

Strand: Matter

Sub strand: Investigating matter

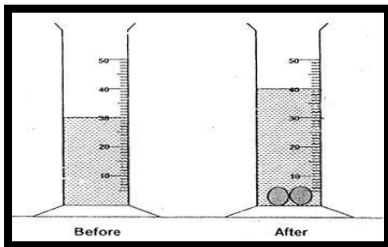
Content Learning outcome: investigate how matter change from one state to another state in our everyday life.

**MEASUREMENTS OF VOLUME AND OF OBJECTS**

- The objects that are placed in known volumes of water displace the amount of water that determines the volume of the object.
- The unit can be written in Litres, millilitres and cubic centimetres.
- Scientist Archimedes’ rule states that “any object that is wholly or partially immersed in a fluid (liquid) is the upward force equal to the weight or volume of the fluid displaced by the object”

**Example:**

Two equal sized marbles were dropped in to a volume of 30 millilitres of water in a cylinder. The reading was taken and the final reading taken was 40 millilitres. What would be volume of each marble? What would be its measure in  $\text{cm}^3$ ?



ANSWER: The two marbles had displaced the amount of water as shown in the working:

$$\begin{aligned} \text{Volume of Marbles} &= \text{Final water mark} - \text{Initial water mark} \\ &= 40\text{ml} - 30\text{ml} \\ &= 10 \text{ ml or } 10 \text{ cm}^3 \end{aligned}$$

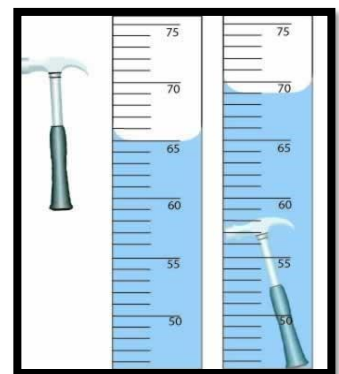
Therefore, for each marble

$$2 \text{ marbles} = 10\text{ml}; 1 \text{ marble} = x$$

$$x = 10\text{ml} \div 2\text{marbles} \times 1 \text{ marble} = 5\text{ml or } 5\text{cm}^3 \text{ Answer.}$$

**ACTIVITY 5:**

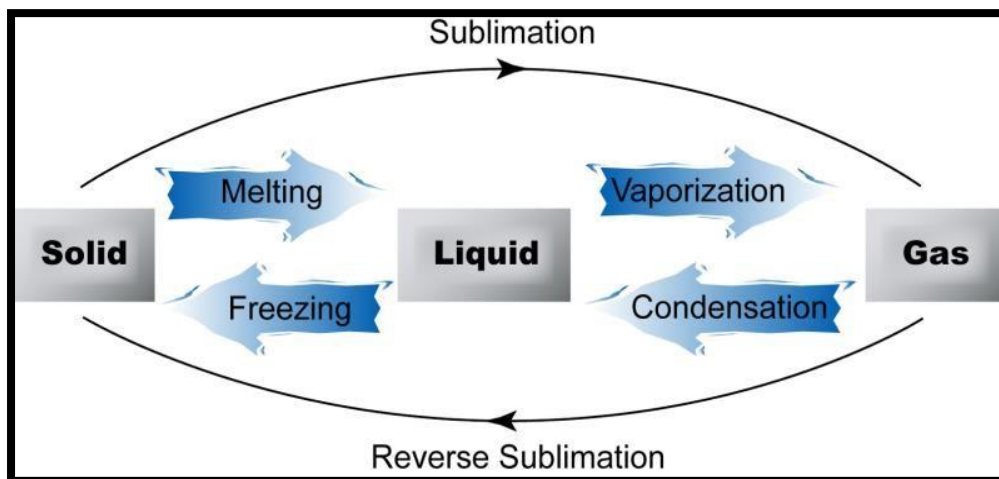
1. Determine the volume (in ml) of the object in the diagram shown below and show your working.



2. What would be the volume in cubic centimetres ( $\text{cm}^3$ )? Write down the answer and the unit.

## Changes of State

- Substances can change from solid to liquid to gases as they get more energy. For example, ice (solid) can change to water (liquid), then to steam or vapour (gas).
- Similarly, we can change gases into liquid and then to solids by taking energy away that is by cooling them down.
- For example, water vapour (gas) on cooling changes into water (liquid) which on further cooling changes into ice (solid).
- In most substances this processes are reversible. They can happen either way because it is a physical change.



**ACTIVITY:** Write the definitions of the following words and examples.

- I. Melting- \_\_\_\_\_
- II. Freezing- \_\_\_\_\_
- III. Vaporisation- \_\_\_\_\_
- IV. Condensation- \_\_\_\_\_
- V. Sublimation- \_\_\_\_\_
- VI. Reverse sublimation - \_\_\_\_\_

The End