Unit 4: Periodic Trends
Periodic Trends Jigsaw Activity

Name _____
Date _____ **Block** ____

Periodic Trend Research

1. Which trend are you researching? **Ionic Radius Trend**
2. Define the word "**radius**". distance from the center to the circumference of a circle
3. How is ionic radius measured? Ionic radius is determined by measuring the atoms in a crystal lattice.
4. Define the word "**ion**". An atom that has lost or gained valence electrons
5. What determines whether the ion will be **positive or negative**? If electrons are lost, the ion is positive; if electrons are gained, the ion is negative; (proton to electron ratio)
6. What happens to the size of an atom when it becomes a **positive ion**? It shrinks smaller
7. Why? When atoms lose electrons, they lose their outermost orbital and shrink in size
8. What happens to the size of an atom when it becomes a **negative ion**? It expands larger
9. Why? The new electrons are added to the valence orbital increasing electron - electron repulsion
10. What type of ions do **metals** form? Metals form **positive cations**
11. Why? Metals are more stable when they lose valence electrons because the lower orbital has all 8 electrons
12. What type of ions do **non-metals** form? Nonmetals form **negative anions**
13. Why? Nonmetals are more stable when they complete their valence orbital to have all 8 electrons
14. In general are metal ions **bigger or smaller** than non-metal ions? smaller
15. What happens to the trend moving from **left to right** across a period? gets smaller; bigger; then smaller
16. What happens to the trend moving **down a group**? gets larger because more orbitals
17. How does **Coulomb's Law** affect this trend? When metals lose their outer orbital, the lower orbital is closer to the nucleus so it is held tighter; nonmetal's valence orbital expands, making it less attractive
18. Which group/ element has the **largest value** for this trend? Alkali Metals (Group 1) / Fr^{+1}
19. Which group/ element has the **smallest value** for this trend? (Group 1) / H^{+1}
20. How do you think this trend affects **chemical reactions**? When metals for **positive cations** and nonmetals form **negative anions**, they attract each other to form an **ionic bond.**
21. How do the **other trends** relate to Ionic Radius? Atomic radius is very similar to ionic radius; but the metal ion is smaller than the metal atom and the nonmetal ion is larger than the nonmetal atom; Metals have low ionization energies because they lose electrons easily; nonmetals have high electronegativity because they desire to gain electrons; low shielding favors anions and high shielding favors cations