Name KEY Block _____ Date _____

ACP - Unit 1 – Valence Electrons, Core Electrons and Ions

Purpose

- To discover the arrangements of electrons within an atom
- To explore patterns in ions that form when atoms transfer electrons.

Instructions

1. Define:
   core electrons All electrons surrounding the nucleus that are not in the outter most shell
   valance electrons outter most e- shell

2. Using the **Table of Electron Shells** handout, complete the **Table of Valance and Core Electrons** handout.

3. How does the number of electrons change as you move from left to right across the periodic table?
   the # of val e- increases by 1 as you move from left to right.

4. What do all group 1A elements have in common?
   they all have 1 valence electron

5. What happens to the electron count and the number of shells when you move from neon, Ne , to sodium, Na?
   You add 1e- and 1 shell

6. How many shells of electrons will Rb have? 5 How many electrons will be in the outermost shell (valence electrons)? 1

7. Look at the periodic table and the **Table of Electron Shells** handout. Explain why the number of electrons in the third shell suddenly changes from 8 to 18 between the element calcium, Ca, and Gallium, Ga?
   Because there are 10 elements between Ca and Ga.

8. On the **Table of Electron Shells** handout complete the bottom section to describe the ion properties of each group. See the two examples completed for you.

9. What happens to the charge of the atom when electrons are removed, why? The charge becomes (+) because there are more protons than electrons.
   Gained, why?
   The charge becomes (−) because there are less protons than electrons.

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10. Does transferring the electrons change the identity of the atom? Explain.

No, only the charge. the identity of an atom depends on the # of protons.

11. What will be the charge of each atoms ion listed below?
What noble gas will its electron arrangement most closely resemble?

	Ion formed	Noble Gas resembled
ex.	Ca 2+	Argon
a.	Li 1+	He
b.	N 3-	Ne
c.	Cl 1-	Ar
d.	Al 3+	Ne
e.	O 2-	Ne

12. Label your own periodic table with the common ionic charges for groups 1A-8A.

TABLE OF ELECTRON SHELLS

Noble Gases

Looses 1e- to become Noble Gas before

Gains 1e- to become Noble Gas after

Group 1A	Group 2A	Group 3A	Group 4A	Group 5A	Group 6A	Group 7A	Group 8A
Hydrogen, H							Helium, He
Lithium, Li	Beryllium, Be	Boron, B	Carbon, C	Nitrogen, N	Oxygen, O	Fluorine, F	Neon, Ne
Sodium, Na	Magnesium, Mg	Aluminum, Al	Silicon, Si	Phosphorus, P	Sulfur, S	Chlorine, Cl	Argon, Ar
Potassium, K	Calcium, Ca	Gallium, Ga	Germanium, Ge	Arsenic, As	Selenium, Se	Bromine, Br	Krypton, Kr
looses 1e- Becomes 1+	looses 2e- Becomes 2+	looses 3e- Becomes 3+	loose or Gain 4e- Become either 4+/4-	Gains 3e- Becomes 3-	Gains 2e- Becomes 2-	Gains 1e- Becomes 1-	This Group does not ionize. All elements ionize to look like Noble gases.

Describe the ion properties of the group here. Note what charge the group will have.

Table of Valence and Core Electrons

	1A	2A	3A	4A	5A	6A	7A	8A
1	H V = 1							He V = 2
2	Li V = 1 C = 2	Be V = 2 C = 2	B V = 3 C = 2	C V = 4 C = 2	N V = 5 C = 2	O V = 6 C = 2	F V = 7 C = 2	Ne V = 8 C = 2
3	Na V = 1 C = 10	Mg V = 2 C = 10	Al V = 3 C = 10	Si V = 4 C = 10	P V = 5 C = 10	S V = 6 C = 10	Cl V = 7 C = 10	Ar V = 8 C = 10
4	K V = 1 C = 18	Ca V = 2 C = 18	Ga V = 3 C = 28	Ge V = 4 C = 28	As V = 5 C = 28	Se V = 6 C = 28	Br V = 7 C = 28	Kr V = 8 C = 28

Key
V = valence
C = core