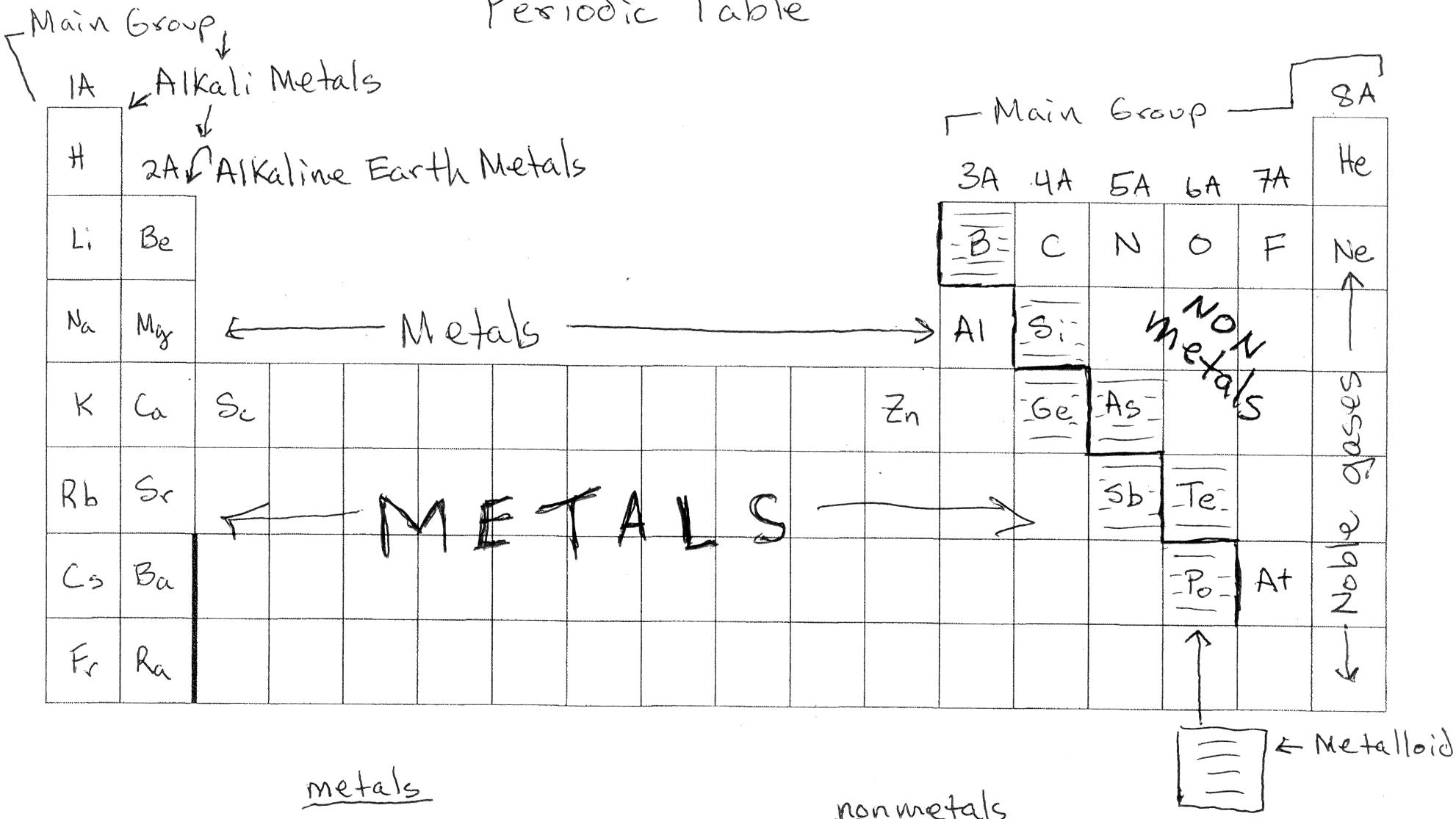
Periodic Table and Trends

2017-2018

Periodic Table



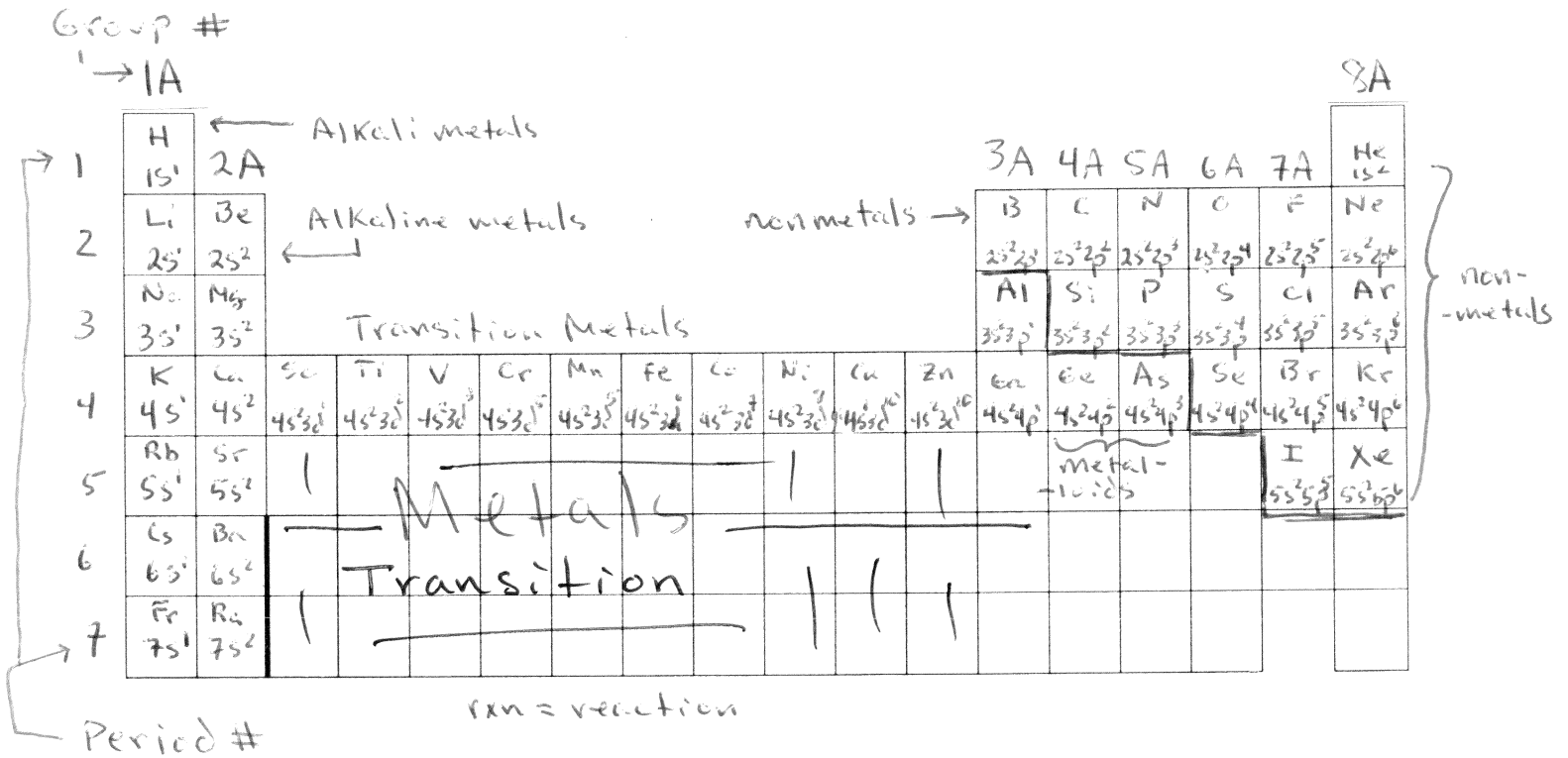
metals

- good conductors
- shine, ductile, malleable
- high density
- high melting point
- high boiling point

nonmetals

- poor conductors
- dull, brittle
- low density
- low boiling points
- low melting points

EC and Periodic Table



- Group = Family = Vertical row of elements
- Group # = Valence = number of outer-most electrons
- Main Group elements = 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A
- Period # = energy level being filled moving left to right across the table.

1. Notice that down any group that the outer valence is the same. The only change is the energy level. This fact accounts for the similar chemistry displayed by a particular group – example: all group 1A elements undergo similar chemical rxns. They all react with water to produce hydroxid

2. Notice that moving left to right across any period that the energy level is filled Li $1s^2 2p^1$ → Ne $1s^2 2s^2 2p^6$ Full

Trends in the Periodic Table

1. Period Number: horizontal row where the energy level is being filled moving L → R. For example, in period 2, energy level two is filled moving from Li to Ne.

2. Group Number: Group is equal to family. A group is the vertical column. For main group elements the group number is the number of valence electrons for those elements.

3. Force of Attraction (FA): The pull exerted by the protons on the electrons.

   FA increases L → R across any period.
   FA decreases down any group.

4. Atomic Radius (size of atom):

   Size decreases L → R across any period
   Size increases down any group

5. Ionization Energy: (IE) the energy required to remove an electron.

   IE increases L → R across any Period
   IE decreases down any group

6. Electronegativity (EN) : In the case where an atom bonds to another atom, the two atoms compete differently for the net attraction of the bonding electrons. For example, in a C-Cl bond the Cl competes more effectively for the bonding e^- than C. Therefore, Cl has more ownership of the bonding e^-.

EN increases L → R across any period.

EN decreases down any group.