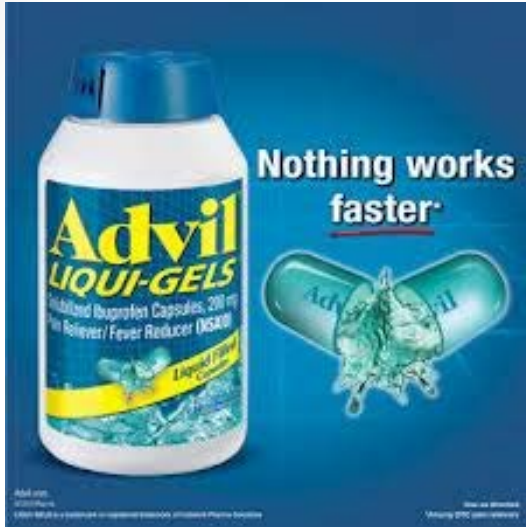


# Factors Affecting Solubility



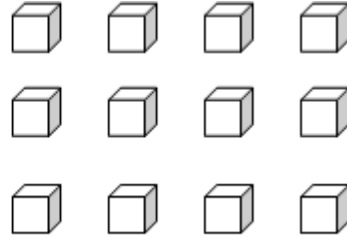
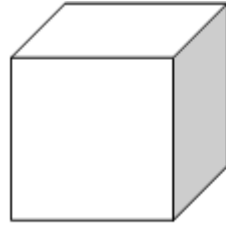
## Outcomes:

- Explain how a change in temperature affects the solubility of gases.
- Explain how a change in pressure affects the solubility of gases.

# Factors That Affect SPEED of Dissolving

## 1. Particle Size:

- **SMALLER** the particle, the **GREATER** the **SURFACE AREA**.
- The **MORE** crystal **SURFACE EXPOSED** to the **SOLVENT**, the **FASTER** it will dissolve.

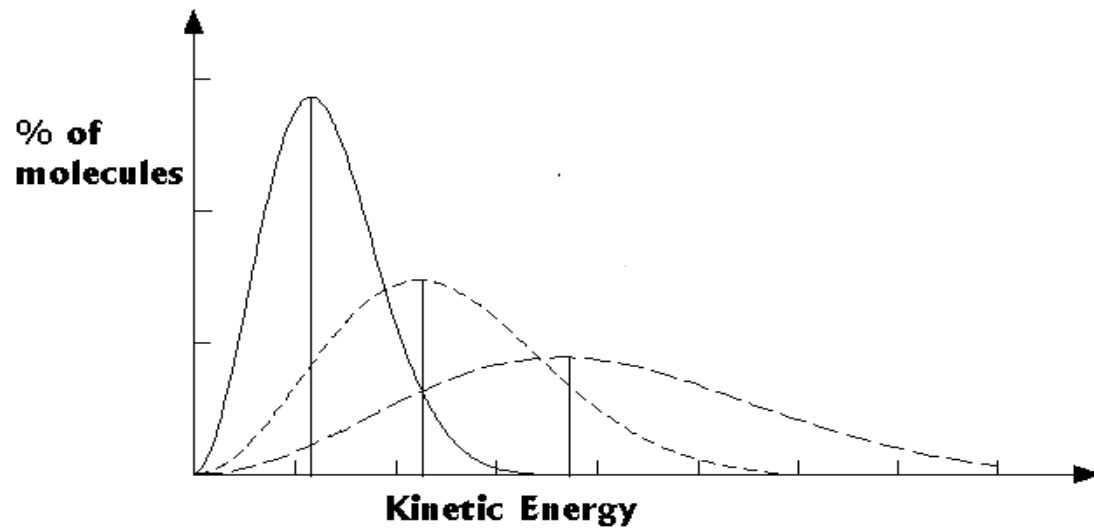


# Factors That Affect SPEED of Dissolving

## **2. Temperature (kinetic energy):**

- Increased **HEAT (K.E.)** increases molecular **MOTION**.
- This has the same effect as increasing the **SURFACE AREA** or **AGITATION**.

**Maxwell-Boltzmann Distribution**



# Factors That Affect SPEED of Dissolving

## 3. *Agitation (Stirring):*

- **STIRRING** exposes **FRESH SOLVENT** to crystal **SURFACES**, **INCREASING RATE** of solvation.



# Factors That Affect SOLUBILITY

Remember that solubility refers to **HOW MUCH** of a substance will dissolve

## ***1. Type of Solvent/Solute***

- Recall: "**LIKE DISSOLVES LIKE**".



# Factors That Affect SOLUBILITY

## *2. Effect of Temperature*

### **a) For Solids:**

- For most solids dissolving is **ENDOTHERMIC** (needs **HEAT**)
- This means that if you have **MORE HEAT**, you can usually dissolve **MORE** of a **SOLID**.

*So the solubility of solids increases as temperature increases.*





# Factors That Affect SOLUBILITY

## 2. Effect of Temperature

### b) For Gases:

- Process is **EXOTHERMIC** (heat **GIVEN OFF**).
- This means **GASES** will dissolve **BETTER** at **COLDER** temperatures



*So, the solubility of gases increases as temperature decreases.*



# Factors That Affect SOLUBILITY

## 3. *Effect of Pressure:*

- Pressure has **LITTLE EFFECT** unless solute is a **GAS**.
- **INCREASING PRESSURE INCREASES** the **GAS** that can be **DISSOLVED**.
- **COLD** liquids have **LESS COLLISIONS** between the **SOLUTE** and **SOLVENT**.
- **HOT LIQUIDS** have **MORE COLLISIONS**, the **ENERGY TRANSFERRED** from these collisions may allow atoms to **ESCAPE** the solution.
- **SEALED** containers reach an **EQUILIBRIUM**, preventing **GAS** from **ESCAPING** the solution.
- Examples: *Carbonated drinks, oxygen in water*, etc.





# Real-Life Connections of Solubility:

- Fats and oils are an important source of **ENERGY** as they undergo **HYDROLYSIS** to form **GLYCEROL** and **CARBOXYLIC** acids. This reaction, which takes place in **AQUEOUS** solution, is hampered by the fact that fats and oils are essentially **INSOLUBLE** in water. So, not much **HYDROLYSIS** occurs in the **STOMACH**. The **BILE SALTS** from gall bladder break up the larger droplets of fats into suspension of very **SMALL DROPLETS**, so that **HYDROLYSIS** can proceed more **RAPIDLY**.
- Drinking plenty of **WATER**: since **WATER** is a polar molecule, it is capable of dissolving many substances, which helps in **DIGESTION**.
- **GLUCOSE** cannot be stored in body cells because of its readily **SOLUBLE MOLECULES**.
- Eating **SMALL MEALS** frequently, rather than one **BIG MEAL**.
- **CHEWING** food properly.
- Vitamin **B & C** are **WATER** soluble and vitamin **A, D, E & K** are soluble in **NON-POLAR** solvents & in the **FATTY TISSUE** of the body (which is non-polar)