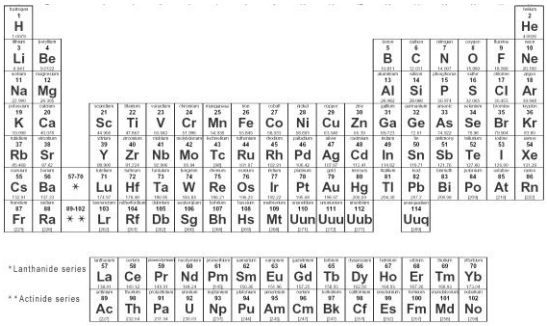
Periodic Table Structure Info Sheet

Periods (rows) → | **Mendeleev –** Organized PT based on atomic masses and properties

Groups (columns) ↑ | **Moseley –** Organized PT based on atomic numbers (the way we do it now!)

Three classes of elements: Metals, non-metals, metalloids/semi-metals



Color code each class of element. Make a key here

Metal Properties:

Chemical Prop.	Physical Prop.
Few electrons in VALENCE shell (outer shell)	Ductile Malleable
Lose electrons easily	Good conductors
POSITIVE charge like Ca^{2+}	Shiny
Make Cations	Solid at room temp

Non-metal Properties:

Chemical Prop.	Physical Prop.
Almost full, or totally full valence shell	NOT Ductile NOT malleable
Tend to gain electrons	BAD conductors
NEGATIVE charge like N^{3-}	Mostly solid
Make ANIONS	Some are gas at room temp

Semi-metal Properties:

Chemical Prop.	Physical Prop.
Most have half full valence shell	Have properties of metals AND non-metals
Make anions OR cations depending on their environment	No way to know which properties of each

Things in the same period have:

Increasing atomic # and mass L→R

Same number of energy levels

Period 1 has 1 level

Period 2 has 2 levels etc…

Things in the same group have:

Increasing atomic # and mass ↓

Same number of valence electrons

Exceptions: d and f block

Similar physical and chemical properties

b/c they have same # of valence e^-s

Valence Electrons:

Outer electrons

Matches the "A" column number

1A has 1 v.e^-, 2A has 2v.e^-, etc.

d and f blocks don't follow rules

Shielding and Z_{eff}:

Outer electrons have trouble "seeing" the protons in the nucleus – the nucleus is "shielded" by the electrons. You can calculate how much "shielding" there is by calculating the "Effective Nuclear Charge"

$$Z_{eff} = Z - S$$

Z_{eff} = effective nuclear charge

Z = atomic #

S = all non-valence electrons

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The Periodic Table of the Elements