Cambridge Lower Secondary Sample Test

For use with curriculum published in September 2020

Science Paper 2

Stage 7

45 minutes

Name .....

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

1 Put the structures in order from **largest** to **smallest**.

organ system **cell** **organ** **tissue**

largest .....

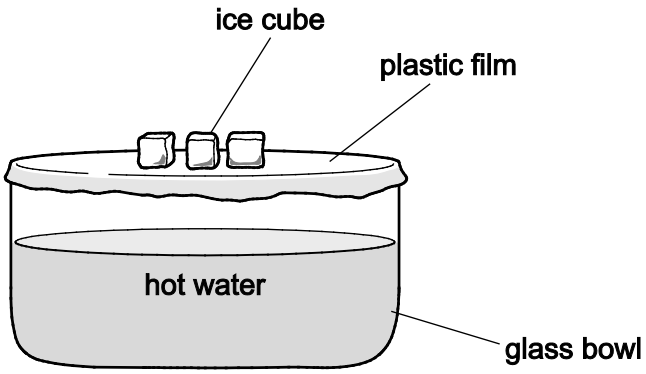
.....

.....

smallest .....

[1]

2 Mia uses a simple experiment to show some of the processes which occur during the water cycle.



(a) Write down **three** processes in the water cycle which Mia's experiment shows.

1 .....

2 .....

3 .....

[3]

(b) Write down one **other** process which occurs during the water cycle.

..... [1]

3 Oliver has a piece of grey magnesium.

He heats the magnesium in air.

The magnesium reacts with oxygen to make a compound.

The compound is a white powder.

(a) Name the compound made.

.....

[1]

(b) When magnesium reacts with oxygen there is a chemical reaction.

Suggest how Oliver knows a chemical reaction has occurred.

.....

[1]

(c) **(i)** Oxygen gas is an element.

In the box draw a particle model to describe oxygen gas.

Use O as a particle of oxygen.

[1]

(ii) The solid compound formed in the reaction contains a magnesium particle and an oxygen particle.

In the box draw a particle model to describe the solid compound.

Use O as a particle of oxygen and ● as a particle of magnesium.

[1]

4 Yuri finds some information on the internet about organisms which live in the Amazon rainforest.

Trees produce fruit and nuts.

Jaguars eat tapirs.

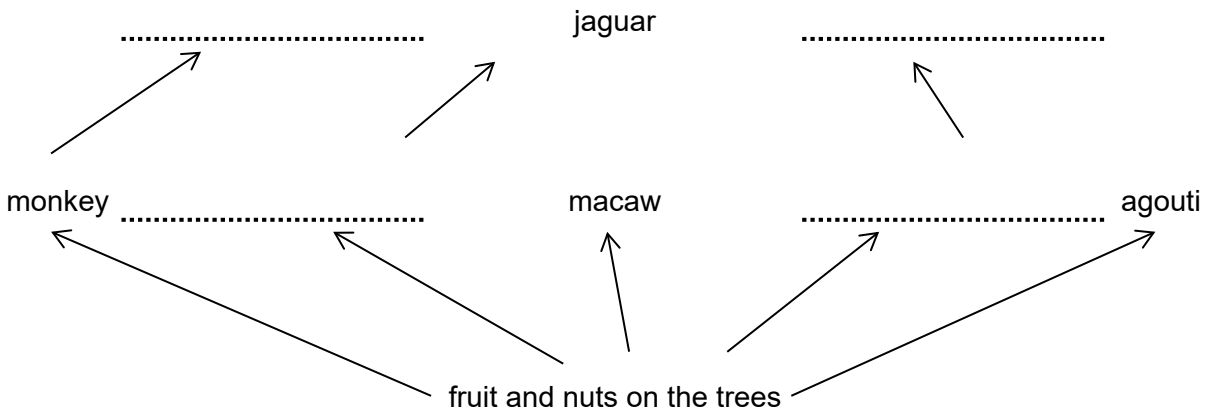
Boa constrictors eat sloths.

Macaws, monkeys, agoutis, tapirs and sloths eat the fruit and nuts on the trees.

Monkeys are eaten by eagles.

(a) Yuri uses the information to write a food web.

Complete his food web.



[2]

(b) What do the arrows in the food web show?

.....

[1]

(c) How many **primary** consumers are there in this food web?

.....

[1]

(d) There are **decomposers** in the rainforest.

(i) Name an example of a decomposer.

..... [1]

(ii) What do decomposers feed on?

..... [1]

5 Metals are electrical conductors.

State three **other** physical properties of **most** metals.

1 .....

2 .....

3 .....

[3]

6 Energy can be transferred from one form into another form.

(a) A light source transfers 20 J of energy into 4 J of light and some heat energy.

(i) Calculate how much energy is transferred into heat energy.

..... J [1]

(ii) Describe what happens to this heat energy.

..... [1]

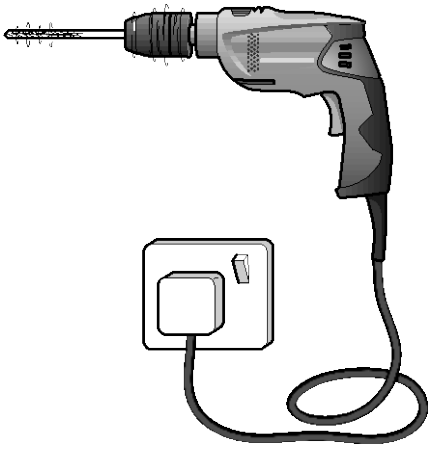
(b) A microphone transfers sound energy into 120 J of electrical energy and 30 J of heat energy.

Calculate how much sound energy is transferred.

..... J [1]

(c) Look at the pictures.

Complete the energy transfer for each picture.



electric drill

..... energy ⟶ 1 .....

2 .....

3 .....

sky diver falling out of a plane

..... energy ⟶ 1 .....

2 .....

girl running

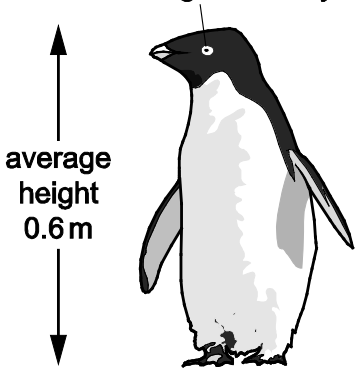
..... energy ⟶ 1 .....

2 .....

[3]

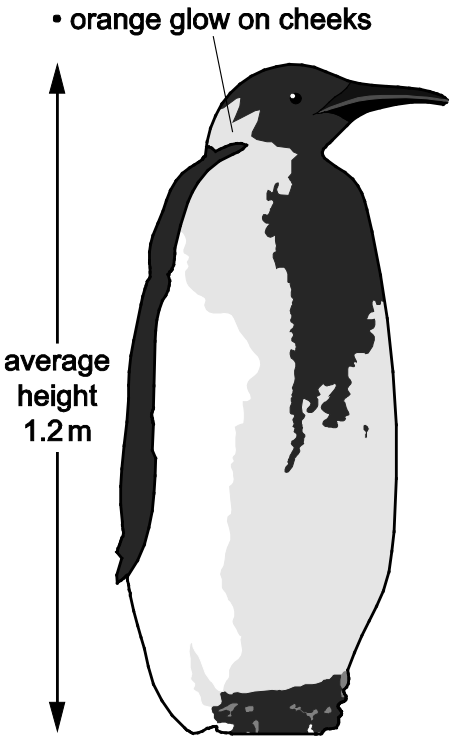
7 Read the information about different species of penguin.

penguin **A**



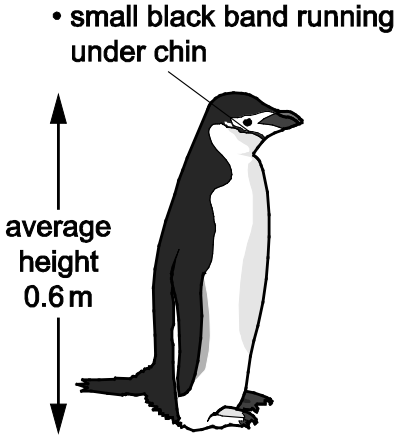
• feeds mainly on fish
• lays two eggs each breeding season

penguin **B**



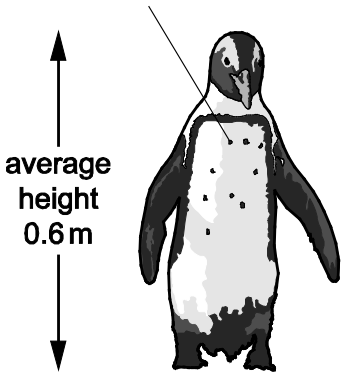
• feeds on fish and krill
• only lays one egg each breeding season

penguin **C**



• feeds on krill and fish
• lays two eggs each breeding season

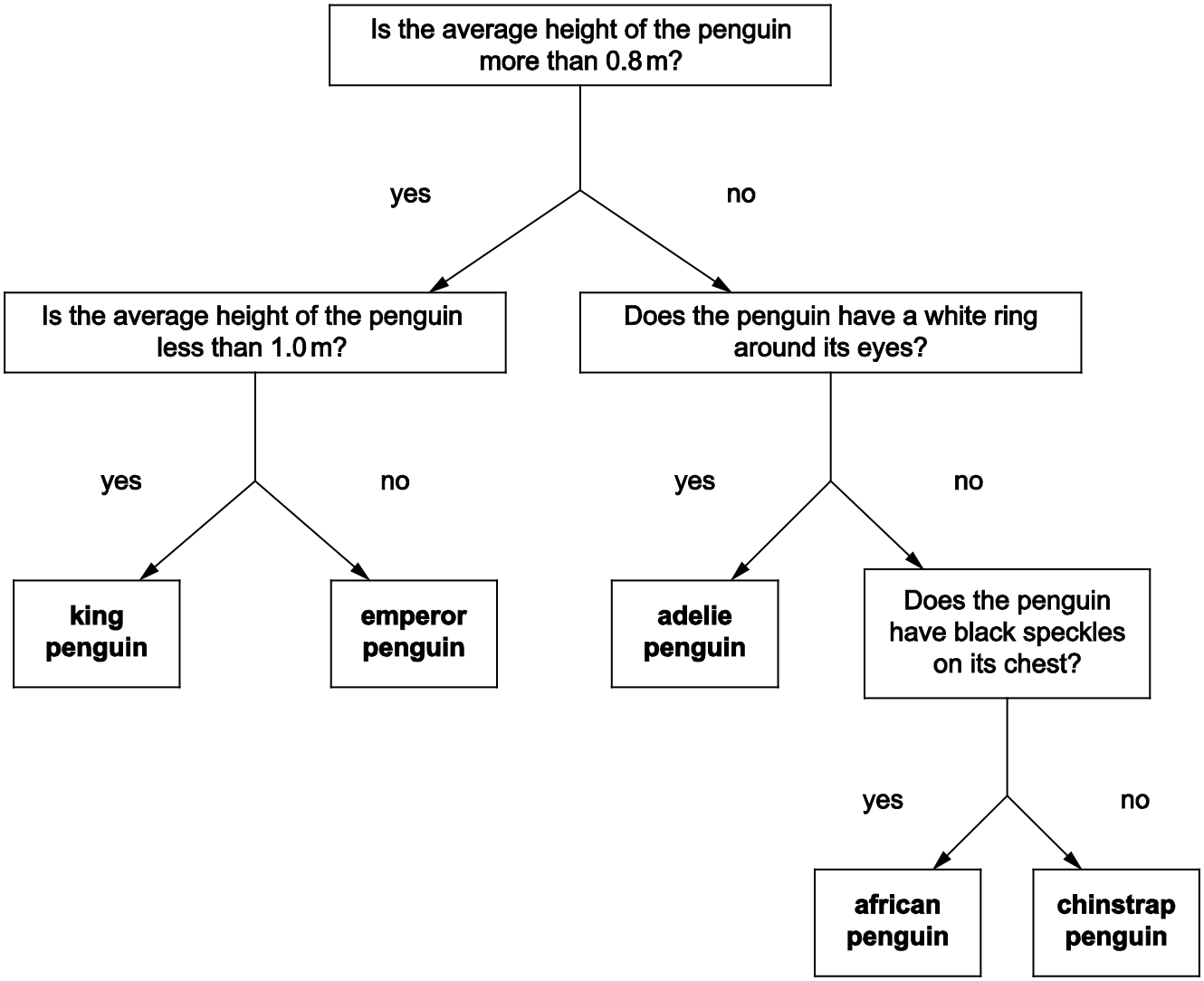
penguin **D**



• feeds on small fish and squid
• lays two eggs each breeding season

NOT TO SCALE

(a) Look at the dichotomous key.



Use the information and the dichotomous key to identify the **four** different species of penguin.

penguin **A** .....

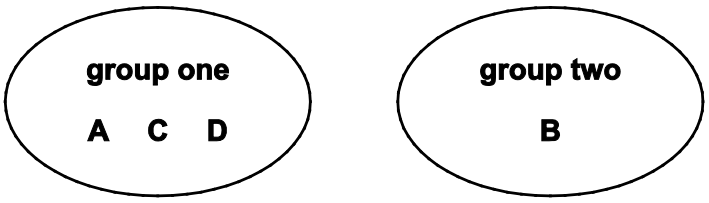
penguin **B** .....

penguin **C** .....

penguin **D** .....

[2]

(b) The four different species of penguin have been sorted into two groups using their height.



What other information can be used to sort the penguins into these two groups?

..... [1]

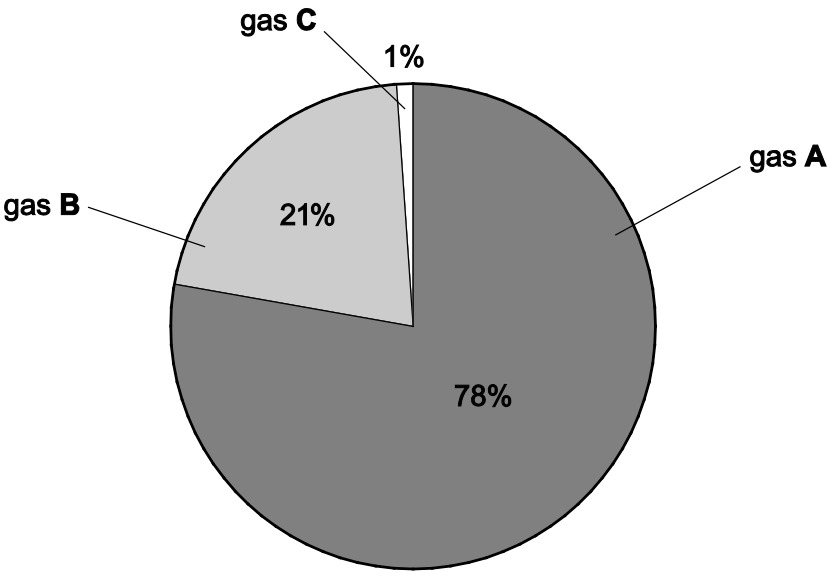
(c) What piece of equipment is used to measure the height of the penguins?

..... [1]

8 Air contains a mixture of gases.

The pie chart shows the percentages of the different gases in clean dry air.

(a) Look at the pie chart.



(i) Name gas **A**.

..... [1]

(ii) Name gas **B**.

..... [1]

(iii) Gas **C** is a mixture of gases. Name one of these gases.

..... [1]

(b) Large areas of rainforest are being cleared by deforestation.

The trees are burnt after they have been cut down.

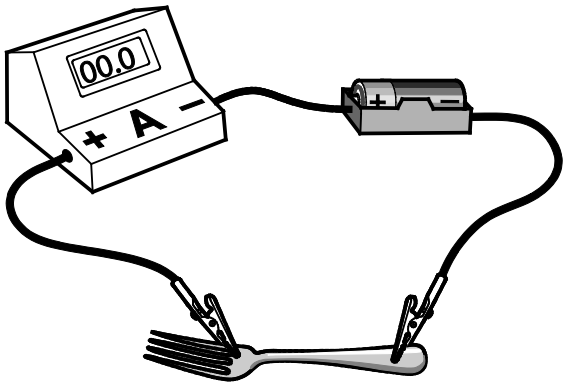
This increases the percentage of one gas in the surrounding air.

Which gas?

..... [1]

9 Ahmed investigates electrical conductors and electrical insulators.

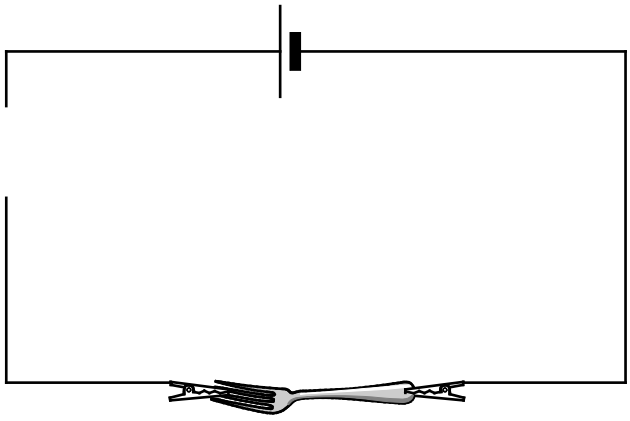
Here is his equipment.



(a) He draws his equipment using electrical symbols.

He forgets to draw one of the electrical symbols.

Complete his diagram.



[1]

(b) Ahmed tests different objects.

Here are his results.

object	electrical conductor	electrical insulator
metal fork	✓	×
wooden spoon	×	✓

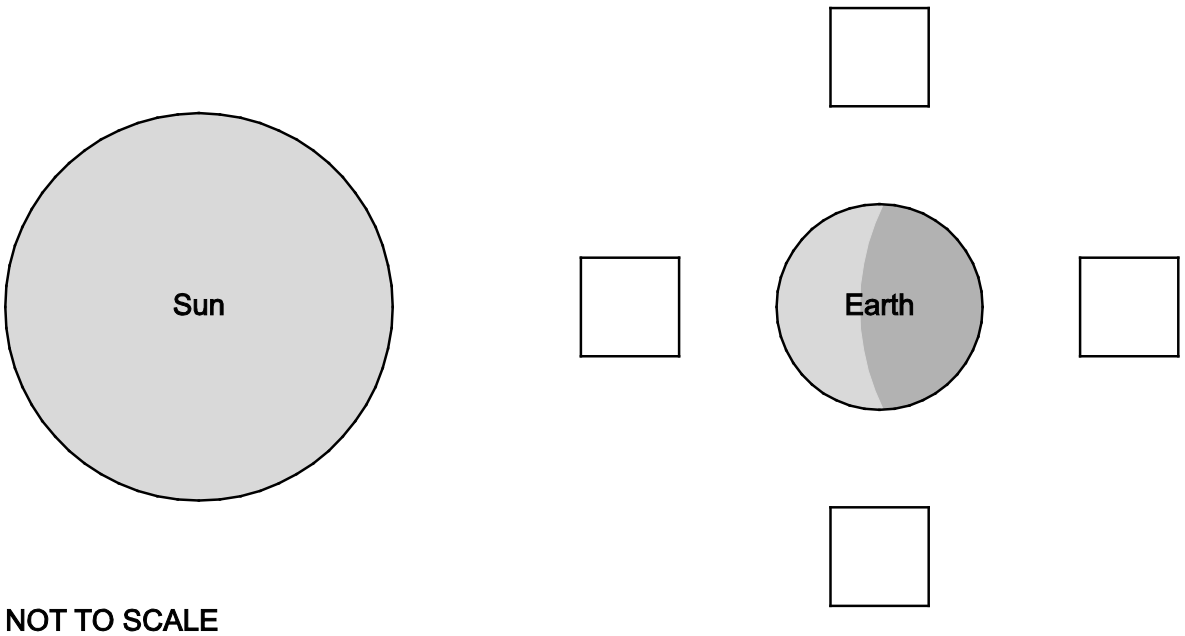
Ahmed uses his results to write a conclusion.

Complete his conclusion.

The metal fork is an electrical conductor because it allows particles called

..... to flow through it. [1]

10 Tick (✓) the correct box to show the position of the Moon during a lunar eclipse.



NOT TO SCALE

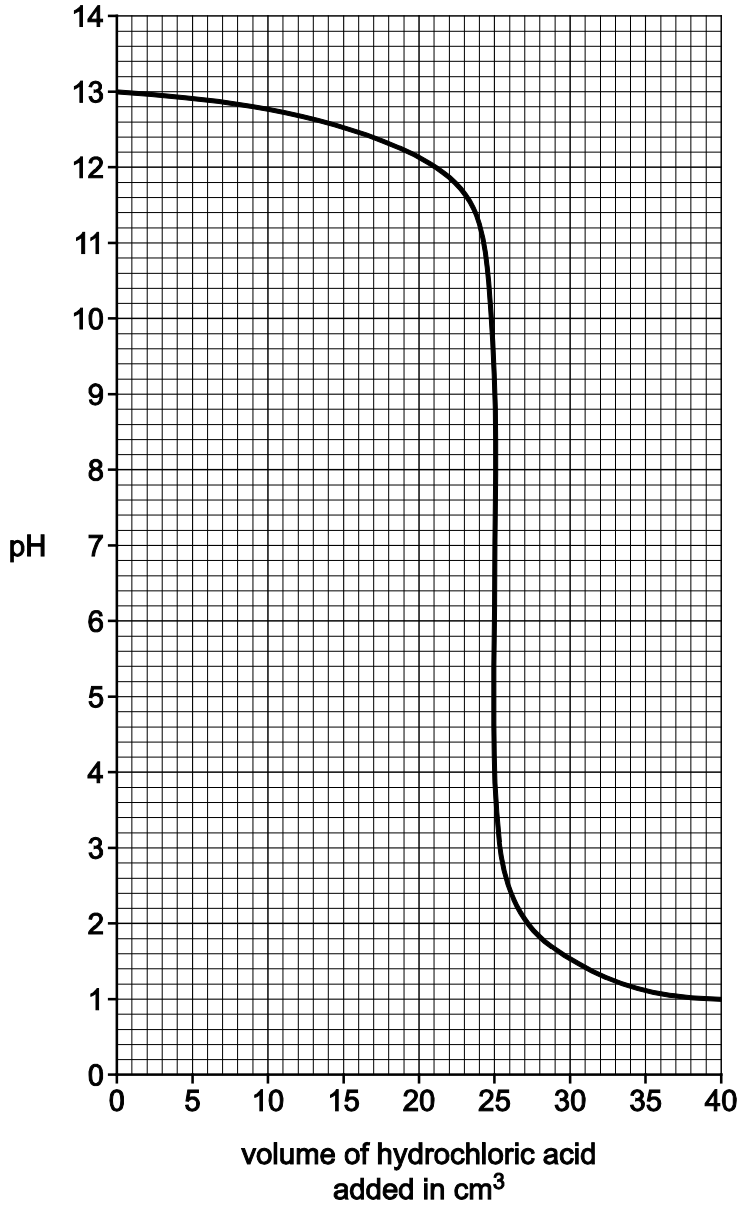
[1]

11 Jamila and Angelique investigate a type of chemical reaction.

Jamila:

- adds 5 cm^3 of hydrochloric acid to sodium hydroxide solution
- measures the pH of the solution using a pH probe
- adds another 5 cm^3 of hydrochloric acid and measures the pH again
- continues until she has added 40 cm^3 of hydrochloric acid.

Here are her results.



(a) What is the pH of the sodium hydroxide solution at the start of the experiment?

pH ..... [1]

(b) What does the pH tell you about the sodium hydroxide solution?

Tick (✓) the correct box.

it is acidic	☐	it is alkaline	☐
it is neutral	☐	it is magnetic	☐

[1]

(c) Which type of chemical reaction is Jamila investigating?

..... [1]

(d) Jamila concludes that she needs to add 15 cm^3 of hydrochloric acid to make the pH of the solution pH7.

Is Jamila correct? .....

Explain your answer.

.....

..... [1]

(e) Angelique repeats the experiment.

She uses an indicator instead of the pH probe to measure the pH of the solution.

Which indicator does she use?

..... [1]

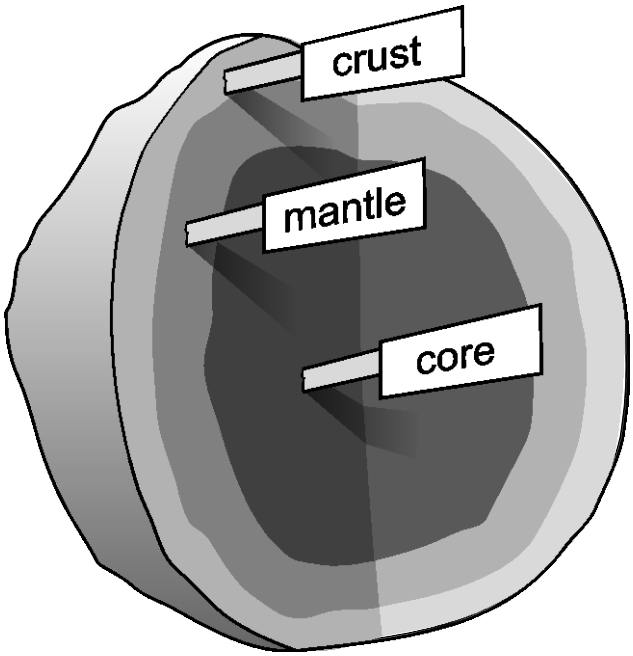
(f) Jamila says using the pH probe rather than an indicator will give better results.

Why is Jamila correct?

.....

..... [1]

12 Blessy makes a model of the structure of the Earth using coloured modelling clay.



(a) Write down **two** strengths of using this model to show the structure of the Earth.

1 .....

2 .....

[2]

(b) There are limitations with Blessy's model.

Write down **three** limitations of her model.

1 .....

2 .....

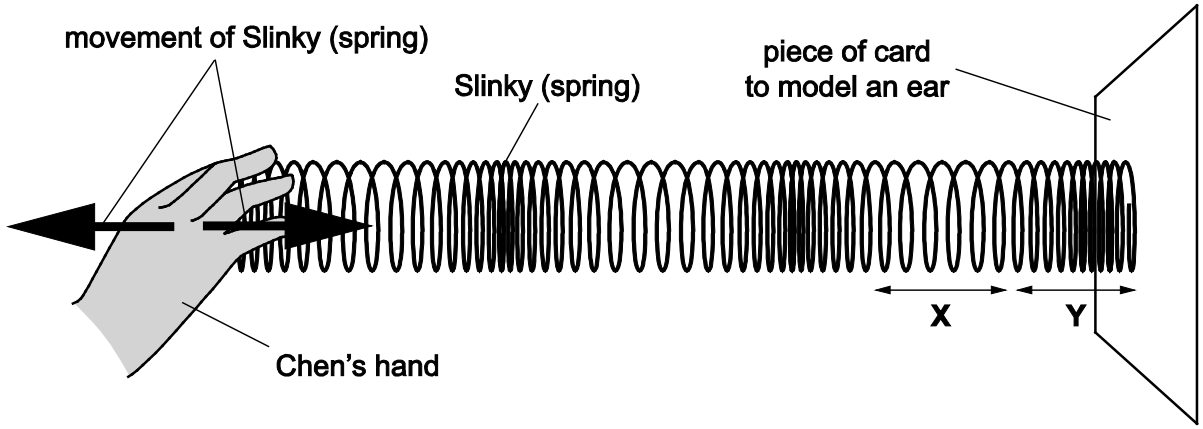
3 .....

[3]

13 Chen and Priya are using a Slinky (spring) to model a sound wave.

Priya attaches the other end of the Slinky to a piece of card.

Chen moves one end of the Slinky backwards and forwards.



(a) What does Chen's moving hand model?

.....

[1]

(b) The Slinky models the movement of air particles in a sound wave.

(i) Name the region labelled **X**.

.....

[1]

(ii) Name the region labelled **Y**.

.....

[1]

(c) Describe how the particles in a sound wave move.

.....

[1]