WKS – Chem H
Electron Dots & Ionic Bonding

NAME Answer Key
Period _____ **Date** _____

1. Draw Lewis (Electron) Dot diagrams for the following atoms:

a. Sr 	b. Kr 	c. Si 	d. Se 
e. Cs 	f. In 	g. Cl 	h. Sb 

2. What is a chemical bond?
A force of attraction between positive and negative charges that holds two atoms together.

3. Why do ions form?
Atoms gain more stable electron configurations by losing or gaining electrons.

4. Describe the formation of both positive cations and negative anions.
Positive ions form when atoms lose valence electrons to "go back" to the previous full shell. Negative ions form when electrons are added to an atom to complete its valence shell.

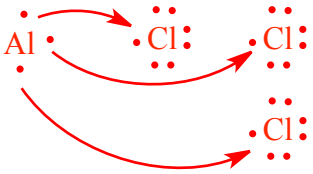
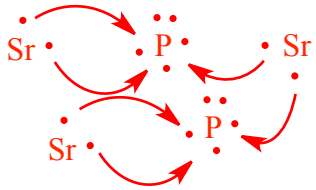
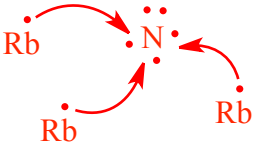
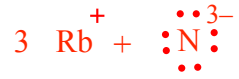
5. What is an ionic bond?
The electrostatic attraction between oppositely charged cations and anions.

6. What is lattice energy and what does it indicate about an ion bond?
It is the energy given off when one mole of an ionic compound is formed from its ions and indicates that ionic bonds are very strong and stable.

7. The first ionization energy for sodium is lower than that for magnesium. The 2nd IE's for both elements are larger than their 1st IE's, but Na's 2nd IE is MUCH larger than that of Mg. Explain.
The 1st IE for Na is lower than for Mg because Na has a lower Z_{eff} than Mg, so the electron removed has a weaker attraction to the Na nucleus than to the Mg nucleus. The 2nd IE for Na is much larger than that for Mg because the removed electron in Na is a core electron, which experience less shielding and higher Z_{eff}, hence a stronger attraction to the nucleus. However, the 2nd electron in Mg is still a valence electron, which still experiences the same (higher) shielding as the 1st electron, hence lower Z_{eff} and weaker attraction.

8. For a particular element, the following data are obtained: IE_1 = 578 kJ/mol, IE_2 = 1820 kJ/mol, IE_3 = 2750 kJ/mol, IE_4 = 11,600 kJ/mol, IE_5 = 14,831 kJ/mol & IE_6 = 18,377 kJ/mol. Which element could this be: Na, Mg, Al, Si, P, or S? Explain
Since there is the largest relative increase in IE between the 3rd and the 4th IE, the element must have 3 valence electrons, so must be Al.

9. *For the following questions draw the Lewis Dot structures before and after transferring electrons. Determine the formula of the resulting compound. Remember-- you may need to add extra atoms sometimes (continued on back)*

Atoms	**Lewis Dots of atoms Before transferring electrons** ***(Show arrows of e⁻'s transferring)***	**Ions formed after transferring electrons** ***(Show correct number of ions and their charges)***	**Formula of compound**
a. K + S			K_2S
b. Ba + O			BaO
c. Al + Cl			$AlCl_3$
d. Sr + P			Sr_3P_2
e. In + As			InAs
f. Rb + N			Rb_3N