

**UNIT 1**  
**Matter, Trends, and Chemical Bonding**  
**Overview of Topics**

Atoms and Ions

- atomic structure
- history of the atomic model
- representations of atoms and ions:
  - Bohr-Rutherford
  - Lewis dot

Periodic Trends

Underlying concepts:

- nuclear shielding/effective nuclear charge
- balance between +/- attraction and -/- repulsion

**Across** a period; **Down** a group:

- atomic radius
- ionization energy
- electron affinity
- electronegativity
- reactivity (consider metals and non-metals separately)

Bonding (Intramolecular Forces)

Ionic vs. Covalent bonding

- fundamental differences
- properties of compounds
- representing both types of compounds with Lewis structures

Bonding continuum:

- pure covalent – polar covalent – ionic

Polarity

- determining bond polarity vs. molecular polarity

Intermolecular Forces

- LDF, DDF, H-“bond”
- Physical properties due to IMF

Shape

- determining shape based on Lewis structure & AXE
- names and bond angles for all shapes

Nomenclature

- Ionic – simple binary, multivalent cations (stock system), polyatomic ions + all derivatives
- Molecular – simple binary, acids