

---

# APPLIED GENERAL **APPLIED SCIENCE**

ASC3 Science in the Modern World  
Report on the Examination

---

1775  
January 2022

---

Version: 1.0

---

---

Further copies of this Report are available from [aqa.org.uk](http://aqa.org.uk)

Copyright © 2022 AQA and its licensors. All rights reserved.  
AQA retains the copyright on all its publications. However, registered schools/colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools/colleges to photocopy any material that is acknowledged to a third party even for internal use within the centre.

**Overall comments**

Most students were able to attempt all questions on the paper. Very few students needed additional pages to give their full responses.

Students appeared to be less well-prepared for the type of mathematical calculations required in the ASC3 examination this series. It was disappointing to see that most of the un-attempted questions were those involving calculations.

Many of the answers seen which did not score marks were direct quotes from the source material which did not answer the question being asked. Centres are advised to encourage students to always write an answer in their own words unless the question specifically asks for a quote from the source.

**Q1.1 (1 mark)**

Some good answers were seen describing why the source was valid, correctly referring to quotes from scientists or the article being peer-reviewed.

**Q1.2 (1 mark)**

Many students correctly gave answers regarding the lack of a named author or the fact that the article was not recent. Some students incorrectly stated that the article was unreliable because it referred to a fictional detective. A small number of students gave the answer that it would not have been peer-reviewed even though they had given peer-review as their answer for Q1.1.

**Q1.3 (2 marks)**

Almost all students scored at least 1 mark with some very good responses seen for the reasons why the author refers to Sherlock Holmes. All answers given in the mark scheme were seen equally.

Some students who did not score marks gave direct quotes from the source which did not actually answer the question, such as he 'prophesied some of the enduring crime-solving methods'.

**Q2.1 (2 marks)**

This question was well-answered with almost half of students achieving both marks. All answers on the mark scheme were seen. Some students achieved 1 mark for a partial answer stating that finger-marks are from unknown subjects and fingerprints are from known subjects.

**Q2.2 (2 marks)**

The more able students could make the link between finger-marks and fingerprints in solving a crime. Some students were able to achieve 1 mark for having the idea of matching fingerprints on a database without mentioning finger-marks.

**Q2.3 (1 mark)**

The limitations of fingerprinting techniques were explained in the source material and around half of students were able to demonstrate their understanding of these ideas. Many incorrect answers referred to smudged fingerprints and miscarriages of justice.

**Q3.1 (1 mark)**

Over 70% of students could work out that DNA phenotyping was the name given to the process of analysing DNA to predict what a person looks like. Incorrect answers were seen across all the other options in this multiple-choice question.

**Q3.2 (2 marks)**

95% of students could give at least one correct example of a physical trait (either skin colour, hair colour or height). A small number of students did not read the question properly and named eye colour when this was the example already given in the question. Answers of simply 'skin' or 'hair' were not given credit.

**Q3.3 (1 mark)**

Most students were able to perform this simple calculation and select the correct answer from the options given in this multiple-choice question.

**Q4.1 (1 mark)**

Only one third of students appreciated that Source B would not have sensationalised language because it is an article from a scientific journal. Credit was not given for answers that just said it was a journal – the idea of it being scientific, formal, or professional, or written for scientists, was required.

**Q4.2 (1 mark)**

Students demonstrated a good understanding here of how sensationalised language is used to engage the audience or make readers want to read more.

**Q5.1 (1 mark)**

Over 90% of students achieved the mark for correctly selecting 'who committed a crime' from the options given in this multiple-choice question.

**Q5.2 (1 mark)**

The more able students correctly worked out that examining pollen through a microscope could determine what type of plant the pollen came from. A small number of students were given credit for referring to an observable feature such as shape or colour. Credit was not given to students for 'where the pollen came from'.

**Q5.3 (1 mark)**

Around half of students achieved a mark here and all answers on the mark scheme were seen in roughly equal numbers. No credit was given for cat hairs or plants because neither of these would need to be examined through a microscope in Source B.

**Q6.1 (2 marks)**

Over 60% of students understood the idea that physical fit analysis is used to determine whether fragments originated from the same object and were able to achieve 1 mark. The most able students achieved 2 marks for describing how this could show a link between two different crime scenes. Students who did not achieve marks gave a quote from the source that did not answer the question, for example 'draw links between locations, place suspects at the scene, and allow for object reconstruction'.

**Q6.2 (2 marks)**

Almost 80% of students achieved at least 1 mark. The correct answer given by most students was that evidence could be contaminated by manual handling.

Some students quoted from the source ('fragile, sharp and embedded in other materials') and did not actually say why this was a problem. The more able students stated that fragments could be damaged (because fragile) or sharp fragments could cause injury. Fragments being embedded in other materials was not given credit as a problem relating to manual handling.

**Q6.3 (1 mark)**

Almost all students correctly stated that the new technique was a form of 3D technology.

**Q6.4 (1 mark)**

Over 40% of students stated correctly that juries could visualise the evidence better using the new technique. Most students who did not score a mark incorrectly stated an advantage of reduced manual handling such as less contamination of evidence.

**Q7.1 (1 mark)**

This question was well-answered with most students able to describe fibre transfer without direct contact or contactless airborne transfer of fibres.

**Q7.2 (1 mark)**

Students were able to describe the use of fluorescent garments to observe fibre transfer. Some students did refer to UV imagery and were given credit for this. A small number of students did not pick up on the 'to observe fibre transfer' and described the participants in the elevator.

**Q7.3 (2 marks)**

This question was answered well with 80% of students scoring at least 1 mark. Most of the correct answers seen referred to the movement of people and the material of the garments. A small number of students did not read the question carefully enough and stated the variable given in the question (the opening and closing of the elevator doors). A few students had not familiarised themselves with the source and incorrectly gave 'time' or 'distance apart', both of which were controlled in the study and so were not variables that could have affected the fibre transfer.

**Q8 (3 marks)**

Approximately half of students were able to achieve two marks by describing how fibres on a person's clothing could have been because of contactless fibre transfer. The more able students could also go on to explain how this may not link them to a crime or might not prove they were guilty of a crime.

**Q9 (9 marks)**

Students achieved across the full range of marks on this extended response question. 20% of students achieved well-deserved level 3 marks (7 – 9 marks) for detailed descriptions of the roles of all, or most, of the types of scientists in the sources and their contributions to solving crimes. These responses were well-structured and included correct use of scientific terminology. Some students only included scientists from sources A and B, or only included one scientist from each source when there were many to write about in sources A and B. A small number of students named the scientist (e.g., Susan Walsh) rather than the 'type of scientist' such as a forensic geneticist. Students scored lower marks if their discussion did not include the role **and** the contribution to solving crimes. Weaker students' responses were simplistic and lacked detail. For example, a pollen scientist studies pollen to see where a crime occurred. A few students discussed the validity and effectiveness of the sources, demonstrating that they had not read the question properly. It was disappointing to see that a few students did not attempt this question at all.

**Q10.1 (1 mark)**

Less than 30% of students could use the data given to calculate the total number of genes in the human genome. Almost 10% of students did not attempt this question.

**Q10.2 (3 marks)**

This question was more accessible to students because it asked students to demonstrate that the total length of DNA in the body is 12 000 000 000 km using given data, rather than calculating an unknown length.

12% of students achieved 3 marks here for well-structured steps in their answers. Some students were able to achieve 1 or 2 marks. Marks lost were mostly due to students not converting metres to kilometres and so having the incorrect power of 10 in the answer.

It was very disappointing to see that 16% of students did not attempt the question.

**Q10.3 (2 marks)**

The most able 15% of students achieved 2 marks for understanding that these are the genes that make us unique and so are those that can be used to identify someone. A further 40% of students achieved 1 mark for the idea of uniqueness or identity but not both.

**Q11.1 (1 mark)**

Over half of students understood that a DNA database is about matching or comparing DNA. Incorrect responses tended to refer to storing DNA or matching fingerprints.

**Q11.2 (1 mark)**

A small number of students could articulate that people could be eliminated from police enquiries by volunteering to give their DNA. Incorrect answers seen included volunteers being used to 'test the system' or 'in case they later committed a crime'.

**Q11.3 (1 mark)**

Almost 80% of students knew that blood or saliva could be used as a DNA sample.

**Q11.4 (2 marks)**

70% of students achieved 1 mark, mostly for stating that wearing gloves would avoid contaminating the DNA sample. Over half of these students achieved 2 marks for explaining that gloves would prevent the officer's DNA from contaminating the sample. Credit was given to students if the contamination mentioned included cells that would contain DNA (such as skin cells or saliva). Many incorrectly stated that it would prevent contamination with fingerprints.

**Q11.5 (1 mark)**

Very few students were able to make the connection between being on the NDNAD more than once and giving different personal details. Most incorrect answers were about having committed a crime before.

**Q 11.6 (1 mark)**

40% of students correctly calculated the DNA profiles stored more than once on the NDNAD. Incorrect answers were mostly due to selecting the wrong information from the table. 7% of students did not attempt this simple calculation.

**Q 11.7 (2 marks)**

Only 10% of students correctly calculated the percentage of the UK population with a profile stored on the NDNAD. This proved a difficult question for most students. Some students used incorrect data and some students did not know how to calculate a percentage. Almost 12% of students did not attempt this calculation.

**Q 12.1 (1 mark)**

65% of students knew that data presented in a graph would enable you to see the pattern or visualise the data better.

**Q 12.2 (1 mark)**

Over 70% of students interpreted the graph correctly and could conclude that the age group with most DNA profiles was the 15–24-year-olds. Many expressed this differently but correctly, for example, 'more people aged 15-24 commit crimes than people in other age groups'. Some students expressed this incorrectly by saying 'most people on the NDNAD are aged 15-24' – this is not true as 65% of people on the NDNAD are not aged 15-24.

**Q 12.3 (2 marks)**

20% of students achieved both marks for the full calculation with a further 10% achieving 1 mark for completing the first part of the calculation.

It was very disappointing to see that over 30% of students did not attempt the question. Being at the end of the question paper, some students may have run out of time, especially if they had spent too long on the extended response question. However, it did appear that students were less well-prepared for the basic mathematical calculations this series than in previous series.

**Q12.4 (1 mark)**

Many students could suggest that ethnicity or gender was an additional piece of personal data that might be stored on the NDNAD. Some incorrectly suggested that a person's address might be stored.



### **Mark Ranges and Award of Grades**

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