

# Trends in the Periodic Table

**1. Periodic Law:** chemical and physical properties of the elements repeat in a regular pattern when arranged by atomic number.

Period # indicates the number of electron shells an element has.

Group # indicates the number of valence electrons an element has.

## 2. Atomic Radius

1. Decreases across a period (more protons, more attraction)
2. Increases down a group (increase in orbitals)

**3. Ionization Energy (E):** the amount of energy required to remove an electron from an atom (Cation formation)

1. First ionization decreases down a group (larger atom, easier to overcome attraction)
2. First ionization increases across a period (more attraction because of smaller size)

*??What about second or third ionization??*

**4. Electron Affinity ( $\Delta E$ ):** the amount of energy released when an atom gains an electron (Anion formation)

1. Increases across a period (smaller radius so more attraction. Electron moves closer to nucleus, releasing more energy)
2. Decreases down a group (because of increase in size)

**5. Electronegativity (EN):** An atom's ability to attract electrons in a chemical bond.

1. Increases across a period (more protons, more attraction)
2. Decreases down a group (more orbitals, less attraction)

*\* We can use EN to predict the type of bond formed between 2 atoms.*