The Periodic Table: People

3 scientists made major contributions to the periodic table

- Mendeleev – arranged elements based on properties of the elements and increasing atomic mass
  - Called the "father of the modern periodic table"
- Meyer – made almost the same periodic table right after Mendeleev
- Mosely – determined the atomic number of the elements

The Periodic Table: Arrangement

- Mendeleev first ordered the table by increasing mass
  - ➡ Why, then, is Te (127.60 amu) listed before I (126.90 amu)?
    Ans: *properties*
- We now order the table by atomic number (Mosely), not atomic mass.
- Periodic Law – there is a periodic repetition of properties of elements when the elements are arranged by atomic number

The Periodic Table: Classes of Elements

- Metals
  - Make up most of the table
  - Good conductors of heat and electricity
  - Have luster (shiny)
  - Solid at room temp (except Hg)
  - Malleable (as thin sheets) and ductile (as wires)
- Nonmetals
  - Mostly poor conductors
  - Often brittle solids, though most are gases
- Metalloids
  - Have properties of both metals & nonmetals
  - Fall along the "staircase" in the periodic table

Electron Configuration & The Table

- As atomic number increases on the periodic table, the number of electrons _____.
- The periodic table has…
  ___ periods across
  ___ groups, also called families in columns
- The periods correspond to energy levels
- The groups correspond to the sublevels (orbitals) & electrons

Electron Configuration and Reactivity

- Nobel Gases
  - Called inert gases because they are unreactive
  - Why are noble gases unreactive?
    - What is the highest occupied energy level of the noble gases? (Discuss)
    - Their highest energy level is full with 8 electrons
- Alkali Metals
  - Extremely reactive
    - Why? (highest energy level)
    - Their highest energy level has only 1 electron.

Valence Electrons

- The electrons in the highest energy level of an atom
- Maximum is 8
- Example: How many valence electrons does Phosphorus have?
  - First, look at the electron configuration. What is the highest energy level and how many electrons are in it?
- Example: How many valence electrons does Arsenic have?
  - Look at the electron configuration again.
  - Notice anything?
- The number of valence electrons is the same for every element within a group.