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Environmental Science 44402

(Specification 4440)

Unit 2: Investigations in Environmental Science

Report on the Examination

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ISA 1 – Fieldwork Investigation - Domestic energy consumption
ISA 2 – Laboratory Investigation - Measurement of rates of photosynthesis

This year was the second examination of ISAs in Environmental Science and it was anticipated that there should be little or no difference in the grade boundary marks compared with last year.

Very few students attempted the Fieldwork ISA this year. The study of photosynthesis was perceived as an easier option to organise. As last year, because no complete school-based investigation was seen, it was difficult at times to interpret some of the selective comments made in answers which referred to students own work. This was especially so when schools/colleges submitted tables and graphs which did not agree with students' answers to questions. Some of the laboratory work was impressively researched by a few schools/colleges.

The moderators were satisfied, however, that the marking guidelines allowed teaches to reflect the ability of their students through the published mark scheme. There was some deviation from the suggested answers to questions and there were several specific misunderstandings to some answers that are mentioned below. Only about 30% of schools/colleges submitted marks which were 'within tolerance'.

Administration of the ISA

Some schools/colleges had difficulty with administering the ISA. A few schools/colleges submitted work well after the published deadline. It is worth noting that the deadline for submission of marks/work to the moderator is **7th May**. Several schools/colleges were slow in dealing with requests for sample scripts. Some schools/colleges did not send a fully completed Centre Declaration Sheet.
Separate Candidate Record Forms are no longer required as the information is now incorporated onto the front cover of the ISA paper.

Once received, the ISA papers were generally in good order. Apart from a few schools/colleges, where the presentation was untidy and the work of some students was difficult to read, the scripts were generally well produced and based on some good centre-based investigations. Fewer schools/colleges submitted unbound work which made the physical processing of the work easier. Some markers failed to write their marks on the scripts or wrote insufficient in annotations to assist the moderators in finding evidence to award marks. This year accurate totals of marks were submitted and all schools/colleges included PSA marks on the main mark sheet. More teachers contacted moderators with queries on the Teachers Notes' this year to receive advice.

More teachers this year did not keep strictly to the marking guidelines and were too generous in their allocation of marks. It is recommended that if teachers are unsure how to allocate marks they should contact their Coursework Adviser. It is recommended that teachers attend one of the Teacher Standardisation meetings organised by AQA in the Autumn term.

Also of concern was that some schools/colleges had printed off versions of the paper in a different font, which in a few case resulted in not all information on the page being presented. This may have disadvantaged their students.

General comments on Fieldwork and Laboratory ISAs

- The graph work was untidy again this year. This made it difficult to verify the accuracy of the work. There was a lack of complete titles to graph axes and tables in the work of many students. A particular omission was reference to 'mean' values and 'per minute' on the dependent axis labels. In a few cases table contents did not match with the graph plots.
- Several students referred in their answers to variables and data which were not in the graphs and tables submitted. It was, thus, impossible to verify their accuracy.
- Many basic terms need to be learnt more thoroughly by students. For example, the words 'accuracy' and 'reliability' are not interchangeable.
- There was a lack of quantification in answers to questions which required evidence for showing links between variables.
- When requested to use evidence from their own work in an answer, some students were reluctant to do so.
- Moderators would welcome more information from some schools/colleges on the work done by students in their investigations. When schools/colleges provided details it was very useful in interpreting students answers.
- Most investigations done by schools/colleges were straightforward and well organised. Most students appeared to have understood the work they had done. This made it easier for them to tackle Section 2 of each paper successfully.

Specific comments – ISA 1 Fieldwork Investigation

Question 1

In 1(b) many students lost a mark by not fully defining the dependent variable eg 'electricity used' should be qualified by 'in kWh', as on their graphs.

Question 2

In 2(a)/2(b) some very vague answers were offered here. More detail on method of collection needed.

Question 3

In 3(b) more precise definition of their control variable was needed.

Question 7

Quality of graph and table construction was generally poor. More care and accuracy is required at this level. If points need to be joined on the graph then they should be on a smooth, clear line.

Question 8

In 8(a) there were some good ideas, although several students appeared to be unsure of the definition of 'random'.

Question 9

Calculations were sound.

Question 10

A few students did not regard the 0 (zero) as a significant figure and gave four significant figures; thus losing a mark.

Question 11

In 11(a)/(b) only a few students answered these correctly. The majority did not refer to a 'house construction' variable – as named in the marking guidelines.

Question 12

In 12(a)/(b) some students showed a lack of understanding of the differences between types of graphs and charts.

Question 13

A lack of structure in answers lost marks for many students. Poor use of English language was a problem for several.

Question 14

In 14(a)/(b) there were some good ideas here, but they were generally poorly presented. More qualification and explanation were needed, rather than the simple statements made by most students.

Question 15

In 15(a)/(b) again there were some good ideas, but they were generally poorly presented. There is no short cut to getting the mark here. The marking guidelines indicated what was required.

Specific comments – ISA 2 Laboratory Investigation

Question 1

A large number of students did not adhere to the sentence construction guided by the stimulus words. Several confused answers failed to achieve marks.

Question 2

In 2(b) the majority of students struggled to give a reason for their choice of range. It is recommended that there is more discussion with students on the methodology of their work.

Question 3

The most common answer was 'amount of bubbles'. The guidelines required an answer such as 'The number of bubbles produced per minute' to gain one mark.

Question 4

In 4(a)/(b) the idea of control variables was poorly developed because it appeared to be poorly understood.

Question 6

There were many unqualified statements and time units were often omitted.

Question 7

Rough and untidy graphs and tables were most common. Most students omitted words or units from axis titles (eg 'mean of..' and'…per minute'). Several marks were carelessly thrown away here.

Question 8

Generally students had the right ideas for the answer to this question but many failed to organise the information well and used poor English. A few students wrote about an experiment on the pond itself, rather than a laboratory test.

Question 9

In 9(a) very few students identified that the very small difference in readings between 0 and 5 cm showed a problem.

Question 11

In 11(b) the calculation was universally well done. But most students did not remove the anomalous figure and thus gained only one of the two marks available.

Question 12

In 12(a) only a handful of students gave a correct answer. Most seemed to find difficulty in interpreting the simple graph. This is clearly an area where more pre-ISA preparation time is essential.

In 12(c) there were many weak answers to the 'different' part of the question. Most did not compare the 'trend' but talked more about the construction of the graph.

Question 13

In 13(a)/(b) many answers to these questions were disappointing. Many answers were unqualified. Some were vague eg 13(b) 'Because it looks nicer' – without identifying the 'it' or what 'nicer' means.

Mark Ranges and Award of Grades
Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.

UMS conversion calculator www.aqa.org.uk/umsconversion