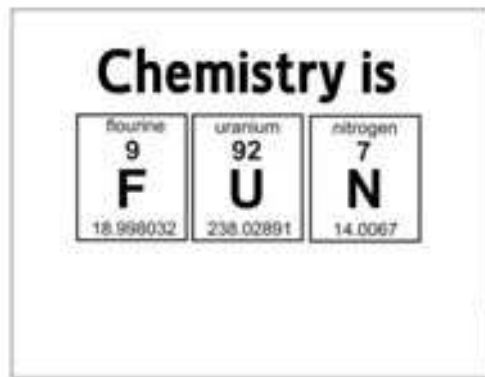


The Review Lab #1

Name: _____ 40/1200



There are three stations in this lab. Visit each one, get the data you need, combine it with data on this sheet and the boards, and the reference tables, to create graphs, make tables, use formulas, and explain all of your thoughts.

Part 1 - Density of Nickels - graphing and using slope math.

Determine the actual volume for nickels. Measure the mass of 5 sets of nickels (any grouping) and measure their volumes using the displacement method (no splashing). Remember: for anything, even water: $1.00 \text{ mL} = 1.00 \text{ cm}^3$ in volume measurement.

Fill in the data table showing nickel mass and volume data, which you need to create a graph. Make a graph showing mass of nickels as a function of the volume of nickels using your measurements. Include a title and labels with units. **Bigger Graphs Are Better Graphs.**

Draw a straight, best fit line for your data points. You'll need to do the slope math for this line **ON THE GRAPH PAPER**, and this will give you your measured density for the coins. Make sure you **CIRCLE** the 2 points you use for the slope math. Your graph **MUST** go through 0,0 (or else the Universe is broken!)

Data table for nickels - Part 2		Volume of water to start _____ mL
# of nickels	mass of the nickels grams	volume to nearest 10th of an mL

Part 2. Density of Deionized water, slope math.

Using the smaller graduated cylinders, an electronic balance, an eyedropper and about 12 mL of deionized water in a small beaker, calculate the mass and volume of water 7 times in a row. None less than 2.0 mL please. Make sure you don't go over the 10.0 mL limit.

Make a graph showing your results with mass as a function of volume. Including a title and labels with units. Draw a best fit line for your data points. You will determine the slope of your line with slope math, which is also your measured density for the deionized water. **Bigger graphs are better graphs.**

You'll need to do the slope math for this line **ON THE GRAPH PAPER**, and this will give you your measured density for the coins. Make sure you **CIRCLE** the 2 points you use for the slope math. Data chart on page 2 of lab.

Part 2.	Data table for deionized water	mass of the glass tube _____ grams
	mass in grams of <u>JUST the water</u>	volume of deionized water to 10ths mL
Trial 1		
Trial 2		
Trial 3		
Trial 4		
Trial 5		
Trial 6		
Trial 7		

Part 3. Properties of Metals vs. Properties of Non-Metals

The Periodic Table is organized so that it is helpful to you to figure out important facts about the elements. The table has up and down GROUPS which contain elements with similar chemical and physical properties. They bond alike, and they are similar physically too. There are 18 groups. The rows going across (7 of these) are called periods. The only similarity any atoms have that are in the same period is that they have the same number of electron orbitals. (check this now for periods 1 through 5, it will take one minute, then you will remember).

1. Starting with Boron (rhymes with...) find that dark staircase line. It separates the metals from the nonmetals (except for the weirdo hydrogen). Metals are on the left side of the staircase, while the non metals are on the right side.
2. Metals have properties that are completely different from nonmetals. Metals make only positive cations—by losing electrons. They conduct heat and electricity, and you can pound them flat (they're malleable) or squish them into a wire shape (they're ductile). They also shine when light is reflected on them (they have luster) and have higher melting points and higher boiling points than nonmetals. All of them are solids at standard temperature and pressure (Table A) except for that really amazing metal mercury which is a liquid.
3. Nonmetals only form anions - by gaining electrons. They do not conduct either heat or electricity, they are brittle, which means not malleable or ductile, tend to be dull and unreflective to light, and usually melt and boil at lower temperatures than metals do. Most are gases, so the idea of malleable or ductile is sort of out the window.
4. All elements are Metals or Nonmetals. In addition, 7 elements along the staircase are ALSO called metalloids, which means that they have some properties from the other team.
5. They are nonmetals, but have SOME metallic properties. Or they are metals, but have SOME nonmetal properties. Al and Po, Aluminum and Polonium, touch this "staircase" but are pure metals, they are not metalloids. They are exceptions to the rule.

Examine the 4 different elements in this lab. Read the 4 sheets that are with the elements! Fill in the chart on the next page about their properties, comparing and contrasting them. Use a pencil so you can make adjustments as needed. Leave NO BLANKS.

I Promise that I read the whole data sheet for S _____ Ti _____ Si _____ Ag _____
 (initial each one when you are done reading)

Element Data	sulfur	titanium	silicon	silver
Is it a metal, a non-metal, a metalloid? Or 2 of these?				
What is its chemical symbol?				
What are the symbols its ions make? (ex: Na ⁺)			None in our class	
Convert its MELTING POINT into °C?				
Is it lustrous? Lustrous or Dull?				
Would this element conduct heat? Yes or No				
Is it BOTH malleable + ductile, or is it BRITTLE ?				
Can it conduct electricity? Yes or No				
What is its ground state electron configuration?				
Write a possible excited state e ⁻ configuration				
# of p ⁺ =				
# of n ^o =				
# of e ⁻ =				

Part 4. PUT ALL QUESTIONS ONTO LOOSE LEAF PAPER

- Calculate the volume of a nickel using the $V = \pi r^2 \cdot h$ formula. U.S. nickels have these dimensions: diameter 21.2 mm, height 1.9 mm.
Convert the mm into cm before doing the calculation or it won't work out!
- You can calculate the actual density for the nickel coins by doing math this way: (now do it on looseleaf)

$$\begin{array}{l} \text{Ni} \quad (8.902 \text{ g/cm}^3)(.25) = \\ \text{Cu} \quad (8.960 \text{ g/cm}^3)(.75) = + \end{array}$$
 _____ \longrightarrow round to 3 sf: _____ g/cm^3
- Calculate the slope of your line in the nickel graph? State the measured density of your nickel coins.
Hint, it's the SAME thing.
- What is your % error for the density of nickels? Why do you have this % error?
- Explain why you did not use the density of the element nickel from Table S.
- On page 124 in the blue Chemistry text book is one sentence called the Periodic Law. Copy it neatly, then explain what it means in your own words.
- Calculate the slope of your line on the water graph. The slope IS the measured density.
- What was your % Error for density of the deionized water, why did you get this error?
- Define metalloid. Make a list of the symbols and names of the 7 members of this group of elements.
What does the "dog-food" exception to the metalloid line rule mean?
- Define luster, define malleable and define ductile. Stay OFF of the internet!!!

this lab	requires this info	for these points
cover	title + intro sentence	1 + 1 = 2
element data table	all element data	8
nickel graph & data table	Title, best fit straight line, units and axis labels	2 + 1 = 3
water graph & data table	Title, best fit straight line, units and axis labels	2 + 1 = 3
lab questions	complete sentence answers and show all the math you're asked to do, write the formulas, and do it neatly	9
this lab due on: _____		25