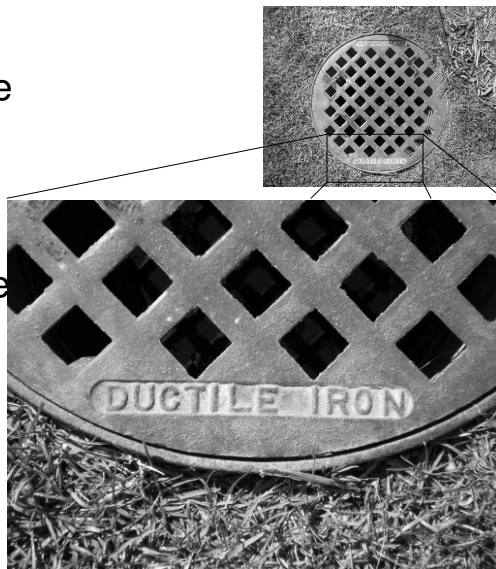


The Periodic Table

- Groups = columns on the table (There are groups 1-18).
- Rows = periods
- Metals: are to the left of the staircase. They are shiny, malleable, ductile, and good conductors.



The Periodic Table

- Metalloids -- has properties of metals and nonmetals, found next to staircase
- Nonmetals -- (right of staircase)
Nonmetals are dull, brittle, poor conductors (many are gases at room temp.)

The Periodic Table

- Mendeleev (1869) arranged the periodic table according to increasing atomic mass in rows and similar properties in columns. He left gaps for yet undiscovered elements.
- His periodic table wasn't perfect -- the irregularities were fixed when Henry Mosely (1910) arranged the table according to atomic #.

Periodic Table Cont.

Families:

- Noble gases (group 18) -- Have filled p orbitals (most stable electron configuration), very unreactive (inert - no known compounds of He, Ne, Ar)
- Alkali metals (group 1) -- soft, very reactive metals, react quickly with oxygen to form a dull surface, must be stored under oil, have a single electron in highest level (form +1 ions to become configuration of a noble gas)

Periodic Table Cont.

- Alkaline earth metals (group 2) -- harder, denser, stronger, higher MP than alkali metals, have 2 electrons in highest level (form +2 ions)
- Transition elements (groups 3-12) -- harder, denser, stronger than group 1&2 elements, various electron configurations
- Lanthanides (elements 57-71) -- shiny, reactive metals
- Actinides (elements 89-103) -- all are radioactive (unstable nucleus that spontaneously decays)

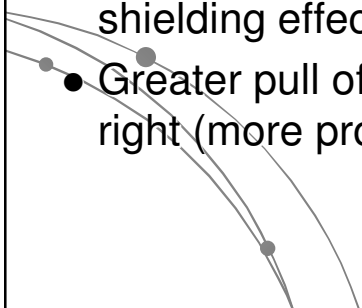
Periodic Table Cont.

- Groups 13-18 known as main block -- some are metals, metalloids, and nonmetals
- Halogens (group 17) -- combine easily with metals, form -1 ions, form salts (especially with alkali metals). Halogen means "salt former". These salts are called "halides". They are the most reactive nonmetals. Gain an electron to achieve configuration of a noble gas.
- Hydrogen doesn't fit with any family -- it's just a proton and an electron after all.

Periodic Table Trends

Atomic Radius:

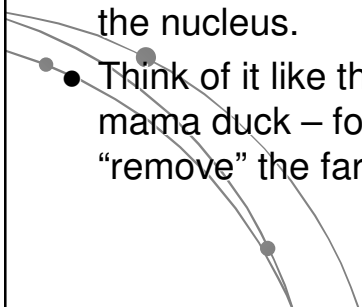
- Increases toward bottom and to the left.
- It increases toward the bottom because of the increase in # of energy levels and the shielding effect.
- Greater pull of nucleus as you go to the right (more protons) keeps radius smaller.



Trends Cont.

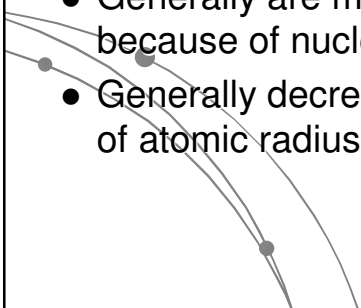
Ionization energy

- The energy required to remove an electron.
- Increases toward right and top.
- Higher at top because they are closer and less shielding.
- Higher to the right because of greater pull from the nucleus.
- Think of it like this – ducklings walking behind mama duck – fox comes along – easiest to “remove” the farthest out duckling....



Trends Cont.

Electron affinity

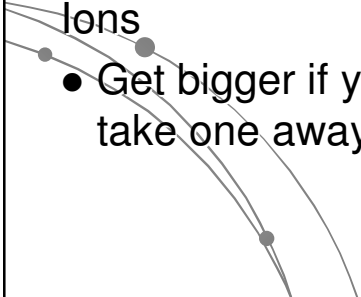
- ability to attract and hold an extra electron.
 - The more negative it is, the easier it is for the atom to take an extra electron.
 - Generally are more negative from left to right because of nuclear charge, atomic radius
 - Generally decreases from top to bottom because of atomic radius, and shielding effect.
- 

Trends Cont.

Electronegativity

- Tendency to attract electrons during bonding.
- Follows same trend as electron affinity.

Ions

- Get bigger if you add an e⁻, smaller if you take one away
- 

Summary of trends

