Name: _____
Date: _____Period_____

Chemistry: *Density Problems*

For each problem below, write the equation and show your work. Always use units and box in your final answer.

1. A 2.75 g sample of a substance occupies a volume of 250.0 cm^3. Find its density.

2. The density of silver (Ag) is 10.5 g/cm^3. Find the mass of Ag that occupies 965 cm^3 of space.

3. Under certain conditions, oxygen gas (O_2) has a density of 0.00134 g/mL. Find the volume occupied by 250.0 g of O_2 under the same conditions.

4. Find the volume that 35.2 g of carbon tetrachloride (CCl_4) will occupy if it has a density of 1.60 g/mL.

5. The density of ethanol is 0.789 g/mL at 20°C. Find the mass of a sample of ethanol that has a volume of 150.0 mL at this temperature.

6. 30.0 g of each of the following acids are needed. Find the volume of each that must be measured out in a graduated cylinder.

   A. hydrochloric acid (HCl), density = 1.164 g/mL

   B. sulfuric acid (H_2SO_4), density = 1.834 g/mL

   C. nitric acid (HNO_3), density = 1.251 g/mL

7. A rectangular block of lead (Pb) measures 20.0 cm X 30.0 cm X 45.0 cm. If the density of Pb is 11.34 g/cm^3, calculate the mass of the block.

8. A cube of gold (Au) has a side length of 1.55 cm. If the sample is found to have a mass of 71.9 g, find the density of Au.

9. An irregularly-shaped sample of aluminum (Al) is put on a balance and found to have a mass of 43.6 g. The student decides to use the water-displacement method to find the volume. The initial volume reading is 25.5 mL and, after the Al sample is added, the water level has risen to 41.7 mL. Find the density of the Al sample in g/cm^3. (Remember: 1 mL = 1 cm^3.)

10. If you **are sure** that a sample of material is aluminum but have no measuring instruments AND are not allowed to handle the sample, how would you determine the sample's density?

10. A gas has a mass of 3175 g and takes up enough space to fill a room that is 200.0 cm X 200.0 cm X 500.0 cm. Use the table below, which lists densities in units of g/mL to help you identify the gas.

Densities of Common Gases at 20°C under Normal Atmospheric Pressure	
Gas	Density (g/mL)
Hydrogen	0.000084
Helium	0.000166
Nitrogen	0.001165
Oxygen	0.001331