

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Monday 9 June 2025 – Morning

**GCSE (9–1) Combined Science A
(Gateway Science)**

J250/02 Biology (Foundation Tier)

**Time allowed: 1 hour 10 minutes
plus your additional time allowance**

YOU MUST HAVE:

a ruler (cm/mm)

YOU CAN USE:

**a scientific or graphical calculator
an HB pencil**

Please write clearly in black ink.

Centre number

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Candidate number

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First name(s) _____

Last name _____

READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS

Use black ink. You can use an HB pencil, but only for graphs and diagrams.

Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.

Answer ALL the questions.

Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION

The total mark for this paper is 60.

The marks for each question are shown in brackets [].

Quality of extended response will be assessed in questions marked with an asterisk (*).

ADVICE

Read each question carefully before you start your answer.

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SECTION A

You should spend a MAXIMUM of 20 MINUTES plus your additional time allowance on this section.

Write your answer to each question in the box provided.

- 1 The diagram opposite shows a key for identifying organisms.**

Identify the organism that has WINGS and is ACTIVE AT NIGHT. [1]

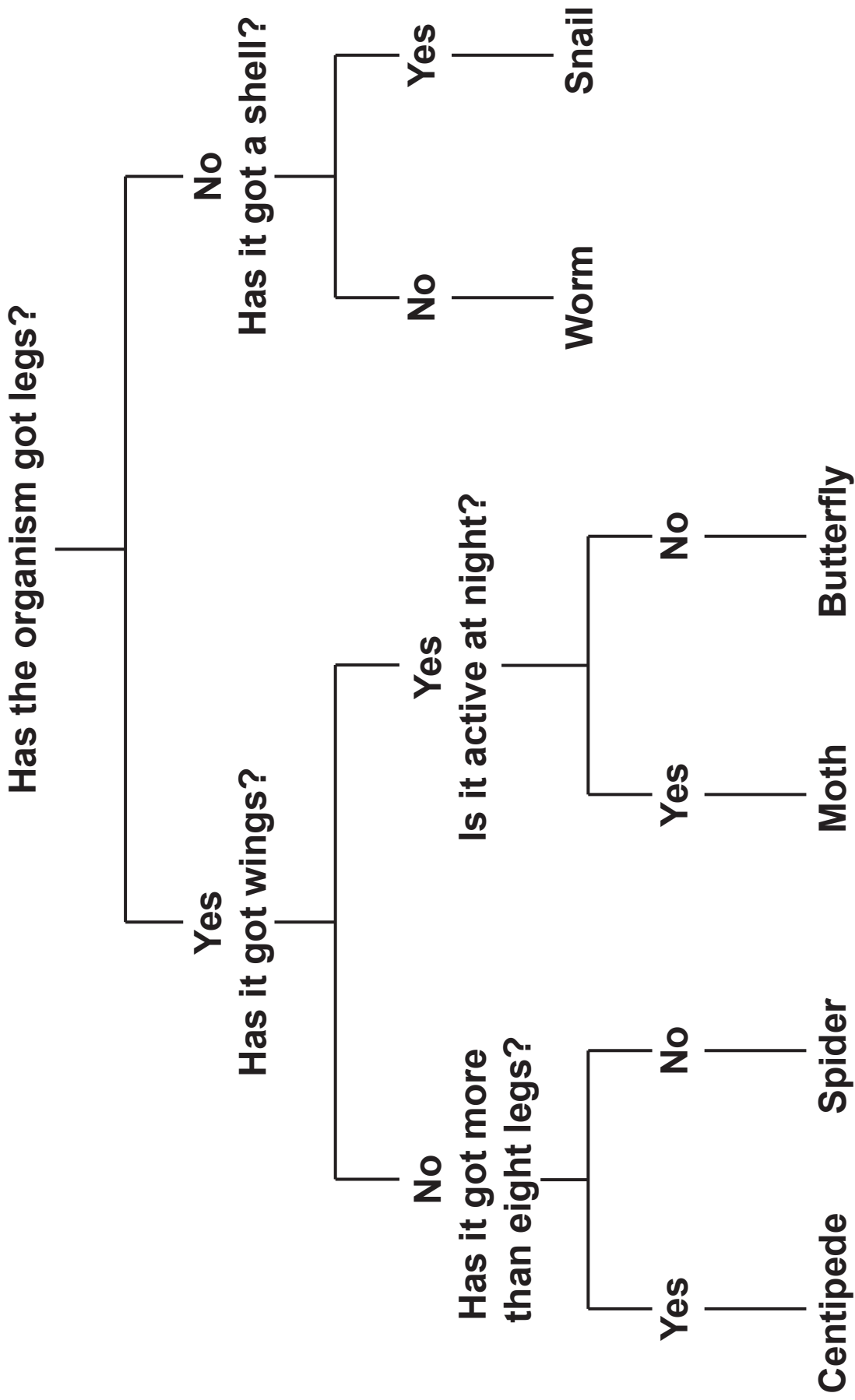
A Butterfly

B Centipede

C Moth

D Snail

Your answer



2 What is the correct treatment for a disease caused by viruses? [1]

- A Antibiotics**
- B Antivirals**
- C Progesterone**
- D Insulin**

Your answer

☐

3 Which of these is an example of GENETIC ENGINEERING? [1]

- A Captive breeding programmes for endangered species**
- B Farmers applying pesticides on their crops**
- C Scientists developing crops that are drought resistant**
- D Selecting pigs with high quality meat to breed together**

Your answer

☐

4 Cardiovascular diseases are treated in different ways.

The table shows some treatments for cardiovascular disease.

	TREATMENT	DESCRIPTION
A	Heart bypass	A new blood vessel is inserted when the coronary artery is blocked.
B	Heart transplant	A new heart from a donor is inserted.
C	Statins	A pill is ingested which reduces cholesterol in the blood.
D	Stent	A small tube is inserted to open up a blocked blood vessel.

Which treatment does NOT involve surgery? [1]

Your answer

5 Which of these could be used to group living organisms in a natural classification system? [1]

- A DNA sequence**
- B Number of legs**
- C Presence of shell**
- D Size of tail**

Your answer

☐

6 Which of these is a non-specific defence mechanism of the human body against pathogens? [1]

- A Making red blood cells**
- B Pancreas producing insulin**
- C Pupil changing size**
- D Stomach producing acid**

Your answer

☐

- 7 Scientists have developed a detailed understanding of the human genome.**

Which of these is a benefit from developing this understanding? [1]

- A Discovering new antibiotics**
- B Explaining why antibiotic resistant bacteria have evolved**
- C Predicting whether a person will develop a genetic condition**
- D Using embryonic stem cells for transplants**

Your answer

☐

- 8 Many non-communicable human diseases are caused by an interaction with a lifestyle factor.**

Which of these is NOT an example of this type of interaction? [1]

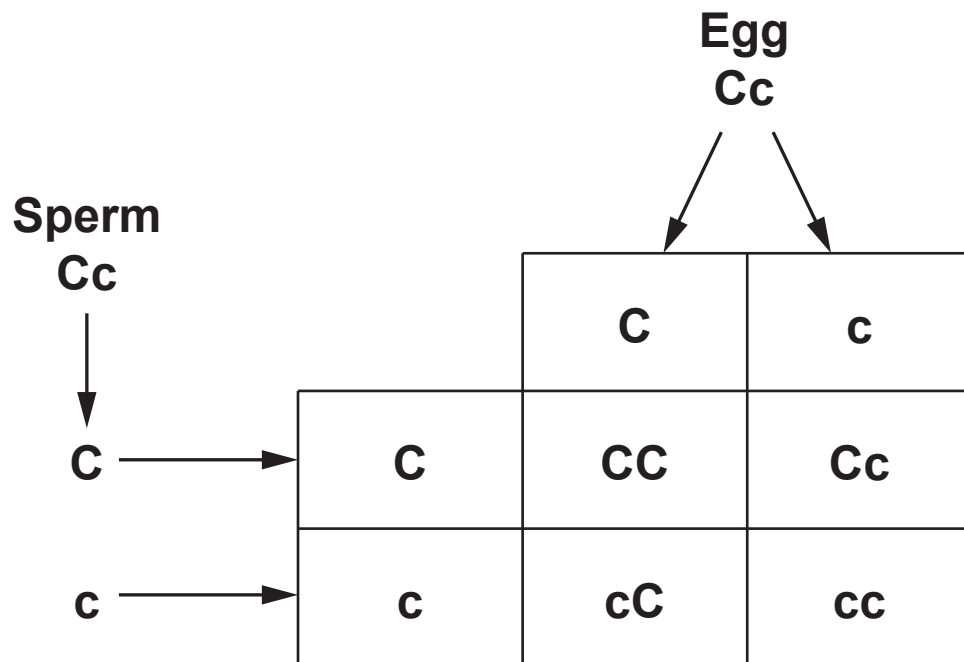
- A Allergies and exercise**
- B Cardiovascular disease and stress**
- C Skin cancer and UV light**
- D Type 2 diabetes and diet**

Your answer

☐

- 9 The diagram shows a genetic cross for inheriting cystic fibrosis.

Cystic fibrosis is a recessive inherited condition.



What percentage of the offspring will have cystic fibrosis? [1]

- A 0%
- B 25%
- C 75%
- D 100%

Your answer

10 Which pathway shows how nitrates are used by plants to make proteins? [1]

A Nitrates → amino acids → proteins

B Nitrates → carbohydrates → proteins

C Nitrates → DNA → proteins

D Nitrates → fatty acids → proteins

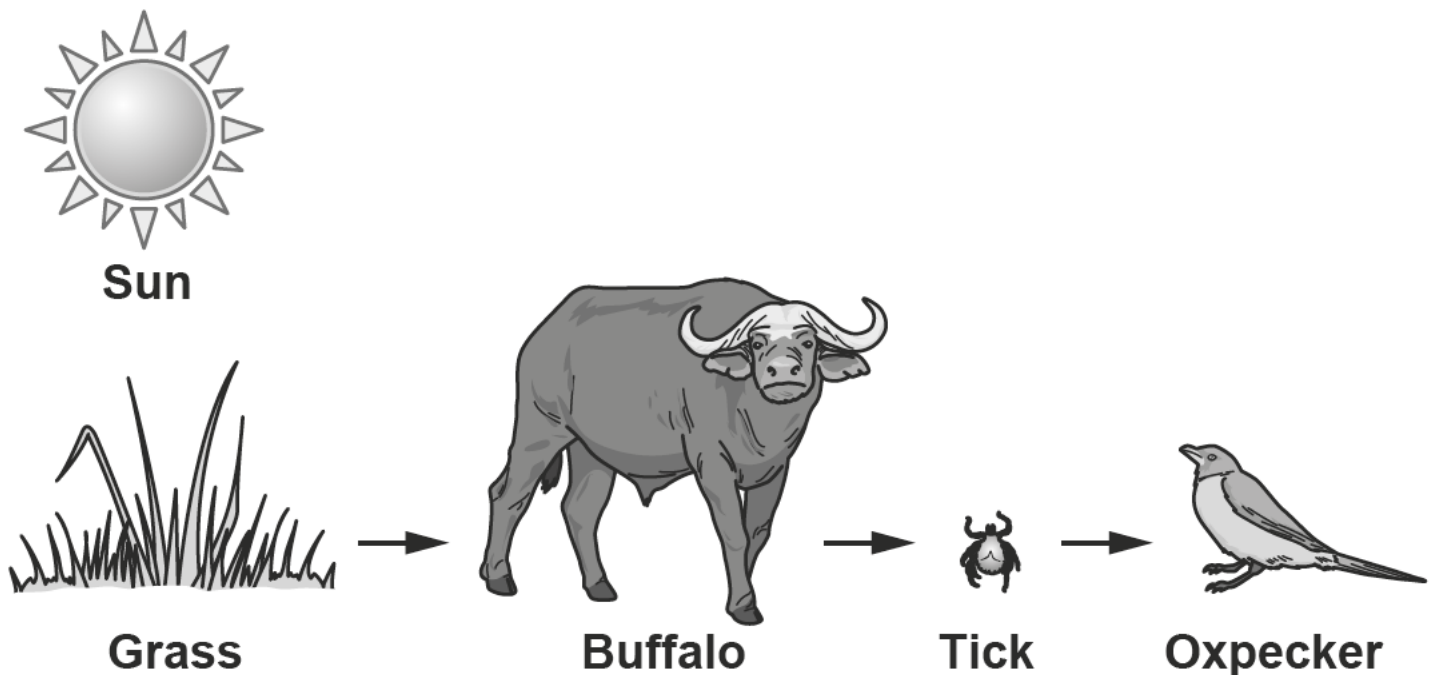
Your answer

SECTION B

- 11 The grasslands of Africa are an example of an ecosystem.

FIG. 11.1 shows a food chain within this ecosystem.

FIG. 11.1



- (a) Name an example of each of the following in the food chain shown in FIG. 11.1.

- (i) A primary consumer.

_____ [1]

- (ii) An abiotic component.

_____ [1]

(b) Describe the role of GRASS as a producer in this food chain.

[2]

(c) Organisms depend on each other for survival. This is called INTERDEPENDENCE.

FIG. 11.2 shows a buffalo and some oxpeckers.

FIG. 11.2

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Ticks are small organisms that feed on, live on and harm the buffalo.

Oxpeckers sit on the buffalo eating the harmful ticks. They also warn the buffalo if danger is nearby.

Identify the type of relationship between these organisms using ideas about interdependence.

Ticks and buffalo _____

Oxpeckers and buffalo _____

[2]

12

- (a) Name the sub-cellular structure which stores the genetic material in an animal cell.

_____ [1]

- (b) Complete the sentences to describe the genetic material.

Use words from the list.

diploid

genes

genome

genotype

haploid

heterozygous

homozygous

variation

The entire genetic material of an organism is called the _____ .

Human body cells have 23 pairs of chromosomes because they have two copies of each chromosome.

These cells are called _____ .

Human gametes have only 23 chromosomes. These cells are called _____ .

Most observable characteristics are the result of multiple _____ . [4]

- (c) Phenotypes, such as height, are determined by genetics, the environment or a combination of both.**

State a phenotype that is determined by each of the following.

Genetic only _____

Environmental only _____

Both genetics and the environment

_____ **[3]**

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13

(a) The diagram opposite shows the carbon cycle.

(i) Complete the TWO labels in the diagram opposite to identify the processes involved in the carbon cycle.

[2]

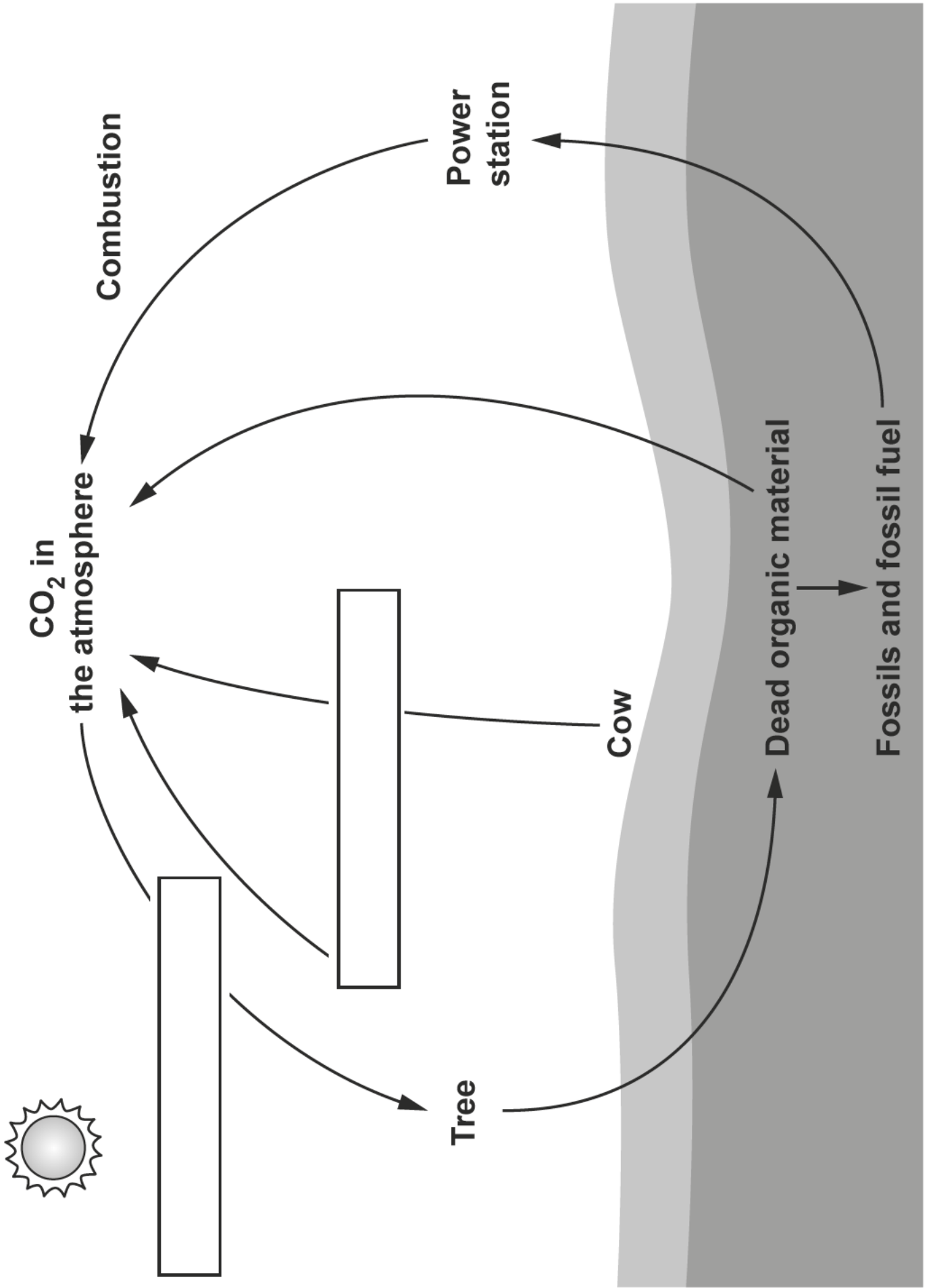
(ii) Explain the role of DECOMPOSERS in the carbon cycle.

[2]

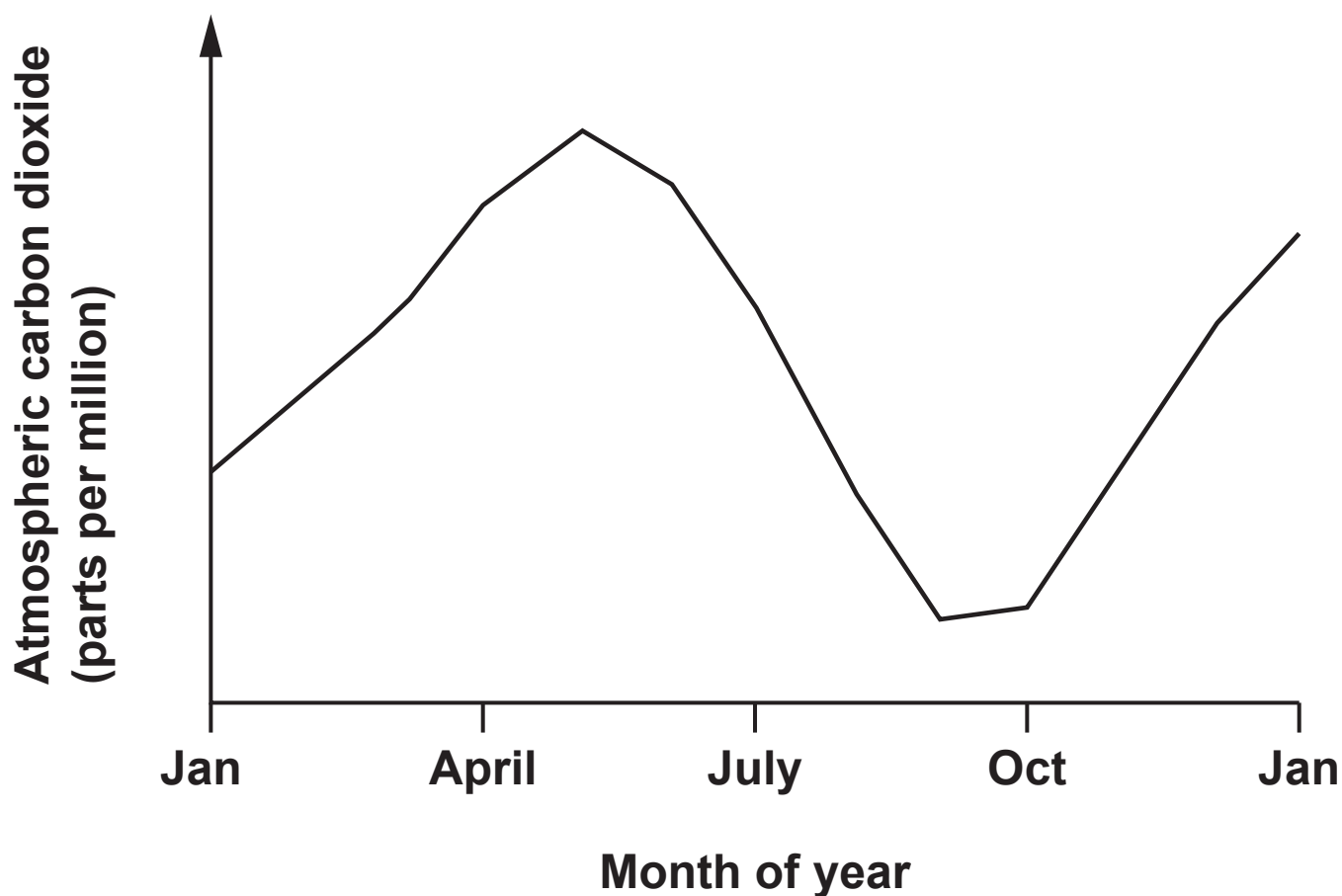
(iii) Decomposition can take place aerobically or anaerobically.

What is meant by the term ANAEROBICALLY?

[1]



(b) The graph shows the changes in carbon dioxide levels in the atmosphere during a year.



Identify the process which causes the changes in carbon dioxide in the atmosphere from April to October.

Tick (✓) ONE box. [1]

Combustion

☐

Decomposition

☐

Photosynthesis

☐

Respiration

☐

(c) Human activity has led to rising carbon dioxide levels in the atmosphere.

This contributes to global warming and reduces global biodiversity.

Describe TWO ways in which human activity can reduce LOCAL biodiversity.

1 _____

2 _____

[2]

14

(a)* Smoking is a risk factor for lung cancer.

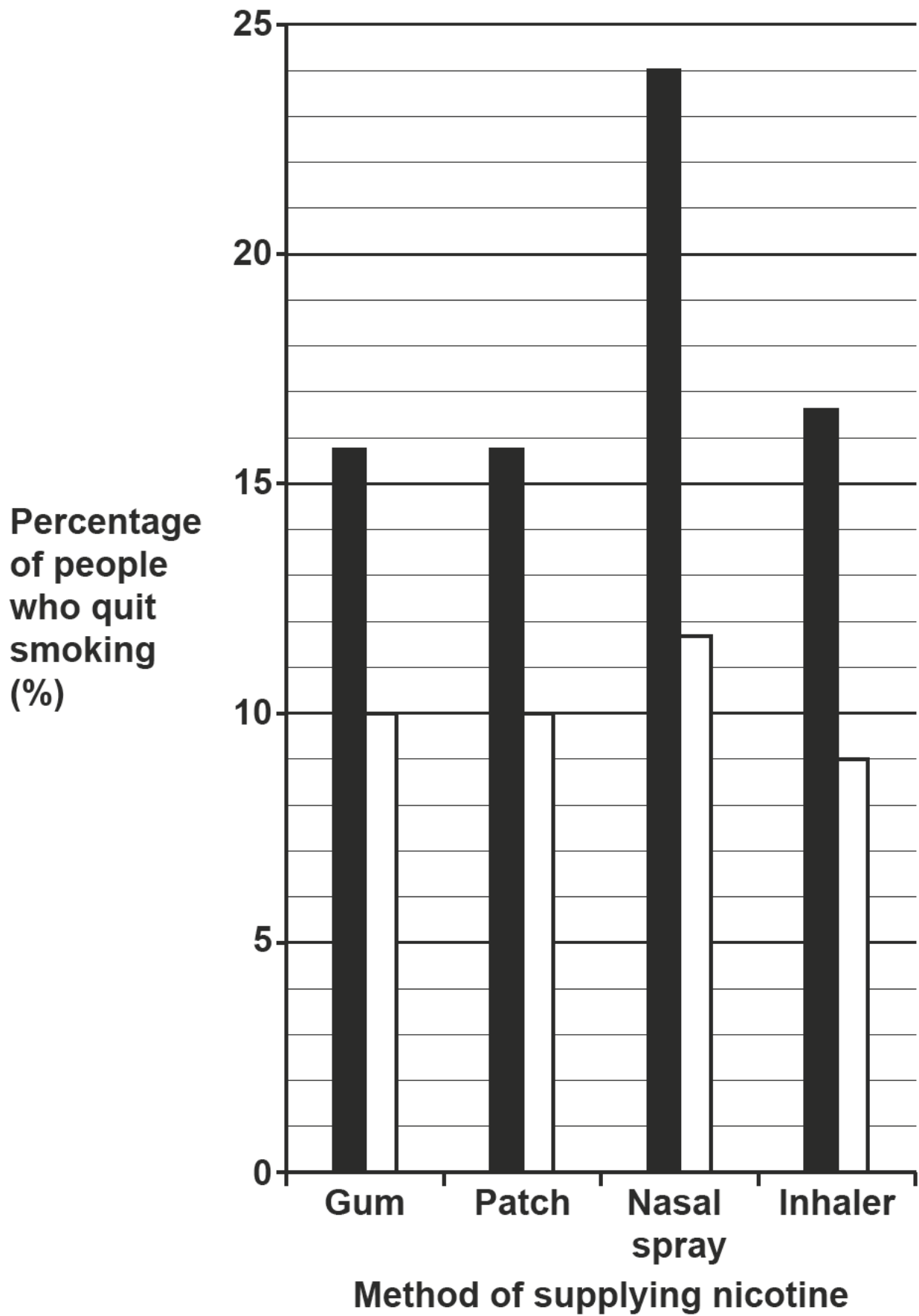
**Nicotine is given to people to help them quit smoking.
The nicotine is supplied using different methods.**

A study looked at the effectiveness of four of these methods.

A placebo was given to some people as part of the study. A placebo looks like the drug being tested but has no medical effect.

The bar chart opposite shows the results.

KEY



What does the study show about the effectiveness of the different methods to help people to give up smoking?

In your answer:

Compare the effectiveness of different methods. Explain the role of the placebo and what its results show.

Use data to support your conclusions.

[6]

(b) Smoking cigarettes can cause lung cancer.

Complete the sentences to explain why.

Use words from the list.

cell division

meiosis

mutation

protein synthesis

reduction

**Cigarettes contain cancer causing chemicals which
can cause DNA _____ .**

This leads to uncontrolled _____ . [2]

- 15 A student investigates the effect of soil pH on the growth of dandelion plants.**

They measure the height of different dandelion plants grown in soils with different pH.

The table shows their results.

Soil pH	Dandelion height (cm)			
	1	2	3	Mean
2	0.6	0.8	1.0	0.8
4	3.2	3.4	3.0	3.2
6	10.5	10.3	10.6	10.5
8	5.0	3.8	5.0	4.6
10	2.0	2.2	1.8	

(a)

- (i) Calculate the mean dandelion height for the soil at pH 10.**

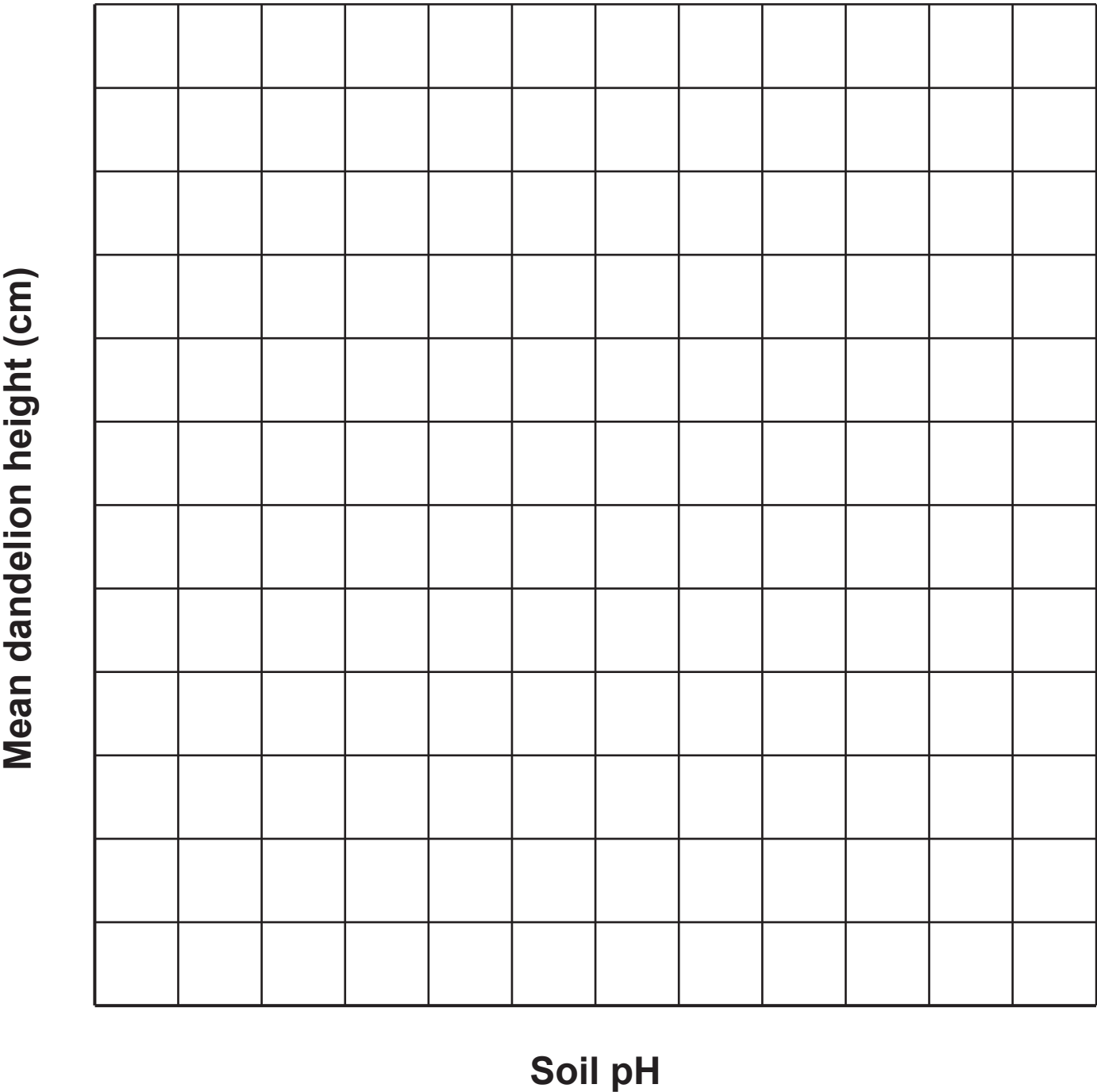
Write your answer in the table. [1]

(ii) The student identifies an outlier in the results.

Tick (✓) ONE correct set of results to identify the outlier. [1]

Soil pH	Dandelion height	Outlier
2	result 2	
6	result 2	
8	result 2	

- (b) Plot a graph of the student's mean results. Choose appropriate scales. [3]
- (c) Draw a curve of best fit. [1]



(d) What conclusions can be made from the student's results?

Include DATA in your answer.

[2]

16

- (a) A student wants to find how effective three antibiotics are for treating a range of bacterial infections.

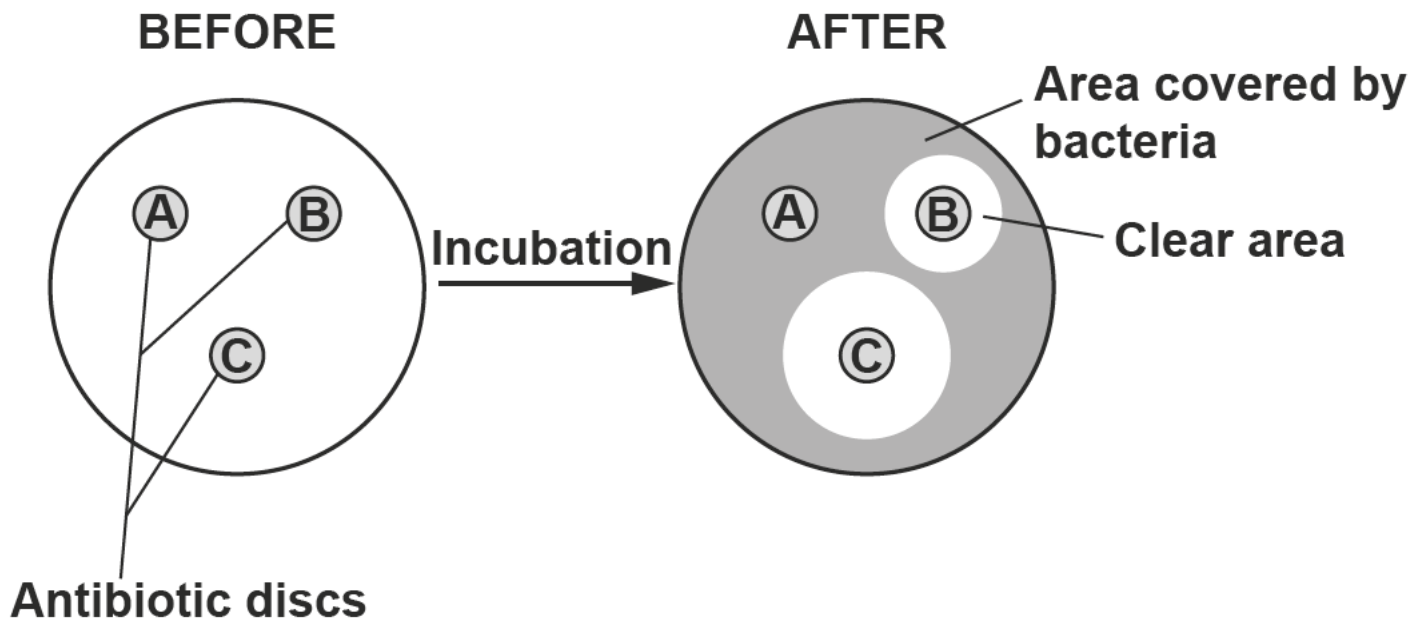
This is their method:

Spread bacteria across an agar plate.

Soak discs with different antibiotics (A, B and C) and place them on the surface of the agar plate.

Leave the plate to incubate for 5 days.

The student's results are shown in the diagram.



- (i) Which antibiotics are the most and least effective at inhibiting bacteria growth?

Put a **ring** around the correct answers.

MOST effective antibiotic **A** **B** **C**

LEAST effective antibiotic **A** **B** **C**

Explain your answers. Use the diagram.

[2]

- (ii) Suggest TWO improvements to the method to increase **VALIDITY** of the investigation.

1

2

[2]

(b) Bacteria are one cause of communicable disease.

Outline the role of the immune system of the human body in defence against disease.

[2]

(c) Tuberculosis (TB) is caused by bacteria. The bacteria usually attack the lungs.

It is estimated that 8.7 million people develop TB worldwide each year.

1.1 million of these people are estimated to have HIV.

(i) Calculate the percentage of people who develop TB worldwide each year who are estimated to have HIV.

Percentage = _____ % [2]

- (ii) Infection with HIV makes you more likely to develop TB.

State ONE reason why having HIV makes you more likely to develop TB.

[1]

- (d) Antibiotics are developed to kill bacteria.

Bacteria have appeared that antibiotics can not kill.

Explain how bacteria could have evolved to become antibiotic resistant.

Use ideas about NATURAL SELECTION.

[3]

END OF QUESTION PAPER

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.

[illegible]

[illegible]

[illegible]

[illegible]



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