Physical Properties:

Physical property:

Can be measured/observed without changing the substance's composition

- Viscosity
- Hardness
- Color
- Conductivity
- Malleability
- Density
- Melting/boiling point

Physical Changes:

Physical change:

Can be reversible, but may not always be so.

Change in physical properties of a material, but not in its composition

- All phase changes (boil, freeze, melt, condense, etc.)
- Break
- Split
- Grind
- Cut
- Crush

Density

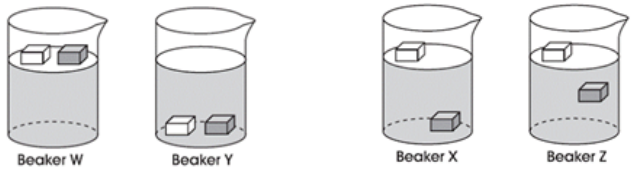
…the ratio of the mass of a substance to its volume.

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

mass (grams, g)

Density, (grams per milliliter, g/mL)

volume (milliliters, mL or cm3)



Density

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

A practice problem…

What is the density of a ball with a mass of 35 g and a volume of 70 mL?

Density

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

Another practice problem…

What is the mass of a coin with a density of 9.9 g/cm^3 and a volume of 1.3 cm^3 ?

Density

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

And one more practice problem…

What is the volume of a liquid with a density of 2.8 g/mL and a mass of 5.6 g?

Density

Density is a physical property that can be used to determine a substance's identity!

METAL	DENSITY (g/cm3)
Aluminum	2.7
Iron	7.9
Lead	11.4
Silver	10.5

What is the identity of a substance with a mass of 15.2 g and a volume of 1.9 cm3?

Density

Sometimes you will have to calculate the volume FIRST, then calculate the density.

Measuring the rise of water in a graduated cylinder resulting from an object

One way we can do this is by water displacement.

11. If a 3-kg marble was dropped into 8 mL of water, what is the density of the marble?