

Sc

KEY STAGE

3

TIER

3–6

## Science test

# Paper 1

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.

2009

\_\_\_\_\_

TOTAL MARKS	
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1. Stefan is on holiday in the mountains. It is snowing.



(a) (i) Choose words from the box to complete the sentence below.

<b>solid</b>	<b>liquid</b>	<b>gas</b>
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A snowflake falls on Stefan's nose and melts.  
When the snowflake melts, it changes

from a \_\_\_\_\_ to a \_\_\_\_\_ .

(ii) Snow that falls on the ground melts slowly.  
Snow that falls on Stefan's nose melts **very quickly**.  
Give a reason for this.

(iii) In his hotel, Stefan sees some changes.  
Are the changes below reversible?  
Write **yes** or **no**.

ice melting \_\_\_\_\_

wood burning \_\_\_\_\_

toasting bread \_\_\_\_\_

1ai  
1 mark

1aii  
1 mark

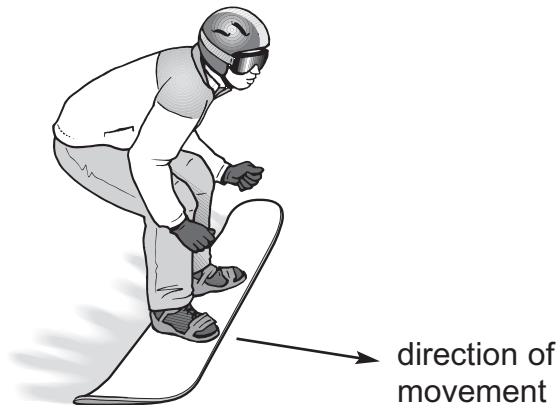
1aiii  
1 mark

- (b) (i) Stefan is snowboarding. Gravity acts on Stefan.  
**On the diagram below**, draw an arrow to show the direction of the force of gravity.



1bi  
1 mark

- (ii) When Stefan wants to slow down, he pushes one edge of the snowboard into the snow.



What force between the board and the snow makes him slow down?

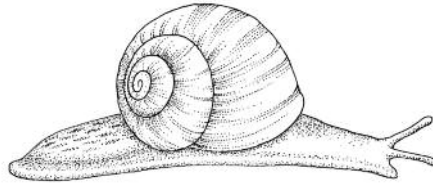
\_\_\_\_\_

1bii  
1 mark

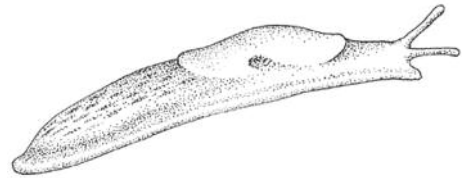
*maximum 5 marks*

2. The drawings below show a snail and a slug.

snail



slug



(a) Look at the drawings above.

(i) Give one way the snail and slug are **different** from each other.

2ai  
1 mark

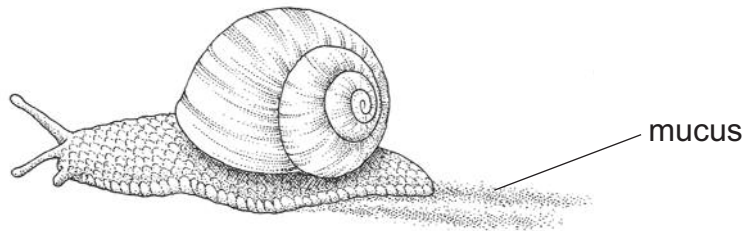
\_\_\_\_\_

(ii) Give one way the snail and slug are the **same**.

2aii  
1 mark

\_\_\_\_\_

(b) Snails produce mucus to help them move along the ground.



How does mucus help snails to move?

Tick the correct box.

Mucus is cold.

Mucus reduces friction.

Mucus increases weight.

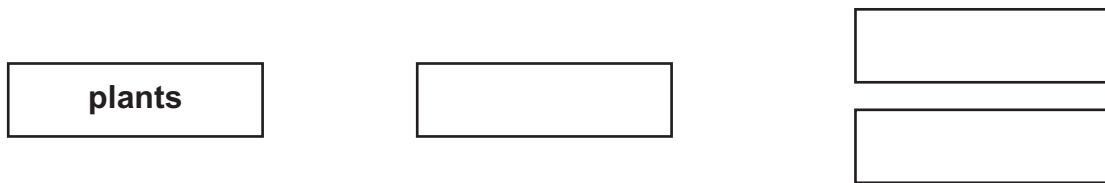
Mucus leaves a trail.

2b  
1 mark

(c) Snails are herbivores. Thrushes and blackbirds eat snails.

Complete the food web below to show the relationship between plants, snails, thrushes and blackbirds.

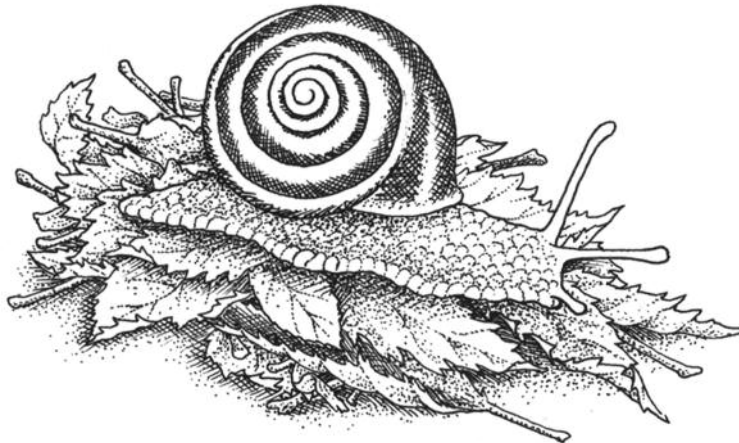
Draw arrows on the diagram.



1 mark 2c

1 mark 2c

(d) Snails that live in woodland areas are usually brown or red.



Suggest how the colour of snails in woodland areas protects them from birds.

\_\_\_\_\_

1 mark 2d





*maximum 6 marks*

3. (a) Tasha puts a small block of wood on a smooth surface.



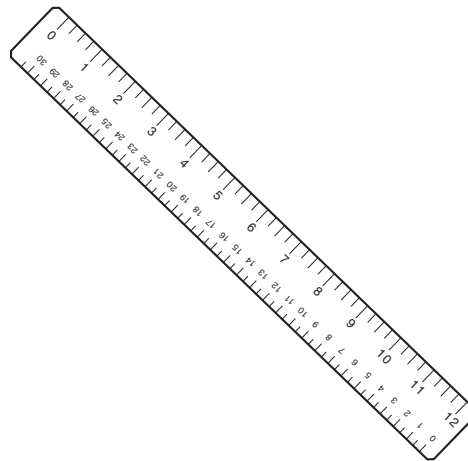
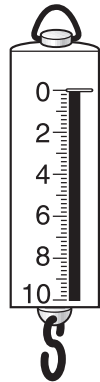
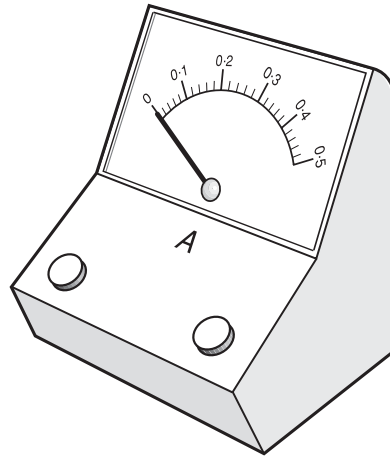
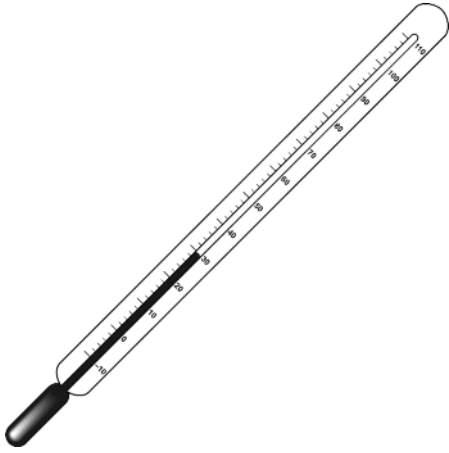
She puts different forces on the block.  
The diagrams below show the size and direction of these forces.

Will each block move to the **left**, to the **right** or **stay still**?  
Tick the correct box in each row.

		<b>forces on block</b>			<b>moves to the left</b>	<b>moves to the right</b>	<b>stays still</b>
					←	→	
<input type="checkbox"/>	3ai 1 mark	(i)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3aii 1 mark	(ii)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3aiii 1 mark	(iii)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	3aiv 1 mark	(iv)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b) (i) Which piece of equipment should Tasha use to measure the forces on the block?

Tick the correct box.



(ii) Give the name of the equipment used to measure force.

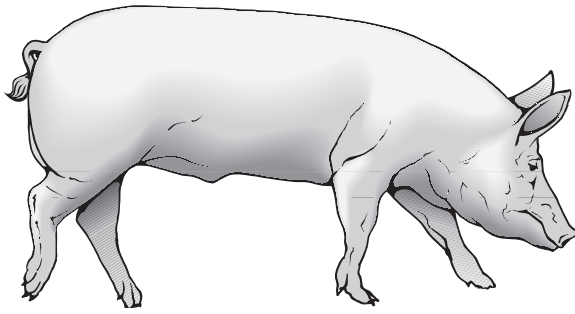
\_\_\_\_\_

3bi  
1 mark

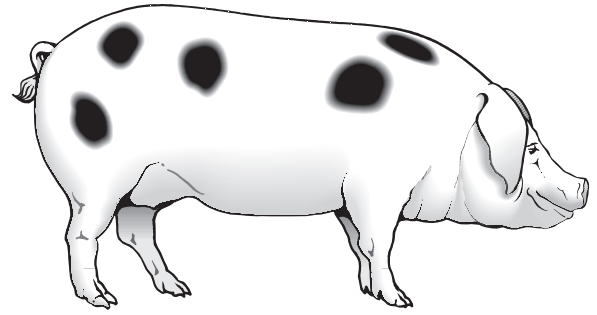
3bii  
1 mark

*maximum 6 marks*

4. The drawings below show pigs from two different breeds.



**Tamworth**



**Gloucester Old Spot**

4ai

1 mark

(a) (i) From the drawings above, give **two** ways in which the pigs are different.

1. \_\_\_\_\_

2. \_\_\_\_\_

4ai

1 mark

(ii) What are these differences called?  
Tick the correct box.

adaptations

classification

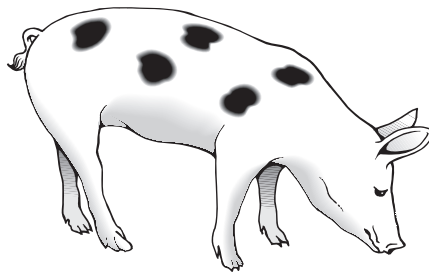
fertilisation

variations

4aii

1 mark

(b) The drawing below shows a piglet bred from a Tamworth and a Gloucester Old Spot.



Give **one** way you can tell that one of its parents is a Tamworth.

\_\_\_\_\_

4b

1 mark



- (c) (i) When pigs reproduce, which **two** types of cell pass information from the pigs to their piglets?  
Tick the **two** correct boxes.

blood  
cell

nerve  
cell

cheek  
cell

egg  
cell

muscle  
cell

sperm  
cell

4ci

1 mark

4ci

1 mark

- (ii) When pigs reproduce, two cells join together.

What is this process called?  
Tick the correct box.

adaptation

classification

fertilisation

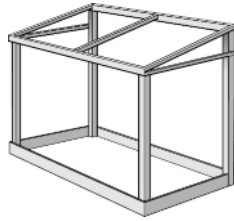
variation

4ci

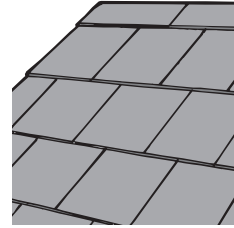
1 mark

*maximum 7 marks*

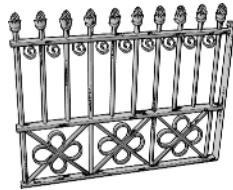
5. The drawings below show six objects found in Sophie's garden.  
The objects are all made of different materials as shown.



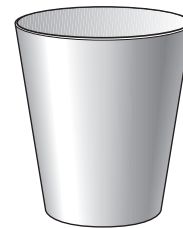
**aluminium**  
greenhouse frame



**slate**  
roof tile



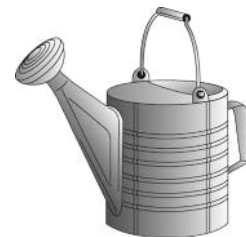
**iron**  
gate



**plastic**  
plant pot



**marble**  
statue

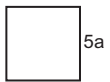


**steel**  
watering can

*not to scale*

- (a) Which two **objects** shown above are made of **rock**?

1. \_\_\_\_\_  
2. \_\_\_\_\_



5a

1 mark

- (b) Write two of the **objects** shown above which are made of **metal**.

1. \_\_\_\_\_  
2. \_\_\_\_\_



5b

1 mark

- (c) (i) A gas in the air reacts with iron to make it rusty.  
Give the name of this gas.

\_\_\_\_\_

5ci  
1 mark

- (ii) What could you do to an iron gate to protect it from this gas in the air?

\_\_\_\_\_

5cii  
1 mark

- (d) Sophie tests each material with a magnet.

Which two materials are attracted to the magnet?  
Tick the **two** correct boxes.

aluminium

slate

iron

plastic

marble

steel

5d  
1 mark

5d  
1 mark

*maximum 6 marks*

6. Richard wanted to find out the best conditions for growing lettuce plants.



He took 4 trays and planted 8 lettuce plants in each.  
The results of his investigation are shown below.

	variables			
tray	light level	air temperature (°C)	soil moisture	number of plants alive after 7 days
A	medium	25	moist	8
B	medium	25	dry	6
C	medium	45	moist	2
D	medium	45	dry	0

(a) How many days did Richard's investigation last?  
Use the table to help you.

\_\_\_\_\_ days

6a  
1 mark

(b) Look at the table. Which variables did Richard **change** in his investigation?  
Tick the correct box.

light level and air temperature

soil moisture and type of soil

air temperature and soil moisture

type of soil and light level

6b  
1 mark

(c) Richard said:



Lettuce plants grow better at a medium light level than at other light levels.

Why is Richard **not** able to make this conclusion from his investigation?

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6c  
1 mark

(d) The table below shows the number of lettuce plants alive at the end of day 1 and day 7 of the investigation.

For each tray, A, B, C and D, suggest the number of plants that were alive on **day 4**. Write your answers in the table below.

	number of plants alive		
tray	day 1	day 4	day 7
A	8		8
B	8		6
C	8		2
D	4		0

6d  
1 mark

6d  
1 mark

*maximum 5 marks*

7. Michelle added some universal indicator solution to four liquids.

Michelle uses the pH chart to fill in her table of results.

**pH chart**

<b>pH</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>colour</b>	red			orange			green	blue			purple			

(a) The table below shows some of Michelle's results.

Complete Michelle's table of results below.

Use the pH chart to help you.

<b>liquid</b>	<b>colour of universal indicator solution</b>	<b>pH</b>
milk	green	
rain water		5
hydrochloric acid	red	
bleach		11

7a

1 mark

7a

1 mark

(b) Explain why using acids can be dangerous.

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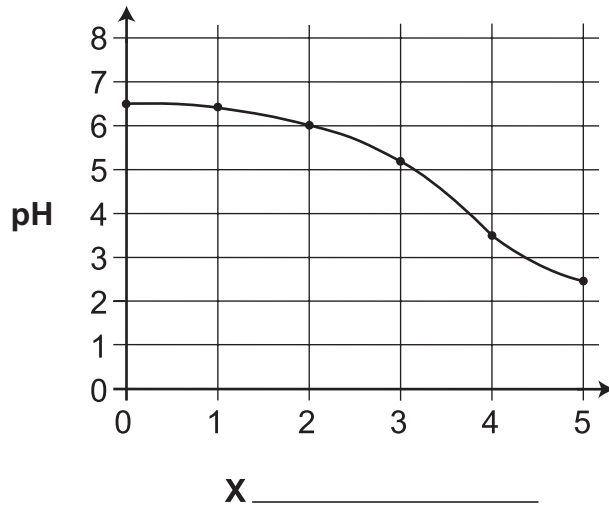
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7b

1 mark

- (c) Michelle measured the pH of some milk stored at room temperature for five days.

The graph of Michelle's results is shown below.  
One of the axes has been labelled.



- (i) Write the axis label for the graph at **X**.

- (ii) Use the graph. How does the pH of the milk change over the five days?

\_\_\_\_\_

7ci  
1 mark

7cii  
1 mark

*maximum 5 marks*

8. The drawing below shows the remains of an animal found in a rock.



(a) Some scientists think the animal in the drawing above was a bird.

(i) Give **one** feature of the animal above that suggests it was a bird.

8ai

1 mark

\_\_\_\_\_

Other scientists think the animal was a reptile.

(ii) What are reptile skins covered with?

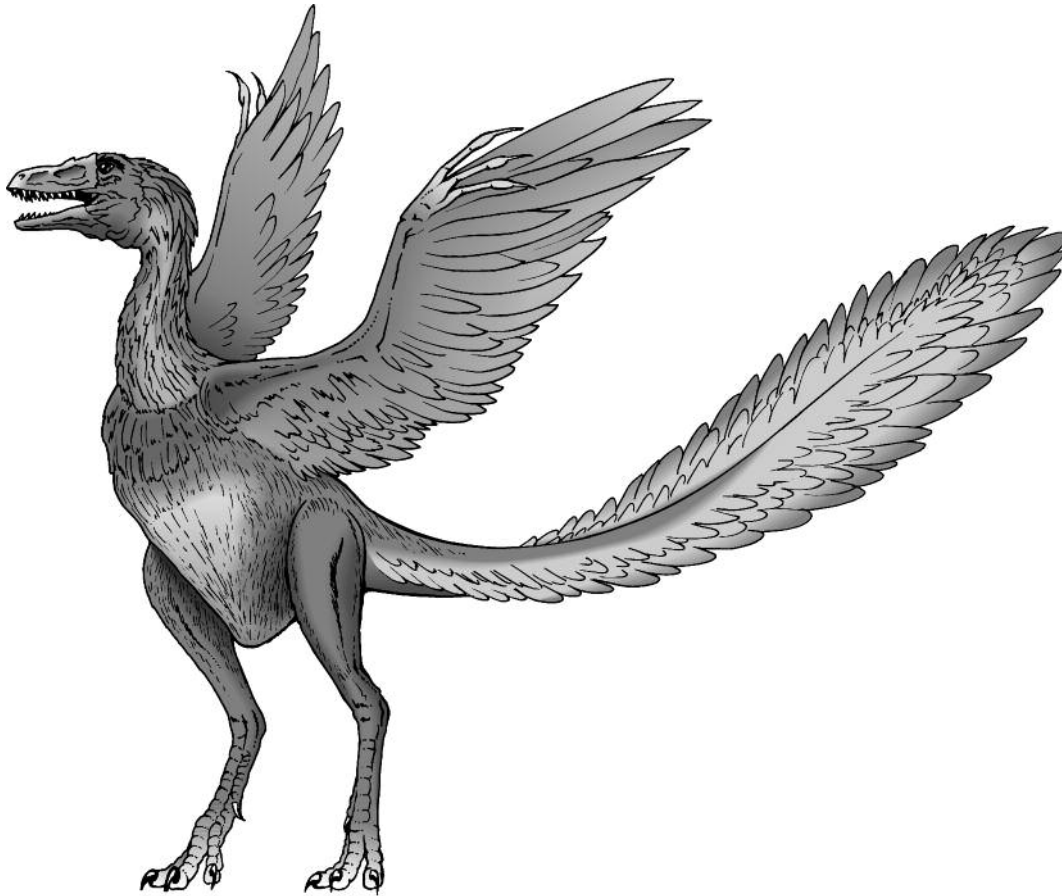
8aia

1 mark

\_\_\_\_\_



- (b) The animal lived millions of years ago. Scientists used the remains to draw what they think the animal looked like when it was alive.



Why can scientists **not** be certain that the animal looked like the drawing above?

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8b  
1 mark

- (c) Give the name for the remains of living things found in rocks.

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8c  
1 mark

- (d) Igneous rocks can be formed from lava from volcanoes.  
The remains of living things are **not** found in rocks made from lava.  
Why does lava destroy the remains of living things?

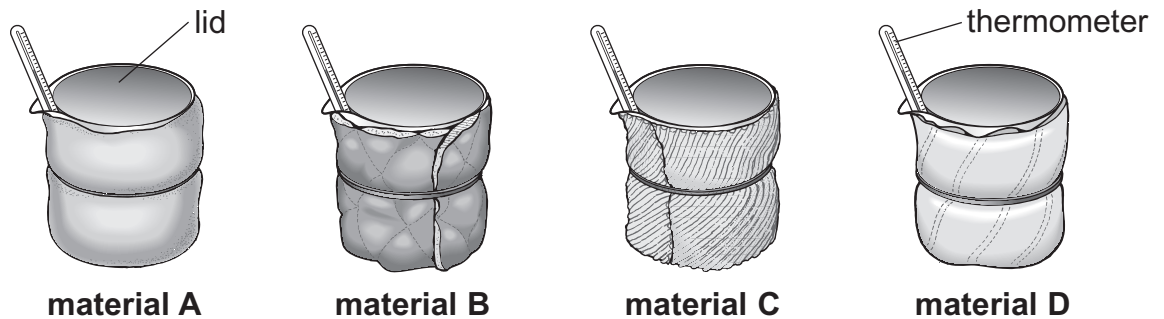
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8d  
1 mark

*maximum 5 marks*

9. A company has made a new material called 'Wellwarm'. They want to use 'Wellwarm' to make coats.

(a) A scientist tested 'Wellwarm' to see how well it insulated a beaker of hot water. She tested 'Wellwarm' and three other materials as shown below.



She wrapped each beaker in a different material.  
She recorded the temperature at the start and 20 minutes later.

(i) What was the independent variable that the scientist **changed**?

9ai  
1 mark

(ii) What was the dependent variable that the scientist **measured** during the investigation?

9aia  
1 mark

(b) The results of the investigation are shown below.

time (minutes)	temperature of water (°C) wrapped in			
	material A	material B	material C	material D
0	60	60	60	60
20	34	40	38	36

- (i) The scientist said that the 'Wellwarm' material is the best insulator. Which material was 'Wellwarm'? Use the results to help you. Tick the correct box.

A       B       C       D

9bi  
1 mark

- (ii) Use the evidence in the results table to explain your choice.

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

9bii  
1 mark

- (c) The company made a coat from each of the four materials they tested.



A person tested the different coats by wearing each one in a cold room. He measured the temperature inside each coat for 30 minutes.

Write down two **other** variables that should be controlled to make this a fair test.

1. \_\_\_\_\_  
2. \_\_\_\_\_

9c  
1 mark

9c  
1 mark

- (d) Write down one thing the scientists should do to make sure the person testing the coats is safe.

\_\_\_\_\_

9d  
1 mark

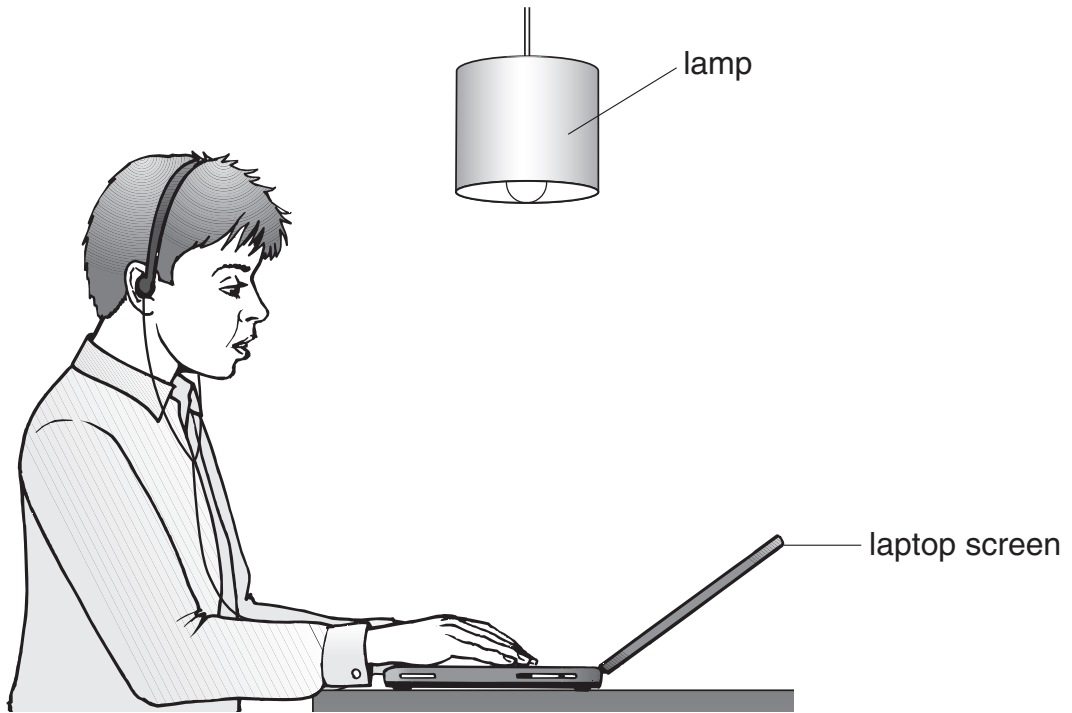
- (e) Suggest **one** advantage of using a temperature sensor and data logger instead of a thermometer in this experiment.

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

9e  
1 mark

*maximum 8 marks*

10. (a) The diagram below shows George using his laptop. Light from the lamp is reflected by the laptop screen.



10ai  
1 mark

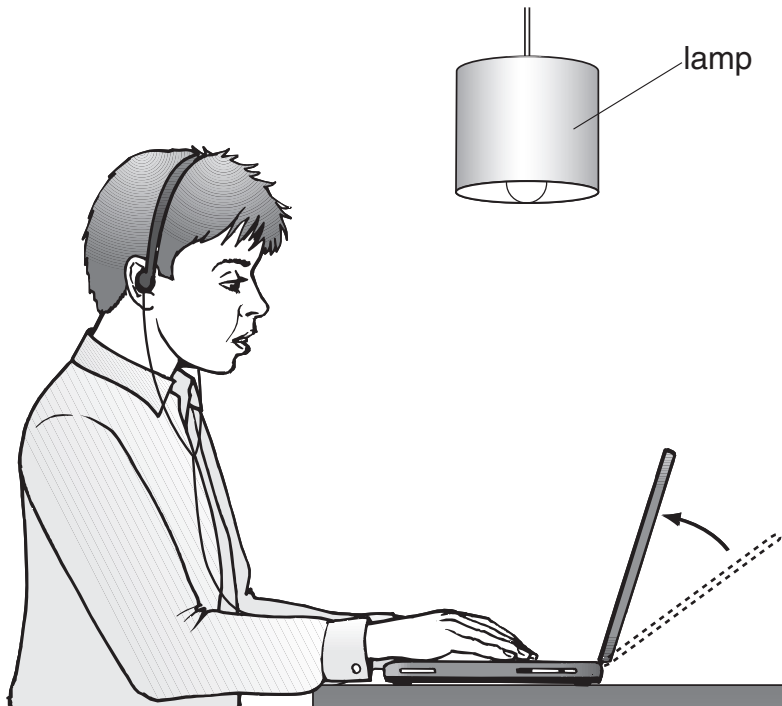
10ai  
1 mark

10ai  
1 mark

- (i) **On the diagram above** draw a ray of light to show how George sees the light from the lamp reflected by the laptop screen. Use a ruler.

Draw arrows to show the direction of light.

- (ii) With the laptop screen in the position shown in part a(i), George sees an image of the lamp on the screen.  
George tilts the screen forwards as shown below.



When the screen is tilted forwards it is easier for George to see the words on the screen.  
What happens to the reflected ray of light when the screen is tilted?

\_\_\_\_\_

\_\_\_\_\_

10aii  
1 mark

- (b) George listens to music on his headphones.

Complete the sentence below using words from the box.

<b>chemical</b>	<b>electrical</b>	<b>gravitational potential</b>
	<b>sound</b>	<b>thermal</b>

The useful energy change in the headphones is from \_\_\_\_\_  
energy into \_\_\_\_\_ energy.

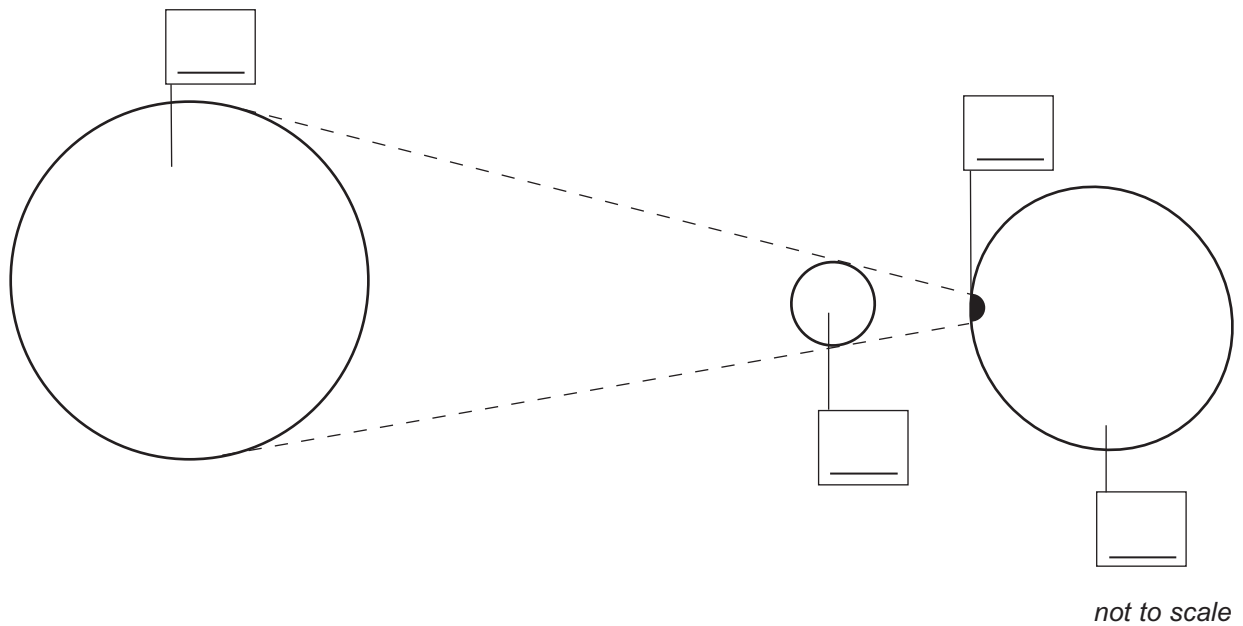
10b  
1 mark

*maximum 5 marks*

11. (a) The diagram below shows the positions of the Sun, Moon and Earth during a solar eclipse.

Write numbers (1–4) on the diagram below to label the features during an eclipse.

1. the Earth
2. the Moon
3. the Sun
4. a region where the total eclipse of the Sun is taking place



11a  
1 mark

11a  
1 mark

- (b) Scientists discovered a regular cycle of eclipses. It is called the Saros cycle. The table below shows the dates of some eclipses in this cycle.

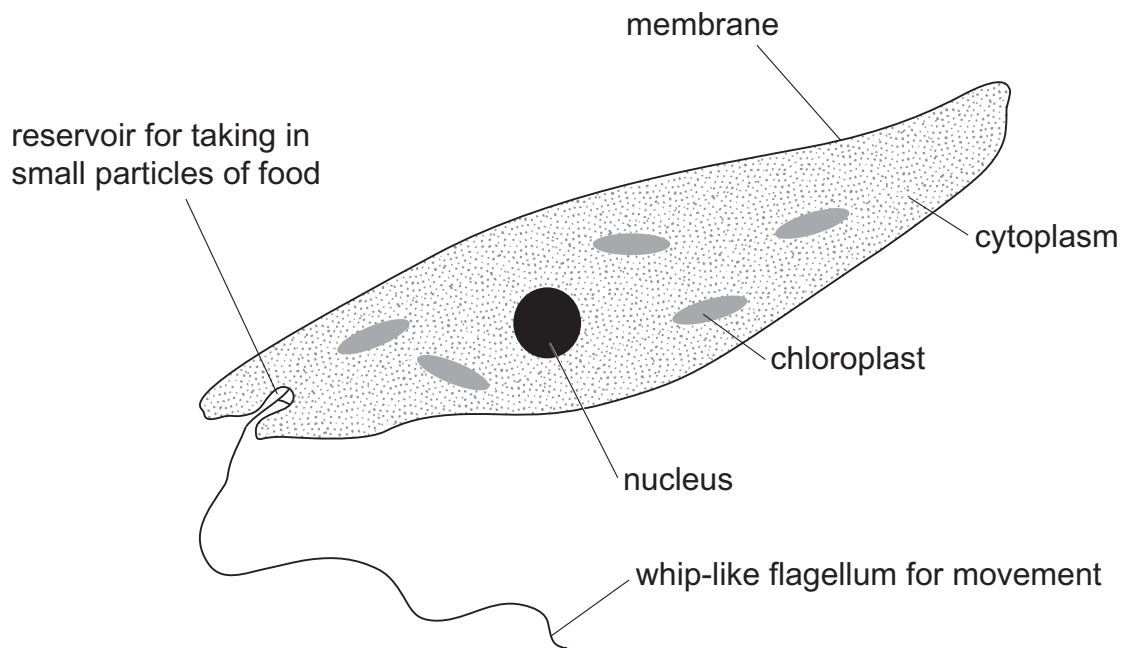
Complete the table by predicting the date of the next eclipse in the Saros cycle.

eclipse	date
eclipse 1	20th July 1963
eclipse 2	31st July 1981
eclipse 3	11th August 1999
eclipse 4	

11b  
1 mark

11b  
1 mark

12. The diagram below shows an organism called Euglena. It is made of only one cell. It lives in ponds and streams. Euglena have features of both plants and animals.



- (a) Look at the diagram of Euglena.

Give **two** pieces of evidence which suggest it is an **animal** cell and **not** a plant cell.

1. \_\_\_\_\_
2. \_\_\_\_\_

12a  
1 mark

12a  
1 mark

- (b) Plant cells can carry out photosynthesis. How can you tell from the diagram that Euglena can carry out photosynthesis?

\_\_\_\_\_

12b  
1 mark

- (c) Complete the word equation for photosynthesis.

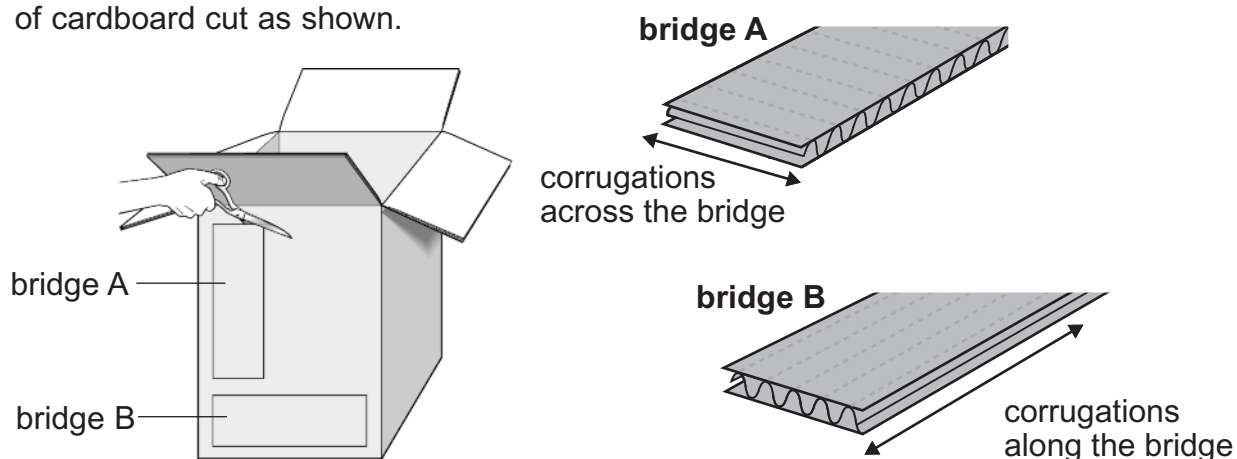
carbon dioxide + \_\_\_\_\_ → glucose + \_\_\_\_\_

12c  
1 mark

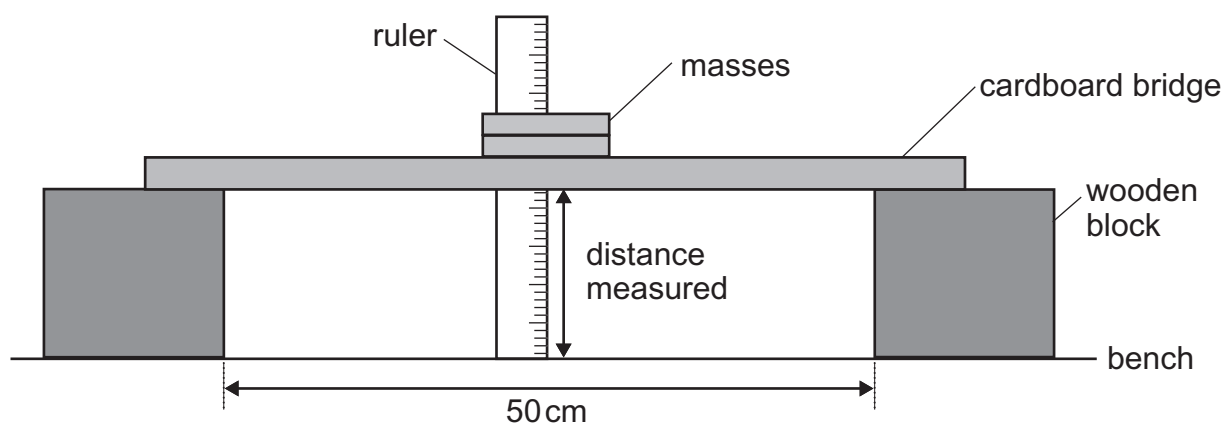
12c  
1 mark

*maximum 9 marks*

13. Joe makes two bridges from strips of cardboard cut as shown.



Joe tests the bridges by adding masses to them. He measures the distance from the bench to the bottom of each bridge for different masses as shown.



13a  
1 mark

(a) Suggest **two** things Joe must do to make his test fair.

1. \_\_\_\_\_
2. \_\_\_\_\_

13a  
1 mark

Here are Joe's results.

mass added to bridge (g)	distance from bench to bottom of bridge (cm)	
	bridge A	bridge B
0	7.2	7.2
100	7.1	7.0
200	7.0	6.5
250	6.8	6.1
300	3.0	5.6
350	0.0	5.0



- (b) (i) Joe put 325 g on each bridge.  
Using the results table, estimate the distance from each bridge to the bench.

bridge A \_\_\_\_\_ cm

bridge B \_\_\_\_\_ cm

13bi  
1 mark

- (ii) Suggest what happened to **bridge A** when it was loaded with 350 g.

\_\_\_\_\_

13bii  
1 mark

- (c) (i) Which bridge would be better for carrying a **200 g** toy car?  
Tick the correct box.

bridge A

bridge B

Explain your answer.

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

13ci  
1 mark

- (ii) Which bridge would be better for carrying a **300 g** toy car?  
Tick the correct box.

bridge A

bridge B

Explain your answer.

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

13cii  
1 mark

*maximum 6 marks*

14. (a) Amy's family are at the beach during the summer.  
Amy and her sister have a bucket containing seawater and sand.



Read the following statements.  
Which are **true** and which are **false**?

Tick **one** box for each statement.

	<b>true</b>	<b>false</b>
Water is a solvent for salt.	<input type="checkbox"/>	<input type="checkbox"/>
Sand sinks in water because water is more dense than sand.	<input type="checkbox"/>	<input type="checkbox"/>
When a solid dissolves in water, the solid is called a solute.	<input type="checkbox"/>	<input type="checkbox"/>

14a  
1 mark

14a  
1 mark

14b  
1 mark

14b  
1 mark

- (b) Seawater contains dissolved salt.  
Describe what Amy can do to separate **and** collect pure water from seawater.

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- (c) Draw a line from each of the **substances** below to the **group** that it belongs to.  
Draw only **three** lines.

Draw a line from each **group** to the correct **description**.  
Draw only **three** lines.

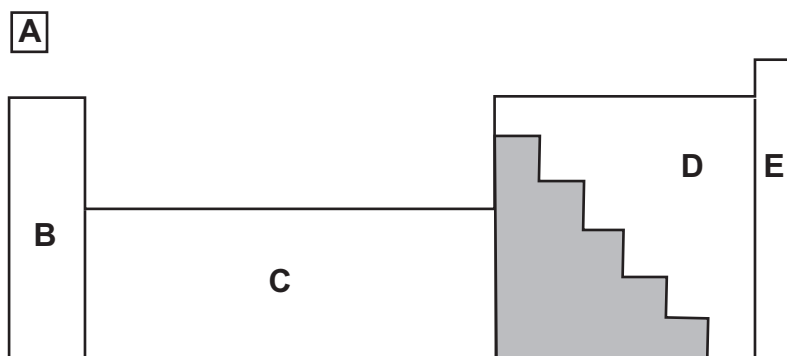
substance	group	description
seawater	compound	It contains two or more types of atoms or molecules which can be physically separated.
salt	mixture	It contains only one type of atom.
oxygen	element	Two or more types of atoms are chemically joined together.

14c  
1 mark

14c  
1 mark

*maximum 6 marks*

15. (a) The diagram below shows part of the periodic table of elements.



The shaded area contains **only** metal elements.

Two other areas also contain **only** metal elements.

Which areas contain only metal elements?

Tick the **two** correct boxes.

15a  
1 mark

A

B

C

D

E

(b) Copper is a metal.

At room temperature copper is a strong solid.

Give **two** other properties of copper that show it is a metal.

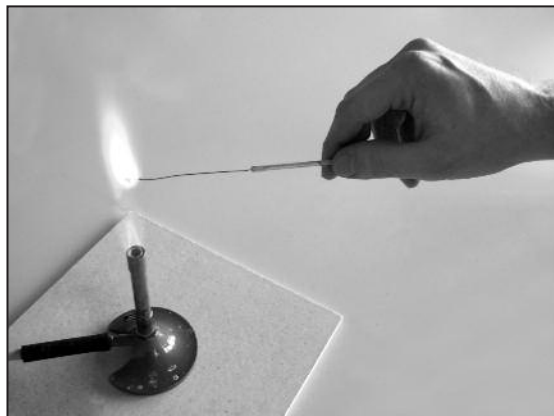
1. \_\_\_\_\_

2. \_\_\_\_\_

15b  
1 mark

15b  
1 mark

- (c) When copper metal is heated it reacts with a gas in air.



What is the chemical name of the **product** formed when copper reacts with a gas in air?

\_\_\_\_\_

15c

1 mark

- (d) Which statement below describes what happens in a **chemical change** but **not** in a physical change?

Tick the correct box.

The product is a solid.

The change only happens at a high temperature.

The atoms have combined in a different way to make a new substance.

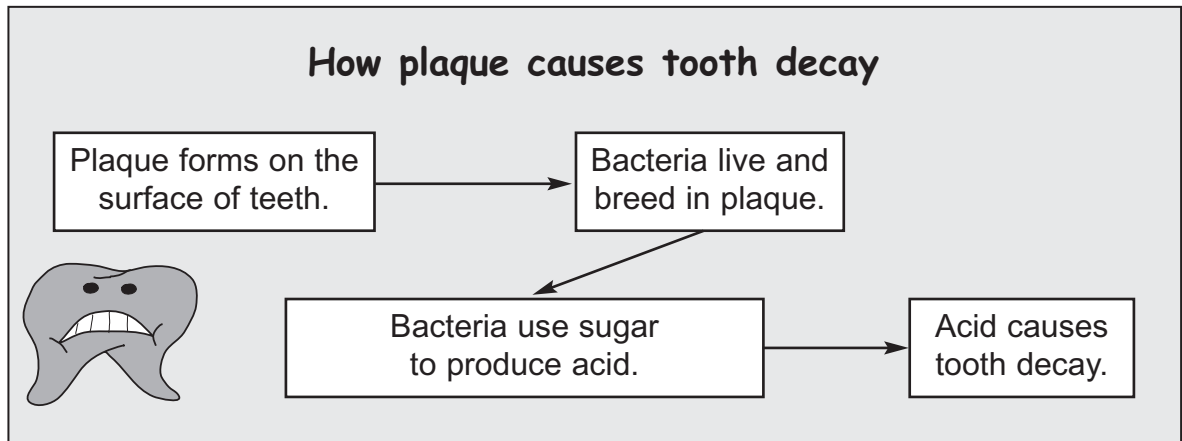
The types of atoms at the start are the same as in the end product.

15d

1 mark

*maximum 5 marks*

16. The dentist's leaflet below shows how plaque causes tooth decay.



(a) (i) Explain how reducing the amount of plaque can reduce tooth decay. Use the leaflet to help you.

16ai

1 mark

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16ai

1 mark

(ii) Using an alkaline toothpaste also reduces tooth decay. Give the reason for this.

16aii

1 mark

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(b) A group of boys wanted to find out how well plaque is removed by brushing teeth.

Every day, before they brushed their teeth, the boys chewed a tablet that stains plaque red.

Explain why the boys looked at their teeth **before and after** brushing.

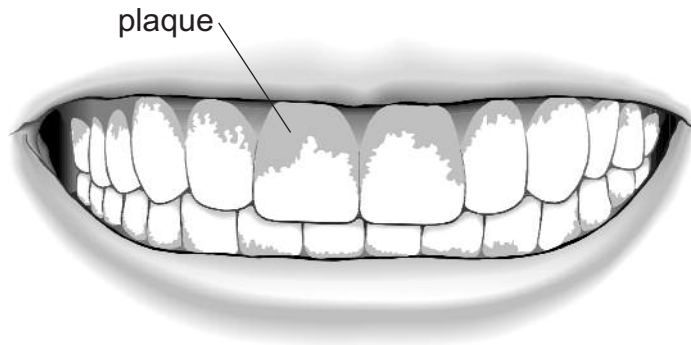
16b

1 mark

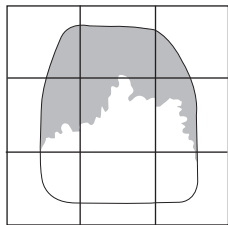
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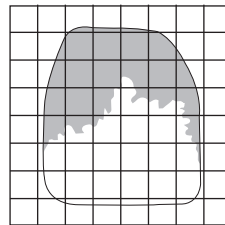
(c) The diagram below shows teeth with the plaque stained.



The boys used a grid drawn on clear plastic to measure the area of the plaque on their teeth.



**A**



**B**

(i) Grid B is better than grid A for measuring the area of plaque.

Why is a grid with smaller squares better for measuring the area of plaque?

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16ci  
1 mark

(ii) The squares on grid B represent  $1 \text{ mm}^2$ .

Use grid B to estimate the area of the tooth covered by plaque.

\_\_\_\_\_  $\text{mm}^2$

16cii  
1 mark

**END OF TEST**

*maximum 6 marks*

