Sc

KEY STAGE 2

Science

Science sampling tests

Selected questions from the 2014 sample

2014

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1 Space

(a) Adele's class is learning about space.

Write **Earth**, **Sun** or **Moon** next to each sentence to show what it is describing.

It is a light source. .....

It takes 24 hours to spin on its axis. .....

Its orbit takes 28 days. .....

a

1 mark

(b)

Adele uses a torch to represent the Sun. She points it towards a globe to show night and day.

Draw **FOUR** lines below to show what time it would be at each place on the globe.

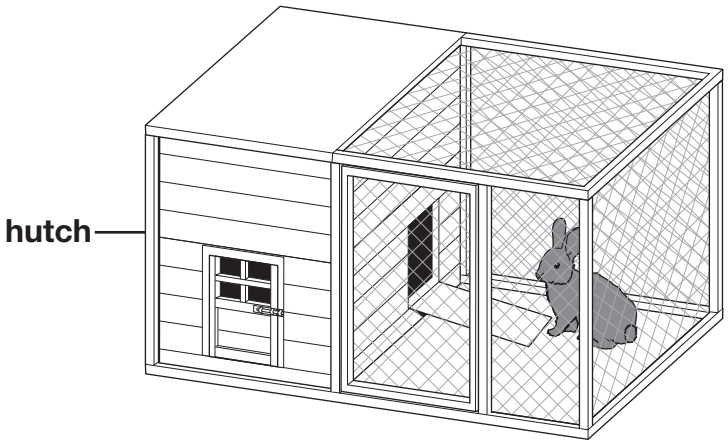
Place	Time
A	midnight
B	midday
C	6 pm
D	3 pm

b

2 marks

2 Rabbit hutch

(a) Alex is planning to make a rabbit hutch to put in her garden.



Alex can choose from the four materials in the table below.

Material	Strength	Damaged by sunlight	Good thermal insulator	Waterproof	Colour
A	high	yes	✓	✓	brown
B	low	no	✗	✓	brown
C	medium	yes	✗	✗	grey
D	high	no	✓	✓	grey

(i) Which material would be best for making the roof of the hutch? Tick **ONE** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

ai

1 mark

(ii) Give **TWO** reasons for your choice.

1. .....

2. .....

aii

1 mark

(b) Alex wants a window in the hutch so she can see her rabbit.

She lists the properties of materials Q and R.

Material	Transparent	Damaged by sunlight	Flexible	Breakable
Q	✓	yes	✓	✗
R	✓	no	✗	✓

(i) What is one **advantage** of using material Q instead of R?

.....

bi

1 mark

(ii) What is one **disadvantage** of using material Q instead of R?

.....

bii

1 mark

3 Sam's mixtures

(a) Sam wants to separate some steel paperclips from a mixture of sand and paperclips.

Tick **TWO** boxes to show the equipment that Sam could use to separate the paperclips from the sand.


sieve ☐


filter ☐


magnet ☐


candle ☐

☐ a
1 mark

(b) Sam has some different mixtures.
He wants to separate **one** material from each of the mixtures.

Tick **ONE** box in each row of the table to show which process Sam must use to separate the material from the mixture.

One has been done for you.

Sam wants to separate...	Process Sam should use			Cannot separate that material
	filtering	evaporating	sieving	
salt from a mixture of salt and water.				
stones from a mixture of stones and sand.				
sand from a mixture of sand, sugar and water.	✓			
salt from a mixture of salt, sugar and water.				

☐ b
3 marks

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4 Sports day

(a) Dan is practising for his school's sports day.

He is going to run the 100 m race.

What unit does 'm' in '100 m race' stand for?
Tick **ONE** box.

minutes	☐	millimetres	☐
metres	☐	miles	☐

☐ a
1 mark

(b) Dan has some ideas about exercise.

Write **true** or **false** under each statement about exercise.

Exercise helps to keep your heart healthy.
.....

Exercise helps to stop people getting overweight.
.....

People exercise when they walk.
.....

If people exercise they will not get ill.
.....

☐ b
2 marks

(c) Leg muscles and bones help people to run and move.
Leg bones are part of the skeleton.

Other than movement, describe **another** function of the skeleton.

.....

c
1 mark

(d) Dan wins the 100 m race at his school's sports day. He gets a medal.

The school's medals are made of **steel** or **plastic**.

They are all the same size, shape and colour.

Dan tests his medal to find out if it is steel or plastic.

Will each test show if Dan's medal is steel or plastic?
Write **yes** or **no** in each row of the table below.

Test	Will the test show if Dan's medal is steel or plastic? Yes or no?
Hold a magnet next to each medal.	
Put each medal in an electric circuit with a bulb and cell.	
Drop some water on each medal.	
Weigh each medal.	
Shine a light on each medal.	

d
2 marks

5 Dropping modelling clay

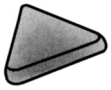
(a) Sarah makes five different shapes using modelling clay.
She uses the same amount of clay for each shape.

Thin cylinder

Dish

Flat circle

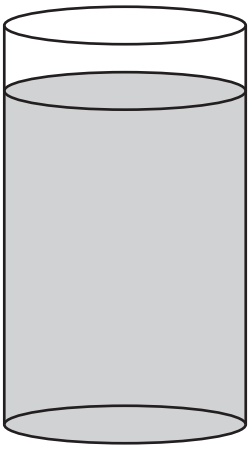
Ball



Flat triangle

Sarah fills a container with syrup.
She drops each shape into the syrup.

She times how long it takes each shape to reach the bottom of the container.



Container of syrup

Tick **ONE** box to show why clay is a good material to use to make different shapes.

Clay can float. ☐

Clay is soft and flexible. ☐

Clay dissolves in water. ☐

Clay is a heat insulator. ☐

☐ a

1 mark

(b) Here are Sarah's results:

Shape	Time to reach the bottom of the container (seconds)
thin cylinder	1.0
dish	8.0
flat circle	4.0
ball	0.5
flat triangle	4.0

Which shape fell the fastest?

..... b

1 mark

(c) Sarah found it difficult to time some of the shapes accurately.

Tick **ONE** box to show why Sarah found it difficult to time some of the falling shapes.

They are made out of the same amount of clay. ☐

They fell at different speeds. ☐

They fell quickly through the syrup. ☐

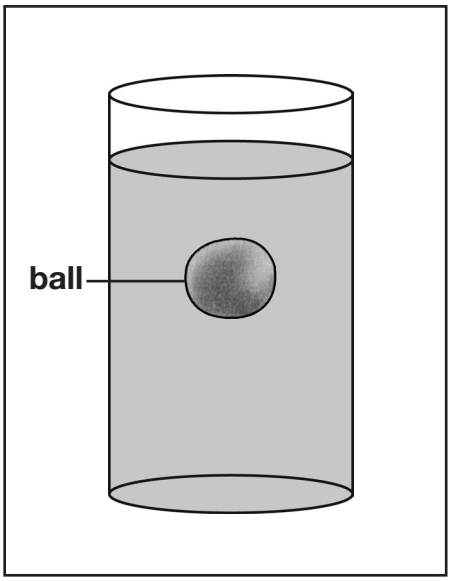
They are different shapes. ☐

c

1 mark

(d) There is a force from the syrup acting on the shapes as they fall.

Draw **ONE** arrow on the diagram to show the direction of the force **from the syrup** on the ball.



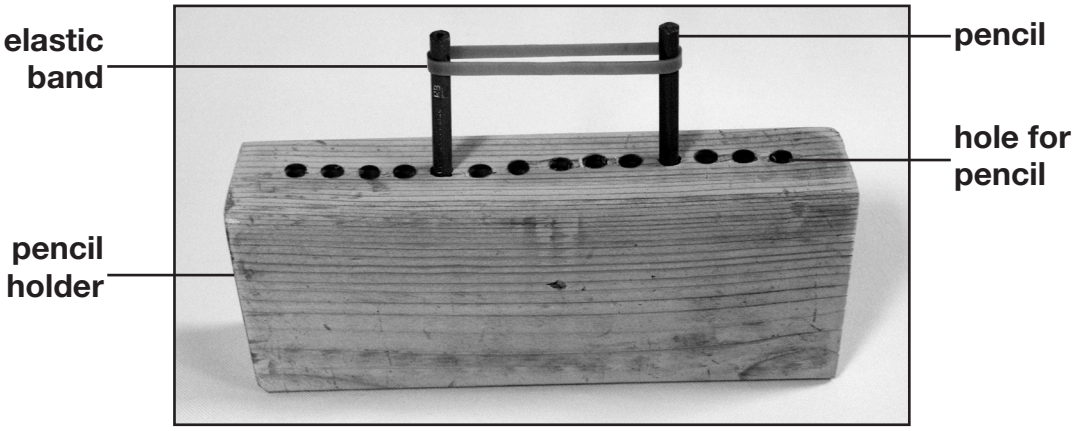
d

1 mark

6 Sound

(a) Salena has made a musical instrument.
She stretched an elastic band around pencils as shown in the picture.

Salena plucks the elastic band.
The instrument makes a sound.



What part of the instrument vibrates to make the sound?

..... a

1 mark

(b) What does the sound travel through to get from the musical instrument to Salena's ears?

..... b

1 mark

(c) Salena changes the elastic band on her instrument.

What would happen to the sound if Salena used a **thicker** elastic band on her instrument?

A **thicker** elastic band makes the sound c

1 mark

(d) Tick **ONE** box to show how Salena can make a **louder** sound on her musical instrument.

- Pluck the elastic band more gently. ☐
- Pluck the elastic band harder. ☐
- Move the pencils closer together. ☐
- Move the pencils further apart. ☐
- Move the elastic band down the pencils. ☐

☐ d

1 mark

(e) Tick **ONE** box to show how Salena can make a sound with a **higher** pitch on her musical instrument.

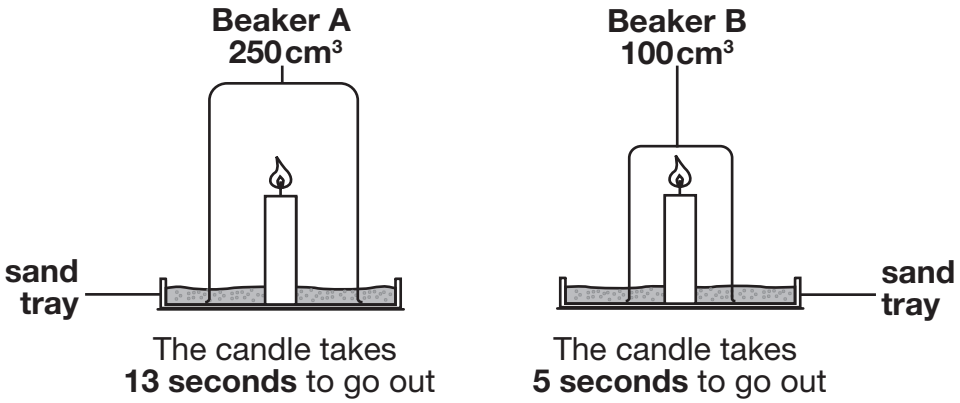
- Pluck the elastic band more gently. ☐
- Pluck the elastic band harder. ☐
- Move the pencils closer together. ☐
- Move the pencils further apart. ☐
- Move the elastic band down the pencils. ☐

☐ e

1 mark

7 Candles burning

(a) Hamza lights two identical candles and puts different sized transparent beakers over them.



Why does Hamza put the candles on sand trays?

.....

a

1 mark

(b) Why is it important to use transparent beakers for this experiment?

.....

b

1 mark

(c) Candles use a gas in the air when they burn.
When there is not enough of this gas left, the flame goes out.

Why did the candle flame in beaker B go out more quickly than the candle flame in beaker A?

.....

c

1 mark

(d) Hamza puts a **500 cm^3** beaker over another identical candle.

Predict how much time the candle flame will take to go out.

..... seconds

d

1 mark

(e) What should Hamza do to check his results?

.....

e

1 mark

(f) Candle wax melts and burns.

Tick **ONE** box in each row of the table to show if each statement describes melting or burning.

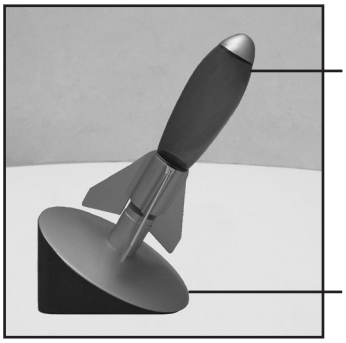
Statement	Melting	Burning
A new material is made.		
It is a reversible change.		
A solid changes to a liquid.		

f

1 mark

8 Toy rocket

(a) Layla has a toy rocket.
She adds bicarbonate of soda to vinegar inside the rocket.
The rocket is forced into the air.



(i) On the diagram below, label each material to show if it is a **solid**, **liquid** or **gas**.

....

ai
1 mark

(ii) What new type of material is formed by mixing bicarbonate of soda with vinegar?

.....

aii
1 mark

(b) Layla wants to find out if changing the amount of bicarbonate of soda affects how far the rocket travels across the playground.

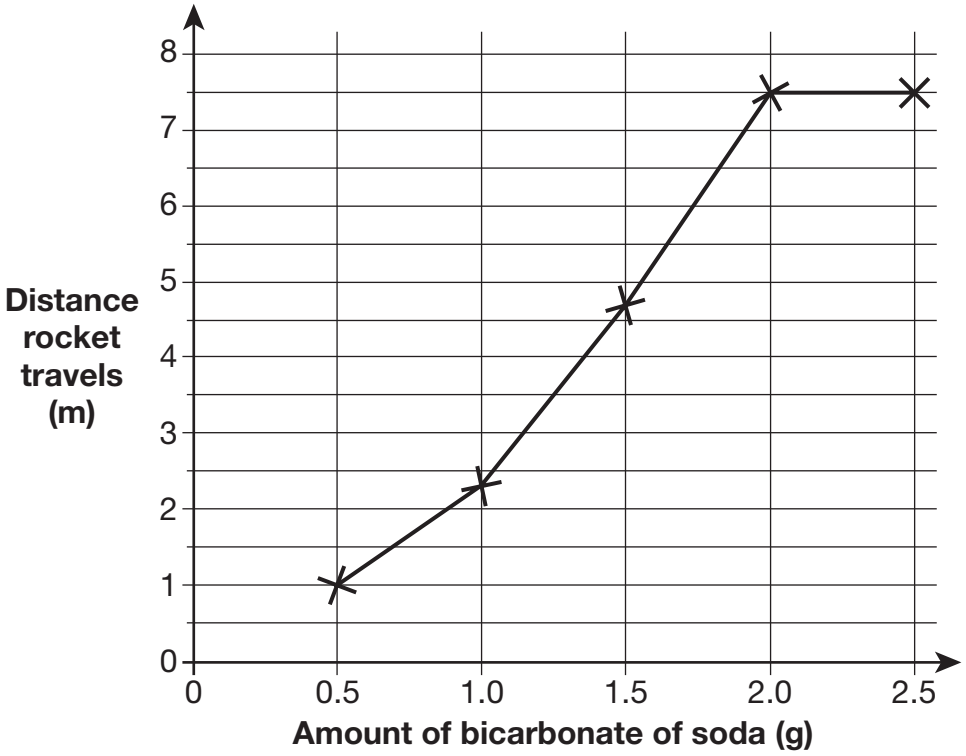
Tick **TWO** boxes to show how Layla should make her test fair each time.

Tick **TWO** boxes.

use the same amount of vinegar	☐	use the same rocket	☐
use the same amount of bicarbonate of soda	☐	make the rocket travel the same distance	☐

b
1 mark

(c) Layla records the results on a line graph.



Estimate how much bicarbonate of soda would make the rocket travel 3.5 m.

..... g

c

1 mark

(d) Layla says, 'The more bicarbonate of soda I use, the further the rocket travels.'

The evidence in the graph shows that Layla's statement is false.

Use the evidence in the graph to explain how you know Layla's statement is false.

.....

.....

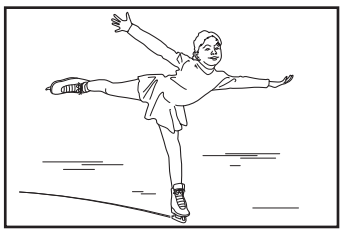
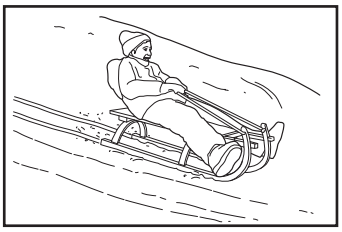
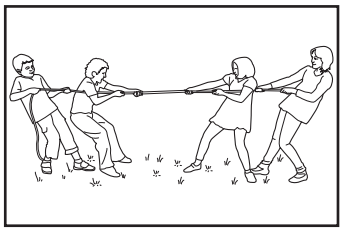
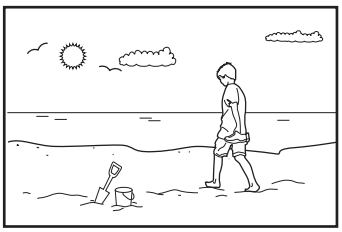
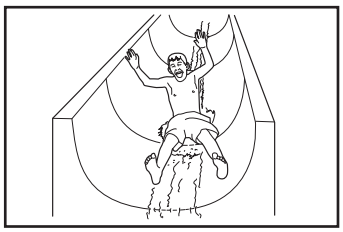
d

1 mark

9 Friction

(a) Friction is the force which causes moving objects to slow down and stop.

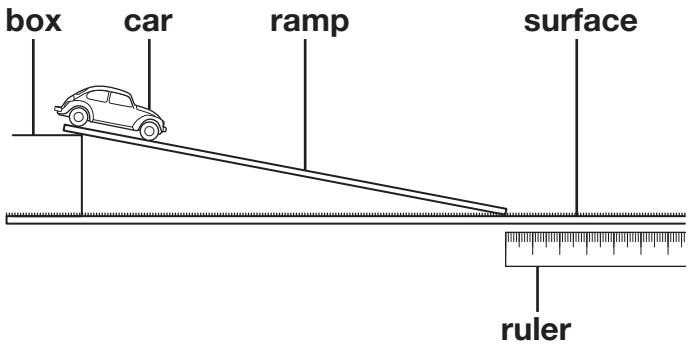
Tick **THREE** boxes to show which activities are only possible because there is a **small** amount of friction.

a

2 marks

(b) Sue rolls a car down a ramp. She investigates how far the car travels along different surfaces before friction causes the car to stop.



Name **ONE** variable Sue must keep the same to make her test fair.

.....

b

1 mark

(c) Sue draws a table of the results.

Surface	Distance travelled by car (cm)		
	first try	second try	third try
tiles	105	72	107
carpet	50	46	45
paving stones	68	66	67
wooden floor	124	129	131

Sue looks at the table.
She thinks she should test one of the surfaces again.

(i) Which of these surfaces should Sue test again?

.....

ci
1 mark

(ii) Describe how the evidence in the table shows that Sue should test this surface again.

.....

.....

cii
1 mark

(d) Look at the table of results.

Tick **ONE** box to show which surface caused the most friction.

tiles ☐ carpet ☐

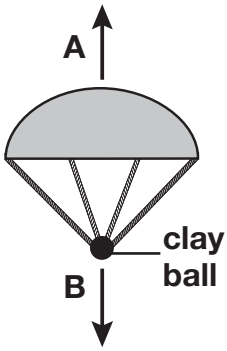
paving stones ☐ wooden floor ☐

d
1 mark

10 Parachutes

(a) Jamie has a parachute. The two arrows on the diagram below show two forces (**A** and **B**) acting on the falling parachute.

Label forces **A** and **B** on the diagram below.



(i) Force **A** is .....

(ii) Force **B** is .....

ai
1 mark

aii
1 mark

(b) Tick **ONE** box to show the effect force **A** has on the parachute.

It makes the parachute fall faster.	☐	It makes the parachute heavier.	☐
It makes the parachute fall slower.	☐	It makes the parachute lighter.	☐

b
1 mark

(c) Jamie wants to find out if changing the material of the parachute affects the time it takes to fall to the ground.
The table shows some of the variables in Jamie's investigation.

Complete the table to show how Jamie should do his investigation. Tick **ONE** box in each row.

Variable	Variable to be changed	Variable to be measured	Variable to be kept the same
height of drop			
mass of modelling clay			
size of parachute			
material of parachute			
time taken to fall to the ground			

c
2 marks

(d) Jamie decides to test each of his parachutes three times.
He records his results in the table below.

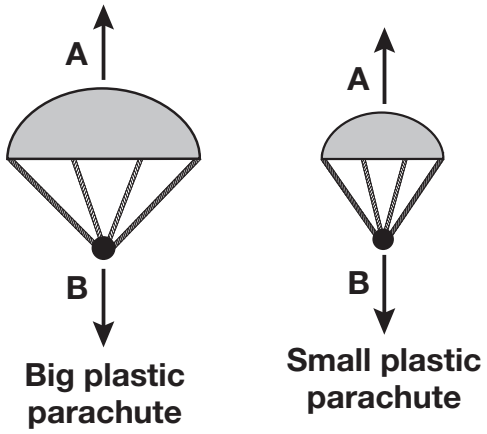
One of the times in his results table looks wrong.

Circle **ONE** time in the results table that Jamie should check.

Parachute material	Time taken to reach the ground (seconds)		
	test 1	test 2	test 3
plastic	2.4	2.4	2.5
bubble wrap	2.1	2.0	2.0
netting	2.9	1.0	1.0

d
1 mark

(e) Jamie makes a **smaller** parachute made of **plastic**.



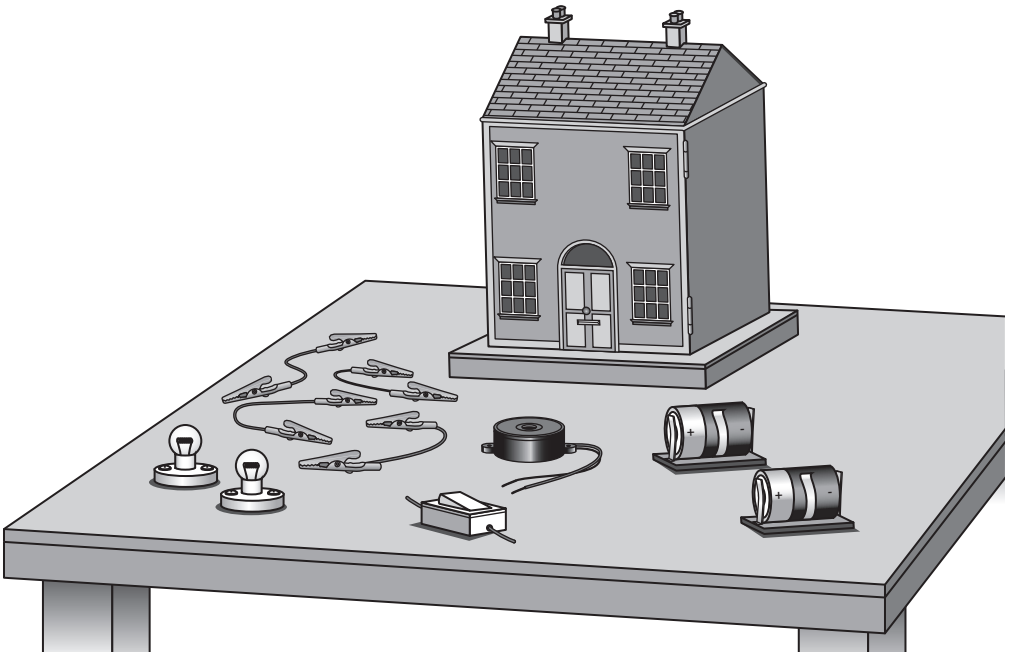
Predict the time it will take the **smaller plastic** parachute to fall to the ground.

..... seconds

e
1 mark

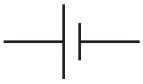
11 Model house

(a) A group of children are making a circuit for a door bell and lights in a model house.



The circuit symbols for the parts used in the circuit are shown below.

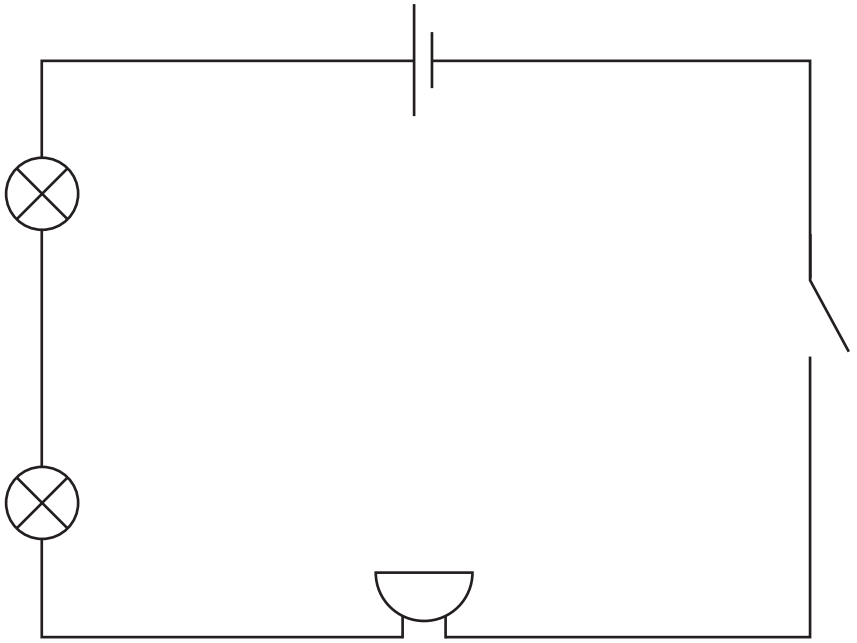
Write the name of each part next to its circuit symbol.
One is done for you.

Circuit symbol	Name of part
	.....
	buzzer .....
	.....
	.....

a

2 marks

(b) The children make this circuit.



(i) What must the children do to their circuit to turn the light bulbs and the buzzer on?

..... bi

1 mark

(ii) The buzzer only makes a quiet sound.

How could the children change the circuit to make the buzzer louder? Give **TWO** ways.

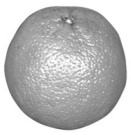
1. .....

2. ..... bii

2 marks

12 Sun, Earth and Moon

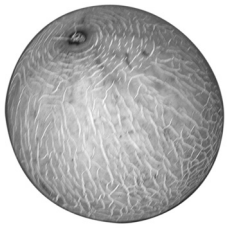
(a) Yu Lin is using fruit to model the Sun, Earth and Moon.



Orange

Strawberry

Cherry



Melon

Pear

Lemon

Complete the table to show the best fruit for modelling the Sun, Earth and Moon. Think about the size and shape.

Object in space	Sun	Earth	Moon
Which fruit should be used for the model?			

a

1 mark

(b) Yu Lin is in the playground on a sunny day.

(i) Tick **ONE** box to show when Yu Lin's shadow will be shortest.

- before school: 8.30 – 9.00 am ☐
- morning break: 10.30 – 10.45 am ☐
- lunch break: 12.00 – 1.00 pm ☐
- afternoon break: 2.30 – 2.45 pm ☐
- after school: 3.30 – 3.45 pm ☐

bi
1 mark

(ii) Tick **ONE** box to show which movement in space causes Yu Lin's shadow to change length during the day.

- the spin of the Earth ☐
- the Earth orbiting the Sun ☐
- the spin of the Sun ☐
- the Moon orbiting the Earth ☐

bii
1 mark

(c) Complete the table below about the different movements in space.

Movement in space	Time movement takes
Earth orbits the Sun	365 days
Earth spins once on its axis	.....
.....	28 days

ci
1 mark

cii
1 mark

13 Country walk

(a) Maryam goes for a walk.

Maryam takes photos of some of the things she sees.

Bird

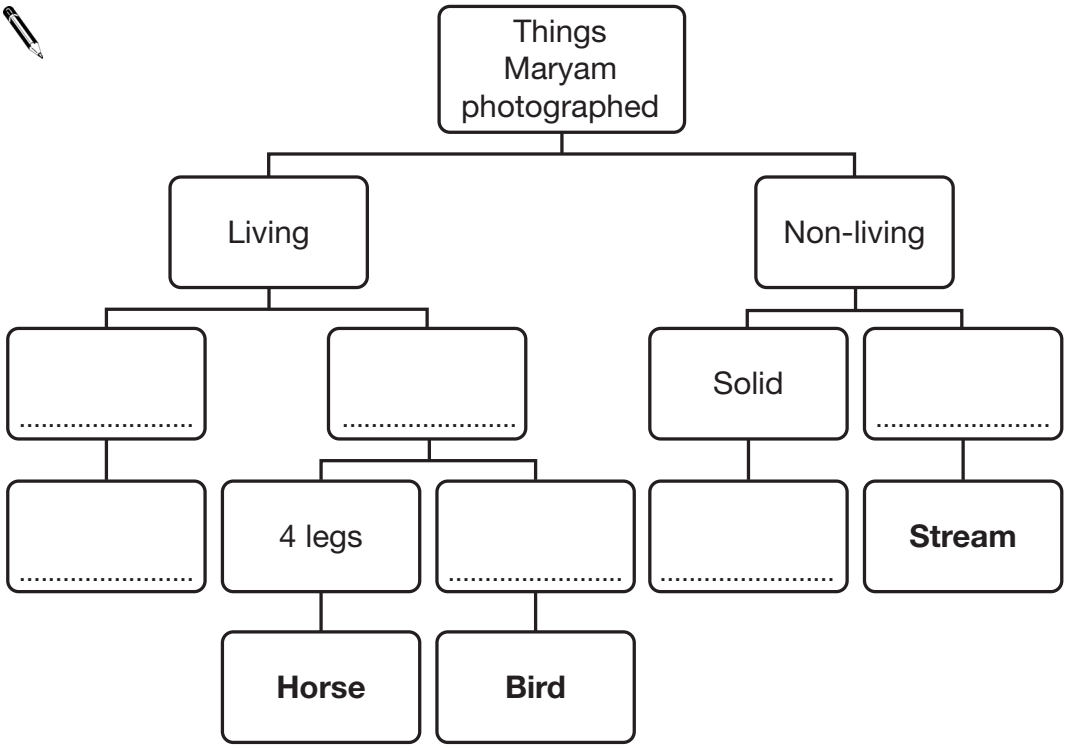
Tree

Horse

Stream

Rock

Complete the key to show how Maryam can sort each of the things she has photographed. Fill in all the boxes.



a

2 marks

(b) Write **yes** or **no** for each reason below to show why we use keys.

Reason	**Yes** or **no**?
to sort things into groups	
to show feeding relationships	
to help identify things	

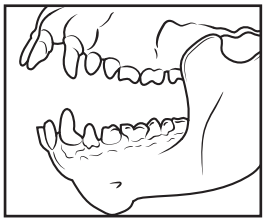
b

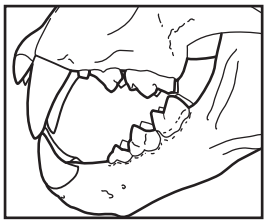
1 mark

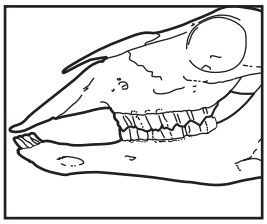
(c) Maryam saw an animal skull on her walk.

She knows that the teeth of an animal can be used to find out what the animal eats.

Draw **THREE** lines to match each animal skull to what the animal eats.







mainly plants

meat and plants

mainly meat

c

1 mark

(d) Write the name of this type of tooth on the line below.

.....

d

1 mark

14 Pulse rate

(a) Class 6 are learning about the human body.

Complete the sentences below using the words in the box.

skull	vessels	lungs	heart	ribs	brain

The ..... pumps blood around the body.

The ..... carry blood around the body.

The ..... protect the heart.

a

1 mark

(b) Your pulse rate tells you how fast your heart is beating.

Tick **ONE** box to show what equipment you could use to work out your pulse rate.

ruler ☐ forcemeter ☐

stopwatch ☐ thermometer ☐

b

1 mark

(c) Class 6 have some ideas about pulse rate.

Write **true** or **false** next to each statement about pulse rate.

	True or **false**?
Different types of exercise can affect pulse rate by different amounts.	.....
Different people can have different resting pulse rates.	.....
A high pulse rate means the heart is beating fast.	.....

c

1 mark

(d) Class 6 investigate the effect of exercise on pulse rate.

They measure Emily's pulse rate three times:

1. at rest.
2. straight after running for 10 minutes.
3. after resting for 20 minutes.

Look at the table of results below.

Some of Emily's pulse rates are missing.

Complete the table of results by predicting Emily's pulse rates straight after running and after resting for 20 minutes.

	At rest before running	After running for 10 minutes	After resting for 20 minutes
Pulse rate (heart beats per minute)	90	.....	.....

d

1 mark

(e) Class 6 think of some questions about the heart and exercise.

Tick **THREE** boxes to show which questions the class could investigate by doing a fair test.

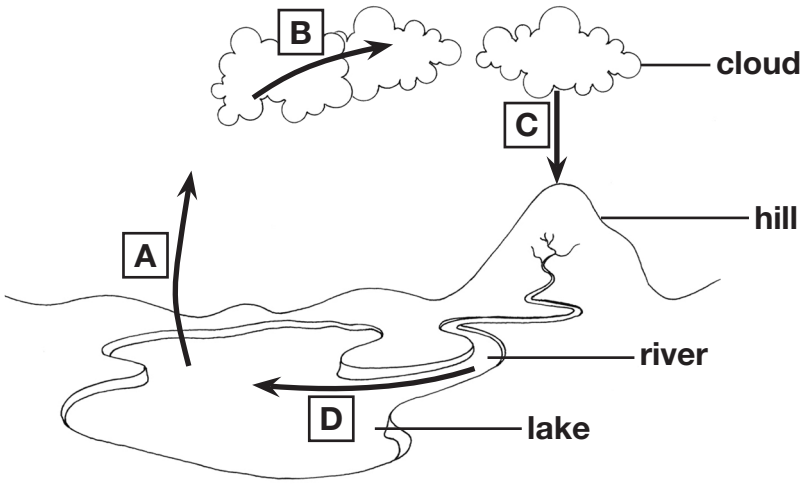
- Where is the heart found in the body? ☐
- How does age affect a person's heart rate? ☐
- How does the heart work? ☐
- What does the heart look like? ☐
- Do tall people have faster pulse rates than short people? ☐
- Do people who exercise regularly eat more food than people who do not exercise? ☐

e

2 marks

15 Clouds

(a) Look at the diagram of the water cycle.



(i) Name what happens at arrow **C** when water droplets leave the cloud.

..... ai

1 mark

(ii) What force makes the water droplets leave the cloud?

..... aii

1 mark

(b) Clouds are made up of tiny water droplets.

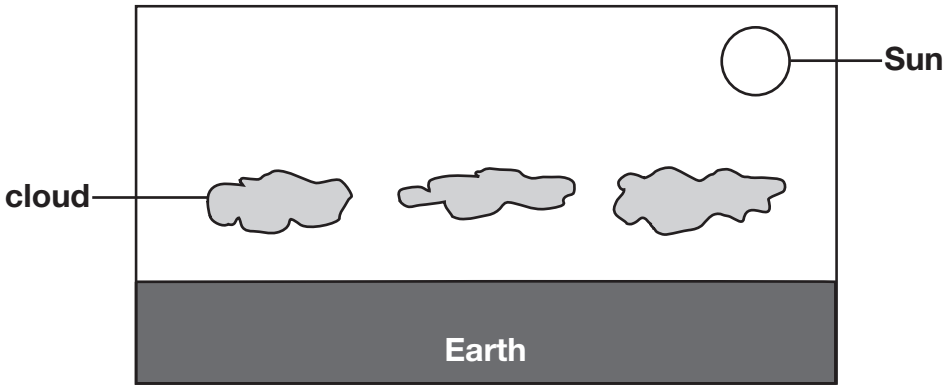
Name the scientific process that happens at arrow **B** and turns water vapour into clouds of water droplets.

..... b

1 mark

(c) Clouds help to keep the Earth cool because they reflect some of the heat and light from the Sun.

Draw **TWO** arrows on the diagram below to show the direction light travels when it is **reflected** by a cloud to keep the Earth cool.



c
1 mark

(d) Clouds reflecting heat and light from the Sun may slow down global warming.

Tick **TWO** boxes to show **two** ways people can help to slow down global warming.

Turn off electric lights when they are not needed.	☐	Use public transport instead of cars.	☐
Make electricity by burning coal.	☐	Cut down forests.	☐

d
1 mark

(e) Some of the Sun's light travels through the clouds to the Earth.

Tick **ONE** box to show the word used to describe materials that let only **some** light travel through them.

transparent	☐	opaque	☐
translucent	☐	permeable	☐

e
1 mark

16 Growing seeds

(a) Marie investigates what conditions are needed for pea seeds to grow into plants.

Write **1**, **2**, **3** and **4** next to each stage below to show the correct order in which Marie will see the parts of the plants grow.

a root grows ☐ a flower grows ☐

a stem grows ☐ leaves grow ☐

☐ a

1 mark

(b) Marie puts pea seeds on cotton wool in four dishes: A, B, C and D.

Marie records her results in the table below.

Dish	Location	Light	Watered	Results Day 2
A	warm cupboard	✗	✓	germinated
B	warm windowsill	✓	✗	no change
C	cold fridge	✗	✓	no change
D	warm windowsill	✓	✓	germinated

Look at Marie's results.

What did the pea seeds need to germinate?
Tick as many boxes as you need.

soil ☐ water ☐ light ☐ warmth ☐

☐ b

1 mark

(c) Marie wants to find out if seeds need air to germinate.

She does a new investigation.

Tick **TWO** boxes to show why she should do a new investigation.

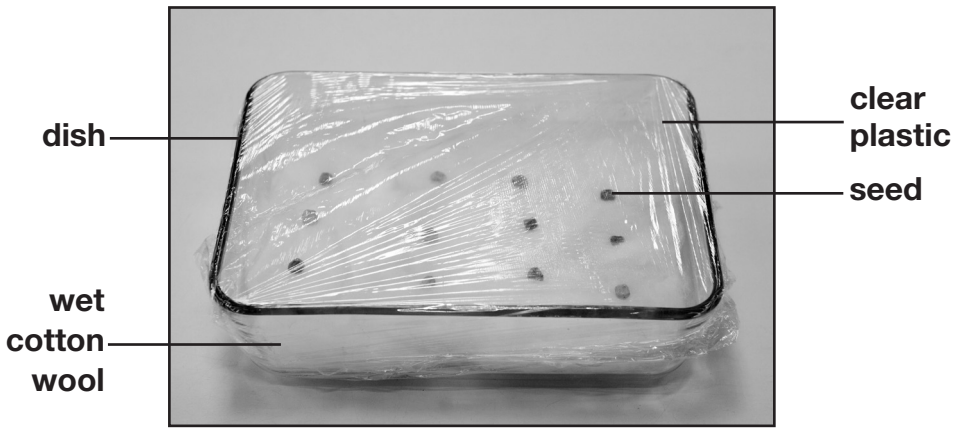
to collect new evidence	☐	to reach a conclusion	☐
to check her results	☐	to predict the result	☐

c

1 mark

(d) Marie puts some seeds in a dish on the windowsill.

She covers the dish with clear plastic so that no air can get into it.



This investigation cannot show if seeds need air to germinate.
Explain why.

.....

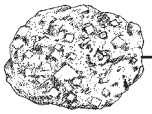
.....

d

1 mark

17 Rock salt

(a) Rock salt comes from the ground.
When water in underground streams runs over the rock salt, the water becomes salty.

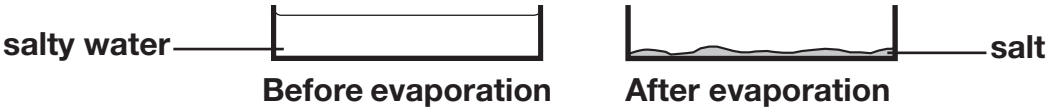


Name the scientific process that happens to salt when it is mixed with water.

.....

a
1 mark

(b) Many years ago people collected salty water from underground streams.
They separated the salt they needed by letting the water evaporate.



What can you do to show that this separation of salt from water is reversible?

.....

.....

b
1 mark

(c) The people improved the way they separated the salt by heating the salty water.

How does heating salty water affect the evaporation of the water?

.....

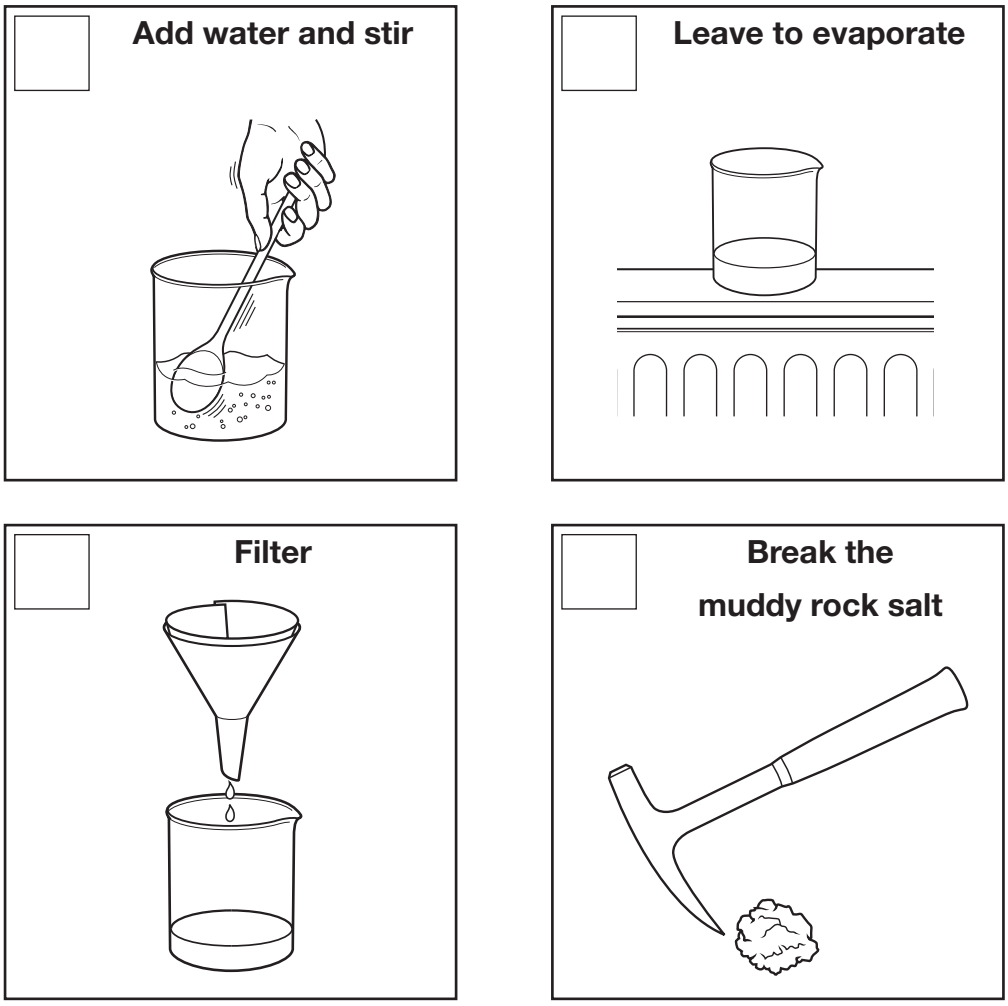
.....

c
1 mark

(d) Oliver has a piece of muddy rock salt.

The pictures below show the four things Oliver must do to separate salt from the muddy rock.

Put the pictures in the correct order for separating the salt by writing 1, 2, 3 or 4 in each box.



d

1 mark

(e) Bits of rock may fly into the air when Oliver breaks the rock salt with a hammer.

What should Oliver do to stay safe from bits of flying rock when he breaks the rock salt?

.....

e

1 mark

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