AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 2F

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.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	

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.

Do not write outside the box

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ANSWER IN THE SPACES PROVIDED

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0 1 A human body cell contains 46 chromosomes.

0 1 . 1 How many chromosomes does a human sperm cell contain?

[1 mark]

Tick (✓) **one** box.

22 ☐ 23 ☐ 46 ☐

0 1 . 2 Draw **one** line from each word to the meaning of that word.

[3 marks]

Word	**Meaning**
	A small ring of DNA in the cytoplasm
Gene	
	All the genetic material of an organism
Genome	
	A small section of DNA which codes for a protein
Nucleus	
	A structure which contains chromosomes

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Some plants contain a harmful chemical called PTC.

Some people can taste PTC.

0 1 . 3 Suggest **one** advantage of being able to taste PTC.

[1 mark]

Only people with a dominant allele **T** can taste PTC.

People with **only** the allele **t** cannot taste PTC.

0 1 . 4 A person has the genotype **Tt**.

What word describes the person's genotype?

[1 mark]

Tick (✓) **one** box.

- Heterozygous ☐
- Phenotype ☐
- Recessive ☐

0 1 . 5 Give the genotype of a person who **cannot** taste PTC.

[1 mark]

Do not write outside the box

0 1 . 6 A woman and a man plan to have a child.

The woman and the man both have the genotype **Tt**.

Complete **Figure 1** to show the possible genotypes of the child.

[2 marks]

Figure 1

		Woman	
		T	**t**
Man	**T**	**T T**	
	t		

0 1 . 7 What is the chance of the child being able to taste PTC?

Use **Figure 1**.

[1 mark]

Tick (✓) **one** box.

25% ☐ 50% ☐ 75% ☐ 100% ☐

10

Turn over for the next question

Do not write outside the box

0 2 Caffeine is a drug that affects reaction time.

Coffee is a drink that contains caffeine.

Five students investigated the effect of drinking coffee on their reaction time.

Each student sat in front of a computer screen showing a reaction timer.

This is the method used.

1. Press any key on the keyboard when the colour of the screen changes to green.
2. Record the reaction time shown on the computer screen.
3. Drink coffee containing caffeine.
4. Wait 15 minutes then repeat steps 1 and 2.

0 2 . 1 What is the dependent variable in the investigation?

[1 mark]

Tick (✓) **one** box.

The coffee containing caffeine ☐

The number of students ☐

The reaction time ☐

0 2 . 2 Give **two** control variables the students should have used.

[2 marks]

1 _____

_____

2 _____

_____

Do not write outside the box

0 2 . 3 Why did the students wait 15 minutes after drinking the coffee before repeating the test?

[1 mark]

0 2 . 4 Responding to the colour change of the screen involves a receptor in the student.

Where is the receptor in the student?

[1 mark]

Tick (✓) **one** box.

Ear ☐

Eye ☐

Skin ☐

0 2 . 5 Responding to the colour change of the screen involves an effector in the student.

What is the effector in the student?

[1 mark]

Tick (✓) **one** box.

Brain ☐

Gland ☐

Muscle ☐

Spinal cord ☐

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Table 1 shows the results.

Table 1

Student	Reaction time in milliseconds	
	Before drinking coffee	**After drinking coffee**
1	385	255
2	420	291
3	285	265
4	871	259
5	463	247

0 2 . 6 What is the effect of drinking coffee on reaction time?

Use **Table 1**.

[1 mark]

Do not write outside the box

0 2 . 7 Which student had the smallest change in reaction time after drinking coffee?

[1 mark]

Tick (✓) **one** box.

Student 1 ☐

Student 2 ☐

Student 3 ☐

Student 4 ☐

Student 5 ☐

0 2 . 8 The students decided that one of the results was anomalous.

What should the students do with the anomalous result when calculating the mean change in reaction time?

[1 mark]

_____

_____

9

Turn over for the next question

Do not write outside the box

0 3 **Figure 2** shows one species of bird on a bird feeder.

Figure 2

The birds use their beaks to reach nuts inside the bird feeder.

Cats sometimes eat the birds.

0 3 . 1 Give the food chain for the birds, cats and nuts.

[2 marks]

0 3 . 2 Which organism in the food chain you gave in Question **03.1** is the primary consumer?

[1 mark]

Do not write outside the box

0 3 . 3 Cats are one biotic factor that affects the size of the bird population.

Which **two** of the following are **biotic** factors?

[2 marks]

Tick (✓) **two** boxes.

- Food ☐
- Pathogens ☐
- Sunlight ☐
- Temperature ☐
- Water ☐

Question 3 continues on the next page

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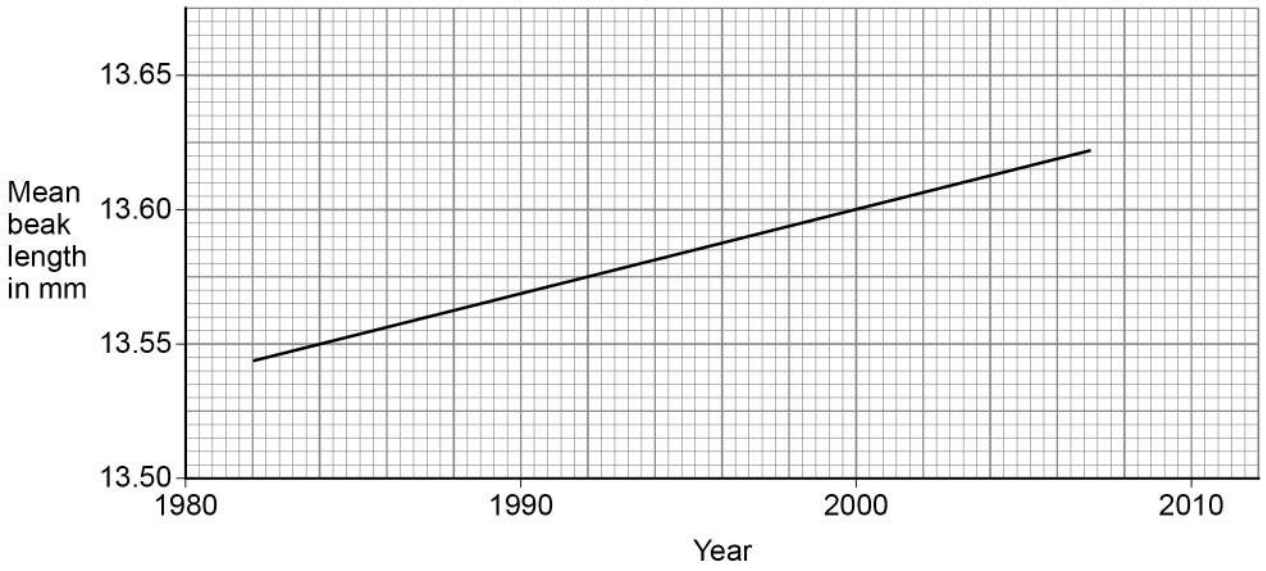
Figure 3 shows the mean beak length of this species of bird from 1982 to 2007.

Figure 3



0 3 . 4 What was the mean beak length in 2000?

[1 mark]

Mean beak length = _____ mm

0 3 . 5 What type of adaptation is beak length?

[1 mark]

Tick (✓) **one** box.

Behavioural ☐

Chemical ☐

Structural ☐

Do not write outside the box

Figure 3 shows evidence of evolution in this species of bird.

0 3 . 6 Scientists have concluded that beak length in this species of bird is increasing.

Complete the sentences about the evolution of this species of bird.

Choose answers from the box.

[4 marks]

excretion	**generation**	**mutation**
reproduction	**respiration**	**variation**

The difference in beak length in the bird population

is called _____ .

A change in a gene affects the beak length.

Change in a gene is called _____ .

The birds with the longest beaks get more food.

Getting more food improves a bird's chances of

survival and _____ .

This process of evolution takes place over more

than one _____ .

Question 3 continues on the next page

Do not write outside the box

0 3 . 7 Birds of this species:

- live for about 3 years
- produce up to 24 eggs every year.

Why is evolution easier to study in birds than in humans?

[1 mark]

Tick (✓) **one** box.

Birds breed less frequently than humans. ☐

Birds have a shorter life cycle than humans. ☐

Birds have fewer offspring than humans. ☐

0 3 . 8 Bacteria also provide evidence for evolution.

Which statement describes evidence for evolution?

[1 mark]

Tick (✓) **one** box.

Bacteria can become resistant to antibiotics. ☐

Decomposition can be caused by bacteria. ☐

Some bacteria are pathogens. ☐

13

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0 4 A fossil was found in rocks. The rocks were formed from mud.

The fossil is of the fungus *Ourasphaira giraldae*.

0 4 . 1 What is the genus of the fungus?

[1 mark]

Tick (✓) **one** box.

Giraldae ☐

Ourasphaira ☐

Ourasphaira giraldae ☐

0 4 . 2 The mud around the fungus did **not** contain oxygen.

Which process did the mud around the fungus prevent?

[1 mark]

Tick (✓) **one** box.

Decay ☐

Geological activity ☐

Photosynthesis ☐

Question 4 continues on the next page

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0 4 . 3 The fossilised fungus is estimated to be 890 000 000 years old.

What is 890 000 000 in standard form?

[1 mark]

Tick (✓) **one** box.

8.9×10^6 ☐

8.9×10^7 ☐

8.9×10^8 ☐

8.9×10^9 ☐

0 4 . 4 Traditional classification divided organisms into kingdoms.

Who developed the traditional system of classification?

[1 mark]

Tick (✓) **one** box.

Carl Linnaeus ☐

Carl Woese ☐

Charles Darwin ☐

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0 4 . 5 More recent classification methods use a three-domain system.

What is the name of the domain the fungus *Ourasphaira giraldae* is classified in?

[1 mark]

Tick (✓) **one** box.

Bacteria ☐

Eukaryota ☐

Plants ☐

0 4 . 6 Why has classification changed over time?

[1 mark]

Tick (✓) **one** box.

Electron microscopes allow more detail to be seen inside cells. ☐

Many more types of organisms have become extinct. ☐

Some fossils are buried so deep that they may never be discovered. ☐

0 4 . 7 The fungus *Ourasphaira giraldae* is now extinct.

Give **two** possible causes of extinction.

[2 marks]

1 _____

_____

2 _____

_____

8

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0 5 Increased carbon dioxide levels in the atmosphere contribute to climate change.

0 5 . 1 Give **one** way deforestation can increase carbon dioxide levels in the atmosphere.

[1 mark]

0 5 . 2 Name **one** other gas that contributes to climate change.

Do **not** refer to carbon dioxide in your answer.

[1 mark]

0 5 . 3 Meat is produced for humans to eat.

Give **two** ways the production of meat releases carbon dioxide.

[2 marks]

1

2

Question 5 continues on the next page

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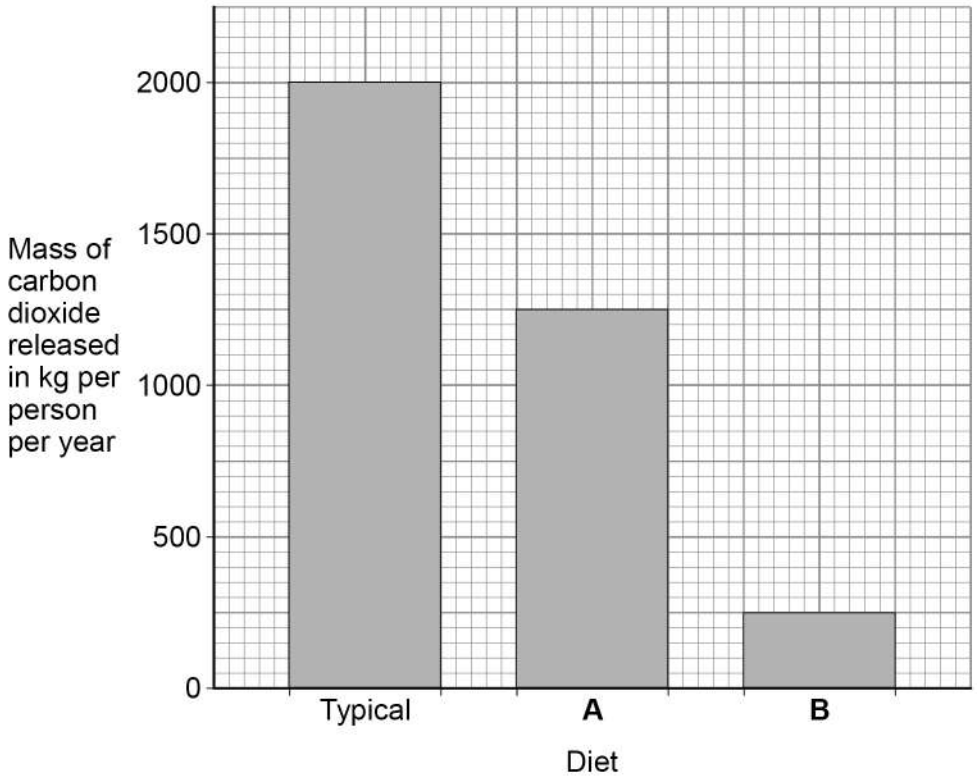
0 5 . 4 The mass of carbon dioxide released during the production of food varies depending on the type of food.

Figure 4 shows the mass of carbon dioxide released as a result of three different diets.

Figure 4



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Compare the mass of carbon dioxide released as a result of the three diets shown in **Figure 4**.

Use data from **Figure 4** in your answer.

[4 marks]

8

Turn over for the next question

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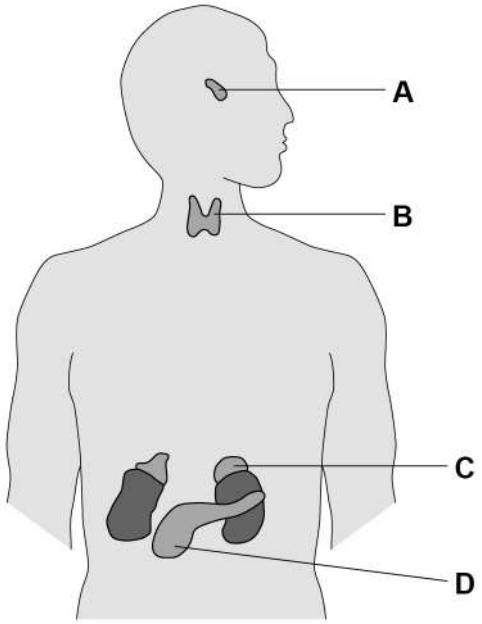
0 6 **Figure 5** shows glands in the human body.

Figure 5



0 6 . 1 Which organ system includes the glands shown in **Figure 5**?

[1 mark]

0 6 . 2 Which gland produces insulin?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 6 . 3 Which gland produces hormones that stimulate the other glands to produce hormones?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

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0 6 . 4 How do hormones travel from one gland to another gland?

[1 mark]

0 6 . 5 Name **two** glands involved in human reproduction.

Do **not** refer to glands shown on **Figure 5** in your answer.

[2 marks]

1 _____

2 _____

0 6 . 6 Ovulation test kits can help women know when they are most fertile.

Ovulation test kits detect the increase in the hormone that stimulates ovulation.

Which hormone is detected by ovulation test kits?

[1 mark]

Tick (✓) **one** box.

- Follicle stimulating hormone (FSH) ☐
- Luteinising hormone (LH) ☐
- Oestrogen ☐
- Progesterone ☐

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0 6 . 7 A new contraceptive drug for men is being tested.

The drug:

- is given in one injection
- stops sperm being able to fertilise eggs
- is effective for up to 13 years.

Evaluate the use of the new drug compared with existing contraceptive methods.

[6 marks]

13

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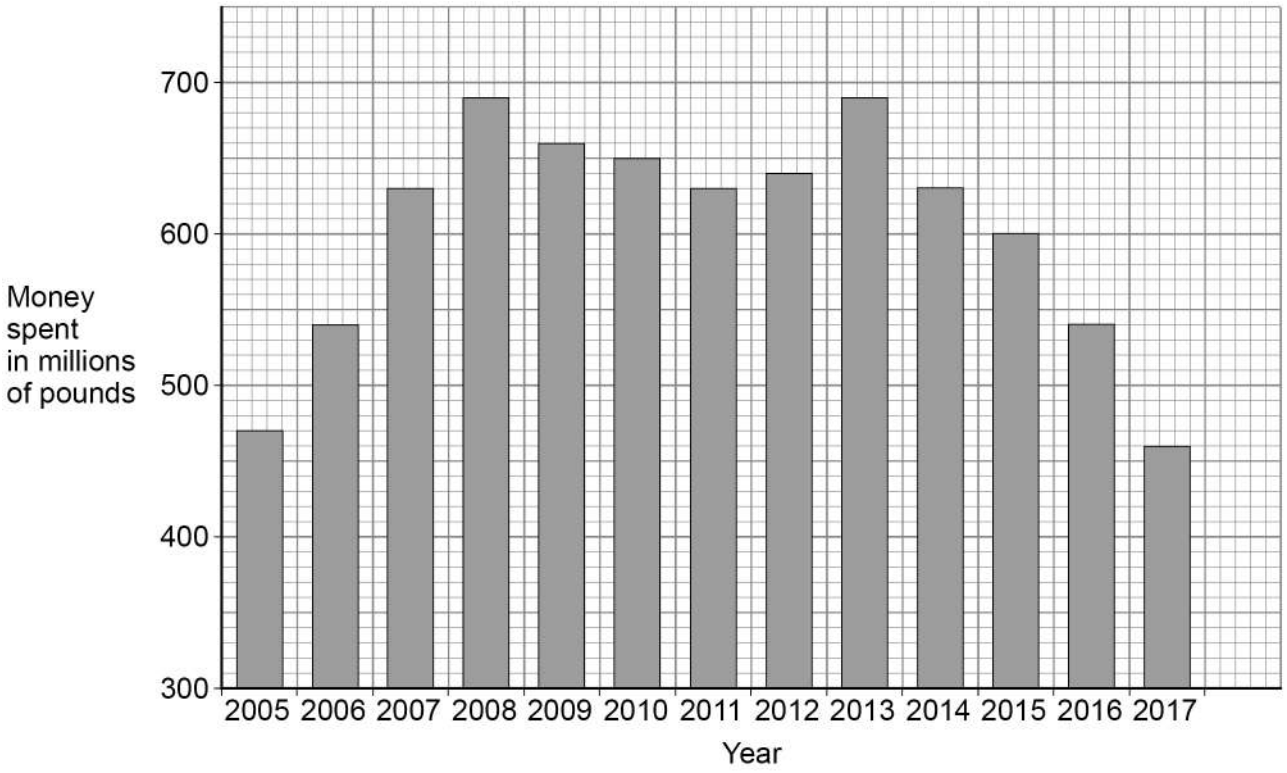
0 7 **Figure 6** shows the money spent on conserving biodiversity in the UK by the government.

Figure 6



0 7 . 1 Describe the trends in the money spent on conserving biodiversity from 2005 to 2011.

Use data from **Figure 6** in your answer.

[2 marks]

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0 7 . 2 Calculate the percentage decrease in the money spent on conserving biodiversity from 2013 to 2017.

Use the equation:

$$\text{percentage decrease} = \frac{\text{change in money spent from 2013 to 2017}}{\text{money spent in 2013}} \times 100$$

Give your answer to 2 significant figures.

[3 marks]

Percentage decrease (2 significant figures) = _____ %

0 7 . 3 Conservation of peat bogs can help maintain biodiversity.

Give **two** uses of peat taken from peat bogs.

[2 marks]

1 _____

2 _____

Question 7 continues on the next page

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0 7 . 4 Describe **two** ways to **increase** biodiversity in the UK.

Do **not** refer to money spent or to peat in your answer.

[2 marks]

1 _____

_____

2 _____

_____

9

END OF QUESTIONS

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