SPECIMEN MATERIAL

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier Paper 2: Biology 2F

Specimen 2018 Time allowed: 1 hour 15 minutes

Materials
For this paper you must have:
- a ruler
- a calculator.

Instructions
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- There are 70 marks available on this paper.
- 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.
- When answering questions 09.3 and 10.3 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

Advice
- In all calculations, show clearly how you work out your answer.

Please write clearly, in block capitals.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname

Forename(s)

Candidate signature _____

0 1 Moose are animals that eat grass.

Figure 1 shows a moose.

Figure 1

Figure 2 shows a food chain.

Figure 2

Grass ⟶ Moose ⟶ Wolves

0 1 . 1 What word describes the grass in **Figure 2**?

[1 mark]

Tick **one** box.

- Consumer ☐
- Predator ☐
- Prey ☐
- Producer ☐

0 1 . 2 What word describes the wolves in **Figure 2**?

[1 mark]

Tick **one** box.

- Communities ☐
- Predators ☐
- Prey ☐
- Producers ☐

Question 1 continues on the next page

Figure 3 and **Figure 4** show how the moose population and the wolf population changed in one area.

Figure 3

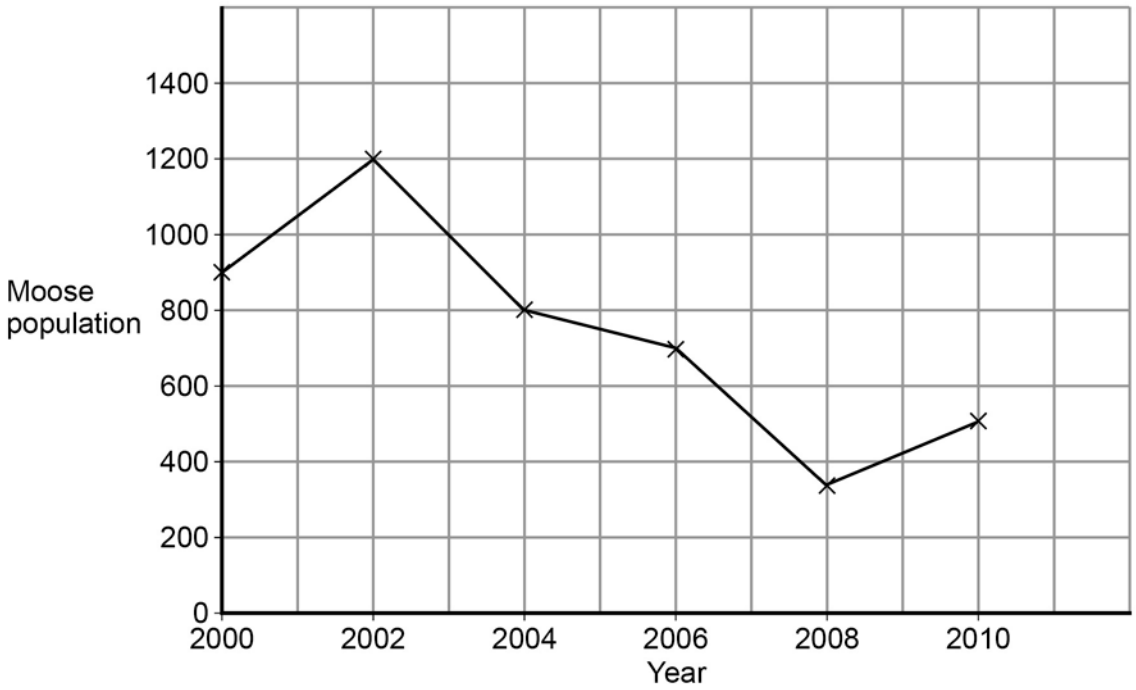
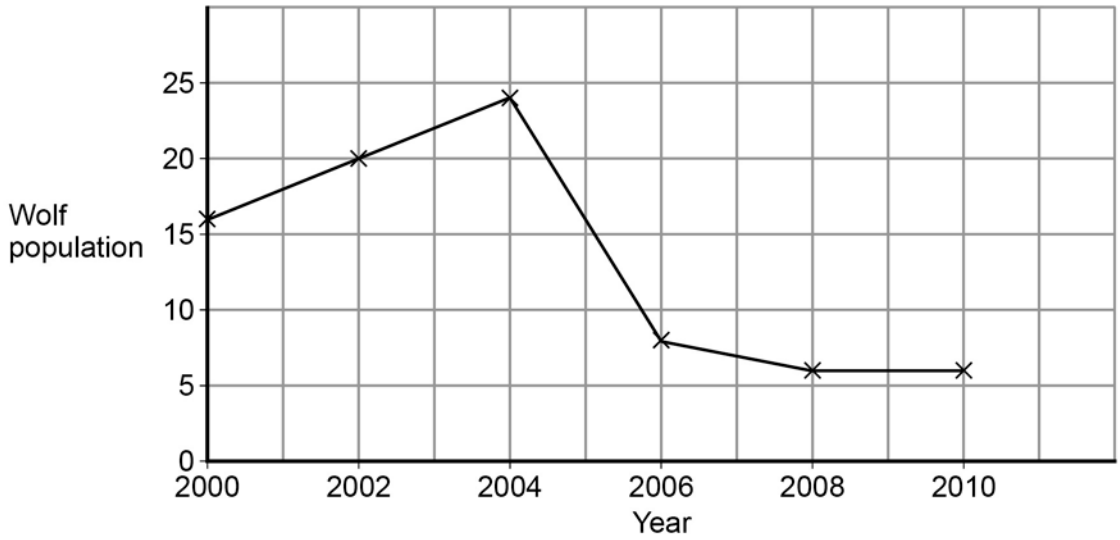


Figure 4



0 1 . 3 Look at **Figure 3**.

In this area the moose population reached its peak in 2002.

What was the size of the moose population in 2002?

[1 mark]

0 1 . 4 Look at **Figure 4**.

How long after the moose population peak did the wolf population peak occur?

[1 mark]

_____ years

0 1 . 5 When the moose population increases, the wolf population increases soon after.

Why does the wolf population increase?

[1 mark]

Tick **one** box.

- There is more competition for moose ☐
- There is more food for wolves ☐
- Other animals prey on moose ☐
- There are more predators of wolves ☐

0 1 . 6 Abiotic factors and biotic factors can affect the size of the wolf population.

Which of these are **biotic** factors?

[2 marks]

Tick **two** boxes.

- Carbon dioxide levels ☐
- Humans hunting ☐
- Light intensity ☐
- Soil type ☐
- Viruses ☐

0 2 Global warming may reduce biodiversity in some areas.

0 2 . 1 What is biodiversity?

[1 mark]

Tick **one** box.

- The different habitats in an ecosystem ☐
- The interaction of living and non-living factors in a habitat ☐
- The interdependence of organisms on Earth ☐
- The total number of organisms in an ecosystem ☐
- The variety of different species on Earth ☐

0 2 . 2 What gases cause global warming?

[2 marks]

Tick **two** boxes.

- Carbon dioxide ☐
- Methane ☐
- Nitrogen ☐
- Oxygen ☐
- Water vapour ☐

0 2 . 3 Give **two** effects of global warming that could reduce biodiversity in an area.

[2 marks]

1 _____

_____

2 _____

_____

Turn over for the next question

0 3 Peat can be burnt as a fuel.

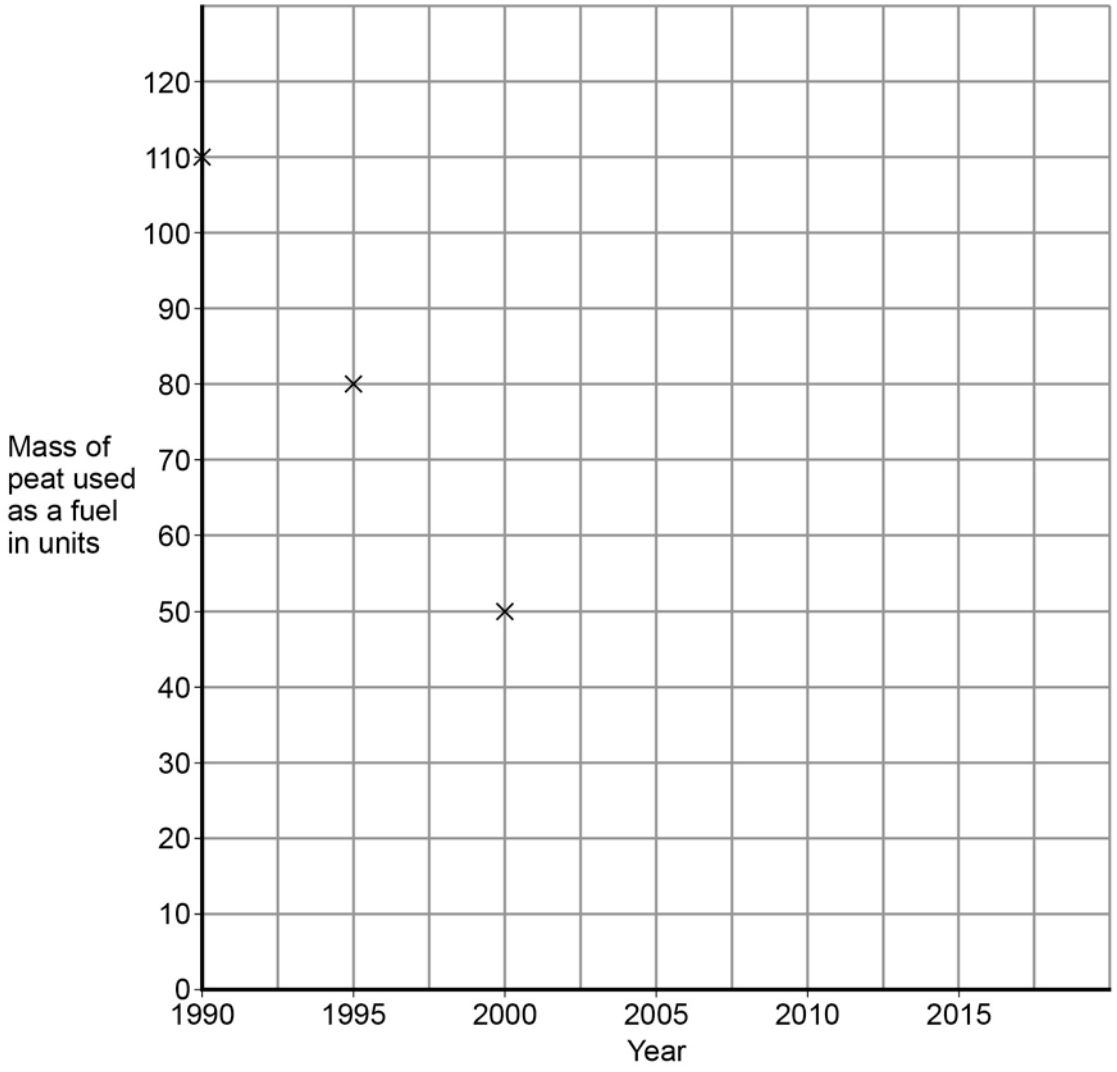
Table 1 shows the amount of peat used as a fuel in the UK over 20 years.

Table 1

Year	Mass of peat used as a fuel in units
1990	110
1995	80
2000	50
2005	20
2010	10

Figure 5 shows some of the information from **Table 1**.

Figure 5



0 3 . 1 Complete **Figure 5** by plotting the points for 2005 and 2010.

[2 marks]

0 3 . 2 Predict the amount of peat used as a fuel in the UK in 2015.

Use information from **Figure 5**.

[1 mark]

Question 3 continues on the next page

0 3 . 3 Plants in the UK are often grown in compost.

Compost usually contains peat.

The coconut fibre shown in **Figure 6** is a waste product of coconut farming.

Coconut fibre can be used to produce peat-free compost.

Figure 6

Table 2 shows features of peat-free compost made using coconut fibre.

Complete **Table 2** to show if each feature is an advantage **or** disadvantage.

[2 marks]

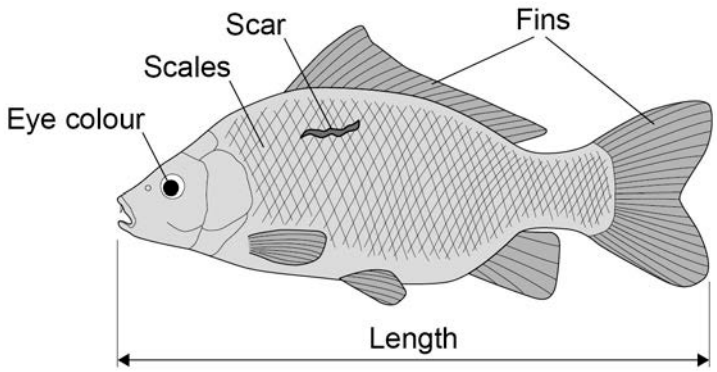
Put a tick in each row.

Table 2

Feature compared to peat compost	Advantage	Disadvantage
Coconut fibre is transported longer distances		
Coconut fibre is a waste product		
Coconut fibre traps less air in the soil, so roots absorb fewer mineral ions		

0 4 **Figure 7** shows a fish called a carp.

Figure 7



The characteristics of an animal can be a result of:

- only genetic causes
- only environmental causes
- both genetic **and** environmental causes.

0 4 . 1 Give **one** characteristic shown in **Figure 7** for each different cause.

[3 marks]

Only genetic causes _____

Only environmental causes _____

Both genetic **and** environmental causes _____

Question 4 continues on the next page

Two alleles control the body colour of carp:

- brown (**B**)
- blue (**b**).

The brown allele is dominant to the blue allele.

The genetic cross from breeding two carp is shown in **Figure 8**.

Figure 8

	B	**b**
b	Bb	
b		

0 4 . 2 Complete **Figure 8**.

[2 marks]

0 4 . 3 Draw a ring around **one** blue offspring shown in **Figure 8**.

[1 mark]

0 4 . 4 What is the probability that the offspring from this genetic cross will be brown?

[1 mark]

Tick **two** boxes.

0 ☐

0.25 ☐

0.5 ☐

1.0 ☐

0 4 . 5 Carp can produce large numbers of offspring.

The two carp crossed in **Figure 8** had 260 000 offspring.

Approximately how many offspring are expected to be brown?

[1 mark]

Brown carp offspring = _____

0 4 . 6 A pond contains carp used for breeding.

The carp for breeding are brown or blue.

A red carp has been seen.

The red carp was **not** added to the pond.

Suggest what might have caused the red carp to appear.

[1 mark]

Turn over for the next question

0 5 Living things can be classified into groups.

0 5 . 1 Scientists look at structures inside cells to classify living things.

Suggest **one** structure found in cells that can be used to classify living things.

[1 mark]

Table 3 shows one system for classifying humans.

Table 3

X	Animalia
Phylum	Chordata
Class	Mammalia
Order	Primates
Family	Hominidae
Genus	*Homo*
Species	*sapiens*

0 5 . 2 Who devised this system of classification?

[1 mark]

Tick **one** box.

Darwin ☐

Linnaeus ☐

Wallace ☐

Woese ☐

0 5 . 3 Look at **Table 3**.

X is the largest category in this classification.

Name category **X**.

[1 mark]

0 5 . 4 Give the **binomial name** of humans.

Use information in **Table 3**.

[1 mark]

0 5 . 5 Suggest **one** way that classification systems are useful to scientists.

[1 mark]

Turn over for the next question

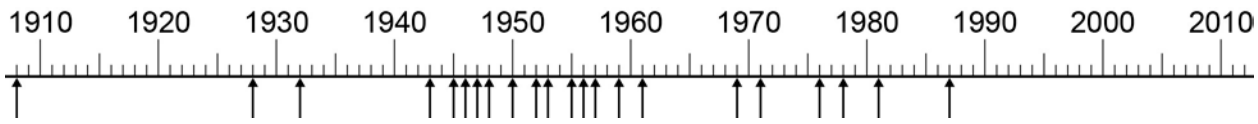
0 6 . 1 Some antibiotics work by destroying the cell membranes of bacteria.

Suggest why these antibiotics may have side effects in the animals that are given these antibiotics.

[1 mark]

Each arrow on **Figure 9** shows the date of discovery of each new type of antibiotic.

Figure 9



0 6 . 2 In which 10 year period were most new types of antibiotic discovered?

[1 mark]

0 6 . 3 **Figure 9** shows 22 new types of antibiotic. These were discovered before 2010.

Determine the percentage of types of antibiotic that have been discovered between 1980 and 2010.

Use information from **Figure 9**.

Give your answer to 2 significant figures.

[2 marks]

_____ %

0 6 . 4 Bacteria can evolve rapidly.

Many bacteria can develop into new strains which are resistant to antibiotics.

Complete **Table 4** to show if each action is **more likely** or **less likely** to help bacteria to become antibiotic resistant.

[4 marks]

Put a tick in each row.

Table 4

Action	More likely	Less likely
Take painkillers for headache		
Washing with antiseptic hand gel		
Adding antibiotics to food for cows		
Giving antibiotics for colds and flu		
Stopping antibiotics as soon as you feel better		

Turn over for the next question

There are no questions printed on this page

0 7 A person with Type 1 diabetes does **not** produce enough of the hormone insulin.

0 7 . 1 Where is the hormone insulin produced?

[1 mark]

Tick **one** box.

- Brain ☐
- Pancreas ☐
- Pituitary ☐
- Thyroid ☐

0 7 . 2 How does insulin travel around the body?

[1 mark]

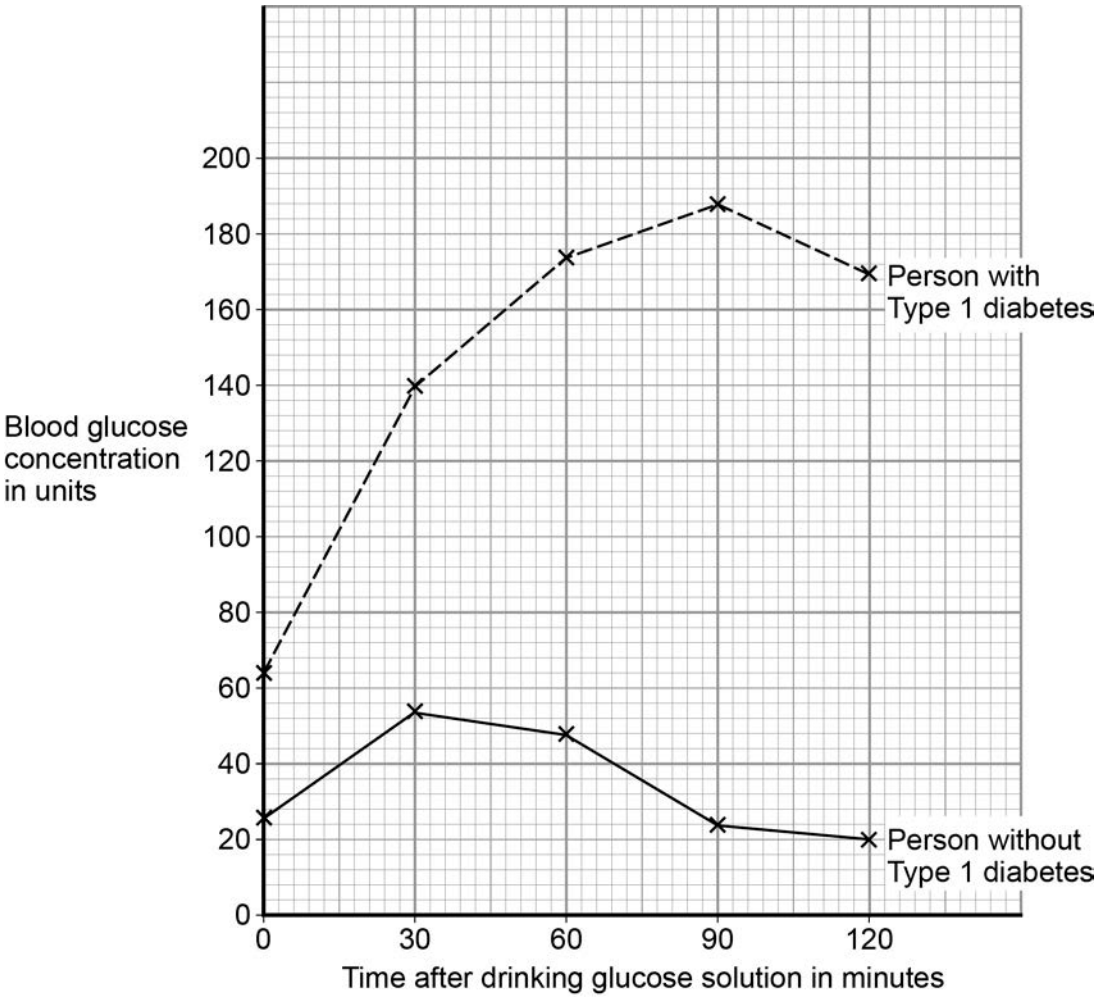
Question 7 continues on the next page

The same concentration and volume of glucose solution was given to two people.

- Person with Type 1 diabetes.
- Person without Type 1 diabetes.

Figure 10 shows how the blood glucose concentration of these two people changed after they each drank a glucose solution.

Figure 10



0 7 . 3 Look at **Figure 10**.

Compare the blood glucose concentrations of the two people.

Include similarities and differences in your answer.

[4 marks]

0 7 . 4 People with diabetes may be asked to control their diet.

Explain how this can help to reduce the risk of developing health problems.

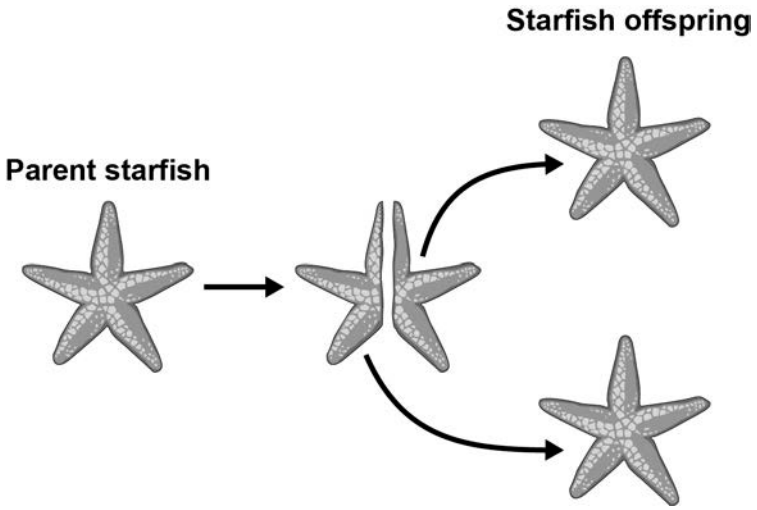
[3 marks]

Turn over for the next question

0 8 Starfish can split in half. Each half can then grow new arms to form offspring.

This process is shown in **Figure 11**.

Figure 11



0 8 . 1 What process produces the starfish offspring?

[1 mark]

Tick **one** box.

- Asexual reproduction ☐
- Fertilisation ☐
- Selective breeding ☐
- Sexual reproduction ☐

0 8 . 2 More cells are produced as the starfish grows more arms.

What process will produce more cells in the starfish as they grow?

[1 mark]

0 8 . 3 All the offspring produced are genetically identical.

What name is given to genetically identical organisms?

[1 mark]

0 8 . 4 Each body cell of the parent starfish contains 44 chromosomes.

How many chromosomes are in each body cell of the offspring?

[1 mark]

Turn over for the next question

0 9 Students used quadrats to estimate the population of dandelion plants on a field.

0 9 . 1 Describe how quadrats should be used to estimate the number of dandelion plants in a field.

[4 marks]

0 9 . 2 The field measured 40 m by 145 m.

The students used 0.25 m^2 quadrats.

The students found a mean of 0.42 dandelions per quadrat.

Estimate the population of dandelions on the field.

[2 marks]

Estimated population of dandelions = _____

0 9 . 3 In one area of the field there is a lot of grass growing in the same area as dandelions.

Suggest why the dandelions may **not** grow well in this area.

[4 marks]

Turn over for the next question

1 0 Neurones pass information around the body.

1 0 . 1 Why are reflex reactions important?

[1 mark]

1 0 . 2 Caffeine is a drug found in coffee.

After a person drinks coffee information passes through neurones in the nervous system more quickly.

Suggest a hypothesis for the effect of caffeine concentration on reaction time.

[1 mark]

1 0 . 3 Two students investigated the effect of caffeine concentration on reaction time.

This is the method used.

1. Student **A** drinks a cup of coffee.
2. Student **B** holds a ruler above Student **A**'s hand.
3. Student **B** drops the ruler.
4. Student **A** catches the ruler as quickly as she can.
5. The distance the ruler falls is recorded.

Suggest how this method could be improved to produce valid results.

[6 marks]

END OF QUESTIONS

There are no questions printed on this page

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Figure 1: Moose © Jeff R Clow/Getty Images
Figure 6: Coconut © afe207/Thinkstock