



# Chapter 5

## Study Guide - Answers

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

- The electrons in the outermost energy level are responsible for the atom's chemical properties. These electrons are called the valence electrons. There can never be more than 8 of these electrons.
- In order for an element to be stable it must have 2 (if it is a small atom) or 8 electrons in its outer energy level.
- The law of octaves says that when the elements are placed in order by atomic number (originally atomic mass) that their chemical and physical properties repeat every 8 elements.
- A periodic trend is a certain properties of the elements change in a predictable way as you move through the periodic table.
- All of the periodic trends relate to the fact that attraction of the nucleus to the electron cloud increases from the bottom left corner to the upper right corner.
- Fill in the definitions below and the element name with the greatest and least value.

Trend	Definition	Highest	Lowest
Atomic radius	<u>size of an atom</u> as measured by dividing the distance between the nuclei of two neighboring atoms by 2	<u>Fr</u>	<u>He</u>
Ionization Energy	<u>energy required to strip an electron from an atom</u>	<u>He</u>	<u>Fr</u>
Electronegativity	<u>attraction of a nucleus to electrons ion a bond</u>	<u>F</u> (He doesn't bond)	<u>Fr</u>

- Fill in the following chart:

Trend	Change Moving Left to Right Across a Period	Change Moving Down a Group
Atomic radius	<u>decreases</u>	<u>increases</u>
Ionization Energy	<u>increases (overall for first ionization energies)</u>	<u>decreases</u>
Electronegativity	<u>increases</u>	<u>decreases</u>

- When an atom gains electrons its size increases.
- When an atom gains electrons it takes on a negative charge.
- When an atom loses electrons its size decreases.
- When an atom loses electrons it takes on a positive charge.
- Define successive ionization energies - energies required to strip off successive electrons from an atom.  
Successive ionization energies depend on the stability of the electron configuration of the current ion.
- Elements on the left side of the periodic table tend to lose electrons to become stable, making them positively charged.
- Elements on the right side of the periodic table tend to gain electrons to become stable, making them negatively charged.
- The elements with the highest ionization energy are the noble gases.
- The elements with the lowest ionization energy are the alkali metals.