Density

Density: The amount of matter ("stuff") in a given volume (amount of space).
To calculate the density of an object, you need to divide the mass of the object by its volume.

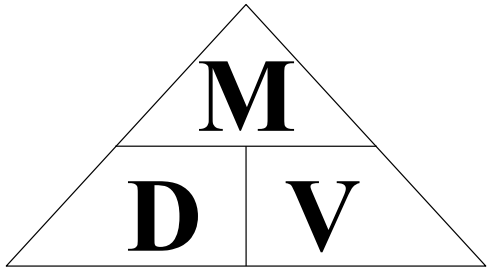
$$\text{Density} = \frac{M}{V}$$

Units of Density: g/cm³, g/mL, kg/m³, kg/L

Mass:
With many objects, mass can be measured using a balance or a scale. If the material is a liquid, you would need to subtract the mass of the container.

Volume:
To measure volume of a regular sized object measure the height, width and length of the object and multiply these three dimension. For a irregularly shaped object, use a graduated cylinder and find the displacement of the object.

Formulas for Density, Mass and Volume:
The triangle of mass, density and volume allows for you to solve for any one of these



Density = $\frac{\text{mass}}{\text{volume}}$ D = $\frac{m}{v}$

Mass = density X volume M = d X v

Volume = $\frac{\text{mass}}{\text{density}}$ V = $\frac{m}{d}$

Density of Water = 1 g/cm³
if an object's density < 1 g/cm³, it will **float**
if an object's density > 1 g/cm³, it will **sink**

Fill in the blanks with the proper formula and then its proper number.

Place an X in the column if the substance will float or sink in water. Give proper units for each answer (g, cm³, g/cm³). Round answers to the tenths place.

Formula	Mass	Volume	Density	Sink?	Float?
	12 g	0.5 cm³			
	16 g		0.2 g/cm³		
		5 cm³	20 g/cm³		
	0.9 g		0.3 g/cm³		
	6 g	4 cm³			
	8 g	1.8 cm³			
		13 cm³	9 g/cm³		
	14.7 g	15 cm³			
		2 cm³	1.1 g/cm³		
	17 g		3 g/cm³		

Problems:

Answer the following questions

1. How is the amount of space an object takes up measured?

   By measuring its _____

2. What is the definition of density?

3. How do you find the density of an object?

4. What is a unit of density?

5. A baseball has a density of 1.5 g/cm^3. If you cut the ball in half, what will the density of one of the pieces be?

6. You know the volume of a glass of milk. What else do you need to know to find the density of the milk?

7. You have a brick with the dimensions of 2 cm by 3 cm by 8 cm. What is the volume of the brick?

8. A piece of wood has a mass of 18 grams and a volume of 30 cm^3. What is the density of the wood?

9. A graduated cylinder is filled to the 50 ml mark. When a marble is put into the graduated cylinder, the water level rises to the 54 ml mark. What is the volume of the marble?

10. A small rock has a density of 1.4 g/cm^3 and a mass of 70 grams. What is its volume?