

# Concept analysis for Chemical bonding

**Concept label** : chemical bonding

**Concept definition** : chemical bonding is the force that hold two atoms together in a molecule or formula unit

**Concept type**: Abstract

**Attribute to**

- a. **Critical** : chemical bonding, the force that hold atoms together, molecule , formula unit

b. **Variable**: properties of bonds, bond energy, bond length, bond angle ,

**Position** :

a. **Supper ordinate**: molecules , compounds

b. **Coordinate** : none

c. **Subordinte** : ionic bond, metallic bond, covalent bond.

**Example** :

psuedo example- ball and stick model of amolecule  
or picture, animation

- None psuedo examples: atom

# Concept analysis for ionic bonding

- **Concept label** : ionic bonding
- **Concept definition**: ionic bonding is a bond formed by attraction of oppositely charged ions that arise through electron transfer between atoms.
- **Concept type** : abstract
- **Attribute to**
  - a. Critical : ionic bond, attraction of oppositely charged ions, electron transfer

b. Variable : electrons, ions, atoms, lattice energy, melting point, boiling point, density, compound , dissociation energy

Position :

a. Supper ordinate: formula units,

b. Coordinate : covalent bonding

c. subordinate: none

Example : bond in NaCl

Non example : bond in water molecule

# Concept analysis for covalent bonding

- Concept label : covalent bonding
- Concept definition : covalent bonding is a bond formed by sharing of electrons between two atoms.
- Concept type : abstract
- Attribute :
  - a. Critical : sharing of electrons, covalent bond , atoms
  - b. Variable : bond length, bond angle, bond energy, bond number, bond order,

- Position :
  - a. Supper ordinate: covalent compounds
  - b. Coordinate : ionic bonding
  - c. Subordinate: polar covalent bond, non covalent bond, coordinate covalent bond

Example : bond in water and methane molecules

Non example: bond in NaCl



# Concept analysis for Metallic bonding

- Concept label : metallic bonding
- Concept definition : metallic bonding is a bond formed by attraction between metal ions and their delocalized valence electrons.
- Concept type: abstract
- Attribute to:
  - a. Critical : delocalized valence electrons, metal ions , metallic bond.

b. Variable: number of valence electrons ,  
cations, type of valence electrons, atomic  
size,

Position :

a. Supper ordinate: metal

b. Coordinate : covalent bond, ionic bond

c. Subordinate : none

- Example: Bonding in sodium metal

Non example: bonding in oxygen molecule

# Concept analysis for Hydrogen bonding

- Concept label : hydrogen bonding
- Concept definition : hydrogen bonding is a type of dipole- dipole force that arises between molecules that have a hydrogen atom bonded to small highly electro negative atom with lone pairs.
- Concept type: abstract
- Attribute to:
  - a. Critical : dipole dipole attraction, force between molecules, hydrogen atom , electronegative atom, lone pair.
  - b. Variable: density, state, polarity,

- Position :

- a. Supper ordinate: inter molecular force

- b. Coordinate : London force

- c. Subordinate : none

Example :bonding between water molecules

Non example: covalent bond in water