AQA

GCSE Science Specimen Papers

Biology 4411
Science A 4461
Science B 4462

ISA and marking guidelines
Revised Biology 1 – Fieldwork ISA B1/Specimen

Revised Biology 1 - Fieldwork   ISA B1/Specimen

This ISA relates to Unit B1 Science A(446X), Science B(446x) and Biology (44xx) sections 11.5 and 11.8

Area of investigation
This work should be carried out during the teaching of the section relating to:
What determines where particular species live and how many of them there are?
Or
How do humans affect the environment?

RISK ASSESSMENT
It is the responsibility of the centre to ensure that a risk assessment is carried out.

The Practical Work
For this part of the investigation candidates may work individually or in groups.

A suggested method is described below but centres may adapt this method to suit their own needs.

The teacher should complete the ISA Explanation sheet. An ISA Explanation Sheet must be included with each piece of candidates' work that is sent to the moderator. Instructions of a general nature may be given to candidates, but these must not be so prescriptive as to preclude the candidates from making their own decisions.

Students must always carry out a fieldwork investigation related to the distribution of a particular species. They may investigate any factor that may possibly influence the distribution. For example, they might investigate the height of grasses at different distances from a footpath, or they might investigate the distribution of certain indicator plants and link this to the type or acidity of the soil.

Candidates need to produce a table for the results and draw a graph or bar chart to show their results. They will need to have collected sufficient data to display in such a format.
(Refer to the Teachers' Guide for further clarification)

The Data Processing
For this part of the investigation candidates must work individually under direct supervision.

Each candidate should draw up his or her own table of results and should process the data in an appropriate way, e.g. charts, graphs, diagrams, line of best fit.

The candidates' work should be collected by the teacher at the end of this session and only returned to the candidates when they undertake the subsequent ISA test.

Candidates' work must **not** be annotated with additional information, either by the teacher or the candidate, which would give them an unfair advantage during the ISA - e.g. the use of the terms independent/dependent variable.

ISA Explanation Sheet

to accompany Each ISA
(You will need to fill in more than one of these sheets if different students have carried out different methods)

Centre Number						Date Practical Carried Out	

ISA Code	**B1/Specimen**	ISA Title	**Fieldwork Investigation**

Name of Teacher	

Independent variable	**Shade or no shade**	Dependent variable	**Height of flowers**

Did you make any changes to the suggested Method?

YES / NO

If Yes - give details of any changes you made to the suggested method, the equipment, chemicals etc. for this investigation.

Method:
Measure the height of flowers in two different areas over a period of time

Any other Information:

Teacher Signature:	**Please attach any experimental worksheet or outline used by the candidates to carry out the investigation if available.**

Surname			Other Names		
Centre Number			Candidate Number		
Candidate Signature			Date		

General Certificate of Secondary Education
June 2XXX / June xxx

SCIENCE / BIOLOGY   SCYC/BLYC/B1/Specimen
 ISA B1/Specimen   Fieldwork Investigation

AQA
ASSESSMENT and
QUALIFICATIONS
ALLIANCE

To be conducted before 4 May 2xxx
For submission in May 2xxx or May 2xxx or May 2xxx

For this paper you must have:
- results tables and charts or graphs from your own investigation.

You may use a calculator.

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

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	**YES / NO**

Signature of teacher marking this ISA _____ Date _____

SECTION 1

These questions are about the investigation that you carried out on fieldwork

Answer all questions in the spaces provided.

1   What were you trying to find out in your experiment?

   ....

   ....

   (2 marks)

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

   ....

   ....

   (1 mark)

   (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   How did you decide where to take your samples?

   ....

   ....

   (1 mark)

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

....

(1 mark)

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

....

....

(1 mark)

7 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.

....

....

....

(2 marks)

8 What did you find out from your investigation?

....

....

....

(2 marks)

9 Do you think that you have enough data to make a conclusion?

Draw a ring your answer.

Yes/No

Use your data to explain your answer

....

....

(1 mark)

10 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)

18

SECTION 2

These questions are about an investigation that may be similar to the one you did.

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

These questions are about an investigation into the distribution of snails in a churchyard. It was carried out by Sally.

Read Sally's report, look at the tables of data and then answer the questions that follow.

"I wanted to find out whether snails in a churchyard are evenly distributed or not. In the churchyard there are two sorts of stone grave: limestone and sandstone. I predict that I shall find more snails around the limestone grave. This is because limestone is calcium carbonate and that is what the snails shells are made of.
I picked 4 pairs of stone graves. I tried to find a limestone and a sandstone one as close together as I could.
I chose 4 different positions around the church. Here is a plan to show where they were."
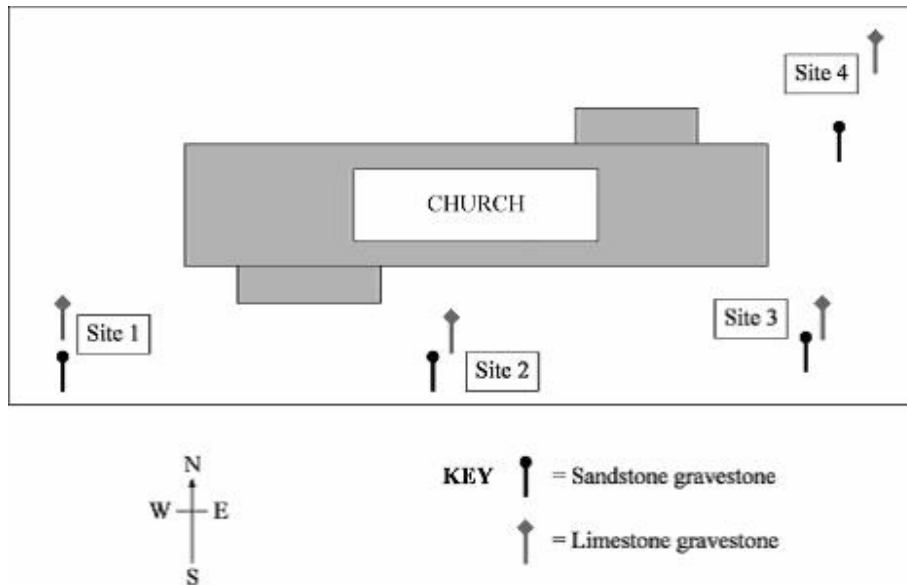
Limestone number	Number of snails counted on each side				Total number
	East	West	North	South	
1	9	2	0	2	13
2	2	0	0	2	4
3	1	4	6	0	9
4	7	15	1	1	24
Totals	*19*	*21*	*7*	*5*	*52*
Mean number of snails per gravestone					*13*

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					

11   Sally chose to investigate whether the type of stone grave affected the distribution of snails.

What kind of variable is the type of stone grave?

Tick the box beside your choice.

A categoric variable ☐

A control variable ☐

A dependent variable ☐

A discrete variable ☐

(1 mark)

12   Sally chose 4 pairs of stone graves.

Why was this better than just choosing one pair?

....

(1 mark)

13   In each pair, Sally found a sandstone and a limestone grave that were as close together as possible.

Why was this a sensible thing to do?

....

....

(1 mark)

Turn over ▶

14 Work out the mean number of snails per sandstone stone grave.
Write your answer in the box in the table.

(1 mark

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

....

....

....

(2 marks)

16 It might have been easier to see any differences if Sally had presented her results 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.

To gain full marks in this question you should write your ideas in good English.
Put them into a sensible order and use the correct scientific words.

....

....

....

....

....

....

....

....

(4 marks)

17 Is there any evidence to suggest that Sally's prediction is correct, and that snails do prefer limestone to sandstone?

Draw a ring around your answer.

Yes/No

Explain your answer.

....

....

(1 mark)

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

....

....

(1 mark)

19   Suggest **one** way in which Sally could improve the reliability of her results.

....

....

(1 mark)

After her field investigation, Sally carried out a test in the laboratory.

She put several pieces of rock into a large tray.

She then put 15 snails into the tray and recorded which piece of rock they went to.

Plan of tray with rocks:

Key: ◯ = Sandstone   ⬤(grey) = Limestone   ● = Quartz
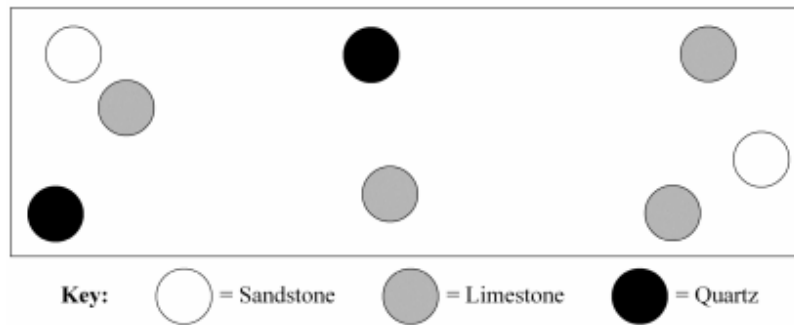
Results:

Type of rock	Number of snails
Sandstone	4
Limestone	10
Quartz	1

20   What is the advantage of carrying out this second experiment?

....

....

(1 mark)

21 Why did Sally put some samples of quartz rock into the tray?

Tick the box beside your choice.

To act as a control experiment ☐

To provide extra shelter for the snails ☐

To separate the limestone from the sandstone ☐

To find out whether snails liked quartz ☐

(1 mark)

22 Did Sally carry out a fair test in this second experiment?

Draw a ring around your choice.

Yes/No

Explain your answer.

....

....

(1 mark)

END OF QUESTIONS

GCSE Science - Investigative Skills Assignment - Marking Guidelines
Biology 1/Specimen – Fieldwork
For use in May xxxx or May xxxx

Please mark in red ink, and use one tick for one mark. Each part of each question must show some red ink to indicate that it has been seen.

Subtotals for each part of each question should be written in the right-hand margin.

Enter the marks for **Section 1** and **Section 2** and the **total mark** on the front cover of the answer booklet.

The teacher must sign and date the front cover of the ISA.
The papers must be kept in a secure place and must **not** be returned to the candidates

Section 1			
Question	**Answer**	**Additional guidance**	**Marks**
1	Dependent variable correctly named Independent variable correctly named	e.g. the number of daisies growing e.g. at different distances from the footpath	1 mark 1 mark
2 (a) 2 (b)	May be the dependent or independent variable	e.g. number of daisies, distance from footpath	1 mark
	Correct method of measurement	This will be dependent upon the answer to part (a), e.g. counting them, using a ruler	1 mark
3	Idea of allowing for random errors/ to be able to spot anomalous results/ to improve reliability		1 mark
4	Reason given for choice of sample sites		1 mark
5	Suitable factor given, e.g. soil/ amount of sunlight/ wet or dry conditions		1 mark
6	Suitable explanation, e.g. tried to make sure that this condition was the same in all test sites		1 mark
7	Suitable data quoted as an example, e.g. Yes, because the data at point X did not fit into the rest of the pattern/ there was quite a bit of scatter about the mean e.g. No, because all the data was very close to a best fit line	(No mark for simply choosing Yes or No)	1 mark

8	Simple statement, e.g. the number of daisies did vary with distance from the footpath		1 mark
	Further detail, e.g. the further away from the footpath, the more daisies there were		1 mark
9		(No mark for simply choosing Yes or No)	
	Reason given, e.g. Yes, because I can see a clear pattern/ relationship between the variables or e.g. No, because I need more data at point X/ there are some anomalous results that need repeating		1 mark
10	**Table:** Correct headings AND units all correct for all measured variables	Table with incomplete headings or units for the measured variables = 1 mark e.g. all headings present = 1 e.g. all units present = 1	2 marks
	Graph: • X axis: suitable scales chosen and labelled with quantity and units	Accept axes reversed It may not always be necessary to show the origin	1 mark
	• Y axis: suitable scales chosen and labelled with quantity and units	Scales should be such that the plots occupy at least one third of each axis	1 mark
	• Points or bars plotted correctly to within ± 1 mm	Allow **one** plotting error out of each 5 points plotted Allow error carried forward from incorrect plots	1 mark

	• Suitable line drawn on graph or bars correctly labelled on bar chart
	
	If the wrong type of graph/ bar chart is drawn, maximum = 3 marks
		If wrong type of graph/chart, maximum 3 marks
		If the independent variable is:
		    continuous should draw a *best fit line graph*
		    categoric should draw a *bar chart*
		    discrete allow either a bar chart or a line graph
			1 mark

SECTION 2			
11	A categoric variable		1 mark
12	One pair may not be typical/ idea of improved reliability		1 mark
13	So that other factors will be constant	Other factors may be named, e.g. shade/ soil type/ wetness	1 mark
14	9		1 mark
15	Any suitable pattern, e.g. snails seem to prefer west, east, north, south in that order	If simply states more snails on limestone than on sandstone, award 1 mark. Cannot really have a pattern when only 2	2 marks
16	bar chart number of snails on y axis type of stone/direction on x axis Quality of written communication - correct use of any two technical terms, eg dependent variable/ independent variable; continuous variable / categoric variable; axis.		1 mark 1 mark 1 mark 1 mark
17	Yes, more snails on limestone	(No mark for simply choosing Yes or No)	1 mark
18	eg sun/shade/moisture/type of vegetation/type of soil		1 mark
19	More repeats and calculate new mean		1 mark
20	Idea of checking with alternative data		1 mark
21	To act as a control experiment		1 mark
22	No. more limestone pieces than sandstone or quartz put in		1 mark