

2. Density

Density = mass / volume (units: gm/cm³ or kg/m³)

a. Common Densities (gm/cm³)

(1)	Ice (solid H ₂ O)	0.92
(2)	Water (liquid H ₂ O)	1.0
(3)	Quartz	2.65
(4)	Lead	10.5
(5)	Benzene	0.81
(6)	Seawater	1.03
(7)	Dry air (0 C)	0.00129
(8)	Hot air (30 C)	0.00116

Key

IMPORTANT CONCEPT: Less dense objects will float in more dense liquids; more dense objects will sink in more dense liquids.

Density determines the nature of "floaters" and "sinkers"

Questions for Thought:

Given the density of lead above, if you had 21 gm of lead, what would its volume be?

Which has a greater density: 1000 kg of Benzene or 1 kg of Lead? **LEAD**

Will ice float in water and why? **YES, LESS DENSE THAN LIQUID H₂O**

Does lead float or sink in water and why?

NO, MORE DENSE THAN H₂O

Consider a freshwater river flowing into the ocean, what will happen to the river water once it flows into the ocean? and why?

RIVER WATER FLOATS, LESS DENSE

Why does a hot air balloon rise in the atmosphere?

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

$$V = \frac{21g}{10.5g/cm^3} = 2 cm^3$$

III. Heat Energy and Temperature

A. Heat - internal energy within a substance = kinetic molecular energy

1. high heat substances = high degree of kinetic molecular energy

a. i.e. the higher the heat the faster the vibration of atoms and molecules

B. Temperature - measure of the average amount of heat energy in a substance - i.e. the average kinetic energy of a substance

a. Metric unit = Celsius, English unit = Fahrenheit

- (1) Measured in terms of freezing and boiling points of water
- (2) water freezes at 32° F = 0° C water boils at 212° F = 100° C