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General Certificate of Secondary Education
Specimen Paper

Environmental Science

44402

Unit 2 Investigations in Environmental Science
Specimen ISA Paper
Fieldwork Investigation

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Valid for submission in XXXX

For this paper you must have:

- results tables and charts or graphs from your own investigation.

You may use a calculator.

Time allowed

- 45 minutes

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the space provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 34.
- You are expected to use a calculator where appropriate.
- In some questions you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Signature of teacher
marking this ISA

Date

The specimen assessment materials are provided to give centres a reasonable idea of the general shape and character of the planned question papers and mark schemes in advance of the first operational exams.

44402

Section 1

These questions are about the fieldwork investigation that you carried out related to the distribution of a particular species.

Answer **all** questions in the spaces provided.

1 In your investigation:

1 (a) what was the **independent** variable (the one that you deliberately changed)?

.....
.....
(1 mark)

1 (b) what was the **dependent** variable?

.....
.....
(1 mark)

2 (a) Write down **one** thing that you **measured** during your investigation.

.....
(1 mark)

2 (b) How did you make this measurement?

.....
(1 mark)

3 Why was it necessary to take several measurements within each sample, rather than just one?

.....
(1 mark)

4 Write down **one** other factor that may have affected the outcome of your investigation.

.....
(1 mark)



5 Explain what you did to control or take account of this other factor.

.....
.....
(1 mark)

6 Were there any random errors in your results?
Draw a ring around your answer.

Yes / No

Use examples from your data to explain your answer.

.....
.....
(1 mark)

7 Look at your results table and graph or chart.

7 (a) What conclusion can you make from your investigation about a link between the two variables that you were investigating?

.....
.....
(2 marks)

7 (b) Use your results to justify the conclusion that you have reached.

.....
.....
.....
.....
(2 marks)

8 Make sure that your results tables, and charts or graphs are handed in with this paper.
You will be awarded up to 6 marks for these.

(6 marks)

Turn over for the next section



Section 2

These questions are based on a vocational application of your own investigation. In some questions you will also be required to relate your own method/results to this new context.

Answer **all** questions in the spaces provided.

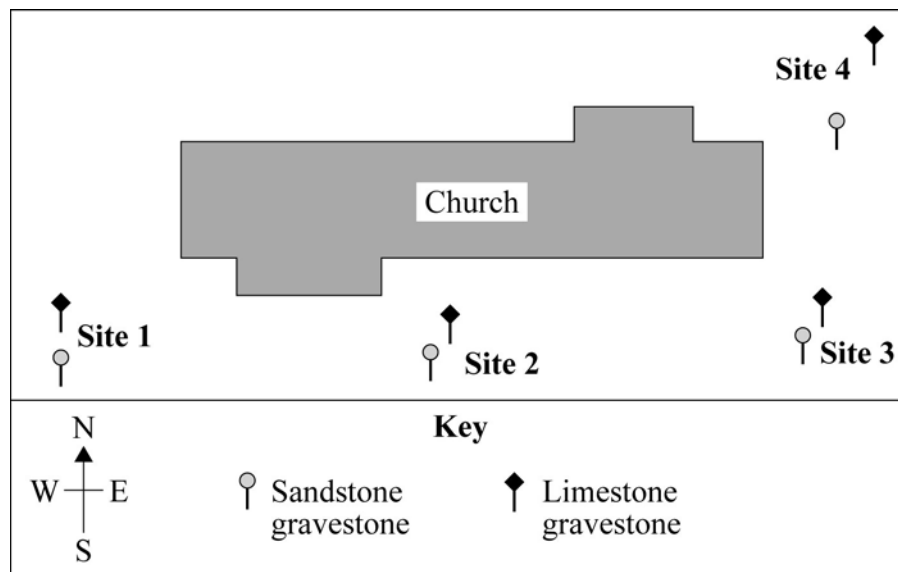
These questions are about an investigation into the distribution of snails in a churchyard which was about to be designated a Local Nature Reserve. It was carried out by a group of Environmental Scientists working for Natural England.

They wanted to find out whether snails in a churchyard are evenly distributed or not.

In the churchyard there were two sorts of gravestones: limestone and sandstone. They predicted that they would find more snails around the limestone grave. They thought this because limestone is calcium carbonate and snails' shells are made of this.

They chose 4 pairs of gravestones. For each pair they tried to find a limestone and a sandstone one as close together as possible. They chose 4 different positions around the church.

The plan below shows the positions of the 4 pairs of graves.



The results of the scientists' investigations are shown in **Table 1** and **Table 2**.



Table 1

Limestone number	Number of snails counted on each side				Total number
	East	West	North	South	
1	9	2	0	2	13
2	2	0	0	2	4
3	1	4	6	0	9
4	7	15	1	1	24
Totals	19	21	7	5	52
Mean number of snails per gravestone					13

Table 2

Sandstone number	Number of snails counted on each side				Total number
	East	West	North	South	
1	5	3	0	0	8
2	2	1	0	3	6
3	0	4	6	0	10
4	3	4	4	1	12
Totals	10	12	10	4	36
Mean number of snails per gravestone					

- 9 The scientists chose to investigate whether the type of gravestone affected the distribution of snails.

What kind of variable is the type of gravestone?

Tick (✓) the box beside the correct answer.

A categoric variable

A control variable

A dependent variable

A discrete variable

(1 mark)



10 The scientists chose 4 pairs of gravestones.

Why was this better than just choosing one pair?

.....
(1 mark)

11 In each pair, the scientists found a sandstone and a limestone grave that were as close together as possible.

Use ideas from your own investigation to suggest why this was a sensible thing to do.

.....
(1 mark)

12 Work out the mean number of snails per sandstone gravestones.

Write your answer in the box in **Table 2**.

(1 mark)

13 Describe **one** pattern that you can see in the results.

.....
.....
(2 marks)

14 It might have been easier to see any differences if the results were presented graphically.

Describe **one** way of showing these results graphically. Explain whether you would use a bar chart or a line graph, and what you would plot on each axis.

.....
.....
.....
.....
(3 marks)

15 Suggest **one** other factor that could be influencing the distribution of snails.

.....
(1 mark)

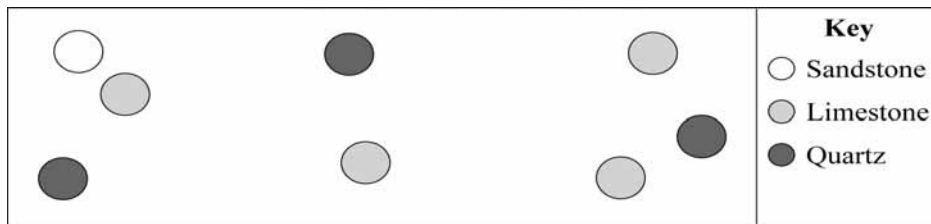


16 Suggest **one** way in which the results of the scientists' investigation could help to preserve endangered species.

.....

(1 mark)

17 After the field investigation, the scientists wanted to carry out a test in the laboratory. They planned to put several pieces of rock into a large tray. They would then put a number of snails into the tray and record which piece of rock they went to.



17 (a) What is the advantage of carrying out this second experiment?

.....

(1 mark)

17 (b) Using ideas from your own fieldwork investigation, explain how the scientists should carry out this investigation. You should write down the method in such a way that the scientists would be able to follow your instructions and obtain valid results. *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

.....

(4 marks)

END OF QUESTIONS



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