

Periodic Trend Research

Atomic Radius Trend

1. Which trend are you researching? Atomic Radius Trend
2. Define the word "**radius**". Distance between center and point on circle
3. How is atomic radius measured? Distance from nucleus to valence electrons;
or half the distance between two adjacent atoms
4. Define "**electromagnetic force**". force of attraction between nucleus and electrons (opposites attract)
5. How does the electromagnetic force affect the size of the atom? stronger force makes it smaller
6. Define "**electron - electron repulsion**". inner core electrons repel electrons in other orbitals
7. How does electron - electron repulsion affect the size of an atom? makes it larger; (likes repel)
8. How does **Coulomb's Law** affect this trend? Coulombs law says that opposite charges will attract
each other more strongly when they are closer; stronger attraction means a smaller atomic radius
9. What happens to the trend moving from **left to right** across a period? atomic radius gets smaller
because as more protons are added the electromagnetic force increases pulling electrons inward
toward the nucleus; therefore, as atomic number increases the radius decreases
10. What happens to the trend moving **down a group**? radius gets larger because more orbitals
11. Explain how the trend is different for **metals versus nonmetals**. metals tend to be larger because they
have less protons to pull inward; nonmetals are smaller because they have more protons
12. Which group/ element has the **largest value** for this trend? Group 1 Alkali Metals / Francium
13. Which group/ element has the **smallest value** for this trend? Group 18 Noble Gases / Helium
14. How do you think this trend affects **chemical reactions**? The larger the metal, the easier it is to remove
valence electrons for ionic bonding; the smaller the nonmetal, the easier it is to attract a valence
electron for ionic bonding. For covalent bonding, smaller nonmetals share electrons more easily
15. How are the **other trends** related to this one? Ionic radius depends on the proton to electron ratio;
the more protons, the smaller the atom will be for a given period; Ionization Energy and
Electronegativity are inversely proportional to size of atomic radius; Metallic Properties are
directly proportional to size of atomic radius; across a period, shielding has no affect on radius,
but down a group it increases with radius