Partial hints for solving tonight's El Sol Sheet

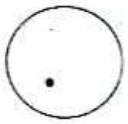
Naming Ions.

CλeMis+ry: http://genest.weebly.com

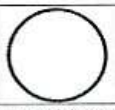
Stop in for help every day at lunch and Tues &Thurs after school!

Name_____

Period_____



1. This is a pretty good drawing of what Thomson thought a Plum Pudding NEUTRAL hydrogen atom looked like. It shows a positive circle with one electron in it.

		SO_4^{2-}	NH_4^+	He
This is (choose one) a) an anion b) neutral c) a cation	This is (choose one) a) an anion b) neutral c) a cation	This is (choose one) a) an anion b) neutral c) a cation	This is (choose one) a) an anion b) neutral c) a cation	This is (choose one) a) an anion b) neutral c) a cation

2. Go through the boxes below and do the following:
   - circle any metal that has a variable charge
   - cross out any polyatomic ion

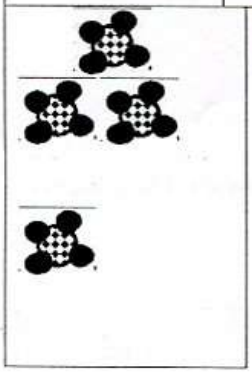
CO_3^{2-}	Al^{3+}	Fe^{2+}	PO_4^{3-}	Au^+
_____	Aluminum	IRON(II)	_____	_____

YOU DON'T NEED A ROMAN NUMERAL. IT'S SUPERFLUOUS BECAUSE ALUMINUM'S CHARGE IS ALWAYS 3+

3. Go back through the boxes above and write the name. Remember the rules for naming:
   - metal ions that **do** have a variable charge are the name of the element, followed by a roman numeral that tells the charge. For example Fe^{3+} is named *Iron(III)*
   - Polyatomic ions just get whatever name is on your photocopied ion sheet given on Tuesday.
   - metal ions that **don't** have a variable charge are called by their element name. For example, Sr^{2+} is just named *strontium*.
4. Do steps #2and #3 on the boxes below

NO_3^-	Pb^+	V^{2+}	Au^{3+}	NH_4^+
_____	LEAD(I)	VANADIUM(II)	_____	_____

Key to understanding the cartoons on this sheet:				
1 chlorine atom	1 hydrogen atom	1 oxygen atom	1 nitrogen atom	1 carbon atom
				



5. How many atoms, total, are in this box? _____
6. How molecules are in this box? _____
7. What is the formula of this compound? _____
8. Which would be an acceptable way to say what's in this box
   a) C_8H_{10} b) C_4H_{16} c) other _____
9. What is the molecular weight of this substance? (the units of your answer should be in g/mole. Your first step should be to look up the g/mole in the periodic table)

Name the following compounds by combining the names you wrote earlier in this sheet:

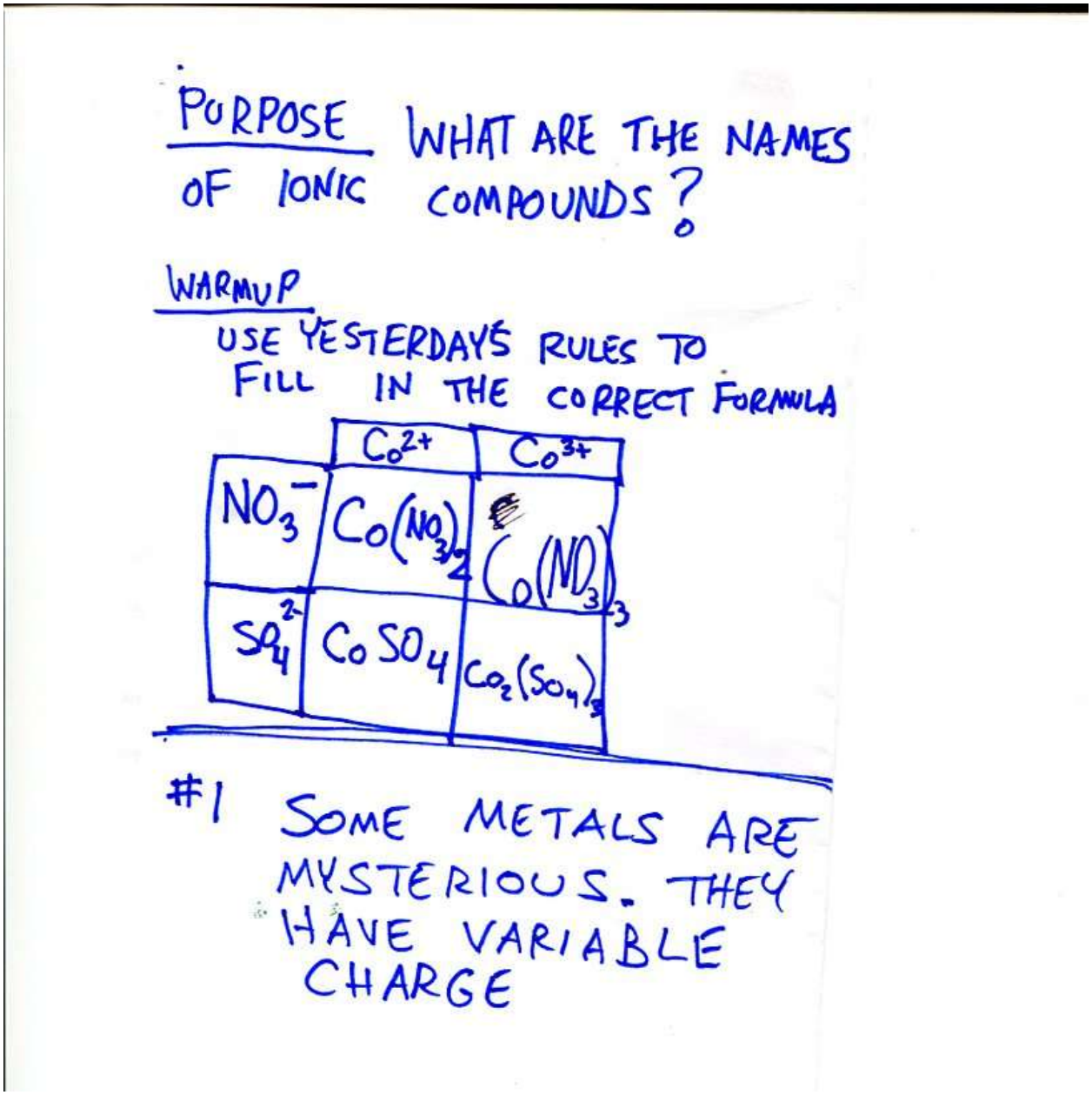
NO_3^-	Pb^+	V^{2+}	Au^{3+}	NH_4^+
CO_3^{2-}	Na^+	Fe^{2+}	Au^{3+}	Au^+

10. Na_2CO_3 _____
11. $PbNO_3$ _____
12. $Al_3(CO_3)_2$ _____
13. VCO_3 _____
14. $Fe(NO_3)_2$ IRON (II) NITRATE
15. $(NH_4)_2CO_3$ AMMONIUM CARBONATE
16. $Au(NO_3)_3$ GOLD (III) NITRATE
17. $Fe_3(PO_4)_2$ IRON (II) PHOSPHATE

18. In the table below, fill in the formula of the ionic compound below its name:

Zinc sulfate	Cobalt (II) carbide SKIP	Silver selenide SKIP	Ammonium sulfide SKIP
Lead (II) nitrate	Silver oxalate	Lead (IV) oxide SKIP	Magnesium oxide SKIP
Copper (I) sulfate	Copper (II) sulfite $CuSO_3$	Sodium bicarbonate $NaHCO_3$	Strontium hypochlorite
Iron (III) oxide SKIP	Copper (I) chromate	Tin (II) sulfate $SnSO_4$	Potassium bisulfate

class notes for Wednesday February 4, 2015



PURPOSE WHAT ARE THE NAMES OF IONIC COMPOUNDS?

WARMUP

USE YESTERDAYS RULES TO FILL IN THE CORRECT FORMULA

	Co^{2+}	Co^{3+}
NO_3^-	$Co(NO_3)_2$	$Co(NO_3)_3$
SO_4^{2-}	$CoSO_4$	$Co_2(SO_4)_3$

#1 SOME METALS ARE MYSTERIOUS. THEY HAVE VARIABLE CHARGE

V^{+1} is Vanadium (I)
V^{+2} is Vanadium (II)
V^{+5} is Vanadium (V)
V^{+6} is Vanadium (VI)

The roman numeral indicates the positive charge on one atom

#2 POLYATOMIC IONS are named from the table

PO_4^{3-} is phosphate

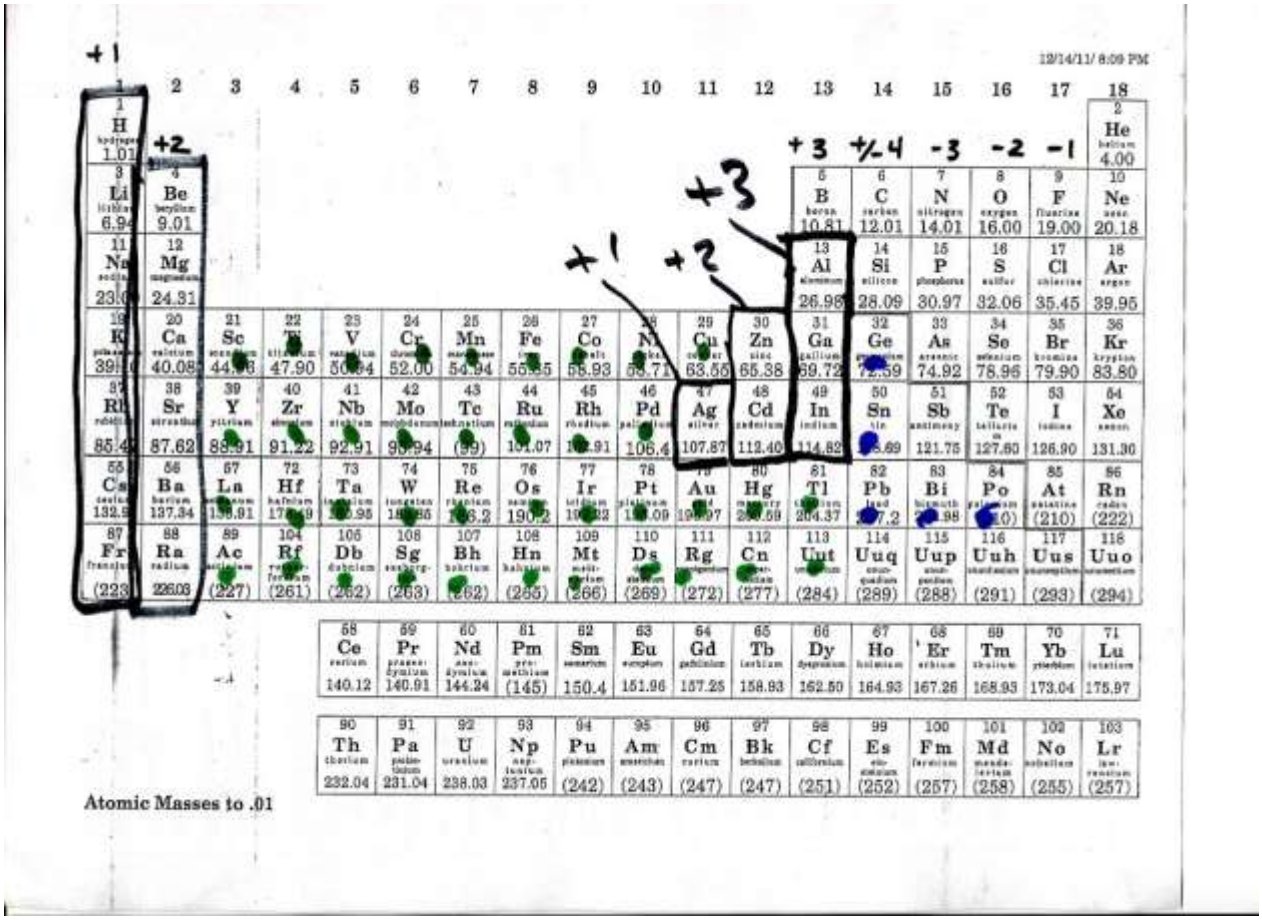
NO_3^- is nitrate

#3

If the metal has a known charge just name it for its element

Mg^{2+} is magnesium

Ag^{+} is silver



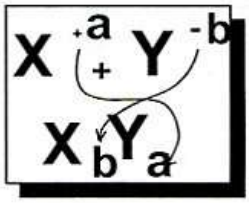
The elements marked with a dot have variable charge. Their charge is unpredictable, so when you describe ions from these squares on the periodic table you must include a roman numeral in their name to tell what the charge is

(in contrast, elements like Al3+, Na+, Ca2+ DON'T need a roman numeral in their name -- every good chemist knows what the charge is of those elements)

Answers to Tuesday's classwork and the La Mano Sheet:

Writing Formulas by Crossing Over

The quickest way to determine the formula of a compound of two elements or polyatomic ions is to use the *Cross-Over Rule*. Look up the oxidation state of each element or ion and reduce to lowest terms. Then cross over the oxidation states without the sign to find the subscripts as shown in the diagram to the right.



Using the Cross-Over Rule, determine the formula for compounds of the elements and polyatomic ions below, and write your answer in the answer space.

FORMULA		NAME
NH_4Cl	1. NH_4 and Cl	
$BaBr_2$	2. Ba and Br	
Al_4C_3	3. Al and C	
Na_2O	4. Na and O	
K_3PO_4	5. K and PO_4	
CaF_2	6. Ca and F	
Li_3N	7. Li and N	
$BaCO_3$	8. Ba and CO_3	
$Al_2(SO_4)_3$	9. Al and SO_4 $Al_2(SO_4)_3$	
$Mg(NO_3)_2$	10. Mg and NO_3	
Li_2S	11. Li and S	
Na_2SO_4	12. Na and SO_4	
$Ca(HCO_3)_2$	13. Ca and HCO_3 → $Ca(HCO_3)_2$	
$Ag(CH_3COO)$	14. Ag (+1) and CH_3COO (−1)	
$Zn(OH)_2$	15. Zn and OH	

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LA MANO iPhone

Plum Pudding Atoms w/Charges

CλeMis+ry- http://genest.weebly.com

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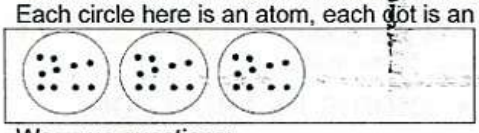
Name answers

Period

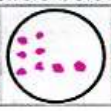
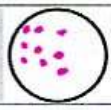
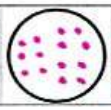
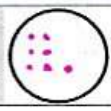
Use the drawing below to answer #1 through #4 below.
Each circle here is an atom, each dot is an electron



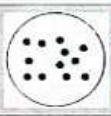
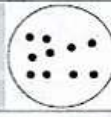
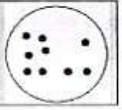
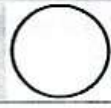
←atoms in sticky tape. (they are neutral)

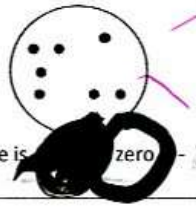
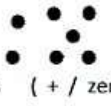
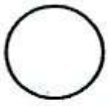
1. Warm up questions:
   a. How many atoms are shown in the box above? three
   b. What is the correct term for each circle? (cation / neutral atom / anion)
   c. What is the charge of a single • ? (-1 / zero / +1)
   d. If electrons are added to these atoms the charge of the tape will become more (negative / positive)

2. Using the neutral sticky tape atoms above as a reference point, draw appropriate numbers of electrons into each circle below.

an atom with two less electrons than a neutral tape atom	 eight electrons	a cation with a charge of +1	 nine electrons
an anion with a charge of -4	 fourteen electrons	a cation with a charge of +3	 Seven electrons because 10-3=7

3. Using the neutral sticky tape atoms above as a reference point, estimate the charge on each atom below.

The charge of this atom is (-2 / -1 / neutral / +1 / +2)  two extra compared to neutral	The charge of this atom is (-2 / -1 / neutral / +1 / +2) 
The charge of this atom is (-2 / -1 / neutral / +1 / +2) 	The charge of this atom is +10 

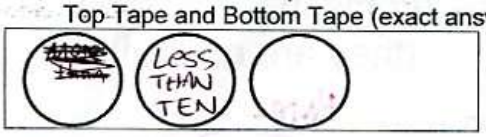
4. A neutral nitrogen atom looks like this according to JJ Thomson's Plum Pudding Model:  The charge is (+ / zero / -)	Thomson would say this is a picture of a) the plum? b) the pudding?  The charge is (+ / zero / -)	Thomson would say this is a picture of a) the plum? b) the pudding?  The charge is (+ / zero / -)

5. Pulling the 'Top Tape' in our lab removed electrons from the Top Tape and added electrons to the Bottom Tape.

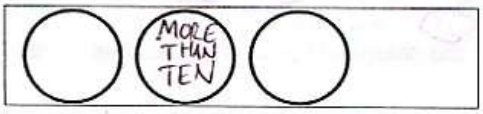
a) This would cause the number of electrons in the Top Tape to (increase / decrease).

b) This would cause the number of electrons in the Bottom Tape to (increase / decrease).

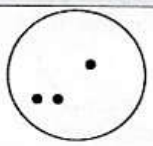
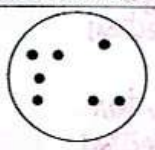
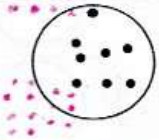
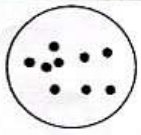
c) Draw dots in each tape atom below to show your guess for how many electrons in the Top Tape and Bottom Tape (exact answers for each student will vary).



←atoms in Top Tape. (cations)



←atoms in Bottom Tape. (anions)

Use the following pictures of NEUTRAL atoms to answer the next four questions				
neutral Hydrogen	neutral lithium	neutral nitrogen	neutral oxygen	neutral fluorine
				

6. Draw enough dots (electrons) on each atom to create the object described

a fluorine anion with a charge of -1	TEN ELECTRONS	a Li + cation	TWO ELECTRONS
a nitrogen anion with a charge of -3	TEN ELECTRONS	a cation of hydrogen with a charge of +1	NO ELECTRONS