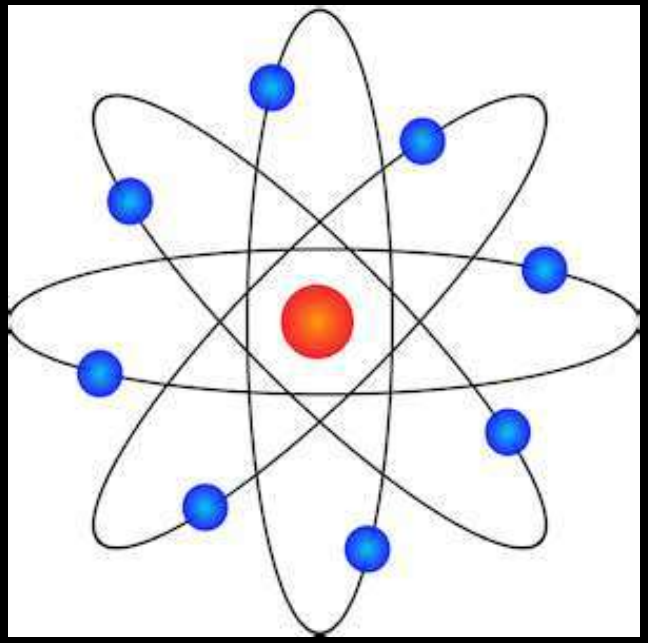
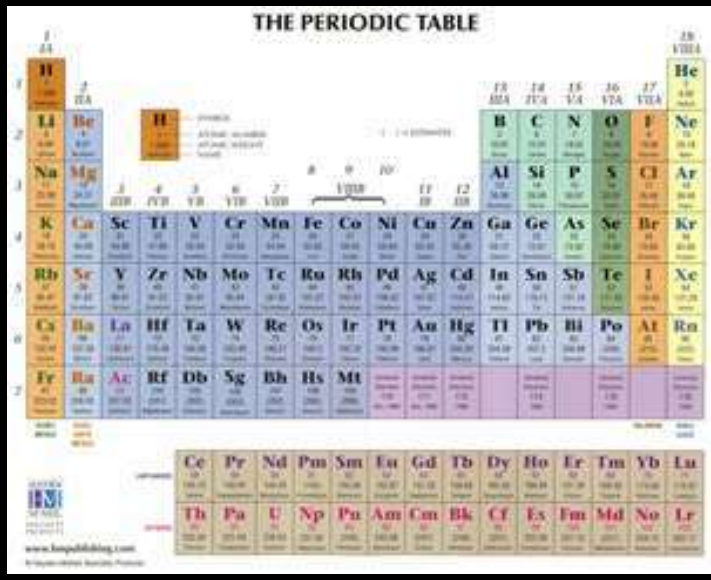




- Atoms, Elements,
- &
- The Periodic Table

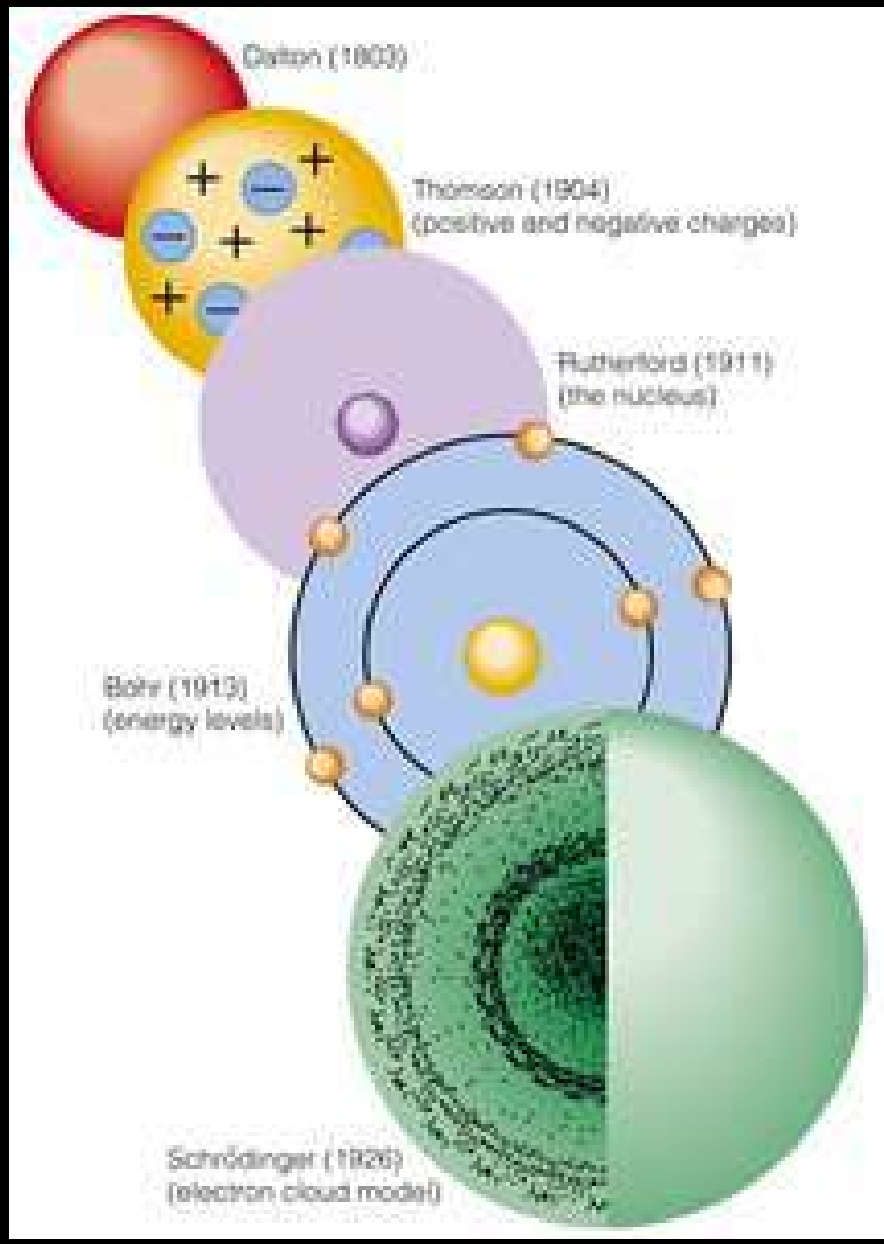
- *Matter* – anything that has mass & volume
- *Element* – a substance composed of only 1 kind of atom
- *Atom* – smallest particle of an element

atomic structure video clip

Atomic structure:

history of atomic models

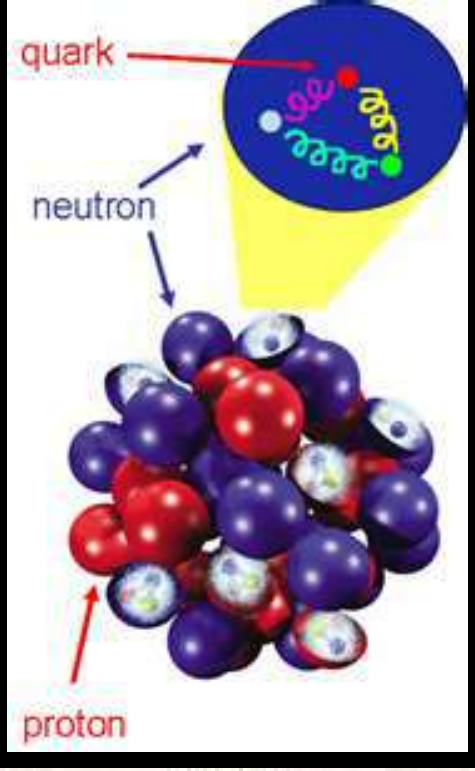
- 1803: John Dalton concluded that all matter is made of atoms.
- 1904: J.J.Thompson discovered electrons & proposed the "plum pudding model"
- 1911: Earnest Rutherford discovered the nucleus.
- 1913: Neils Bohr proposed that electrons orbit with electrostic forces rather than gravity. the "planetary model"
- 1926: Erwin Schrodinger analyzed electron orbits from a geometric point using quantum physics,

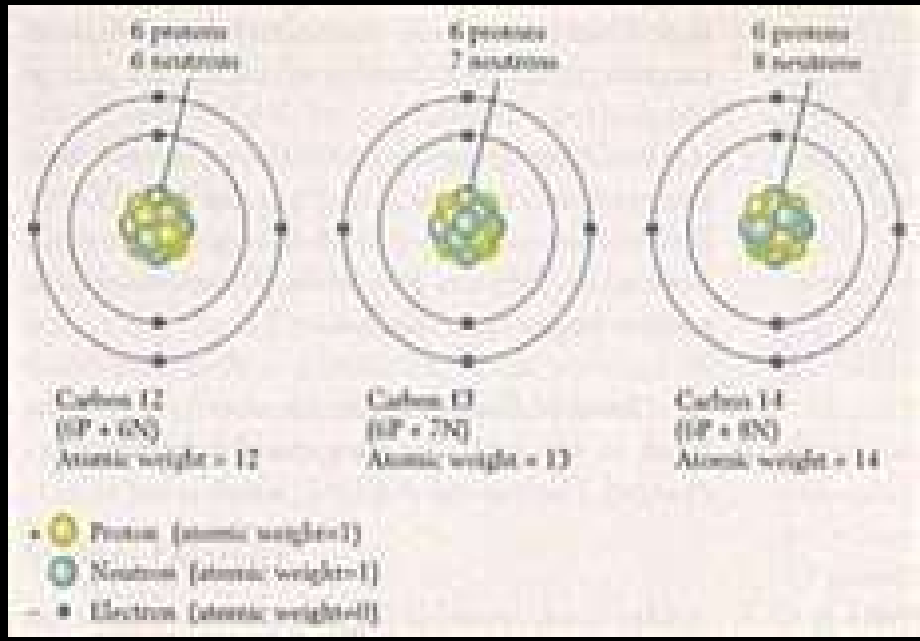


- *Quarks* – small particles that make up protons and neutrons. 3 quarks held together by the strong nuclear force (p^+ or n°).

- *Isotopes* - Atoms of the same element with different numbers of neutrons.

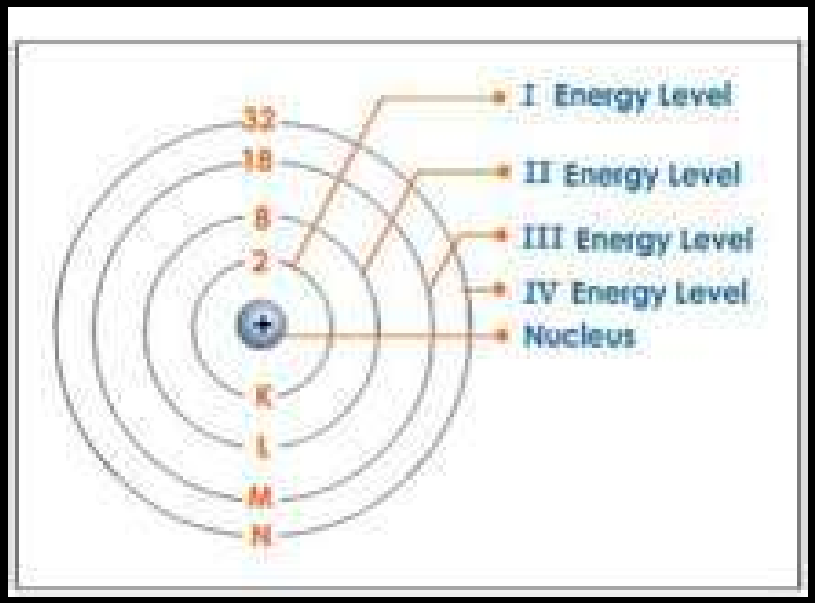
isotopes video clip





Electron energy levels

- 1st level = maximum *2*
- 2nd level = maximum *8*
- 3rd level = maximum *18*
- 4th level = maximum *32*
- 5th level = maximum *32*
- 6th level = maximum *18*
- 7th level = maximum *8*



- *Valence* electrons (very outside ring) can never exceed 8 electrons

Periodic Table of the Elements

we will learn how to interpret the table & learn the most important element symbols.

- The symbol: 1st letter is capital, 2nd letter is lower case. *(most symbols are in Latin)*
- Atomic Number = # of protons, or # of electrons.

  (in a stable atom, the # of protons is equal to the number of electrons)

  Ex: Lithium has 3 p^+ & 3 e^-
- Atomic mass/weight = # of protons plus # of neutrons. *(avg. is due to isotopes)*

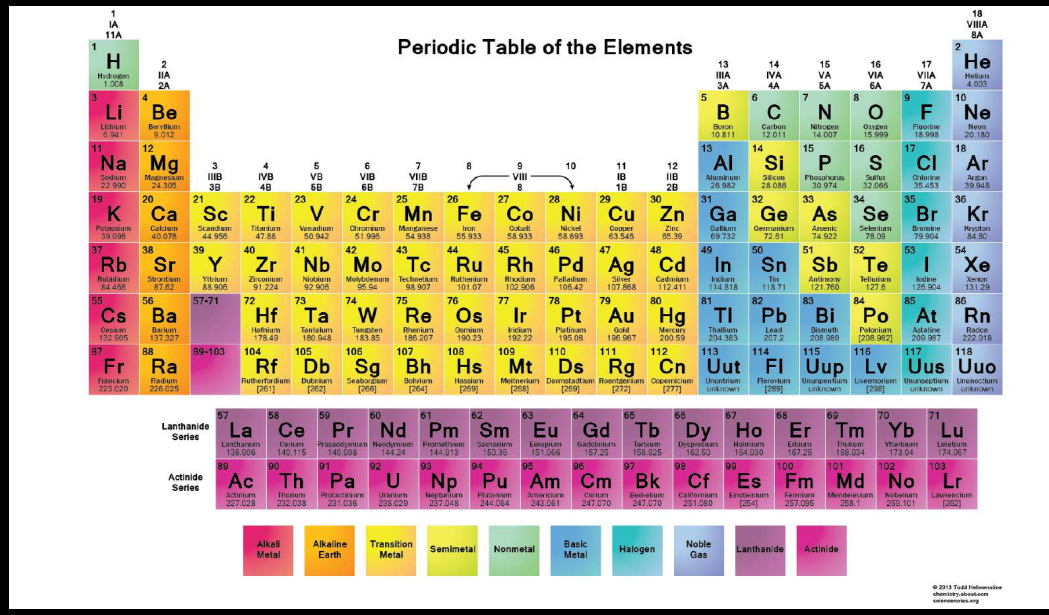
  Ex: Lithium 7 has 4 neutrons. 7 – 3 = 4

  Lithium 6 has 3 neutrons. 6 – 3 = 3

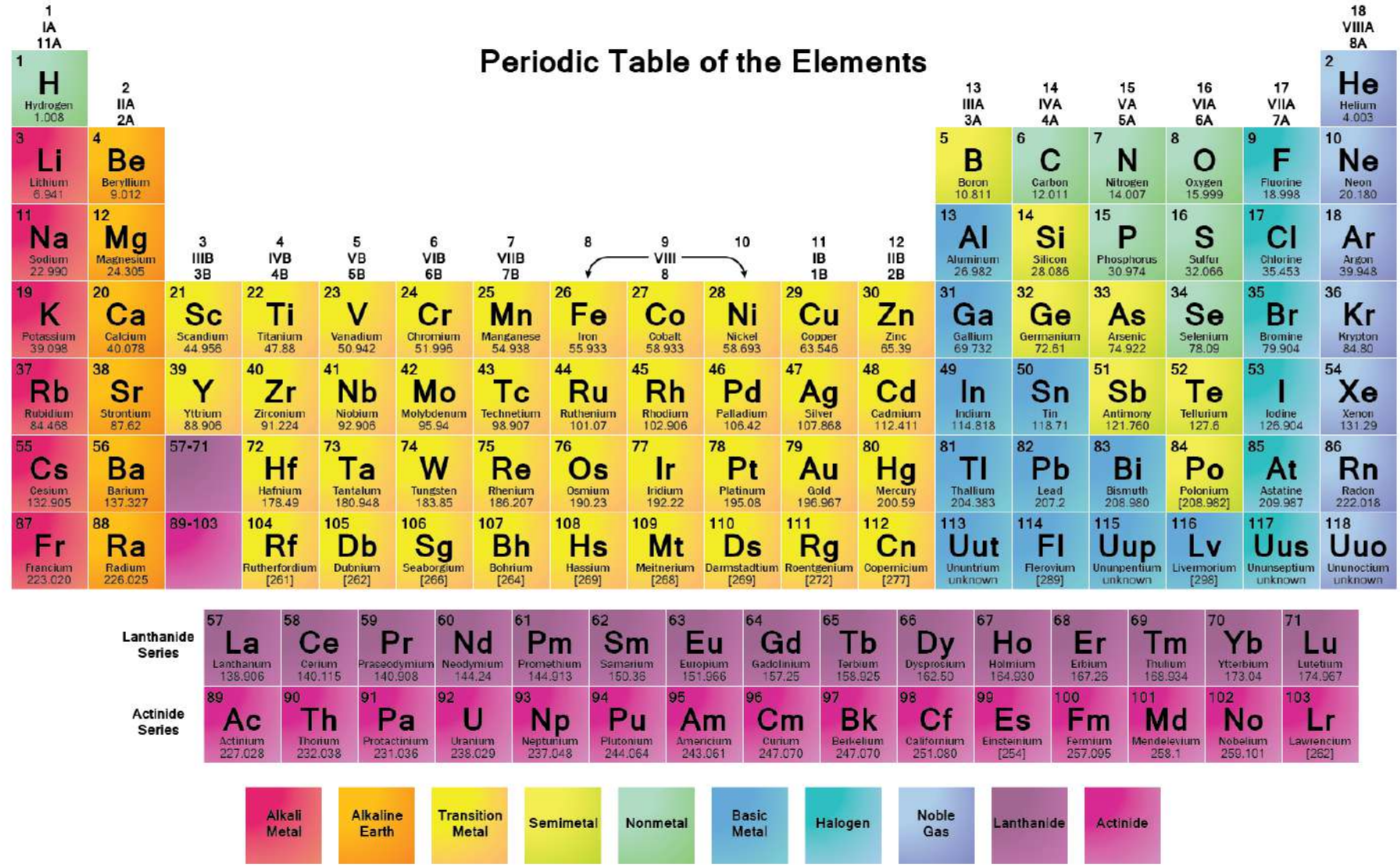
Periodic Table of the Elements

- The column is called a group or family

  (all elements in a family have similar characteristics)
- The number above the column is the group number and identifies the # of valence electrons.
- The element at the top of the column is the family name.
- The row is called a period & tells how many rings of electrons the atom has.

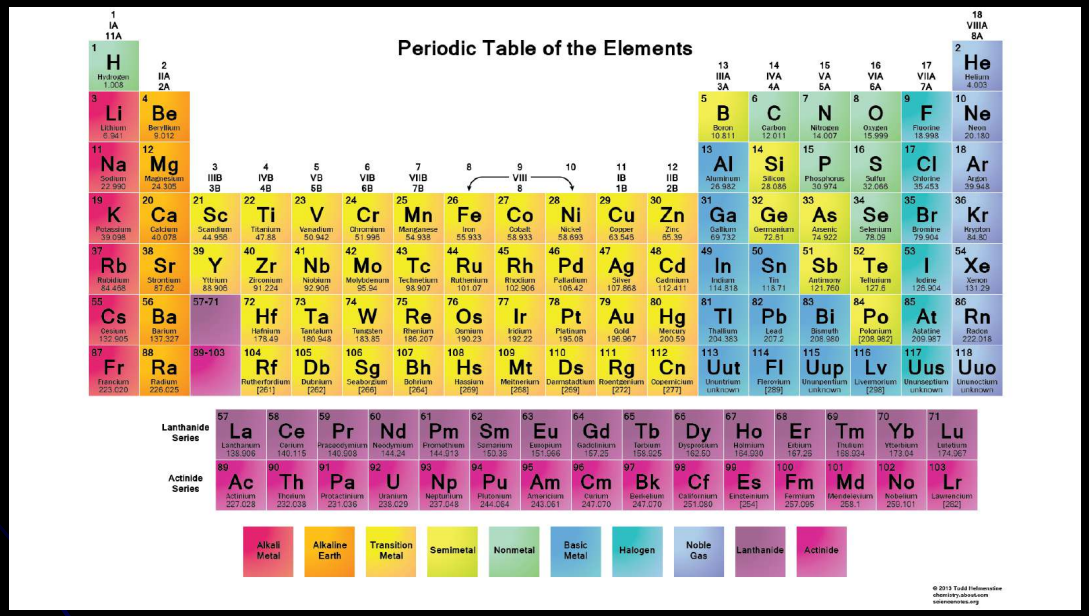


Mendeleev arranged the elements in the table by increasing atomic number/atomic mass/number of protons.



Periodic Table of the Elements

- *Metals*: good conductors, shiny, malleable, & ductile
- *Non-metals*: poor conductors, dull, & brittle or powdery
- *Noble Gases* – group 18 (He family), stable atoms, do not naturally form compounds
- *Metalloids*: some characteristics of metals & some of non-metals



Chemical Elements.com - An Interactive Periodic Table of the Elements

6 most common elements found in living things:

- *Carbon*
- *Hydrogen*
- *Oxygen*
- *Nitrogen*
- *Phosphorous*
- *Sulfur*

The main element in all organic compounds is *Carbon*

(more on compounds in our next unit)