GENERAL COMMENTS

The pass rate for school candidates in the Science CPE 2014 paper was 75.8 % which was slightly higher than the previous year. 10% more girls than boys passed the Science paper. As in previous years, a high number of students were able to achieve the highest grades, A* and A, with fewer obtaining grades B – E. While for the top grade the difference between boys and girls is only of 0.7%, the difference at the lower end of the grade spectrum is much more marked with a difference of about 10%.

Candidates scored an average of 40 marks in Section A while the mean score for Section B remained low (16 over 40). Pupils must be encouraged to attempt the Section B of the Science paper, given that the items within a question are graded in terms of difficulty. For instance questions such as: Which gas is mainly released when fossil fuels are burnt? (Q 4, 2(a)) or Name the part of a plant that germinates to produce new plants (Q 4, 3(a)) was within the reach of most pupils.

Some candidates were able to read and understand the question within the context set and answered accordingly. However, many others read the questions superficially and were not able to apply their knowledge to the given context. They sometimes proceeded by identifying key words from the question without really taking into account the context set. For instance, in Question 3 part 1(a), where the candidate had to identify two sources of pollution from the diagram, many named sources which were not found on the diagram.

It was also noted that candidates find it difficult to link the different scientific concepts they have learnt. Learning concepts in isolation does not allow them to apply a logical reasoning and to understand the concepts more thoroughly. For instance, they know that oxygen is taken up during respiration and that it is necessary for burning. However, it is more difficult for them to link the two processes and to understand that the same property of oxygen is required in both cases. Similarly, they know that carbon dioxide is given out during
respiration, is a toxic gas released when fossil fuels are burnt and is linked to pollution. Pupils must be able to understand that, because carbon dioxide is a toxic gas, it has to be eliminated from the body and is given out. As carbon dioxide is found in very low quantities in the atmosphere, it does not affect our health (unless when there is a high level of air pollution). Understanding how these different processes are interlinked will help students avoid making mistakes when they are asked about the properties of different gases. They can also apply more easily their knowledge to new situations or contexts set in the examination paper.

Language remains a problem and candidates have difficulty in expressing themselves in correct English. Most of the answers required only a short phrase but still a number of candidates failed to respond appropriately. Candidates often grasp the meaning of the questions, that is, they can read with understanding but have more difficulty expressing their answers in writing. This resulted in candidates sometimes giving answers which were not clear and concise. Some gave long answers, which although related to the topic, were not related to the questions set. They often lacked the appropriate scientific jargon also. For instance, candidates often have difficulties with words such as ‘transparent’, ‘translucent’, ‘evaporation’ etc. Other candidates gave answers which were too vague. For example for Question 4 part 2 (b): Suggest one harmful effect of a rise in the sea level; answers such as ‘deep sea’ or ‘waves’ were obtained. Though related to the topic, it was expected that the candidate would write on the harmful effects caused by giant waves or a deeper lagoon or sea. This shows the importance of encouraging pupils to answer open ended questions during classroom practices and to write down their answers in a clear way.

Carelessness or answering in a mechanical way also led to the loss of marks for some candidates. For instance, in question 3 part 1 (b): Suggest two ways in which air pollution may be avoided; a number of candidates gave causes of air pollution instead of ways to avoid the air pollution. Bright candidates made this type of mistake because they worked through the paper too rapidly while
candidates who were struggling made this type of mistake because they often learned the content by heart and did not pay much attention to the context in which the question was set.

It is also important that candidates read the instructions of the questions carefully. It has often been noted over the past years, that when diagrams are given and that candidates have to draw on or label the diagram they miss that part or do not attempt the question. It is therefore advisable that pupils work more on diagrams by drawing, labelling, drawing arrows, etc., as this is an important scientific skill. They must also be careful while reading the question to make sure they have not missed any part of it.

Science teaching is often based on prior knowledge and pupils encounter a lot of science in their everyday life. When it is raining, what they eat and how it affects them, their environment and the way they interact with it, the air they are breathing, the water they are drinking are all linked to science and can be explained through scientific concepts. Real life experience and the experimental, hands-on aspects of science makes for an inclusive environment where all pupils in the classroom can participate by sharing their thinking, ideas and their own explanation of different phenomena. It is important to develop the inquisitive aspects of science teaching as this may help pupils in understanding concepts better and apply it out of the confine of the textbook and classroom.

Candidates must develop some examination skills, such as reading instructions carefully and revising what they have written so as not lose marks unnecessarily.

SPECIFIC COMMENTS

Section A

Section A is made up of Question 1 and Questions 2A and 2B. The items focused on the Essential Learning Competencies. It carries 60% of the total marks of the question paper. The mean mark in Section A was 40.
QUESTION 1

This question comprised 10 multiple choice items from different topics of the syllabus. Pupils did not have much difficulty with this question and in general went through the different items with confidence. Some carelessness in reading of the stem of the question were noted.

Items: 1, 5 and 6 were found to be relatively easy with more than 75% of the candidates obtaining the correct answer:

Items 2, 3, 4, 7, 8, 9 and 10 proved to be more challenging to the candidates with at least a quarter of the candidates giving a wrong answer.

Item 1: Which one of the following food is obtained directly from plants?

A number of candidates gave the wrong answer for this item. Though an easy item, it required candidates to stop and think before giving the answer. They had to look at each food item and ask themselves whether it is obtained from an animal or a plant (or from elsewhere). ‘Eggs’ are directly obtained from animals and was easily eliminated. Rice is a very common basic food item used in Mauritius and Rodrigues but pupils are familiar with the grains of rice they eat and had to think about where this rice comes from. Honey and yoghurt are both food obtained from animals but unlike food such as meat, they are regularly consumed by vegetarians. Some pupils therefore did not think only about a food obtained from plants, but more about a food item which is consumed by vegetarians as their main food source is from plants. Consequently a number of candidates gave the wrong answers honey and yoghurt.

Item 2 Name the gas that is not present in air.

A number of wrong answer were obtained for this item. Pupils learn different concepts in isolation and are often unable to link these concepts. For instance, they know that chlorine gas is used in the purification of water, oxygen is used in
respiration and for burning and carbon dioxide is used during photosynthesis. Pupils also learn about the formation of water vapour when there is evaporation and when this gas evaporates it goes into the atmosphere or it is present in air. However, it becomes more difficult for them to think beyond these facts. For instance, they should have understood that chlorine gas is highly toxic and is used to kill germs and that it cannot be found freely in the atmosphere.

Item 3  *An example of a soft sound is…*

Candidates could proceed by elimination for this item, the sound from firecrackers, aeroplanes or thunder storm not being soft.

Item 4  *Which one of the following is a method used to preserve food?*

This item was straightforward and was a direct recall of information. However, a number of candidates got it wrong and instead chose covering or heating. It must be well emphasised that when we are talking of food preservation it is for a long period of time and methods such as heating, covering or washing will not preserve the food for a long time.

Item 5  *Which one of the following materials is man – made?*

The correct answer C – plastic was easily found by many candidates.

Item 6  *Which one is an insect? (from the given diagram)*

The most common mistake here was ‘Bat’. All the animals presented in the diagram had wings to fly but could be classified as birds, mammals or insects, depending on their specific characteristics. This item shows the importance of understanding the specific characteristics that differentiate groups of animals. General characteristics such as having wings or 4 legs are not specific to a group of animals.
Item 7  Which one of the following describes a characteristic of living things?

This item proved to be one of the most difficult in Question 1, with nearly half the candidates getting the wrong answer. Some pupils were not familiar with the characteristics of living things and gave answers for the characteristics of plants – that is they produce their own food. Here, pupils must be able to distinguish between living things and specific characteristics of plants and animals. They might compare the characteristics of living things with that of non-living things so that it is clear which characteristics classify something as living or non-living.

Item 8  Which of the following objects will cause the bulb to light up when used to close the gap at point Z?

A metallic pin when inserted in the gap will cause the bulb to light up. This item tested candidates’ knowledge of conductors and non-conductors of electricity. The most common wrong answer was ‘an elastic band’.

Item 9  Which of the following sources of energy is extracted from the Earth?

Candidates experienced some difficulty here, confusing sources of energy extracted from the Earth with the concept of natural and man-made sources of energy. Thus, many gave the wrong answers ‘ethanol’ or ‘bagasse’.

Item 10  Which one of the following statements is false?

Candidates were able to answer this item without much difficulty.
QUESTION 2A (20 marks)

As is often the case, candidates performed relatively well on this question. The types of question set were easily accessible to most and allowed examiners to conclude that pupils in general were able to read with understanding. The answers required were either already given in a list of words or had to be matched and thus presented less of a writing challenge to the candidates.

Part 1: Fill in the blanks

Many candidates were able to score full marks in this part of the question. However, some continue to make mistakes in copying the given words from the list. Pupils must be encouraged to copy the words exactly as given in the list.

The item ‘A deer is a …………………………… animal.’ proved to be the most challenging one in this part.

Part 2: True or False

This question contained only two items on the topic ‘Water’ and was easily answered by most candidates.

Part 3: Matching

The question required candidates to match different pictures to the energy transformation taking place. Many pupils were able to do the matching well. Some wrote corresponding letters or numbers next to the words given instead of drawing lines. This practice needs to be discouraged as candidates often get confused and end up losing marks.

The challenging item in this question was to identify the energy transformation taking place in a battery operated radio where many candidates gave the wrong answer “Sound to electrical.”
QUESTION 2B (20 marks)

This question consisted of two parts, with the first part being on food and health and the second part on materials.

Part 1- A table listing two types of breakfast, A and B was given.

Items (a) and (b) were found to be relatively easy and most candidates obtained the correct answers. More than one correct answer was possible for both. However, candidates were expected to give the name of food items already listed in the table and any other food item not found in breakfast A and B was not accepted.

(c) (i) Which one of A or B is a balanced meal?

The correct answer was B in which the three food groups, carbohydrates, protein and vitamins and minerals were present.

A number of candidates here gave the wrong answer A.

(c) (ii) Give a reason for your answer.

The expected answer here should show that the candidate understood that there was one food group missing from the list of food items given and thus the breakfast would not be a balanced meal.

Some candidates, were able to express their answers clearly, stating that breakfast A did not contain any food item containing vitamins or minerals.

Some candidates instead of saying what breakfast A lacked to make it a balanced meal, stated that breakfast B contained food items from all the different food groups or that breakfast B contained food containing vitamins and minerals (as opposed to breakfast A). Such answers were also accepted.

However, some candidates only stated that breakfast B is a balanced meal and such answers do not contain any reason or explanation.
(d) Apart from eating a balanced meal, suggest one good habit to stay in good health.

A number of different answers related to hygiene or good habits that must be undertaken regularly were considered correct. Answers which were too vague or general such as ‘we must play’ have to be discouraged and pupils must learn to answer according to the context set in the question.

Part 2- This item was based on the topic ‘Material’ and candidates had to fill in a table by either naming a material used to make the given object or by giving a reason why the material was suitable for the given purpose.

Candidates were able to find the material used to make an aeroplane, a car tyre or a shirt more easily than giving an explanation as to why these materials were used for these purposes.

- Why is stainless steel used to make knives? – Some candidates were able to give correct answers such as ‘because it does not rust’ or ‘because it is hard/ strong’. These are properties which are important for a material that is used to make a knife. However, though a knife is made up of a material which is shiny, it is not the reason why this material is used to make the object.

- Why is leather used to make jackets? – Answers relating to the materials being waterproof, long-lasting, fire-resistant, comfortable to wear etc. were all accepted. However, more general answers such as ‘it is cheap’ were considered wrong.

It is worth noting here that it is important to link useful property/characteristic with uses being made. For instance iron rusts but it is not the useful property for which it is used to make a knife. Similarly, it is not because cotton fabric is made from plant that it is good to use for summer wear but it is for its property of being absorbent.
Section B

Questions from Section B tested mostly the Desirable Learning Competencies. Though some questions required a slightly more elaborate answer in the form of a sentence or a short phrase, there were many items where only a one word answer was required. It is therefore recommended that Section B of the question paper be attempted by all candidates as many of them can score marks here as well. The mean mark scored by candidates for Section B was 16.

Question 3

Part 1 – This question was based on pollution.

(a) Give two sources of air pollution shown in the diagram.

A number of possible answers was accepted for this item. The sources of pollution could be the vehicles, the factory or the burning of wastes as shown in the diagram.

Some candidates gave sources of pollution not shown in the diagram, such as, dust from stone crushers. There were also some telescoping answers where both answers referred to the same source of pollution. It is important to highlight that telescoping answers lead to the loss of marks.

(b) Suggest two ways in which air pollution may be avoided.

Here answers which were not related to the given diagram were also accepted. A number of different correct answers were given such as the fitting of air filters in chimneys, fixing catalytic converter to exhaust pipes of vehicles or not using cars for travelling short distances.

Some wrong answers referred to the effects of air pollution (for instance; it affects people’s health) instead of the ways to avoid air pollution.
Part 2

This question was based on the human teeth.

For part (a), candidates were required to draw a line from tooth X (diagram 5b) which is an incisor to its corresponding location in the lower jaw of an adult, represented in diagram 5(a).

A number of candidates did not answer this question. They might have had difficulty here in understanding the instructions given or have missed this part through lack of attention.

Some candidates drew X instead of a line. If the location indicated was correct, the marks were awarded. Many others placed the tooth in the wrong location on the jaw.

(b) Give the name of tooth Y.

The expected answer here was ‘canine’. However, given that the drawing of the canine and the premolar found in the textbook are very similar, candidates who gave premolar as answer were also credited.

(c) Give the name of the tooth that is not found in the jaw of a child who is 3 years old.

Pupils are expected to know the dentition of a child and an adult. They must learn that premolars are not found in a set of milk teeth. Some candidates were able to give the correct answer while wrong answers included molars, incisors and canines. The name of the different types of teeth are incisors, canines, premolars and molars while back teeth or front teeth is not considered as the name of the teeth but rather the types of teeth.
(d) Suggest one way to prevent tooth decay.

This item was well answered by the majority of candidates. However, a few did not mention the regularity with which the precaution must be taken; for instance brushing one’s teeth after each meal or twice a day. Pupils must also be careful not to mix the problem of ‘obesity’ with that of tooth decay. Many answers related to ‘avoiding eating oily food’.

Part 3- This part was based on ‘light’.

(a) What is the name given to objects that do not produce shadows in the presence of light?

Many pupils gave the correct answer, that is, transparent objects. Some pupils gave the name of objects such as window panes or glass or air which were also rewarded.

(b) Shadows are formed when some materials are kept in front of a source of light. Explain why.

There were two important elements that were expected by examiners for this question. The first one is that light travels in a straight line and the second part is that light cannot pass through opaque objects. These two reasons account for the formation of shadows. Candidates often gave incomplete answers or had difficulty in answering the question in a clear and concise way.
Question 4

Part 1 - This part was based on the topic ‘Water’

(a) Give two ways in which water may be polluted.

A number of correct answers were possible. Answers could be related to agricultural activities, oil spills, throwing of waste or chemicals from factories. Many candidates were able to give the correct answers. It was important that candidates clearly expressed the ways in which the water was being polluted.

A number of candidates, however, gave the ways in which to prevent water pollution. Candidates must be reminded to read the questions carefully and not to answer in a mechanical way.

(b) Why should water from reservoirs be filtered before they are distributed to houses?

Many answers concerned the importance of removing impurities and solid wastes. It was important for candidates to make the distinction between filtration and chlorination. While filtration will remove solid waste, it does not kill germs and bacteria and thus does not make the water safe or pure enough for drinking.

(c) Suggest one way in which we can avoid wastage of water.

Many correct answers related to daily activities at home, such as repairing leaking pipes. Candidates were also able to use the knowledge gained during government campaigns to avoid wastage of water. Answers such as ‘pay a fine for washing cars during periods of drought’ were well received by examiners.

Some wrong answers related to ways of preventing water pollution or ways to save electricity rather than avoiding the wastage of water.
Part 2 – Part 2 was based on the topic ‘Earth and Environment’.

(a) Which gas is mainly released when fossil fuels are burnt?

This question was correctly attempted by most candidates. Correct answers included carbon dioxide or water vapour. It must be noted that carbon monoxide is produced upon the partial burning of fossil fuels.

(b) A consequence of Global warming is a rise in the sea level. Suggest one harmful effect of a rise in the sea level.

Many candidates here did not read the question carefully enough and gave answers related to global warming but not to the consequence of a sea level rise.

Correct answers included the loss of coastal habitats for humans, erosion of beach or coastal regions, stronger waves causing beach erosion and deeper lagoons causing a loss of recreational activities, dangerous marine animals can come nearer to the shore or the loss of low lying islands such as the Maldives. Vague answers such as ‘people must not venture at sea’ or ‘loss of life’ are to be discouraged.

Part 3 – Part 3 was based on plants

(a) Name the part of a plant that germinated to produce new plants.

There was only one possible answer here, seed or seed from fruits.

(b) Give two functions of the stem of the plant.

Many candidates were able to give at least one correct answer. Expected answers included ‘to carry water and minerals from the roots to other parts of the
plant’, ‘to hold/support the leaves towards maximum sunlight’, ‘to carry food from the leaves to other parts of the plant’.

A number of candidates confused the functions of the roots with that of the stem. Answers such as ‘it takes up water from the soil’ were not accepted.

*(c) Explain how plants help to maintain the composition of air.*

A number of candidates gave only partially correct answers for this part. They were expected to write about the air cycle, that is, plants give out oxygen during the day (through photosynthesis) and take up carbon dioxide (which is released by human and animals). Answers such as ‘*for human beings can live on the earth*’ were not accepted.