Sc

KEY STAGE
3

TIER
3–6

2009

Science test

Paper 2

First name _____

Last name _____

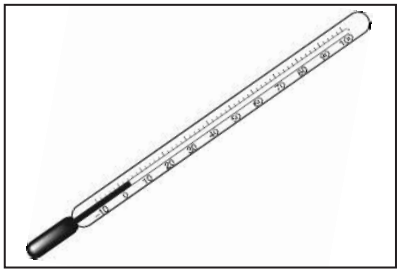
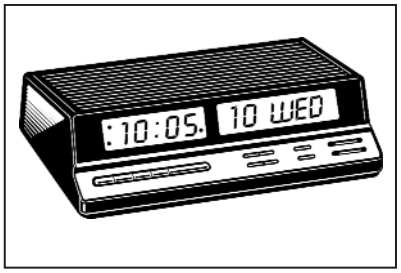
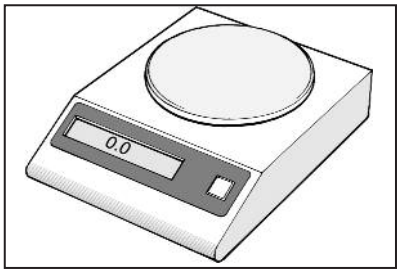
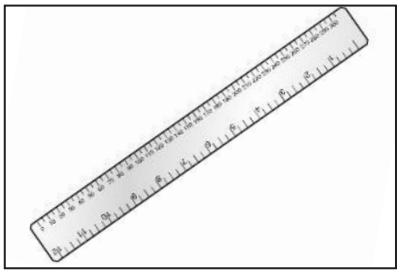
School _____

Remember

- The test is 1 hour long.
- You will need: pen, pencil, rubber, ruler, protractor and calculator.
- The test starts with easier questions.
- Try to answer all of the questions.
- The number of marks available for each question is given below the mark boxes in the margin. You should not write in this margin.
- Do not use any rough paper.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

TOTAL MARKS	

1. (a) Peter used the equipment below to investigate growth of plants.

equipment	measurement	unit
	measures the **time** for the experiment	cm
	measures the **temperature** of the air	°C
	measures the **length** of a plant	days
	measures the **mass** of a plant	grams

1ai
1 mark

1ai
1 mark

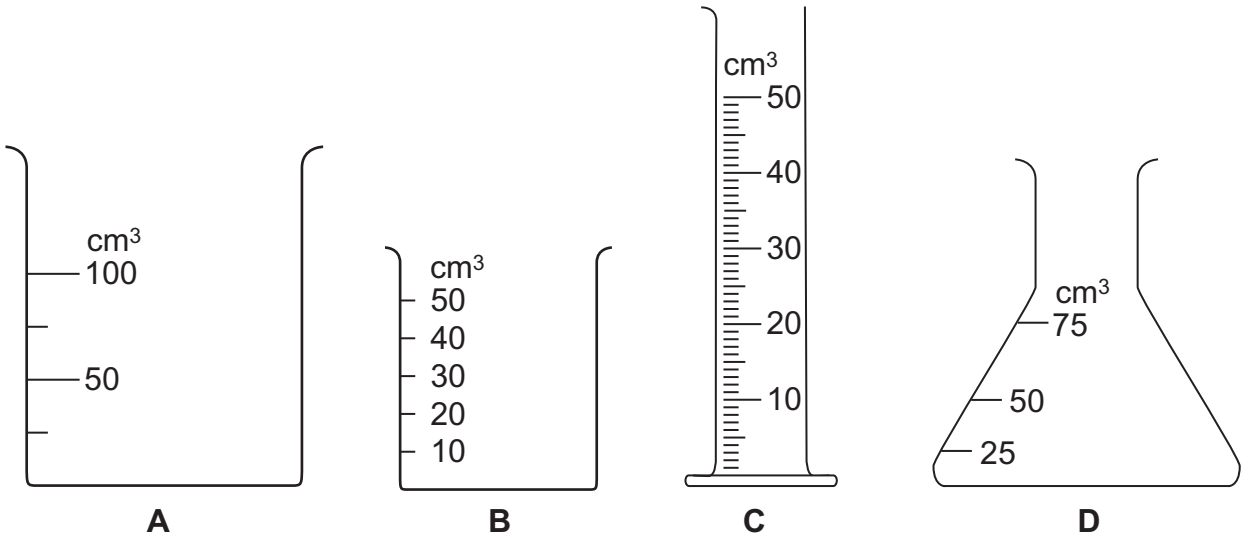
1aii
1 mark

1aii
1 mark

(i) Draw one line from each piece of **equipment** to the **measurement** Peter made.

(ii) Then draw one line from each **measurement** to the correct **unit**.

(b) The diagrams below show four measuring containers.



Which is the best container to use to measure 15 cm^3 of water?

Write the letter.

_____

1b
1 mark

Why did you choose this container?

_____

_____

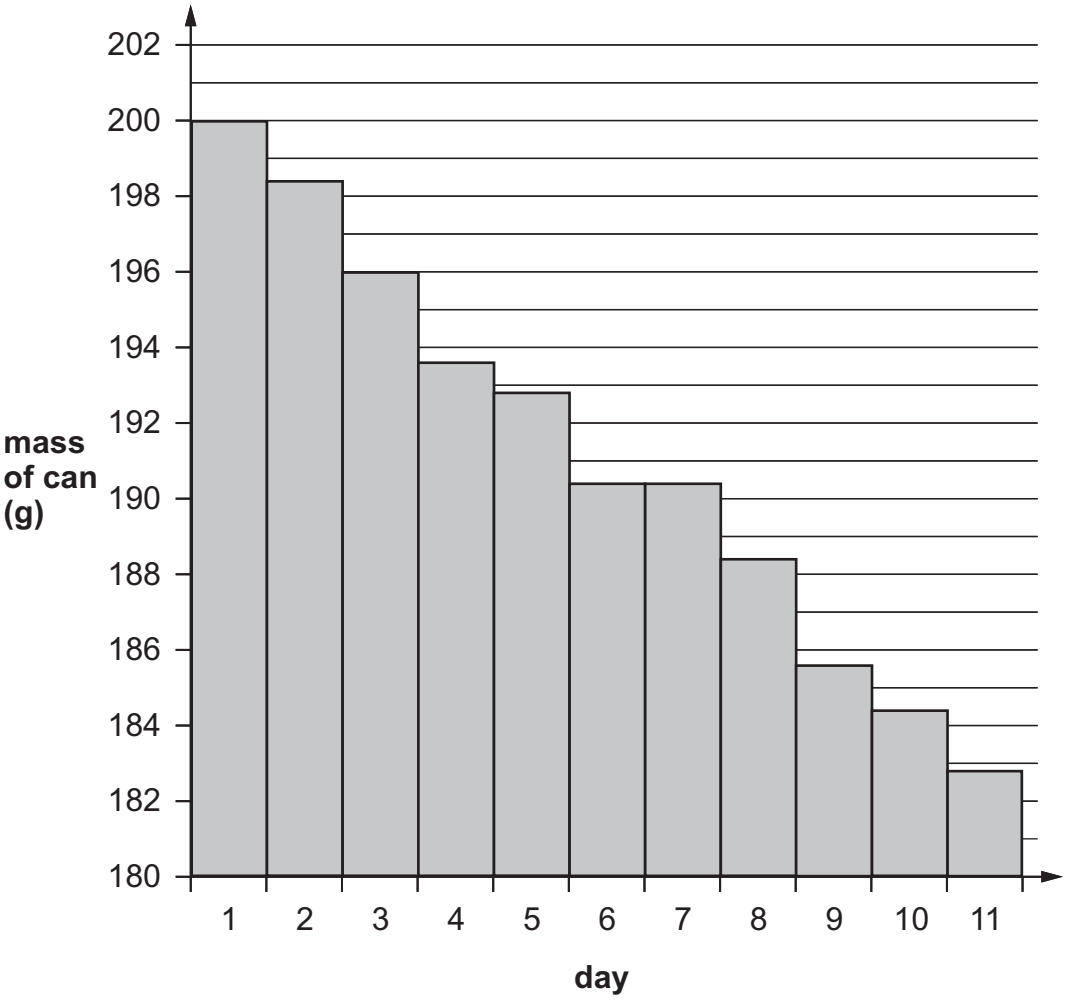
1b
1 mark

maximum 6 marks

Total
6

2. Anna has a can of deodorant that she uses once each day.
Before she uses the deodorant she measures the mass of the can.

(a) Her results are shown in the graph below.



(i) What was the mass of the can of deodorant on day 1?

_____ g

2ai
1 mark

(ii) How did the mass change as Anna used the deodorant?

_____

2aii
1 mark

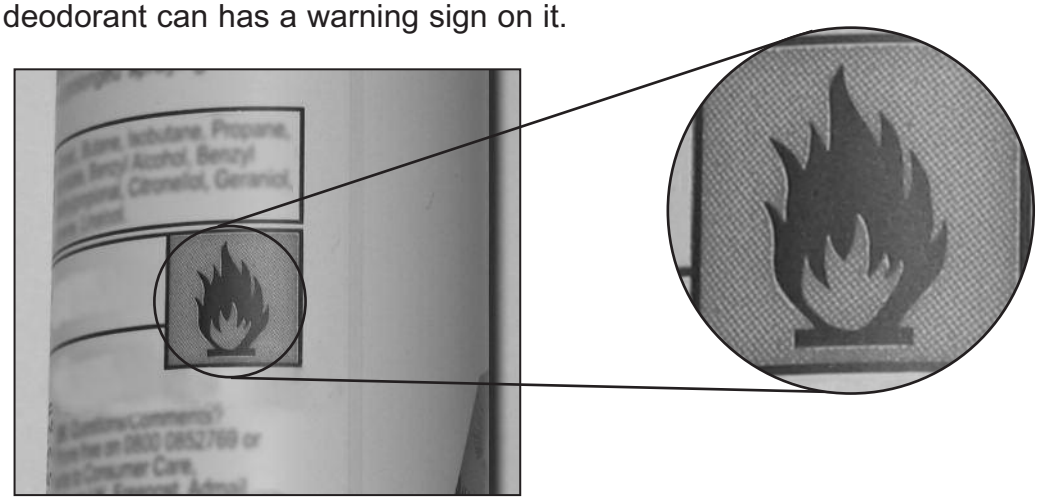
(iii) Anna did **not** use the deodorant on day 6.
How can you tell this from the graph?

_____

_____

2aiii
1 mark

(b) The deodorant can has a warning sign on it.



What does this warning sign mean?

_____

2b

1 mark

(c) A deodorant contains a solution of perfume and alcohol.

What happens to the perfume when it is mixed with the alcohol?
Tick the correct box.

It boils.	☐	It dissolves.	☐
It freezes.	☐	It melts.	☐

2c

1 mark

(d) Anna sprayed the liquid deodorant under her arms.
After a few minutes, her skin had dried.

What happened to the liquid?
Tick the correct box.

It evaporated.	☐	It dissolved.	☐
It boiled.	☐	It condensed.	☐

2d

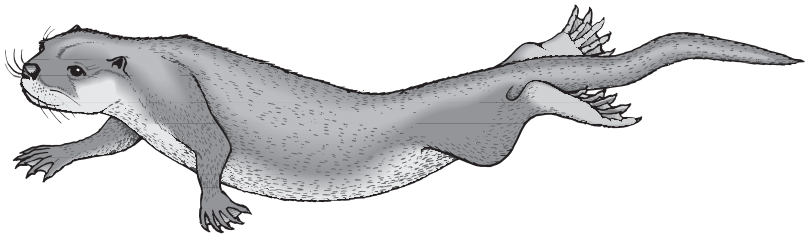
1 mark

maximum 6 marks

Total

6

3. The picture below shows a mammal called an otter.



(a) Give **one** feature that **only** mammals have.

3a

1 mark

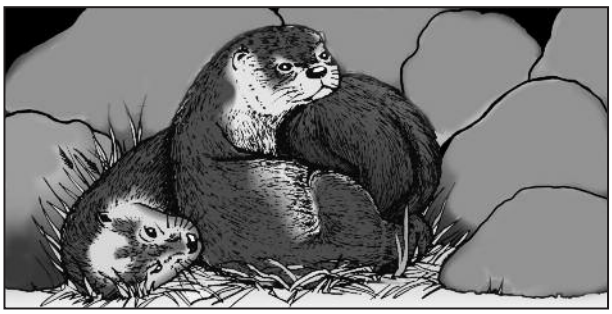
(b) Otters live by rivers.

Give **one** way the otter is suited for swimming.
Use the picture above to help you.

3b

1 mark

(c) Otter cubs are born in a burrow under the ground.



(i) How does this help the otter cubs survive?

3ci

1 mark

(ii) Why must the burrow be above the level of the water in the river?

3cii

1 mark

(d) Otters catch fish and birds for food.

Which word below describes an otter?
Tick the correct box.

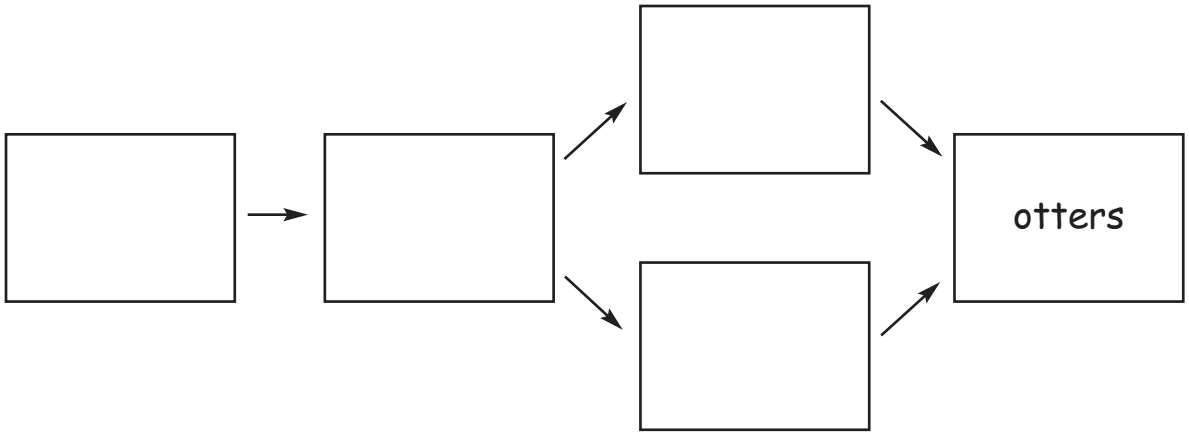
herbivore	☐	predator	☐
prey	☐	producer	☐

☐ 3d
1 mark

(e) The information below describes what some animals eat.

- Insects eat plants.
- Birds and fish eat insects.
- Otters eat fish and birds.

Complete the food web using this information.
One box has been done for you.



☐ 3e
1 mark

☐ 3e
1 mark

(f) In the 1960s, the number of otters in England decreased.
To increase otter numbers, scientists released otters in pairs (one male and one female).

Why were the otters released in pairs?

_____

_____

☐ 3f
1 mark

maximum 8 marks

Total
☐
8

4. (a) The diagrams below show how much heat is lost from different parts of a house every second.

without insulation



Through which part of the house above is most heat lost?

_____

4a

1 mark

(b) Part of the house is insulated to reduce the loss of heat. This is shown below.

with insulation



(i) Which part of the house has been insulated?

_____

4bi

1 mark

(ii) Explain your answer.

_____

_____

4bii

1 mark

(c) The table below gives information about three fossil fuels that can be used to heat a house.

fuel	physical state	energy released when 1 g is burned (J)	Does the fuel produce these substances when burned?	
			water	sulphur dioxide
coal	solid	25 000	yes	yes
oil	liquid	42 000	yes	yes
methane	gas	55 000	yes	no

(i) Which fuel in the table releases the **least** energy when 1 g is burned?

_____

4ci

1 mark

(ii) Methane **can** be compressed.
Which information in the table shows that methane can be compressed?

_____

4cii

1 mark

(iii) Sulphur dioxide causes acid rain.
Use the table to explain why burning methane does **not** produce acid rain.

_____

_____

4ciii

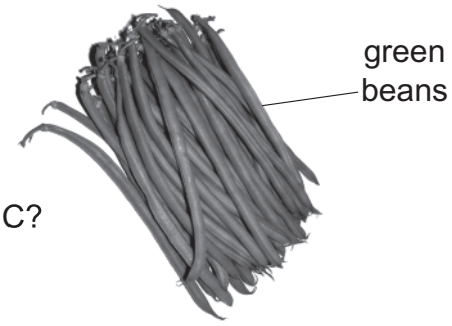
1 mark

maximum 6 marks

Total

6

5. (a) Green beans contain vitamin C.

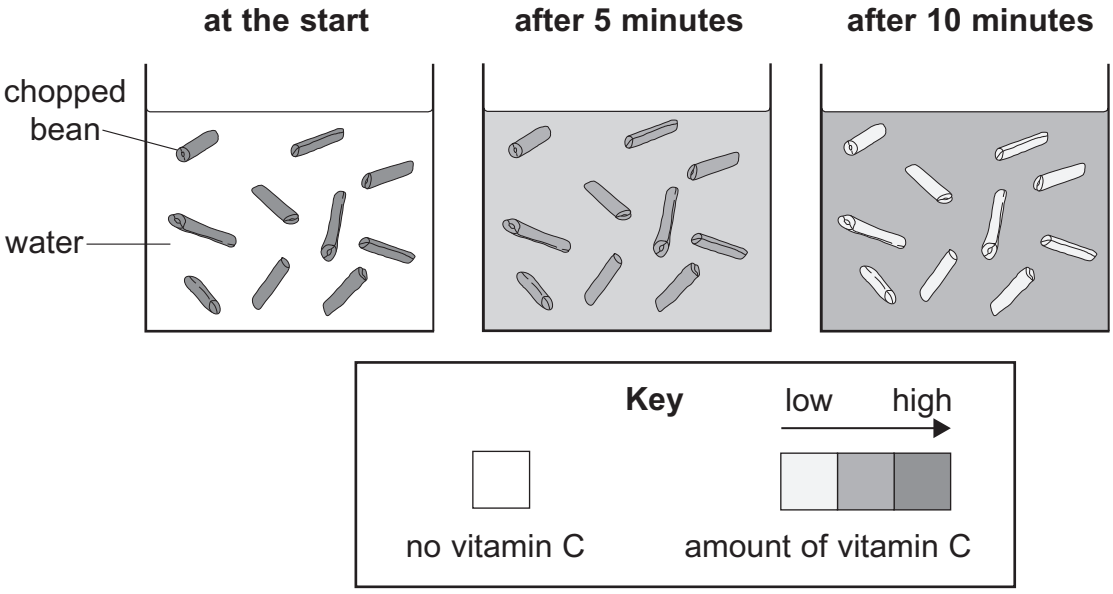


Which other food is a good source of vitamin C?
Tick the correct box.

cheese	chicken	eggs	oranges
☐	☐	☐	☐

☐ 5a
1 mark

(b) The amount of vitamin C changes in the beans and in the water as the beans are cooked. The shading shows how it changes.



Use the diagram. How does the **amount of vitamin C** in the beans and in the water change as the beans are cooked? Tick one box in each row.

amount of vitamin C	increases	decreases	stays the same
in the beans			
in the water			

☐ 5b
1 mark

(c) Cheese is a source of calcium.

Why do we need calcium?

_____

5c
1 mark

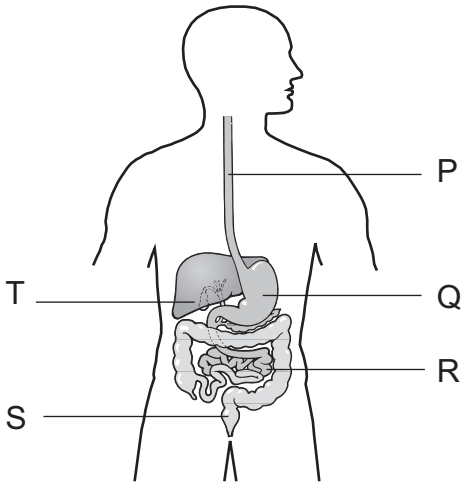
(d) Draw a line from each nutrient to a good source of that nutrient in our diet.

nutrient	source of nutrient
starch	lean chicken meat
fat	jam
protein	pasta
sugar	margarine

5d
1 mark

5d
1 mark

(e) The diagram shows part of the human digestive system.



(i) Write the letter which labels the small intestine.

_____

5ei
1 mark

(ii) Write the letter which labels the stomach.

_____

5eii
1 mark

maximum 7 marks

Total
7

6. Tom is doing a bungee jump from a bridge.



He is attached to one end of an elastic rope.
The other end of the rope is attached to the bridge.
Tom jumps from the bridge.

(a) (i) What force makes Tom fall towards the ground?

_____

6ai
1 mark

(ii) Tom does **not** hit the river below the bridge.
What makes Tom stop falling before he hits the river?

_____

6aii
1 mark

(b) The next person to do a bungee jump is Jill.

Jill weighs less than Tom.
Complete the sentence below using words from the box.

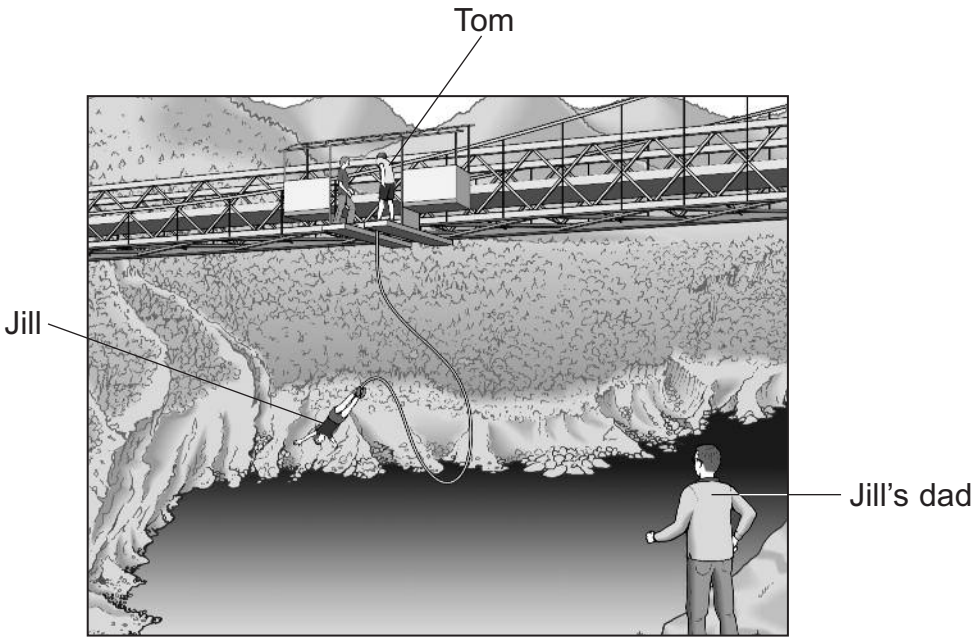
more than	less than	the same as

When Jill jumps, the rope will stretch _____

it did when Tom jumped.

6b
1 mark

(c) Jill's dad watches her doing the bungee jump.
He is standing a long way from the bridge.
Jill shouts 'bungee' at the same time as she jumps off the bridge.
Jill's dad sees her jump before he hears her shout.



(i) Why does Jill's dad **see** her jump before he **hears** her shout?

_____

_____

6ci
1 mark

(ii) Tom is near Jill when she shouts. Her dad is far away.

Complete the sentence to describe how the shout will sound to Tom compared with Jill's dad. Use one word from the box.

louder	**higher**	**lower**	**quieter**

The shout will sound _____ to Tom.

6cii
1 mark

(iii) What part of Tom's ear vibrates when he hears Jill shout?

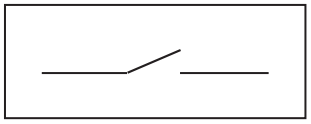
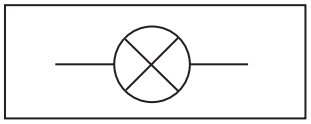
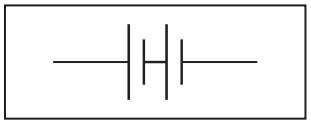
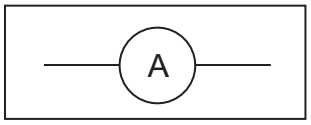
_____

6ciii
1 mark

maximum 6 marks

Total
6

7. (a) Draw a line from each circuit symbol below to the correct name.
Draw only four lines.

circuit symbol	name
	ammeter
	switch
	motor
	battery
	bulb

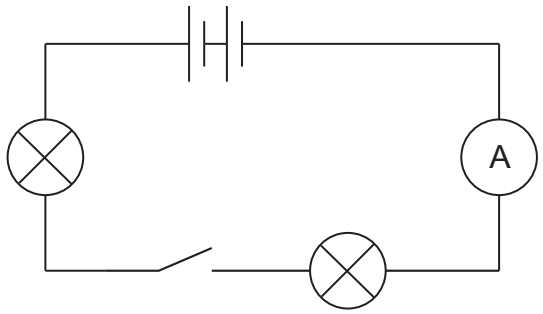
7a
1 mark

7a
1 mark

7a
1 mark

(b) Fred made **circuit 1** as shown below.

circuit 1



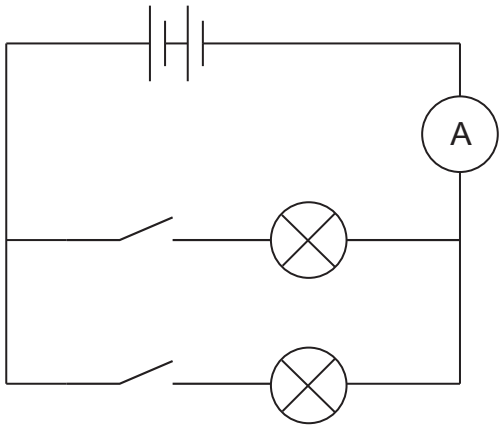
Give the name of the part that is the energy source for the circuit.

_____

7b
1 mark

(c) Fred then made **circuit 2** as shown below.

circuit 2



In the table below, tick a box to show whether **circuit 1** and **circuit 2** are series or parallel circuits.
Tick only **two** boxes.

	series	**parallel**
circuit 1		
circuit 2		

7c
1 mark

(d) What metal is usually used for wires in electric circuits?

_____

7d
1 mark

maximum 6 marks

Total
6

8. Nancy is a dancer.



(a) When Nancy dances her arms and legs are moved by pairs of antagonistic muscles.

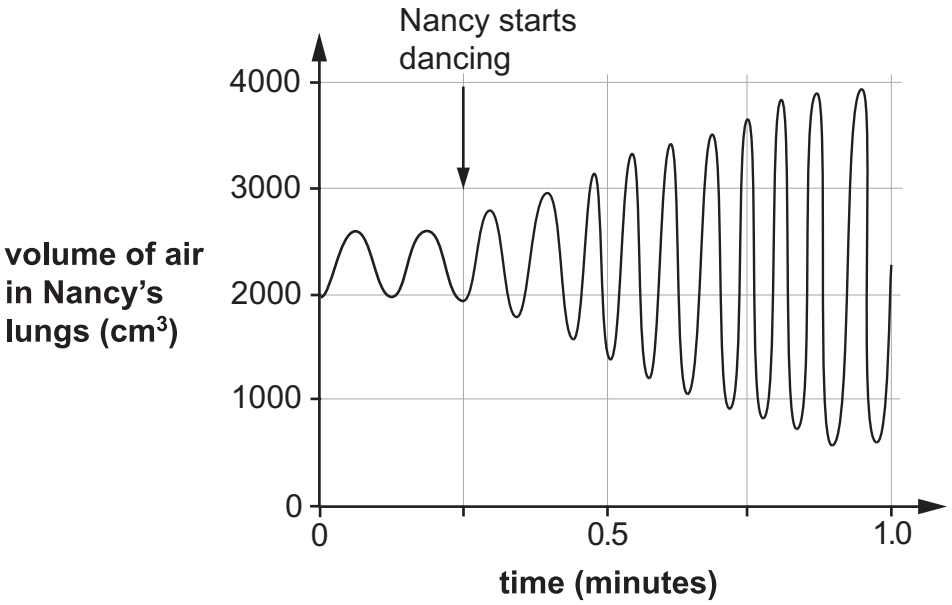
How do antagonistic muscle pairs work?
Tick the correct box.

Both muscles contract at the same time.	☐
One muscle is big and the other is small.	☐
As one muscle contracts, the other relaxes.	☐
One muscle is strong and the other is weak.	☐
Both muscles relax at the same time.	☐

☐ 8a

1 mark

(b) As Nancy dances her breathing changes because she needs more oxygen. The graph below shows how the volume of air in her lungs changes when she dances.



From the graph, give **two** ways her breathing changes when she dances.

1. _____

2. _____

8b
1 mark

8b
1 mark

(c) Nancy's muscle cells produce carbon dioxide as she dances.

Which of the following shows how the carbon dioxide is removed from Nancy's body?
Tick the correct box.

muscle cells → bloodstream → windpipe → lungs → nose ☐

muscle cells → windpipe → lungs → bloodstream → nose ☐

muscle cells → bloodstream → lungs → windpipe → nose ☐

muscle cells → windpipe → bloodstream → lungs → nose ☐

8c
1 mark

maximum 4 marks

Total
4

9. (a) The table below shows the pH of four acidic liquids.

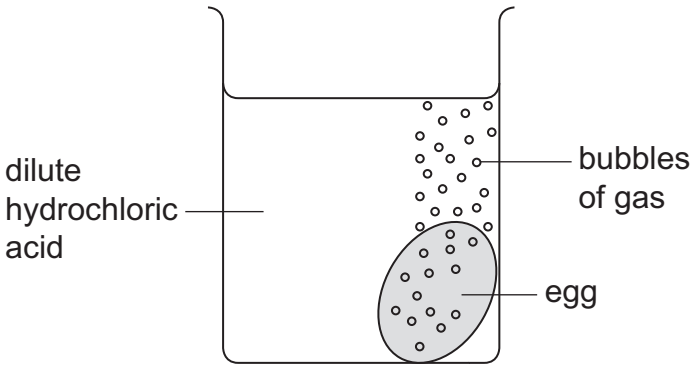
acidic liquid	pH
grapefruit juice	3.1
ethanoic acid	3.0
lemonade	4.4
dilute hydrochloric acid	1.0

Which of these liquids is the **least** acidic?

9a

1 mark

(b) Emilio cooked an egg until it was hard-boiled.
He put the egg in a beaker of dilute hydrochloric acid as shown.



(i) The egg shell reacted completely with the acid.
After two days the pH of the liquid in the beaker was 2.5.

How did the **acidity** of the liquid in the beaker change?
Use the table above to help you.

9bi

1 mark

(ii) Emilio put another hard-boiled egg in some ethanoic acid.
It took longer for the shell to react completely.

Use the table opposite to suggest a reason for this.

_____

_____

9bii

1 mark

(c) The chemical formulae for four acids are shown in the table below.

sulphuric acid	hydrochloric acid	nitric acid	ethanoic acid
H_2SO_4	HCl	HNO_3	CH_3COOH

(i) Give the **name** of the element that is present in all four acids.

_____

9ci

1 mark

(ii) Give the **names** of the two **other** elements present in sulphuric acid.

1. _____

2. _____

9cii

1 mark

(iii) How many atoms are there in the formula HNO_3 (nitric acid)?

_____

9cii

1 mark

9ciii

1 mark

maximum 7 marks

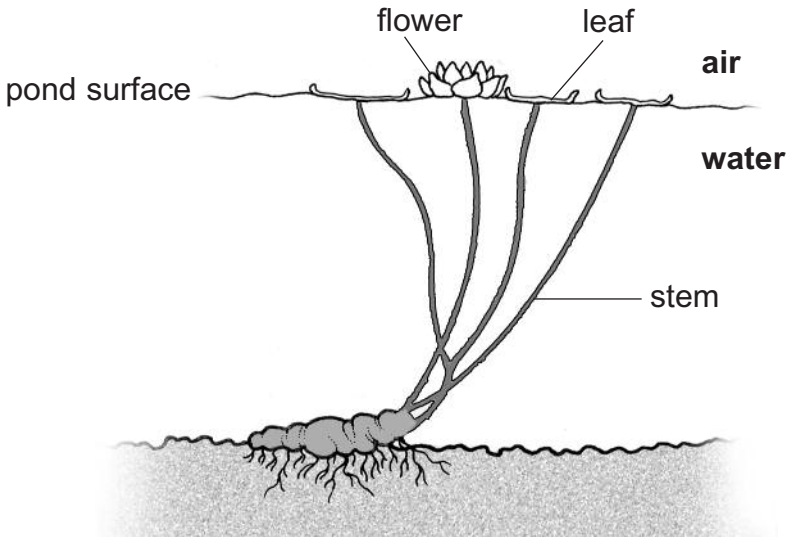
Total

7

10. The photograph below shows some water lilies in early summer.



This diagram shows a water lily plant.



(a) Water lilies do **not** grow well in moving water.

Suggest a reason for this.

_____

_____

10a

1 mark

(b) During the winter, many water lily plants do **not** grow new leaves.

Suggest **one** reason why the plants do **not** grow new leaves in the winter.

_____

10b

1 mark

(c) (i) Give **one** way water lily plants are adapted to live in water.

_____

10ci

1 mark

(ii) Explain how this adaptation helps the water lily to grow in water.

_____

_____

10cii

1 mark

(d) In the summer, water lilies produce large yellow flowers.
The flowers float on the surface of the pond.



Suggest **one** way these colourful floating flowers help the water lily to reproduce.

_____

_____

10d

1 mark

(e) When water lilies cover the pond surface with leaves, the pond does not get as hot during the day.

Explain why the pond does **not** get as hot.

_____

_____

10e

1 mark

maximum 6 marks

Total

6

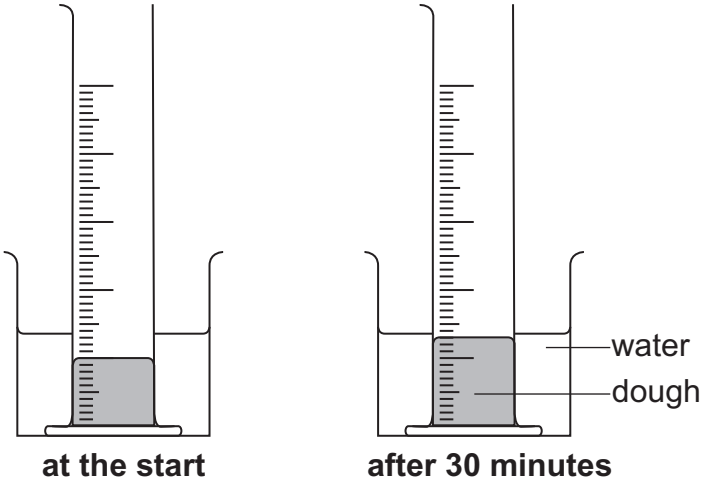
11. Sara investigated making bread.
She described what she did below.

I mixed flour, water, sugar and yeast to make bread dough.

I put 50 cm^3 of dough into a measuring cylinder.

I put the measuring cylinder into a water bath at 30°C.

I measured the volume of the dough after 30 minutes.



Sara repeated the experiment with the water bath at different temperatures.
Her results are shown below.

temperature of water bath (°C)	volume of dough (cm^3)	
	at the start	after 30 minutes
30	50	66
45	50	73
60	50	77
75	50	71
90	50	60

(a) Use the table of results.
What question did Sara investigate?

_____

_____

11a

1 mark

(b) At each temperature Sara used dough from the same mixture.

(i) Give **one** other way Sara made her experiment fair.

_____

11bi

1 mark

(ii) Why would using dough from a different mixture make Sara's experiment **unfair**?

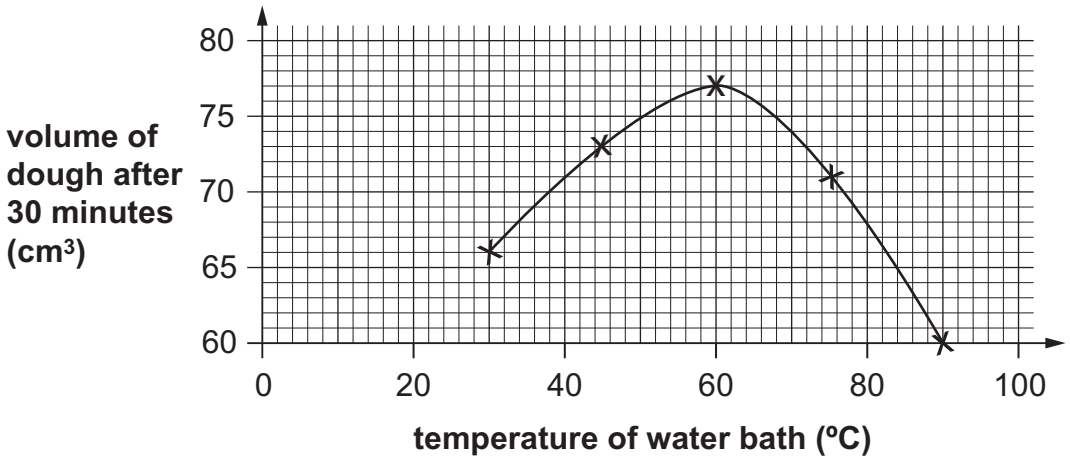
_____

_____

11bii

1 mark

(c) Sara plotted her results on the graph below.



Describe the relationship between the variables on the graph from 30°C to 90°C.

_____

_____

_____

11c

1 mark

11c

1 mark

(d) Sara made a prediction.

The volume of the dough will increase because of the yeast.



What could she do to test her prediction?

_____

_____

11d

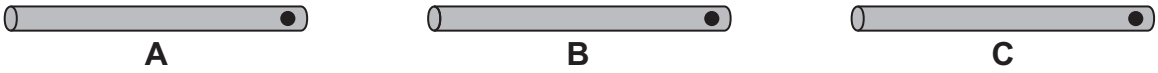
1 mark

maximum 6 marks

Total

6

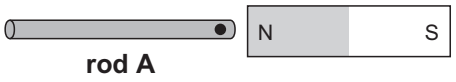
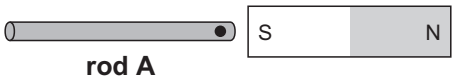
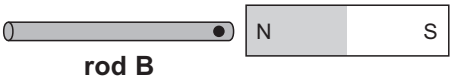
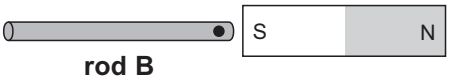
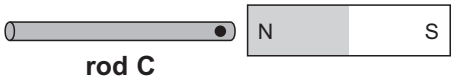
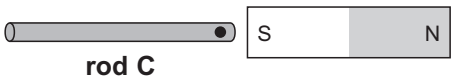
12. Hannah has three rods (A, B and C) made from different metals.
One rod is a **magnet**; one is made of **copper**; and one is made of **iron**.
She does not know which rod is which.



Each rod has a dot at one end.

(a) Hannah uses **only** a bar magnet to identify each rod.
She puts each pole of the bar magnet next to the dotted end of each rod.

Complete Hannah's observations in the table below.
Write if each rod is **copper**, **iron** or a **magnet**.

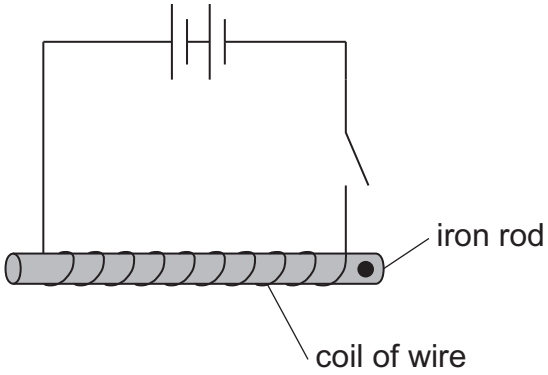
test	observations	type of rod
 	attract attract	Rod A is _____.
 	nothing happens _____	Rod B is _____.
 	attract _____	Rod C is _____.

12a
1 mark

12a
1 mark

12a
1 mark

(b) Hannah uses the iron rod to make an electromagnet.



When the switch is closed the iron rod becomes an electromagnet.
Give **two** ways Hannah could make the electromagnet stronger.

1. _____

2. _____

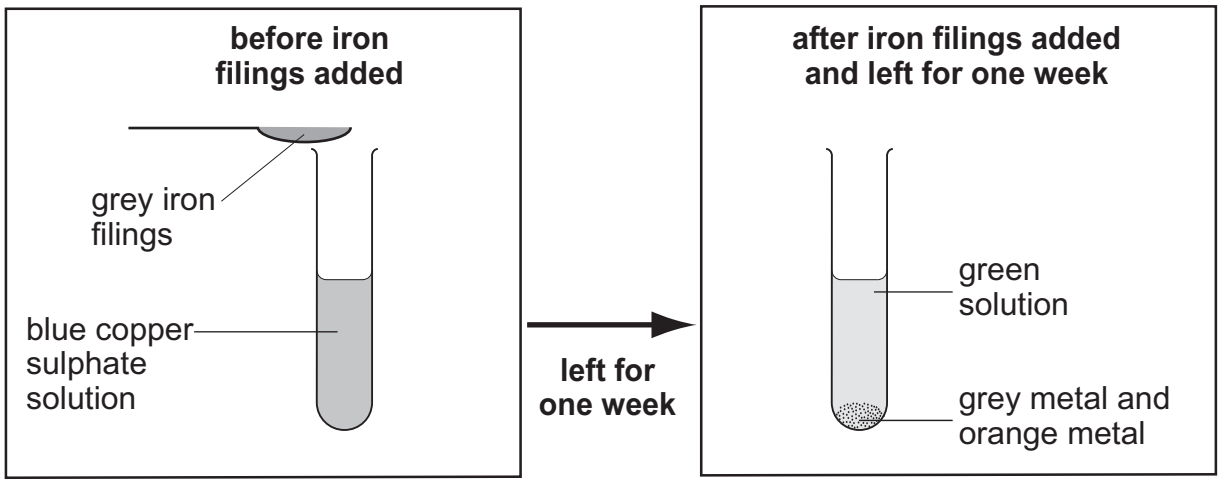
12b
1 mark

12b
1 mark

maximum 5 marks

Total
5

13. Joanne added iron filings to copper sulphate solution.
She observed the reaction after one week.



(a) What evidence in the diagrams shows that a chemical reaction has taken place?

_____

13a

1 mark

(b) The reaction between iron and copper sulphate is a **displacement** reaction.

(i) Give the name of the orange metal visible after one week.

_____

13bi

1 mark

(ii) What is the name of the compound formed in this reaction?

_____

13bii

1 mark

(iii) Joanne poured the green solution into another test tube. She added some copper pieces to the solution.

Will a displacement reaction occur?

yes ☐ no ☐

Explain your answer.

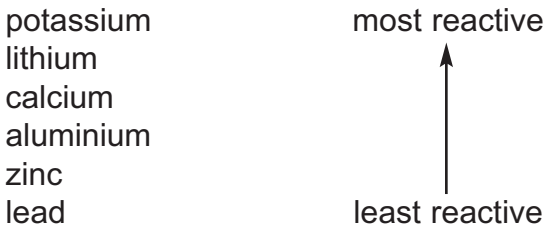
_____

_____

13biii

1 mark

(c) Part of the reactivity series of metals is shown below.



Use the information above.
Which **two** metals would react with aluminium nitrate in a displacement reaction?

Tick the **two** correct boxes.

calcium ☐ potassium ☐

zinc ☐ lead ☐

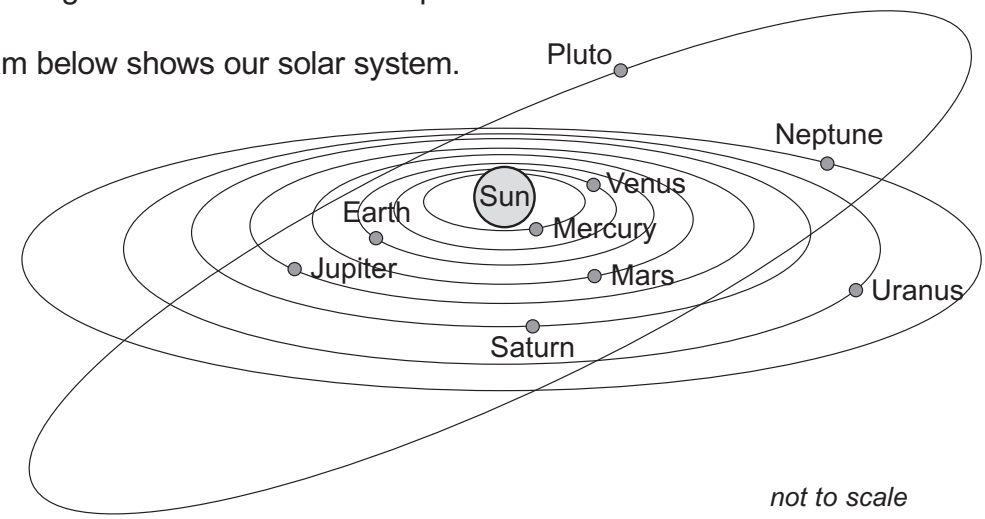
☐ 13c
1 mark

maximum 5 marks

Total
☐
5

14. Pluto was discovered in 1930. It was classified as a planet.
In 2006, scientists agreed that Pluto is **not** a planet.

(a) The diagram below shows our solar system.



not to scale

(i) **From the diagram**, what supports the idea that Pluto is a planet?

_____

14ai
1 mark

(ii) **From the diagram**, what supports the idea that Pluto is **not** a planet?

_____

14aii
1 mark

(b) The table below shows information about planets in our solar system.

planet	diameter (km)
Mercury	4800
Venus	12200
Earth	12800
Mars	6800
Jupiter	142600
Saturn	120200
Uranus	49000
Neptune	50000

Pluto has a diameter of 2300 km.
How does this information suggest to scientists that Pluto is **not** a planet?

_____

14b
1 mark

(c) An object called Charon orbits Pluto.

How does the presence of Charon support the idea that Pluto is a planet?

_____

14c

1 mark

(d) The table below shows the composition of the atmosphere of some of the objects in our solar system.

object	atmosphere
Mercury	none
Venus	mainly carbon dioxide
Earth	mainly nitrogen and oxygen
Neptune	hydrogen, helium and methane
Earth's moon	none
Titan (a moon)	nitrogen and methane
Pluto	nitrogen and methane

Atmosphere is **not** used to classify objects as moons or planets.
Use the information above to suggest a reason for this.

_____

_____

14d

1 mark

(e) Why do you think scientists found it difficult to decide how Pluto should be classified?

_____

_____

14e

1 mark

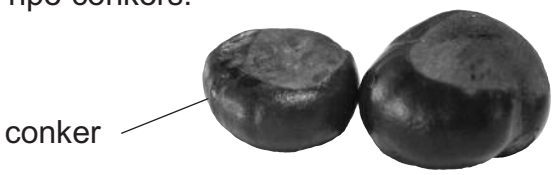
maximum 6 marks

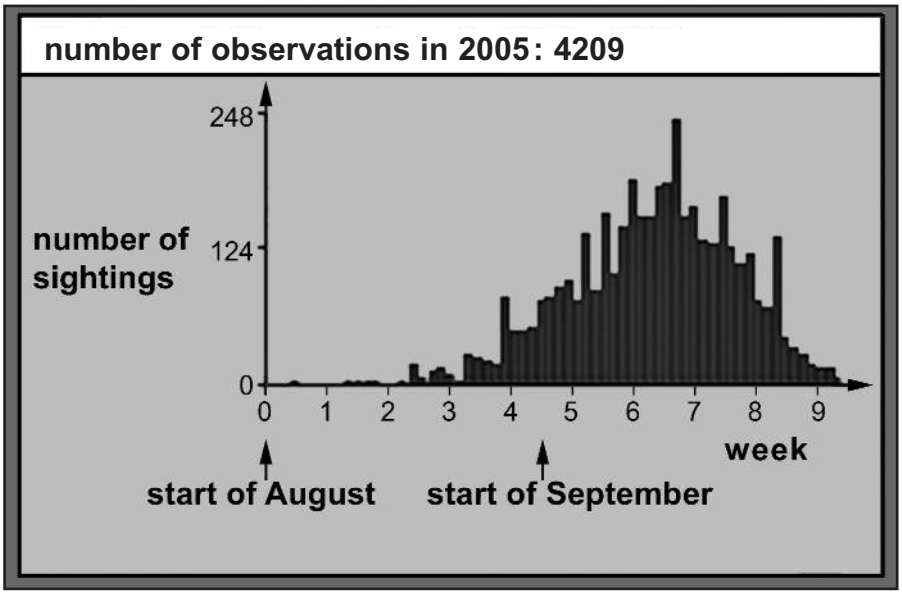
Total

6

15. Every autumn the BBC asks people all over the UK to record when and where they see the first ripe conkers. The results are shown on a website.

Conkers only ripen in the autumn.





(a) Some pupils discussed these results and made some conclusions.

Tick a box in each row to say whether the conclusion is **true** or **false** or whether you **cannot tell** based on the results.

	true	**false**	**cannot tell**
There are more conkers in 2005 than there have been in other years.	☐	☐	☐
There are only 248 conker trees in the UK.	☐	☐	☐
The most common time for the first ripe conkers was in September.	☐	☐	☐
The number of sightings decreased between August and September.	☐	☐	☐

☐ 15a
1 mark

☐ 15a
1 mark

Information from *http://www.bbc.co.uk/nature/animals/wildbritain/autumnwatch/results/conkers.html* (December 2005)

(b) The map shows where members of the public saw ripe conkers in the UK.



(i) Suggest **one** reason why it is a good idea to collect data by asking the public to observe when conkers ripen.

_____

_____

15bi

1 mark

(ii) Suggest **one** reason why it is **not** a good idea to collect data by asking the public to observe when conkers ripen.

_____

_____

15bii

1 mark

(c) The data was collected in one year.

What data would the BBC need to collect to find out if the time of year in which conkers ripen is changing?

_____

15c

1 mark

(d) Conkers ripen earlier in the south of the country than in the north.

Suggest why conkers ripen earlier in the south.

_____

15d

1 mark

END OF TEST

maximum 6 marks

Total

6

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QCA/09/3800 (Pupil pack)
QCA/09/3798 (Mark scheme pack)
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