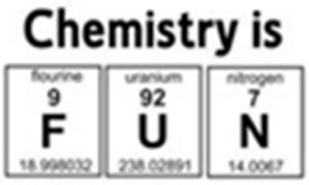
The Review Lab #1

40/1200

Name:



Part 1 - Density of Nickels

Measure the dry mass of 5 sets of nickels.
Do not round the mass on digital scales!
Then measure the corresponding volumes using the displacement method (no splashing).
Measure volume to the nearest 10th mL

Part 2 - Density of Deionized Water

Using the smaller graduated cylinders, an electronic balance, an eyedropper and deionized water, measure the proper amounts of water, and measure mass.

Deionized water is PURE WATER, density = 1.00 g/mL

Number of nickels	Mass of nickels grams	Nickel volume mL or cm^3
10		
15		
20		
25		
30		

Do you know what element number 28 on the Periodic Table is?

I wouldn't bet 5¢ that you know! Haha!

Deionized Water Density	
Volume of water	Mass of JUST the water grams
3.0 mL	
4.0 mL	
5.0 mL	
6.0 mL	
7.0 mL	
8.0 mL	
9.0 mL	
10.0 mL	

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

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.

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 shells.

1. Find Boron (rhymes with…) find the 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 nonmetals 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, they are malleable which means you can pound them flat, they are ductile which means you can squish them into a wire shape. They have luster, which means they shine when light is reflected on them. They have higher melting points and higher boiling points than nonmetals. All of them are solids at room temperature except for that really amazing metal called 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 they crack when you smash them. They tend to be dull and unreflective to light. Nonmetals usually melt and boil at lower temperatures than metals do. Most are gases, so the idea of malleable or ductile is silly.

4. All elements are Metals or Nonmetals. In addition, 7 elements along the staircase are ALSO called metalloids. Metalloids are metals with some nonmetallic properties or, nonmetals with some metallic properties. Al + Po make up the "AlPo" dog food exception, Al and Po are both metals.

5. The nonmetal metalloids (B, Si, As, Te, and At) have SOME metallic properties. The metal metalloids (Ge and Sb) have SOME nonmetallic properties. Al and Po, Aluminum and Polonium, touch this "staircase" but are pure metals, they are not metalloids.

Periodic Law

When the atoms are arranged in order of atomic number
(in the weird shape of our table),
there is a periodic repetition of the chemical and physical properties in the groups.

Elements	sulfur	titanium	silicon	silver
Symbol from Periodic Table				
Check ALL that apply	___ metal ___ nonmetal ___ metalloid	___ metal ___ nonmetal ___ metalloid	___ metal ___ nonmetal ___ metalloid	___ metal ___ nonmetal ___ metalloid
List ALLthe ions each element makes. (ex: Na^{+1})			None in our class	
MELTING POINT in °C	°C	°C	°C	°C
Is it Lustrous or Dull? (circle)	Lustrous or Dull	Lustrous or Dull	Lustrous or Dull	Lustrous or Dul
Does this element conduct heat? Yes or No?				
This element is malleable + ductile or brittle (circle)	Malleable + Ductile Brittle	Malleable + Ductile Brittle	Malleable + Ductile Brittle	Malleable + Ductile Brittle
Can it conduct electricity? Yes or No?				
What is its ground state electron configuration?				
Write a possible excited state e^- configuration				
# of protons				
# of neutrons				
# of electrons				

Lab Questions. PUT ALL QUESTIONS ONTO LOOSE LEAF PAPER

1. Calculate the volume of a nickel coin using the formula of $V = \pi r^2 \cdot h$
   U.S. nickels have these dimensions: diameter 21.2 mm, height 1.9 mm.
   Convert the mm into cm before doing the calculation!

2. You can calculate the actual density for the nickel coins by doing math this way: (copy onto loose leaf)
   Ni $(8.902\ g/cm^3)(.250) =$
   Cu $(8.960\ g/cm^3)(.750) =$ _____
   sum these up → then round answer to 3 SF: _____ g/cm^3

3. State the measured density of your nickel coins. Hint, it's the SAME thing as the slope, with units!

4. What is your % error for the density of nickels?

5. Explain why you did not use the density of the element nickel from Table S as your actual value.

6. On page 2 of this handout is the Periodic Law. Copy it neatly and explain what it means.

7. State the measured density deionized water. Hint, it's the same thing as the slope, with units!

8. What was your % Error for density of the deionized water?

9. Define metalloid. What are the names and symbols of these 7 elements? What about Al and Po, they touch the stairs, are they metalloids as well? Why is there a can of AlPo dog food in our classroom?

10. Define luster, define malleable and define ductile. Definitions are in this lab handout.
    Stay off the internet!

GRAPHING

You need to make 2 BIG GRAPHS, one for the density of the nickel coins and another for the density of deionized water. On both, mass is on the Y axis (up and down) and volume is on the X axis (left to right).

You will start both graphs at 0,0 and make scales that are consistent and have NO BREAKS.

You will draw the best fit straight line, start at 0,0 and then calculate slope for these lines ON THE GRAPH.

Circle the 2 points you are using for slope. They may or may not be data points you measured. They must be on the line. Your slopes are your measured densities of the nickel coins and the pure water.

This lab	Requires this	For these points
Cover	title + intro sentence	1 + 1 = 2
Element Page	All boxes filled in correctly	7
10 lab questions	Math, units, words, etc.	20
Nickel Graph	Including title, axis labels with units, scales, best fit lines, and slope math with SF and units.	6
Water Graph		
This lab is due		35 points