in animal feeding • Calculate and interpret the nutritive value of a feed
Types of feed	<p>Illustrate the basic classification of animal feeds</p> <ul style="list-style-type: none"> • Define roughages and concentrates • Name the characteristics of roughages and concentrates • Describe the different types of roughages and concentrates • Make a schematic representation of different types of animal feeds • List the main functions (importance) of roughages and concentrates
Subdivision of Feeds Planning a feed flow programme	<p>Compare and give examples of protein-rich and carbohydrate-rich feeds</p> <p>Supplements to rations</p> <ul style="list-style-type: none"> • Indicate the different ways of supplementing: minerals, vitamins, non-protein nitrogen and growth stimulants <p>Planning a feed flow programme</p> <ul style="list-style-type: none"> • Define and describe a feed-flow program, maintenance and production ration • A brief overview of the Pearson square method (feed formulation) • Calculate and drawing the feed requirements using a single Pearson square method • Interpret the Pearson square results for feed mixtures • Interpret and describe a fodder/feed flow/fodder production planning • Explain the importance of fodder flow/fodder production planning • Do a basic calculation of a feed/fodder flow program for a group of livestock (number of animals and feed needed over a period of time)

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Animal Production, Protection and Control	
MAIN TOPIC	SUGGESTED CONTENT
Animal production; Increasing animal production	Animal production systems <ul style="list-style-type: none"> • Describe and compare intensive and extensive animal production systems • List the differences between small-scale/subsistence and large-scale/commercial farming systems
Intensive farming	Study examples of intensive farming productions including broiler production, battery system, feedlots and a piggery <ul style="list-style-type: none"> • Describe how factors like nutrition/feeding, environment, reproduction/breeding and general enterprise management are used to increase animal production under intensive farming (broiler production)
Extensive farming	Study examples of extensive farming productions including sheep farming, beef production and poultry production <ul style="list-style-type: none"> • Describe how factors like nutrition/feeding, environment, reproduction/breeding and general enterprise management are used to increase animal production in extensive farming (beef production)
Animal shelter/ protection/housing	Give the importance or reasons for shelter/housing <ul style="list-style-type: none"> • Identify different structures used for sheltering/housing livestock in an intensive animal production system • Identify and describe different intensive production systems like a backyard system, intensive/semi-intensive system and a free range systems for poultry, pigs or dairy production • List the basic housing or shelter requirements/guidelines for an intensive production system like a holding shed, feed shed and holding pens • Identify and describe the different equipment/tools for intensive housing systems like feeders, water supply, bedding and lighting
Behaviour and handling of farm animals	Behaviour of farm animals <ul style="list-style-type: none"> • Describe the common behaviours of cattle, sheep, pigs and poultry under various conditions • Handling of farm animals • Give the reasons/importance of handling farm animals • Describe the effect of incorrect handling on farm animals (harm and effect) • State the basic guidelines for handling cattle, sheep, pigs and poultry • Identify and describe the different techniques/tools/aids utilised to handle farm animals • List the basic guidelines/requirements for transporting/moving farm animals from one farm to another/abattoirs
Animal diseases and protection	<ul style="list-style-type: none"> • Describe the signs of poor health/sick animals (cattle, pigs and chickens) • Name and describe the methods of testing animal health • List the various methods of administering medicine to animals (cattle, pigs and chickens) • Describe the sustainable use of medication • Distinguish between infectious, non-infectious and metabolic animal diseases • Identify and describe the level of seriousness of animal disease(chronic, per-acute and acute)

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	<p>Animal diseases</p> <ul style="list-style-type: none"> • Indicate the main micro-organisms causing diseases in animals • Identify the most important diseases in South Africa based on the mode of transmission, animal host, symptoms and treatment:
Viral and bacterial diseases	<p>Evaluate viral diseases like foot and mouth disease (FMD), rabies, Rift Valley fever (RVF), avian/bird flu, swine fever/flu and Newcastle disease (NCD)</p> <ul style="list-style-type: none"> • Describe bacterial diseases like anthrax, mastitis and tuberculosis (TB)
Protozoan and fungal diseases	<p>Indicate protozoan diseases like anaplasmosis, redwater, heartwater and coccidiosis</p> <ul style="list-style-type: none"> • Describe fungal diseases like lumpy wool and ringworm • Identify and explain the economic implications of these animal diseases • Describe the preventative/control measures for animal diseases
Internal parasites/ endoparasites	<p>Define the meaning of internal parasite</p> <ul style="list-style-type: none"> • Identify and describe the main groups of internal parasites like tapeworms, liver fluke and roundworms • Describe the life cycles, animal hosts, symptoms and treatment of tapeworms, liver fluke and roundworms. • Identify and explain the financial implications and detrimental effect of internal parasites • Describe the basic preventative/control measures of internal parasites
External parasites/ ectoparasites	<p>Define an external parasite</p> <ul style="list-style-type: none"> • Distinguish between ticks, nasal worm blowflies, lice and mites as examples of external parasites • Identify and describe the life cycle of ticks (single/two/three host ticks), nasal worm (sheep); and blowflies, lice and mites (sheep). • Identify and describe the financial implications and detrimental effect of external parasites • Indicate the basic preventative/control measures of external parasites
Plant and metallic salt poisoning	<p>Identify and describe the maize fungus, poison bulb, thorn apple as examples of plant poisoning</p> <ul style="list-style-type: none"> • Discuss the treatment of animals suffering from plant poisoning • Describe the preventative/control measures of plant poisoning • Identify and describe common salt and urea poisoning (the symptoms and treatment) • Indicate the preventative/control measures of salt poisoning • Describe the basic principles of good health to control animal diseases and parasites/pests • Indicate the role of the state in animal protection

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Animal Reproduction	
Animal reproduction Male and female reproductive systems	Reproductive organs of cattle <ul style="list-style-type: none"> • Differentiate between the primary and secondary male reproductive organs/structures • List the functions of the testes, epididymis, scrotum and the accessory sex glands (vesicular glands; prostate; Cowper's gland) • Describe the process of sperm formation (spermatogenesis) and identify the schematic representation of spermatogenesis • State the factors causing sterility and infertility in bulls • Identify and describe the primary and secondary female reproductive organs (structure) • Indicate the functions of the ovaries, fallopian tubes, uterus and vagina • Describe the process of ovigenesis/oogenesis and identify the schematic representation of ovigenesis/oogenesis
Oestrus and oestrus cycle	Define oestrus or the heat period <ul style="list-style-type: none"> • Identify and describe the female sex hormones and their respective functions • Indicate and describe the periods/stages/phases of the oestrus cycle in cows • List the noticeable signs/characteristics of oestrus in cows • Describe the practical methods dairy farmers can adopt to assist in identifying cows on heat
Synchronisation of oestrus and mating	Define the concept of the synchronisation of oestrus/heat <ul style="list-style-type: none"> • Briefly describe the various techniques/methods of synchronization of oestrus/heat • List the advantages and disadvantages of synchronisation of oestrus • Describe the basic factors causing sterility and infertility in females (cow) • Define mating/copulation and ejaculation • Describe the natural mating by referring to the male sexual display/courtship behaviour/pattern, factors that regulate mating behaviour among bulls and the five main stages of mating/copulation
Artificial mating (Artificial insemination, embryo Transplantation and cloning)	Indicate the main requirements for successful AI <ul style="list-style-type: none"> • List the advantages and disadvantages of AI • Describe the collecting of semen by using an artificial vagina or electrical stimulation/electro-ejaculator • State the basic requirements for semen collection and storage • Describe the characteristics of good quality semen (semen evaluation) • Describe the dilutants and functions of such dilutants • Identify the correct time for artificial insemination (timing for AI) • Indicate and describe the correct technique for carrying out AI
Embryo transplantation/transfer (ET)	Identify and define the embryo transplantation/transfer (ET), superovulation, embryo flushing/harvesting, donor cows, recipient cows <ul style="list-style-type: none"> • Describe the aims/purposes of ET and embryo flushing/harvesting • List the advantages and disadvantages of ET

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MAIN TOPIC	SUGGESTED CONTENT
Nuclear transfer (Cloning)	<ul style="list-style-type: none"> • Define nuclear transfer/cloning • List the aims/purposes of animal cloning • Distinguish between reproductive cloning and therapeutic cloning • Indicate the advantages and disadvantages of cloning
Fertilisation and pregnancy	<ul style="list-style-type: none"> • Identify and define fertilisation, pregnancy/gestation, freemartins and placenta • Describe the fertilisation process • Describe the formation of multiple births (twins) and freemartins • Identify the phases/stages of pregnancy • Give the main reasons for abortions
Birth/parturition and dystocia	<ul style="list-style-type: none"> • Identify and define fertilisation, pregnancy/gestation, freemartins and placenta • Describe the fertilisation process • Describe the formation of multiple births (twins) and freemartins • Identify the phases/stages of pregnancy • Give the main reasons for abortions
Milk Production/lactation	<ul style="list-style-type: none"> • Identify and define the lactation, dry period and milk ejection • Identify and describe the structure of the udder of a cow (functions) • Discuss the milk ejection/milk let down process and hormones involved • Explain the importance and functions of colostrum to the new born calf • Identify and describe the interpretation of the lactation curve and lactation cycle (period)
AGRICULTURAL MANAGEMENT & MARKETING, PRODUCTION FACTORS AND BASIC AGRICULTURAL GENETICS: PAPER 2	
Agricultural Management and Marketing	
MAIN TOPIC	SUGGESTED CONTENT
Agricultural marketing	<ul style="list-style-type: none"> • Define the market/marketing • Distinguish between marketing and selling • List, identify and describe the main functions of agricultural marketing (transport, storage, packaging and processing/value adding) • Price determination and demand/supply • Define and describe demand and supply, • Explain and interpret the law of demand and supply (the interpretation of the demand and supply curve/graph) • Identify and explain the factors influencing the demand and supply of a product • Identify and describe the price elasticity of demand/supply and price inelasticity of demand/supply

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<p>Market equilibrium</p>	<ul style="list-style-type: none"> • Define market equilibrium • Interpret a hypothetical demand and supply curve to indicate market equilibrium • Interpret the market equilibrium; • Describe the development of a market • Describe the importance of a market with regards to fixed prices, type of buyers and methods to promote products • List the approaches to marketing including mass marketing and multi-segment marketing • Identify and explain sustainable agricultural marketing (green markets, eco-labelling)
<p>Agricultural marketing systems</p>	<ul style="list-style-type: none"> • Define the concept of free marketing • Indicate the general advantages and disadvantages of a free-market system • Identify and describe the main channels/options of a free-market system and their advantages and disadvantages (farm-gate market, fresh-produce markets, stock sales, direct marketing and Internet marketing) <p>Co-operative marketing</p> <ul style="list-style-type: none"> • Define the concept of agricultural co-operatives and their background • Describe the principles of agricultural co-operative • Name the types of agricultural co-operatives • Describe the benefits/advantages of agri-co-operatives <p>Controlled Marketing</p> <ul style="list-style-type: none"> • Describe the concept of controlled marketing <p>Agricultural marketing chain or supply/demand chain</p> <ul style="list-style-type: none"> • Identify and describe a marketing chain/supply/demand chain • List the factors that hamper the marketing chain of agricultural products • Indicate the ways to streamline and improve the agri-business chain • Briefly describe the role of legislation in the effective marketing of agricultural products
<p>Agricultural entrepreneurship and business planning</p>	<ul style="list-style-type: none"> • Define an entrepreneur and entrepreneurship • Describe the important aspects of the entrepreneur and entrepreneurship • Describe the entrepreneurial success factors or personal characteristics • Identify the main distinct phases of the entrepreneurial process <p>Agri-business plan</p> <ul style="list-style-type: none"> • Define and outline a business plan • Identify and indicate the reasons for drawing up a business plan in the agricultural sector • Outline the standard format and layout (components) of an agricultural business plan • Indicate the problems encountered when drawing up an agri-business plan • Identify electronic resources used as a tool for drawing up an agri-business plan • Describe a basic SWOT analysis

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Production factors	
MAIN TOPIC	SUGGESTED CONTENT
Agric-production factors Land and labour	<p>Land</p> <ul style="list-style-type: none"> • Identify the functions of land (in economic terms) • Indicate the economic characteristics of land as a production factor • Describe the techniques/methods of increasing land productivity <p>Labour</p> <ul style="list-style-type: none"> • Define the term labour • Describe the different types of labour in agriculture (with relevant examples) • Identify and describe the problems associated with labour in agriculture • Indicate the methods for increasing labour productivity • Identify the labour legislation Acts affecting farm workers in South Africa [LRA, BCEA, OHSA, COIA and SDA] • Describe the standard format and layout (components) of a labour/farm worker contract
Capital and management	<p>Capital</p> <ul style="list-style-type: none"> • Define the following terms: capital, assets, cash flow, budgets • Identify and describe the types of capital (with relevant examples) • List the methods of creating capital • Identify and describe the sources of finance/credit (long-term, medium-term and short-term credit) • Indicate the problems associated with capital as a production factor • Identify and describe the capital/financial management systems including financial records, farm asset records and farm budgets • Indicate the differences between an enterprise budget and a whole farm budget (example of farm budget) • Identify the components of a cash flow statement • State the main aspects which are included in a cash flow budget statement
	<p>Management</p> <ul style="list-style-type: none"> • Define the concept of farm management/management, strategic farm risk management • Identify and explain the principles/components of management • Indicate the general management skills needed to manage a farm business • Identify and describe the internal and external forces which affect/influence farming businesses • Discuss the primary sources of risk in farming business • Identify and discuss the main risk management strategies/techniques (diversification strategies, risk-sharing strategies)
Basic Agricultural Genetics	
Basic Agricultural Genetics Monohybrid inheritance Dihybrid inheritance	<p>Genetic concepts</p> <ul style="list-style-type: none"> • Define basic genetic terminology like genetics/heredity, genes, chromosomes and alleles (homozygous and heterozygous); • Distinguish between genotype and phenotype, dominant and recessive genes • Indicate a monohybrid inheritance/crosses (Mendel's First Law: Law of Segregation)

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	<ul style="list-style-type: none"> • Indicate a dihybrid inheritance/dihybrid crosses (Mendel's Second Law: Law of Independent Assortment) • Use various methods, such as a Punnet square, genetic diagrams and schematic representations to illustrate the crosses; • Describe Mendel's laws of segregation and independent recombination of characteristics • Distinguish between qualitative and quantitative characteristics
The pattern of inheritance	<ul style="list-style-type: none"> • Identify and describe the pattern of inheritance that leads to different phenotypes: incomplete dominance, co-dominance, multiple alleles, polygenic inheritance and epistasis; • Define the concept of pre-potency and atavism with relevant examples; • Describe the sex chromosomes and sex-linked characteristics (examples)
Variation and mutation	<ul style="list-style-type: none"> • Define genetic terminology like variation, mutation and selection • Identify and describe the importance of variation and selection • Discuss the external (environmental) and internal (genetic) causes of variation • Identify the types of mutagenic agents and their effects (changes in chromosome structures)
Selection	<ul style="list-style-type: none"> • Indicate the general principles of selection like biometrics including heritability and estimated breeding values(EBVs) and compare natural vs. artificial selection • Indicate the selection methods used by plants and animal breeders (mass, pedigree, family and progeny selection) and breeding values • Identify and describe inbreeding, line-breeding with relevant examples, cross breeding, upgrading, species-crossing, out crossing and the advantages and disadvantages of these different breeding systems
Genetic modification/ genetic engineering	<ul style="list-style-type: none"> • Define the concept of genetic modification/genetic engineering in plants and animals (with relevant examples) • List the aims of genetic modification of plants and animals • Indicate the advantages of genetic engineering over traditional methods • Identify and describe the current uses/application of genetically modified plants • Indicate the techniques used to genetically modify plants/animals • Describe the potential benefits of genetically modified crops • Name the characteristics of GMO's • Indicate the potential risks of GMO's

5. IMPORTANT POINTS TO REMEMBER

CALCULATIONS	GRAPHS
<p>The general criteria used for calculations:</p> <ul style="list-style-type: none"> ➤ Correct formula ➤ Substitution of values ➤ Simplifying of values ➤ Correct answer and units ➤ Proportionality (e.g. fodder flow) <p>At least TWO calculations per question papers should be expected.</p>	<p>Graphs will be assessed according to the following criteria:</p> <ul style="list-style-type: none"> ➤ Type of graph (line; bar) ➤ Correct heading ➤ Correct plotting of values (correct values; proportional plotting) ➤ Labelling and units on Y-axis ➤ Labelling and units on X-axis

The assessment of parasites in the examination		
Aspect	Types of parasites	
	Internal	External
1. Type of animal infected	Liver fluke, roundworm	Nasal worm
2. Life cycle	Tapeworm	Ticks, blowflies
3. Control/Preventative measures	Roundworms, tapeworms	Mites
4. Treatment	Liver fluke	Ticks
5. Economic implications	Tapeworm, roundworm	Ticks, mites

The assessment of diseases in the examination				
Aspect	Types of diseases			
	Viral	Bacterial	Protozoan	Fungal
1. Type of animal infected	Rabies	Mastitis	Heartwater	Ringworm
2. Transmitting agent	RVF, Rabies FMD	Anthrax	Anaplasmosis	Ringworm
3. Symptoms	FMD, NCD	TB	Heartwater	Lumpy wool
4. Control/Preventative measures	Rabies, Swine flu, Avian flu	Mastitis	Anaplasmosis	Lumpy wool
5. Treatment	RVF	Anthrax	Coccidiosis	Ringworm
6. Economic importance	FMD, RVF, Avian flu, Swine flu	Mastitis	Redwater	Lumpy wool



6. EXAMPLE OF A SACAI ANSWER SHEET TO BE USED IN PAPER 1 AND 2

SECTION A: TOTAL [45]

EXAMINATION NUMBER:

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ID NUMBER:

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QUESTION 1.1

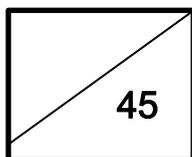
1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10 X 2 = 20)

QUESTION 1.2

	Only A	Only B	A &B	None
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(5 x 2 = 10)



QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 X 2 =10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 X 1 = 5)

7. SUBJECT SPECIFIC MARKING GUIDELINES

- All marking should be done in **red pen**. Internal moderation is done in **black pen**; moderation by SACAI is done in **green pen**, while Umalusi moderates in **purple pen**.
- **Marks** should be indicated with a tick "✓" directly above the relevant keyword. In the case of two marks per fact, two ticks "✓✓" should be indicated. Do NOT place the tick at the end of the line or paragraph.
- Where a sentence or paragraph is awarded a mark (as opposed to a single word or fact) bracket off the relevant section e.g. "[]" and tick it.
- Where a correct point is made, but this is **irrelevant** to the given question, indicate by writing "**Irr**" above the sentence and/or paragraph. If a whole section is irrelevant, bracket it off and write "**Irr**". If a large portion of the paper is irrelevant, draw a 'squiggly' line through the centre of the page and write "**Irr**" next to this line.
- Where facts are **repeated** within a question, write "**R**" to indicate repetition.
- If a candidate is **penalised** e.g. for listing points instead of providing an explanation in sentence format, bracket it off and write "**Q**" for "question" next to it.
- NO personal or **corrective comments** addressed to the candidate should be included.
- If the **maximum number of marks** is achieved before the end of an answer, draw a straight line through the CENTRE of the page with an arrow at its tip and write "**max**" at the bottom of this line.
- **Subtotals** for a question should be written in the RIGHT HAND margin where that section of the question ends.
- **Totals** for the entire question or test (or task) should equal the total of all the subsections and should be entered in the LEFT HAND margin of the script where the test starts (or where the question starts).
- RULE OFF in red pen across the ENTIRE page at the end of a full question.
- Do NOT circle any marks.
- **Transfer** the total mark per question to the front cover of the script (or to the appropriate block, if there is one).
- Confirm the total mark with your initials/signature and date.

MARK ALLOCATION

It is recommended to follow the mark allocation used in past NCS exam papers, whether it is one (1) or two (2) marks per fact/answer.

8. THE IMPORTANCE OF BALANCED PAPERS

In Grades 10 and 11, the year mark is derived from tasks, tests and the mid-year examination. In Grade 12 the Preliminary Examination adds to the SBA or year mark. For promotion purposes, the year mark is added to the end-of-year examination mark.

The total mark for each grade in FET is weighted as follows:

- Year mark 25%;
- End-of-year examination 75%.

Tests, tasks and examinations must cater for a range of cognitive levels and Bloom's Taxonomy is recommended to be used in this regard.

Out of necessity, teachers/facilitators must measure their students' ability. Doing so requires a classification of levels of intellectual behaviour important in learning. **Bloom's Taxonomy** (amongst others) provides a measuring tool for thinking. It is a multi-tiered model of classifying thinking according to six cognitive levels of complexity: *remembering, understanding, applying, analysing/synthesising, evaluating, and creating*.

These terms are defined as follows:

- **Remembering:** Retrieving, recognising and recalling relevant knowledge from long-term memory.
- **Understanding:** Explaining ideas or concepts. Constructing meaning from oral, written and graphic messages through interpreting, classifying, comparing, and explaining.
- **Applying:** Using information in another familiar situation. Carrying out, implementing.
- **Analysing:** Breaking information into constituent parts and to determine how the parts relate to each other. (**Synthesis:** The combination of parts, or elements, in order to form a more complete view or system).
- **Evaluating:** Making judgements based on criteria and standards through checking and critiquing.
- **Creating:** Putting elements together to form a coherent or functional whole; recognising elements into a new pattern or structure through generating, planning or producing.

This cumulative hierarchical framework consists of six categories each requiring achievement of the prior skill or ability before the next, more complex one remains easy to understand.



The following table classifies the cognitive levels as *lower order (A)*, *middle order (B)* and *higher order (C)* together with the suggested weighting of each to be applied in question papers and assessment tasks.

Differentiation and weighting

COGNITIVE LEVEL WEIGHTING %	CONTEXT WORDS	KEY VERBS
A 40%	<i>Knowledge</i>	Name, Mention, Give, Indicate, Provide, Arrange, Define, Label, List, Outline, Locate, Recognise, Select, State and Supply
B 20%	<i>Comprehend (understand)</i>	Describe, Identify, Restate, Review, Summarize, Classify, Compare, Define, Distinguish, Interpret, Match and Select
B 20%	<i>Application</i>	Apply, Calculate, Draw, Explain, Identify, Illustrate, Prepare, Operate, Practice, Solve, Draw (sketch), Modify, Adapt, Compute, Discover, Survey, Gather, Prepare, Use and Show
C 20%	<i>Analysis</i>	Analysis, Categorize, Compare, Distinguish, Discuss, Examine, Investigate, Test, Deduce, Differentiate, Relate, Classify, Contrast, Explain, Generalise
	<i>Synthesis</i>	Arrange, Compose, Formulate, Organise, Plan, Assemble, Construct, Combine, Create, Depict, Design, Develop, In-Corporate, Integrates, Invent, Predict, Produce and Structure
	<i>Evaluation</i>	Appraise, Assess, Comment on, Critically analyse, Evaluate, Conclude, Interrogate, Judge, Compare, Score, Justify, Critique and Recommend
	<i>Creation</i>	Combine, Construct, Create, Design, Formulate, Integrate, Modify, Prepare, Predict and solve, Propose, Judge, Organise, Plan, Prioritise, Rate, Rearrange, Substitute,

Conclusion

This Examination Guidelines document is meant as a tool for clarification and reference when teaching Gr 12 Agricultural Sciences. It is therefore not a substitute for the Revised SACAI CAPS document (or the DBE CAPs document) which teachers should teach to.

Qualitative curriculum coverage is forever essential and cannot be emphasized enough.

References:

- SACAI CAPS Based Subject Guidelines (Grade 10 – 12), 2014: Agricultural Sciences
- DBE, Agricultural Sciences Examination Guidelines Grade 12, 2014