

Examiners' Report/  
Principal Examiner Feedback

Summer 2015

PLSC Science (LSC01/01)  
Year 9 Achievement Test

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## **General comments**

This was the fourth examination for the Year 9 Achievement Test in Science. It was pleasing to see that so many candidates were very well prepared and the paper seemed to give candidates of all abilities the opportunity to demonstrate their knowledge and understanding. The fact that in the main, all questions were attempted, gave further proof of the accessibility of the paper. There was no indication of candidates being short of time.

There was a wide spread of marks indicating that the paper successfully differentiated between students of differing abilities. The groups of ten multiple choice sections were meant to become more difficult as the paper progressed and this was reflected in the performance of the candidates. It was again noticeable that Section B, which contained free response questions designed to test practical and experimental skills, proved more challenging to most students than did Section A.

## **Comments on individual questions**

### **Section A**

#### Question 1

Most candidates knew that metals are conductors of heat.

#### Question 2

Most knew the symbol for copper with Co a common wrong choice.

#### Question 3

This question proved the most difficult of the first ten with many opting for a compound or even an atom.

#### Question 4

The majority knew that it was because light from the Sun is reflected by the Moon but significant numbers chose B, thinking the light came from the Earth.

#### Question 5

As expected this proved straightforward.

#### Question 6

Most correctly chose photosynthesis with respiration the most common alternative.

#### Question 7

This question on forces acting on a kite proved difficult for some with all answers being quite common.

#### Question 8

Most candidates interpreted the bar chart correctly.

#### Question 9

Many candidates correctly selected the value of the force of gravity on Earth.

#### Question 10

Many recognised that drag slows the plane down although significant numbers thought that it was the weight.

#### Question 11

11(b) Disappointingly many candidates did not follow the instruction to choose the property from the table and instead described methods to separate the mixtures. The Mark Scheme reflected this to the benefit of the candidates. In (i) most pupils correctly understood that a magnet or magnetism was needed but in (ii) some thought that a magnet would also work to separate salt and copper.

#### Question 12

Many had a good understanding of where chromosomes are found but not what they were made from.

#### Question 13

Displacement reactions and the reactivity series seemed to have been taught well at many centres. Most candidates were able to correctly identify that there was no reaction between gold and calcium chloride. A few candidates got confused with metal and acid reactions and so suggested salts and hydrogen as products.

#### Question 14

Very few candidates gained both marks as it was very rare to see a refracted emergent ray. Perhaps students had not seen or done this practical.

#### Questions 15-24

These multiple choice questions were meant to be more demanding than the first set and, in the main, this proved to be the case.

#### Question 15

This proved to be an easy question for most but some suggested gamete.

#### Question 16

Most were aware that cystic fibrosis is a harmful condition in humans.

#### Question 17

This question concerning scurvy proved difficult with many thinking it was a bacterial infection. Significant numbers gave the answer A of a balanced diet, which might have been a result of not reading the question carefully enough.

#### Question 18

Most knew that chromosomes carry genetic information in a cell with weaker candidates sometimes suggesting vacuoles.

#### Question 19

Most appreciated that an ammeter should be used to measure a current in a circuit but others suggested the use of a voltmeter in parallel or series. Perhaps they thought that as two alternatives contained a voltmeter it had to be one of them!

#### Question 20

The word equation for the reaction between an acid and a carbonate was correctly completed by many but surprisingly magnesium hydroxide and hydrogen were quite often suggested as being the products.

#### Question 21

Identifying two unknowns in the equation for photosynthesis did not prove to be straightforward with many giving answers containing sunlight and others interchanging water and glucose.

#### Question 22

Again a good understanding of the reactivity series was shown here, with just a few unfortunately identifying the most reactive metal instead of the least.

#### Question 23

Perhaps not surprisingly in the context of the diagram given, most correctly identified the arrow showing the upthrust force.

#### Question 24

This proved to be a difficult question. Many thought the difference between the moths was caused by selective breeding or inheritance.

#### Question 25

(a) Most understood that gravity keeps satellites in orbit although a few spoilt their answer by suggesting it was the gravitational pull of the Sun that kept the satellite in orbit around the earth.

(b)(i) The meaning of a geostationary orbit was very poorly described with very few adequate answers seen. However in b(ii) most candidates gave a suitable use although some vague answers of simply taking photographs were given.

#### Question 26

This was generally answered very well and nearly all candidates correctly identified which of the three characteristics were inherited or affected by the environment.

#### Question 27

In (a) most candidates were able to complete the Punnet square correctly. However correct answers to (b) which required the term "dominant" appeared to be centre specific, as it was either seen in the majority of scripts from a centre or hardly at all in scripts from other centres.

### Questions 28-37

As expected the final ten Multiple Choice questions proved to be the most challenging on the paper.

#### Question 28

Most were able to identify the pivot.

#### Question 29

Although many did correctly give the products of the reaction between a metal and a dilute acid, it was surprising that answers including carbon dioxide were not uncommon.

#### Question 30

This involved a very common practical involving measuring the loss in mass of a flask and contents when marble chips react with dilute hydrochloric acid. It was disappointing to see that large numbers could not explain the loss in mass with many thinking that the marble chips having all dissolved was the cause of the loss in mass instead of realising a gas was produced which left the flask.

#### Question 31

This question involving a circuit diagram proved to be difficult with many thinking the answer was 2V.

#### Question 32

This circuit diagram question was answered more successfully by candidates with most appreciating the effect of adding another cell to the circuit.

#### Question 33

Many did know the main function of root hairs in a plant but significant numbers chose A or less surprisingly, D.

#### Question 34

Most recognised the description of sedimentary rocks although metamorphic was often seen.

#### Question 35

As hydrogen was made common to all responses to make the question more accessible, it was a little disappointing that not more selected the correct option of A.

#### Question 36

The correct equation for finding the weight of an object was not well known with all three distractors being regularly suggested.

#### Question 37

Most did select the correct formulae of the products with understandably answer D, with water as a product, being the most common incorrect suggestion.

#### Question 38

Most candidates could place the stages involved in cloning in the correct sequence, with 2 and 3 being the wrong way round as the most common incorrect response.

#### Question 39

In (a) many candidates could place the metals in order of reactivity although some reversed the order. Others failed to notice the distinction between reacts slowly and reacts very slowly. In (b) most could relate to the observations in the table and make correct predictions but some tried to name the metals.

#### Question 40

This proved to be a very challenging question to most. In (a)(i) candidates often failed to use the key word pressure correctly. Many did not fully understand the relationship between force, pressure and area with some stating that the force was less when the (surface) area was large. Most did not realise that the force at the top/bottom of pin is the same.

In (ii) many correctly understood the role large tyres play in preventing the tractor sinking into the mud. The relationship between area and pressure was well described in some cases but again there was confusion between pressure and force.

In (b) it was noticeable that many of those who answered correctly had to do the calculation without a calculator although they are allowed in the examination. Units were a big issue with many writing  $\text{Nm}^2$  with others not seeming to understand what the word units meant.



## Section B

As is the norm, this section contained questions which were mainly practically based. As in the past, the section proved to be challenging for many candidates, perhaps suggesting that candidates need more direct practical experience.

### Question 41

(a)(i) Most did not identify a variable that had not been mentioned in the question stem with temperature and amount of acid being the most common incorrect answers. There were very few references to the cross. Many did not seem to understand the idea of a control variable.

(a)(ii) The majority made reference to goggles or gloves.

(b) Most candidates scored 2 marks for the graph with the most common mistakes being scales incorrectly drawn - often uneven gaps between 0 and the first and second numbers. Lines of best fit were most commonly drawn incorrectly as straight lines or occasionally points were joined dot to dot. Few drew the line of best fit, which was a curve. Some drew bar charts.

(c) It proved difficult to score two marks. Of those who scored one mark it was often for stating a conclusion without giving a correct reference to the data which was needed for the second mark.

### Question 42

(a) Most gave a correct suggestion to ensure it was a fair test.

(b) Few candidates appreciated the need for the units in the table.

(c)(i) Nearly all candidates could identify the most streamlined shape.

(ii) Many candidates had a good understanding of how to make results more reliable by repeating the experiment.

### Question 43

(a) Many candidates had the independent and dependent variables the wrong way round. Others gave incorrect responses about plant growth.

(b) This was usually well answered with the most common responses involving water and soil. However, some just repeated the independent and dependent variables.

(c)(i) Nearly all candidates got this correct.

(c)(ii) It was disappointing to see that so few knew how to make their readings more precise with only a few references to mm or using a smaller scale. Most confused precision with reliability and gave incorrect answers involving repeating.

### Question 44

(a)(i) Many candidates could refer to reducing heat loss or keeping heat in. The common incorrect answers gave references to evaporation.

(ii) Only a few candidates gave the key word of control but many gained the mark as they were able to describe the idea of a comparison.

(b) Most candidates who gained this mark did so by quoting from the data. However many weak answers were seen which often made reference to insulators and conductors.

### **Summary Section**

Based on their performance on this paper, candidates should:

- be given as much practical experience as possible;
- improve their understanding of the difference between reliability and precision;
- learn how to apply scientific knowledge to explain results and draw conclusions
- increase their familiarity with units
- appreciate that lines of best fit can sometimes be curves
- improve their understanding of the terms dependent and independent variables
- be made aware that a calculator can be used in the examination

