Unit 4: Periodic Trends
Periodic Trends Jigsaw Activity

Name _____
Date _____ **Block** ____

Periodic Trend Research

1. Which trend are you researching? **Ionization Energy Trend**
2. Define "**first ionization energy**". The amount of energy required to **remove** 1 valence electron the outermost orbital from
3. What trend happens when **successive ionization energies** are measured? Usually the energy required increases because the atom becomes less stable as it loses electrons
4. How is **ionization energy** measured? kilojoules per mole (1 mole = atomic mass listed on periodic table)
5. What happens to the trend moving from **left to right** across a period? Ionization Energy **increases** to the right
6. Explain how this trend affects the **noble gases**. Noble gases are stable atoms due to full valence orbitals. They have **HIGH** ionization energies because it requires a lot of energy to force them to lose an electron.
7. What happens to the trend moving **down a group**? Ionization Energy **decreases** down a group because valence electrons are further from the nucleus making it easier to remove them
8. How does **Coulomb's Law** affect this trend? **Larger** atoms with **more** orbitals require **less** Ionization Energy; Smaller atoms with less orbitals require more Ionization Energy; the closer opposite charges are the stronger they attract
9. Explain how the trend is different for **metals versus nonmetals**. For any given period (row) on the table, metals will require **LESS** Ionization Energy because they have **less protons** in their nucleus; **weaker** electromagnetic attraction
10. Which group/ element has the **largest value** for this trend? Group 18 Noble Gases / Helium
11. Which group/ element has the **smallest value** for this trend? Group 1 Alkali Metals / Francium
12. How does this trend affects **ionic bonding**? Ionic bonding occurs when a metal **TRANSFERS** valence electrons to a nonmetal; the lower the IE of the metal, the easier it is to transfer the valence electrons
13. How does this trend affects **covalent** bonding? Ionization energy is the energy required to **REMOVE** an electron; however, covalent bonding wants to **SHARE** - not remove; so it does NOT favor covalent bonding
14. How does the ability to lose a valence electron affect the bonds **polarity**? Losing electrons makes the atom more positive; positive ions are called CATIONS; when an atom gains a positive or negative charge it has **INCREASED** its polarity
15. How do the **other trends** affect this one? **Atomic radius and shielding effect Ionization Energy because** the larger the atom, the greater the shielding effect (core electrons blocking the attraction between the protons and the valence electrons), which makes it require less energy to remove a valence electron