Name _____ Period _____

Lab 2 – Density of a Solid and a Liquid **40 Points**

Introduction

In this lab we will be solving for density, the mass (weight) of an object based on the object's volume (*size*). To solve for density we need to measure the volume and mass of the sample using basic laboratory techniques.

Density is found using the density equation:

D = m / v, where D = Density (g/mL), m = mass (g), and v = volume (mL)

Volume by Water Displacement

The volume of a solid can also be found using the displacement method. To use the displacement method the initial volume (*initial, without solid*) and final volume (*with solid*) using the equation below:

$V_{solid} = V_{after} - V_{start}$

Density Tables for Metals

Element	Aluminum	Brass	Copper	Gold	Iron	Lead	Nickle
Density	2.60g/mL	8.50g/mL	8.96g/mL	19.3g/mL	7.87g/mL	11.3g/mL	8.90g/mL
Element	Platinum	Silver	Steel	Tin	Tungsten	Vanadium	Zinc
Density	21.5g/mL	10.5g/mL	7.86g/mL	7.26g/mL	4.51g/mL	6.0g/mL	7.14g/mL

Lab Procedure

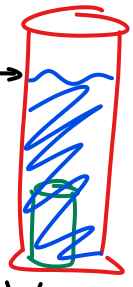
Density of a Solid

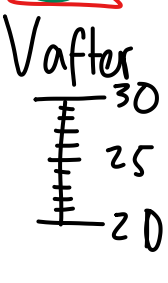
Volume by Displacement

1. Add water to the halfway mark on a graduated cylinder (*record volume*)
2. Add metal and record new volume (*record volume*)
3. Subtract new volume from original volume
4. Use volume and mass above to solve for density
5. Determine metal based on chart above/properties

Data Table with Initial Calculations (*V_{metal} and Radius*)

Metal	V_{start} (*ml*)	V_{after} (*ml*)	V_{metal} ($V_{after} - V_{start}$)	Mass (*g*)
Silver (*Shiny*) (Dark)				
Silver (*Not Shiny*) (Light)				
Gold	20mL	29mL	9mL*	71.6g*





29mL − 20mL

Calculations

Density (*Solid Measurements*)

D = Mass (m) / V_{metal}

$D = \frac{M_{metal}}{V_{metal}}$ *

Silver (*Shiny*)	Silver (*Not Shiny*)	Gold
D = _____	D = _____	D = $\frac{71.6\text{ g}}{9\text{ mL}}$
D =	D =	D = 7.96 g/mL

dark silver

light silver

orange/yellow

Results

What were the metals for each metal cylinder?

Compare results from each density calculations to chart on front of lab document

Cylinder	Silver (*Shiny*)	Silver (*Not Shiny*)	Gold
Metal			Brass

(use color + density