Name: _____   Date: _____

Mass, Volume, and Density (Science 8)

MASS is: _____

Mass is expressed in units of: _____

VOLUME is: _____

Volume is expressed in different units depending on if it is a liquid or solid.

Volumes of **liquids** are expressed in _____.
Other units also exist, such as L (liters), oz (ounces), cups, teaspoons, etc.

Volumes of **solids** are expressed in cubic units, such as _____

_____ and m³ (meters cubed).

DENSITY is: _____.

It tells us whether a substance will _____ or _____ in another substance.

Density Units
The formula to calculate density is:

Therefore, the units for density are **_any mass unit divided by any volume unit_**:

e.g. $\frac{g}{mL}$, $\frac{g}{cm^3}$ are the ones most commonly used, but you could also see $\frac{kg}{L}$, $\frac{lb}{m^3}$, etc.

Density of solids is given in units of **_____**.
Density of liquids is given in units of **_____**.

PRACTICE

1. A gold ring sinks in water. Therefore, gold is (more/less) dense than water.

2. If oil floats on top of water, that means that oil must be (more/less) dense than water.

3. Based on their units, classify the following quantities as **masses**, **volumes**, **densities**, or **none** of these.

   a. 15kg   _____   h. 2.4 g/cm³   _____

   b. 3.25g   _____   i. 13.582 g/kg   _____

   c. 2L   _____   j. 12.8 g   _____

   d. 11.5 cm³   _____   k. 21 cm³   _____

   e. 1.2 g/mL   _____   l. 2.7 mL/g   _____

   f. 32 g   _____   m. 3.8 kg/mL   _____

   g. 6.3 cm²   _____   n. 150 mL   _____

4. What is the density of water? Remember units.

   _____

Material	Density (g/cm³)
Foam plastics	0.01-0.6
Wood	0.4-0.8
Natural rubber	0.83-0.91
Polypropylene	0.90
H.D. polyethylene	0.96
Polystyrene	1.0-1.1
Polyvinyl chloride	1.40
Magnesium and alloys	1.74-1.88
Hollow aluminum	2.2-2.5
Aluminum and alloys	2.6-2.9
Zinc and alloys	5.2-7.2
Stainless steels	7.5-7.7
Brass and bronze	5.2-7.2
Copper and alloys	7.5-9.0
Lead and alloys	10.7-11.3

5. Use the table on the right to answer the following questions.

   a. What *weighs more*: a gram of foam or a gram of zinc?

   _____

   b. What is *more dense*: a gram of foam or a gram of

   zinc?   _____

   c. In water, will foam float or sink?   _____

   d. In water, will zinc float or sink?   _____

6. There is 30 mL of water in a graduated cylinder. When a rock is put into the water, it sinks, and the water level rises to 34 mL. What is the volume of the rock? Remember units and show your work.

7. Calculate the density of a rock that weighs 8g and has a volume of 3 cm³. Remember units and show your work.

8. Calculate the density of a piece of Styrofoam™ that has a volume of 50 cm³ and weighs 3g. Remember units and show your work.

9. There is a graduated cylinder with 20 mL of water. A ring weighing 12g is dropped into the water and it sinks to the bottom, causing the water level to rise to 21.5 mL.
   a. What is the volume of the ring? Remember units and show your work.

   b. What is the density of the ring? Remember units and show your work.

   c. Compare the density you calculated in "b" to the table from question #5. What material is the ring most likely made out of?