



A Level **Environmental Science**

7447/2

Report on the examination

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General

Teacher feedback on the 2025 7447-2 exam was positive, in that students felt comfortable with the topics assessed and they understood the structure of the questions. This was evident in the very few questions not attempted, including the maths questions, suggesting the paper was accessible.

Some excellent answers were seen across the paper, showing strong knowledge and understanding of the specification in well-structured answers. However, in some cases a lack of careful question interpretation resulted in a significant number of students missing marks. This was evident in Q1.1 where they were asked to explain, but many described and in Q7.4 and Q8.4 where students failed to structure their response to answer both parts of the question. A few areas where students are missing out on marks include; not giving examples of biotic or abiotic factors e.g. Q8.1, using unspecific phrases such as 'pollution' e.g. Q10.1, rather than a named example and are often not clear about directions of change, using words like 'affect' rather than increase/decrease e.g. Q3.4.

Most of the maths questions proved accessible and were well answered. However, some students struggled in questions where, although only simple calculations were required, they needed to first work out what calculations they needed to perform e.g. Q3.3. There were many cases where students lost marks for not extracting data from the graph carefully enough e.g. Q5.4, Q7.3 and Q10.2. In questions where they then needed to use data they had extracted from the graph in a simple calculation e.g. division or % e.g. Q5.4 and Q7.3, they often did this successfully gaining at least one mark with their error being carried forward, if they provided their workings. It is evident that some students are not using a calculator in the exam.

Questions assessing practical skills were generally well answered, with students demonstrating good AO1 knowledge and AO2 application. Answers to evaluation questions e.g. Q7.5 generally lacked explicit statements of judgement for full marks.

The 9 mark levels of response question was attempted by most, although a lack of knowledge on the topic area was evident, and a significant number demonstrated confusion over the basic principles of asexual reproduction.

Many more students chose to answer 11.2 over 11.1, although these essay questions were comparable in the range of answers seen. Some outstanding level five responses were seen, along with the lower scoring level one responses which lacked expansion, scientific details, a range of content or focus on the question itself.

Overall, the 2025 7447-2 examination performed well.

Question 01.1

This first question was not well answered. Many provided a description of the relationship rather than an explanation. Those who did attempt an explanation but did not achieve the mark usually used unclear terminology such as 'heat'.

Question 01.2

Students needed to apply their knowledge in this suggest question, which proved to be very challenging. The presence of greenhouse gases was the most commonly seen correct answer. Regularly seen answers that did not receive the mark included; closer to the sun, no water, slow rotation and high mass. Volcanic activity was seen frequently but was not awarded the mark unless coupled with greenhouse gases. A few confused answers described data from the table.

Question 01.3

This question differentiated well. Well-structured responses were seen, however some answers only gained one mark for not stating that the speed of rotation would be slow, or did not include an element of 'duration' of exposure.

Question 01.4

A well answered question with most stating that water will be frozen or it would also be too cold for enzyme activity. The most common answer not receiving the mark was for simply stating that it was too cold to support life, without a specific reason.

Question 02.1

Almost two thirds of students achieved the mark, with the most common answer that none of the rats died during the study. However, some missed the mark by specifically stating that no 'marked rats' died, rather than inferring no rats (marked and unmarked).

Question 02.2

Most scored full marks on this question, with very few scoring zero or unattempted. Four different methods were seen to reach the final answer, however most multiplied the total population by 0.2 and 0.8 separately and then divided each into the area to give the correct range as one number. A few answers incorrectly divided the area into the % population and a few only gave 20% population density, instead of finding the range as + and – 20%. A few incorrectly added 0.2 to 965. Errors made on stage one and two were carried forward where workings were shown.

Question 02.3

Students found this a relatively easy question, with most giving competition for food and spread of disease as the most common correct answers. Those not achieving full marks were usually lacking a named resource or gave two points about competition. Rarely did answers score zero marks.

Question 02.4

Less than half gained the mark for this AO1 question, which was the second most frequently unattempted question of the paper. The most common incorrect answers included the Wildlife and Conservation Act, Wildlife Protection Act and named examples of designations such as SSSI.

Question 02.5

Over half scored two or three marks on this question, and almost three quarters achieved mark point one, demonstrating a good understanding of the reproductive strategies of r and k species. Most answers scoring two out of the three marks went on to explain that this gives r selected species a competitive advantage. The third mark point was seen less frequently, and when attempted it was often described with a lack of clarity in relation to the question.

Question 03.1

This was generally well answered and differentiated well. Most scored at least two or three marks. Answers that did not score full marks included those referring to litmus paper, or did not extend their 'observe the colour change' with 'to a colour chart'.

Question 03.2

Most answers received a mark for potassium, although a few incorrect alternatives included calcium, water and carbon. Protein synthesis and DNA were the most common correct answers given for nitrogen and DNA and ATP were the most common for phosphorous. More correct answers were seen for nitrogen than phosphorus. Many who did not score full marks gave answers that were too broad, such as for cell growth. Some gave a list of answers in each box which did not receive the mark if at least one was incorrect.

Question 03.3

Over half gained full marks and over three quarters gained at least one mark. There were a few variations of errors made on stage one, of which were carried forward into stage two, resulting in one mark. Common stage one errors included: the sum of the starting mass and the mean mass per day followed by the multiplication of the 60-day duration. Many forgot to include the starting mass. A few confused answers attempted to use the pH in the calculation showing a lack of understanding of variables.

Question 03.4

This question was not particularly well answered due to many giving a description of the relationship between pH and growth, rather than suggesting a reason e.g. growth increases as pH increases or they did not give details of the reasons but gave a simple statement e.g. plants prefer less acidic conditions. A few incorrect references were made to plants preferring more alkaline conditions.

Question 04.1

Most answers demonstrated knowledge and understanding of the information in the table, however, limited application to the question and clarity in their answer structure meant that many did not achieve full marks. A mark was most frequently given for critically endangered meaning the species was at highest risk of extinction. Unclear reasoning for habitat

fragmentation and lack of application for endemic species meant that these marks were less frequently given. Some merely gave definitions of endemic species, which was not enough for the mark.

Question 04.2

This was well answered with recognition of the role of funding.

Question 04.3

Answers that did not achieve the mark often correctly identified 'keystone species' but did not go on to clearly apply this to the question in terms of distinguishing the role of keystone species within their explanation. They often simply described the role of any non-keystone species.

Question 05.1

Less than half gained the mark in this question. Many did not include B1 in the equation.

Question 05.2

This question was not well answered as students often missed that the data for F is biomass, meaning it must be weighed (or measured). Counting fish alone would not produce biomass data and stating the data for F is recorded or monitored was not enough to say how the biomass data was found. Those who gained one mark usually did so for the second mark point of data for R, G and M would be only estimated.

Question 05.3

A well answered question with 'number of days at sea' being the most common answer. A few did not achieve the mark for mis-interpreting the question being about any factor that may cause fishing effort to change, rather than factors that directly contribute to effort.

Question 05.4

Many read 19800 correctly from the graph but those who only achieved one mark commonly gave 23000 in place of 3200, having read both values from the left hand x axis. Those who did so but divided correctly achieved an error carried forward mark. Students should give their answers to the same level of precision as the raw data, in this case two.

Question 05.5

Unfortunately, many answers demonstrated a misunderstanding of CPUE, thinking it was a product of purposefully lowered fishing effort and resulted in leaving more fish in the sea to reproduce and replenish populations. These answers scored a maximum of two marks if they went on to provide two converse mark points (in the same context as error carried forward). Those who did understand the implications of a decrease in the CPUE, often went on to successfully link this to impacts of fishing and gain full marks. Many answers gave good links between a decreasing CPUE and lowered energy efficiency per fish, resulting in more fuel, carbon dioxide emissions contributing to climate change. A few answers discussed sustainability in terms of a socio-economic impact rather than environmental.

Question 06.1

This was well answered, with three quarters of students accessing the mark. Students that did not tended to miss out the idea of cultivation/growing. Although not commonly seen, some answers indicate a lack of understanding of the concept of a species.

Question 06.2

A full range of answers were seen, but there were many level 1 answers showing a clear misunderstanding of the concept of asexual reproduction. Many confused artificial insemination/embryo transfer to be asexual reproduction. As well as this confusion, many level 1 answers only gave one method and failed to expand with details about how or why this was advantageous in a comparative context. Level 1 and level 2 answers often included explanations that were not specific to one particular method e.g. increase in desired characteristics, which is linked to all the methods.

Level 2 answers usually included named methods but often lacked clarity in the details and gave limited elements of advantages or comparisons. GMO was sometimes referenced, though not made relevant to the question. Level 3 answers linked asexual and sexual reproduction to a few specific named methodologies for each, often with brief details of how the method works, and included advantages of each with some comparison. The higher scoring answers were well structured in relation to the question focusing on all aspects and included excellent terminology and examples.

Question 07.1

A reasonably well answered question with most answering in context of a threat to livestock or crops although 'pest' was sometimes used without context. Those who referenced an impact of an invasive species often failed to qualify this impacting a protected species and failed to achieve the mark.

Question 07.2

Most students achieved the mark with leg ringing, tagging and observation of unique markings being the most commonly seen. Those who did not achieve the mark often stated 'mark release recapture' answers or taking photos on motion sensitive cameras but gave no link to unique markings. Some answers confused individuals and species identification e.g. auditory monitoring.

Question 07.3

A well answered question. However, many of those who only scored one mark did not read the graph carefully enough and gave incorrect data for wild bred birds, often giving 40 or 41 instead of 39 or the incorrect total, often giving 65 instead of 64. An error carried forward mark was often applied to those answers who went onto find the % correctly. The % calculation was usually correct. Only a few failed to round their answer correctly or did not give it to a whole number.

Question 07.4

On the whole students found this question challenging, despite some excellent answers seen by a few who provided evaluative comments about specific information from the graph. Many pointed out that the released pairs had the highest frequency of no chicks leaving the nest ('Accept' mark point). Although most attempted the first mark point, there was a lack of ability to articulate the difference between the origins producing the highest mean number of chicks and the frequency of different origin pairs producing the highest mean number of chicks. There were many answers describing general elements of the graph that did not link to the question e.g. released pairs have more years of experience. Many picked out that there were not the same number of pairs with each origin but did not go on to evaluate this by saying this made it difficult to compare the results between the origins.

Question 07.5

Many students did not structure their answer to fully answer the question. There were many correct points that did not link to eagle release and so missed the mark. The idea of 'long-term population increase' was often missed. Simple answers such as 'soft release' were not enough for one mark. Many included 'monitoring' as an answer but did not qualify of what and how this would help long term population increase.

Question 08.1

Students found this question challenging, with only a small proportion achieving full marks. Answers scoring zero often gave vague points such as 'makes the data more accurate/reliable/reduces anomalies' and made no attempt at linking their answer to mangroves. Many students stated that more samples would reduce the spread of data around the mean, which did not score a mark. There were a reasonable number who did present the concept that it would allow the collection of a greater variety of data due to including a wider set of environmental conditions. However, many did not give an example of an abiotic or biotic condition and therefore did not achieve the second mark point.

Question 08.2

This proved challenging with less than a third able to correctly answer this question on standard deviation. Many gave D as an incorrect answer.

Question 08.3

Most students attempted this question, despite appearing difficult. The majority failed to convert 46 to 0.46. The equations themselves were often done correctly, but the appropriate number of significant figures was not well understood and many failed to give their answer to three significant figures. Many students achieved two marks, with errors carried forward. Those who failed to convert units, but did give an incorrect answer (out by $\times 10^2$) to three significant figures were awarded three marks with their error carried forward. Over a quarter of the cohort achieved three marks or more and only a very small proportion achieved zero marks.

Question 08.4

As with Q7.5, students often failed to structure their answers carefully enough to fully apply to the question. Two parts were required for one mark; a function provided by mangroves and

how this reduces the impacts of climate change. Many only gave functions of mangroves. Those that gained full marks often produced well structured, coherent and detailed answers. Most correct answers included carbon sequestration reduces greenhouse gases helping to prevent further global warming. However, those who only stated 'carbon sequestration' did not achieve the mark.

Question 09.1

This practical question was well answered and differentiated well with sweep nets and pheromone traps being by far the most frequently seen correct answers. Those who only gave generically named equipment, such as nets or traps did not achieve the mark.

Question 09.2

This practical question was answered well with nearly three quarters gaining one or more mark. Most students achieved the first mark point, 'not attracted to UV light', but the whole range of mark points were seen.

Question 09.3

This proved to be the most difficult question on the paper and was not answered well showing a lack of understanding of the factors that govern the choice of a statistical test. Students often stated the independent and dependant variables, rather than the characteristics of these variables. Those who were on the right track often gave two of the same mark point such as counted data and frequency data. Many correctly gave counted data but few gave categoric data.

Question 09.4

Most students achieved the mark on this simple maths question by presenting their answer as it is laid out in the mark scheme. However, some answers missed the mark by not fully showing their working, instead only giving $523/6$. Some over complicated their attempt by trying to use the Chi-squared formula. This was the most frequently non attempted question of the paper, demonstrating that a significant number did not understand what was being asked.

Question 09.5

This statistics question was well answered with more than half gaining all three marks. Those who only achieved two marks usually failed to perform the final stage of addition, and instead gave 0.17 as their final answer, suggesting that sigma is not well understood, despite being labelled in the key.

Question 09.6

This question was not as well answered as expected. Answers that missed the mark often missed the term 'significant' or stated 'correlation' instead of 'difference'. Some failed to include the variables and only gave simple statements such as no difference. The question refers to 'this' investigation and so students should relate the null hypothesis to the specific variables being investigated.

Question 09.7

This question differentiated well with over half gaining one mark and a third gaining full marks. A few selected an incorrect critical value, (often 12.59 due to not finding the correct degrees of freedom) but this error was carried forward and the mark awarded for the second mark point if they went on to interpret the outcome correctly. A reasonable number confused the p value with the critical value.

Question 09.8

This was attempted by most and well answered if students were careful enough to focus on variety and not simply more named resources available. A few missed the marks for only providing vague answers such as 'resources', 'habitats' or not giving a named abiotic factor. The term 'habitat' is rarely enough when providing examples of ecological needs. Some failed to interpret the question accurately and just stated facts from the table, such as it has the highest Simpsons diversity index. Some failed to calculate the mean and instead of giving their answer as mixed, they gave D.

Question 10.1

Most of the students attempted this question but few gained full marks by not developing their answer enough. Answers that only scored one mark often linked the breakdown of PET to it no longer being in the environment, but then did not expand. For example, can be recycled so less going to landfill. The term 'pollution' was seen frequently but is too vague to achieve a mark.

Question 10.2

Those who read the graph carefully and noted the 'describe' command gave good answers using data. Those who only achieved one mark usually gave the wrong data from the graph e.g. 78 and 80 were frequently seen, but described the relationship well. Those who scored zero often failed to note the command word and gave an explanation about enzymes denaturing instead of describing. Equal numbers achieved one and two marks.

Question 10.3

Just over half gained the mark for this maths question. Many gave the correct answer but gave it to more than two significant figures or failed to round their answer and gave 8.3. There were a significant number who made an error reading the graph but carried out the correct calculation.

Question 10.4

Over a third scored zero on this question with evidence that some had missed the focus on 'sustainability'. There were some confused answers referring to the risk of enzyme denaturing. Most answers achieved mark points one and two.

Question 10.5

Over half gained at least one mark but less than a third gained full marks. Lack of knowledge was not an issue, instead answer structure prevented many from accessing the available marks. Answers were not always fully developed into explanations. Simple answers such as 'for biomimetics' or 'medicines' did not answer the first part of the question. This resulted in many

giving partial answers that overall scored no marks. Those who achieved full marks gave answers structured to fully answer the question. Named examples helped gain the mark where sentence structure lacked clarity.

Question 11.1

Some excellent accounts of various environmental impacts associated with intensive agriculture were seen, expanded with scientific processes and relationships. Habitat destruction was often seen in association with extensive agriculture and a few excellent answers include positive impacts of methods associated with each system such as through the use of organic fertilisers providing food for detritivores which aerate the soil enhancing drainage as well as improving soil structure by binding peds which reduces soil erosion. Most answers compared the systems well and higher level answers made links between energy use and impacts.

A few answers over expanded on some impacts for example by producing long written accounts of the consequences of climate change, from the increased greenhouse gases produced by the Haber process. While the expansion of points using processes and relationships gains valuable credit a few who wrote whole pages on climate change (documenting several consequences), not only lost focus a little but they also restricted the range of content/ other direct points they usually provided. The answers reaching the highest levels did so by expanding on each of their points using detailed scientific processes and relationships in a concise writing style, so not to take up so much space (and time) enabling them to include a wider range of detailed points. Lower level answers often only addressed two or three points for each system, whereas the highest level answers usually addressed at least four or five points across both impacts and energetics. Well structured essays compared the systems point by point and included impacts to the atmosphere, hydrosphere, biosphere and soil.

A few essays lost focus of the comparison between intensive and extensive systems by simply writing accounts of a range of different agricultural methods, the impacts they produce and ways in which these can be prevented or reduced, without explicitly linking each to one of the systems.

The environmental impacts element of the question was addressed more comprehensively than the energetics aspect, which was usually only discussed in terms of the use of fossil fuels for farm machinery or electricity for light and heating. Essays reaching higher levels also included the energy used in various agrochemical production and a small number included content on feed production, and improving FCR. Key terminology associated with energetics such as energy ratio, embodied energy and FCR was rarely seen.

Question 11.2

A far greater number of students chose this essay over 11.1, which proved to be an accessible question with most answers being of a considerable length.

A wide range of answers were seen, with the highest scoring responses including expanded and detailed scientific processes and relationships of several points of importance and threats, equally balanced between the two habitats and comparisons made. Good answers explored the same points between the two habitats, such as the different ways each are

important in temperature regulation and how each are threatened by climate change. The inclusions of comparative positive and negative feedbacks also demonstrated synoptic understanding. Other examples included links and comparisons to the hydrosphere, biosphere and resource exploitation. Higher level answers included accurate scientific details of the points they made and ozone depletion was often seen in level 5 answers.

Good answers linked the specific ecological features of each habitat to their importance and compared two or three points of importance and two or three threats of each habitat. Excellent answers compared three or four points of importance and three or four threats to each habitat, expanding each and giving scientific details of processes. Relationships were described between the ecological features as well as between importance and threats, and key terminology was used. Some expanded their points on threats with brief descriptions of current methods used to reduce these threats, thereby helping to reduce their magnitude.

Lower level answers often lacked expansion on points made, little or no scientific details and only two or three points made overall. Comparisons were not always made and some responses were presented more as two separate essays one after another. There was frequent confusion over the concept of astrology and astronomy and that polar bears live in Antarctica.

Mark Ranges and Award of Grades

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