

Lesson 6:

SNC1P

Measuring Density

- D refers to the mass of one unit of volume of a substance. It is a unique relationship between the mass and volume of a substance.
- In the SI, the density of a substance is the mass (in kilograms) of one cubic metre of a substance. Thus, the preferred SI unit of density is the k (kg/m³).
- Density is useful in i a substance.
- Different substances have d densities at specific temperature (ranges).
- Density is also useful to determine if the object will s or f in a given liquid.
- To calculate density, we use the equation: _____

$$\frac{M}{dV}$$

a) $d = ?$ $V = 100 \text{ mL}$ $M = 450 \text{ g}$	b) $d = 3 \text{ kg/m}^3$ $V = 950 \text{ m}^3$ $M = ?$	c) $d = 0.5 \text{ g/cm}^3$ $V = ?$ $M = 20 \text{ g}$
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Sample Problems/Homework:

- 1) Mercury metal is poured into a graduated cylinder that holds exactly 22.5 mL. The mercury used to fill the cylinder weighs 306.0 g. From this information, calculate the density of mercury.
- 2) A block of aluminum occupies a volume of 15.0 cm³ and weighs 0.0405 kg. What is its density?
- 3) 28.5 g of iron shot is added to a graduated cylinder containing 45.50 mL of water. The water level rises to the 49.10 mL mark. From this information, calculate the density of iron.
- 4) A block of lead has dimensions of 4.50 cm by 5.20 cm by 6.00 cm. The block weighs 1587 g. From this information, calculate the density of lead.
- 5) Find the mass of 250.0 mL of benzene. The density of benzene is 0.8765 g/mL.
- 6) What is the weight of the ethanol that exactly fills a 200.0 mL container? The density of ethanol is 0.789 g/mL.
- 7) What volume of silver metal will weigh exactly 2500.0 g. The density of silver is 10.5 g/cm³.
- 8) A rectangular block of copper metal weighs 1896 g. The dimensions of the block are 8.4 cm by 5.5 cm by 4.6 cm. From this data, what is the density of copper in kg/m³? (Hint: Convert g to kg and cm to m first.)