SNC 1D1

THE DENSITY OF MATTER

A. Density:

the mass of a substance (how much matter it has) divided by its volume (how much space it occupies).

equation -- **$D = m/V$**

where D = density (kg/m^3)
m = mass (kg)
V = volume (m^3)

very important quantitative property of matter -- it helps identify a substances

every substance has a specific density (p. 36 of textbook)

the preferred SI unit for density is kg/m^3

other units are also used: g/L, g/dm^3, g/cm^3, g/mL

note that: **$1\ kg/m^3 = 1\ g/L = 1\ g/dm^3$**
$1\ g/cm^3 = 1\ g/mL = 1000\ kg/m^3$

B. Density Calculations:

1. Conversions:
   $1000\ kg/m^3 = ?\ g/cm^3$
   $5.0\ g/mL = ?\ kg/m^3$
   $25.67\ g/cm^3 = ?\ g/L$

2. Problems:
   Example: A young man wants to buy his sweetheart a friendship ring made of pure gold at Phoenix General Store and Tackle. The mass of the ring is 29.8 g. The young man remembers what he had learned in his Science class, and quickly takes out a graduated cylinder. He fills it up to the 20 mL mark with water, and throws the ring in. The level of water rises up to 22.64 mL. Is this substance real gold?

   Density = Mass / Volume (D = m/V)

   = 29.8 g / 2.64 mL
   = 11.287879 g/mL
   = 11.3 g/mL
   = 11300 kg/m^3

   V = 22.64 mL - 20 mL
   = 2.64 mL
   m = 29.8 g

The density of gold = 19300 kg/m^3
Therefore the substance is not gold, but lead (11300 kg/m^3) painted gold in colour!!!!