

Introduction to Chemistry



Unit 2

Module 2



Module Concepts

- What properties define matter?



Properties of Matter

- All properties fall into one or more of four categories:
 - Physical
 - Chemical
 - Extensive
 - Intensive



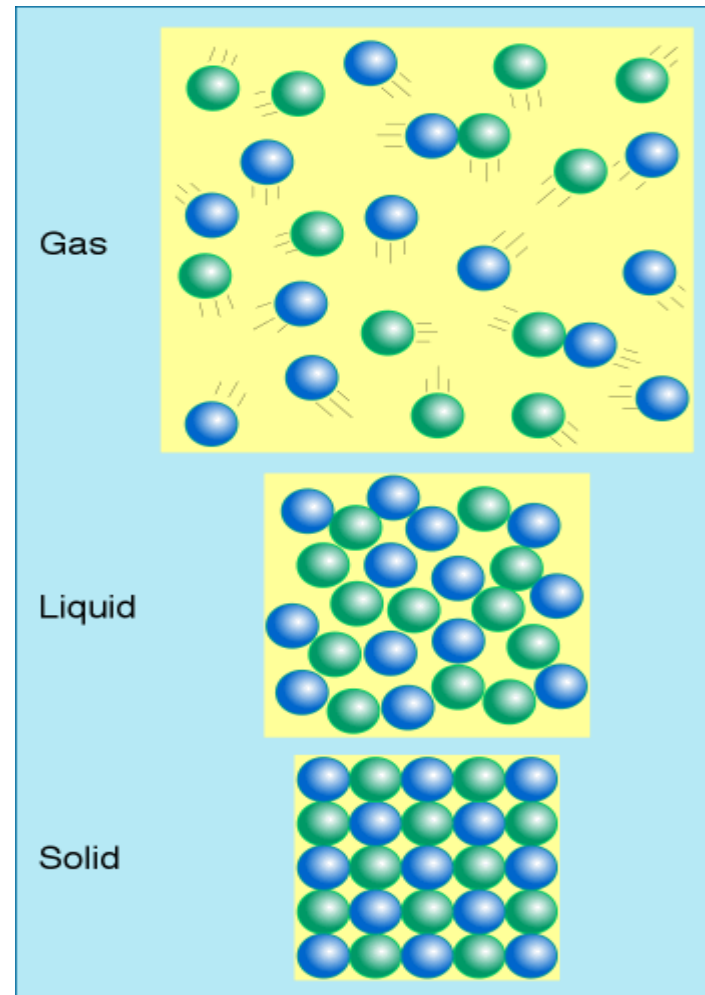
Physical Properties

- Physical properties are those that can be measured or observed without changing the chemical composition of matter.
- ***States of Matter*** - most basic physical property, describing relative energy of particles



Physical Properties – States of Matter

- *Gas* - no fixed shape or volume, expand to fill container, particles have very high kinetic energy
- *Liquid* - fixed volume, assumes shape of container, particles have more kinetic energy
- *Solid* - fixed shape and volume, rigid structure, particles have low kinetic energy



Physical Properties – Cont'd

- Other physical properties include (but are not limited to):
 - Color
 - Texture
 - Shape
 - Density (mass to volume ratio)
 - Conductivity (ability to conduct electricity)
 - Melting point (temperature at which a substance melts/freezes)
 - Boiling point (temperature at which a substance boils)
 - Malleability (ability to be pounded into thin sheets)
 - Ductility (ability to be pulled into thin wires)
 - Etc.



Chemical Properties

- Chemical properties are those properties that can be observed only when substances interact with one another.
- These describe the chemical reactivity of a substance.



Chemical Properties

- Examples
 - Iron rusts when exposed to air.
 - A copper statue turns blue-green when exposed to air and rain.
 - Acid reacts with base.
 - Blonde hair turns green after swimming all summer.
 - An apple rots after falling off the tree.



Extensive Properties

- Extensive properties depend on the quantity of matter present.
 - Examples
 - Mass
 - Volume
 - Weight
 - Time it takes for a sample of sugar to dissolve in a sample of water



Intensive Properties

- Intensive properties are independent of the quantity of matter present.
- These include all chemical properties and most physical properties.
- Examples:
 - Melting Point
 - Boiling Point
 - Reactivity toward acid

