

Sc

KEY STAGE

3

TIER

3–6

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.
- If you are asked to plan an investigation, there will be space for you to write down your thoughts and ideas.
- Do not use any rough paper.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

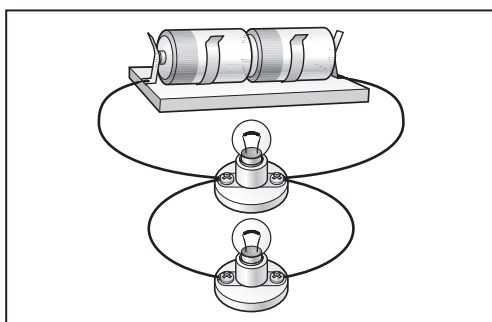
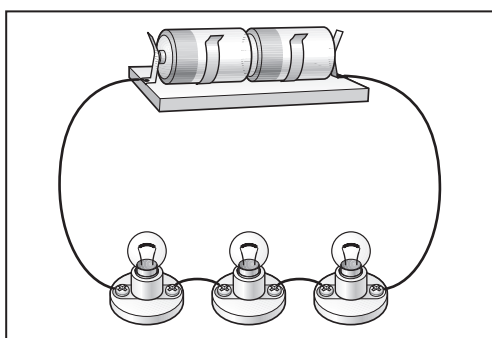
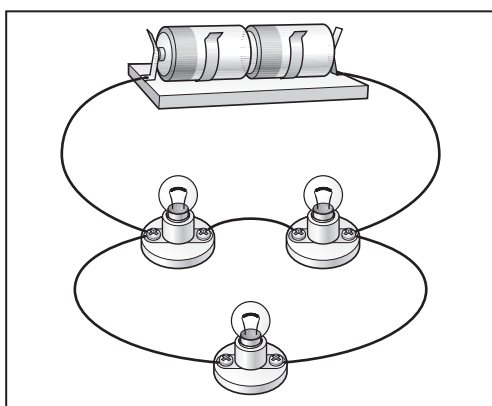
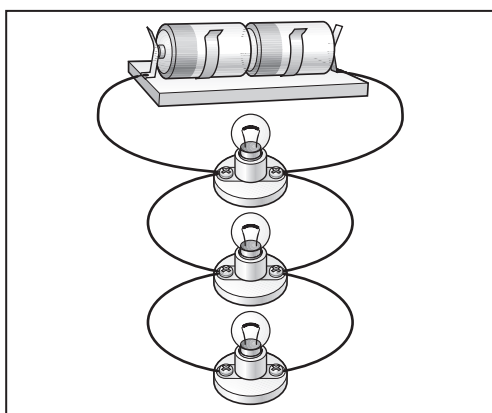
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TOTAL MARKS

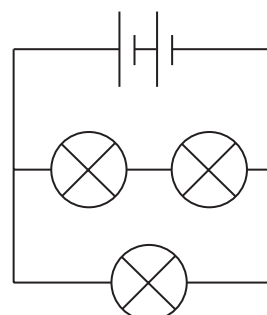
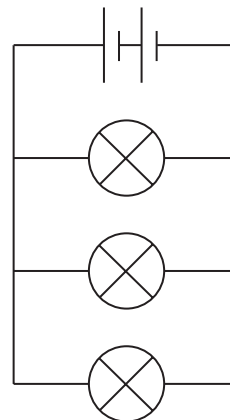
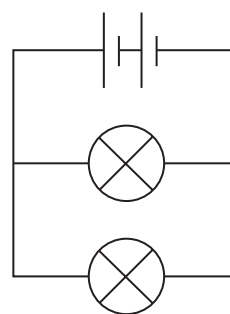
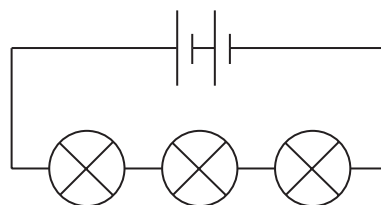
8
0
0
2

1. (a) Draw a line from each electrical circuit to the correct circuit diagram.
Draw only **four** lines.

electrical circuit



circuit diagram



1a

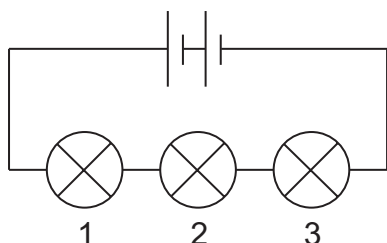
1 mark

1a

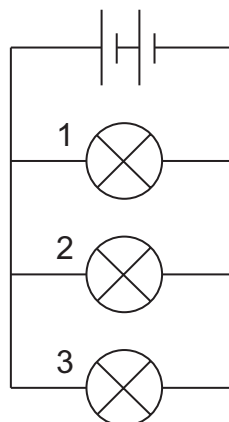
1 mark

- (b) In each circuit below, **bulb 1 breaks** and goes off.

Under each circuit diagram below, tick the correct boxes to show if bulb 2 and bulb 3 are **on** or **off**.



circuit A



circuit B

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

	on	off
bulb 1 breaks		✓
bulb 2		
bulb 3		

☐ 1b
1 mark

☐ 1b
1 mark

☐ 1c
1 mark

- (c) Give the name of the part that provides energy for each circuit.

- (d) Why is copper used for wires in a circuit?
Tick the correct box.

Copper does **not** stick to a magnet.

☐

Copper is a good conductor of electricity.

☐

Copper is a brown metal.

☐

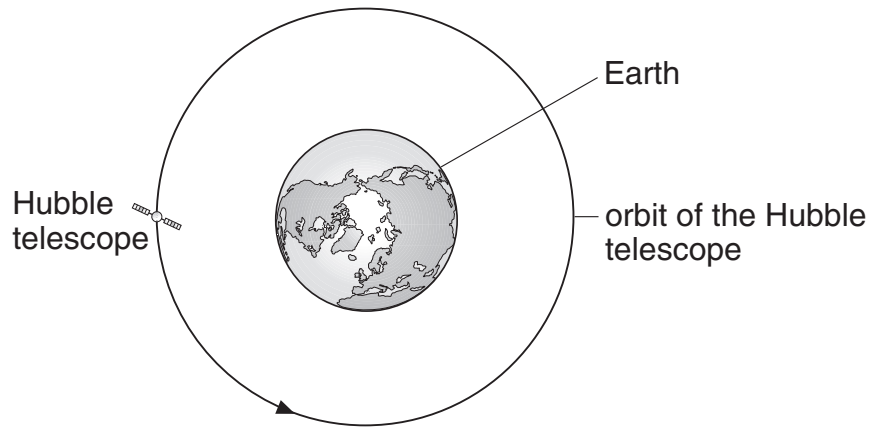
Copper is a good conductor of heat.

☐

☐ 1d
1 mark

maximum 6 marks

2. The diagram below shows the Hubble telescope in orbit around the Earth.



not to scale

- (a) Which force keeps the telescope in orbit around the Earth?
Tick the correct box.

air resistance

☐

friction

☐

gravity

☐

magnetism

☐

- (b) The Hubble telescope is a satellite used for looking at planets and stars.

Give **one** other use of satellites.

- (c) Fill each of the gaps in the following sentences with a different word from the box below.

absorbs

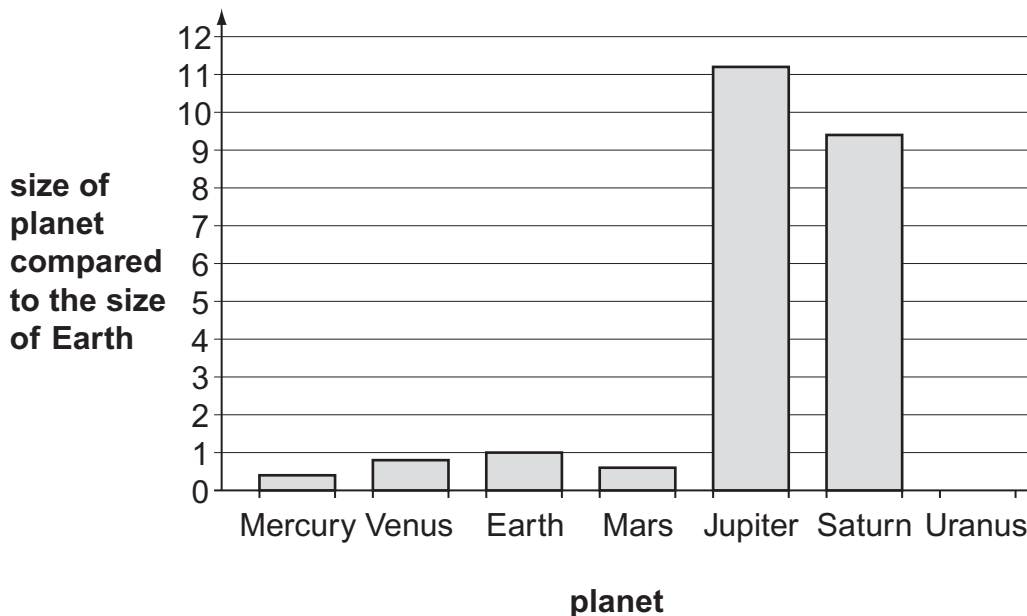
produces

reflects

You can see the Sun because it _____ light.

You can see a satellite because it _____ light.

- (d) The bar chart shows the size of five planets compared to the size of Earth.



The planet Uranus is four times the size of Earth.
On the chart above, draw a bar for the planet Uranus.

☐ 2d
 1 mark

- (e) (i) Arrange the following in order of size, starting with the smallest.

Sun	Hubble telescope	Earth
-----	------------------	-------

_____ smallest _____ largest _____

☐ 2ei
 1 mark

- (ii) Some stars are bigger than the Sun but they look smaller.
 Why do they look smaller than the Sun?
 Tick the correct box.

They are brighter than the Sun. ☐

They are the same colour as the Sun. ☐

They are further away than the Sun. ☐

They are nearer than the Sun. ☐

☐ 2eii
 1 mark

maximum 6 marks

3. Raj put a piece of chalk in one container and a piece of granite in another container. He shook both containers for two minutes. The photographs below show what happened.

chalk
before shaking



chalk
after shaking

granite
before shaking



granite
after shaking

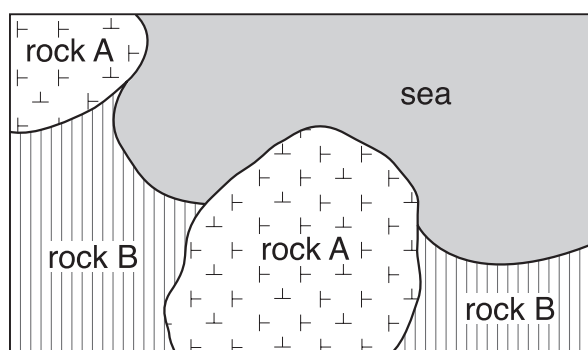
- (a) (i) Give **two** ways the **chalk** had changed.

1. _____

2. _____

- (ii) Suggest why the **granite** did **not** change.

- (b) A map of a coastline is drawn below. Waves crash against the rocks.



Which rock is chalk and which rock is granite?
Give the letters from the map.

chalk _____ granite _____

- (c) The photograph below shows the remains of an animal found in chalk rock.



- (i) What are the remains of living things found in rock called?

- (ii) Look carefully at the animal remains in the photograph.
Which animal could it be related to?
Tick the correct box.

snail

☐

starfish

☐

ladybird

☐

slug

☐

Give a reason for your answer.

- (d) Granite is formed underground from very hot melted rock.

- (i) Animal remains are **not** found in granite.
Give the reason for this.

- (ii) What is hot melted rock called when it is **underground**?
Tick the correct box.

sand

☐

magma

☐

lava

☐

mud

☐

maximum 8 marks

4. (a) Draw a line from each change of state to the correct name.
Draw only **four** lines.

change of state

name

solid to liquid

evaporating

liquid to gas

melting

gas to liquid

condensing

liquid to solid

freezing

4a

1 mark

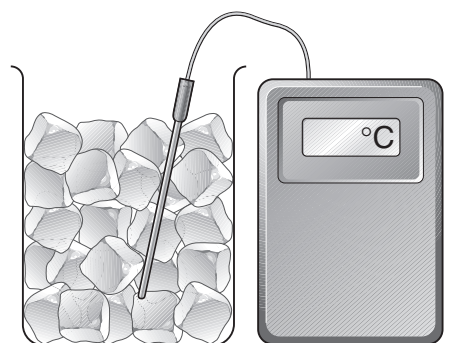
4a

1 mark

4a

1 mark

- (b) Kate made some ice cubes from pure water.
She used a sensor to measure the temperature of the ice.



What temperature will the sensor show when the ice is melting?

_____ °C

4b

1 mark

- (c) Kate made some more ice cubes from salt solutions. She used a different amount of salt in each ice cube.

The table shows the temperature at which the ice cubes melted.

mass of salt in each ice cube (g)	temperature ice cube melted (°C)
5	-4
10	-8
15	-11
20	-15

Look at the table above.

As the mass of salt increased, what happened to the temperature at which the ice cube melted?

1 mark 4c

- (d) In very cold weather a mixture of salt and sand is spread on roads.

Why are salt **and** sand used?

Tick the **two** correct boxes.

Salt makes the roads white.

☐

Sand dissolves in water.

☐

Salt makes water freeze.

☐

Sand increases friction between car tyres and the road.

☐

Salt makes ice melt.

☐

Sand makes water freeze.

☐

1 mark 4d

1 mark 4d

maximum 7 marks

5. Sharon is riding her horse. She is wearing a riding hat.



(a) Give the name of **one organ** the riding hat protects.

5a

1 mark

(b) The horse is a mammal.
Give **one** fact about horses that shows they are mammals.

5b

1 mark

(c) When the horse is running, some of its organs do more work.

Draw a line from each organ to show what it does.
Draw only **two** lines.

organ

what the organ does

heart

It takes in oxygen faster.

It moves the bones faster.

It digests food faster.

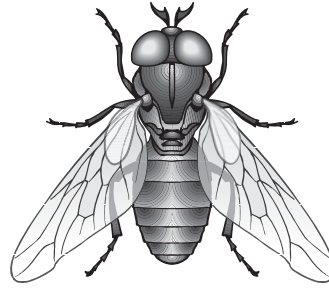
It pumps blood faster.

lung

5c

1 mark

(d) The drawing shows a horsefly.



- (i) The horsefly is an insect.
Which of the following features do insects have?
Tick the **three** correct boxes.

They have a backbone. ☐

They have a segmented body. ☐

They have six legs. ☐

They have hair. ☐

They have scales. ☐

They have two pairs of wings. ☐

☐ 5di
1 mark

☐ 5di
1 mark

- (ii) Female horseflies bite horses and feed on their blood.
Male horseflies feed on plants.

Draw a line from each horsefly below to the word that describes the way it feeds.

Draw only **two** lines.

horsefly

describing word

female horsefly

herbivore

carnivore

producer

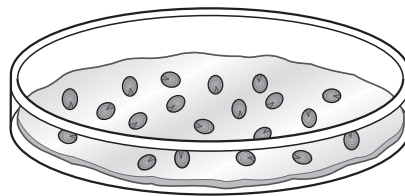
male horsefly

prey

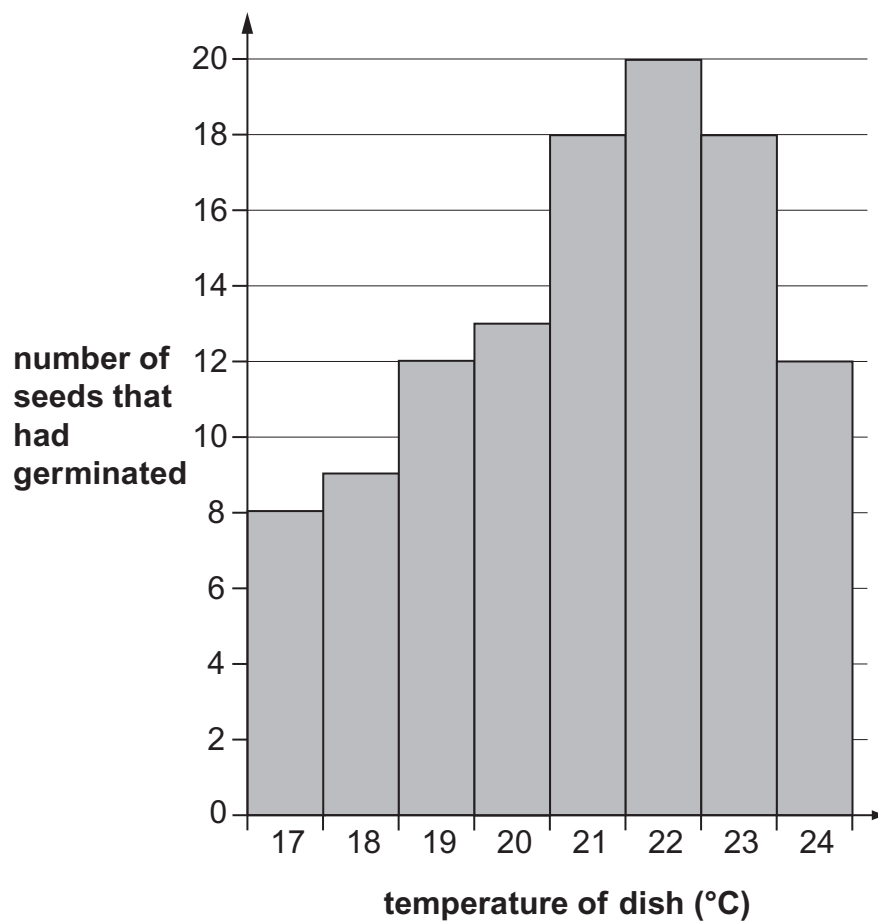
☐ 5dii
1 mark

maximum 6 marks

6. Abdul put cress seeds on wet filter paper in dishes.
He put 20 seeds in each dish.
Every day he added 5 cm³ of water to each dish.
He kept each dish at a different temperature.



The bar chart below shows how many seeds had germinated after two days.



Use the bar chart to answer the following questions.

- (a) (i) How many different temperatures did Abdul use?

6ai
1 mark

- (ii) What was the lowest temperature Abdul used?

_____ °C

6aii
1 mark

- (iii) How many seeds had germinated at 21°C?

6aiii
1 mark

- (iv) Abdul said 23°C was better than 21°C for seeds to germinate.

Was he correct?

Tick the correct box.

yes

☐

no

☐

Use the bar chart to help you give a reason for your choice.

6aiv
1 mark

- (v) How does the bar chart show that 22°C is the best temperature for seeds to germinate?

6av
1 mark

- (b) Give **one** way Abdul made sure his investigation was a fair test.

6b
1 mark

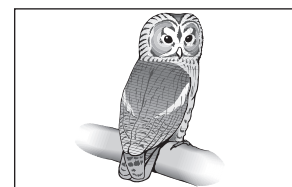
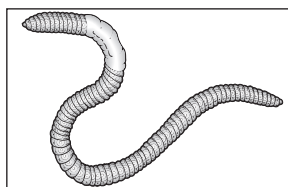
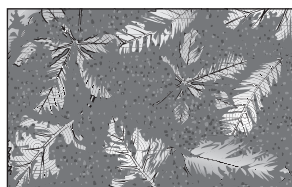
maximum 6 marks

7. The drawing below shows a mole. Moles dig tunnels through soil.



(a) Give **one** way a mole is suited for digging through soil.

(b) Moles are part of the food chain shown below.



plant remains → worm → mole → owl

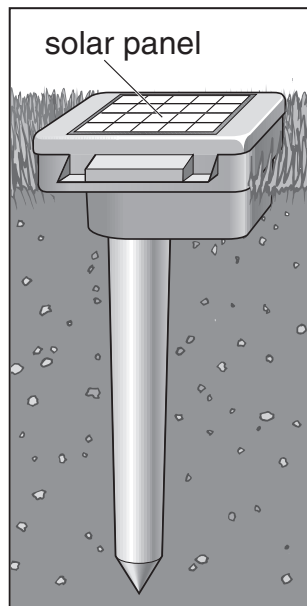
not to scale

(i) Which living thing in this food chain do moles eat?

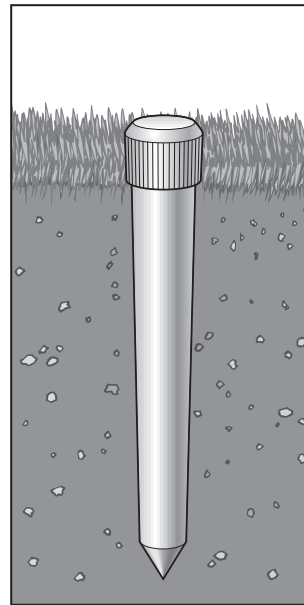
(ii) Which living thing in this food chain is a predator of moles?

- (c) Some people use mole-scarers to get rid of moles from their gardens.

Two different mole-scarers are shown below.
They both produce sounds that scare moles away.



**solar-powered
mole-scarer**



**battery-powered
mole-scarer**

- (i) Where does the energy come from for the solar-powered mole-scarer?

- (ii) Suggest **one** reason for using a solar-powered mole-scarer instead of a battery-powered mole-scarer.

- (iii) Some gardeners use poison to kill moles.

Suggest **one** reason for using a mole-scarer rather than poison to get rid of moles.



7ci

1 mark



7cii

1 mark

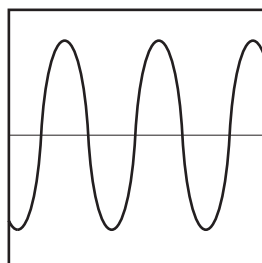


7ciii

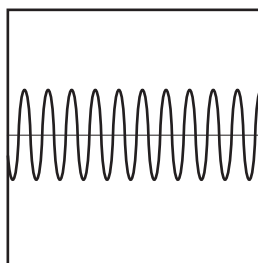
1 mark

maximum 6 marks

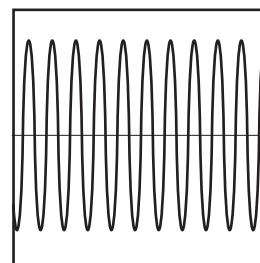
8. (a) The diagrams below show the patterns produced on an oscilloscope by three different sound waves.



A



B



C

- (i) Which **two** waves have the same loudness?
Write the letters.

_____ and _____

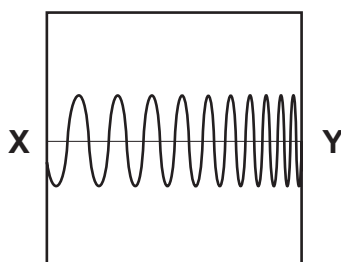
How do the diagrams show this?

- (ii) Which **two** waves have the same pitch?
Write the letters.

_____ and _____

How do the diagrams show this?

- (iii) Shuli is listening to a sound that produces the pattern below.



Describe how the sound that Shuli **hears** changes between X and Y.

1 mark

1 mark

1 mark

- (b) The table below shows the maximum time a person can listen to music at different sound levels without damage to the ear.

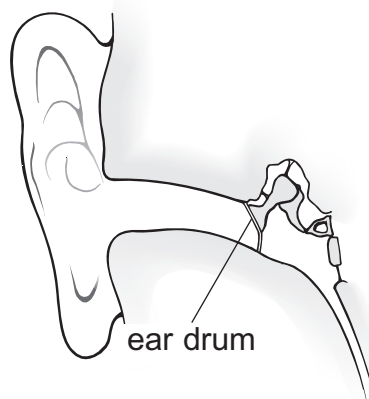
sound level (decibels)	maximum time (hours)
86	8
88	4
90	2
92	1
94	0.5

Estimate the maximum time a person could listen to a sound of 87 decibels.

_____ hours

8b
1 mark

- (c) The diagram below shows part of the human ear.

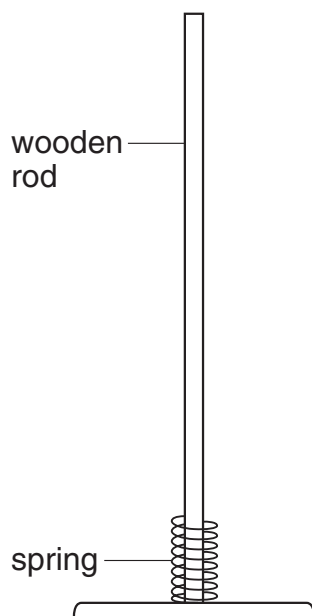


What happens to the ear drum as a sound gets louder?

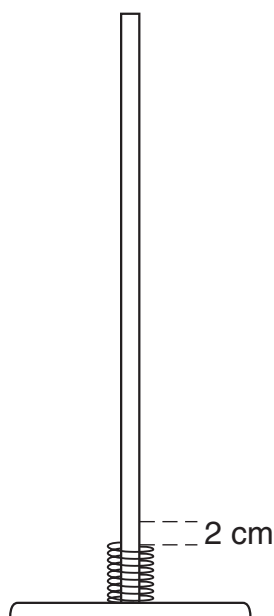
8c
1 mark

maximum 5 marks

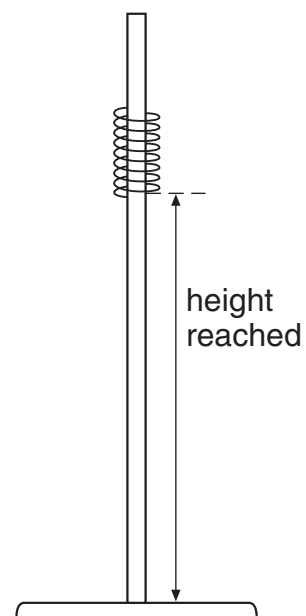
9. Jenny put a spring over a wooden rod.



She pressed the spring down 2 cm.

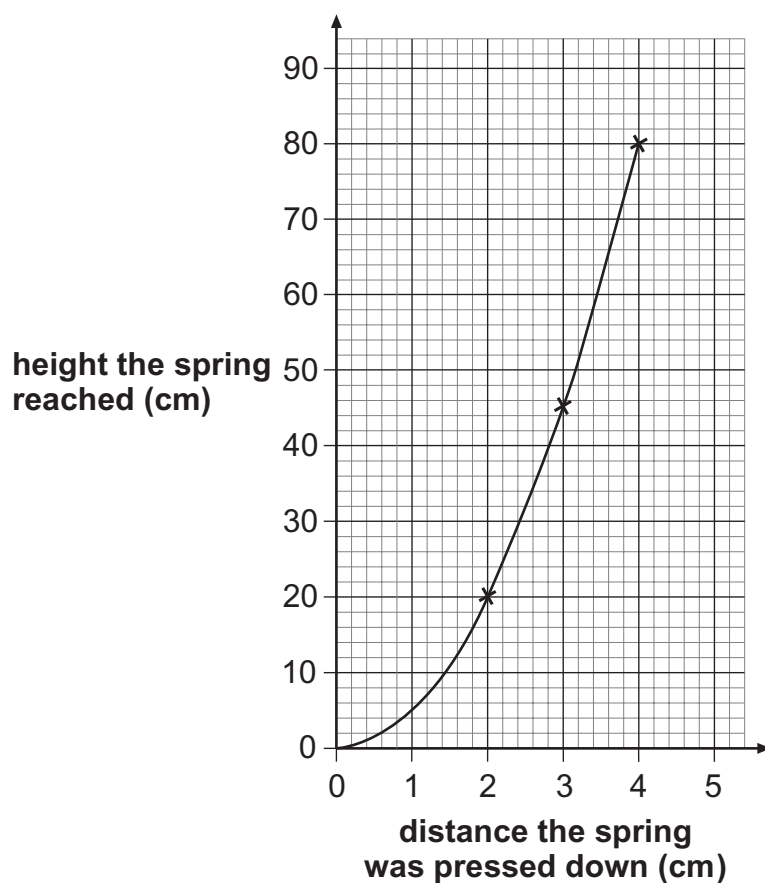


She let go of the spring and measured the height it reached.



not to scale

Jenny repeated her experiment. She pressed the spring down more each time. Her results are shown in the graph below.



- (a) Use Jenny's graph to complete the table below.

distance the spring was pressed down (cm)	height the spring reached (cm)
2	
3	
4	

- (b) Jenny said, 'If I double the distance I press the spring down, the height it reaches will also double'.

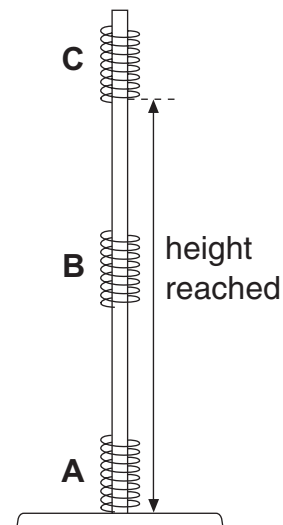
How do the results show she was wrong?

- (c) This diagram shows the moving spring in three different positions.

Complete the sentences below by choosing words from the box.

You can use each word more than once.

most	some	least
-------------	-------------	--------------



- (i) When the spring is moving at **B** it has _____ kinetic energy and _____ gravitational potential energy.
- (ii) When the spring reaches **C** it has _____ gravitational potential energy and _____ kinetic energy.
- (iii) When the spring stops at **A** it has _____ kinetic energy and _____ gravitational potential energy.

maximum 5 marks

9a
1 mark

9b
1 mark

9ci
1 mark

9cii
1 mark

9ciii
1 mark

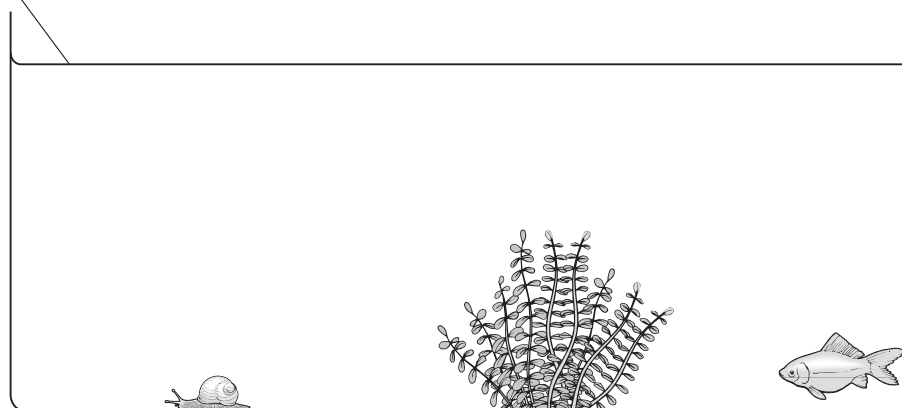
Total
5

10. (a) The diagram below shows a fish tank.

The surface of the water acts like a mirror.

The fish can see the snail reflected in the surface of the water.

surface
of water
(mirror)



10a

1 mark



10a

1 mark



10a

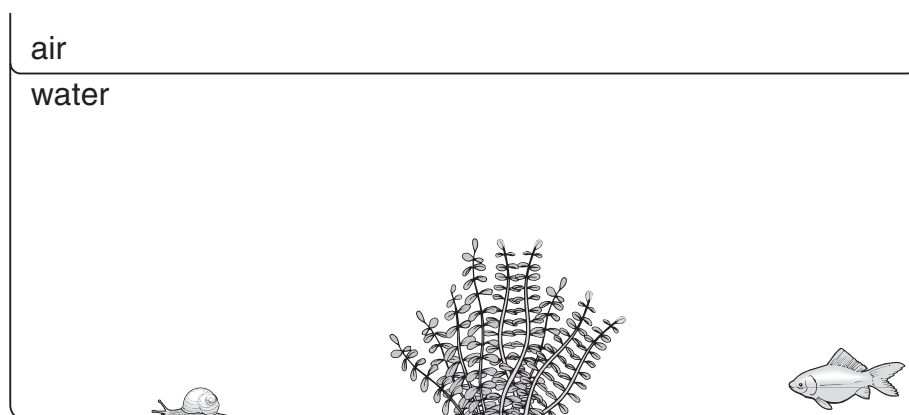
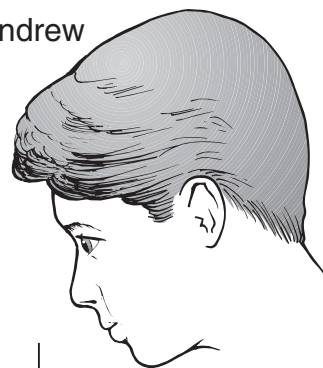
1 mark

Draw a ray of light which passes from the snail, and reflects from the surface, to show how the fish can see the snail. Use a ruler.

Put arrows on the ray of light.

(b) Andrew is looking at the snail.

Andrew



When a ray of light passes from water to air it changes direction.

- (i) Draw a ray of light from the snail to Andrew to show how Andrew can see the snail. Use a ruler.

Put arrows on the ray of light.

- (ii) What is the name given to this change in the direction of a ray of light?



10bi

1 mark



10bi

1 mark



10bii

1 mark

maximum 6 marks

11. Paul had four substances:

citric acid

copper sulphate

indigestion tablet

sugar

He dissolved 1 g of each substance in 20 cm³ of distilled water.

He used universal indicator to find the pH of each solution.

(a) (i) Sugar solution does **not** change the colour of green universal indicator.

What does this tell you about sugar solution?

Tick the correct box.

It is an acid.

☐

It is an alkali.

☐

It is neutral.

☐

It is sweet.

☐

(ii) Suggest the pH of citric acid.

(iii) Indigestion tablets neutralise acid in the stomach.

What does this tell you about indigestion tablets?

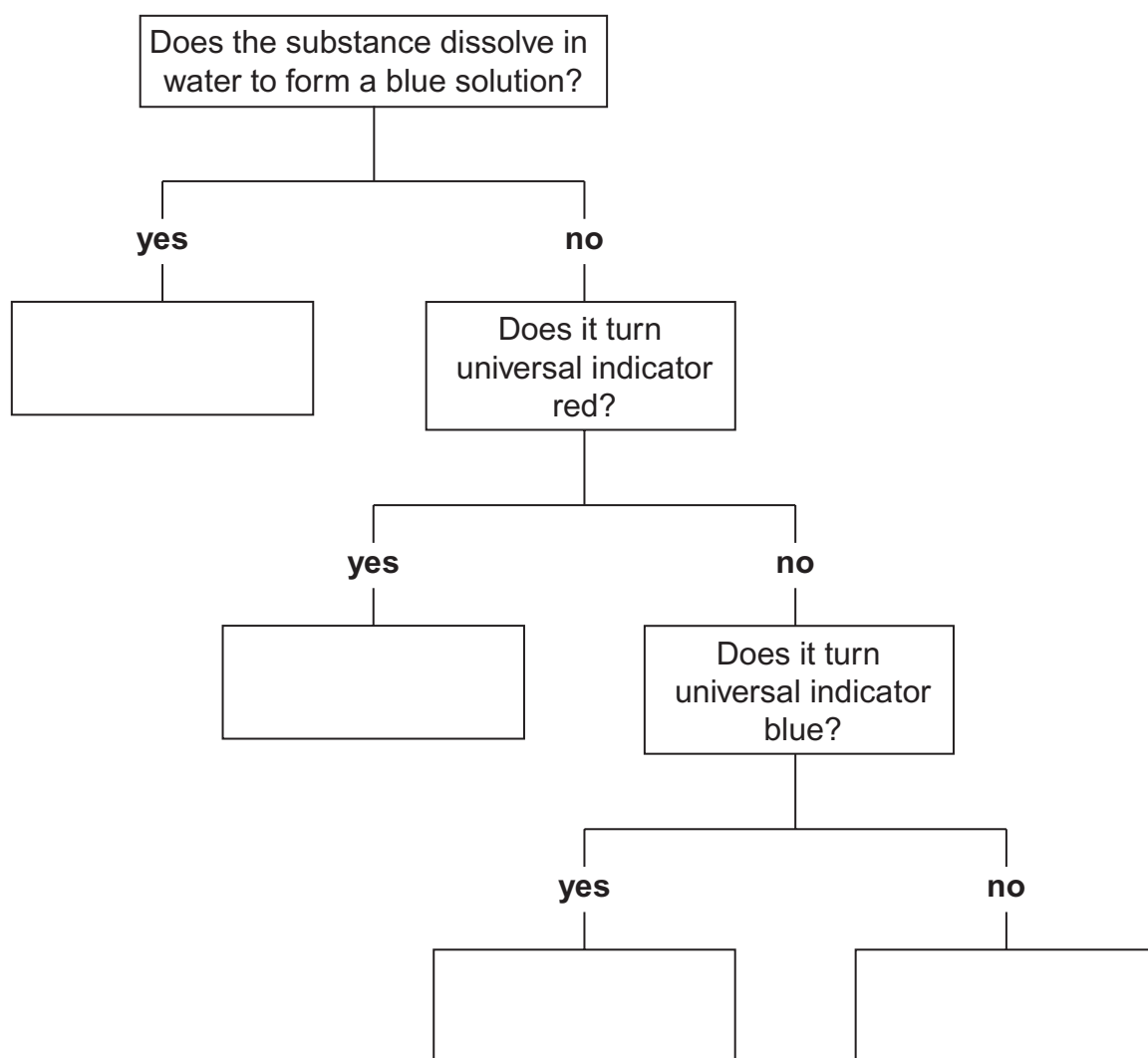
(b) Complete the flow chart below with the names of the substances in the boxes.

citric acid

copper sulphate

indigestion tablet

sugar



11b
1 mark

11b
1 mark

11b
1 mark

maximum 6 marks

12. The drawing below shows a gemstone set in a gold ring.



Crystals of gemstones are found in different rocks.

(a) There are three groups of rocks:

igneous

metamorphic

sedimentary

- (i) Crystals can be found in rocks that have been changed into different rocks by high temperature and high pressure.

Which group of rocks is formed in this way?

- (ii) Crystals can be found in rocks formed by the cooling of hot magma.

Which group of rocks is formed in this way?

- (b) How does the rate at which magma cools affect the size of the crystals formed?

12ai
1 mark

12aai
1 mark

12b
1 mark

- (c) Gemstones called rubies are made from an aluminium compound with the formula Al_2O_3 .

The chemical symbol for aluminium is Al.

- (i) Give the name of the element that is combined with aluminium in this compound.

12ci
1 mark

- (ii) Suggest the name of the compound with the formula Al_2O_3 .

12cii
1 mark

- (iii) How many atoms are there in the formula Al_2O_3 ?

12ciii
1 mark

- (d) (i) The gemstone in the drawing is set into a gold ring.
Gold is an element that is found in rocks.
Gold is never found combined with other elements.

Part of the reactivity series of metals is shown below.

more reactive	aluminium
	zinc
	lead
less reactive	copper

Where should gold be placed in this reactivity series?

12di
1 mark

- (ii) The more reactive metals react with acids.

Complete the word equation for the reaction of zinc with hydrochloric acid.

zinc + hydrochloric acid \longrightarrow _____ + _____

12dii
1 mark

12dii
1 mark

maximum 9 marks

13. The table below shows the mass of six nutrients in 100 cm³ of three types of milk.

nutrient	100 cm ³ of human milk	100 cm ³ of cows' milk	100 cm ³ of milk made from baby-milk powder
carbohydrate (g)	7.4	5.0	7.2
fat (g)	4.2	3.7	3.6
protein (g)	1.1	3.5	1.5
calcium (mg)	35.0	120.0	49.0
iron (mg)	0.075	0.05	0.9
vitamin C (mg)	3.8	1.5	6.9

- (a) A scientist compared the three types of milk.

Why was it a fair comparison?

- (b) Both human milk and milk made from baby-milk powder contain more sugar than cows' milk.

Which data in the table supports this?

13a
1 mark

13b
1 mark

(c) Why do we need calcium in our diet?

13c

1 mark

(d) (i) Baby-milk powder is made from cows' milk.

What evidence is there in the table that iron is added when making baby-milk powder?

13di

1 mark

(ii) Why do we need iron in our diet?

13dii

1 mark

(e) A pupil said, 'There is more vitamin C than protein in human milk'.

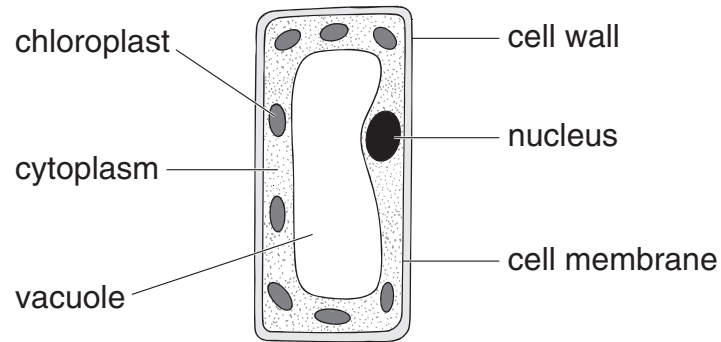
How can you tell from the table that the pupil was wrong?

13e

1 mark

maximum 6 marks

14. The diagram below shows a plant cell.



(a) In which part of a plant would you find this type of cell?

14a
1 mark

(b) (i) Give the function of the nucleus.

14bi
1 mark

(ii) Give the function of the chloroplasts.

14bii
1 mark

(iii) Give the function of the cell wall.

14biii
1 mark

(c) Give the names of **two** labelled parts that are **not** present in animal cells.

14c
1 mark

1. _____

14c
1 mark

2. _____

- (d) Tick **one** box in each row to show whether the statement is true for photosynthesis **or** for respiration.

statement	photosynthesis	respiration
carbon dioxide is produced		
light is needed		
it occurs in plants and animals		
oxygen is produced		

☐ 14d
1 mark

☐ 14d
1 mark

END OF TEST

maximum 8 marks

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