



LEVEL 3 Certificate

Applied Science

ASC3: Unit 3 Science in the Modern World
Report on the Examination

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General comments

Students were able to attempt all questions and some very good responses were seen across the whole paper. It was pleasing to see that good students were able to explain answers using their own words unless the question asked them to use examples directly from the pre-release material. Centres should encourage their students to write answers in their own words. Some less able students had given quotes from the sources for almost all their answers, and often these were incorrect and showed little understanding.

There were few students using additional pages to complete the question paper, with students giving suitably succinct responses. This included the extended response question (Q8) where most students who achieved level 3 marks for this question (7, 8 or 9 marks) managed to achieve these marks without the need for additional pages.

The mathematical calculations (Q7.1, Q7.2 and Q9.3) were generally poorly answered despite being simple mathematical calculations, such as means and percentages. Centres would be advised to ensure that students practice these during the preparation for the ASC3 examination.

The questions based on scientists (Q11.1, Q11.2 and Q11.3) were poorly answered by most students. Students were unable to apply their knowledge of the roles of scientists to the contexts in the question paper, and to specify exactly what the scientists would do, such as 'monitor' or 'conduct experiments'. Most students used vague terms such as 'look at', 'study' and 'find out'.

Centres may find it helpful to review past papers to see the type of questions and answers that may be asked whilst preparing students for the ASC3 examination (although it is appreciated that the subject content of these papers will be different).

Q1.1 (1 mark)

This was a good introductory question which was well answered. Over 90% of students were able to find the correct answer from the pre-release material to achieve the mark for this multiple-choice question.

Q1.2 (3 marks)

This question was well-answered, with over 60% achieving all 3 marks. All answers on the mark scheme were seen.

Some students did give quotes from the sources which did not actually answer the question, such as 'technical and production refinements'. Students should be encouraged to answer the questions in their own words rather than trying to give quotes.

Q1.3 (2 marks)

Most students were able to achieve at least 1 mark here, mostly for saying high fuel prices. Those who did not achieve the second mark generally said that carmakers were required to cut emissions rather than that legislation required carmakers to cut emissions.

Q2.1 (1 mark)

Very few students achieved the mark for stating that factories were being built to make batteries. Most students either referred to making more electric cars or did not relate their answer to the automotive industry.

Q2.2 (4 marks)

This question differentiated well with more able students achieving 3 or 4 marks. Less able students achieved 1 or 2 marks for not describing how the two problems were solved, for example, with more powerful and cheaper batteries.

Q2.3 (2 marks)

Over 50% of students were able to achieve 2 marks here, with a further 30% achieving 1 mark, mostly for stating that Chinese manufacturers will soon be exporting to Europe.

Q3 (3 marks)

Approximately 80% of students scored marks on this question. Students who achieved 1 mark usually did so for stating that the Paris climate talks aimed to reduce CO₂ emissions. Some students also described a reduction in fossil fuels and achieved 2 marks, but very few were able to link this to car manufacturers needing an alternative to petrol and diesel cars.

Q4 (2 marks)

Most students were able to achieve a mark for stating that an environmental benefit would be less pollution or lower CO₂ emissions. Those who did not achieve this mark tended to give inadequate quotes such as 'a cleaner, greener mobility future' or 'tightening of CO₂ limits', which did not answer the question.

Fewer students were able to give a social benefit such as more jobs or better health. Incorrect answers here often referred to cost, such as people saving money on petrol.

Q5.1 (1 mark)

Most students (over 85%) achieved the mark mostly for the idea that 400 000 people had put down a deposit before the Tesla was even made. Some students did use a quote here, '400 00 drivers put down a \$1000 each without even sitting in it,' which was acceptable because the question asked for 'one piece of evidence'.

Q5.2 (1 mark)

Approximately half of students achieved the mark. All answers on the mark scheme were seen in roughly equal measure. Those that did not achieve the mark often simply gave \$35 000 rather than saying that it was affordable or only \$35 000.

Q5.3 (1 mark)

Over 60% of students achieved a mark mostly for saying that the Tesla had a limited range. Incorrect answers seen included that it was expensive, even though some had said that it was

affordable in their answer to 5.2. It is understandable that students might think \$35 000 is expensive but, in this context, this was not an acceptable answer.

Q6.1 (2 marks)

It was disappointing that so many students simply gave a quote in answer to this 'explain' question. However, 60% of students did manage to give a quote that did answer the question correctly and so, on this occasion, this was allowed. However, centres should ensure that students are encouraged to write answers in their own words.

Q6.2 (2 marks)

The same comment as given in 6.1 can be given here. Approximately 60% of students achieved 2 marks here, sometimes with a direct quote from the source, which was allowed.

Q7.1 (2 marks)

Only a quarter of students were able to correctly calculate the percentage of total CO₂ emissions that came from tailpipe emissions of petrol and diesel cars. This question did differentiate well, as students who scored 2 marks here were usually those who scored high marks overall. A further 30% of students were able to select the correct data from the source but were then unable to do the correct maths and so were given 1 mark.

Q7.2 (2 marks)

Only 17% of students were able to correctly calculate the percentage decrease in tailpipe emissions with an earlier ban, although a further 16% achieved 1 mark for selecting the correct data from the source. Students should be encouraged to practice doing simple mathematical calculations prior to the ASC3 examination.

Q7.3 (2 marks)

This question was poorly answered, with only 5% of students achieving both marks and only a further 15% achieving 1 mark for the idea of time to train staff. Incorrect answers seen often quoted 'meeting the infrastructure and energy needs of EVs', which did not answer the question, or the answers referred, incorrectly, to tailpipe emissions.

Q7.4 (1 mark)

Just over 20% of students were able to describe what was meant by full lifecycle emissions. These students had obviously discussed this in class during their study of the pre-release materials. Centres are encouraged to discuss key terms from the sources to help students develop a good understanding of the topic prior to the ASC3 examination.

Q7.5 (1 mark)

Slightly fewer students (15%) were able to state why full lifecycle emissions is a useful measure when discussing electric vehicles. These students did tend to be those who had achieved the mark in Q7.4 and did understand what the term meant.

Q8 (9 marks)

There was a full spread of marks seen here, with the mean mark being 5. As already stated, fewer students wrote more than necessary and ran over unnecessarily onto additional pages. There were some excellent concise answers seen which achieved level 3 marks (7 – 9 marks) (approximately 30% of students) and were written entirely in the space provided on the question paper. Centres appear to have followed the previous advice given and have encouraged their students to be more concise in making their points.

Students should be reminded to read the extended response question very carefully. In this question students were asked to evaluate the validity and describe the effectiveness of each source. Students who commented only on validity or only on effectiveness were limiting themselves to level 2 marks as they had not answered the question fully. When discussing effectiveness, students could include the nature of the content as well as the language used. Some students simply discussed electric cars and why they would or would not buy one. Often these students did not refer to the sources at all or they described what information was present in the source but did not refer to validity or effectiveness. Some of these answers were lengthy and would have taken the students a long time to write. These students scored very few marks. It is important that centres encourage students to carefully consider what they are being asked to do before they begin writing in the extended response question.

Q9.1 (1 mark)

Approximately half of students were able to achieve a mark for suggesting that using renewable energy has reduced the use of fossil fuels.

Q9.2 (1 mark)

60% of students were able to correctly state a year between 2005 and 2010 and give the reason that there was a decrease in greenhouse gas emissions from the transport sector. Some students backed this up with data, which is good practice, although not required here. Those students who did not achieve this relatively easy mark had either stated a year but no reason or vice versa.

Q9.3 (2 marks)

This proved to be a difficult question. Only 7% of students correctly calculated the mean annual decrease in GHG emissions. A further 13% calculated the decrease of 136 and achieved 1 mark but did not then divide by the correct number of years to find the mean. Many of these divided by 6 because there were 6 columns in the table rather than the 25 years from 1990 and 2015. This was disappointing and another example of poor mathematical skills amongst these Applied Science students.

Q9.4 (2 marks)

Some good answers were seen here. 65% of students were able to suggest at least one correct reason for the decrease in GHG emissions from the household services sector. Many good examples of 'awareness' were seen, such as the use of smart meters, and 'more efficient appliances', such as energy-saving light bulbs.

Q9.5 (3 marks)

Approximately half of students scored at least 1 mark here. The most commonly seen correct answer was the idea that less mining is taking place. Some good students did get the idea that there have been reductions in livestock or changes in the management of waste (some mention of biodigesters) in the agriculture sector and that more products are being imported in the manufacturing sector. Less able students simply referred to using electric vehicles in all three industry sectors.

Q10 (3 marks)

This question was well-answered, with almost all students achieving at least 1 mark and over 30% achieving all 3 marks. Those who achieved 2 marks missed out the idea that CO₂ emissions are now a bigger proportion of the total GHG emissions. This was as expected as this was the hardest point.

Q11.1 (2 marks)

All three of these questions on scientists were poorly answered by students. Only 5% of students knew that an environmental scientist would monitor the effects of, for example, GHGs on the environment or on organisms. Many students wrote statements such as 'to find out about how things damage the environment', which were too vague, especially since the word 'environmental' was in the question.

Q11.2 (2 marks)

It was not surprising, yet still disappointing, that many students wrote that a research scientist 'does research'. Only just over 20% of students achieved any marks here, with only 3% achieving 2 marks. Despite being clearly listed in the specification, students did not appreciate that research scientists conduct experiments or collect data, nor that their main aim is to inform others of their findings. A research scientist has featured on previous papers and the answers required here are consistent with those on previous papers.

Q11.3 (2 marks)

This question was answered slightly better than Q11.1 and Q11.2, with 45% of students scoring at least 1 mark. Since the question asked how a product developer might help reduce climate change, the answer did require more than just develop products. The idea of developing more efficient products or using more efficient processes was expected. Those who achieved both marks tended to achieve the second mark for producing less GHG emissions, making this question slightly easier than Q11.1 and Q11.2 because this idea was the main theme of section B of the paper

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.