

45 minutes

Science Paper 1

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	
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16	
17	
18	
Total	

1 The table shows information about four elements.

These four elements are in the same group in the Periodic Table.
They are in the same order as they are found in the Periodic Table.

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element	melting point in °C	boiling point in °C	state at room temperature	size of atom (comparison)
fluorine		-188	gas	
chlorine	-102	-34		
bromine	-7		liquid	
iodine	114	184	solid	

(a) There is a trend in the melting and boiling points of these elements.

Use this trend to predict:

(i) the melting point of fluorine °C [1]

(ii) the boiling point of bromine °C [1]

(b) (i) Room temperature is about 20°C.
Predict the state of chlorine at room temperature.

..... [1]

(ii) Look at these numbers.

133 99 114 64

The numbers represent the size of the atoms.

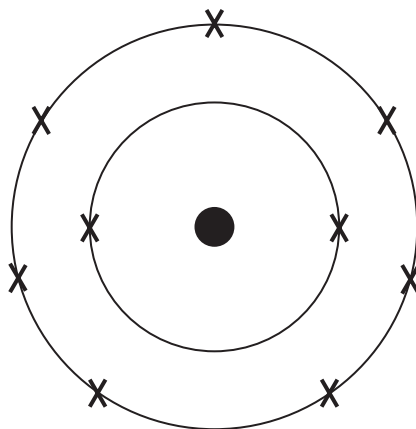
The larger the number, the larger the atom.

Use these four numbers to complete the **size of atom (comparison)**
column in the table.

[1]

- (c) Fluorine has two electron shells.
It has the electronic structure of **2.7**

This can be shown on a drawing:



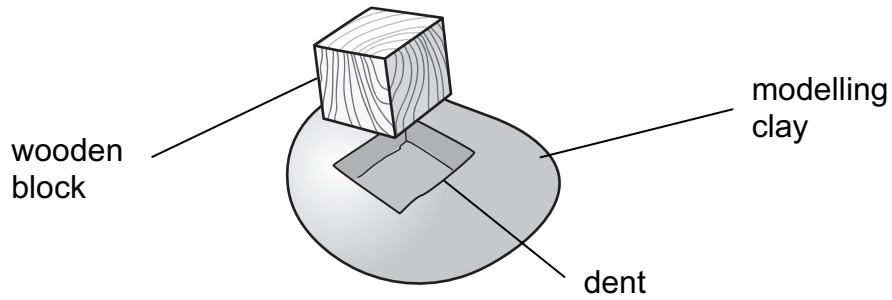
Chlorine has the electronic structure **2.8.7**

Draw the electronic structure of chlorine in this box.

[3]

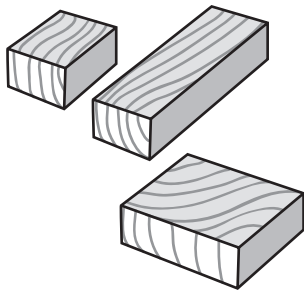
- 2 Azim knows that pressure is related to force and area. He pushes a wooden block into some modelling clay

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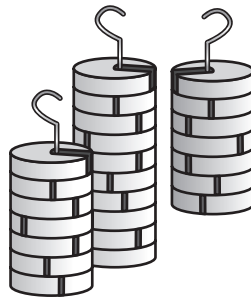


He decides to investigate how force and area affect pressure.

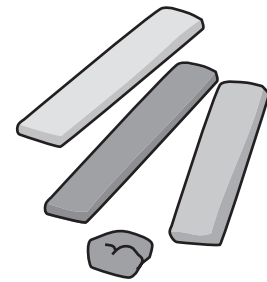
The pictures show the apparatus he uses.



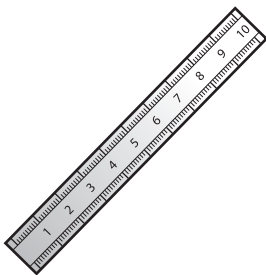
wooden blocks with
different areas



different masses



modelling clay



ruler

(a) (i) Write an outline plan for his investigation.

.....
.....
.....
.....

[2]

(ii) What measurements does he need to take?

.....
.....

[1]

(iii) Azim repeats all of his measurements. Why does he do this?

.....
.....

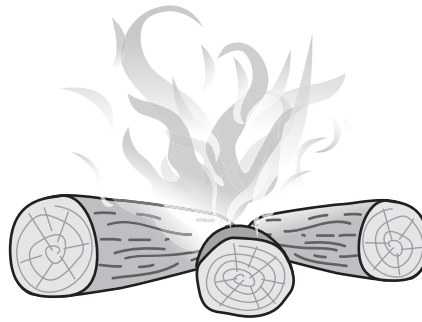
[1]

(b) Draw a results table for Azim's investigation.

[2]

3 Burning fuel releases heat into the surroundings.

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Burning fuel is a chemical reaction.

(a) What is the name of this type of chemical reaction?

Underline the answer from the list of words.

conduction

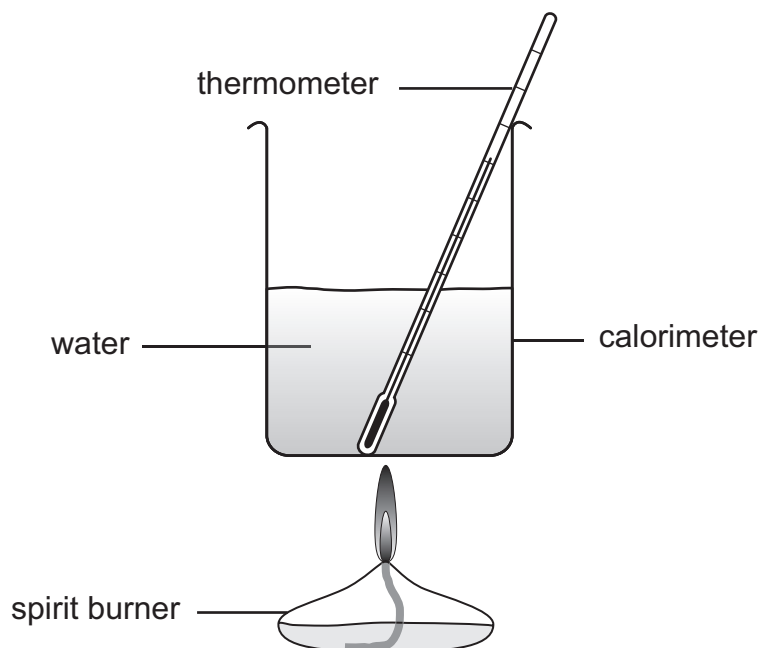
convection

endothermic

exothermic

[1]

- (b) Nina investigates three different fuels. She uses this apparatus.



She burns 1g of fuel each time.

fuel	starting temperature in °C	final temperature in °C	temperature change in °C
paraffin	15	31	16
ethanol	15	33	
propanol	20		21

- (i) Complete the table with her results.

[1]

- (ii) Which fuel released the most heat energy to the surroundings?

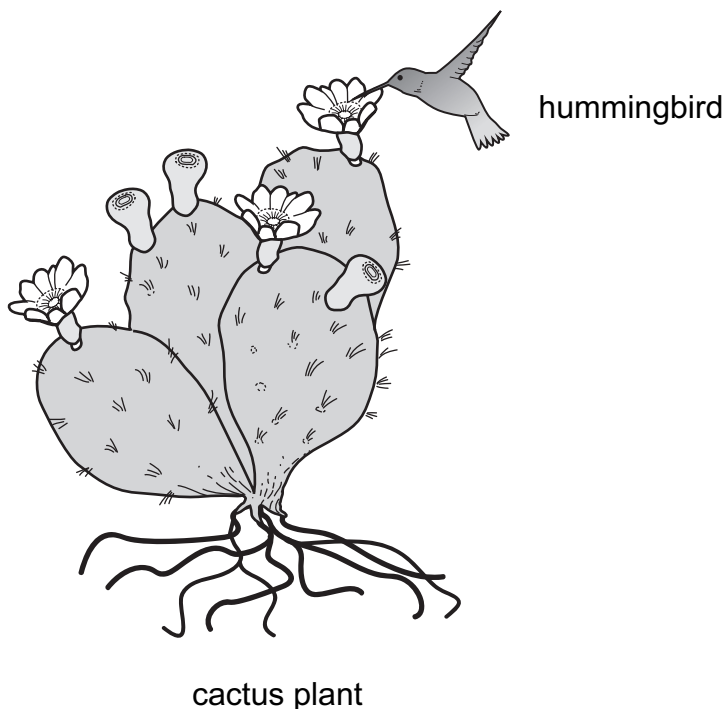
.....

Explain why.

..... [1]

4 Hummingbirds feed on cactus flowers.

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- (a) Cactus plants live in very dry areas. They have special adaptations to this habitat.

Describe **two** of these adaptations and explain how they help the cactus plant to survive.

Adaptation 1

How it helps

Adaptation 2

How it helps [2]

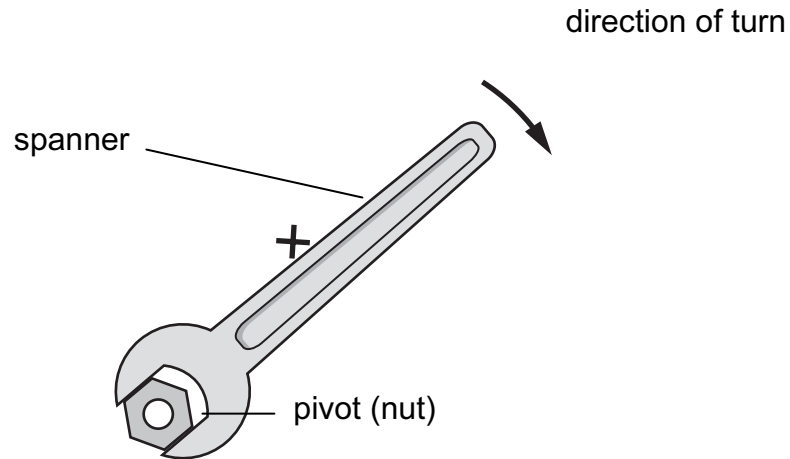
- (b) Hummingbirds are adapted to feed on cactus flowers.

Describe **one** adaptation and explain how it helps the hummingbird to feed.

Adaptation

How it helps [1]

5 Sunita uses a spanner to turn a nut.



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(a) The point **X** is **10 cm** from the pivot (nut).

She holds the spanner at point **X**. She uses a force of **80 N**.

Calculate the size of the moment.

Underline the correct answer.

8 Ncm

10 Ncm

70 Ncm

800 Ncm

[1]

(b) Sunita holds the spanner at position **X**.
She finds it very difficult to turn the nut.

Suggest **one** thing she could do to make it easier to turn the nut.

..... [1]

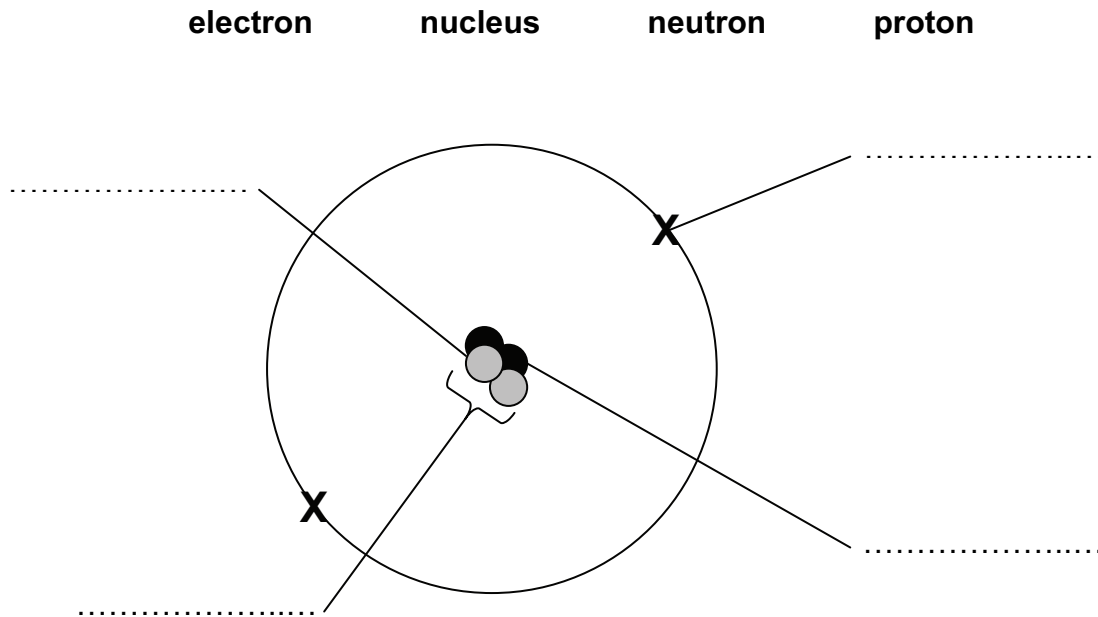
(c) Write the name of another piece of equipment that uses moments.

..... [1]

6 Ernest Rutherford helped to develop a model of the atom.

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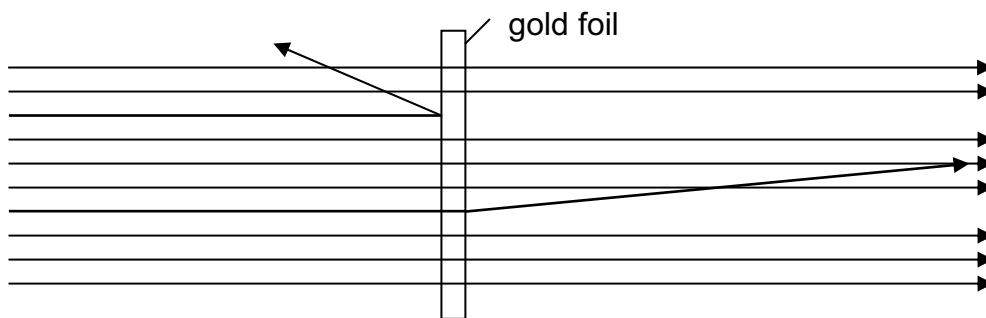
(a) Label the diagram of a helium atom using these words.



[2]

(b) Ernest Rutherford fired very small particles at a thin gold foil.

The diagram shows the path of the particles.

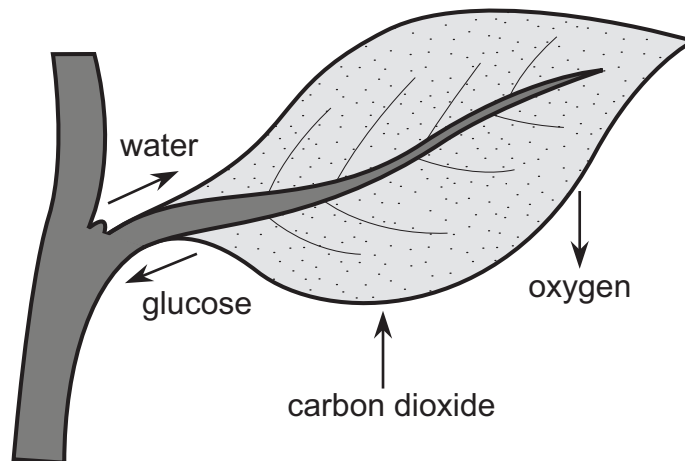


Most of the particles pass straight through the gold foil.
Other particles are scattered when they hit part of the gold atom.

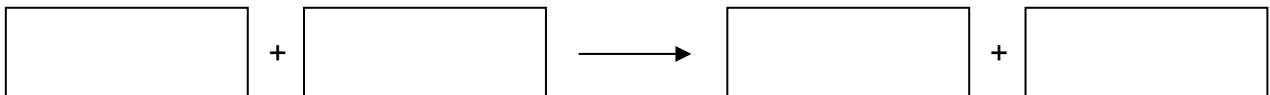
What part of the gold atom causes the small particles to scatter?

..... [1]

7 Photosynthesis takes place in green leaves.



(a) Complete the word equation for photosynthesis.
Use the information in the diagram to help you.



[2]

(b) Which of these statements are correct?

Tick (✓) the boxes next to the **two** correct statements.

All plant cells carry out photosynthesis.

All animal cells carry out photosynthesis.

Photosynthesis is carried out by producers.

Photosynthesis takes place in chloroplasts.

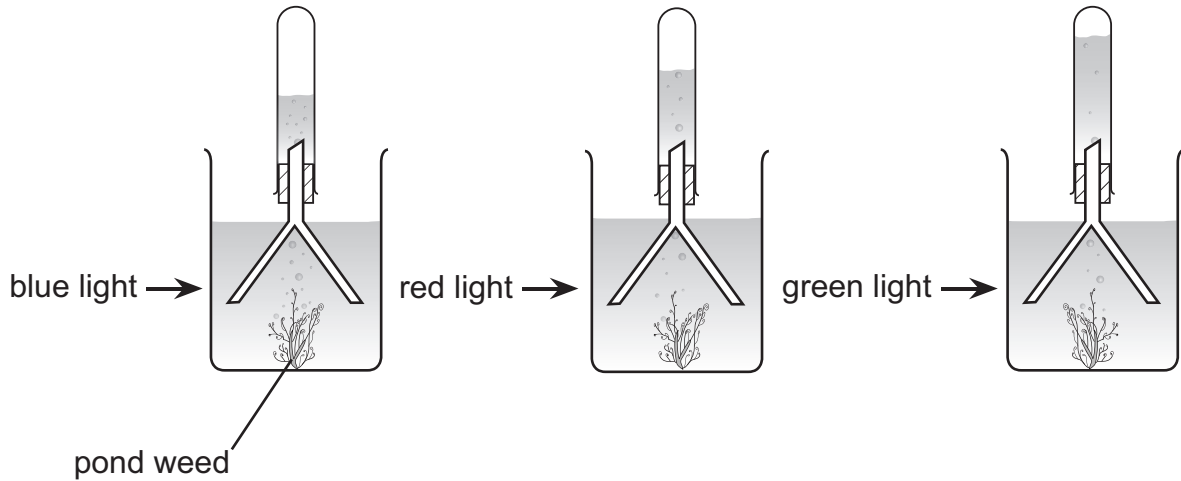
Photosynthesis is the same as respiration.

[2]

- (c) Tomas knows light is needed for photosynthesis. He wants to find out what happens to photosynthesis in different coloured light.

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He uses this equipment.



Bubbles of gas are **produced** during photosynthesis.

Tomas counts the number of bubbles produced in a minute.

Here are his results.

colour of light	number of bubbles of gas in a minute
blue	95
red	70
green	10

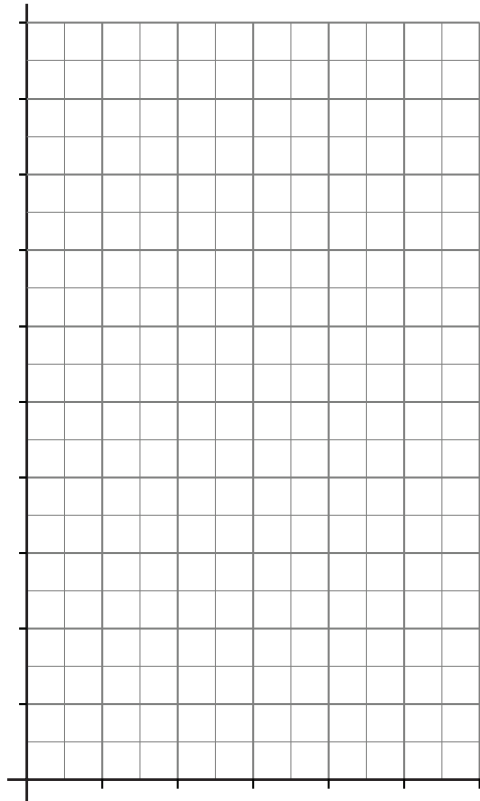
- (i) How could Tomas make his results more reliable?

..... [1]

(ii) Draw a bar chart to show Tomas' results.

Remember to add **labels**.

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Teacher's
Use



[2]

(iii) What conclusion can you make from his results?

.....

[1]

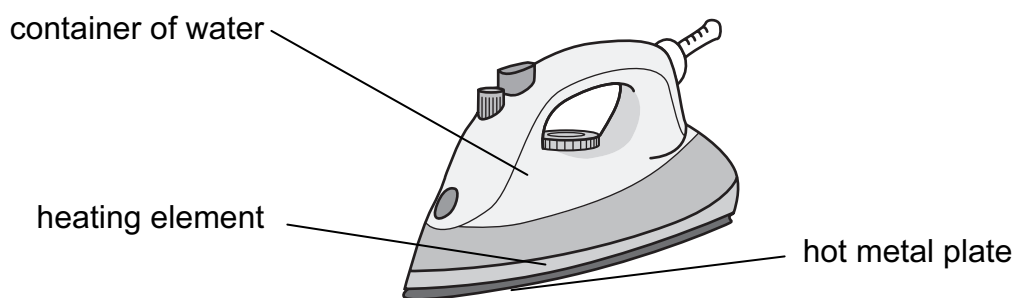
(iv) Use your knowledge about the colour of leaves to explain his results.

.....

.....

[1]

8 This is a piece of laundry equipment for taking creases out of clothes.



(a) The metal plate is heated using the heating element.
The heating element touches the metal plate.

(i) How is the thermal (heat) energy transferred to the metal plate?

Underline the answer from the list of words.

condensation

conduction

convection

evaporation

radiation

[1]

(ii) Explain how the particles in the element transfer this thermal (heat) energy to the metal plate.

.....

.....

[1]

(b) The water in the bottom of the container becomes warm.

This happens because of a thermal (heat) transfer process.
Name this process.

.....

[1]

9 This question is about the Periodic Table.

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(a) (i) Shade a period on the Periodic Table.

		H												He				
Li	Be											B	C	N	O	F	Ne	
Na	Mg												Al	Si	P	S	Cl	Ar
K	Ca																	

[1]

(ii) Write the chemical symbol for a metal element from the table.

..... [1]

(b) (i) Shade the elements in Group I on the Periodic Table below.

		H												He			
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca																

[1]

(ii) The melting point decreases from the top to the bottom of the group.

Describe **one** other trend that changes from the top to the bottom of the group.

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

10 (a) Sexual reproduction in flowering plants involves several stages.

- A seed dispersal
- B fertilisation
- C pollination
- D seed formation

Put the stages in the correct order.

The first one has been done for you.

C			
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[1]

(b) Seeds can be dispersed in many different ways.
Why is it important for seeds to be dispersed?

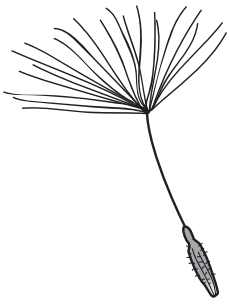
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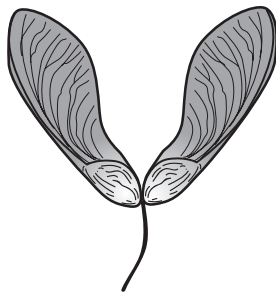
[1]

(c) Here are some pictures of different seeds.

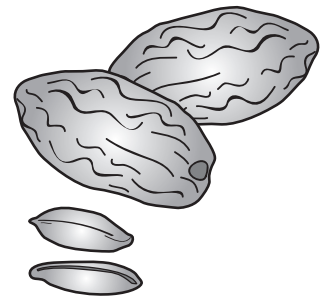
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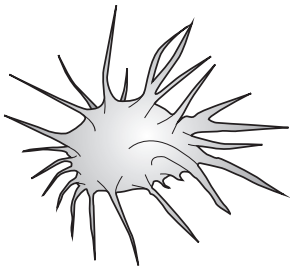
dandelion seeds



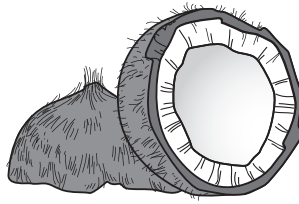
maple seeds



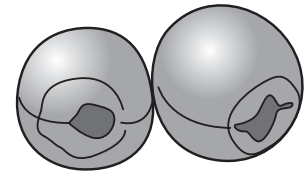
date seeds



sandbur seeds



coconut seeds



lotus seeds

NOT TO
SCALE

- (i) The coconut and lotus seeds are dispersed by floating on water. This is because they are light and filled with air.

Complete the sentences.

Dandelion and maple seeds are dispersed by

This is because they are [2]

- (ii) The date and sandbur seeds are dispersed by animals. For both seeds, suggest how this happens.

1. Date seeds

.....

2. Sandbur seeds

..... [2]

11 Erik has a solid cube of aluminium.
He knows that its mass is between 10g and 20g.

(a) Circle the **best** method for measuring mass and circle the **best** method for measuring volume.

method for measuring mass

method for measuring volume

- Use scales with a range of 0–100 g
- Use scales with a range of 0–1000 g
- Use scales with a range of 0–10 kg

- Put the cube into an empty measuring cylinder.
- Measure the length of the cube with a ruler.
- Find the volume of the container the cube is in.

[1]

(b) Erik records the results for this cube of aluminium.

mass = 13.5 g

volume = 5.0 cm³

Calculate the density. Remember to write the unit for density.

.....
.....

density = unit [2]

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