Chemistry 1
 Name

 Unit 3 Study Guide – Electrons & Ionic Bonds
 Period _____ Date _____

 Unit 1 Periodic Table Retest
 THIS COMPLETED STUDY GUIDE IS DUE 12/16/15 AS PART OF THE UNIT 3 PACKET.

ALT 3 LT3a Flame Tests and Electron Structure

What evidence is there that certain atoms are present in a compound? Why do elements in the same group in the periodic table have similar properties?

Key Vocabulary: Know the following terms from Unit 3 Introduction handout.

- <u>Core electron</u> (p. 93):
- <u>Electron configuration</u> (p. 118):

- <u>Valence electron</u> (p. 93):
- <u>Valence shell</u> (p. 93):

• <u>Flame Test</u> (p. 88):

Answer these review questions using your handouts, notes, and the text book.

 $_$ 1. Use Data Table 1 to determine the flame color produced in a flame test for

copper nitrat	$e(Cu(NO_3)_2)$	_			
Compound	Flame color				I. "Excited" electron moves away from nucleus. Light energy
$Ba(NO_3)_2$	Green		((and	2. 2. When electron moves back, it releases
Cu(NO ₃) ₂	Blue-green				light energy.
CaCl ₂	Orange	-			
A. Blue B. Orange		C. Green D. Blue-green			

2. When you test sodium chloride in the flame of a Bunsen burner, the flame turns yellow-orange. **Explain** the process that is responsible for the flame color. Refer to Bohr Model above or p. 88.

Big Idea: The arrangement of atoms in the periodic table reflects the arrangement of electrons in the atom.

- 3. For the main group elements, explain how to use the periodic table to determine the number of valence electrons.
- 4. For a main group element, explain how to use the periodic table to determine how many electron shells to include in its shell model.

5. Apply your knowledge of electron configurations and the periodic table to fill in the following information for the elements listed.

Element Symbol	Element Name	# total electrons	# valence electrons	# core electrons	# of electron shells
Li					
Na					
Be					
Sr					
N					
Р					
0					
S					
F					
Cl					

6. Drawing Shell Models of Atoms.

- a) Draw the nucleus and write in the correct number of protons.
- b) Use the period # to decide how many electron shells to draw around it _____.
- c) Draw in the electrons until you have the total number of core and valence electrons. Shell #1 holds 2 electrons (closest to the nucleus!) Shell #2 holds up to 8 electrons.
 Shell #2 can hold up to 18 but for elements atomic number 1 18 it holds up to 8 electrons.

Shell #3 can hold up to 18 but for elements atomic number 1-18 it holds up to 8 electrons. Shell #4 can hold up to 32 but for elements atomic number 19-36 it is the valence shell and holds up to 8

Draw a Shell Model of Beryllium (Be)	Draw a shell model of Fluorine

7. Read the summary on p. 94 of the text book. Why do elements in the same group tend to have similar properties?

ALT 3 LT3b Ionic Bonds How is chemical stability related to the arrangement of electrons in atoms?

Key Vocabulary: Know the following terms from Unit 3 Introduction handout.

- <u>Ion</u> (p. 97): atom that has lost or gained electrons and has a + or charge.
- <u>Anion</u> (p. 97): negatively charged ion. Nonmetals tend to gain electrons and form anions.
- <u>Cation</u> (p. 97): positively charged ion. Metals tend to lose electrons and form cations.
- <u>Ionic compound (p. 101)</u>: form between a metal element and a nonmetal element. Ionic compounds form when valence electrons are transferred between atoms.
- <u>Rule of zero charge</u> (p. 102): When a metal and a nonmetal atom bond, they form a compound with an overall zero charge.
- <u>Monoatomic ion</u> (p.111) *mono* means one. A monoatomic ion is formed from one element

Metal Elements	Group #	# Valence electrons	Ionic charge	Non Metal Elements	Group #	# Valence electrons	Ionic charge
Li	lA	1	1+	N	5A	5	3-
Na				Р			
K				0			
Be				S			
Mg				Se			
Sr				F			
Rb				Cl			
Al				Br			
Ga				Ι			
In							

8. Fill in the blanks in the table

9. Draw shell models for sodium (Na) and chlorine (Cl) and include arrows that show the transfer of electrons so that each atom in the compound has the same electron arrangement as a Noble gas. [p. 98]

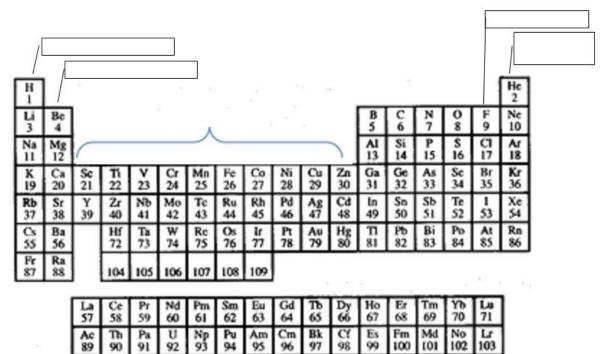
- 10. In most ionic compounds, how many electrons does each ion have in its valence shell?A. eight electronsB. either two electrons or eight electronsC. a number equal to its atomic numberD. a number equal to its mass number
- 11. For the following pairs of elements, apply the rule of zero charge to predict their formula. Write the name of each compound.

	Li and I	Al and O	Sr and Cl	K and P
Formula				
Name				

Retest ALT 1 LT1.c Periodic Table Patterns + New Patterns from Unit 3 *Vocabulary: Know these key terms for the Periodic table.*

- <u>Group (p.46)</u>
- <u>Period (p. 46)</u>
- Main group elements (p. 46)
- Transition elements (p. 46)

- <u>Alkali Metals (p. 46)</u>
- Alkaline Earth Metals (p. 46)
- Halogens (p. 46)
- Noble gases (p. 46)
- 12. Label the periodic table using the vocabulary words above.



13. Which of the following are nonmetals? Circle all that apply.

Boron (B)	Calcium (Ca)	Copper (Cu)	Selenium (Se)
Carbon (C)	Cobalt (Co)	Radon (Rn)	Thallium (Tl)

- 14. What is the pattern in valence electrons across the 2^{nd} period of the periodic table?
- 15. What is the pattern of valence electrons down one of the main groups (ie. Group 1A,2A,3A,4A, 5A, 6A, 7A, and 8A)?
- 16. Applying your new knowledge of valence electrons and Noble Gas envy explain why the Group 1A Alkali Metals and Group 7A Halogens are the most reactive elements on the periodic table. You might consider drawing a few diagrams to enhance your explanation.