UNIFIED COUNCIL'S

STEP-UP
SERIES

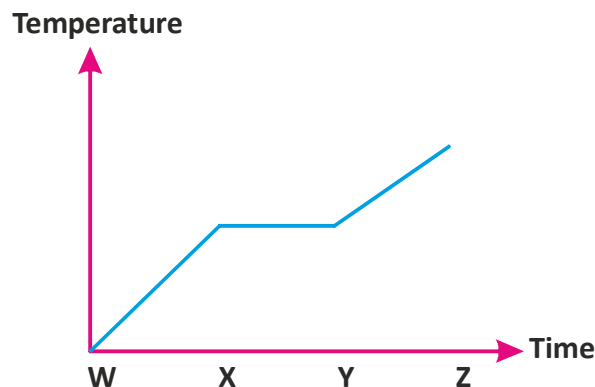Chapter 1 (Solutions)

MATTER IN OUR SURROUNDINGS

SCIENCE
CLASS 9

01

A girl melts four cubes of ice in a beaker. She leaves the beaker on a table for a few hours, and then heats it. The graph given below shows the changes undergone by the melted ice.

(a) What is the initial temperature of the water formed by the melting ice ?

(b) What is happening to the water from W to X in the graph ?

(c) Which of the lines – WX, XY or YZ – best represents room temperature ?

(d) At which point – W, X, Y or Z – did she heat the beaker ?

(e) Does ice gain or lose heat in order to melt ?

(a) The initial temperature of the melting ice is 0 °C.

(b) From W to X the water is gaining heat and increasing in temperature.

(c) The line XY best represents room temperature.

(d) She heats the beaker at point Y.

(e) Ice gains heat in order to melt.

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Chapter 1 (Solutions)
MATTER IN OUR SURROUNDINGS

SCIENCE
CLASS
9

02

Maya took substance X and measured its volume. She then tried to press it and measured its volume again. She plotted the graph given below to show her results.

Volume of
substance X

When not
pressed
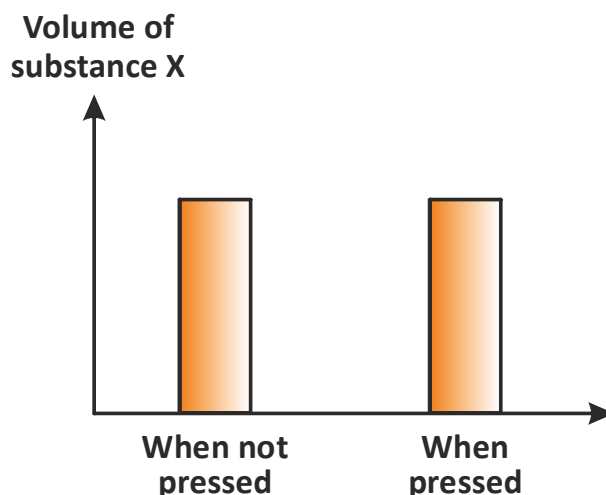
When
pressed

(a) From the given graph, what do you infer about the state of matter that substance X is in ?

(b) Why the volume of substance X remains unchanged when it was pressed ?

(a) Substance X is in the solid or in the liquid state.

(b) The volume of object X remained unchanged when it was pressed. Solids and liquids cannot be compressed. They have a definite volume. Thus, substance X is either a solid or a liquid.

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Chapter 1 (Solutions)

MATTER IN OUR SURROUNDINGS

SCIENCE
CLASS
9

03

A laboratory has 100 beakers containing various substances. The pie chart given below shows some properties of the substances.
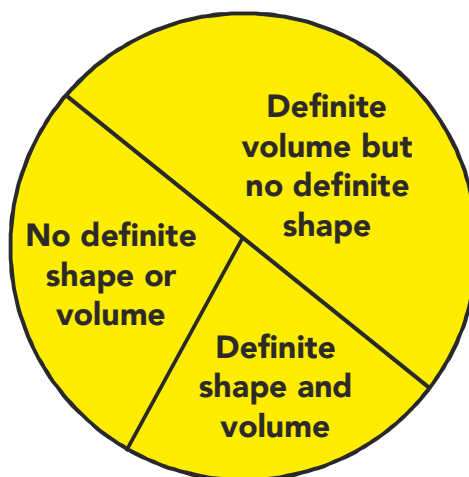

(a) In which state of matter is the group with the least number of substances ?

(b) How many beakers contain liquids ?

(c) How did you arrive at your answer in (b) ?

(a) Solid state

(b) 50 Beakers

(c) According to the given pie chart, half of the beakers contain a substance that has a definite volume but no definite shape. As there are 100 beakers in total, 50 (half of 100) contain liquids.

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SERIES

Chapter 1 (Solutions)
MATTER IN OUR SURROUNDINGS

SCIENCE
CLASS
9

04 A student had a measuring cylinder with 200 ml of water. He then dropped four pebbles of different sizes. K, L, M and N, into it as shown below. The table given below shows his observations.

Pebbles in the water	Reading on the measuring cylinder
K	210 ml
K + L	220 ml
K + L + M	250 ml
K + L + M + N	300 ml
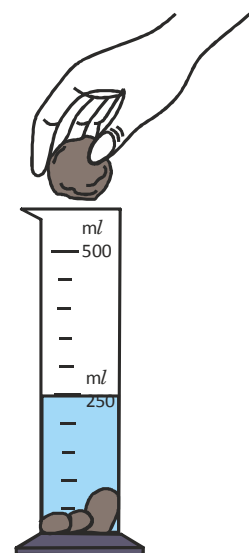
(a) Calculate the volumes of pebbles L and N.

(b) The pebbles and water are matter because they have _____ and occupy _____.

(a) Volume of pebble L

= (Reading on measuring cylinder with pebbles K + L)–

(Reading on measuring cylinder with pebbles K)

= 220 ml – 210 ml = 10 ml

Volume of pebble L is 10 ml

Volume of pebble N

= (Reading on measuring cylinder with pebbles K+L+M+N) – (Reading on measuring cylinder with pebbles K+L+M)

= 300 ml – 250 ml = 50 ml

Volume of pebble N is 50 ml

(b) mass; space

05 Three measuring cylinders of different sizes are filled with 50 ml of boiling water.
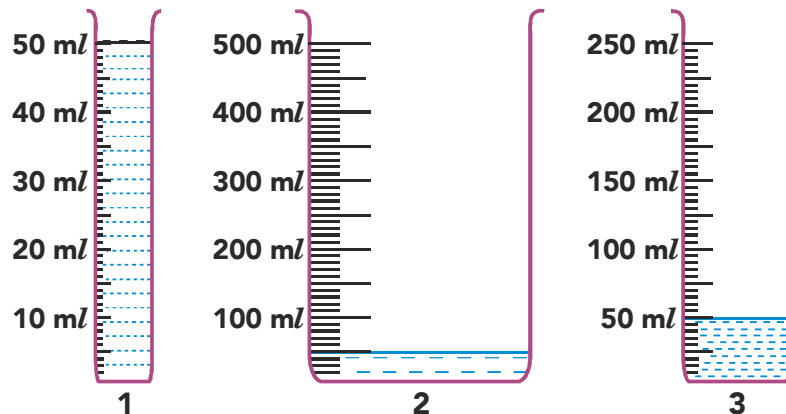
(a) Arrange the rate of evaporation of water in the three measuring cylinders from the highest to the lowest.

(b) Which factor affects the rate of evaporation in this experiment ?

(c) Which factor will increase the rate of evaporation in the measuring cylinders ?

(a) 2, 3 and 1

(b) Exposed surface area of water.

   The rate of evaporation is higher when the exposed surface area of water is larger.

(c) The presence of wind. / Low humidity.

   The rate of evaporation will be higher in the presence of wind than in the absence of wind.

   When humidity is low, there is less water vapour in the air, the rate of evaporation will be higher.