

45 minutes

Science Paper 2

Stage 9

Name

Additional materials: Ruler

READ THESE INSTRUCTIONS FIRST

Answer **all** questions in the spaces provided on the question paper.

You should show all your working on the question paper.

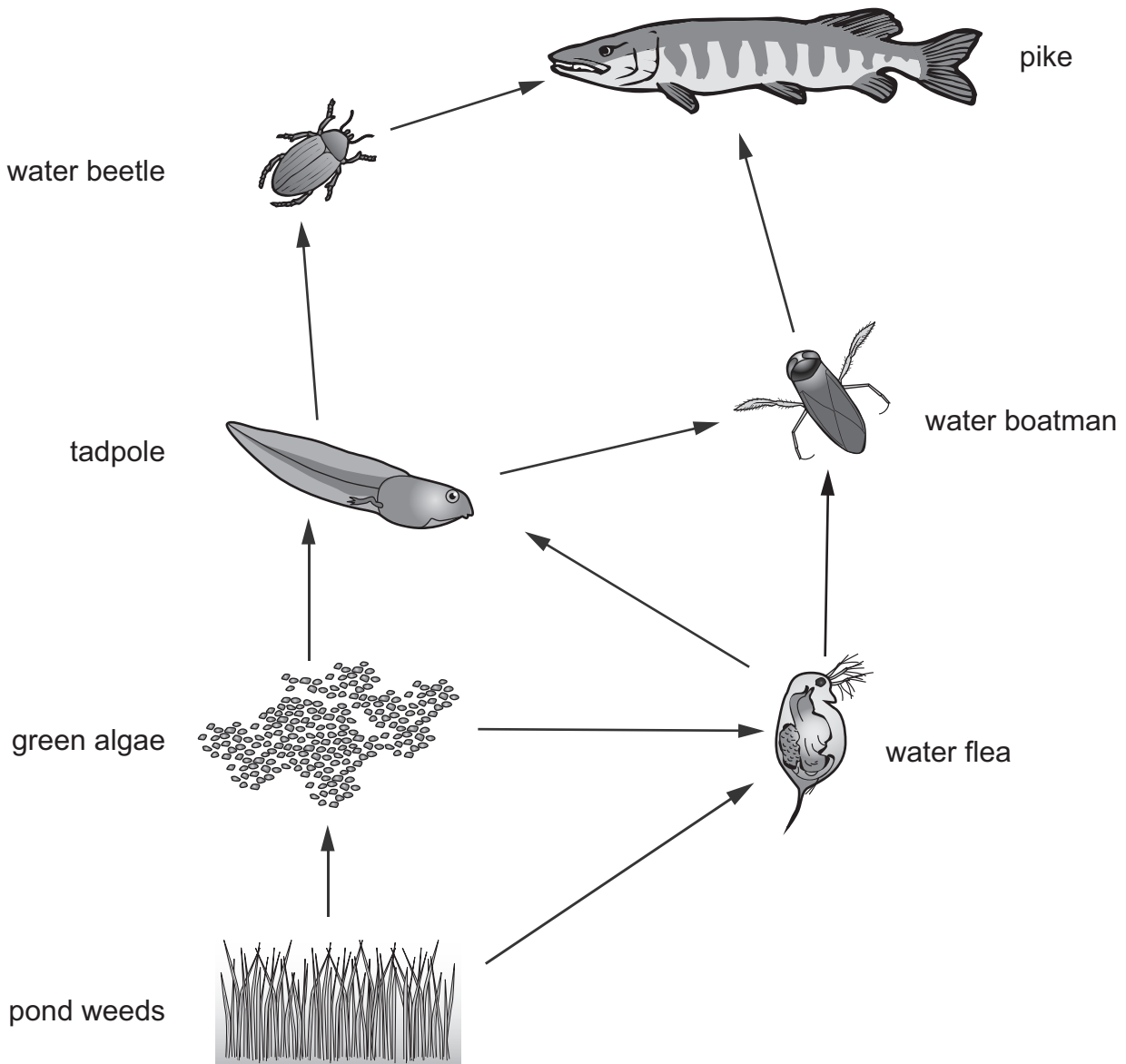
The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.

For Teacher's Use	
Page	Mark
1	
2	
3	
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5	
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9	
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12	
13	
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16	
17	
18	
19	
20	
Total	

1 The diagram shows part of a food web in a pond.

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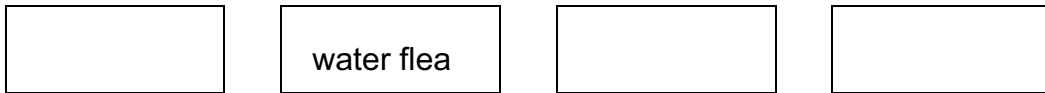
(a) Complete these sentences using the food web.

An example of a predator is

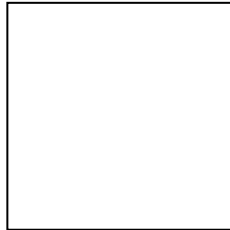
Its prey is the

[2]

(b) (i) Complete this food chain.



[1]



(ii) In the box under the food chain, draw an arrow to show the direction of energy flow.

[1]

(c) (i) The number of green algae and pond weeds increase.

What will happen to the number of tadpoles and water fleas?

.....

Explain why this happens.

.....

[2]

(ii) Alfonso adds more pike to the pond.

Predict **one** effect this may have.

.....

.....

[1]

(d) Decomposers are important in food webs.

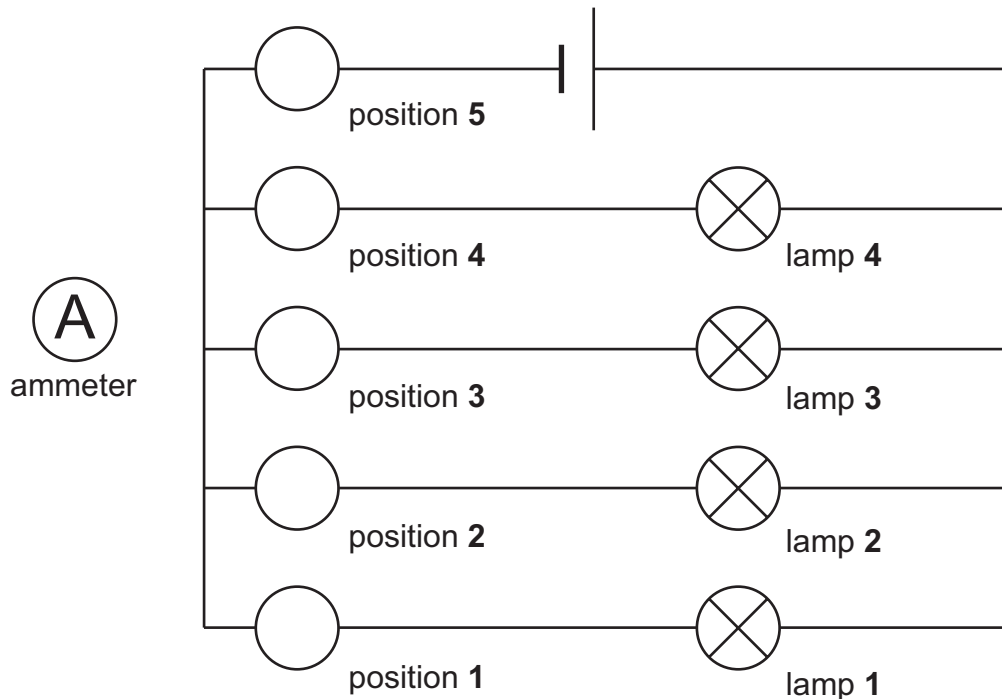
What do decomposers do?

.....

.....

[1]

2 Sami investigates this parallel circuit.



He uses one ammeter and places it in position 1. He takes the reading and records it in the table.

He then places the ammeter in Position 2. He takes the reading and records it in the table. He repeats this process again for Position 3, and then Position 4.

Sami predicts that the readings on the ammeter in Positions 1, 2, 3 and 4 will be all the same.

These are Sami's results.

position of ammeter	current in amps
1	0.10
2	0.15
3	0.10
4	0.10
5	

(a) Suggest why one reading was different.

..... [1]

(b) Use the results in the table to predict the current in position 5.

..... amps [1]

(c) Sami removes lamp 1 from the circuit.
Predict the current in position 5 now.

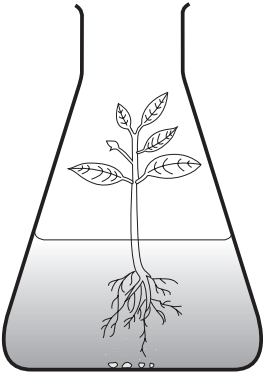
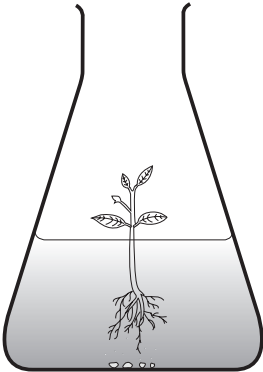
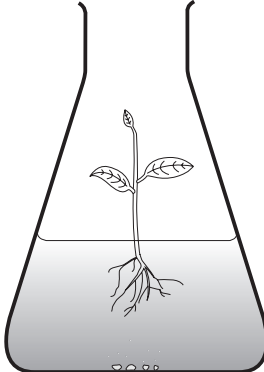
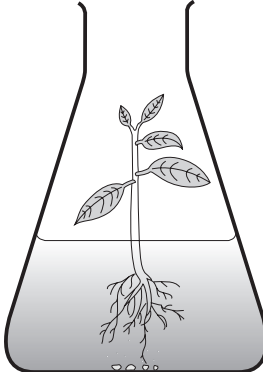
..... amps [1]

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- 3 Kylie investigates the importance of the elements contained in mineral salts for plants.

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Here are her results.

all mineral salts	all mineral salts without nitrogen	all mineral salts without phosphorus	all mineral salts without magnesium
			
healthy and fully grown	small plant	weak shoots and roots	yellow leaves

- (a) The first plant in the table was given all the mineral salts.

Why did Kylie include a plant that was given all the mineral salts in her investigation?

..... [1]

- (b) Kylie records her results by drawing a picture of each plant.

What **one** measurement could she take to improve her results?

..... [1]

(c) Interpret the results for the following **three** plants.

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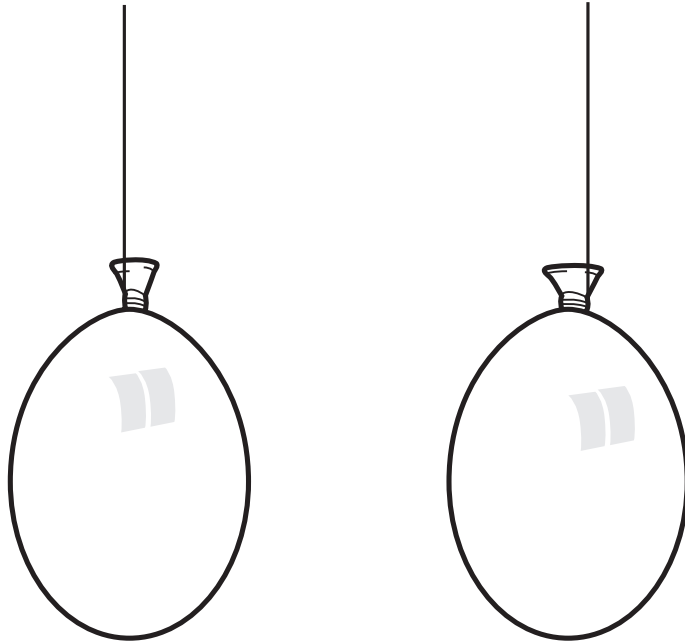
(i) The plant given all the mineral salts without nitrogen looks
..... because nitrogen is needed for
..... [1]

(ii) The plant given all the mineral salts without phosphorus is
.....
because phosphorous is needed for [1]

(iii) The plant given all the mineral salts without magnesium is
.....
because magnesium is needed for [1]

- 4 (a) Two balloons are rubbed with a dry cloth.

They are then hung next to each other.



Here are some statements about the two balloons.

Tick (✓) **one** box for each statement to show whether it is **true** or **false**.

statement	true	false
The balloons have different charges and so repel each other.	<input type="checkbox"/>	<input type="checkbox"/>
The balloons have a neutral charge so repel each other.	<input type="checkbox"/>	<input type="checkbox"/>
The balloons have the same charge so repel each other.	<input type="checkbox"/>	<input type="checkbox"/>
The balloons have the same charge so attract each other.	<input type="checkbox"/>	<input type="checkbox"/>
The balloons have a neutral charge so attract each other.	<input type="checkbox"/>	<input type="checkbox"/>

[2]

(b) Electrostatics can be useful.

The picture shows a person dusting.



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(i) Use your knowledge of electrostatics to complete these sentences. Use these words.

attracted

charged

negative

opposite

positive

repelled

the same

The duster is The dust has
charge so it is to the duster. [2]

(ii) Electrostatics can be a problem.

Give **one** example.

..... [1]

5 Different metals are added to water.

Some of these metals are added to acid.

Here are the results.

metal	observation with water	observation with acid
zinc	no reaction	bubbles of gas and metal slowly react
potassium	it floats and then a flame is seen	—
calcium	bubbles of gas	reacts quickly producing many bubbles of gas
platinum	no reaction	no reaction
nickel	no reaction	a few bubbles of gas when the acid is warmed

(a) Write the **five** metals in order of reactivity.

Start with the most reactive metal at the top.

most reactive

.....

.....

.....

least reactive [1]

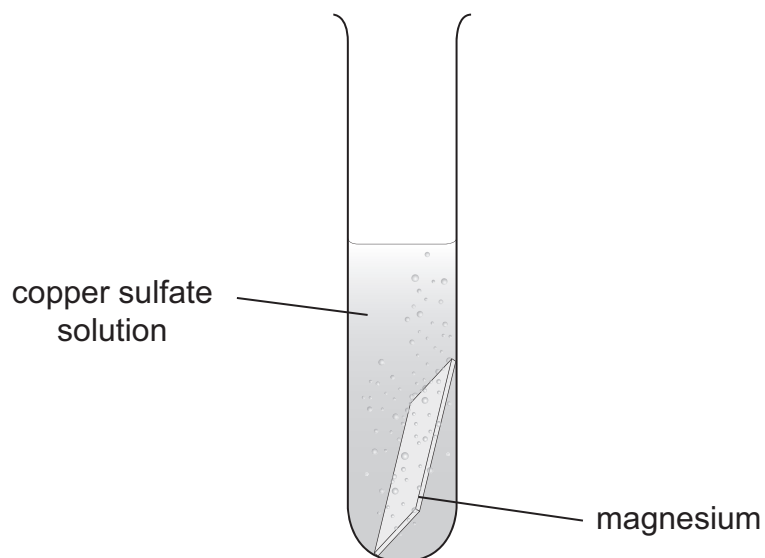
(b) Name another metal that reacts in a similar way to potassium.

..... [1]

(c) Why is there no result shown in the table for potassium being added to acid?

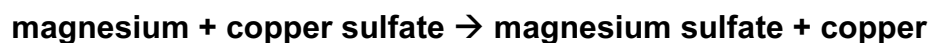
..... [1]

- 6 (a) Anneka puts a piece of magnesium in a solution of copper sulfate.



A reaction takes place.

The word equation for the reaction is:



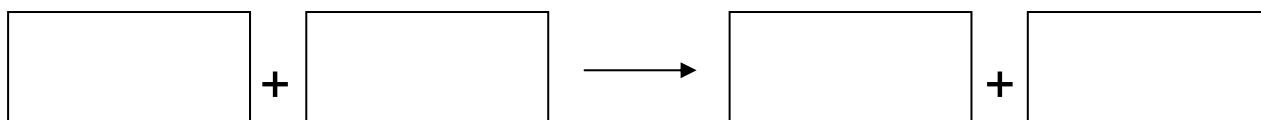
Why is this reaction called a **displacement** reaction?

.....
 [1]

- (b) Anneka puts a piece of magnesium in a solution of lead nitrate.

A displacement reaction takes place.

Write the word equation for this reaction.



[2]

- (c) Anneka puts some copper in a solution of sodium chloride.

There is no reaction. Give a reason.

..... [1]

7 Franco leaves a beaker of warm water in the laboratory for 20 minutes.

He observes that the temperature of the water has decreased.

(a) How does he measure this temperature change?

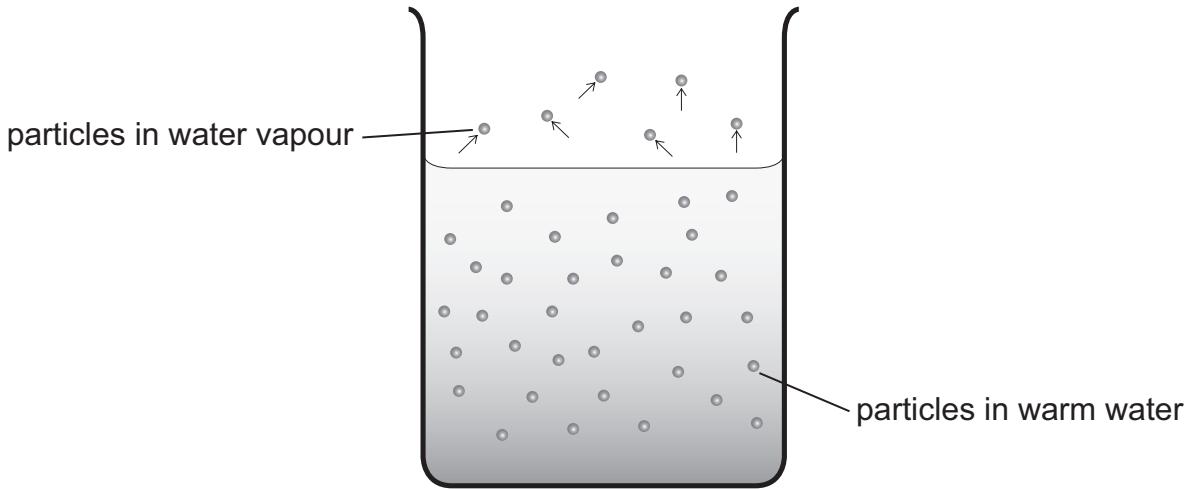
.....
..... [1]

(b) (i) Some of the particles in the warm water have escaped from the surface of the water.

Name this process.

..... [1]

(ii) The diagram shows the particles in and above the beaker of warm water.



Which of these statements help to explain why the warm water cools down?

Tick (✓) **three** boxes.

The particles in warm water are gaining kinetic energy.

The particles in warm water with the most kinetic energy escape.

The particles in warm water with the least kinetic energy escape.

The particles in warm water with less kinetic energy are left behind.

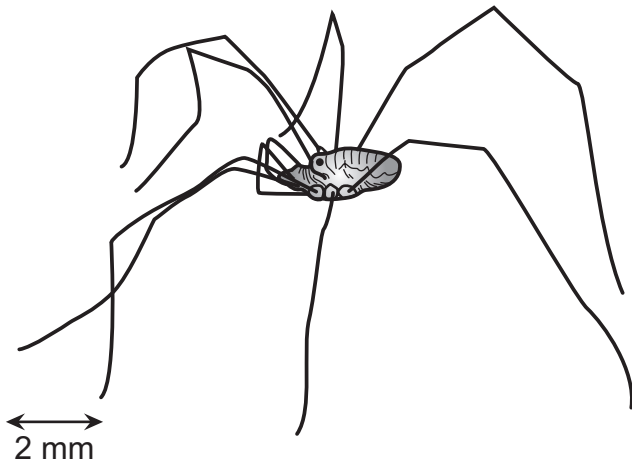
The particles in warm water with more kinetic energy are left behind.

The less kinetic energy the particles have, the cooler the water.

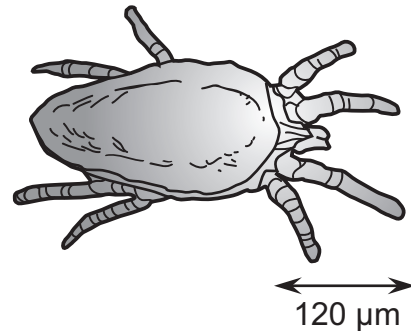
[3]

8 Here are two arachnids.

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Arachnid A



Arachnid B

This key can be used to identify seven arachnids. Identify the **two** arachnids shown in the diagram.

- 1 has a tail Go to 2
- does not have a tail Go to 3
- 2 tail is long Alta
- tail bends Scorna
- 3 has pincers larger than body Go to 4
- does not have pincers Go to 5
- 4 smaller than 2mm Piona
- larger than 2mm Lotta
- 5 small fat legs Go to 6
- thin legs with bends in middle Coddil
- 6 body is two egg shapes Seema
- body is one egg shape Dorril

Arachnid A is a

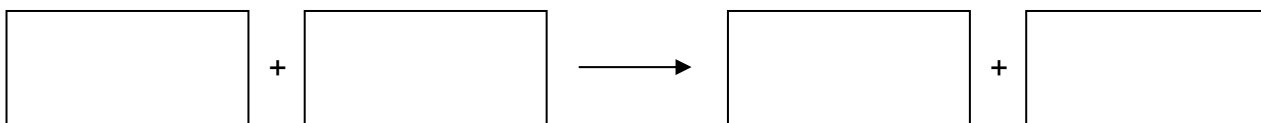
Arachnid B is a

[2]

- 9 Davinder investigates the reaction between magnesium and hydrochloric acid. Magnesium chloride and hydrogen are made.

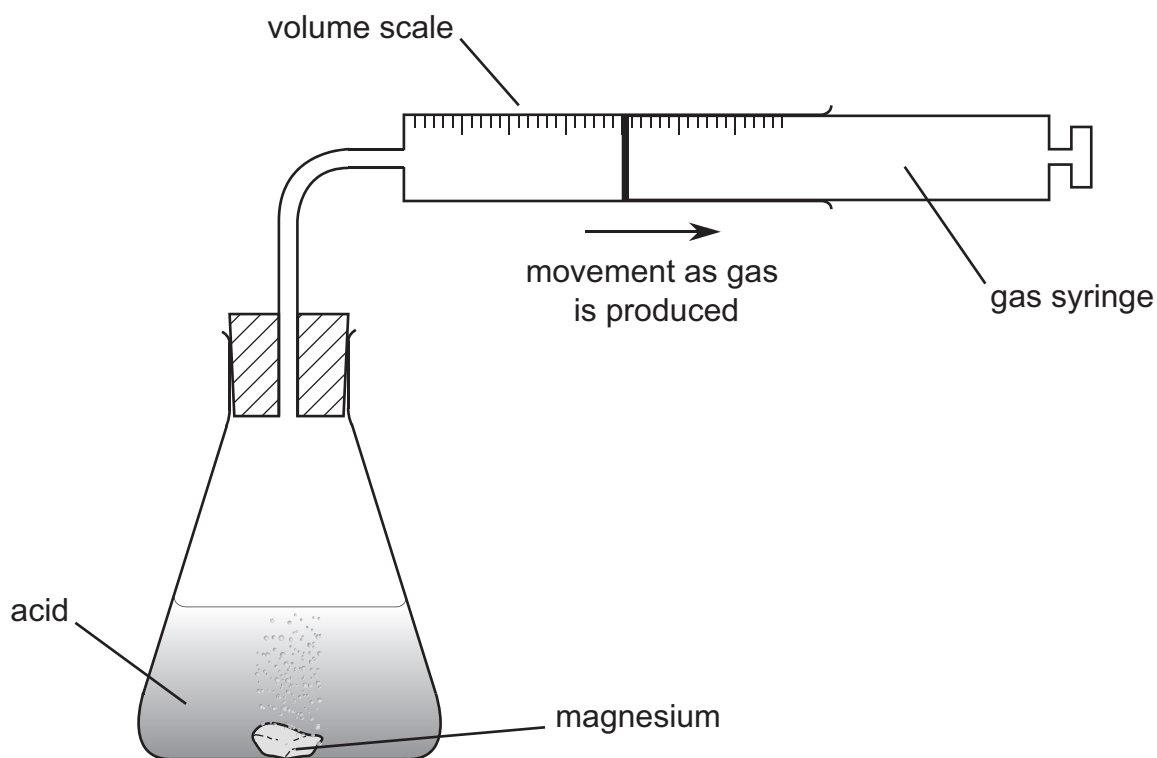
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(a) Write the word equation for this reaction.



[1]

(b) He uses this apparatus.



(i) What safety precaution does Davinder need to take?

.....

Explain your answer.

.....

.....

[2]

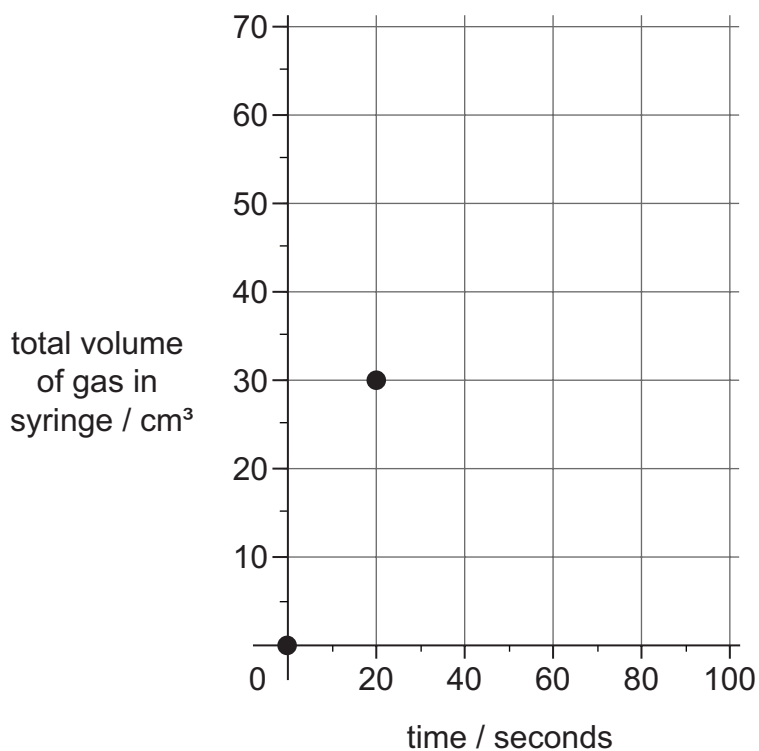
(ii) How could he make sure his results are reliable?

.....

[1]

(c) The table shows his results.

time in seconds	total volume of gas in syringe in cm^3
0	0
20	30
40	45
60	55
80	60
100	60



(i) Finish plotting the graph using the results from the table.

[1]

(ii) Draw the line of best fit to complete the graph.

[1]

(iii) Use your graph to find out what time the reaction finishes.

.....seconds [1]

(iv) Complete this sentence.

The reaction is fastest between seconds and seconds. [1]

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Use

(d) What could speed up the reaction between magnesium and hydrochloric acid?

Tick (✓) **three** boxes.

Use a less concentrated hydrochloric acid.

Add a catalyst.

Use the same mass of magnesium but as a fine powder.

Use the same mass of magnesium but as one large lump.

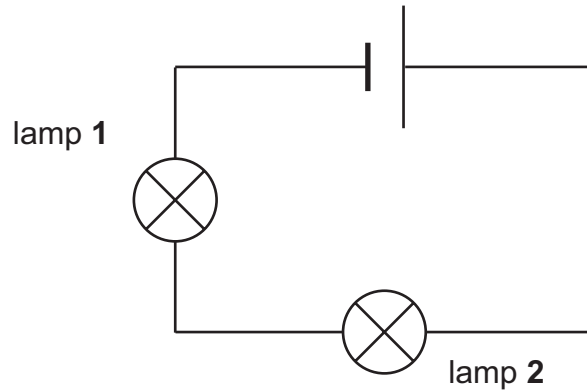
Increase the temperature of the acid.

Decrease the temperature of the acid.

[2]

10 This is a complete electrical circuit.

For
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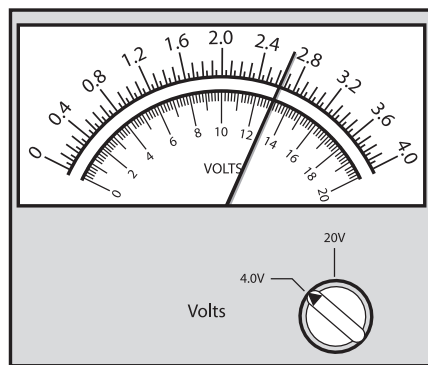
(a) Add an ammeter to the circuit diagram to show how you would measure the current flowing through lamp 2.

[1]

(b) Add a voltmeter to the circuit diagram to show how you would measure the voltage across lamp 2.

Look at the reading on the voltmeter.

It is connected to the 0–4 V scale.

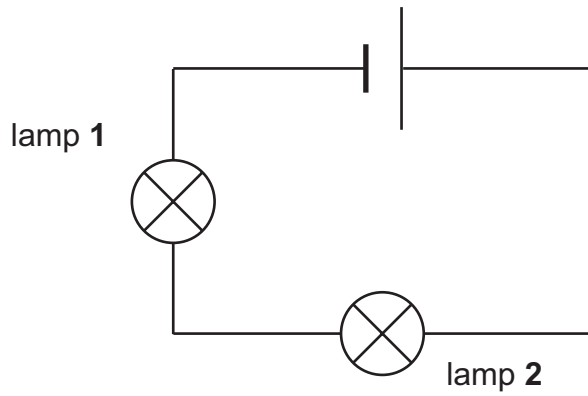


The reading on this voltmeter is V

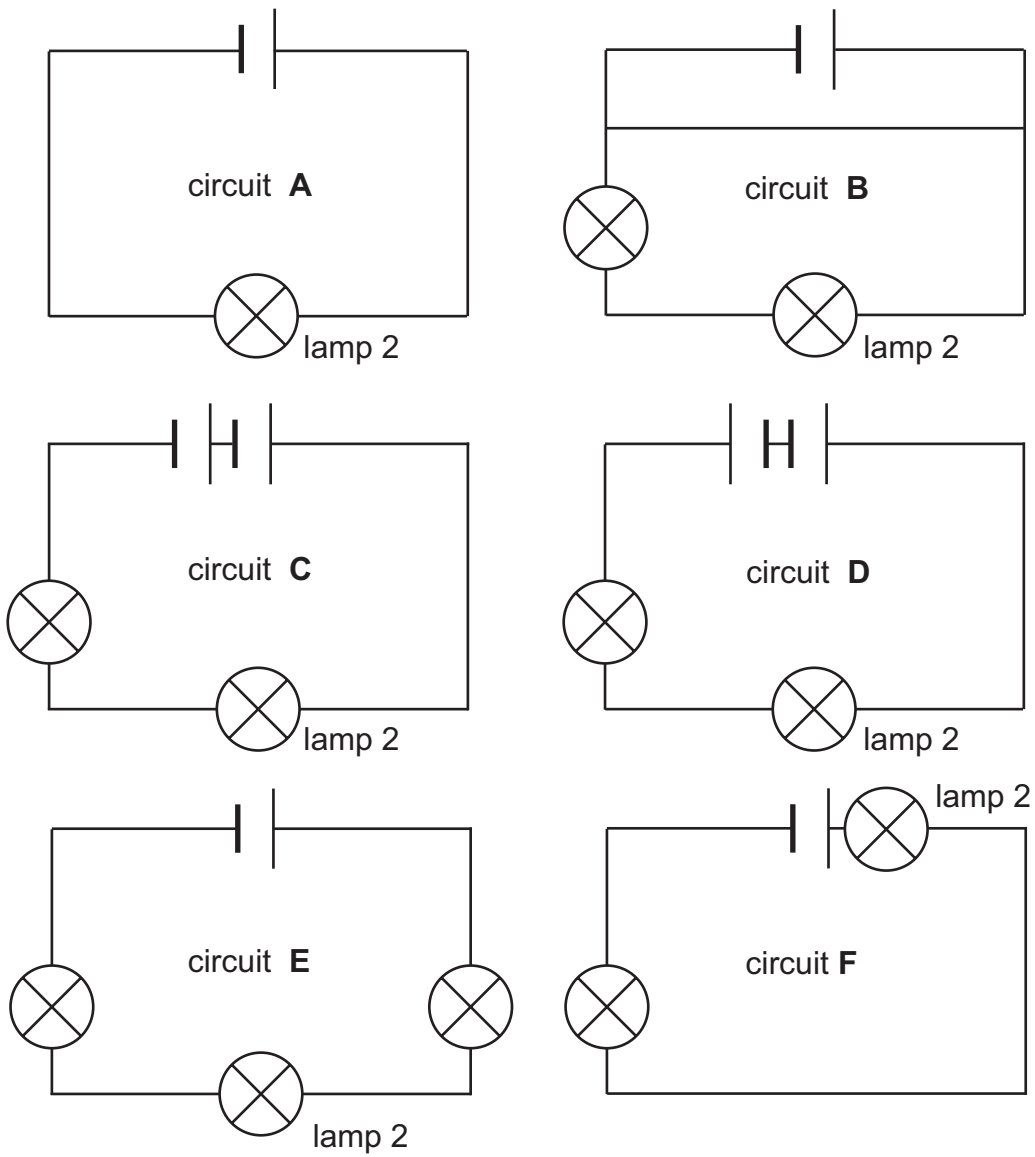
[1]

(c) Here is the original circuit.

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Which **two** circuits could increase the brightness of lamp 2?



The circuits that could increase the brightness of lamp 2 are

..... and

[2]

11 Organisms inherit characteristics from their parents.

The genetic material needed is found in cells.

Which part of the cell carries this genetic information? Circle the correct answer.

cell membrane

cell wall

cytoplasm

nucleus

[1]