

Prep for Periodic Trends Lab

- When a property gradually changes across a period, and there is a tendency for this change to repeat at regular intervals, we say that the property exhibits a **Periodic Trend**.
 - Elements get less metallic from left to right in a period.
 - Atomic radius decreases from left to right in a period.

Metals
Metalloids
Nonmetals

- The magnitude or strength of a property also shows a gradual change (or trend) within a family as we move down or up a group.

In this week's lab, we shall look at two trends:

- The ability of a halogen to take electrons away from a halide.
- The reactivity of several metals with water.
- Halogens are neutral, diatomic molecules: F_2 , Cl_2 , Br_2 , I_2 , X_2 , Y_2 .
 - Halogens can be dissolved in water to yield **aqueous** solutions of the molecules; each solution has a distinctive color: $F_2(aq)$, $Cl_2(aq)$, $Br_2(aq)$, $I_2(aq)$, $X_2(aq)$ blue, $Y_2(aq)$ yellow.
- Halides are the negatively-charged, monatomic ions of the halogens. We can get them into aqueous solution by dissolving a soluble salt of the halide (e.g. NaCl) in water. All aqueous halide ions are colorless: $F^-(aq)$, $Cl^-(aq)$, $Br^-(aq)$, $I^-(aq)$, $X^-(aq)$, $Y^-(aq)$.
- We will mix solution of a halogen and a halide and look for a color change to decide if the halogen took electrons away from the halide:

$$X_2(aq) \text{ [blue sol'n]} + Y^-(aq) \text{ [colorless sol'n]} \rightarrow \text{blue solution [Y}^-\text{ kept its electron; no reaction]}$$

$$X_2(aq) + Y^-(aq) \rightarrow X_2(aq) + Y^-(aq)$$

OR

$$X_2(aq) \text{ [blue sol'n]} + Y^-(aq) \text{ [colorless sol'n]} \rightarrow \text{yellow solution [Y}^-\text{ lost its electron, became Y}_2\text{]}$$

$$X_2(aq) + Y^-(aq) \rightarrow X^-(aq) + Y_2(aq)$$
- Look for a halogen that always takes electrons from halides, and one never that takes electrons.
- When metals are mixed with water, we will observe how their reactivity changes within a group, and within a period. This will allow us to make predictions as to the reactivity of other metals.
 - The more vigorous the reaction, the more reactive the metal.

11 Na 22.99																		17 Cl 35.45
19 K 39.10	20 Ca 40.08																	35 Br 79.90
																		53 I 126.9