OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



EXAM QUESTION PACK

B6.1 MONITORING AND MAINTAINING THE ENVIRONMENT

SCORE	PERCENTAGE
/149	%

STEMUP

These questions belong to OCR, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by OCR. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with OCR and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. OCR has not endorsed, approved or been involved in the production of it. OCR and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

OCR publishes its past papers, mark schemes and examiner reports. Always check the current specification at ocr.org.uk before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Gateway Biology A (9-1)

Monitoring and maintaining the environment

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **149**.
- The total number of marks may take into account some 'either/or' question choices.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

1 Many habitats are being destroyed.

Why is it important that we stop habitats from being destroyed?

A to maintain biodiversity
B to maintain homeostasis
C to maintain active transport
D to maintain differentiation

Your answer ☐

[1]

2 The rock pocket mouse is a small grey coloured mouse that lives in Mexico.



These mice are the main food for owls.

Rattlesnakes also feed on these mice.

The mice get most of their food from grass plants.

Scientists want to construct a pyramid of biomass for this food web.

They first need to estimate how many organisms there are in the area.

They decide to do this using sampling.

(i) Describe how the scientists would sample an area and ensure that the sample was not biased

---

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

[2]

(ii) * To estimate grass cover and the number of animals, they use a quadrat.

Why do scientists use sampling when studying the organisms living in a habitat?

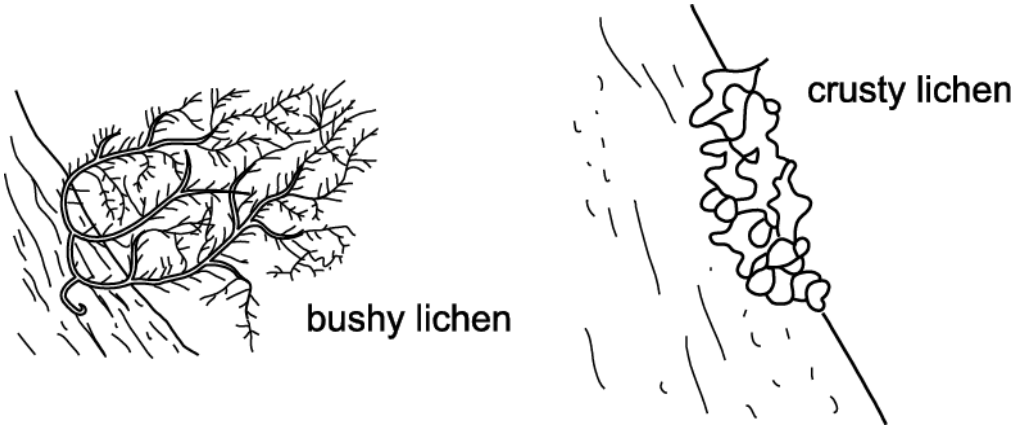
Identify the limitations of this method and potential improvements that could be made to ensure that the estimated population size of plants and animals closely matches the actual value.

[6]

STEMUP.CO.UK

3(a) Lichens are sensitive to pollution because they take up chemicals from the air.

The diagram shows a 'bushy' species of lichen and a 'crusty' species of lichen.



Bushy lichens are usually more sensitive to pollution than crusty lichens.

Use the diagrams to suggest why.

---

[1]

STEMUP.CO.UK

(b) The students decide to use lichens to try and work out how polluted their school grounds are.

They read about a scale called the Lichen Diversity Value (LDV).

It is worked out in this way:

- choose four trees in the area
- hold a quadrat on the north side of the trunk of one tree
- count the total number of all the lichens in the quadrat
- then do this on the east, south and west side of the tree
- repeat this for each tree.

(i) Suggest how the students could choose four trees.

---

[1]

(ii) The students put their results into a table.

	Number of individual lichens found in each quadrat			
Tree number	North	East	South	West
1	3	11	18	7
2	4	12	17	8
3	5	10	15	12
4	4	15	12	9
mean	4.0	12.0	15.5	

The LDV is found by adding together the four mean values.

The students calculate the mean number of lichens on the north, east and south sides of the trees.

Calculate the mean for the west side and use this to calculate the LDV.

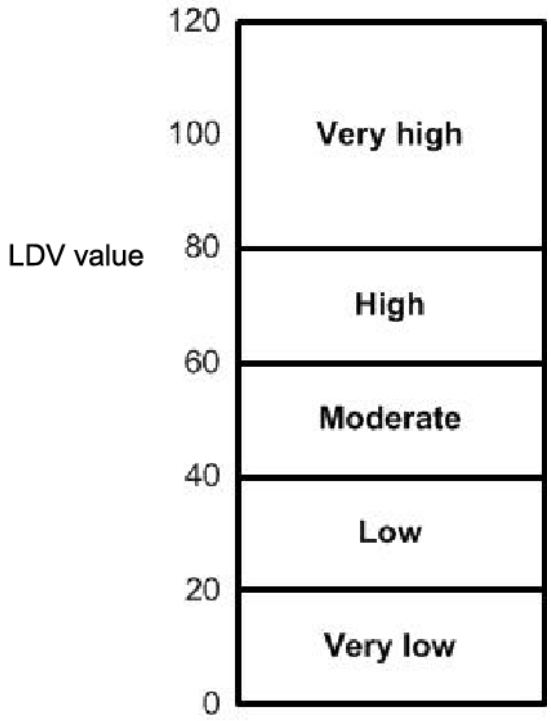
LDV = _____ **[2]**

(iii) This scale shows the type of diversity shown by the LDV.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK



What does the LDV show about the amount of diversity in the school grounds?

---

[2]

(iv) LDV is calculated by counting all the lichens present.

What else about the lichens could the students look for to make a better assessment of pollution?

---

[3]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

4 Eva investigates the number of daisy plants growing on the school playing field.

She uses a quadrat to count the number of daisy plants growing in different areas of the field.

The table shows her results.

quadrat	number of daisy plants
1	8
2	2
3	7
4	5

Each quadrat has an area of 0.25 m^2.

The school playing field has an area of 15000 m^2.

Estimate the population of daisy plants growing on the school field.

A 682
B 82500
C 330000
D 1320000

Your answer ☐

[1]

5 Palm oil is used in the manufacture of biscuits, crisps, cereals and many other processed foods.

Palm oil production has a negative effect on the environment.

Which statement identifies a **negative** effect of palm oil production?

A Palm oil plantations are found in countries with tropical rainforest.
B Palm oil production has increased due to the demand for more processed food.
C Palm oil plantations support a low biodiversity.
D Palm oil production provides jobs for the local community.

Your answer ☐

[1]

© OCR 2022. You may photocopy this page.

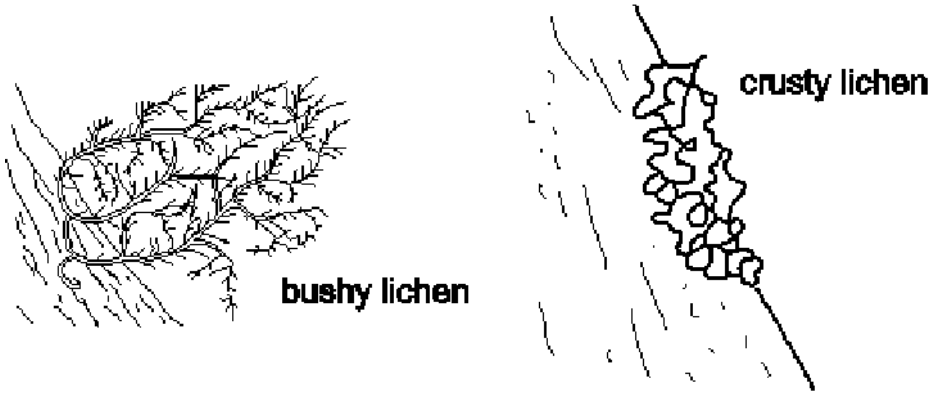
Created in ExamBuilder

STEMUP.CO.UK

6 Some students are investigating lichens.

Lichens are often studied because they are sensitive to pollution.

Lichens are sensitive to pollution because they take up chemicals from the air.



Students decide to use lichens to try and work out how polluted their school grounds are.

They read about a scale called the Lichen Diversity Value (LDV).

It is worked out in this way:

- choose four trees in the area
- hold a quadrat on the north side of the trunk of one tree
- count the total number of all the lichens in the quadrat
- then do this on the east, south and west side of the tree.
- repeat this for each tree.

(i) Suggest how the students could choose four trees.

---

[1]

(ii) The students put their results into a table.

	Number of individual lichens found in each quadrat			
Tree number	North	East	South	West
1	3	11	18	7

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

2	4	12	17	8
3	5	10	15	12
4	4	15	12	9
mean	4.0	12.0	15.5	

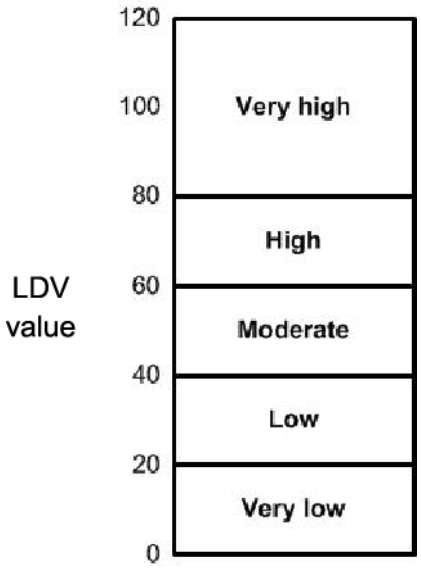
The LDV is found by adding together the four mean values.

The students calculate the mean number of lichens on the north, east and south sides of the trees.

Calculate the mean for the west side and use this to calculate the LDV.

LDV = _____ [2]

(iii) This scale shows the diversity of the lichens shown by the LDV.



What does the LDV show about the diversity of lichens in the school grounds?

_____

_____ [2]

(iv) LDV is calculated by counting all the lichens present.

What else about the lichens could the students look for to make a better assessment of pollution?

© OCR 2022. You may photocopy this page.

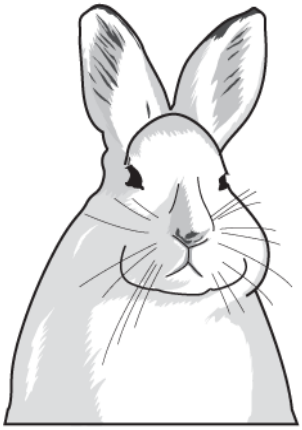
Created in ExamBuilder

STEMUP.CO.UK

---[3]

7 Snowshoe hares live in parts of Canada.

They are preyed on by animals called lynx.



snowshoe hare



lynx

Where the lynx and hares live there is snow on the ground for long periods of time.

Scientists think that increasing levels of carbon dioxide pollution may make the weather in Canada warmer.

Warmer weather might affect the survival of snowshoe hares.

In 2015 the scientists collected data about the survival of the hares.

They also predicted how the hares will survive in the future if the weather gets warmer.

Their results are shown in the table.

Year	2015	2050	2080
percentage	9.3	8.2	7.0

chance of a hare surviving one year			

Write about how an increase in carbon dioxide levels can make the weather warmer.

How can warmer weather explain the predictions about the survival of the hares?

The quality of written communication will be assessed in your answer to this question.

[6]

8

Harry has been looking at the ladybirds on a bush in the garden.

He knows that there are two main types of ladybird living in the area.

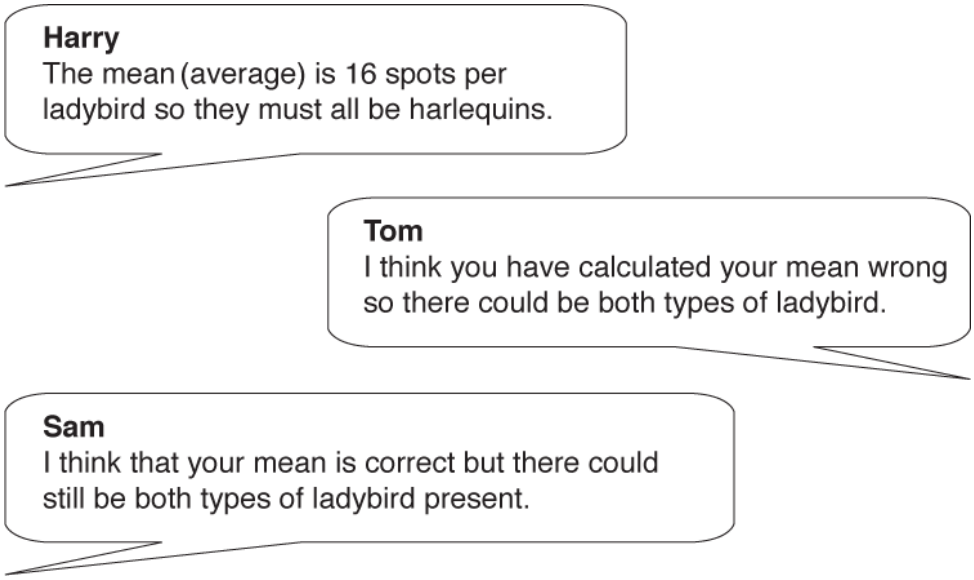
The two main types of ladybird can have different numbers of spots on their body.

Type of ladybird	Number of spots on the

	body
harlequin	15–21
7 spot	7

On the bush there are 30 ladybirds with a total number of 480 spots.

Harry is talking to two of his friends.



Which friend's answer is correct?

Explain your answer.

--- [2]

9 Snowshoe hares live in northern Canada where there is snow on the ground for much of the year.

Scientists think that increasing levels of carbon dioxide pollution may affect the survival of snowshoe hares.

In 2015 the scientists collected data about the survival of the hares.

They have also predicted how the hares will survive in the future.

Their results are shown in the table.

Year	2015	2050	2080
percentage chance of a hare surviving one year	9.3	8.2	7.0

Write about how carbon dioxide pollution can change the hare's habitat and why the hares could become **extinct** if the scientists' predictions are correct.



The quality of written communication will be assessed in your answer to this question.

---

[6]

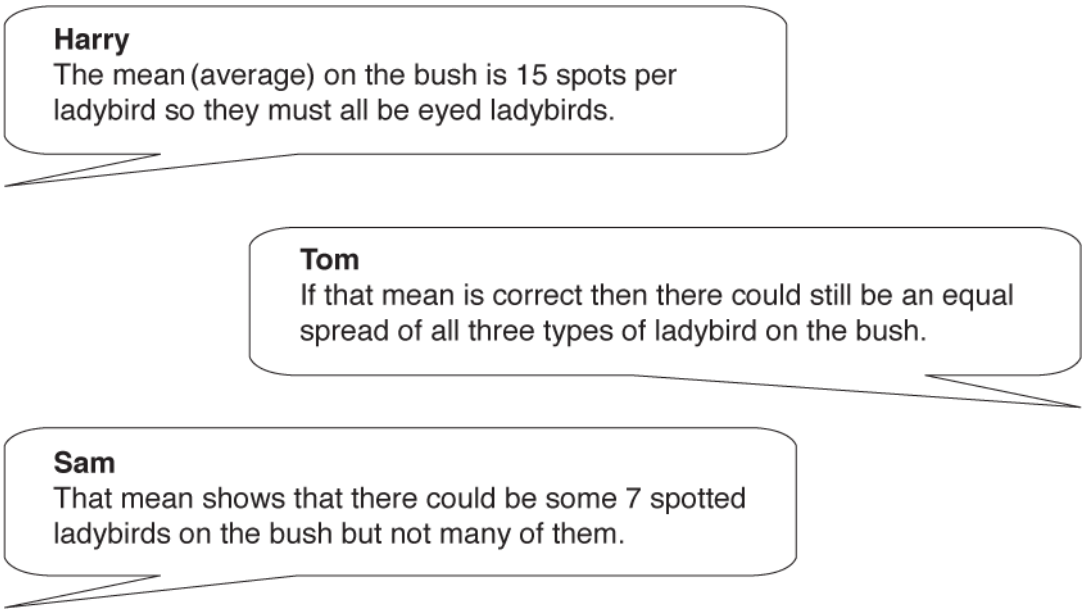
10 Harry has been looking at the ladybirds on a bush in his garden.

He knows that there are three main types of ladybird living in the area.

The three main types of ladybird can have different numbers of spots on their body.

Type of ladybird	Number of spots on the body
harlequin	15–21
eyed	15
7 spotted	7

Harry is talking to two of his friends.



Which friend's answer is correct?

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

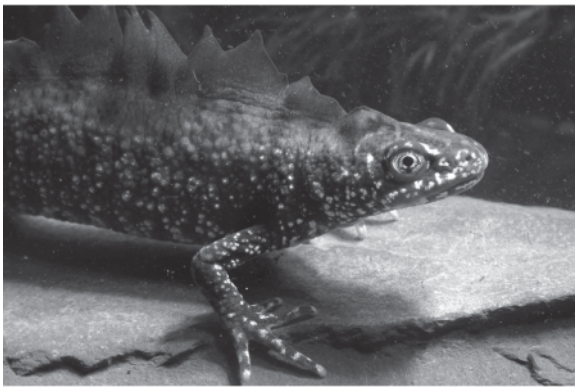
STEMUP.CO.UK

Explain your answer.

---

[2]

11(a) The photograph shows a great crested newt.



Great crested newts live in ponds.

Scientists monitor the population of newts in a pond over 5 years.

They do this by collecting a sample of newts swimming in the pond.

Which piece of apparatus would they use to collect the newts?

Put a (ring) around the correct answer.

net

pooter

quadrat

pit fall trap

[1]

(b) The scientists use the numbers of newts they collect to estimate the population.

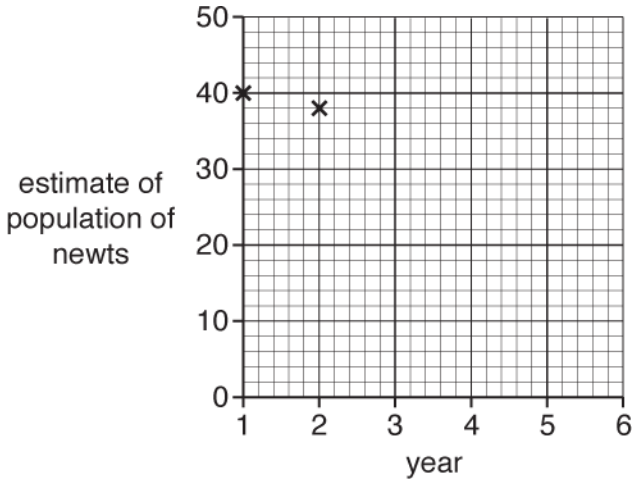
The table shows their estimates.

year	Estimate of population in pond
1	40
2	38
3	36
4	26
5	16

(i) Plot the estimates onto the graph.

The first two points have been done for you.

[1]



(ii) Use a line of best fit to predict a population estimate for year 6.

estimate = _____ newts. [1]

(iii) The scientists are concerned about the newt population.

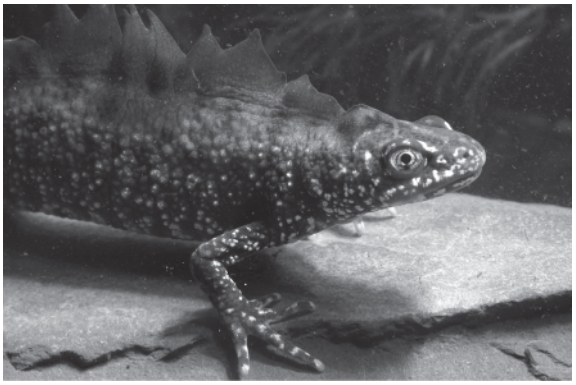
Use the data to suggest why they might be concerned.

---

[2]

STEMUP.CO.UK

12(a) The picture shows a great crested newt.



Great crested newts live in ponds.

Scientists monitor the population of newts in one pond over 5 years.

They use the method of capture - recapture each spring to estimate the population.

The table shows their results.

Year	Number of newts captured and marked in 1st sample	Number of newts captured in 2nd sample	Number of newts in 2nd sample previously marked	Estimate of newt population
1	14	13	3	61
2	21	14	5	59
3	19	12	4	57
4	18	16	5	58
5	17	11	5	

Use this formula to calculate the population estimate for **year 5**.

Give your answer to the nearest whole number.

$$\text{population size} = \frac{\text{number in 1st sample} \times \text{number in 2nd sample}}{\text{number in 2nd sample previously marked}}$$

answer _____

[2]

(b)

(i) Write down **two** conclusions from the data.

1

2

---

[2]

(ii) Suggest **one** reason why these conclusions may not be valid.

---

[1]

13 Many water companies release treated sewage back into rivers in places called sewage outfall.



Most sewage outfalls are monitored for pollution by the environment agency.

In 1989 there were a number of outfalls not being monitored.

These outfalls were identified and named TDC outfalls.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Water companies have been told to reduce these TDC outfalls by allowing the environment agency to monitor them.

The table shows how the number of TDC outfalls has changed in some areas.

Water company progress in reducing TDCs		
	number of TDCs in 1989	number of TDCs in 2016
Anglian	328	328
Northumbrian	9	9
South West	62	46
Southern	29	29
Thames	1787	400
United Utilities	650	650
Wessex	152	84
Yorkshire	234	234

Why is it important to reduce the number of TDC outlets?

[2]

14 A scientist was studying a population of snails.

He caught 60 snails in the first sample. He marked them and released them.

He caught 50 snails in the second sample. 20 of the snails were marked.

$$\text{Use this equation: estimated population} = \frac{\text{number caught in first sample} \times \text{number caught in second sample}}{\text{number in second sample that are marked}}$$

What is the estimated population?

A 150
B 2400
C 3000
D 60 000

Your answer ☐ [1]

15 A scientist is estimating the number of rabbits in a field.

He has eight different estimates, 12, 12, 13, 15, 17, 19, 22 and 26.

Which is the median value for his estimates?

A 8
B 12
C 16
D 17

Your answer ☐ [1]

© OCR 2022. You may photocopy this page.

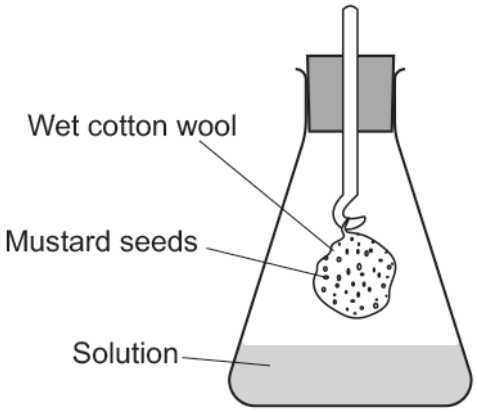
Created in ExamBuilder

STEMUP.CO.UK

16(a) A student investigates the effect of acid rain on seed growth.

- She soaks cotton wool in a solution with a pH value of 7.0.
- She puts 20 mustard seeds onto the cotton wool and places it inside a flask.
- She adds the same solution to the flask.
- She then repeats this four times using solutions with different pH values.

One of the flasks is shown in the diagram.



After **8 days** she counts how many of the seeds are growing.

The table shows her results.

pH of solution	Number of the 20 seeds that are growing after 8 days
7.0	17
6.5	18
6.0	16
5.5	6
5.0	2

The student used 20 seeds in each flask.

Write down **one** other factor that the student should have kept the same in this investigation.

---

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(b) Describe what this investigation shows about the effect of acid rain on seed growth.

---

[2]

(c) One way to compare the growth of seeds is to use a germination index (**GI**).

$$\text{Use the formula: GI} = \frac{\text{mean root length} \times \text{number of seeds that are growing}}{\text{number of days}}$$

(i) For the seeds at **pH 6.0**, the mean root length was 5 mm.

Calculate the **GI** for these seeds.

Answer = ---------- [2]

(ii) Look at the equation for **GI**.

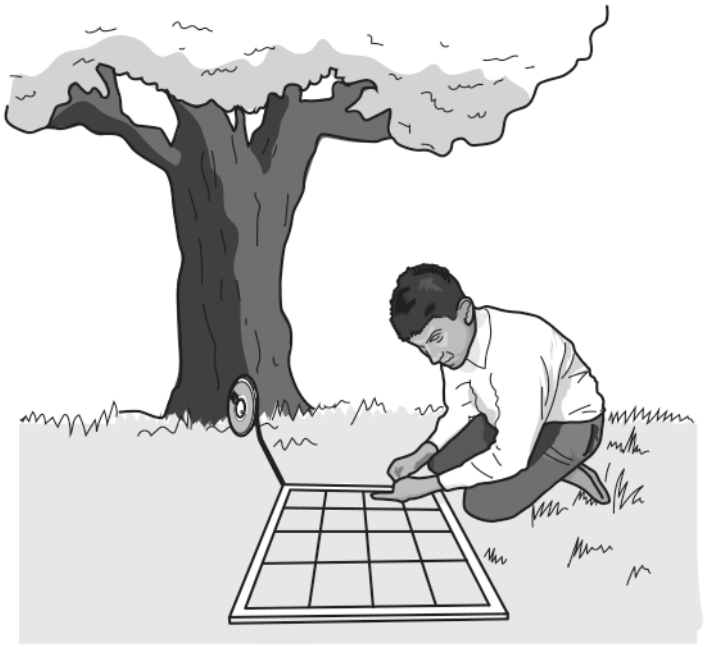
This is a better way of measuring the effect of acid rain on seed growth than just counting the number of seeds growing.

Explain why.

---

[1]

17 A student investigates plants growing underneath a tree.



He lays out a tape measure on the ground, starting at the tree. He then places a quadrat on the ground.

He measures the percentage of the ground in the quadrat that is covered by plants. He repeats this every metre away from the tree.

The table shows his results.

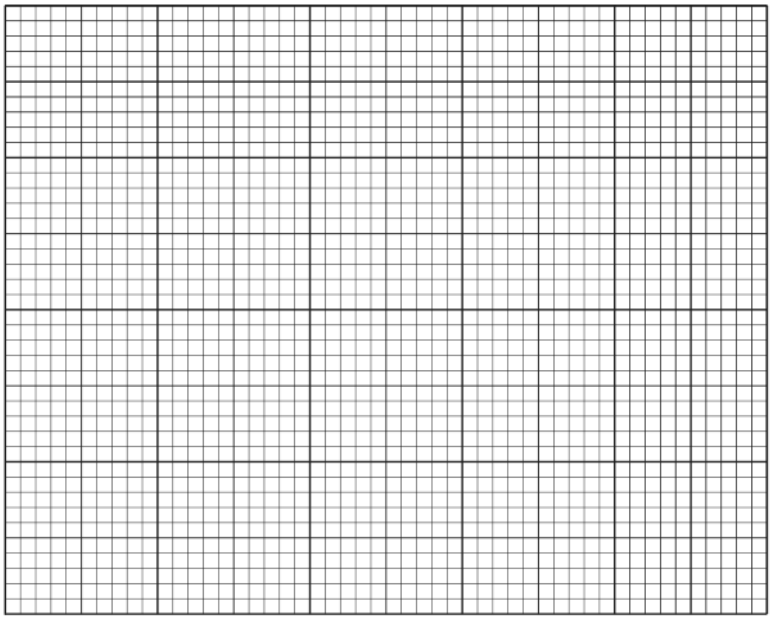
Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Plot a graph of the student's results and draw a line of best fit.



[5]

18 The table shows changes in the forest cover in some continents of the world.

Continent	Total forest cover (millions of hectares)		
	1990	2000	2005
Africa	699	656	635
Asia	574	567	572
Europe	989	998	1001
South America	891	853	832

What is the approximate percentage decrease in the area of South America covered by forest between 1990 and 2005?

A 0.9%
B 1.1%
C 6.6%
D 7.1%

Your answer [ ]

[1]

STEMUP.CO.UK

19 A scientist is estimating the number of rabbits in a field.

He has eight different estimates, 12, 12, 13, 15, 17, 19, 22 and 26.

Which is the median value for his estimates?

A 8
B 12
C 16
D 17

Your answer ☐ **[1]**

20 A student investigates the plants growing underneath a tree.



He lays out a tape measure on the ground, starting at the tree. He then places a quadrat on the ground.

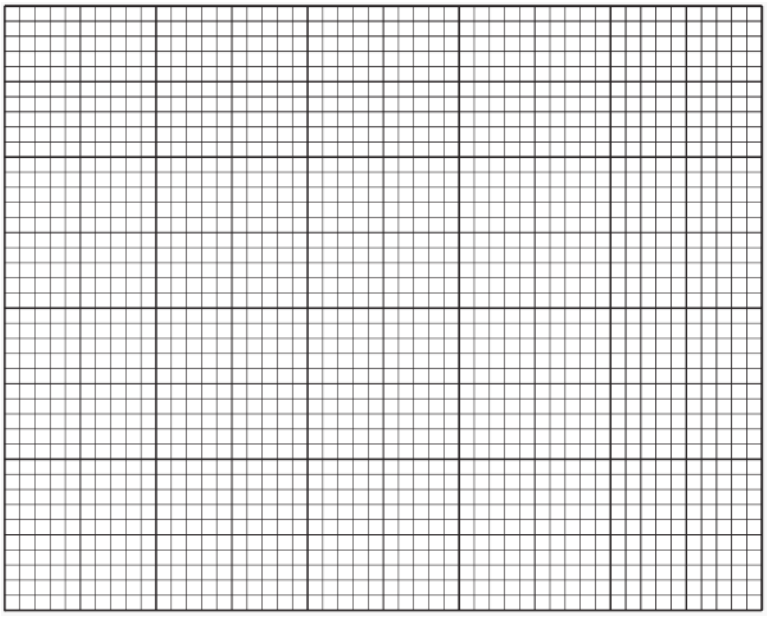
He measures the percentage of the ground in the quadrat that is covered by plants. He repeats this every metre away from the tree.

The table shows his results.

Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10

2	15
3	18
4	22
5	50
6	58
7	62
8	64

Plot a graph of the student's results and draw a line of best fit.



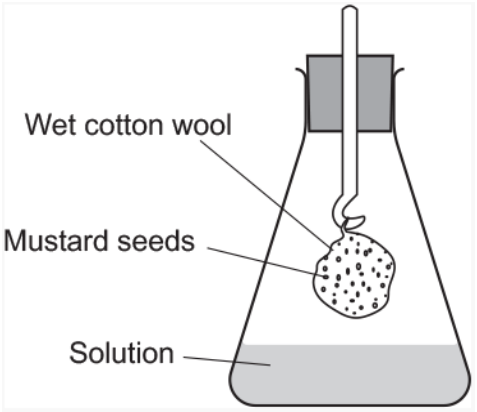
[5]

21(a) A student investigates the effect of acid rain on seed growth.

She dips some cotton wool in 20 cm^3 of water. She then puts 20 mustard seeds onto the cotton wool and places it inside a flask. The student puts the remaining water into the flask with the cotton wool.

She repeats this four more times, each time using different solutions of water and dilute sulfuric acid.

One of the flasks is shown in the diagram.



After **8 days** she counts how many of the seeds have germinated.

The table shows her results.

Volume of water in flask (cm^3)	Volume of dilute sulfuric acid in flask (cm^3)	Number of seeds that germinated
20	0	18
16	4	15
8	12	13
4	16	6
0	20	2

What is the dependent variable in this investigation?

[1]

(b) State why the student changed the volume of water in each flask.

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(c) The student kept each flask at the same temperature during the experiment to make it a fair test.
Explain **one** other reason why she kept each flask at the same temperature.

---

[1]

(d) Explain what this experiment shows about the effect of acid rain on seed germination.

---

[2]

(e) The student used a formula to describe the germination of seeds called the viability index (VI).

(i) For the seeds in 20 cm^3 of sulfuric acid, the mean root length was 5 mm and the mean shoot length was 2 mm.

Calculate VI for these seeds.

Use the equation:
VI = mean root length × mean shoot length × percentage of seeds that germinated

Answer = ---------- [2]

(ii) Using VI is a better way of comparing the effects of acid rain than just using the number of seeds germinated.

Explain why.

---[2]

22 A student estimates the number of snails in a pond. Part of his method involves collecting snails and marking them.

What is the name of the method he is using?

A Aseptic technique
B Capture-recapture
C Percentage increase
D Scaling-up

Your answer ☐ [1]

23(a) A salt marsh is a large, muddy area of land where a river joins the sea.

Student **A** and student **B** study the plants growing on a salt marsh.

They both sample the plants present by laying out two tape measures at right angles across the salt marsh.

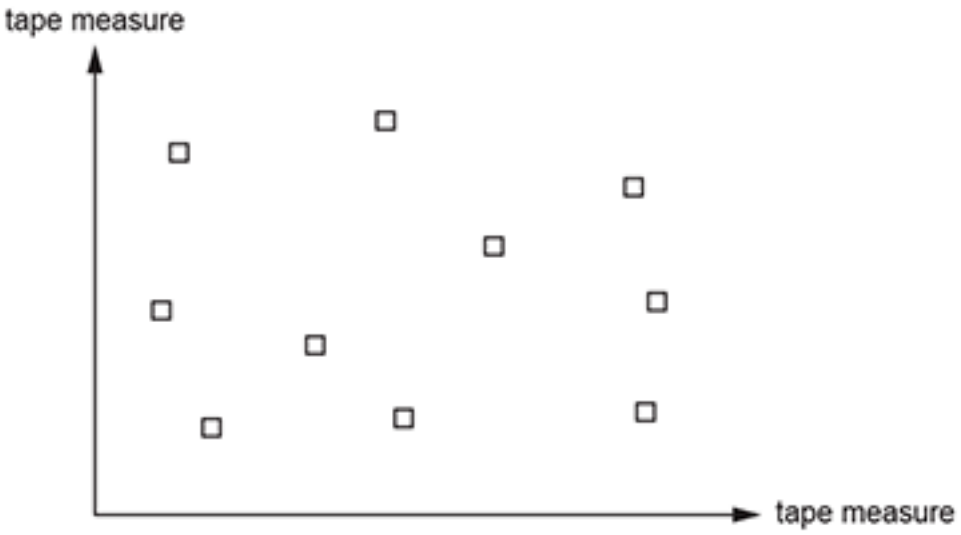
They then place a square frame on the ground in different places and count the number of plants in the square, as shown below.



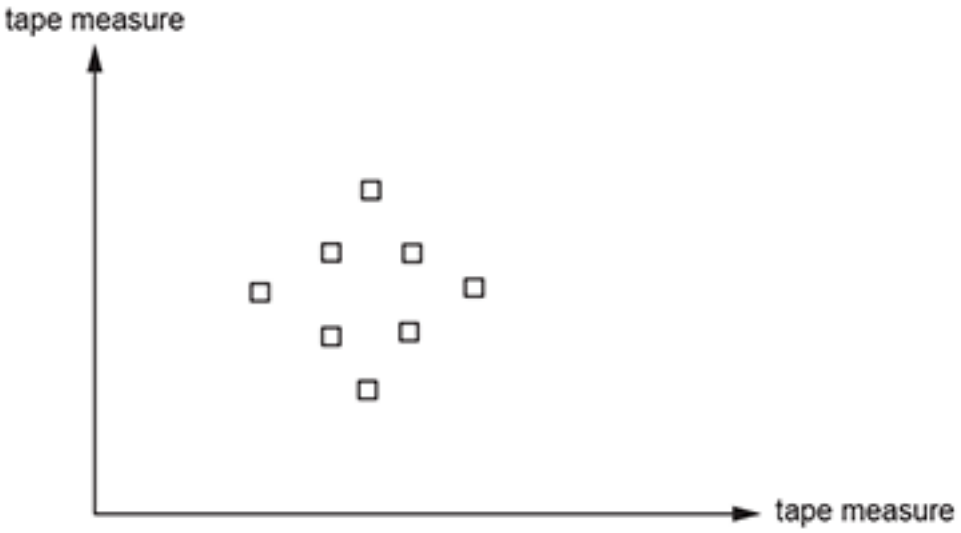
What is the name of the square frame that they use to sample the plants?

[1]

(b) The diagrams show the position of each student's samples across the salt marsh.
Each small square in the diagrams represents one sample.



Student **A**'s sampling



Student **B**'s sampling

(i) The whole salt marsh has an area of 2500 m^2.

Each square frame has an area of 0.25 m^2.

Calculate the percentage of the whole salt marsh that was sampled by student A.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Percentage = ... % **[3]**

(ii) Look at the two students' sampling shown in the diagrams.

Explain which student is likely to get the most accurate estimate for the number of plants in the salt marsh.

student .....

explanation .....

.....

.....

.....

.....

[3]

(iii) Their teacher said that they should take care as there may be harmful bacteria in the salt marsh.

State **two** things that the students could do to reduce the risk of infection from the harmful bacteria.

1 .....

.....

2 .....

.....

[2]

(c) * In some salt marshes large sand banks have been built. These stop tides from entering the salt marsh. The level of soil on the salt marsh builds up and the marsh turns into dry land.

Local farmers want to turn salt marshes into dry land and other people want to leave it as a salt marsh.

Explain why. Use ideas about land use and biodiversity in your answer.

[6]

24 Which of these is an example of ecotourism?

A Setting up monkey parks in the UK.
B Allowing people to sponsor endangered animals.
C Encouraging people to view animals in their natural environment.
D Educating children about the benefits of conservation.

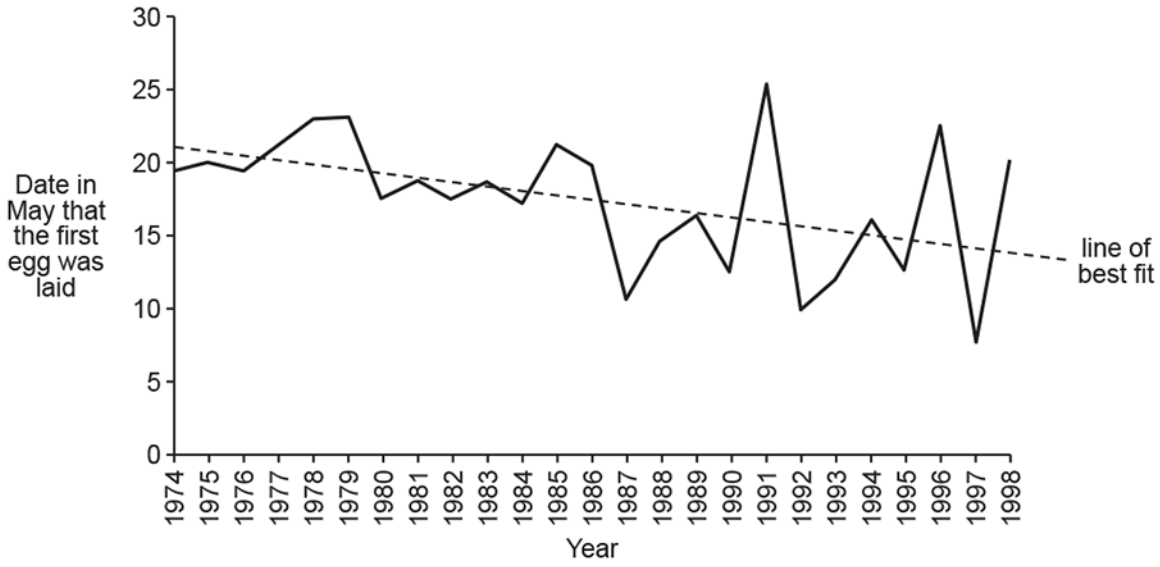
Your answer [1]

25 Blue tits are small birds seen in gardens.

Blue tits usually lay their eggs in the month of May.

For many years, the scientists have recorded the first day that an egg was laid.

This data is shown in the graph.



The scientists made this explanation for the results:

The results are due to climate change.

Suggest arguments **for** and **against** this possible explanation.

Use information from the graph in your answer.

[4]

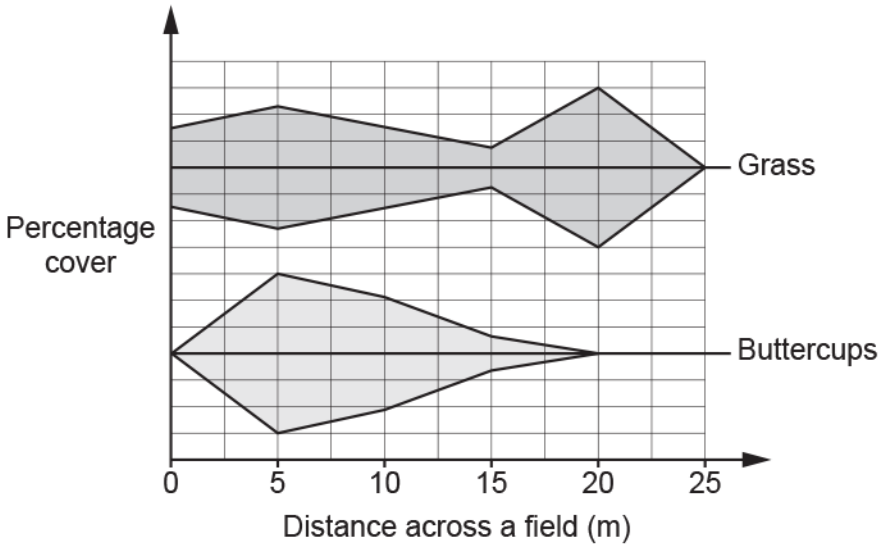
© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

26 A group of students collected some measurements from a field.

They plotted the measurements on this graph.



Which technique have the students used to collect the data?

A Capture-recapture

B Random quadrats

C Scaling up

D Transect line with quadrats

Your answer ☐ **[1]**

27(a) **Fig. 18.1** shows a drawing of a very small insect that feeds on the leaves of pine trees.



Fig. 18.1

Give the **name of the equipment** and **explain how** the scientists would use it to collect insects.

Name of equipment _____

How it is used _____

_____

_____

_____

_____ **[3]**

(b) Scientists can estimate the number of insects on a tree using capture-recapture.

First, they collect some insects from the tree.

Fig. 18.2 shows the equipment they use.

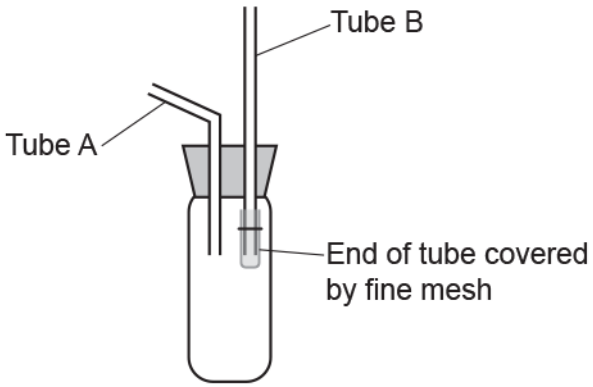


Fig. 18.2

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

They capture 25 insects from a tree and then mark them. This is their first sample.

They then release the insects and sample the tree again two days later. In this second sample there were 30 insects and 3 had been marked.

(i) Estimate the population size of insects on the tree.

Use this formula:

$$\text{Estimated population size} = \frac{\text{Number in first sample} \times \text{Number in second sample}}{\text{Number in second sample previously marked}}$$

Estimated population size = ... **[2]**

(ii) To mark each insect the scientists put a small spot of paint on the underside of the insect.

Explain why they marked the underside of the insects and not the top.

---

[2]

(c) Scientists want to see if there is a link between the level of pollution in the air and the number of insects on trees.

They sample trees at different distances from a factory that was releasing sulfur dioxide.

Fig. 18.3 shows their results.

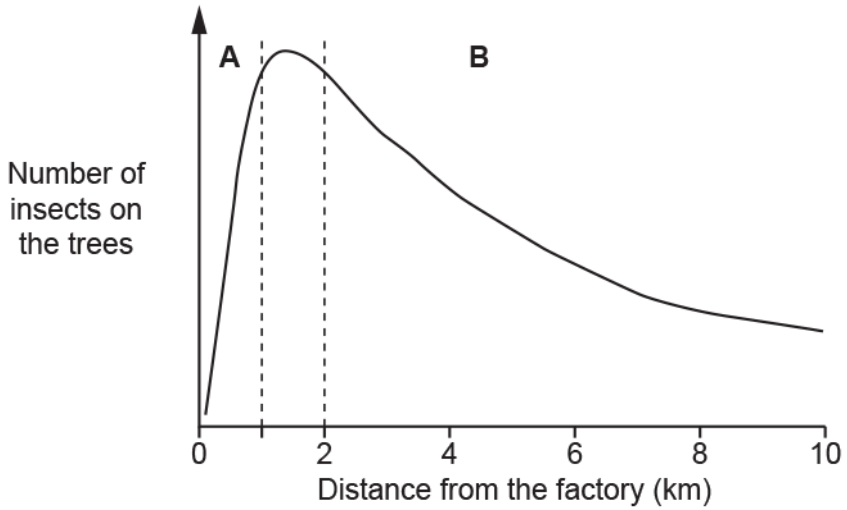


Fig. 18.3

(i) The scientists found that sulfur dioxide can make the waxy cuticle of leaves thinner.

Suggest how this could explain the number of insects on the trees, further from the factory, in section **B** of the graph in **Fig. 18.3**.

---

[2]

(ii) Look at section **A** of the graph in **Fig. 18.3**. Which is a possible explanation for the shape of the graph nearest the factory, in section **A**?

Tick (✓) **one** box.

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

Low concentrations of sulfur dioxide kill the insects. ☐

Low concentrations of sulfur dioxide make the insects reproduce faster. ☐

Very high concentrations of sulfur dioxide kill the insects. ☐

Very high concentrations of sulfur dioxide make the insects reproduce faster. ☐

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

28(a) Gardeners use dead plant material to make compost. They add this compost to soil where they are growing plants.

A new way of making compost is called bokashi. In this process the compost is made **anaerobically** in a different type of composter.

Scientists compare the normal methods of making compost with bokashi.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Why did the scientists put the same mass of compost in each composter?

Tick (✓) **one** box.

To allow valid comparisons of the results. ☐

To decrease the temperature. ☐

To make the measurements more accurate. ☐

To make the results repeatable. ☐

[1]

(b) **Table 20.1** shows the scientists' temperature measurements.

	Temperature of the compost (°C)	
Time (days)	Normal compost	Bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

© OCR 2022. You may photocopy this page.

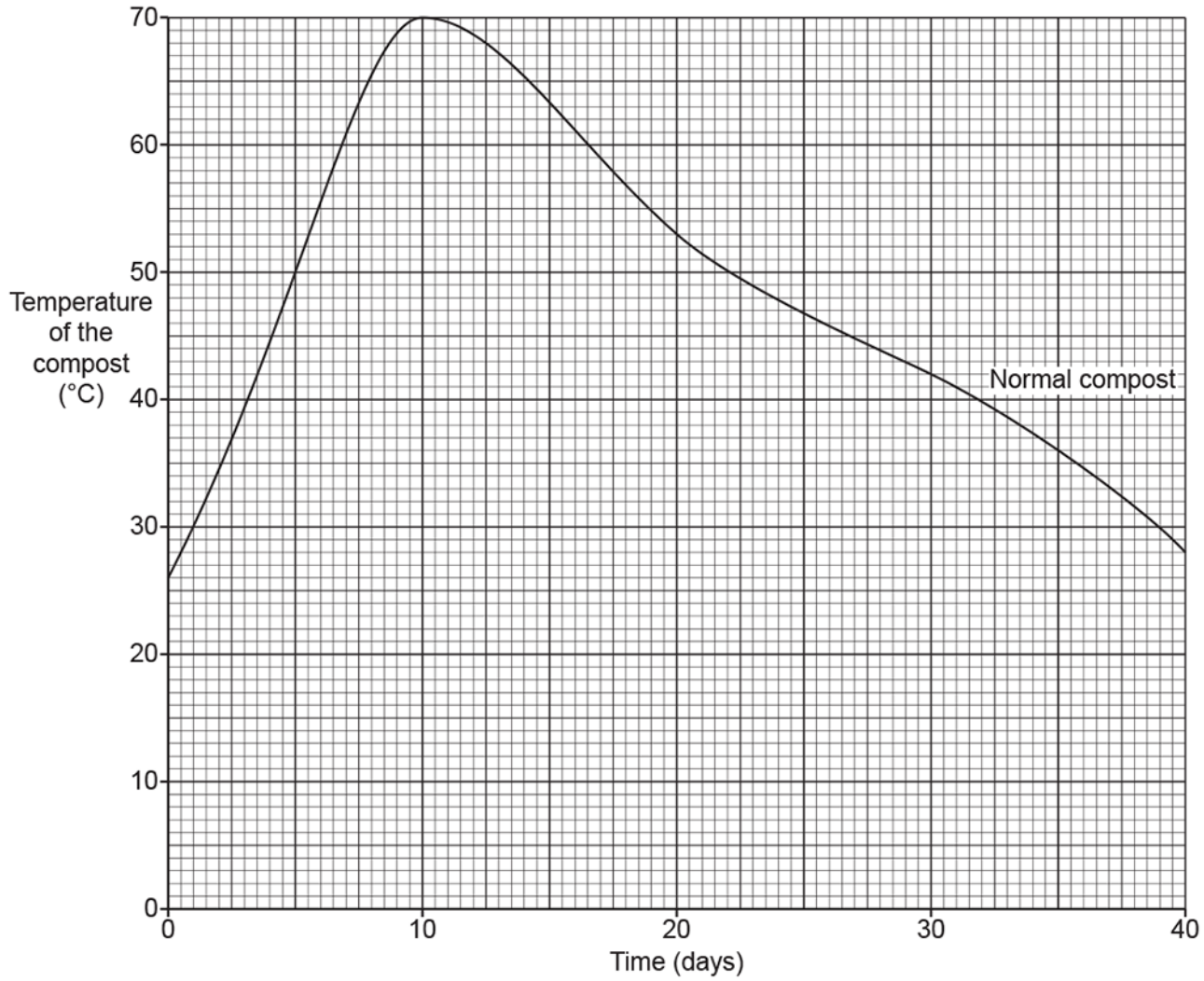
Created in ExamBuilder

STEMUP.CO.UK

Table 20.1

(i) The scientists' results for the normal compost are plotted on the grid.

Complete the graph by plotting the results for the **bokashi** compost and draw a curve of best fit.



[3]

(ii) Describe the change in the temperature of the **normal** compost during the investigation.

---

[2]

(iii) Use data from **Table 20.1** to calculate the difference between the maximum temperature of the normal compost and the maximum temperature of the bokashi compost.

Difference = ... °C **[2]**

(iv) Which **two** statements explain this difference in temperature between the two types of compost?

Tick (✓) **two** boxes.

Both types of compost are made by aerobic respiration. ☐

Normal compost is made by aerobic respiration. ☐

Normal compost is made by anaerobic respiration. ☐

Aerobic respiration and anaerobic respiration release the same amount of energy. ☐

Aerobic respiration releases more energy than anaerobic respiration. ☐

Aerobic respiration releases less energy than anaerobic respiration. ☐

[2]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(c) **Table 20.2** shows the scientists' results for the mass of the compost.

	Normal compost	Bokashi compost
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	760	1200

Table 20.2

(i) The mass of the normal compost has decreased by 19 kg per day.

Calculate the decrease in mass of the bokashi compost per day.

Give your answer to the nearest **whole** number.

Decrease = ...kg per day **[3]**

(ii) Carbon dioxide is given off in the making of the compost. This causes most of the decrease in mass.

Scientists think that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

---

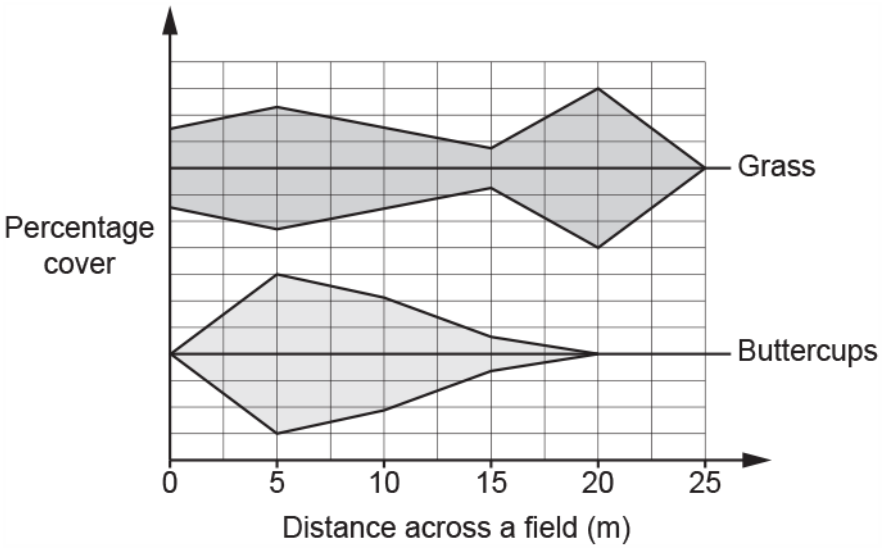
[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

29 A group of students collected some measurements from a field.
They plotted the measurements on this graph.



Which technique have the students used to collect the data?

A Capture-recapture
B Random quadrats
C Scaling up
D Transect line with quadrats

Your answer ☐ [1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

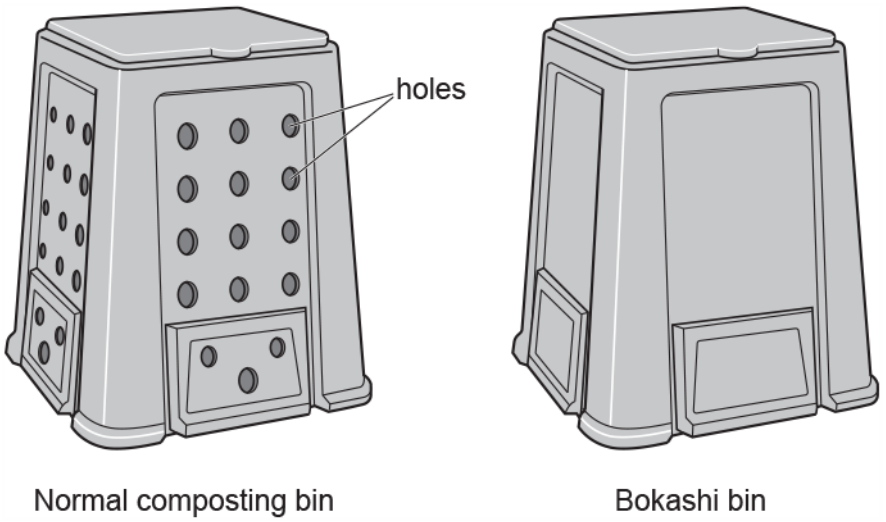
STEMUP.CO.UK

30(a) Gardeners often turn dead plant material from their garden into compost. They then add this compost to the soil where they are growing plants.

Compost can be made in a composting bin. In the bin **aerobic bacteria** turn dead plant material into compost.

Some people use a different way of making compost, called bokashi. In this process the compost is made **anaerobically.**

The drawings show a normal composting bin and a bokashi bin.



Explain the difference in the design of the two composting bins.

---

[2]

(b) Scientists investigate the two methods of making compost.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Write down **one** way that the scientists make sure that they can draw valid conclusions.

---

[1]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

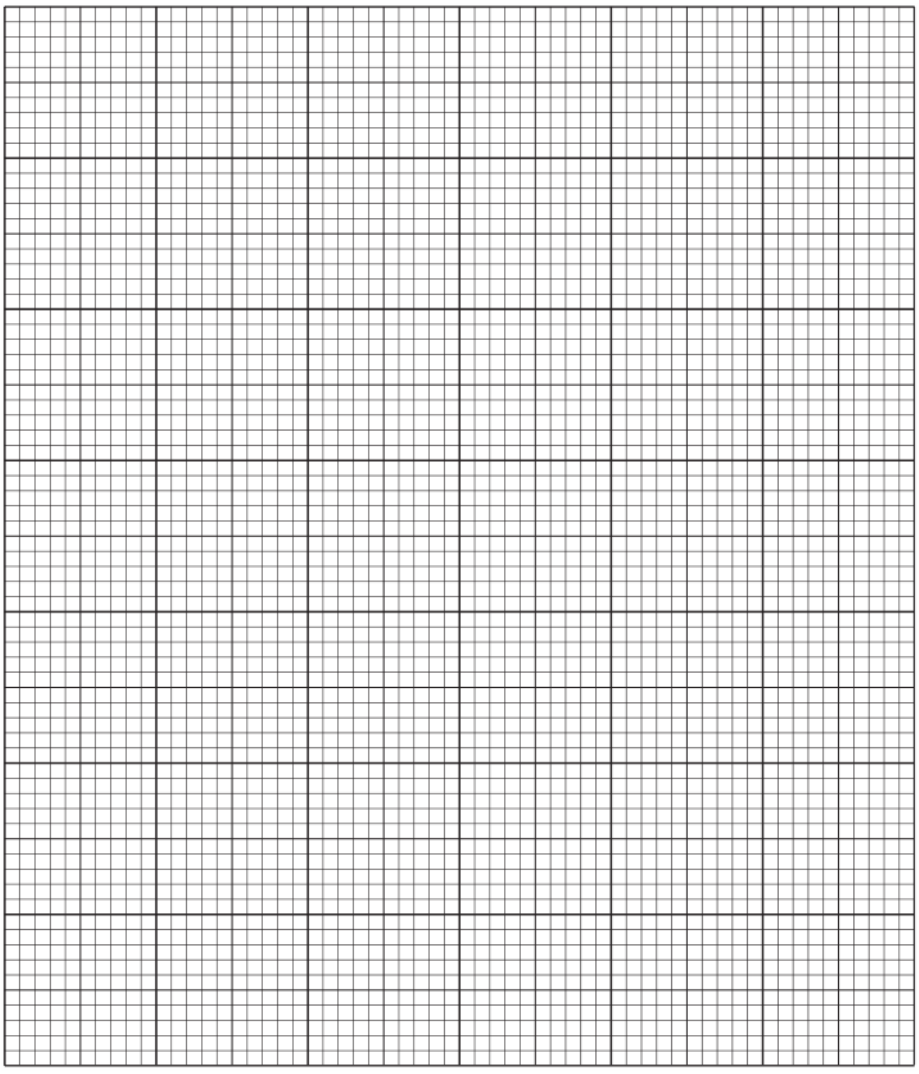
STEMUP.CO.UK

(c) **Table 18.1** shows the scientists' temperature readings.

	Temperature of the compost (°C)	
Time (days)	normal compost	bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 18.1

(i) Plot the scientists' results on the grid for normal and bokashi compost, and draw **two** curves of best fit.



[5]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(ii) Explain why the temperature of the compost in the **normal** bin changed as shown in the graph.

---

[2]

(iii) Explain the difference in the temperature changes between the aerobic normal compost and the anaerobic bokashi compost.

---

[2]

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK

(d) **Table 18.2** shows the scientists' results for the mass of the compost.

	Normal compost	Bokashi compost
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	750	1100

Table 18.2

A gas is given off in the formation of the compost. This causes most of the decrease in mass.

(i) The percentage decrease in the mass of the normal compost is 50%.

Calculate the percentage decrease in the mass of the bokashi compost.

Give your answer to **2** significant figures.

Percentage decrease = ... % **[3]**

(ii) The scientists concluded that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

---

[2]

END OF QUESTION PAPER

© OCR 2022. You may photocopy this page.

Created in ExamBuilder

STEMUP.CO.UK