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

Monday 1 June 2020 Afternoon 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

0 1 This question is about reproduction.

0 1 . 1 Which **two** statements are true for sexual reproduction in humans?

[2 marks]

Tick (✓) **two** boxes.

Gametes are formed. ☑

Offspring are clones. ☐

Offspring are genetically identical to parents. ☐

Only one parent is involved. ☐

Sperm and egg fuse. ☑

0 1 . 2 Humans reproduce by sexual reproduction.

Complete **Figure 1** to show the inheritance of sex.

[3 marks]

Figure 1

		Mother	
		X	**X**
Father	**X**	XX	XX
	Y	XY	XY

Do not write outside the box

0 1 . 3 Draw a ring around the genotype of all male children in **Figure 1**.

[1 mark]

0 1 . 4 When children reach puberty, reproductive hormones cause changes in their bodies.

Draw **one** line from each hormone to the change the hormone causes at puberty.

[2 marks]

Hormone	**Change the hormone causes at puberty**
Oestrogen	Breasts develop
	Skin turns lighter
Testosterone	Voice becomes deeper
	Wisdom teeth appear

Question 1 continues on the next page

Do not write outside the box

A woman does **not** want to become pregnant.

She considers two methods of contraception.

0 1 . 5 Draw **one** line from each method of contraception to how the method prevents pregnancy.

[2 marks]

Method of contraception	How the method prevents pregnancy
Condom	Sperm are killed
Oral contraceptive (the pill)	Hormones stop eggs maturing
	Embryos do not implant in the uterus
	Sperm do not reach the egg

Do not write outside the box

0 1 . 6 Give **one** advantage and **one** disadvantage of taking oral contraceptives to prevent pregnancy.

[2 marks]

Advantage reliable

Disadvantage may affect fertility later

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Turn over for the next question

Do not write outside the box

0 2 Ammonites became extinct millions of years ago.

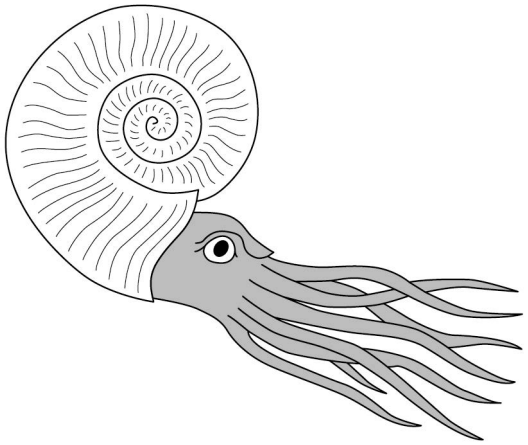
Figure 2 is a photograph of a fossil ammonite.

.

Figure 3 is a drawing of what scientists think a living ammonite looked like.

Figure 2

Figure 3



0 2 . 1 How was the fossil in **Figure 2** formed?

[1 mark]

Tick (✓) **one** box.

The ammonite left traces where it moved. ☐

The ammonite shell was replaced by minerals. ☑

The ammonite was frozen in ice. ☐

0 2 . 2 Suggest why scientists are **not** certain what living ammonites looked like.

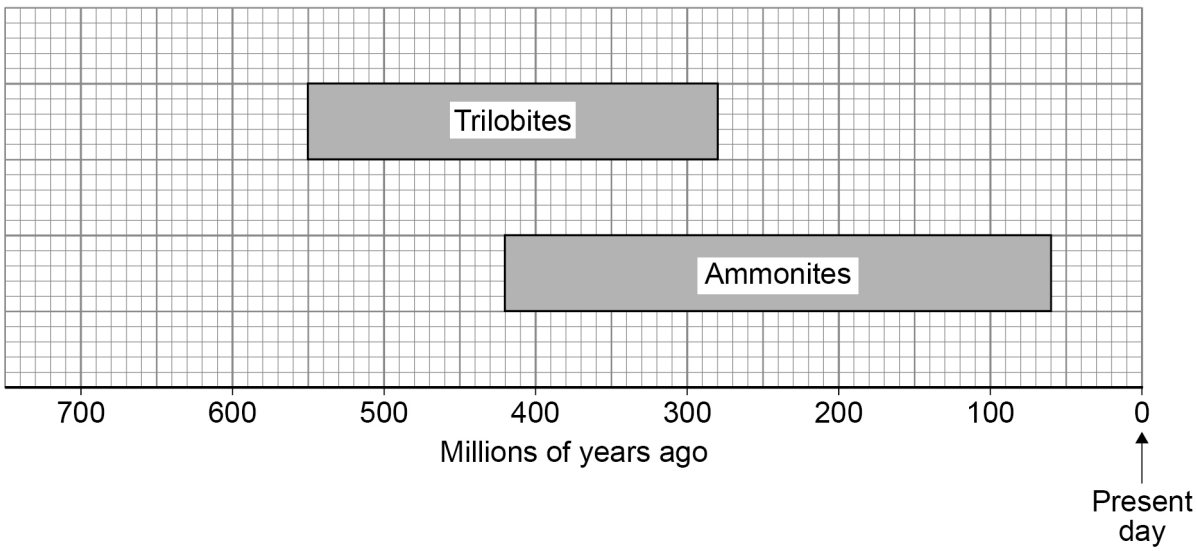
[1 mark]

soft parts do not mineralize

Do not write outside the box

Figure 4 shows when two different types of organism were alive on Earth.

Figure 4



0 2 . 3 How many millions of years ago did ammonites become extinct?

Use **Figure 4**.

[1 mark]

60 million years

0 2 . 4 Trilobites lived on Earth for 270 million years.

Calculate how much longer ammonites lived on Earth than trilobites.

Use **Figure 4**

[2 marks]

ammonites)
420 - 60 = 360
360 - 270 =
90 million years

Turn over ►

Do not write outside the box

0 2 . 5 Suggest **two** factors which may have caused ammonites to become extinct.

[2 marks]

1 Drought

2 global warming

The fossil record provides evidence for the theory of evolution by natural selection.

0 2 . 6 Which scientist proposed the theory of evolution by natural selection?

[1 mark]

Tick (✓) **one** box.

Carl Linnaeus ☐

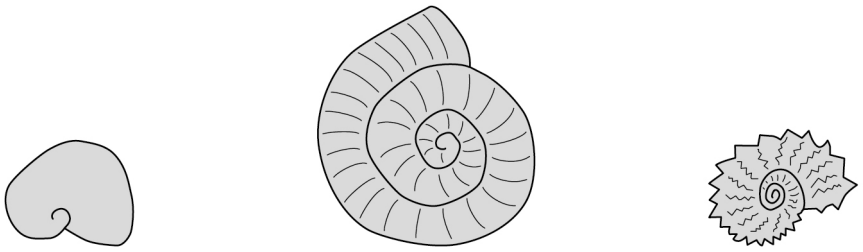
Carl Woese ☐

Charles Darwin ☑

Do not write outside the box

0 2 . 7 **Figure 5** shows ammonite fossils from three different time periods.

Figure 5



400 million years ago | 300 million years ago | 200 million years ago

How do the fossils in **Figure 5** give evidence for the theory of evolution by natural selection?

[1 mark]

Tick (✓) **one** box.

All fossils have coiled shells. ☐

More recent fossils are bigger. ☐

Older fossils are more simple. ☑

9

Turn over for the next question

Do not write outside the box

0 3 Mineral ions are important chemicals in an ecosystem.

0 3 . 1 Plants take in nitrate ions dissolved in water.

Which part of a plant takes in nitrate ions?

[1 mark]

Root hairs

0 3 . 2 Name **two** chemicals that are cycled between plants, the soil and the air.

Do **not** refer to nitrogen or nitrates in your answer.

[2 marks]

1 Carbon

2 water

Do not write outside the box

0 3 . 3 All the chemicals in a plant are recycled when the plant dies.

Describe how:

- microorganisms recycle chemicals
- the chemicals are used again by new plants.

[6 marks]

- microorganisms decay (the dead plant)
- microorganisms respire
- using carbon compounds glucose
- releasing carbon dioxide
- into the atmosphere
- new plants take in carbon dioxide
- (carbon dioxide) for photosynthesis
- making glucose

Nitrate mineral ions

- are released into soil
- to be taken up by new growing plants

Water

- plants dehydrate or water evaporates when they die
- recycled as rain needed by growing

9

Turn over for the next question

Do not write outside the box

0 4 Homeostasis regulates the internal conditions of the human body.

0 4 . 1 Which **two** processes are regulated by homeostasis?

[2 marks]

Tick (✓) **two** boxes.

- Controlling water output in urine ☑
- Defending the body against pathogens ☐
- How quickly you walk ☐
- Keeping cool on a hot day ☑
- Waking up in the morning ☐

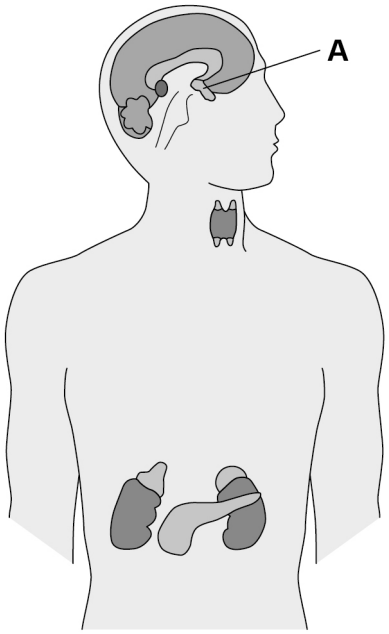
Do not write outside the box

Hormones are produced by glands in the endocrine system.

Each hormone has an effect on a target organ.

Figure 6 shows glands of the endocrine system.

Figure 6



0 4 . 2 What is the name of gland **A**?

[1 mark]

Tick (✓) **one** box.

Pancreas ☐

Pituitary ☑

Thyroid ☐

Question 4 continues on the next page

Do not write outside the box

Before eating a sugar-coated cereal a person had a blood glucose concentration of 5.2 mmol/dm^3

Soon after eating the cereal the person had a blood glucose concentration of 8.4 mmol/dm^3

0 4 . 3 Calculate the increase in the blood glucose concentration.

[1 mark]

8.4-5.2

Increase = 3.2 mmol/dm^3

0 4 . 4 The person needed medication to decrease their blood glucose concentration.

Suggest what disorder the person has.

[1 mark]

Diabetes

0 4 . 5 There is a problem with the hormone control of the person.

What is the problem?

[1 mark]

Tick (✓) **one** box.

The blood is not taking hormones to target organs. ☐

The pancreas is not releasing insulin. ☑

The pituitary gland is not being stimulated. ☐

Do not write outside the box

0 4 . 6 The person:

- works in an office
- drives to work
- is overweight
- watches the television and reads every night
- drinks a hot chocolate every night.

Suggest **two** lifestyle changes the person could make to help treat their disorder.

[2 marks]

1 change diet

2 take more exercise

8

Turn over for the next question

Do not write outside the box

0 5 This question is about biodiversity.

A farmer:

- grows only wheat crops
- has used all his small fields to make a few large fields
- cuts down trees in his woodlands to burn as fuel.

0 5 . 1 What are **two** ways the farmer could increase biodiversity on his farm?

[2 marks]

Tick (✓) **two** boxes.

Cut down trees to grow wheat ☐

Plant hedgerows around his fields ✓

Plant many different crops in his fields ✓

Put fences around his fields ☐

Put fertiliser on his wheat crop ☐

Do not write outside the box

Students investigated the effect of cutting down trees in the woodland.

This is the method used.

1. Mark out a 10 m by 10 m area where trees have been removed.

2. Place a 1 m × 1 m quadrat at six random positions in the area.

3. Record the number of plant species present.

4. Record the number of invertebrate species seen among dead leaves on the ground.

5. Repeat steps 1 to 4 in an area where there are trees.

0 5 . 2 Suggest **one** improvement the students could make to their method.

[1 mark]

repeat in each area

0 5 . 3 The students made this prediction:

'There will be more invertebrate species living in the area where there are trees.'

Explain why the students' prediction may be correct.

[2 marks]

the trees provide habitat(s) or shelter
so (more) food camouflage
shade available

Question 5 continues on the next page

Turn over ►

Do not write outside the box

Table 1 shows the students' results.

Table 1

Quadrat	Number of plant species		Number of invertebrate species	
	Area with no trees	Area with trees	Area with no trees	Area with trees
1	8	2	4	10
2	6	2	3	6
3	7	0	4	8
4	6	3	5	14
5	20	4	2	9
6	8	1	6	13
Mean	7	2	4	10

0 5 . 4 The students decided that one result was anomalous.

Draw a ring around the anomalous result in **Table 1**.

[1 mark]

0 5 . 5 How does removing trees affect the number of invertebrate species living among the dead leaves on the ground?

Use **Table 1**.

[1 mark]

removing trees decreases the number of invertebrate species

Do not write outside the box

0 5 . 6 There were more plant species growing in the area where there were no trees.

Explain why.

[3 marks]

(less trees means) more light
(and) more water minerals in soil
(so) reduced competition

10

Turn over for the next question

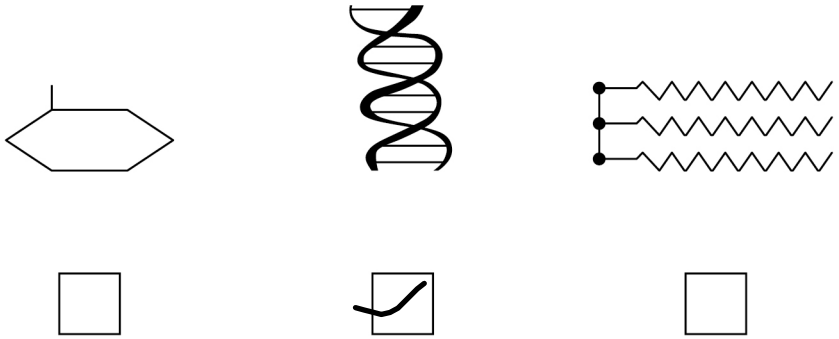
Do not write outside the box

0 6 This question is about DNA and genes.

0 6 . 1 Which diagram represents a DNA molecule?

[1 mark]

Tick (✓) **one** box.



☐ ☑ ☐

0 6 . 2 Describe the structure of a DNA molecule.

[1 mark]

Double helix

0 6 . 3 A gene is a small section of DNA on a chromosome.

Complete the sentences.

[2 marks]

A gene codes for a particular sequence of Amino acids .

This sequence makes a specific proteins .

Do not write outside the box

0 6 . 4 What is meant by the term genome?

[1 mark]

All the genetic material of organism

0 6 . 5 The complete human genome is now known.

Which important scientific advance was made using knowledge of the human genome?

[1 mark]

Tick (✓) **one** box.

Discovering antibiotic resistant bacteria	☐
Finding more foods to eat from tropical forests	☐
Tracing how aboriginal people spread across Australia	✓
Working out when the last ice age ended	☐

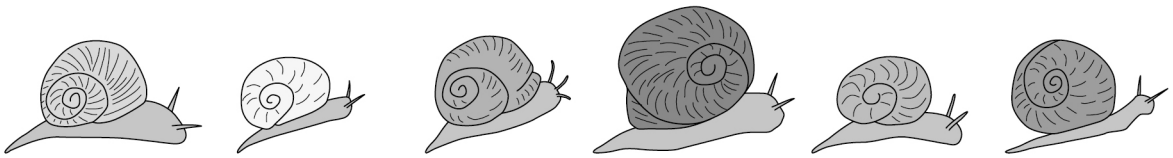
Question 6 continues on the next page

Do not write outside the box

A student found six different snails of one species in his garden.

Figure 7 shows the snails.

Figure 7



0 6 . 6 All the snails are different.

What scientific term describes differences in characteristics between individuals of a species?

Variation

[1 mark]

0 6 . 7 A change in DNA has caused snail **P** to be very different from the other five snails.

Suggest why there might be an increasing number of snails similar to snail **P** in each future generation.

[2 marks]

stronger larger (shell)
(so) more likely to (survive and) breed

9

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Turn over for the next question

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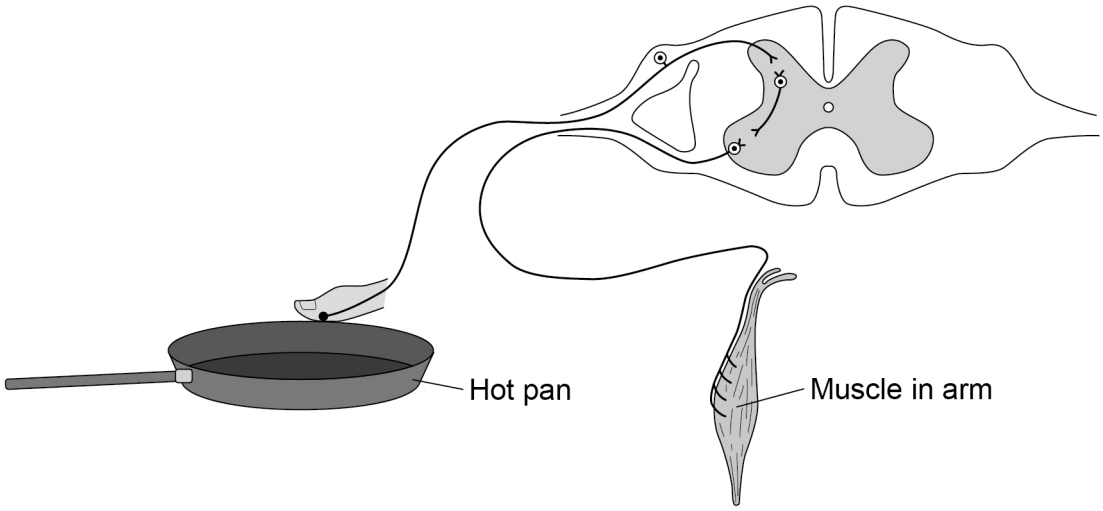
0 7 Human reactions are a response to an external change.

0 7 . 1 Reflex actions help to protect the body against damage.

Figure 8 shows the nervous pathway for a reflex action.

Figure 8



A stimulus from the hot pan will cause the muscle in the arm to contract and move the finger away.

Describe how the stimulus from the hot pan reaches the muscle in the arm.

[4 marks]

(stimulus is) detected by the receptor
- (initiates) an electrical impulse
- (impulse) travels v via the neurones
- sensory, relay and motor

Do not write outside the box

0 7 . 2 A student investigated whether using the right hand or the left hand had an effect on reaction time.

The student only tested right-handed people.

Describe a method for the student's investigation.

Include details of the test you would use for reaction time.

[4 marks]

- select at least 3 people
- do reaction time test at least 3 times using right hand
- details on how to do test in valid manner
- find a mean
- remove anomalous readings

Question 7 continues on the next page

Do not write outside the box

A different student carried out an investigation to see if playing tennis improved reaction time.

The student used two groups of six people.

Table 2 shows the results.

Table 2

Person	Reaction time in seconds	
	People who play tennis	People who do not play tennis
1	0.2	0.3
2	0.4	0.4
3	0.3	0.6
4	0.4	0.5
5	0.2	0.3
6	0.3	0.2
Mean	**X**	0.4

0 7 . 3 Calculate mean value **X** in **Table 2**.

[2 marks]

$$\frac{0.2+0.4+0.3+0.4+0.2+0.3}{6}$$

X = 0.3 seconds

0 7 . 4 What is the dependent variable in the student's investigation?

[1 mark]

reaction time

Do not write outside the box

The student concluded:

'Playing tennis improves reaction time.'

0 7 . 5 Give **one** piece of evidence which supports the conclusion.

[1 mark]

students who play tennis (regularly) had shorter faster (mean) reaction time(s)

0 7 . 6 Give **one** piece of evidence which does **not** support the conclusion.

[1 mark]

small sample used

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END OF QUESTIONS

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