

**AQA - Variation and evolution – GCSE Combined Science Biology**1. **May/2020/Paper\_2F/No.2**

0 2

Ammonites became extinct millions of years ago.

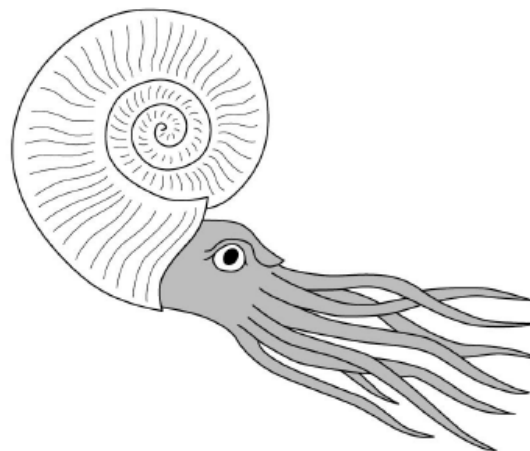
Figure 2 is a photograph of a fossil ammonite.

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]

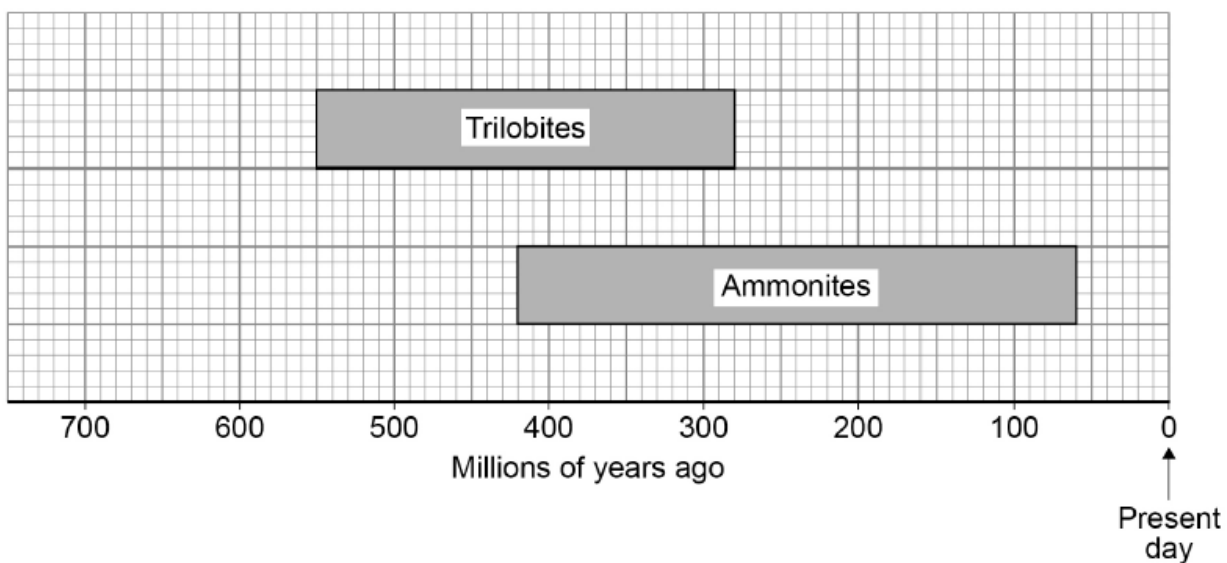
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Figure 4 shows when two different types of organism were alive on Earth.

Figure 4



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

Use Figure 4.

[1 mark]

\_\_\_\_\_ 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]

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ million years

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

[2 marks]

1 \_\_\_\_\_

2 \_\_\_\_\_

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

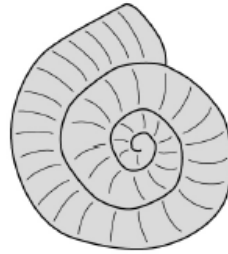
Charles Darwin

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.

## 2. May/2020/Paper\_2F/No.6

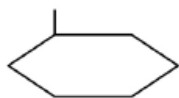
0 6

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]

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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 \_\_\_\_\_ .

This sequence makes a specific \_\_\_\_\_ .

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

[1 mark]

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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

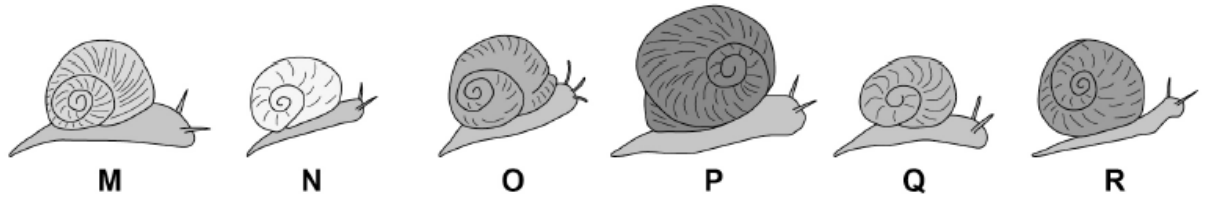
Tracing how aboriginal people spread across Australia

Working out when the last ice age ended

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?

[1 mark]

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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]

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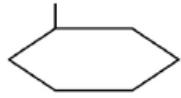
## 3. May/2020/Paper\_2H/No.1

**0 1** This question is about DNA and genes.

**0 1 . 1** Which diagram represents a DNA molecule?

[1 mark]

Tick (✓) **one** box.






**0 1 . 2** Describe the structure of a DNA molecule.

[1 mark]

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**0 1 . 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 \_\_\_\_\_.

This sequence makes a specific \_\_\_\_\_.



0 1 . 4 What is meant by the term genome?

[1 mark]

---

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0 1 . 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

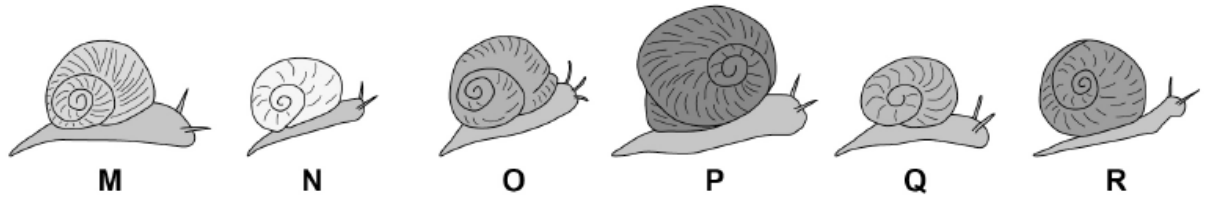
Tracing how aboriginal people spread across Australia

Working out when the last ice age ended

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

Figure 1 shows the snails.

Figure 1



0 1 . 6 All the snails are different.

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

[1 mark]

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0 1 . 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]

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## 4. May/2020/Paper\_2H/No.5

0 5

This question is about inheritance.

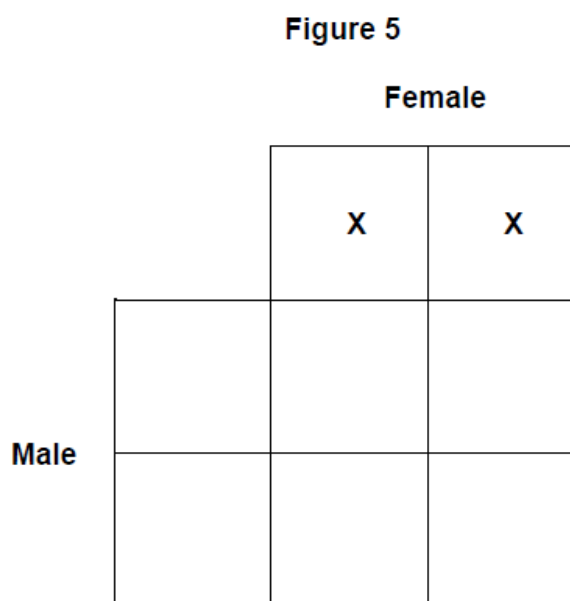
Humans have 23 pairs of chromosomes in each body cell.

One pair of chromosomes determines sex.

0 5 . 1

Complete **Figure 5**.

[2 marks]



0 5 . 2

In some families all children are the same sex.

Give the reason why.

[1 mark]

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Cystic fibrosis (CF) is an inherited disorder.

0 5 . 3 A man and a woman do **not** have CF.

The man and the woman have a child who has CF.

Draw a Punnett square diagram to find the probability that their next child will have CF.

Use the symbols:

T = dominant allele

t = recessive allele

Draw a ring around the genotype of any children with CF.

**[4 marks]**

Probability = \_\_\_\_\_

Embryo screening for CF can be done by two methods.

### Method 1

- The woman becomes pregnant by sexual intercourse.
- After 10 weeks of pregnancy a fine needle is inserted into the uterus.
- A sample of the fluid surrounding the embryo is taken.
- The DNA of the embryo is tested for CF.

The screening is done free by specialist hospitals for couples who are at risk of having a child with CF.

There is a small risk of miscarriage.

### Method 2

- The couple use In Vitro Fertilisation (IVF) to produce a small number of embryos.
- Each embryo is tested for CF.
- One or two embryos without CF are implanted in the woman's uterus.

In 2017 the success rate for having a baby by IVF for women under 35 years was 30%

IVF is a stressful, invasive procedure.

In most UK areas the free public health service does not provide IVF for all women asking for it.

0 5 . 4

Suggest **three** reasons for choosing **Method 1** instead of **Method 2**.

[3 marks]

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

0 5 . 5

Suggest **one** advantage of **Method 2**.

[1 mark]

\_\_\_\_\_  
\_\_\_\_\_

5. May/2020/Paper\_2H/No.6

0 6

Scientists believe that the first life on Earth was primitive anaerobic bacteria which first appeared billions of years ago.

0 6 . 1

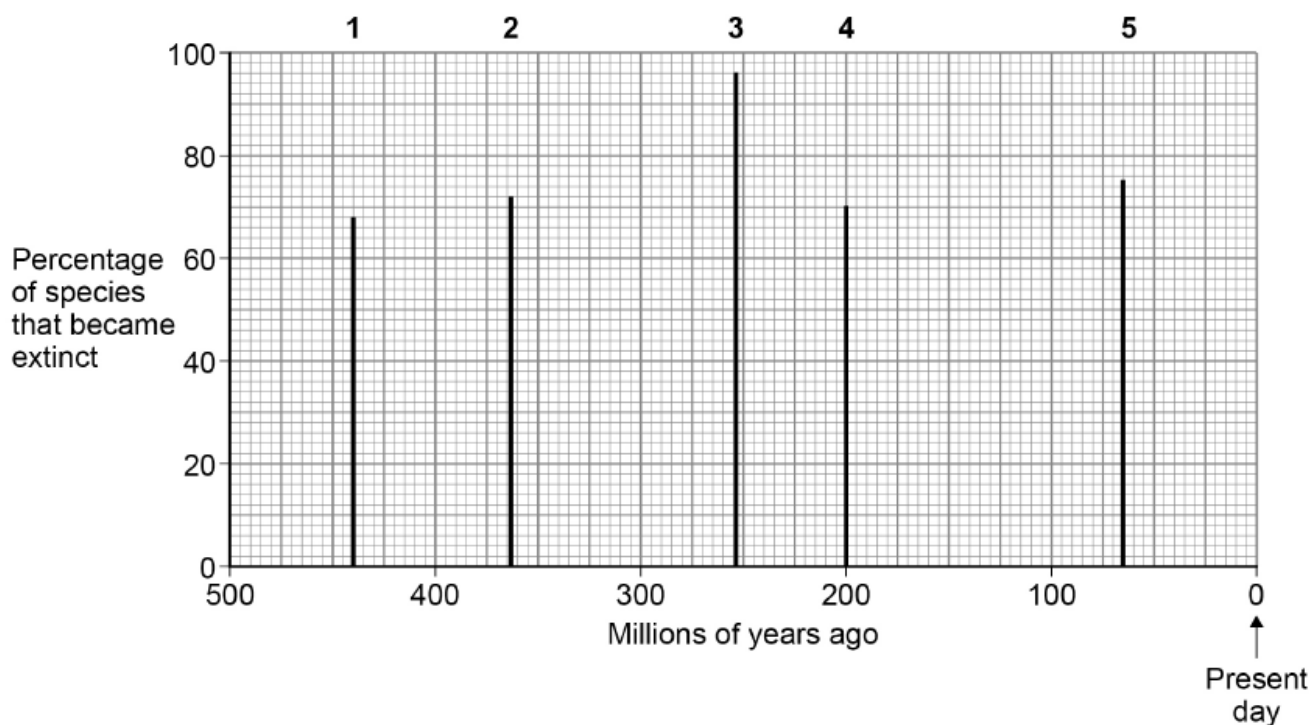
Which domain of the three-domain classification system do these primitive anaerobic bacteria belong to?

[1 mark]

Scientists have identified five periods of mass extinction since the fossil record began.

Figure 6 shows the timeline of the five mass extinction events.

Figure 6



0 6 . 2

Ammonites were organisms that first appeared in the oceans 415 million years ago.

Ammonites disappeared in the 5th mass extinction.

Draw a horizontal line on Figure 6 to show the time period that ammonites existed on Earth.

Label the line 'ammonites'.

[1 mark]

0 6 . 3 Another type of organism that existed in the oceans was called trilobites.

Trilobites existed from 544 million years ago until 278 million years ago.

How many more years did ammonites exist than trilobites?

[2 marks]

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\_\_\_\_\_ years

0 6 . 4 There was an increase in the percentage of species which became extinct in the third mass extinction compared to the first mass extinction.

Calculate the percentage increase.

[3 marks]

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Percentage increase = \_\_\_\_\_ %



## 6. June/2019/Paper\_2F/No.4

0 4

A cat breeder noticed that four kittens from one Siamese cat mother had a new blue colour at the tip of their tails.

0 4 . 1

What has caused the new colour to appear?

**[1 mark]**

Tick (✓) **one** box.

Fertilisation

Mitosis

Mutation

0 4 . 2

The cat breeder wants to use selective breeding so that all new kittens have blue tail tips.

Describe the process of selective breeding the cat breeder could use.

**[3 marks]**

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0 4 . 3

Suggest **one** reason why the cat breeder wants to have all new kittens with the blue tail tips.

**[1 mark]**

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0 4 . 4 Siamese cats can suffer from heart defects.

Why might there be more Siamese cats with heart defects amongst the kittens with blue tail tips?

[1 mark]

Tick (✓) **one** box.

They are clones

They are formed by mitosis

They are formed by sexual reproduction

They are produced by inbreeding

With each pregnancy, the cat breeder expected that:

- 50% of the kittens would be male
- 50% of the kittens would be female.

The sex chromosomes in cats are inherited in the same way as in humans.

The sex chromosomes are X and Y.

0 4 . 5 Give the combination of sex chromosomes present in a male cat and in a female cat. [1 mark]

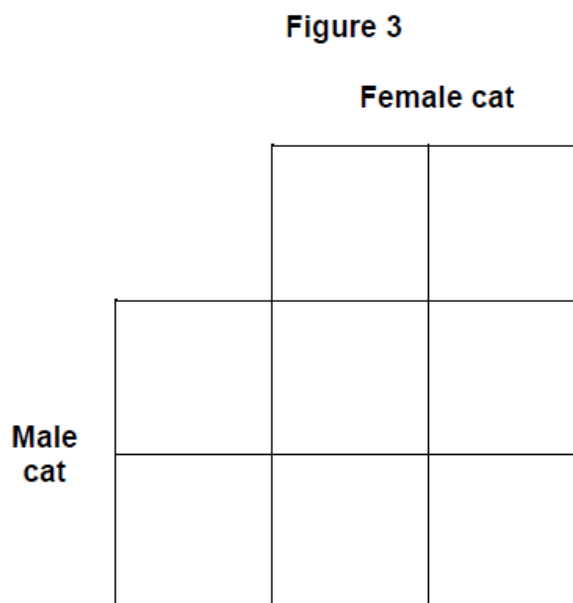
Male cat \_\_\_\_\_

Female cat \_\_\_\_\_

0 4 . 6 The cat breeder expected 50% male kittens and 50% female kittens.

Complete the Punnett square in **Figure 3** to show why.

[2 marks]



0 4 . 7 In the first pregnancy there was one male kitten and three female kittens.

Give the reason why there were **not** two kittens of each sex.

[1 mark]

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