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# **GAUTENG DEPARTMENT OF EDUCATION**

## **AGRICULTURAL SCIENCES**

### **CASS PORTFOLIO**

**GAUTENG DEPARTMENT OF EDUCATION**

**CONTINUOUS ASSESSMENT**

**AGRICULTURAL SCIENCES**

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## **1. What is a portfolio?**

A portfolio is a collection of a learner's work and is determined by the Subject Assessment Guidelines (SAG).

A variety of items are organised in a certain format which will then form the learner's portfolio. It should be freely available in the classroom, so that the learners can work on it whenever they find it necessary to do so. Items, which can be included in such a portfolio, include investigation tasks, simulation tasks, small projects, tests and examinations, which are collected over a period of time and which serve a specific purpose.

Portfolios are also defined as an ongoing systematic collection of products which represent milestones in the learner's journey towards excellence. This collection includes items, which represent the whole terrain, and also shows how the learner's journey has progressed towards a specific aim.

The collection of portfolio items from different components of the curriculum makes the portfolio an instrument for documentation and analysis, serving as a summary of the learner's progress throughout the year.

Portfolios enable the teacher to find out more about the learner as an individual, but the learners also find out more about themselves. It is a report on the learner's progress, as well as a report of that which the learner perceives to be important.

Arter and Spandel summarise the main characteristics of portfolios when they describe it as follows: "A portfolio is a purposeful collection of student work that tells the story of the student's efforts, progress or achievement in given area(s). This collection must include student participation in selection of portfolio content, the guidelines for selection, the criteria for judging merit and evidence of student self-reflection."

It is thus emphasised that a portfolio is an arrangement of the characteristics of authentic assessment. It makes continuous assessment possible and includes a rich variety of items as evidence of that which the students know and can do. The content of portfolios can be created within realistic contents. In addition, it can also be a reflection of the process of product development. It provides an excellent opportunity to transform assessment into a learning experience. Think of the portfolio as a mechanism whereby a story is told – a story that will communicate something about the learner to the reader.

## **2. Purpose**

The primary reasons for using portfolios as one type of authentic assessment tool include:

- assessing learner's accomplishment of learning outcomes
- assessing the quality of learner's sustained work

- allowing learners to turn their own special interests and abilities into a show-case
- encouraging the development of qualities such as pride in quality workmanship, ability to self-evaluate, and ability to accomplish meaningful tasks
- providing a collection of work learners may use in the future for college or university application and job seeking
- documenting improvement of learners' work

### 3. 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 (CASS) and an **External Examination** which makes up the remaining 75%. The Programme of Assessment for Agricultural Sciences comprises seven tasks which are internally assessed. Of the seven tasks two are examinations and two are tests. The remaining three tasks should be different forms of assessment such as practical task, assignment, project, case study or research. Together the Programme of Assessment and the external assessment component make up the annual assessment plan for Grade 12.

The following diagram shows the annual assessment plan for Agricultural Sciences:

#### Annual assessment plan for Agricultural Sciences, Grade 12

TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Task 1: Project (20) Task 2: Test (10)	Task 3: Research (20) Task 4: Midyear exam (10)	Task 5: Test (10) Task 6: Assignment (20) Task 7: Trial exam (10)		7

#### **4. Content for portfolios**

The content for portfolios for Agricultural Sciences is guided by the programme of assessment as stipulated in the Subject Assessment Guidelines (SAG).

The portfolio comprises:

- Two tests (first and third term)
- Two written examinations (midyear and trial)
- Three practical tasks: investigation, research and simulation  
(one per term in terms 1, 2 and 3)

#### **5. Programme of Assessment in Grade 12**

##### **5.1 Tests and examinations**

Two of the assessment tasks should be tests written under controlled conditions at a specified time. **A test should last at least 60 minutes and count a minimum of 100 marks.** Tests should include the theory of the agricultural processes, principles and concepts and the application thereof in the production of agricultural product(s)/ artefact(s). The mid-year and preparatory examinations will take the format of the external, end of year examinations (refer to page 11 of the subject guideline document- January 2007)

##### **5.2 Practical Tasks**

The practical tasks should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and varied ways. These tasks should be based on practical activities such as simulations, investigations and small projects and should focus on more than one of the following content areas i.e., soil sciences, plant sciences, animal sciences, agricultural management, optimum resource use as well as basic chemistry and genetics.

### 5.2.1 Investigation tasks

- **What is an investigation task?**
  - ✓ Investigation: a search or examination in order to discover facts.
  - ✓ Research: systematic investigation to establish facts or principles or to collect information on a subject.
  - ✓ Experiment: test or investigation.
  - ✓ Testing and verifying production reproduction and processing principles or/and concepts.
  
- **Examples of investigation tasks.**
  - ✓ Practical investigation on the effect of pH on availability of nutrients for plant growth.
  - ✓ The importance of synchronization of oestrus.
  - ✓ Practical testing and observation of the impact of socio economic and political issues on natural resources in production/processing:
  
  - ✓ Experiments:
    - The grading or classification of soil particles
      - Bulk density

### 5.2.2 Simulation tasks

- **What is a simulation task?**
  - ✓ From Latin *simulare* – to copy
  - ✓ Simulation is the replication of a real situation without being in it.
  - ✓ Involve role playing
  - ✓ Model: representation, usually on smaller scale, of a device,
  
- **Examples of simulation tasks.**
  - ✓ Create a food garden and then look at the role abiotic factors on the simulated ecosystem.

### 5.2.3 Assignments

An Assignment is a problem solving exercise with clear guidelines and a specified length.

It is more structured and less open ended than a project. For example an assignment may be based on a case study that may cover exercises such as:

- √ **calculations**
- √ **balancing chemical equations**
- √ **graphs, etc**
- √ **scheduling irrigation etc.**

### 5.3 Examinations

**The mid-year and trial examinations for Grade 12 should consist of one paper of 6 questions and will count 200 marks. The suggested duration of the paper is 3 hours. All the questions are compulsory.** The questions should be set in such a way that they cover the knowledge and skills of Learning Outcome 3, the investigative Assessment standard of Learning Outcome 2 and the values and attitudes of Learning Outcome 1 of the Agricultural Sciences Subject Statement.

The trial examination needs to be closely related to the final examination in terms of time allocation, layout of the paper and subject requirements.

See the Subject Assessment Guidelines for an outline of the Grade 12 examination paper.

## **6. Learner's portfolio**

The learners' portfolio should be well planned, organised and presented in a neat manner, for example, a file. It should include the following:

- a contents page;
- a continuous moderation report;
- a declaration by the learner;
- the assessment tasks in the following order
  1. project
  2. test
  3. research
  4. midyear exam
  5. test
  6. assignment/ simulation
  7. preliminary exams
- a summary of marks

## **7. Teacher's portfolio**

It is required from the Department of Education that a teacher's portfolio should accompany the learners' portfolios. This portfolio should include the following:

- a contents page;
- the formal Programme of Assessment;
- the requirements of each of the assessment tasks (e.g. project, practical tasks, research, tests and examination papers);
- the tools used for assessment for each task (e.g. memorandums, checklists, rubrics); and
- record sheets for each class (working mark sheets).

## 8. Evaluating portfolios

Periodic evaluation of portfolios should be conducted at a time predetermined by the teacher and his learners. Logical times for evaluation would be at the conclusion of a project, the end of a programme or unit, term or academic year.

The teacher must make sure that every assessment task is marked and captured. Marks on the teacher's record sheets must correspond with the marks in the learners' portfolios.

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

<b>LEVEL</b>	<b>MODERATION REQUIREMENTS</b>
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, to ensure that a variety of assessment tasks have been used to address the content and that assessment covered a range of cognitive levels.
Cluster/ District	Teacher portfolios and a sample of evidence of learner performance must be moderated twice during the first three terms.
Provincial	Teacher portfolios and a sample of evidence of learner performance must be moderated once a year.

## 9. Examples Activities

- **Case Study**

Read the following case study and answer the questions that follow

- 1.1 Name the soil characteristics that he can determine with this experiment .
- 1.2 The soil on his farm is clay, sandy soil and loam soil. which type will most probably be found in:
- 1.2.1 Soil type A
  - 1.2.2 Soil type B
  - 1.2.3 Soil type C
- 1.3 What can John do to ensure that soil type A retains more water?

- **Assignment**

- 2 The table below gives soil temperature readings at different depths (soil surface and at 20 cm) taken from 6:00am till 18:00 in the evening in your area.

Time	Surface	20 cm depth
6:00	8°C	4°C
8:00	9.5°C	4°C
10:00	14°C	4.5°C
12:00	21°C	11.5°C
14:00	26.5°C	16°C
16:00	23.5°C	17.5°C
18:00	19°C	15.5°C

- 2.1 Plot the information on a diagram. Use the X axle for time of day and the y-axle for temperature.
- 2.2 At what time of day was the surface temperature and 20cm depth temperature the highest.
- 2.3 Explain the daily variation in soil temperature of the surface and below surface temperature.
- 2.4 State why there is a variation between the temperature on the surface and the temperature at 20cm depth. Briefly justify your answer.

- **Simulation**

- 3.1 Mrs Mbuza and Mrs Gerard are neighbouring maize producers living in Polokwane. Mrs Mbuza uses conventional tillage whilst Mrs Gerard is using zero or no-tillage to produce her maize. Each year Mrs Mbuza losses 8.9 tons of soil to erosion whilst Mrs Gerard losses 2.4tons.

- 3.1.1 Justify the loss of soil experienced by both farmers
- 3.1.2 Differentiate between the two concepts,  
a. conventional tillage  
b. zero/no tillage
- 3.1.3 Which of the two tillage practices will lead to the soil retaining more Water and why?
- 3.1.4 List two other cropping systems that can be used that are beneficial to the fertility status of the soil

- **Calculations**

**QUESTION 1**

The nutritive ratio is an indication of the protein content of a feed. It is the ratio between the digestible protein and non- protein compounds (carbohydrate and fats) in a ration or feed.

A feed contains a total digestible nutrient content of **80%** and digestible protein content of **8%**.

Calculate the nutritive ratio of this feed.

**QUESTION 2**

The coefficient of digestibility is a measure of the digestibility of a feed, expressed as a percentage in terms of dry material.

Using the following information, calculate the digestible dry material content of Lucerne feed consumed by sheep

**30kg** lucerne with moisture content **10%** was taken in. **8kg** manure was excreted with moisture content of **20%**.

**NB: Please show all your calculations.**

**QUESTION 3**

A maize farmer has just received results of his soil analysis from the laboratory, which indicate that his soil is deficient in nitrogen.

His local supplier sells LAN 28 at **R185.00** per ton and urea at **R437.95** per ton. Which of the two nitrogen fertilizers is the cheapest?

**QUESTION 4**

2:1:6 (24) is an inorganic fertilizer.

4.1 What do the figures stand for?

4.2 Calculate the percentage of each nutrient contained in this fertilizer bag.

4.3 If 20kg of potassium must be added per hectare, how many kg of the mixture must be applied per ha?

**QUESTION 5**

Evaporation from a pan **E<sub>o</sub>** is **20mm** and the crop factor (**f**) for citrus is **0.65**.

What will the evapo-transpiration (**E<sub>t</sub>**) in the citrus orchard be?

- **Tests**

## AGRICULTURAL SCIENCE PORTFOLIO TEST

**MARKS** : 150  
**TIME** : 2 hours

### INSTRUCTIONS:

- All questions are **COMPULSORY**
- Use the answer book provided.
- Write neatly and legibly.
- NUMBER** your answers correctly.
- Use the same numbering system that has been used on the question paper.
- NEVER** leave any question unattempted.

## SECTION A

### Question 1.1

Four possibilities, of which one is correct, are suggested as answers to the following questions. Indicate the correct answer by **making a cross** over the appropriate letter next to the question number on the answer sheet provided.

### EXAMPLE:

A	B	<del>C</del>	D
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**NB:** If more than one cross appears in an answer, **no** marks will be awarded.

1.1.1 Farmers usually prefer to use fertilizer mixtures to fertilize crops because

- A. The fertilizer mixtures are cheap
- B. Nutrients in a mixture are more accessible
- C. Plant nutrients can conveniently be applied simultaneously in the chosen proportions.
- D. They do not have acidifying effects.

1.1.2 The unit price of LAN (28%) of a ton costs R459, is

- A. R16,39
- B. R62,20
- C. R17,99
- D. R30,00

- 1.1.3 A potato plant stores food in the
- A. Root
  - B. Stem
  - C. Leaves
  - D. Ovaries
- 1.1.4 When fruit develops without a stimulus of fertilization, it is known as
- A. Vegetative reproduction
  - B. Sternospermacarpy
  - C. Stimulative parthenocarpy
  - D. Vegetative parthenocarpy
- 1.1.5 Scheduled irrigation means
- A. Certain irrigation systems
  - B. Weekly irrigation
  - C. The optimal use of irrigation water.
  - D. The irrigation of crops
- 1.1.6 If the farmer does not apply monoculture, he practices
- A. Crop rotation
  - B. Mulch cultivation
  - C. Grass keys
  - D. Minimum tillage
- 1.1.7 The factor that is not a production factor, is
- A. Soil
  - B. Vegetation
  - C. Labour
  - D. Management
- 1.1.8 An example of production or working capital is,
- A. Breeding cows
  - B. Shearing machines
  - C. Fertilizers
  - D. Milking machines
- 1.1.9 The primary natural resource is
- A. Labourers
  - B. Soil
  - C. Capital
  - D. Trees
- 1.1.10 \_\_\_\_\_ is the agricultural production factor which is subject to the law of diminishing returns.
- A. Soil
  - B. Capital
  - C. Management
  - D. Labour

**Question 1.2**

Write down the correct term for each of the following statements:

- 1.2.1 The transfer of ripe pollen from the anther to the ripe, receptive stigma of another flower on the same plant.
- 1.2.2 The hard outer cover of a pollen grain.
- 1.2.3 The application of water in the form of drizzle.
- 1.2.4 The information needed for scientific planning of a country's total land surface.
- 1.2.5 The apparatus used by irrigation farmers to measure the moisture tension of soil.
- 1.2.6 The type of drainage system which is used for the fast transportation of surface water.
- 1.2.7 Capital investment in permanent structures on the farm.
- 1.2.8 Too much capital invested in farming in relation to land and available labour.
- 1.2.9 The energy application which refers to the human action, physical or mental during and at the achievement of a useful goal.
- 1.2.10 The place where buyers and sellers meet and trade according to rules.

(10)

**Question 1.3**

- 1.3 Match **Column A** with **column B** by writing the corresponding **letter** from **Column B** next to the question number.

COLUMN A	COLUMN B
1.3.1 Casual workers	A. Repetitive task
1.3.2 Seasonal workers	B. Work during specific hours
1.3.3 Fixed capital	C. Fuel, dip, wages, etc
1.3.4 Working capital	D. Machinery, implements, etc
1.3.5 Insurance	E. Non-repetitive work
	F. Under capitalization
	G. Decrease the risk to income
	H. Durable, permanent assets

(10)

**Question 2**

- 2.1 A horticulturist wants to fertilize crops using phosphatic fertilizer. The local agricultural cooperative sells superphosphate(11.3%) at R1 956/ton and raw phosphate (12.8 %) at R1 785/ton.
  - a. Calculate the unit value of these two fertilizers (6)
  - b. Which one of the two fertilizers would you recommend to the Horticulturalist to buy? Justify your answer (3)

- 2.1.1 Two types of LAN are available on the market, Namely, LAN (26) and LAN (28).  
What is the meaning of the number in brackets? (1)
- 2.2 A farmer buys a bag of fertilizer mixture on which the following code appears:  
**2: 3: 5 (20)**
- 2.2.1 Indicate the meaning of the figures in the fertilizer mixture. (4)  
2.2.2 Calculate the percentage content of each nutrient in the mixture. (6)
- 2.3 List **FOUR** important characteristics of phosphorus for plant growth. (4)  
2.4 Name **SIX** functions of water in plants. (6)
- [30]**

### Question 3

- 3.1 Below is the diagrammatic representation of a dicotyledonous flower and answer the questions that follow based on it.
- 3.1.1 Identify the parts labelled A, C, E and G. (4)  
3.1.2 What is the collective name for parts labelled F, G and H (1)
- 3.1.3 Identify the letter which refers to the whorl, which is important for the attraction of insects for pollination. (1)
- 3.1.4 Which letter represents the part that will develop into a seed? (1)
- 3.1.5 Does the drawing above represent a monoecious or dioecious flower when it is still in the bud? (1)
- 3.2 A rose flower with brightly coloured petals needs to be pollinated. Which **TWO** agents could lead to the pollination of this flower? (2)
- 3.3 Your friend wants to start a nursery. Explain the following to her/him:
- 3.3.1 A rhizome and give **TWO** examples (4)  
3.3.2 Producing trees using slips (2)  
3.3.3 Difference between grafting and budding (4)

- 3.4 A maize breeding specialist conducted a series of tests to determine the optimal yields of different maize population densities.

Test Number	Number of plants/ha	Yield per hectare(tons /ha)
1	7000	20
2	8 000	40
3	9 000	60
4	10 000	80
5	11 000	70
6	12 000	50
7	13 000	30

- 3.4.1 Draw a bar graph to represent the test results given in the above table. (5)
- 3.4.2 Which plant population density provided the highest yield per hectare?
- 3.4.3 Suggest why there were increases and decreases when the plant density was increased. (3)

**[30]**

#### **Question 4**

- 4.1 Study the illustrations below and answer the questions that follow.

- 4.1.1 What type of irrigation method is illustrated? (2)

- 4.1.2 Identify variations of this irrigation method as illustrated from **(i)** to **(v)** (2)
  - 4.1.3 What are the advantages of the illustrated irrigation methods? (6)
  - 4.2 List the **FIVE** main types of natural veld (5)
  - 4.3 Give **FIVE** reasons why crop rotation should be practised. (5)
  - 4.4 As a newly appointed land surveyor for a big company, you have been requested to address farmers about the importance of conducting soil surveys before embarking on any farming venture in your area. Outline, step by step, the procedure they must follow when gathering information during a soil survey. (7)
- [30]**

### **Question 5**

Read the following case study based on agricultural economics and answer the question that follow.

- 5.1 With the aid of appropriate examples, explain which of the following Marketing functions are important in agriculture: (3)
    - 5.1.1 Processing
    - 5.1.2 Standardization
    - 5.1.3 Market equilibrium. (1)
  - 5.1 Name five factors which hamper marketing of agricultural products. (5)
  - 5.2 State five advantages of Free Marketing. (5)
- [30]**  
**TOTAL: 150**