

GRADE 8 SCIENCE

UNIT 3: FLUIDS & VISCOSITY

Chapter 8: *Density*

describes the amount of mass in a given volume of a substance.

DENSITY

- A measure of the mass contained in a given volume.
- A substance with a lower density will float on substances with higher densities.



DENSITY AND THE PTM

- The PTM states that different substances have different sized particles.
- The PTM also states that there are spaces between the particles.



○ The greater the spaces between the particles, the less particles therefore the lower the density.

Ex. Water vapour has a lower density than liquid water.



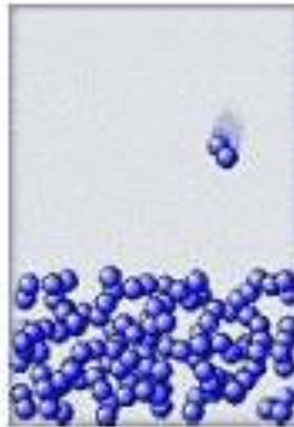
- *In general*, gases are less dense than liquids and liquids are less dense than solids.

Gas



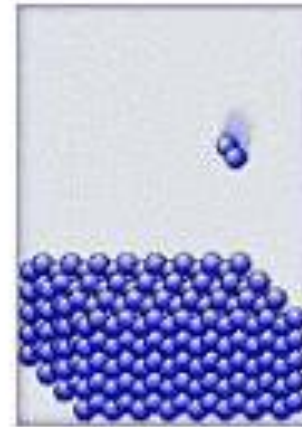
- low density

Liquid



- high density

Solid



- high density



CALCULATING DENSITY

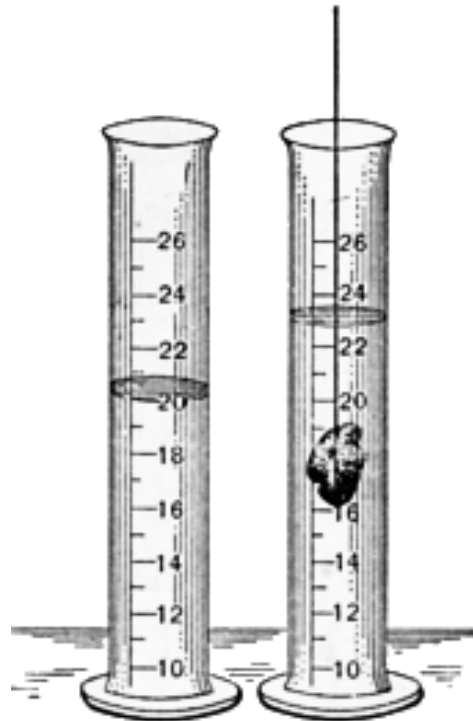
- You must know the mass and volume of a substance first.

Mass: the amount of matter in a substance.

Volume: the amount of space occupied by the substance.

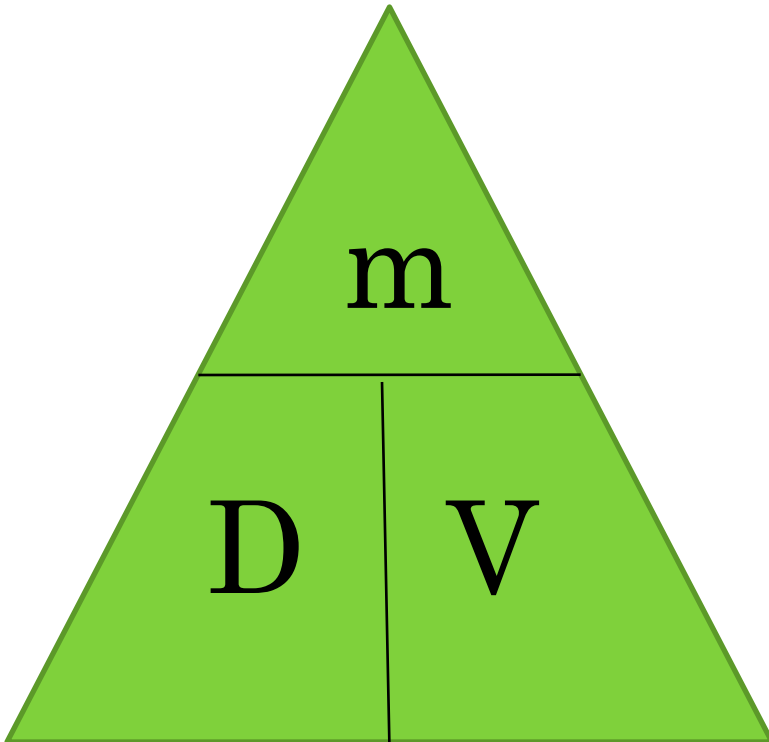


To measure the volume of an irregular shape, you will need to determine the amount of water it displaces.



Formula:

$$\text{Density} = \frac{\text{Mass (m)}}{\text{Volume (V)}}$$



SAMPLE PROBLEMS

1. Find the **density** of a 10g mass of a substance that has a volume of 2.0 cm³.

$$D = \frac{m}{V}$$

$$D = \frac{10g}{2.0cm^3}$$

$$D = 5.0g/cm^3$$



2. You want to put 10g of salt into a container. What is the **volume** of the container if the salt completely fills it?

$$V = \frac{m}{D} \quad V = \frac{10\text{g}}{2.16\text{g/cm}^3}$$

$$V = 4.63\text{cm}^3$$



What is the mass of
1500mL of helium?

$$m = D \times V$$

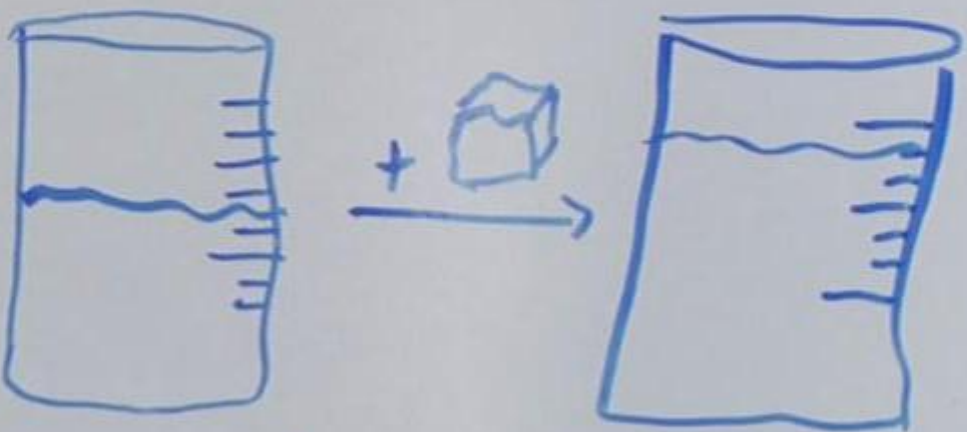
$$m = 0.0002\text{g/mL} \times 1500\text{mL}$$

$$m = 0.3\text{g}$$



Assignment: Complete
the practice problems
on pages 312- 314.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$



$$\text{final} - \text{initial} = V$$

Core Lab Activity 8-2B:

Pg. 316-319

“DETERMINING DENSITY”



TEMPERATURE & DENSITY

Increasing temperature will cause the particles in a substance to gain energy, spread out and take up less space.

Results in decreased density.



EXAMPLES/ APPLICATIONS...

- Hot air balloons
- Warm vs. cool tire pressure
- Water in each of its three states (*water as a solid is less dense as the particles move apart as they freeze*) ●

- Drying wood
- Salt water is more dense
- Swim bladder (fish)
- Submarines

