Periodic Trends

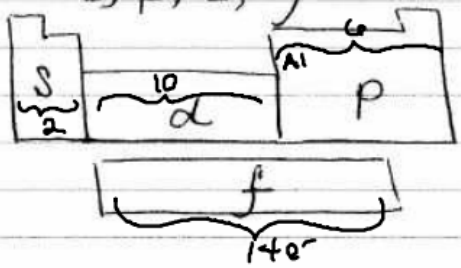
Energy level = period # (row), 1-7

Valence e⁻ = group # (column) 1-8 octet rule

Sublevels = regions within the electron cloud.

s = holds 2e⁻
p = holds 6e⁻
d = holds 10e⁻
f = holds 14e⁻

s, p, d, f



the large zones on the periodic table refer to the location of the last e⁻ for the element

ex: Calcium = last e⁻ is block s

A.R.

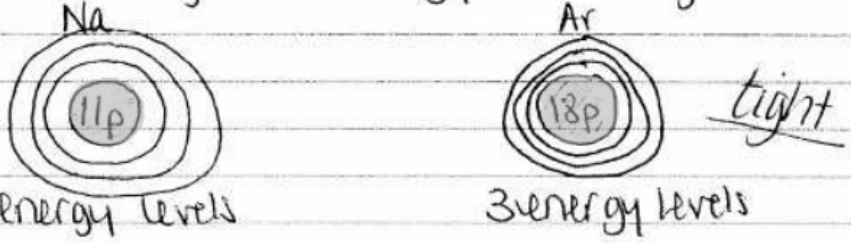
Atomic Radius = the distance between the nucleus + the outermost e⁻.

1 small
↓
7 large

① Atoms get larger as you go down a group because the # of energy levels is increasing.

② Atoms get smaller as you go from left to right across a period due to the pull from the increasing # of protons on the e⁻ making the energy levels tighten.

large → small



Loose

tight

Key: the larger the # of protons the stronger the pull on the e⁻.

Ionic Radius = the radius of an atom after an e^- has been gained or lost.

e^- lost = positive charge, atom gets smaller

e^- gained = negative charge, atom gets larger

example:
$K \rightarrow K^{1+}$ lost an e^-, gets smaller
$Br \rightarrow Br^{1-}$ gained an e^-, gets bigger

I.E. **Ionization Energy** = the energy required to remove the most loosely held e^-

Small → Large ① IE increases as you increase the # of protons within a period, because of the pull from the protons. (opposite of size)

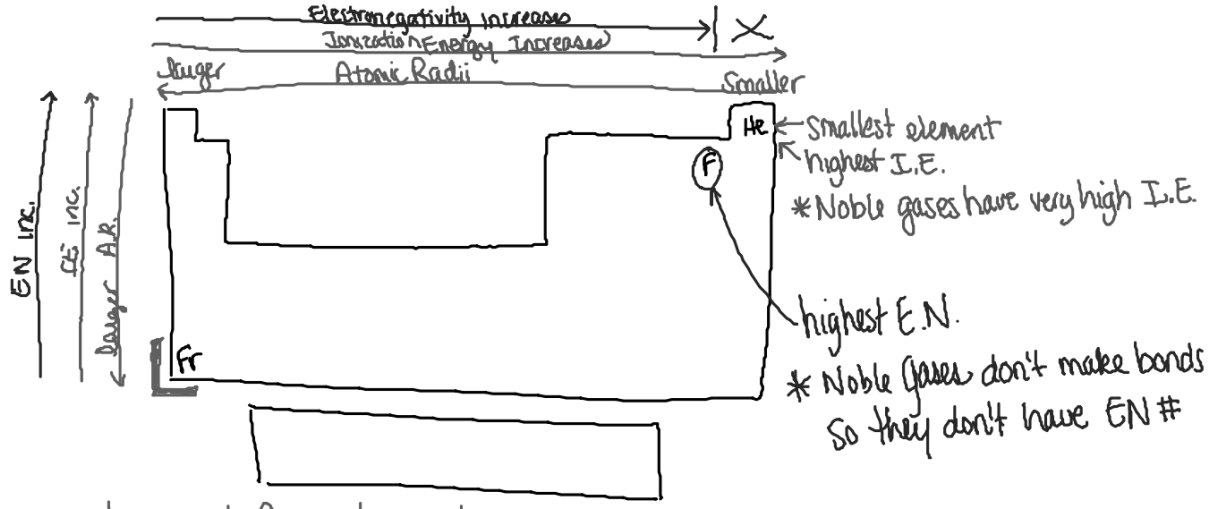
Large ↓ Small ② IE decreases as you increase the # of energy levels, because the e^- are further away from the proton pull.
* Large atoms have a very low IE
* very small atoms have a very high IE.

E.N. **Electronegativity** = the attraction of an atom to the e^- in a covalent bond.

small → large
large ↓ small

* elements that are smaller with a high IE have a higher E.N., Large atoms have a low EN.
* Noble Gases do <u>not</u> make bonds ∴ they don't have an EN value *

EN is a measure of the unequal sharing of e^- between two atoms.



Lower left is largest

Lower left is Lazy
& low ionization energy
& low electronegativity
Weak attraction for e⁻