

## SCH 3U

### TYPES OF SOLUTIONS

#### DEFINITIONS:

##### 1. SOLUTIONS versus PURE SUBSTANCES

Solutions



variable compositions



Salty water contains varying amounts of salt dissolved in the water.

Pure Substances



fixed compositions



pure water = 2 Hs & 1 O

##### 2. SOLUTION = a homogeneous mixture of 2 or more substances

#### **SOLVENT**

= any substance that has other substances dissolved in it

#### **SOLUTE**

= other substances that are present in the solution

- when a solute dissolves in a solvent, no chemical reaction occurs.
- separating solute from solvent depends on **physical properties**.

#### TYPES OF SOLUTIONS

- various combinations of solute and solvent **states** are possible
- gases, liquids and solids mixed together

- **AQUEOUS SOLUTIONS** = a solution in which water is the solvent
- **MISCIBLE** = *miscible* liquids can be combined in any proportions
  - ethanol and water are miscible -- either can be the solvent
- **IMMISCIBLE** = liquids that do not readily dissolve in each other
  - oil and water
- **ALLOYS** = solid solutions of metals
  - bronze-- 10% tin and 90% copper
  - coins -- copper and nickel

## **SOLUBILITY & SATURATION**

1. **SOLUBILITY** = is the amount of solute that dissolves in a given quantity of solvent, at a certain temperature.
  - solubility of salt in water at 20°C is 36 g per 100 mL of water.
2. **SATURATED SOLUTION** = formed when no more solute will dissolve in a solution
  - In above example, no more than 36 g of salt will dissolve in 100 mL of water at 20°C; however, the solution may be able to dissolve other solutes.
3. **UNSATURATED** = a solution that can still dissolve more solute; it is not yet saturated.

## **SOLUBILITY IN SOLVENTS:**

- general rules for SOLIDS and LIQUIDS are as follows:

### **In 100 mL of solvent:**

$< 0.1 \text{ g}$	$0.1 \text{ g} \text{ --- } 1 \text{ g}$	$> 1 \text{ g}$
insoluble	sparingly soluble	soluble

- general rules for solids and liquids do **not** apply to GASES
  - oxygen in water --  $0.0009 \text{ g}/100 \text{ mL}$  of fresh water is sufficient to ensure survival of aquatic life

## ***LIKE dissolves LIKE...***

- polar solvents dissolve polar solutes
- non-polar solvents dissolve non-polar solutes