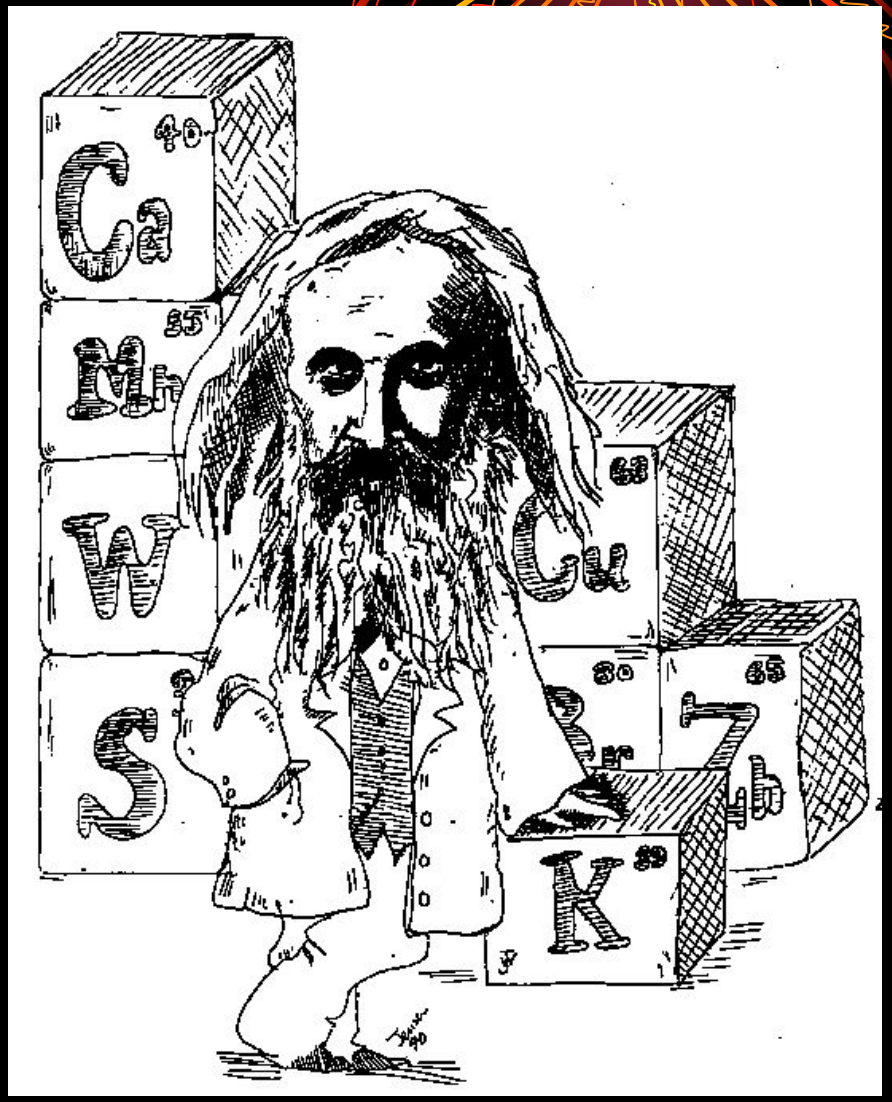
Trends on the Periodic Table

More than just a table!

The First Periodic Table

- Dimitri Mendeleev was one of the first to publish a table using these properties to arrange the elements.
  - He placed similar elements in the same vertical column.
  - He left open spaces on his chart for elements he predicted would someday be found but had not been discovered at that time.

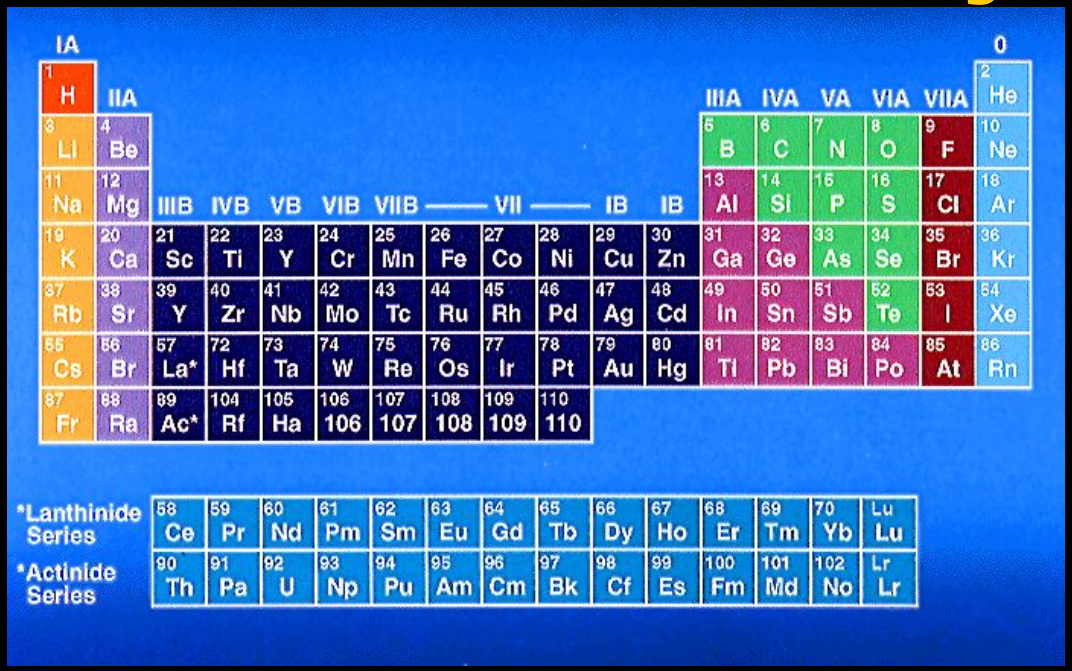


The Periodic Law

- He developed the idea of the Periodic Law: “When elements are arranged in order of increasing atomic weight their properties are repeated periodically.”
  - Today we know that atomic number is a better way to structure the periodic table. Mendeleev and other early researchers did not know about protons and neutrons and isotopes.

FAMILIES on the Table

- **<u>Families (a.k.a. Groups)- a vertical column</u> on the periodic table in which elements have similar chemical reactivity**



Group 1 – Alkali metals

Include Li, Na, K, etc.

- **most chemically reactive of the metals (must be stored under oil as they will react with air)**
- **react explosively with water**
- **are so soft they can be cut with a knife**

YOU'VE GOT TO SEE THIS!

YOU TUBE CLIP: K + H_2O

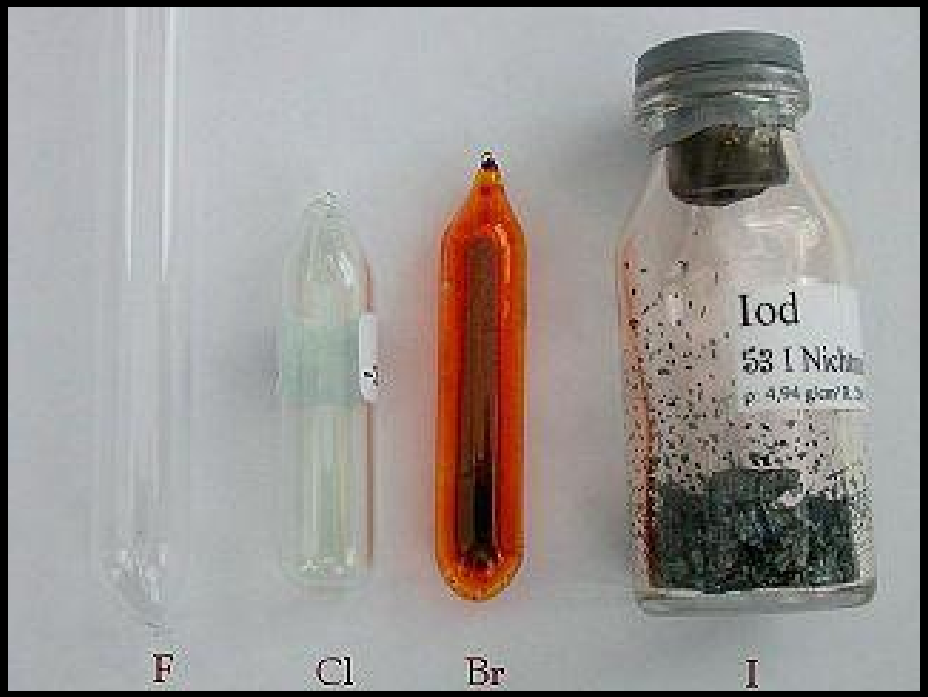
Group 2 – Alkaline Earth metals

Includes Be, Ca, Mg, etc.

- **are very chemically reactive and are never found free in nature (same as alkali metals)**
- **React with water to produce alkaline (i.e. basic) solutions**

Group 17 – Halogen family

- named from “salt former”, these elements exhibit all 3 physical states at room temp!
- are highly reactive with metals, especially alkali metals (as a result they are highly toxic)



Group 18 - Noble gases

Include He, Ne, Xe, etc

- **are all EXTREMELY STABLE and only rarely react to form compounds**
  - **Sometimes called INERT GASES**
- **all are gases which are naturally occurring**
- **when given energy (with electricity or extreme heat) each noble gas gives off a unique colour…**

PERIODS on the Table

- **Periods- a horizontal row on the periodic table**
  - **As you go across a row from left to right you find that cations increase in positive charge until you hit the carbon-family**
  - **As you go across a row from right to left you find that anions increase in negative charge until you hit the carbon-family**