

# Solutions and Solubility



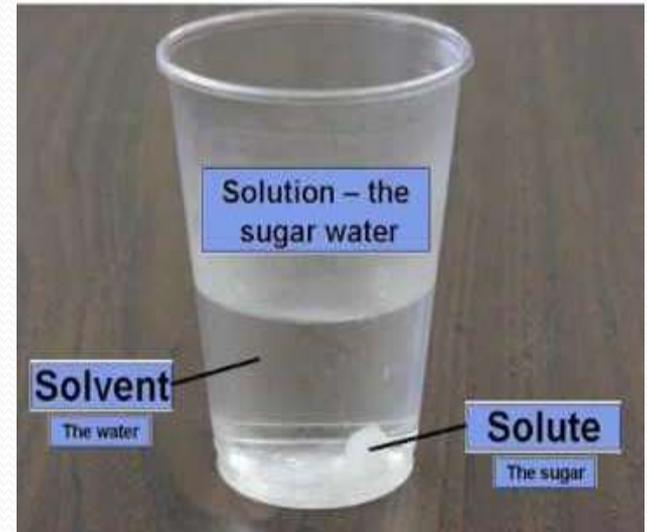
# What is a Solution?

- A **solution** is a mixture that has the same composition, color, density, and even taste throughout.
  - Solutions are **homogenous** mixtures.



# What is in a Solution?

- Solutions are made of two parts:
    - **Solute**: The substance that is dissolved
    - **Solvent**: The substance doing the dissolving
- i.e. Salt water, Soft drinks, Food coloring and water



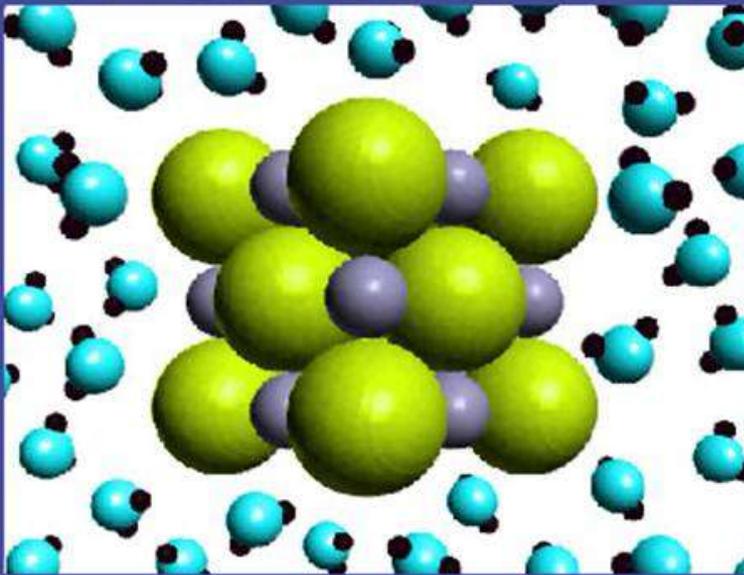
# Dissolving Process

- Remember the **kinetic theory**
  - Molecules are always moving
  - Molecules randomly collide
- When we dissolve sugar in water, what happens?
  - Water molecules attach to outside of sugar molecules and the sugar apart
  - Works from the outside → in

# Dissolving Process

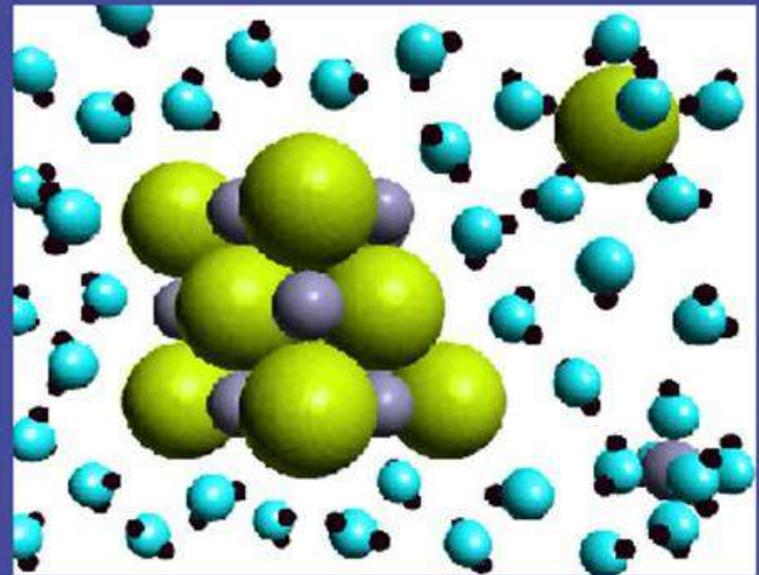
**NaCl**

**As it is Immersed in Water**



**Na+ (Small)    Cl- (Large)**

**NaCl Dissolving**



**Cl- attracts the + end of water  
Na+ attracts the - end of water**

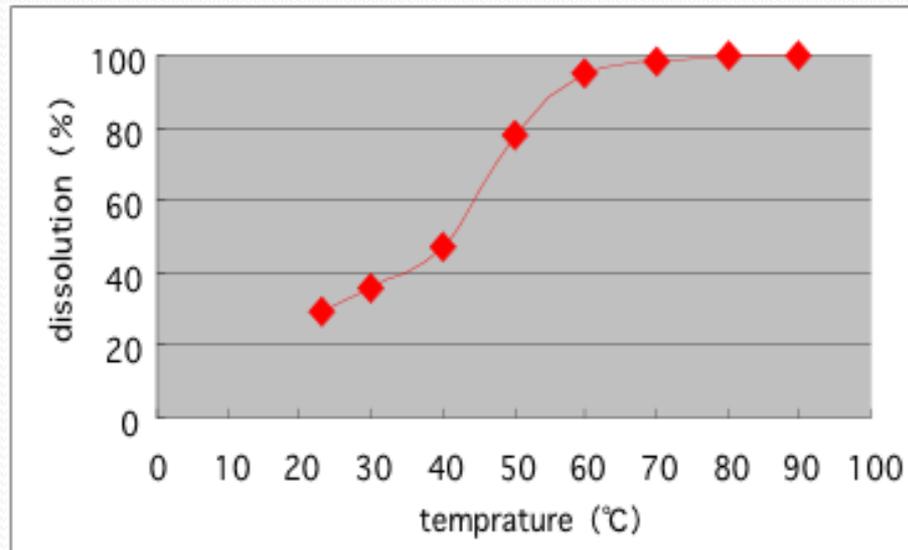
# Stirring and Dissolving

- Increasing the movement of molecules allows more solvent to get to the solute



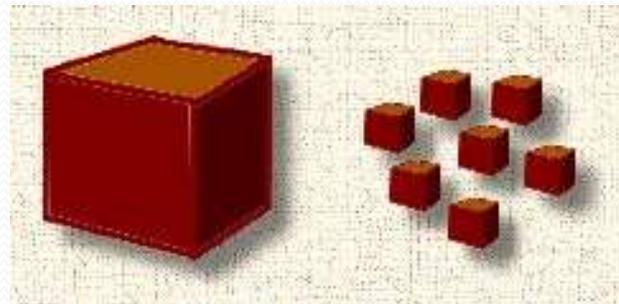
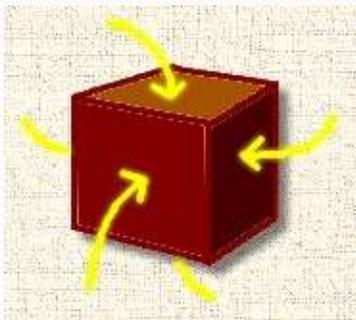
# Temperature and Dissolving

- As a substance is heated, its particles move faster
- The faster they move, the more collisions between the solvent and the solute



# Surface Area and Dissolving

- A substance in small pieces dissolves faster than one in big piece.
- Breaking a molecule uncovers more surface area
- More surface area, more solute particles can be pulled into solution



# Concentration

- The quantity of solute dissolved in a given quantity of solvent
- **Dilute** = small amount of solute dissolved in solvent
- **Concentrated** = large amount of solute dissolved in solvent

# Diluted vs. Concentrated



# Solubility

- The greatest quantity of a solute that will dissolve in a given quantity of solvent to produce a saturated solution

# Factors that Affect Solubility

- Volume
- Temperature
  - Ex: hot tea can hold more sugar than cold tea

# Solubility Values

- Tells how much of a substance will dissolve in a certain volume under a certain temperature

# How Much Will Dissolve?

- The solubility of a substance stops at equilibrium
- Equilibrium – balance of solute molecules coming and going from solution

# Unsaturated Solutions

- **Unsaturated** = solutions that is able to dissolve more solute
- **Saturated** = Solution that cannot dissolve any more solute at the given conditions
- **Supersaturated** = holding more dissolved solute than is specified by its solubility at a given temperature

# Temperature and Solubility Graphs

- Y axis – how many grams of solute will dissolve in 100 mL of water
- X – axis – temperature in degrees Celsius
- Show how much substance dissolves at a given temperature

# Solubility in g/100 g water

