



Mauritius Examinations Syndicate

PSAC 2021-2022

Modular Grade 6 Science

Subject Code: P141/2

Examiners' Report

April 2023

SCIENCE

(Subject Code No. 141/2)

INTRODUCTION

The PSAC Modular Grade 6 Science Assessment was held in August 2022. This assessment was carried out in part completion of the PSAC Science Assessment 2021-2022.

The content of the assessment was based on the learning outcomes of the Grade 6 Science Teaching and Learning Syllabus (MIE 2015). The cognitive dimension of the assessment was based on three assessment objectives (AOs), namely:

- Knowledge and understanding (40%)
- Application (40%)
- Scientific Inquiry (20%)

Performance in the PSAC Science Assessment was satisfactory on the whole. The number of candidates who achieved numerical Grade 5 or better increased slightly in 2022 but remains comparable to the performance in the previous assessment sessions as shown in **Table 1**.

Table 1: Performance of candidates in the PSAC Science Assessment

Year	Percentage no. of candidates who achieved numerical Grade 5 or better in Science
2019	74.71 %
2020-2021	77.1 %
2021-2022	79.6 %

While it is encouraging to note that the overall performance of candidates is improving, attention is drawn to the fact that candidates' written responses remain mostly maladroit or clumsy. They reveal pupils' struggle to express themselves in writing using proper English.

The purpose of this report is to highlight the main findings of the analysis of candidates' performance in the PSAC Modular Grade 6 Science Assessment. These are based on a representative sample of scripts examined.

Key messages:

- It is important to insist on pupils' correct spelling of scientific words in English. In general, incorrect spelling, punctuation and/or grammar are not penalised. However, if an incorrect spelling changes the meaning of an answer, marks cannot be awarded. For example, writing **leather* for *feather* or **glass* for *grass* would, in principle, be unacceptable.
- There is a need to consolidate pupils' understanding of the requirements of given questions. There are many instances where candidates were expected to write a one-word or short answer but provided long sentences or phrases. Pupils' attention should be drawn to the fact that writing unnecessary long answers often leads to mistakes and, consequently, to the loss of marks. The converse is also true. Writing a one-word answer when an extended answer is required may also result in the loss of marks.
- As reported in previous reports, where an extended answer is required, there is value in building pupils' ability to write simple, short sentences in constructing their answers.
- Pupils should be taught to answer questions with reference to the context provided. Very often candidates offered answers that are generic. These answers neither indicate pupils' understanding nor showcase their ability to apply their scientific knowledge in the given contexts.
- Pupils should refrain from giving more answers than required in a given question. In the 2021-2022 assessment session, a significant number of candidates lost marks because they gave contradicting answers to questions that required a single answer.

GENERAL COMMENTS

The analysis of candidates' performance in the PSAC Modular Grade 6 Science Assessment indicates that the paper was accessible and relatively easy in general. The mean mark scored by candidates in the paper was 32 out of 50.

The analysis of candidates' scripts further indicate that they had acquired a good knowledge base of the science concepts and processes taught at this level. As is generally the case, knowledge and recall questions were well-answered on the whole. However, candidates tend to struggle with questions aimed at assessing their ability to apply their knowledge base in a given context. Apart from the fact that candidates do not always read these questions carefully, the inaccurate responses they gave revealed two other weaknesses:

1. Candidates' indiscriminate use of generic answers. Examples include:
 - *It/They/People/Animals will die.*
 - *It cause/does not cause pollution.*

These responses often suggest a shallow understanding of the scientific concepts learned. Depending on the questions asked, and where relevant, it is important that pupils be encouraged to provide more accurate answers by expanding their answers to include, for example, the type of pollution caused or how the pollution is caused.

2. The regurgitating of answers learned by heart disregarding the question asked or the context given. Well expressed sentences that were irrelevant to the questions asked were quite often seen. In these cases, candidates stopped at a familiar term used in the question and wrote answers that they recalled when the term was previously used in the class without paying attention to the question asked.

SPECIFIC COMMENTS

QUESTION 1 (5 marks)

This question comprised five multiple-choice items that were fairly straight-forward. Each item assessed a specific concept from a particular topic of the syllabus.

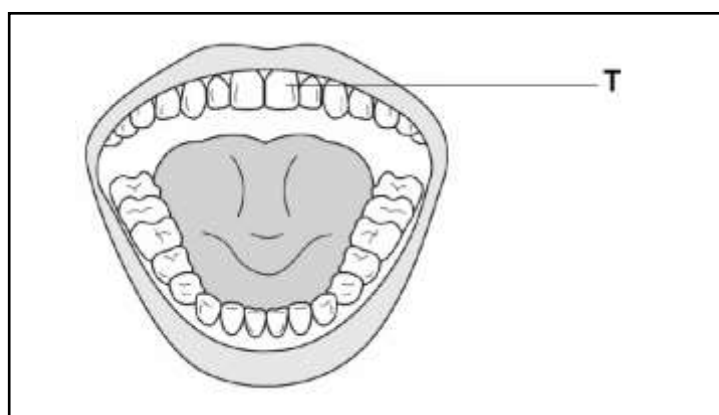
Performance in this question was satisfactory as shown in the **Table 2** below.

Table 2

Item Number	Key	% correct
(a)	B	76.9
(b)	A	76.0
(c)	A	77.1
(d)	C	60.7
(e)	D	62.2

Item (a) *What is Tooth T called?*

This item assessed candidates' knowledge of the different types of human teeth. They had to identify the incisor from the diagram shown below.



The vast majority of candidates answered this item correctly. Nevertheless, a few candidates mistook the canine for the incisor. Highlighting the differences in size and shape between the two front teeth might help to dissipate any confusion in the future.

Item (b) *Which one of the following gases is used to put out fires?*

This item was also well-answered on the whole. Option **C** (Oxygen) was a strong distractor. It is helpful to have facts about oxygen and carbon dioxide affixed on Bristol paper in the classroom for candidates:

1. to see the relationship between the two gases in common processes (e.g. in the oxygen-carbon cycle, in the burning of candles) and
2. to be able to compare and contrast between their uses.

Carrying out live demos of the simple experiment on the burning of candle found in the textbook can further help reinforce pupils' understanding of the importance of these two gases in this context.

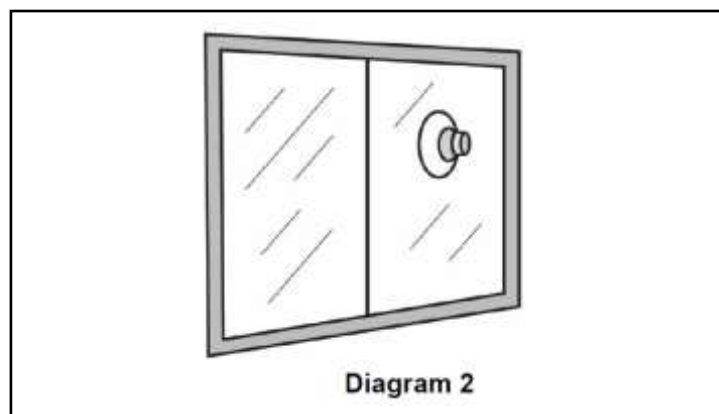
Item (c) *Which one of the following meals is a balanced meal?*

This was the most accessible multiple-choice item. As opposed to items (a) and (b), item (c) was an application question which required candidates to identify one food item from each of the three food groups to make up a balanced meal. By successfully answering this question, a large number of candidates indicated that they:

1. recalled what the food groups are,
2. could recognise examples of food items classified under each food group, and
3. understood what a balanced meal is.

Item (d) *Which one of the following statements is true?*

This question was based on a diagram of a suction cup stuck on a window pane as shown below.



Performance on this item was satisfactory. About two-third of the candidates chose the correct Option **C** (*Air pressure inside the suction cup is less than air pressure outside it*). Option **A** (*Air pressure inside the suction cup is greater than air pressure outside it*) was the most popular distractor.

Item (e) *What causes day and night on Earth?*

This was a knowledge-based question. Option **D** (*The rotation of the Earth on its axis*) was the key. However, a significant number of candidates chose Option **B** (*The rotation of the Earth around the Sun*) instead. This calls for a reinforcement of pupils' understanding of the occurrences that arise from the different relative movements of the Earth and the Sun within the solar system. The use of 3D models of the solar system as a means to illustrate these occurrences may be potentially very useful in this context and is strongly encouraged. It might also be very helpful to carry out the activity proposed in the textbook with a globe onto which light from a torch is shone than to have pupils read about the activity. Learning by doing is more effective in reinforcing pupils' understanding of abstract concepts in general.

QUESTION 2 (14 marks)

Question 2 was based on the topic of '*Animals*'. It comprised a number of part questions. The mean mark for the question was 9.23 out of 14.

Part (a)

In part (a)(i), candidates had to classify the shark, the hen and the bat as either birds, mammals or fish. The performance in this part question was very good. A few candidates wrongly identified the bat as a bird and the hen as the mammal.

Part (a)(ii) required candidates to recall the body cover of the three above-mentioned animals. Almost half of the candidates did so successfully. The correct answers *scales, feathers and hairs* were quite often misspelt. A few candidates did not seem to have understood the term 'body cover' as used in the textbook and gave answers such as **rough* or **smooth* instead.

A good number of candidates gave one correct similarity between the hen and the bat in part (a)(iii). The most common mistake in this part question seems to have resulted from candidates' superficial reading of the question. In this way, quite many candidates gave a difference instead of a similarity between the two animals.

Part (a)(iv) was accessible to the majority of candidates who readily explained what an aquatic animal is. A few candidates gave the characteristics of the fish as answer instead. For e.g., **Aquatic animals have gills*.

In part (a)(v), candidates were asked to state the group of animals to which the dolphin belong. Many rightly recognised that the dolphin is a mammal.

In part (a)(vi), candidates had to give a reason for their answer to part (a)(v). Candidates were expected to provide a characteristic of mammal as answer: *Dolphins give birth to their young ones* or *Dolphins give milk to their young ones*. Some candidates did not answer this part question. Quite a good number of candidates also stated the characteristics of the dolphin rather than that of mammals (e.g., **The dolphin have not gills*).

Part (b)

About 7 out of 10 candidates correctly identified **Animal Y** as a butterfly in part (b)(i). However, fewer candidates were able to tell the group of animals to which butterflies belong in part (b)(ii). A common wrong answer in this case was **bird*.

Part (c)

Part (c) assessed candidates' knowledge of the characteristics of living things such as they grow, they move from one place to another, they breathe, they feed themselves. A significant number of candidates did not recall the characteristics. An important number of candidates also provided answers related to the specific characteristics of certain groups of animals such as **They have scalse on their body* or **They lay eggs*.

QUESTION 3 (12 marks)

Question 3 was based on the topic of '*Materials in our environment*'. Performance in this question was fair. The mean mark achieved was 7.62.

Part (a)

Question 3(a) assessed candidates' knowledge of the sources of some materials, namely silk, iron and rubber. It was a matching type question. Many candidates answered the question correctly.

Candidates also offered a wide range of correct answers in part 3(a)(ii) where they had to give a use of silk.

Part (b)

Question 3 (b) required candidates to:

- (i) label the part of a car that is made of rubber.
- (ii) name the material used to make the windshield of a car.

- (iii) explain why the material they had mentioned in the previous part is used to make windshields.
- (iv) suggest a man-made material used to make the body of a car.
- (v) explain why the body of the car must be painted.
- (vi) suggest a reason why the bumper of a car is made of plastic.

The overall performance of candidates in parts (b)(i), (b)(ii) and (b)(iii) was good. The tyre of the car was clearly identified as being made of rubber by the majority of candidates. Some candidates identified the wheel instead.

A common mistake in part (b)(ii) was to name the source from which glass is made (**silica sand*) rather than naming the material itself (*glass*). 'Glass', although a common word, was often misspelt as **galls*, **grass*, or **gass*.

Few candidates found *steel* as the man-made material from which the body of the car is made. **Iron* and **Aluminium* were common wrong answers in this part question. It shows that a significant number of candidates either overlooked the term 'man-made' given in the question or considered 'iron' and 'aluminium' to be man-made.

Many candidates recognised that the body of the car should be painted to avoid it from rusting in part (b)(v). A good number of candidates also gave the answers: **to make it more attractive* or **The car will be beautiful*. Although cars do look more attractive when painted, this idea remains scientifically inaccurate. Paint serves to protect the body of the car from corrosion.

Candidates had difficulties answering Part (b)(vi) in general. It was an application question requiring candidates to choose which property of plastic makes it suitable to make a bumper. Expected correct answers were that *plastic can be moulded into different shapes and sizes*, *Plastic is light/strong/hard/durable*. However, some candidates focused on the use of the bumper rather than on why it is made of plastic and gave answers such as **to protect from accidents* or **to protect the car*.

Part (c)

Question 3(c) required candidates to

- (i) give one way how the dumping of plastic is harmful to the environment.
- (ii) name the process by which plastic is transformed into useful materials.

Performance in this question was fair. In part (c)(i), answers were mostly very general. For example, a considerable number of candidates wrote *It causes pollution* as an answer without specifying the type of pollution it causes or how the dumping of plastic causes pollution. Quite many gave answers that focused on the disadvantages of using plastic without explaining how it affects the environment. Examples include: *It contains toxic substances* or *It is not bio-degradable*.

Performance in part (c)(ii) was unexpectedly lower than in part (c)(i). A recurrent mistake was for candidates to write **Silica sand*. *Recycling*, when correctly identified, was most of the time misspelt. Other quite common incorrect answers were **reuse*, **reduce*, **bottle*. This suggests that either the question asked or the concept of recycling was not well understood.

Organising an educational tour to *Precious Plastic Mauritius* would help pupils see for themselves how plastic is recycled in Mauritius. Precious Plastic is a non-profit organisation that provides solutions to plastic waste. It also organises sensitisation campaigns such as cleaning of the beaches and mangroves. For more information, visit <https://www.preciousplastic.mu>

QUESTION 4 (9 marks)

Question 4 was based on the topic of '*Energy*'. On the whole, candidates scored a mean mark of 5.50 in this question.

Part (a)

In this part question, candidates had to state three forms of energy into which electrical energy is converted when a television set is switched on. Few candidates found at least two of the forms of energy. Very often these two forms of energy that were identified included light energy and sound energy. Even fewer candidates scored full marks for correctly identifying heat energy as the third form of energy. Common wrong answers were **movement energy* and **electrical energy*.

Part (b)

Performance was slightly better in this part question. A large number of candidates could name a fuel that is used in thermal power stations. **Petrol* was the most common wrong answer recorded.

Part (b)(ii) was well-answered in general. Candidates had to state the form of energy used by the solar cells in a solar panel. Performance in this question indicated that some candidates still confuse between forms of energy and sources of energy. **Sun* was a common incorrect answer recorded. Another confusion candidates seemed to have regards whether solar energy is a form of heat energy or light energy. Solar energy is radiation from the sun. It is both a source of light energy and heat energy. Different technologies harness solar energy in different ways. Technologies such as photovoltaic cells found in solar panels, for example, use light energy from the sun to produce electricity. In contrast, solar water heaters capture the heat from the sun to generate heat energy. In addition to highlighting the difference between forms and sources of energy, therefore, building pupils' understanding of how solar energy is used in solar water heaters as opposed to when it is used to produce electricity can help in dissipating any misconception they nurture.

Part (b)(iii) required candidates to give an advantage of using hydro power stations to produce electricity. It was well done although candidates clearly had difficulties to express themselves in writing. Some responses were either inexact or imprecise. A good number of candidates

also gave a disadvantage rather than an advantage of using hydro power stations. Examples of typical wrong answers were:

- **It can get more electricity*
- **It more water to produce more electricity*
- **When it have no water in river you can not produce electricity*

Part (c)

Part (c) assessed candidates' knowledge and understanding of the causes and consequences of global warming.

Part (c)(i) was correctly answered by a considerable number of candidates. The answer was *global warming*. A good number of candidates gave **greenhouse effect* as answer. It is important to help pupils understand the difference between the two. The emission of greenhouse gases and the greenhouse effect cause global warming. Global warming is a consequence of the emission of these gases.

As mentioned above, part (c)(ii) proved difficult for the vast majority of candidates. Performance in this question suggests the need to consolidate pupils' understanding of causes and consequences of 'global warming', 'melting of ice caps', 'tsunamis', 'flooding', 'pollution' and the like. Of particular importance is to highlight how these phenomena relate (or not) to each other. Candidates too often mistook sea level rise for tsunamis or flash floods in this question.

Another important shortcoming was for candidates to provide generic answers such as **The living things can die*. Such answers tend to indicate candidates' lack of mastery and scientific understanding of the concepts in question. In addition, an important number of answers were not explicitly related to the people living near the sea as was required in the question. An example was **Small islands will be covered with the sea*.

Expected correct answers to this part question revolved around ideas of how the gradual increase of sea level rise can:

1. lead to the loss of coastal land/houses/infrastructures
2. force people to migrate inland.
3. lead to fishermen and hawkers losing their jobs.

QUESTION 5 (10 marks)

Performance in this question was average. The mean mark was 6.15.

Part (a)

In part (a), candidates were asked to explain what an ecosystem is. This question revealed a key misconception on the part of a large number of candidates, namely that non-livings depend on living things to exist. Answers such as **An ecosystem is when living things and non-living things depend on each other to exist* were quite common. It is important to emphasise how living things are dependent on both living and non-living things to survive but that the converse is not true.

Some of the responses given by candidates were incomplete. For e.g., **An ecosystem is an environment where living things depend on non-living things*.

Part (b)

Candidates were required to give an example of a non-living thing on which living things depend to survive in part (b). A one-word answer was expected: *Air, Water, River*. Candidates often provided incorrect phrases that led to the loss of marks. A typical example is **The cow eat on gras*.

Part (c)

In part (c)(i), candidates were asked to name the process by which plants manufacture their food. This question was very well-answered in general except that the term 'photosynthesis' was often misspelt.

Part (c)(ii) was a *Fill in the blank* objective type question with no words given. It assessed candidates' knowledge of the conditions necessary for photosynthesis to take place. Few scored full marks in this part question. The difficulty which most candidates seemed to have encountered was reading with attention. The term 'green leaves' in the given sentence implied the presence of **chlorophyll* as one of the conditions that was already given in the question. Carbon dioxide was also given in the sentence which meant that a second condition, **air*, was also provided in the question. These were often overlooked by candidates unfortunately. **Light* as opposed to sunlight was also quite commonly seen.

Part (d)

In part (d), a significant number of candidates offered plausible ways of protecting the ecosystem shown. However, a good number of candidates lost the mark for providing answers that were not related to the context given. Some examples include the following:

- **By planting more trees on the bare lands*
- **Enforce laws*
- **Prevent overgrazing by animals*

Measures that were considered correct were:

1. to keep the environment clean
2. to prevent the uprooting of plants
3. to prevent killing of the animals living in the ecosystem

Part (e)

Part (e), where candidates had to complete a diagram of a food chain, was reasonably well-answered in general.

Part (f)

In part (f), candidates had to explain what would have happened to the chameleon and the grass if the grasshoppers were removed from the ecosystem.

Few candidates scored full marks in part (f). The generic answer **They will die* were often seen in both parts (f)(i) and (f)(ii).

Conclusion

The performance of candidates in the PSAC Modular Grade 6 Science Assessment reveals the need for pupils to build their capacity to spell common words and scientific terms accurately. It may be useful to have these scientific terms (e.g., photosynthesis, ecosystems, recycling, bio-degradable, galvanisation) legibly written and affixed in the classroom. Learning through play is also advocated. Proposing the hunt for a mysterious word by giving clues or organising activities such as *Tu seras pendu* are playful ways of engaging pupils in addressing spelling mistakes.

Children at this age also learn better by doing. Hands-on experiments and demonstrations provide solid learning opportunities to clarify pupils' misunderstandings and encourage deeper learning. They are strongly recommended.