

## Periodic Trend Research

- Which trend are you researching? **Shielding Effect**
- Define "shielding effect". **Interference created by core electrons blocking the attraction between the protons in the nucleus and the valence electrons**
- How is shielding measured? **Based on # of core electrons**
- What happens to the trend moving from **left to right** across a period? **No change**
- Why? **Because the total # of orbitals does NOT change; no change in amount of core electrons**
- What happens to the trend moving **down a group**? **Shielding effect increases**
- Why? **As atoms get larger the amount of shielding increases because more core orbitals are added**
- How does shielding affect **valence electrons**? **It blocks the valence electron's attraction to the nucleus; making it easier to remove electrons**
- What is "**effective nuclear charge**"? **The amount of protons remaining after shielding effect that are still capable of attracting valence electrons;  $Z_{\text{eff}} = \text{Atomic \#} - \text{Number Core Electrons}$**
- How is **effective nuclear charge** different for:  **$\text{Na}^{+1}$ ,  $\text{F}^{-1}$  and Ne**? **Sodium ion, Fluorine ion, and Neon atom all have 10 total electrons with 2 core electrons; so  $Z_{\text{eff}}$  the effective nuclear charge for**  
 **$\text{Na}^{+1} = 11 - 2 = +9$        $\text{F}^{-1} = 9 - 2 = +7$       and       $\text{Ne} = 10 - 2 = +8$**
- How does **Coulomb's Law** affect this trend? **More orbitals causes the valence electrons to be farther away, which results in a weaker attractions to the nucleus**
- Which period experiences the **greatest** shielding effect? **Period 7 (Elements 89 - 118)**
- Which period experiences the **least** shielding effect? **Period 1 (Elements 1 - 2)**
- How do you think this trend affects **chemical bonding**? **More shielding makes it easier for metals to lose electrons and **TRANSFER** them to nonmetals during IONIC BONDING**
- How does this trend affect the **other trends**? **When shielding increases, the atom has more orbitals This causes atomic radius and ionic radius to increase. Ionization Energy decreases because it is easier to remove electrons. Metallic properties increases because electrons are easier to remove... and Electronegativity decreases because the valence orbital is further away making it more difficult to gain an electron.**