



CHAPTER 8

PHYSICAL PROPERTIES OF MATTER

Metal and Non Metals

1

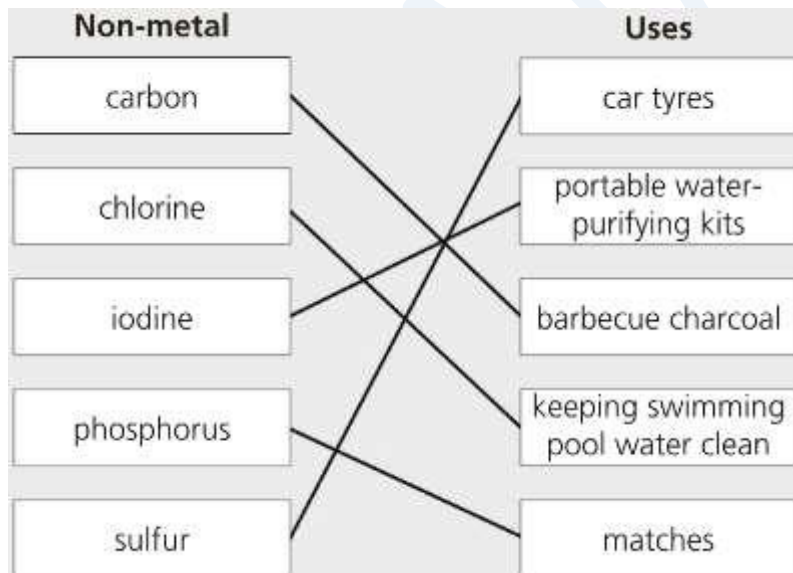
a

Substance	Metal	Non-metal
A	✓	
B		✓

b

Any two from: oxygen, nitrogen, carbon dioxide, water vapour. c It is shiny, and a non-metal surface is dull.

2



The properties of materials

3

a

A

Cannot be bent; snaps if a large force is applied to it; you can see through it. Properties: rigid, brittle, transparent.



B
You cannot see through it; it takes up water and bends. Properties: opaque, absorbent, flexible.

C
You cannot see through it clearly; it cannot be bent; does not let heat pass along it. Properties: translucent, rigid, heat insulator.

D
You cannot see through it; it bends; when placed in a circuit, it makes a lamp light up. Properties: opaque, flexible, electrical conductor.

b

D

c

A

4

Three materials feel soft. You can use a large, heavy ball and other items to compare the softness of the materials.

a

Hypothesis: If a heavy ball is dropped on a soft material, it will leave a mark on the soft material.

b

Prediction: The softer the material, the easier it will be to see the mark caused by the heavy ball.

c

For example: Drop the heavy ball from the same height onto each of the three materials. Record the changes. (This could be done by measuring the mark or photographing the changes.)

d

Repeat the experiment several times.



e

If there are differences in the marks left on the different soft materials.

f

It may be difficult to judge the changes caused by the heavy ball.

5

Example of a possible plan:

- Place each twig in turn between the two laboratory stools.
- Make sure the same length of twig rests in the open space between them.
- Place the metre ruler vertically behind the centre of the twig between the stools and note its position (measure the height of the twig).
- Hang the bucket by the handle on the centre of the twig.
- Record the height of the twig on the metre ruler again.
- Place a 10g mass in the bucket and record the height on the metre ruler again.
- Keep adding 10g masses and noting each position change, but do not let the twig snap or fall between the stools.
- Repeat the above with each twig and compare the results.

a

The independent variable is the one that the experimenter changes. In this experiment, it is the type of twig.

b

The dependent variable is the one that is measured. In this experiment, it is how much the twig bends.

c

From the data collected, students should be able to see that the most flexible twig will have bent down the most, and the most rigid twig will have bent the least.

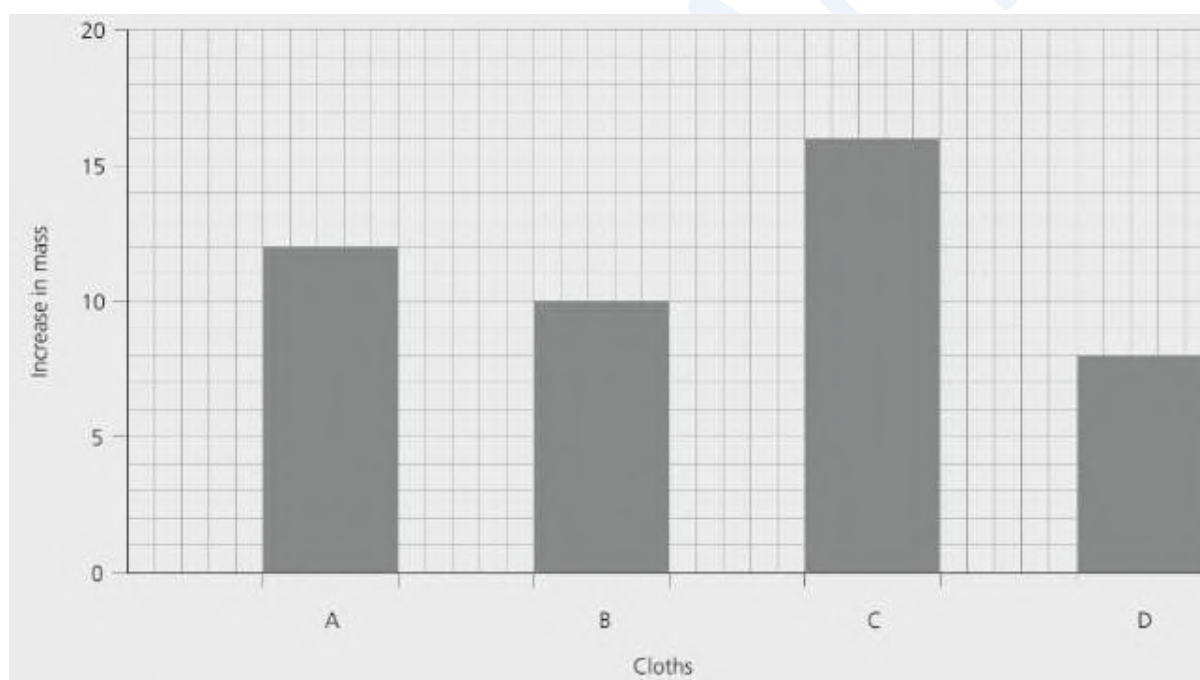
6

a

Yes, Ahmed did make a fair test. He used the same mass of cloth, soaked each one for 10 seconds (making sure they were fully submerged), and allowed the water to drop off for 30 seconds before reweighing them.



b



c

C, A, B, D

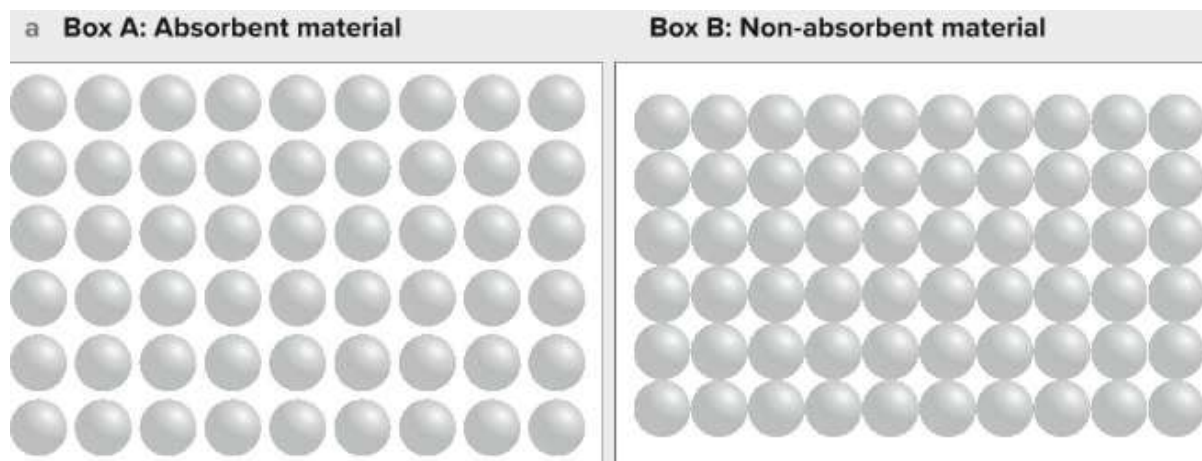
d

Yes, he could have used samples of cloth that all had the same area, for example.



7

a



b

The water can enter the material through the openings (spaces) in it and pass into the spaces in-between them. Water cannot enter and stay in the material because there are no openings to the outside.

Property profiles

8

a

It is malleable (it can be pressed into a shape), it is a good conductor of heat and it is waterproof.

b

It is a heat insulator (an insulator of heat), it is soft enough to be carved into shape and it is rigid.

9

a

B

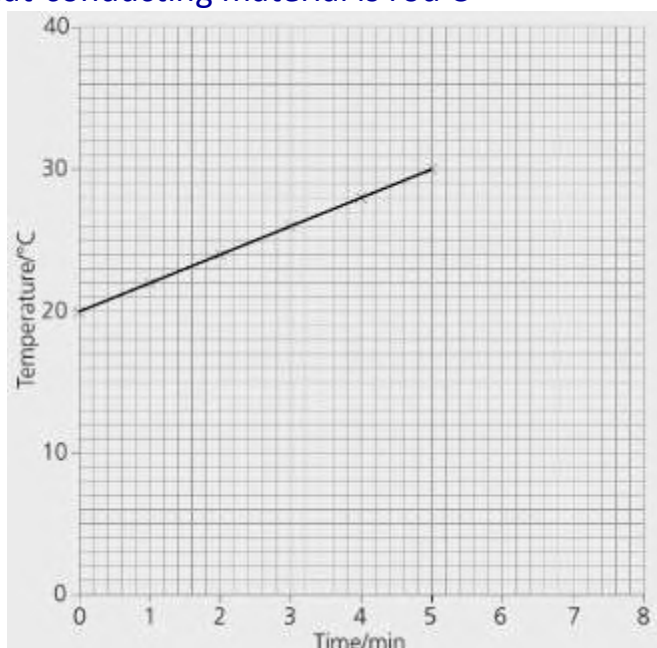
b

C



c

The best heat-conducting material is rod C



d

7.4 minutes (accept approx. 7.5 minutes).