Chp2 : Density Problems & Calculations

There are physical characteristics of a substance that help identify the substance. One of these characteristics is density. Density (whose most common symbol is the lowercase letter d) is defined as mass per unit volume. Density is calculated by dividing the mass of an object by its volume. This is shown in equation form, as follows:
Density = mass ÷ volume Density x Volume = Mass
We can calculate the density of a solid, liquid, or gas. Although the density of liquids and solids does change with temperature and pressure changes, the amount is fairly small. We will ignore these small amounts and act as if all our density problems are at the same temperature and pressure. Note the difference in units in the formulas of the density of a solid and liquid. The unit for cubic centimeters is cm^3 and for milliliters is mL.

Practice Problems

1) A block of aluminum occupies a volume of 15.0 mL and weighs 40.5 g. What is its density?	2) Mercury metal is poured into a graduated cylinder that holds exactly 22.5 mL. The mercury used to fill the cylinder weighs 306.0 g. From this information, calculate the density of mercury.
3) What is the weight of the ethyl alcohol that exactly fills a 200.0 mL container? The density of ethyl alcohol is 0.789 g/mL.	4) A rectangular block of copper metal weighs 1896 g. The dimensions of the block are 8.4 cm by 5.5 cm by 4.6 cm. From this data, what is the density of copper?
5) A flask that weighs 345.8 g is filled with 225 mL of carbon tetrachloride. The weight of the flask and carbon tetrachloride is found to be 703.55 g. From this information, calculate the density of carbon tetrachloride.	6) Calculate the density of sulfuric acid if 35.4 mL of the acid weighs 65.14 g.
7) Find the mass of 250.0 mL of benzene. The density of benzene is 0.8786 g/mL.	8) A block of lead has dimensions of 4.50 cm by 5.20 cm by 6.00 cm. The block weighs 1591 g. From this information, calculate the density of lead.
9) 28.5 g of iron shot is added to a graduated cylinder containing 45.5 mL of water. The water level rises to the 49.1 mL mark, From this information, calculate the density of iron.	10) What volume of silver metal will weigh exactly 2500.0 g. The density of silver is 10.5 g/cm^3.

Chapter 2 Density / Buoyancy Questions:

Answer the questions that are shaded: Show your work!

Object	**Mass** (gram)	**Volume** (mL or cm^3)	**Density** (g/mL or g/ cm^3)	**Sink or Float?**
Piece of Cork	24	100	**Question 1**	**Question 2**
Piece of Wood	89	10	**Question 3**	**Question 4**
Steel Cube	7.8	1	**Question 5**	**Question 6**
Steel Nail	**Question 7**	1.6	7.8	**Question 8**
Block of Gold	575	**Question 9**	19.3	**Question 10**
Ice Cube	**Question 11**	1	0.92	**Question 12**
Rubber Stopper	33	30	**Question 13**	**Question 14**
Milk Carton	2	**Question 15**	0.95	**Question 16**
Block of Aluminum	81	30	**Question 17**	**Question 18**
Pinewood	**Question 19**	25	0.50	**Question 20**

Formulas to Remember:

D=m/v V=D/m m= D x V

D= Density V= Volume m= Mass

Remember: Density of water is 1.

For an object to float, the density must be LESS than 1, otherwise, it will sink!