



PSAC 2019

Grade 5 Modular Science

Subject code: **P141/1**

Examiners' Report

INTRODUCTION

The assessment in Science is modular in nature and students are required to take the first assessment at the end of Grade 5 and the second part of the assessment in Grade 6. The first part of the assessment covers the content studied at the level of Grade 5 and subsequently the second part of the assessment covers the content studied in Grade 6.

The Science paper also ensures that the three assessment objectives (AOs) namely 'Knowledge & Understanding', 'Application' and 'Inquiry Skills' are adequately assessed. The weighting of this paper is 50% and the duration of the question paper is 1 hour. The table below shows the weighting of the different AOs for both Science assessment papers, as described in the Annual Programme for PSAC 2019.

Assessment Objectives	Weighting %
Knowledge & Understanding	40
Application	40
Inquiry Skills	20

The examiners' report for PSAC Grade 5 Science offers constructive feedback on candidates' performance and guidance for future candidates. The contents of the syllabus that gave rise to misconceptions or highlighted a gap in the knowledge of candidates are also included in the report. Other aspects which caused difficulty along with possible reasons are also commented on. Key messages are included to draw the attention of Educators on the essential areas to focus on.

This report should be read in conjunction with the published question papers for the examination. A full copy of the question paper can be downloaded from the MES website.

PAPER OVERVIEW

The paper consists of 6 questions. Question 1 contains 5 multiple choice questions (MCQs). Questions 2-6 include objective-type questions as well as short-answer and open-ended questions that enable candidates to demonstrate their knowledge and application of essential scientific concepts.

GENERAL COMMENTS

The overall performance on the question paper was considered good. Candidates showed good grasp of the syllabus content and there was a range of correct responses for the open-ended questions.

A good number of questions in the paper were one-word answer questions. Although there was a significant number of these questions that were knowledge-based, candidates were also called upon to show application and reasoning skills for both the objective-type and open-ended items. The knowledge-based items were generally well tackled by candidates. The application of concepts remains a challenge for a majority of candidates at this level. Candidates also struggled with questions assessing scientific inquiry skills.

Since around 60% of the weighting of the paper is on the AOs 'Application' and 'Inquiry skills', it is, therefore, very important that emphasis be laid on the development of these skills. Hands-on activities and experiments are proven to be the best method to engage students and develop their interest for a better understanding of scientific concepts. It is believed that students would have been able to relate to the concept if they would have done it in real-life situation.

The ability to interpret and evaluate information as well as to make predictions and deductions, are learning outcomes presented by the Science curriculum. Statistical analysis shows that for this year there has been a rise in the number of candidates that could correctly tackle questions that required interpretation of data.

In this year's paper, candidates were required to draw a seedling and a flowering plant. In last year's examination reports for PSAC, it was pointed out that students should be encouraged to produce good drawings with correct labelling. It is important here to reiterate that drawing is one

among the key communication skills for Science and much attention needs to be given to that aspect in classroom.

The mean mark of this paper was 27 out of 50 marks with girls performing slightly better than boys.

KEY MESSAGES

- It is important that candidates read questions carefully in order to understand what exactly is being asked. Qu 3(b)(ii) is an example where candidates lost marks due to misinterpretation or misreading the question altogether. Educators are encouraged to constantly remind students of the importance of reading questions properly and avoid writing answers hastily.
- Although the misspelling of scientific terms was not penalised, candidates need more practice in writing terms such as 'evaporation', 'condensation' and 'amphibians' which all appear in the syllabus.
- For questions where two reasons are required, for example **Qu 5(c)**, candidates need to avoid the telescoping of answers. that is, giving the same idea in the two responses but only expressed in different words.
- Differentiation between key terms such as '**source** and **form** of energy' or '**endemic** and **endangered** species' needs to be emphasized.
- Language still seems to be barrier for candidates to express themselves in open-ended questions.

Question 1

Question 1 consists of 5 multiple-choice (MCQ) items which ensured a broad coverage of the syllabus. The learning outcomes from any unit can be tested in this part of the assessment paper.

Table 1

<i>Item Number</i>	<i>Key</i>	<i>% Correct</i>	<i>Most common incorrect choice</i>
1	B	79	C
2	D	75	C
3	C	62	B
4	A	80	B
5	C	78	D

Questions 1, 4 and 5 proved to be the most accessible items, allowing most candidates to attempt them correctly. At the opposite end of the spectrum, item 3 proved to be the most challenging.

Comments of specific items

Item 1 was a relatively easy recall question on states of matter. Candidates were required to identify the substance which was in a solid state. The obvious answer was ice and a good number of candidates selected the correct answer, B. It was clear that option 'A' which was air could not be the answer. This suggests that candidates are well acquainted with the state of matter of air.

Item 2 was a knowledge-based question. Students who identified D as the correct answer had a good understanding of the functions of the different parts of a plant and were able to use the diagram to help them find the answer. It was clear from statistics that the distractors 'flower' and 'fruit' and 'leaves' were known to be incorrect for the function of transport of water from the roots to other parts of the plant.

Item 3 was about ways to prevent soil erosion. Options A and D proved to be clearly incorrect for the majority of candidates. This item required candidates to read and understand the question which contained some technical words such as 'overgrazing' and 'dense vegetation' before providing their response.

Item 4 was the item where the majority of candidates obtained the correct answer. This question required candidates to identify the main energy transformation taking place when an iron is used. In the diagram, the plug was shown to provide the clue that the source of energy is electrical energy. Since the electrical appliance in the diagram was an iron, the main energy transformation was from electrical to heat. Although there can be other transformations such as 'electrical to light' or 'electrical to sound', these transformations were not the main energy transformation.

Item 5 was a simple application question about wire connection to a bulb. A bulb has two connecting parts. One end of the wire to the cell should be connected to one end of the bulb. The other end of the wire should be connected to the other part. A common misconception was to connect both ends of wire to only one part of the bulb.

Question 2 (10 marks)

This question was on the topic 'Plants'. The first part of the question was about labelling and pollination whereas the second part was on the process of photosynthesis. Candidates fared generally well on this question, with most of them scoring more than 5 out of 10 marks. However, the open-ended item on pollination suggested that many candidates struggled to express themselves clearly to provide the necessary details.

Comments on specific items

- (a)(i) A good number of candidates could label the parts of the flower correctly. However, there was some confusion between the male and female part. The labelling of petals did not pose any problem.
- (ii) This item required candidates to give a reason for the colourful property of flowers. Responses had to include the idea of attracting insects. Whilst many candidates seem to know that the colour of the flowers is linked to pollination, they could not express themselves clearly. In many cases, candidates gave details about pollination, which was the expected answer for part (a)(iii).
- (iii) The more able candidates could understand that a detailed answer was required since the question was about **describing** the pollination process. It was expected that candidates make mention of the transfer of pollen, with emphasis of the transfer being from the male part to the female part.
- (b) For this item, a significant number of candidates scored more than 50% of the marks allocated. The major challenge was to be able to read with understanding, which seemed to pose some trouble for those candidates with language difficulties. This question also highlighted a potential misconception. Here a good number of candidates identified oxygen as being the gas required for photosynthesis. This confusion could be because the end part of the sentence mentioned '**presence in air**'. It needs to be emphasised that carbon dioxide is also a component of air.

Question 3 (8 marks)

This question was about animals, focusing on habitats, and the concept of 'endemic' and 'endangered' birds. It was one of the best answered questions on the whole Question Paper. 4 out of 8 marks were one- word answer questions and were easily answered by most. The mean mark for this question was 4.4.

Comments on specific items

- (a)(i)** A significant number of candidates could answer this item correctly. It required candidates to link the animals shown in the diagram provided to their habitat. Identifying soil as the habitat for earthworm was correctly done by many. Most candidates knew that the frog was the only animal from the diagram given that could live both in water and on land. However, in a haste to answer provide an answer, some candidates have given 'amphibian' instead of 'frog' as answer.
- (ii)** This item was correctly attempted by the majority of candidates. However, in many cases the word 'amphibian' was wrongly written. Although, candidates were not penalised for spelling mistakes, Educators are encouraged to ensure that their pupils write scientific terms correctly.
- (iii)** Candidates provided a panoply of answers for this part with the most common ones being that a habitat is important because it provides shelter, protection from predators and protection from bad weather. It is to be noted that telescoping of ideas were penalised.
- (b)(i)** A majority of candidates wrote the correct definition for endemic birds. The expected answer was that an endemic bird is one that lives in a particular place and cannot be found anywhere else. A common misconception was to confuse between the terms 'endangered', 'dangerous', 'endemic', 'native' and 'rare'. It is worth taking some time to ensure that pupils do not automatically equate 'endemic' to 'endangered' though many endemic species are indeed endangered.
- (ii)** A well attempted item by the majority of candidates, although some gave names of endemic birds in Mauritius rather than in Rodrigues.

- (iii) This item was about the importance of protecting endangered species. Many candidates understood the idea of having to preserve them for future generations. Some candidates also mentioned eco-tourism, which was a correct answer.

Question 4 (7 marks)

This question focussed on the processes of evaporation and condensation and proved rather challenging for many candidates, particularly the open-ended item where many candidates scored lower weightage marks instead of full marks. The mean mark for this question was 3.0.

Comments on specific items

- (a)(i) Most candidates identified evaporation as the correct process, showing a good understanding of changes of states. There were many who understood the question but wrongly wrote the word 'evaporation'. The less able candidates showed some confusion over the terms 'condensation' and 'evaporation'.
- (ii) Candidates did not fare well in this question. Only the more able candidates could score full marks by giving the correct answer – adding a layer of oil or even covering with a lid. A common misconception that was highlighted by this item is that evaporation happens only in the presence of the sun. It needs to be emphasized that even in a shady place, evaporation takes place but the rate is less (or the process happens more slowly) than in the presence of a source of heat.
- (b) Many candidates successfully identified the two forms of energy from the sun as being light energy and heat energy.
- (c)(i) The formation of droplets of water was by condensation. Common incorrect answers included 'precipitation', 'melting' and 'evaporation'.
- (ii) This question was poorly attempted by the majority of candidates. Many described the process of condensation in the context of the water cycle. The expected answer was 'the water vapour in the air touches the cold surface of the glass and hence forms water droplets'.

Question 5 (10 marks)

Question 5 was based on the topics 'Energy' and 'The simple electric circuit'. 5 out of 10 marks were one-word answers, which assessed both knowledge with understanding and application skills. Most items carried 1 mark. Whilst candidates showed good grasp of concepts about circuit, they found open-ended questions rather challenging and in many cases telescoping of answers was seen with open-ended items. This question was one of the least scoring ones with a mean mark of 4.4.

Comments on specific items

- (a)(i) This was a challenging item that provided the more able candidates the opportunity to demonstrate their understanding of the unit on electrical circuit and energy. The majority of candidates could score only partial marks by identifying whether the circuit was open or closed. In this case, the expected answer was an open circuit justified by the gap between Part A and Part B and hence there is no flow of electricity.
- (ii) The expected answer for source of energy was either a cell or a battery. A significant number of candidates could not find the correct answer, showing that emphasis needs to be laid on the learning of the source of energy in an electrical circuit. There was some confusion regarding source and form of energy.
- (b)(i) A good number of candidates provided the correct answer, which could be any electrical conductor. Candidates needed to know examples of electrical conductors to answer this question. The most common answers included metal spoon, metal hair pin, coin, an electrical wire among others. Attention is to be drawn to that fact that answers such as 'spoon' was not awarded marks as they were not sufficiently detailed regarding their electrical conductivity.
- (ii) This was a well-answered item with most candidates scoring full marks. Candidates demonstrated a good understanding of energy transformation. The correct answer was from chemical energy to movement energy.
- (c)(i) Although this was a knowledge question, it proved challenging for the majority of candidates. There was a telescoping of answers which was not awarded full marks. Expected answers included:

- Switch off lights / the television when leaving a room.
- Do not leave the fridge door open too long.
- Use energy efficient bulbs.

(ii) This question concerned precautions to be taken at home while using electricity. The accepted answers included:

- Do not try to repair broken electric wires or appliances.
- Do not touch an electrical switch / appliance with wet hands.
- Do not connect many plugs to one socket.
- Do not put metal objects in electrical sockets.

Again, there were many candidates who did not score full marks due to the telescoping of answers.

Question 6 (10 marks)

Question 6 was a question that assessed mainly the inquiry skills of candidates. Candidates were required to look for relevant information and make simple predictions. This question also gave them an opportunity to demonstrate their understanding of the life cycle of a flowering plant. This was one of the better- answered questions on the paper with a mean mark of 5.8.

Comments on specific items

- (a)(i)** Many candidates correctly identified the number of beans that germinated in the experiment. This question tested the scientific skills of students to interpret data as well as to make predictions. The number of correct responses showed that students had a good grasp of that aspect of scientific inquiry.
- (ii)** Most candidates easily identified 25°C as the more suitable temperature for seed germination based on the number of seeds that germinated in the table of information given.
- (iii)** This item proved to be one of the most challenging ones in this paper. Very few candidates gave the correct reason which relates to the idea of a fair test and thus the necessity to control other variables besides the independent variable. Candidates are not expected to use any technical term but only to explain that in order to know the effect of the factor of temperature, all other conditions need to be kept the same in the experiment.
- (b)** This item was about the conditions necessary for seed germination. Most candidates manage to score partial marks by correctly identifying only one of the conditions – either water or air. This item also highlighted the misconception of soil and sunlight being conditions for seed germination. As has been raised in previous examiners' reports, Educators are encouraged to differentiate between the processes of germination and photosynthesis. It is in the green leaves that photosynthesis takes place in a plant whereas in a seed, at the moment of germination, there is no leaf and thus mineral salts from the soil and sunlight are not needed for germination to take place.
- (c)** This was a well – attempted item which assessed the ability to draw and the proper understanding of life cycle of a plant. The item required candidates to draw a seedling with both root and shoot or a small plant with root and just 2-3 leaves in the first box to score

full marks. Many candidates lost marks by missing either the root or shoot. In the second box, candidates were required to either draw a flower or a flowering plant and label it.

Conclusion and Recommendations

It was found that there has been a minor improvement in the mean mark for the paper compared to last year, which showed that there is an increasing number of students who are getting a better grasp of the scientific concepts studied at the level of Grade 5. Open-ended questions remain a challenge for the majority of candidates and hence it is recommended that pupils be encouraged to practice these types of questions. Students are, furthermore, encouraged to answer in their own words questions that demand reasoning rather than providing rote learnt answers.

Experiments remains a core part in the teaching of Science. Hands-on experiments and demonstrations undoubtedly allow better understanding of concepts and consequently promote application of these concepts. Whilst conducting experiments, it is important that the attention of students be drawn to the different variables. At this level, it is not recommended to introduce complex terms such as independent and dependent variable. But, they need to be aware that it is essential to identify the control variables when planning an experiment.

A good approach to improve acquisition of scientific terms would be to encourage drawing along with labelling when doing an experiment. In addition, it would be interesting to link the skills acquired during an experiment to other scenario in everyday life. This will promote the application of concepts in different context. It would definitely be advantageous for students to carry out experiment in Science laboratory. However, in case of absence of a science laboratory, it is advised that a science corner be created so that students have the opportunity to either perform experiments in their textbooks or that the Educator can provide demonstrations of the experiments.