Let the mind manage the body
Que l'esprit gère le corps

Mauritius Examinations Syndicate

PSAC 2023

Modular Grade 5 Science

Subject Code: P141/1
Examiners' Report

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SCIENCE

(Subject Code No. 141/1)

INTRODUCTION

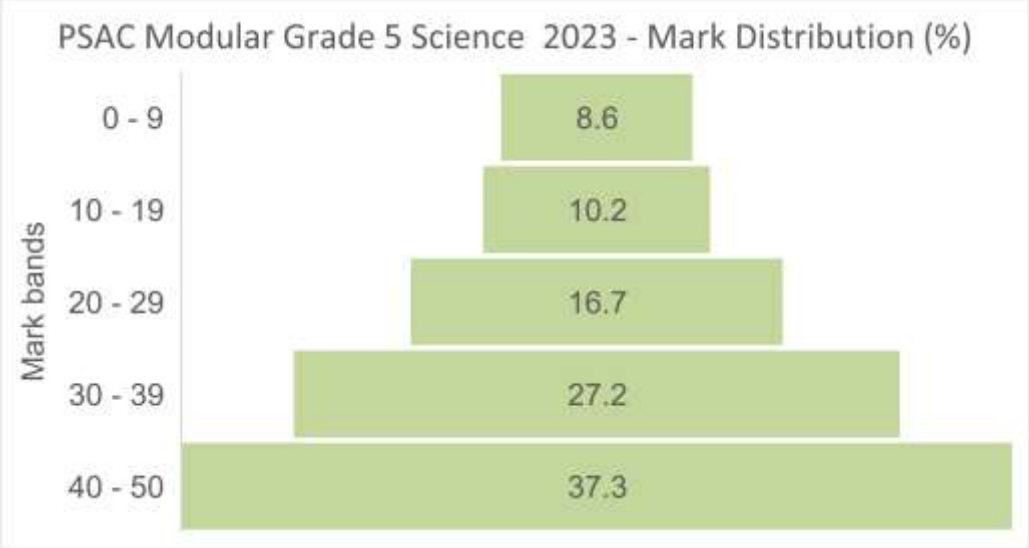
The sixth edition of the PSAC Modular Grade 5 Science Assessment was held in September 2023. The assessment was based on the learning outcomes of the Grade 5 *Science Teaching and Learning Syllabus*. It assessed the extent to which candidates developed:

1. knowledge and understanding of the concepts learned (40 %),
2. their ability to use the knowledge acquired in given contexts (40 %), and
3. scientific inquiry skills (20 %).

The purpose of this report is to discuss the performance of candidates in the different questions, the difficulties encountered, common mistakes that were noted and the misconceptions uncovered.

GENERAL COMMENTS

On the whole, candidates fared very well in the PSAC Modular Grade 5 Assessment 2023. Nearly 82 % of the candidates achieved numerical grade 5 or better. They scored an average of 32 marks out of 50. A closer look at the mark band distribution further indicates that fewer candidates achieved low scores compared to those who achieved higher marks.



All these clearly suggest that the question paper was accessible to the majority of candidates. It appears that many of the Science concepts taught were well grasped.

However, it is important to highlight that many candidates did not read questions carefully before giving their answers. Instances where this happened are outlined in the specific comments which follow. Attention is also drawn to the fact that marks were sometimes lost for answers that were not precise enough. Candidates tended to give vague and/or general answers that were either irrelevant to the question asked or did not demonstrate thorough understanding of the concepts assessed.

SPECIFIC COMMENTS

QUESTION 1 (5 marks)

Question 1 was a multiple-choice question comprising five items.

Performance on this question was very good. Candidates scored 4 out of 5 marks on average.

Table 1 summarises the performance of candidates on the individual items within the question.

Table 1

Item Number	Key	% correct
(a)	**B**	79.9
(b)	**C**	76.5
(c)	**C**	91.8
(d)	**D**	49.9
(e)	**A**	87.1

Item (a) *Which one of the following is a fossil fuel?*

This item was well-answered in general. Candidates correctly identified coal as the fossil fuel from the given list (Bagasse, Coal, Wax and Wood). However, a few candidates seemed to think that bagasse is a fossil fuel. Drawing pupils' attention to the processes by which coal and bagasse are formed may help them differentiate between the two with more confidence in the future.

Item (b) *What is the **shiny** liquid found inside the thermometer?*

The majority of candidates answered this question correctly. Option **A**, **Alcohol*, was the most common incorrect answer. It can be useful to know that the boiling point of alcohol (ethanol) is about 78 ^{o}C. Therefore, if alcohol is used in a glass thermometer, the range of that thermometer will not exceed 78 ^{o}C. In **Diagram 1**, the range of the thermometer shown was from -20 ^{o}C to 110 ^{o}C, suggesting that the liquid inside could not be alcohol.

Item (c) *What form of energy is needed by **sailing boats** to sail?*

This was the most well-answered multiple-choice item. A few candidates chose option **A**, **Chemical energy*, possibly overlooking the fact that the boat was a sailing boat rather than a motor boat.

Item (d) *What part of the Cassava plant is shown in **Diagram 3**?*

This was the least well-answered item in Question 1. Options **C**, **The stems*, was the most popular incorrect answer. It is likely that candidates were driven to give this answer because the roots of the Cassava plant look more like stems than roots.

Item (e) *Which one of the following birds is endemic to **Rodrigues**?*

Performance on this question was good. The majority of candidates recognised that the Cardinal Jaune was endemic to Rodrigues. However, some candidates chose option **C**, **The kestrel*.

QUESTION 2 (12 marks)

This question was based on the topics '*Energy*', *'Transformation of Energy*' and '*The Simple Electric Circuit*'. Performance in this question was satisfactory. Out of a total of 12 marks, candidates scored about 8 marks on average.

Part (a)

Candidates' performance in Question 2(a) was average. The question required them to state the source of energy used by humans to work. Responses obtained showed that a good number of candidates still confuse between **form** and **source** of energy. **Chemical energy* was a common incorrect answer given.

Part (b)

In part 2 (b)(i), it appears that some candidates did not read the question carefully. They had to state a form of energy produced by a drilling machine other than sound energy. While some wrote **sound energy* (which was already given in the question), others wrote **electrical energy* (which is used by the drilling machine rather than produced by it). Expected correct answers were *movement energy* and *heat energy*

In part 2(b)(ii), candidates had to explain how continuous exposure to the drilling machine could affect the man's health. Marks were often lost in this part question because the answers given were either too vague or not related to the man's health as required. Some examples include:

- **noies pollution*
- **we will become death*
- **the drilling machine affects the health body of the man*

However, a good number of candidates recognised that the man might suffer from

- hearing problems,
- backaches and headaches,
- pain in the wrists, elbows, fingers, shoulders,
- sleeping disorders
- respiratory problems arising from exposure to the dust produced by the drilling machine.

The performance in part 2(b)(iii), where candidates had to give one way how sound energy is useful, was good. Although expressed in a variety of ways, responses often related to the importance of sound energy for communication and entertainment purposes or to warn against dangers.

Part (c)

Question 2(c) was based on a diagram showing solar-powered street lamps. It assessed candidates' understanding of the energy transformation that takes place in the lamps during the day and at night. Performance in this question was fair on the whole.

In part (c)(i), candidates had to state the source of energy used by the street lamps. Quite a good number of candidates stated the form of energy used instead. **Solar energy* and **Electrical energy* were among the most common mistakes recorded.

Candidates struggled to identify the correct transformations of energy that take place during the day and at night in part (c)(ii). Their performance in this part question highlights the need to reinforce how solar cells harness light energy from the sun to produce electrical energy. During the day, the electrical energy is stored as chemical energy in the rechargeable batteries. At night, the chemical energy stored in the rechargeable batteries is converted back into electrical energy to produce light energy.

Part (d)

Question 2(d) was based on a simple electrical circuit diagram comprising a gap between two points, **P** and **Q**. Performance in this part question was good on the whole.

Candidates had to state the function of the cell in the electrical circuit in part 2(d)(i). Few were able to state that the function of the cell is to transform its stored chemical energy into electrical energy. Some candidates pointed out that the cell was the source of energy or that it produces electrical energy, which were acceptable answers. Common incorrect answers included the following:

1. **To give light energy to the bulb*
2. **The cell distributes electrical energy in the circuit*
3. **It stores chemical energy*
4. **It provides chemical energy to the circuit*

In part 2(d)(ii), the majority of candidates rightly stated that the bulb does not light up because the plastic spoon (an insulator) does not allow electricity to pass through it.

Candidates also readily recognised that the bulb would light up if the plastic spoon was replaced by a metal object (a conductor) in part 2(d)(iii).

QUESTION 3 (12 marks)

Candidates generally fared well in this question.

Part (a)

Question 3(a) was based on a picture of a frog and a fish.

In part 3(a)(i), the majority of candidates correctly identified water as the natural habitat of fish.

In part 3(a)(ii), however, fewer candidates were able to give two ways in which the fish is adapted to live water. Many of the answers given were imprecise. Examples include:

- **They can breathe in water*
- **They can swim*
- **It is their natural habitat*

It is to be pointed out that none of these answers indicate how the fish is adapted to live in water. Candidates were expected to be more precise by specifying that fish have gills to breathe in water or that they have fins and tails to move in water.

The majority of candidates recognised that the frog is an amphibian in part 3(a)(iii). A significant number of candidates was also able to state that amphibians live both in water and on land in part 3(a)(iv).

Part (b)

Part (b) proved to be quite challenging for many candidates. In part (b)(i), many were able to name a plant which grows in water. A wide range of correct answers was obtained. However, the majority of the candidates struggled to state how the plant they had mentioned was adapted to live in water.

Part (c)

Part (c) was well-answered on the whole.

The majority of candidates knew that the 'Boa of Round Island' was endemic to the Round island. The Boa, however, was a common incorrect answer in this case.

Candidates successfully named a nature reserve in part (c)(ii). Some gave the names of nature reserves found in Australia, New Zealand and America, which were considered acceptable answers.

In part (c)(iii), many demonstrated a good understanding of how nature reserves help to protect rare animals. Correct answers provided often related to either the breeding of these animals in captivity or to providing them with shelter and food.

Candidates also showed a firm awareness regarding the precautions to be taken when visiting nature reserves in part (c)(iv). They recognised that they should not litter, destroy nests or eggs of the animals in particular.

QUESTION 4 (5 marks)

Question 4 was the least-well answered question in the paper. It assessed candidates' understanding of the causes and effects of soil erosion. The main difficulty encountered by candidates in this question was to tell apart the causes, effects and consequences of soil erosion. Consequently, a good number of candidates gave an effect of soil erosion where they were expected to give a cause and vice versa.

Some of the expected answers in part (i) were:

- Strong winds or heavy rainfall
- Deforestation or cutting down of trees
- Burning of forests

An important number of candidates had a misconception that soil erosion is caused by tsunamis. This point may need to be clarified during teaching. In some cases, tsunamis may lead to soil erosion (a consequence of tsunamis) but they are not causes of soil erosion as such.

In part (ii) where candidates had to give two effects of soil erosion, part marks were often lost for expressing the same idea twice.

Relatively few candidates could provide two reasons how dense forests help to prevent soil erosion.

Question 5 (8 marks)

Performance in questions 5 was satisfactory. It assessed candidates' knowledge and understanding of the states of water and the processes by which water changes from one state to another.

The question was based on a diagram comprising three glasses:

- Glass **A** containing tap water
- Glass **B** containing hot water with steam shown coming out
- Glass **C** containing ice cubes in water with water droplets on the outer surface of the glass

The majority of candidates identified 24 ^{o}C as the appropriate temperature of the water found in glass **A** in part (a)(i).

In part (a)(ii), candidates were required to name the process that takes place in glass **B** (evaporation). A small number of candidates mistook evaporation for condensation.

In part (a)(iii), candidates were asked to state the change in the state of water that was taking place in glass **B**. A good number of candidates did not seem to have read the question carefully. Instead of stating the change of state from the liquid state to the gas state, they gave the state of water in glass **B** (**Liquid state*).

It was clear to candidates that ice was water in the solid state in part (a)(iv).

The confusion between evaporation, condensation and melting was again apparent in part (a)(v). It appears that candidates knew the terms used to describe the different processes by which water changes from state to another. However, it did not seem clear to them when and how each of these processes occur. Providing opportunities for varied hands-on activities focusing on the occurrence of each process can potentially help to dissipate this persistent confusion among pupils.

In part (a)(vi), candidates had to describe how water droplets were formed on the outer surface of the glass **C**. There were two elements of answers required for candidates to score full marks:

1. recognising that there is a difference in the temperature of the air around the glass and its surface, and
2. recognising that the difference in temperature causes water vapour to condense to water.

Candidates' responses revealed a number of misconceptions regarding the process of condensation. Many were unsure about which part of the glass or the air was cooler. Some felt that when the ice melts, it transformed into the droplets of water on the outer surface. As mentioned above, candidates could fairly easily identify the process of condensation but could not describe the process.

The majority of candidates was able to provide a property of ice that makes skating possible in part (b).

QUESTION 6 (8 marks)

The performance in question 6 was average. Candidates scored a mean mark of 4 out of a total of 8 marks.

Part (a)

This question assessed candidates' knowledge and understanding of the parts and functions of a hibiscus flower.

In part (a)(i) and (ii), a good number of candidates confused the female part of the flower with the male part. In contrast, it was pleasing to note that some other candidates used the scientific terms *pistil* and *stamen* correctly even if these are not taught at this level.

A large number of candidates answered part (a)(iii) correctly by specifying that flowers were often brightly coloured or had a nice scent to attract insects.

A considerable number of candidates correctly identified wind pollination as the answer to part (a)(iv). Some candidates also gave pollination by hand (mechanical pollination) which, although beyond the scope of the syllabus, was correct.

In part (v), quite a good number of candidates recognised that pollination is necessary for the plant to reproduce or for the flower to develop into a fruit.

Part (b)

This question was an inquiry-based question that assessed candidates' understanding of the functions of the roots and the stems. It showed that some candidates had difficulties to differentiate between the specific functions of these two parts of a plant.

In part (b)(i), candidates were required to identify which function of the stem was under investigation. The expected answer was that the stem carries water from the roots to other parts of the plant. A noticeable number of candidates answered that the stem carried water from the soil to other parts of the plant when there was no soil in the context given.

Part (b)(ii) was well-answered in general. However, some candidates who did not identify the correct function of the stem in part (b)(i) gave the answer to part (b)(i) in part (b)(ii).

Quite a good number of candidates recognised that the level of water had dropped because the roots had absorbed some of the water. In some cases, marks were lost for imprecise answers.