



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE COMBINED SCIENCE: TRILOGY

H

Higher Tier
Biology Paper 2H

Monday 9 June 2025

Morning

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	



J U N 2 5 8 4 6 4 B 2 H 0 1

IB/M/Jun25/G4006/E9

8464/B/2H

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ANSWER IN THE SPACES PROVIDED**



0 1

This question is about genetics.

The fur colour of rabbits is controlled by two alleles.

0 1 . 1

Draw **one** line from each term to the meaning of the term relating to genetics in rabbits.

[3 marks]

Term	Meaning of the term
Chromosome	A fur colour that is seen
Gene	A whole strand of DNA found in the nucleus of a rabbit cell
Genome	Codes for a protein that affects fur colour
	The complete genetic composition of a rabbit

Question 1 continues on the next page

Turn over ►



0 1 . 2

In rabbits:

- the allele for brown fur (**B**) is dominant
- the allele for white fur (**b**) is recessive.

A rabbit with the alleles **Bb** and a rabbit with the alleles **bb** breed together.

Determine the probability that one of the offspring will have white fur.

You should:

- complete the Punnett square diagram
- identify any offspring that will have white fur.

[5 marks]

Probability = _____



0	1	.	3
---	---	---	---

A male rabbit is heterozygous for fur colour.

The rabbit's body cells have the genotype **Bb**.

One of the sperm cells from the rabbit has the allele **b**.

Explain why the alleles in the rabbit's body cells and the allele in the sperm cell are different.

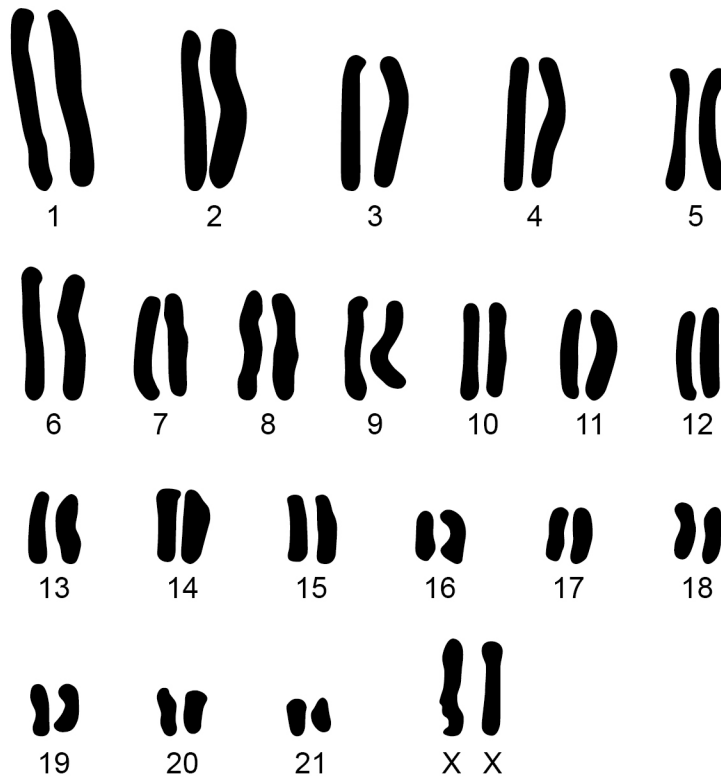
[2 marks]

Question 1 continues on the next page



Figure 1 shows the chromosomes of a rabbit.

Figure 1



0 1 . 4 How many chromosomes would be found in a skin cell of a rabbit?

Use **Figure 1**.

[1 mark]

Number of chromosomes = _____

0 1 . 5 The sex of a rabbit is controlled in the same way as the sex of a human.

Give the evidence from **Figure 1** that the rabbit is female.

[1 mark]



0 2

This question is about the hormones involved in reproduction.

0 2 . 1

Name **one** hormone produced in the **ovaries**.

[1 mark]

0 2 . 2

Give **one** function of the hormone that is produced in the **testes**.

[1 mark]

Different methods of contraception can involve:

- barriers
- hormones.

0 2 . 3

Condoms are a barrier method of contraception.

Give **one** advantage of condoms as a method of contraception compared with hormonal methods of contraception.

Do **not** refer to cost in your answer.

[1 mark]

Question 2 continues on the next page



[6 marks]

[illegible]



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0 9

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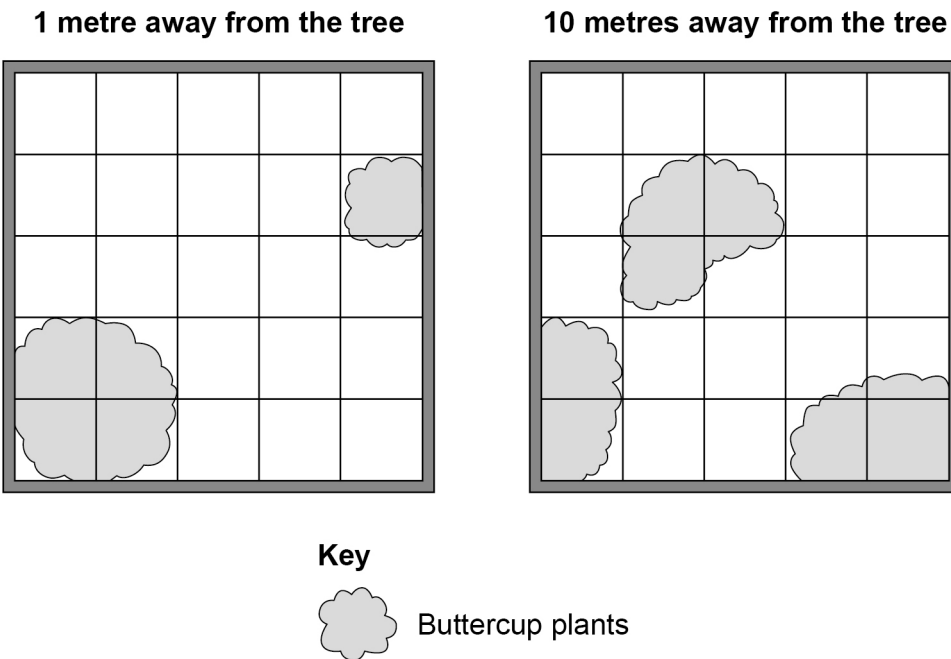
0 3

Buttercups are small plants.

Students investigated the distribution of buttercup plants at different distances from a tree.

Figure 2 shows quadrats being used to sample two areas.

Figure 2

**0 3****1**

What was the independent variable in this investigation?

[1 mark]



0 3 . 2

Students counted every small square in the quadrat that was **at least half** covered by buttercup plants.

Determine the percentage cover of buttercup plants **10 metres** away from the tree.

Use **Figure 2**.

[3 marks]

Percentage cover = _____ %

0 3 . 3

The students placed:

- several quadrats 1 metre away from the tree
- several quadrats 10 metres away from the tree.

Give **two** factors the students should consider when deciding how many times to place a quadrat at each distance.

Do **not** refer to time available.

[2 marks]

1 _____

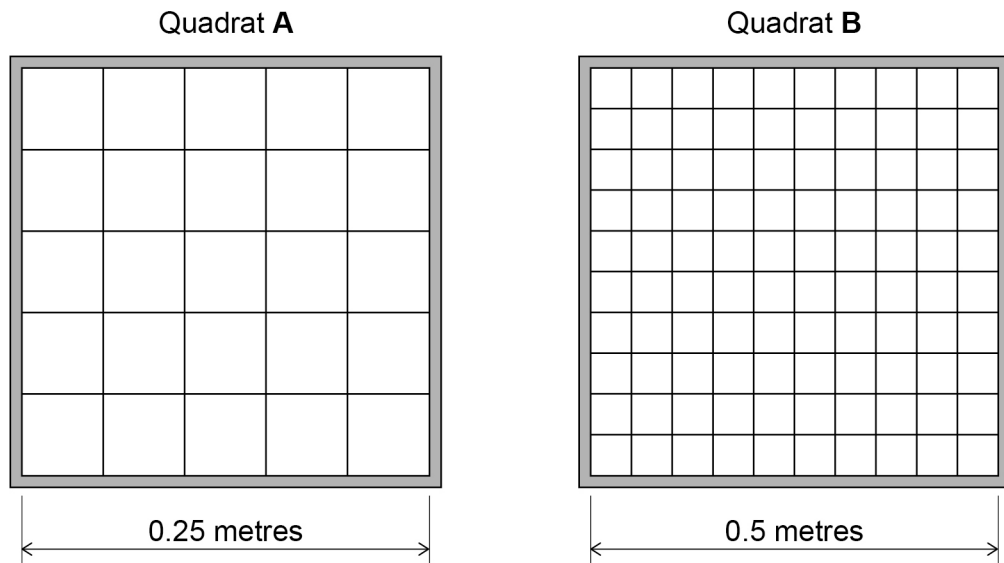
2 _____

Question 3 continues on the next page



0 3 . 4 Figure 3 shows two different quadrats.

Figure 3



Not to scale

Explain **two** advantages of using quadrat **B** instead of quadrat **A** in the investigation.

You should include calculations in your answer.

[4 marks]

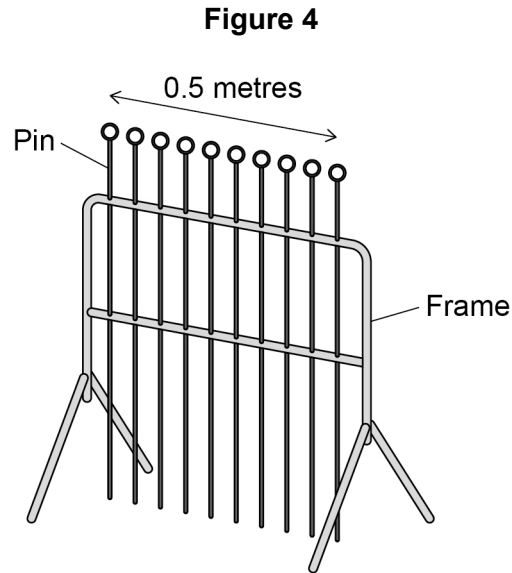
1 _____

2 _____



A point quadrat can also be used to estimate the percentage cover of plants in an area.

Figure 4 shows a point quadrat.



When using a point quadrat, the pins are pushed down to the soil.

The number of pins that touch a buttercup plant is counted.

0 3 . 5

What are **two** advantages of using a point quadrat compared with using a square quadrat?

[2 marks]

Tick (✓) **two** boxes.

With a point quadrat, a plant that is smaller than half a square is more likely to be counted.

☐

With a point quadrat, each species of plant is easier to identify.

☐

With a point quadrat, no judgement of cover is needed.

☐

With a square quadrat, a buttercup plant covering other plants cannot be counted.

☐

With a square quadrat, the results are less likely to be biased.

☐


0 3 . 6 The percentage cover of buttercup plants can be estimated using the equation:

$$\text{percentage cover} = \frac{\text{number of times a pin touched a buttercup plant}}{\text{total number of pins used}} \times 100$$

30 students each collected results from 50 pins.

The students then put **all** their results together.

Buttercup plants had a percentage cover of 7%.

Calculate the number of times a pin touched a buttercup plant.

[3 marks]

Number of times a pin touched a buttercup plant = _____

15



0	4
---	---

Farmers can increase crop yield by controlling the conditions the plants grow in.

0	4	.	1
---	---	---	---

Maize is a crop plant.

A variety of maize has been genetically modified (GM) to be resistant to a herbicide.

Explain how growing GM herbicide-resistant maize can produce a larger yield than growing non-GM maize.

[4 marks]

Extra space

0	4	.	2
---	---	---	---

Explain how growing a GM herbicide-resistant crop can **decrease** the biodiversity of animals.

[2 marks]

Question 4 continues on the next page



Bees are a type of insect.

The number of insects near a crop can be increased by planting hedgerows.

0 4 . 3

Increasing the number of bees **and** other insects increases crop yield.

Suggest **two** reasons why increasing the number of insects can increase crop yield.

[2 marks]

1 _____

2 _____

0 4 . 4

Hedgerows provide habitats for insects.

Give **one** reason why increasing hedgerow habitats increases insect numbers.

[1 mark]

0 4 . 5

Some farmland contains areas of peat.

When peat is dug up:

- the oxygen levels in the peat increase
- the peat decays quickly.

Explain why increasing the level of oxygen in peat contributes to climate change.

[2 marks]

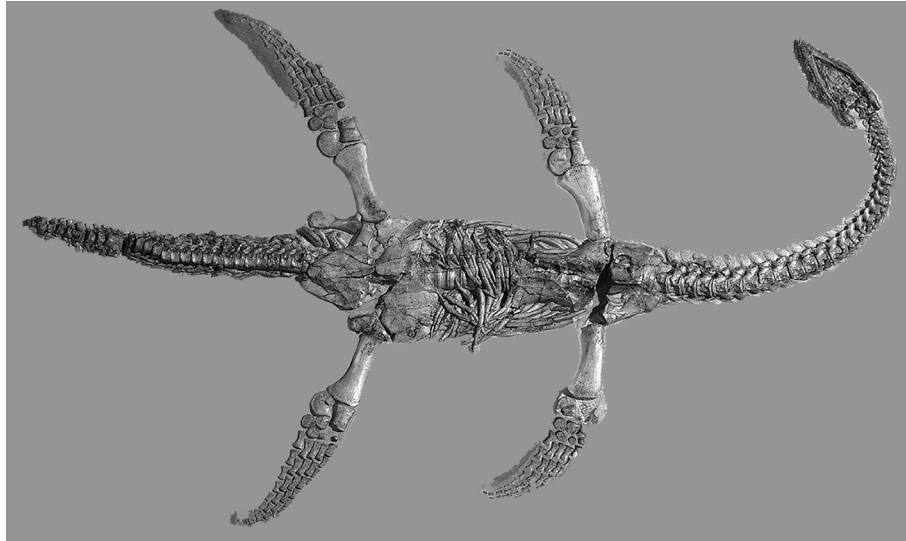


0 5

Plesiosaurs are extinct reptiles that lived in the ocean.

Figure 5 shows a fossil of a plesiosaur.

Figure 5



0 5

1

Plesiosaurs may have moved rapidly upwards to hold their heads above the water surface to search for prey.

What **type** of adaptation was the rapid upwards movement?

[1 mark]

0 5

2

Give **two biotic** factors that may have caused the extinction of plesiosaurs.

[2 marks]

1

2



0	5	.	3
---	---	---	---

Describe how the plesiosaur fossil in **Figure 5** could have been formed.

[3 marks]

0	5	.	4
---	---	---	---

Scientists use fossils to study evolution.

Suggest **two** reasons why scientists **cannot** study the mutations involved in the evolution of plesiosaurs.

Do **not** refer to extinction in your answer.

[2 marks]

1

2



0 5 . 5 **Table 1** shows part of the classification of a plesiosaur.

Complete **Table 1**.

[2 marks]

Table 1

Classification group	Name
Domain	
Kingdom	Animalia
	Chordata
Class	Reptilia
	Plesiosaur
	Cryptoclididae
Genus	Cryptoclidus
Species	eurymerus

0 5 . 6 Give the binomial name of the plesiosaur in **Table 1**.

[1 mark]



0 6

The human body makes the hormone insulin and a chemical called C-peptide.

C-peptide concentration in the blood has a linear relationship with the amount of insulin the body produces.

0 6**. 1**

Which equation represents a linear relationship?

[1 mark]

Tick (✓) **one** box.

$$y = mc + x$$

☐

$$y = mc^2 + x$$

☐

$$y = mx + c$$

☐

$$y = mx^2 + c$$

☐

Question 6 continues on the next page



Glucagon is a hormone produced by the body.

0 6 . 3

Which organ produces glucagon?

[1 mark]

Tick (✓) **one** box.

Liver

☐

Pancreas

☐

Small intestine

☐

Stomach

☐

0 6 . 4

In some people, glucagon is produced in smaller quantities than is needed.

Explain why people who do **not** produce enough glucagon feel weak and tired.

[4 marks]

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END OF QUESTIONS



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