



Examiners' Report

Principal Examiner Feedback

Summer 2017

Pearson Edexcel PLSC in Science (LSC01/01)
Year 9 Achievement Test



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General comments

This was the sixth examination for the Year 9 Achievement Test in Science. The paper aimed to give candidates of all abilities the opportunity to demonstrate their knowledge and understanding. Candidates seemed to be well prepared on the whole, and most could attempt all the questions which was evidence of the overall accessibility of the paper. There seemed to be no evidence of candidates being short of time.

The paper produced a very wide spread of marks indicating that the paper successfully discriminated between students of varying abilities. The groups of ten multiple choice sections were designed to become more difficult as the paper progressed and this was reflected in the performance of the candidates. As has been the case in the past it was noticeable that Section B, which contained free response questions designed to test practical and experimental skills, proved more difficult to most students than did most questions in Section A.

Comments on individual questions

Section A

Question 1

Most candidates recognised the air is a mixture although a few suggested steam.

Question 2

Most candidates demonstrated a secure understanding of the key terms in the question and gave the correct answer. Of those that did not, thinking that copper sulfate is insoluble in water was most often chosen and a minority responded that it melts in water.

Question 3

This was answered very well, although a few seemed to mix up the terms prey and predator by selecting C.

Question 4

Many candidates responded well to this question but some are possibly confusing *reacting* with change of state as they gave high melting point as their response.

Question 5

It would appear that many candidates had not secured this knowledge as all responses were frequently seen.

Question 6.

This was answered very well with only a few selecting mass as a force instead of weight.

Question 7

This was usually answered correctly but some candidates did not appreciate the difference in the size of one of the arrows and thus stated that it does not move.

Question 8

Options A and D were probably seen here in equal numbers.

Question 9

Almost all candidates identified the producer.

Question 10

The vast majority of candidates demonstrated an understanding of the pH scale. Some, however, got it in reverse order giving 14 as their response.

Question 11

This question on organs in the human body was generally answered well although some candidates did not score the mark for C as they omitted the word *small* whilst others incorrectly referred to it as the *large* intestine.

Question 12

This was answered poorly as many candidates could not draw the mirrors even though the symbol to use had been given. Those that did use the correct symbol often had no knowledge of where to place the mirrors. Other candidates lost the second mark for failing to draw the arrows in the correct direction or drew dotted or discontinuous rays of light.

Question 13

Although many correct answers were given, surprisingly, many answers that were not acids were also seen including hydrogen, carbon dioxide and other substances. Only strong candidates were able to identify copper oxide as a base. Many answers simply stated that it was neutralisation as copper sulfate and water were produced.

Question 14

This was answered well with the most common errors being to identify B as cytoplasm or occasionally chlorophyll.

Question 15

Most candidates were able to correctly identify different types of rock.

Question 16

Most candidates were able to correctly select the meaning of addictive.

Question 17

The majority chose the correct formula whilst CaCO_2 was the most popular incorrect response.

Question 18

This was generally answered correctly, with some candidates unsurprisingly selecting a voltmeter in series as opposed to in parallel.

Question 19

Most candidates correctly selected malleable.

Question 20

Candidates did not seem secure on types of energy transfer as all incorrect responses were frequently seen. Candidates should be reminded to consider alternatives carefully as an incorrect response B, given by many, was only slightly different to the correct response D.

Question 21

Many candidates were obviously not confident on the use of these type of diagrams as all options were regularly seen.

Question 22

The idea of gravitational force varying with altitude did not seem to be well understood with all options except the island beach seen in about equal numbers.

Question 23

The majority of candidates answered this correctly. Those that did not seemed to be equally likely to choose any of the other alternatives.

Question 24

This was not an easy question and it was good to see many correct answers. Probably not surprisingly the most common incorrect answer was A.

Question 25

Good numbers of candidates gained a mark in (a) by referring to greater yield or resistance to disease, pests etc. However, in (b) too many answers suggested a definite problem is known now eg they believe that GM crops *definitely do* cause harm whereas they should be speculating that they *may* have possible future/long term health effects.

Question 26

In part (a) many correctly identified acid rain as being the problem. However, significant number of candidates lost marks in part (b) for identifying the wrong gas or for answers that were too vague such as *it is caused by gases from cars/factories*.

Question 27

(a) Many were able to perform the calculation although the unit of pressure was not well known. Some wrote down the right calculation but then gave an incorrect answer or no answer at all. Possibly they either entered it into their calculator incorrectly or probably more likely, did not have a calculator with them.

(b) Very few candidates gained this mark. It was common to see *pressure would increase* or candidates correctly identifying that the area would decrease or even half but most did not translate that into the pressure doubling. A minority of candidates carried out the additional calculation to obtain 50 000.

Question 28

This question concerning strawberry plants and runners was answered well.

Question 29

Whilst many candidates did answer this question concerning human characteristics correctly, it was apparent that a large number of candidates are struggling with the idea of inherited features and those affected by the environment. Gender was given very frequently as an incorrect response.

Question 30

Most correctly recognised the example as being selective breeding, with only the occasional incorrect response given.

Question 31

The question on Ptolemy's model of the Solar System was answered very well, with the Sun and Milky Way seen as popular incorrect answers.

Question 32

This appears to be a concept that candidates are struggling with as many were not able to process the numbers correctly to give the correct answer. All incorrect responses were regularly seen.

Question 33

There were many correct answers but many omitted the formation of carbon dioxide and gave salt and water as their response.

Question 34

Most correctly identified refraction with only the occasional incorrect response given to this question.

Question 35

It would appear that many candidates have not secured this knowledge as every possible response was frequently seen.

Question 36

This proved to be a good discriminator with only strong candidates selecting the correct balanced equation. A was a popular incorrect response.

Question 37

The concept of Sankey diagrams appears not to have been understood very well. Many just seemed to use the output figure and gave answer B, rather than looking at the input as well and then working out the efficiency as requested by the question. It is important to read questions carefully and use all available information.

Question 38

(a) Candidates must appreciate that *hydrogen gas produced* is not an observation as the gas cannot be seen – the observation is bubbles/effervescence/fizzing.

(b) Similarly, the production of different metal hydroxides is not an observation as this cannot be determined by looking at the reactions.

(c) Writing balanced chemical equations seemed to be very centre specific indicating possibly that some are not teaching the skill at this stage.

Question 39

Many students failed to link speed to time in part (a) and only a select few used the phrase directly proportional. In part (b) many just wrote *constant speed* and some, having given the correct numerical answer then lost the mark for giving the wrong unit. In part (c) the most common error was to multiply by 30 rather than 20.

Question 40

(a)(i) scored very highly but few candidates knew the word genotype in part (ii). In part (b) a range of mostly incorrect percentages were seen indicating poor understanding of the effect of dominant alleles.

Section B

As always, this section contained questions which were mainly practically based. As in previous years, the responses in this the section were again generally not as good as those in the earlier section, but there was an improvement from last year.

Question 41

- (a) Many candidates were able to recognise the variables although some got them the wrong way around.
- (b) The vast majority of candidates were able to recognise the need for repeats and some even went further and stated calculating a mean once this was done.
- (c) Most graphs were plotted well although the use of linear scales and the full use of the grid were not always seen. Candidates should be reminded to take care over the plotting of points as examiners will check each one is in the correct place.
- (d) Those candidates that plotted the graph correctly were usually able to obtain the required information from the graph. Candidates should be encouraged to draw their working lines on the graph for their own checking purposes, whether or not the question asks for them to do it.

Question 42

- (a) was answered very well, with only the occasional incorrect response seen although some answers were not comparative and so did not gain the mark.
- (b) *Gloves* was a popular correct answer although the explanation was not always suitable. Candidates should be reminded that when explaining a precaution that they need to give properties of the situation/substance rather than generic statements such as *protects hands*.
- (c) Candidates need to ensure they have read the question carefully as many were giving variables that were already given in the question.
- (d) Correct names of laboratory equipment need to be known – it was disappointing that a large number of candidates were not able to correctly name a measuring cylinder. Furthermore, candidates should be made aware of when different pieces of equipment are appropriate.
- (e) Most were able to read the thermometers and calculate the rise in temperature with only the occasional error.
- (f) Most candidates did not know what the term *quantitative* means.
- (g)(i) A correct answer was given by the majority of candidates although some just said it meant it was the least reactive metal which was insufficient, and others simply paraphrased the question saying that it meant the temperature did not rise.

(ii) Almost all candidates gave the correct order of reactivity with only the occasional incorrect response.

(h) Many gave a correct answer in terms of heat loss although it was sometimes poorly worded. Others tended to suggest it was to stop spillages.

Summary Section

Based on their performance on this paper, candidates should:

- continue to be given as much practical experience as possible
- be given more opportunities to improve their understanding of the terms dependent and independent variables and discuss the choice of control variables
- be given more opportunity to use chemical formulae
- ensure all answers to calculations are given the correct units
- ensure that they take a calculator into the examination