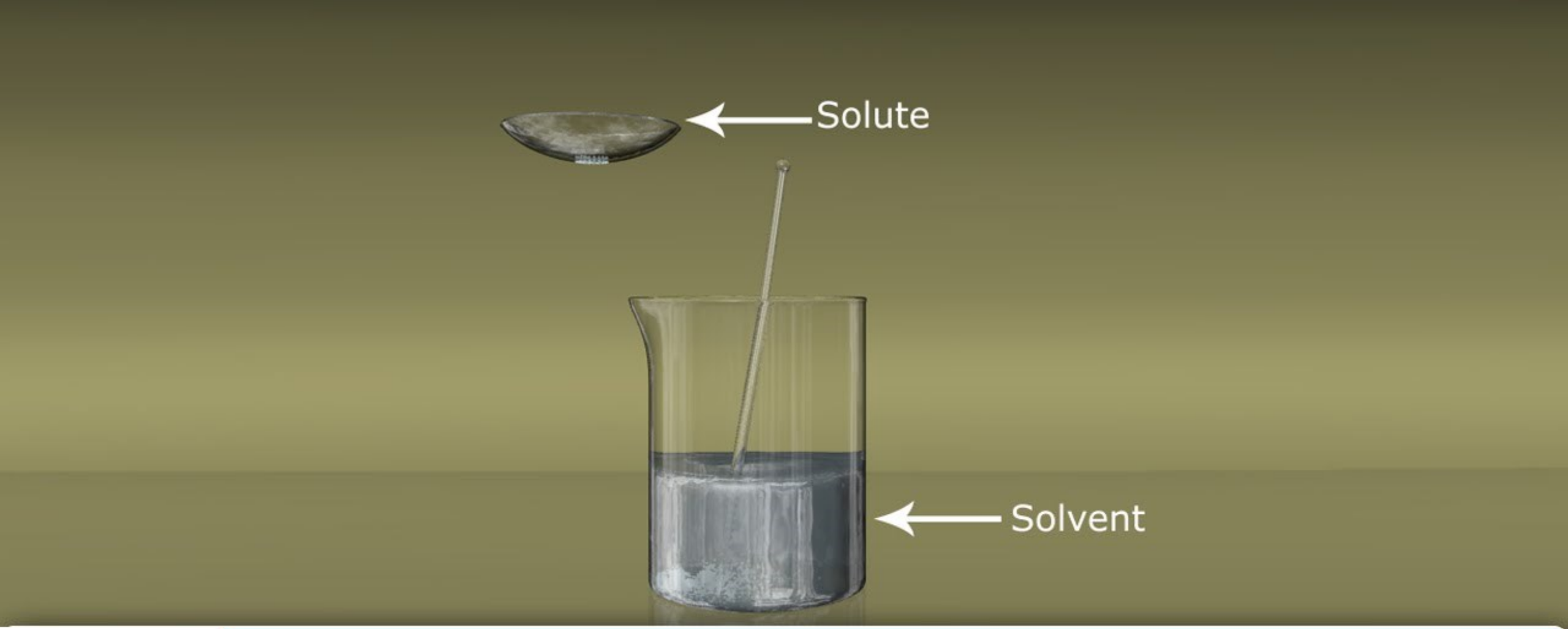


ACTIVE
The Joy Of Happy Learning

SOLUBILITY

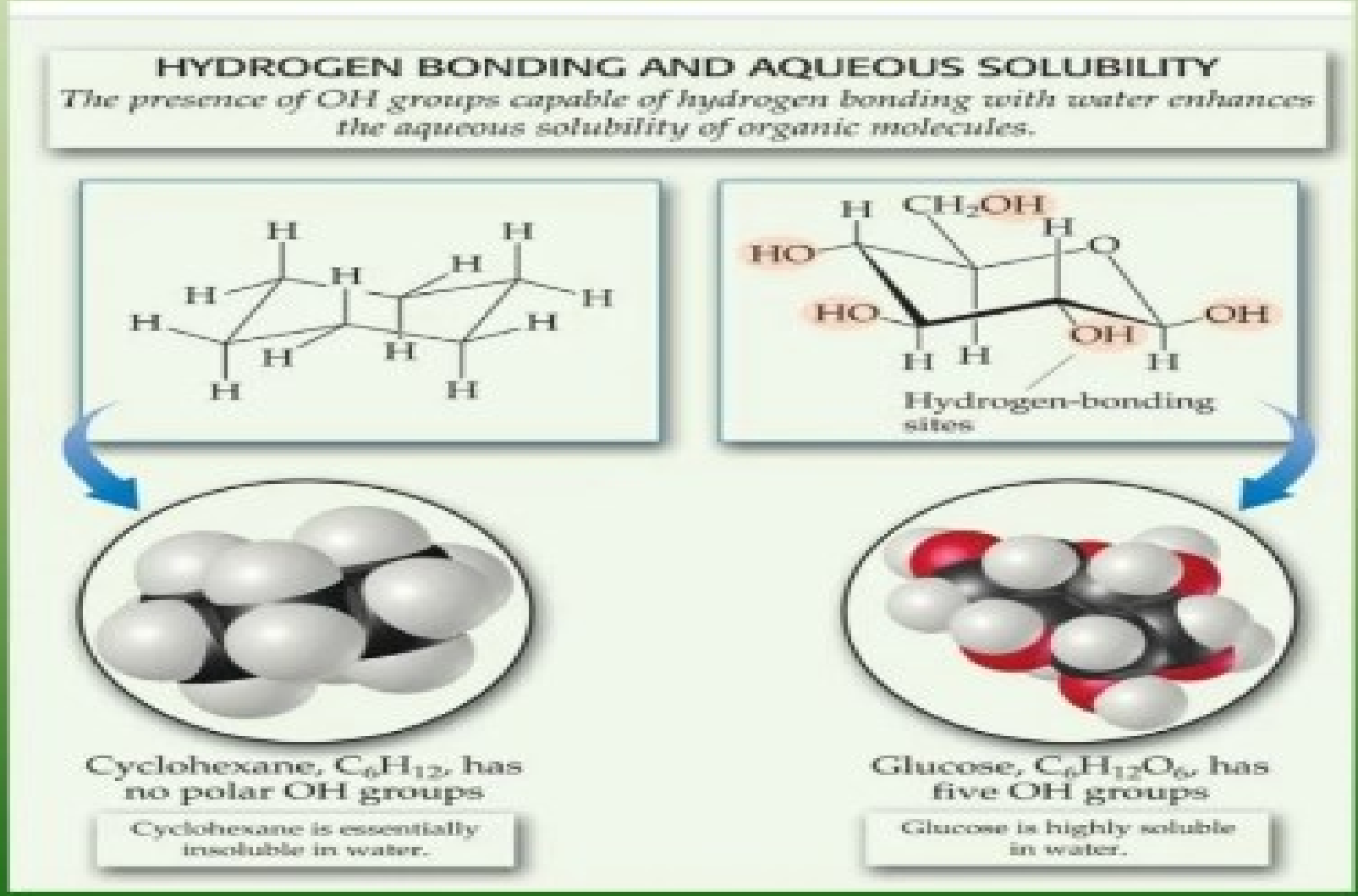
Definition

Solution	A system in which molecules of a solute are dissolved in a solvent vehicle
Solubility	The concentration of solute in a saturated solution at a certain temperature and pressure
Saturated Solution	A solution contains a solute at the limit of its solubility at any given temperature and pressure
Sub-saturated Solution	A solution containing the dissolved solute in a concentration below that necessary for complete saturation
Supersaturated Solution	A Solution containing the dissolved solute above its normal solubility limit

Factors Affecting Solubility

- The stronger the attraction between solute and solvent molecules, the greater the solubility.
- ***Like dissolves like*** (the substances have similar intermolecular attractive forces.)
- Polar substances tend to dissolve in polar solvents. Non-polar substances do not dissolve in polar solvents.

Factors Affecting Solubility



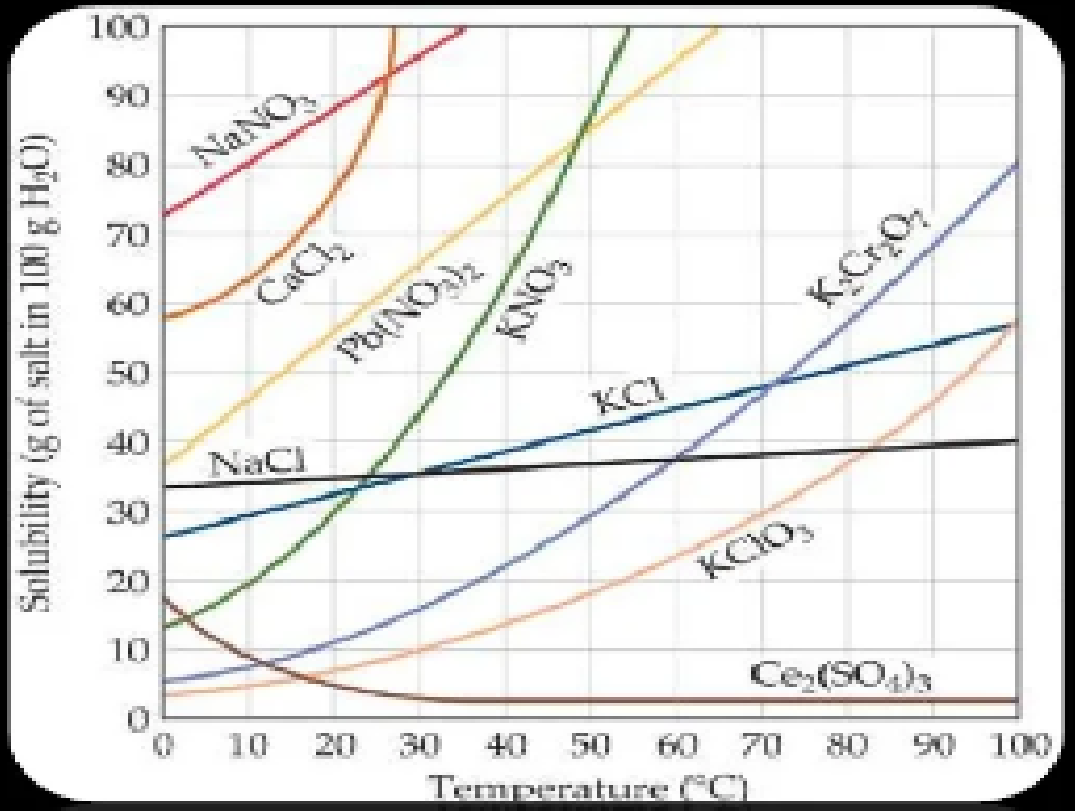
Glucose (which has hydrogen bonding) is very soluble in water, while cyclohexane (which only has dispersion forces) is not.

LABORATORY ACTIVITY 2.8
FACTORS SOLUBILITY

SOLVENT	WATER	KEROSENE	ACETONE	ALCOHOL
Oil	IMMISCIBLE	MISCIBLE	MISCIBLE	S/MISCIBLE

SOLVENT	NaCl	$C_{12}H_{22}O_{11}$	$C_{10}H_8$	I_2
Water	SOLUBLE	SOLUBLE	INSOLUBLE	INSOLUBLE

Temperature



Generally, the solubility of ***solid*** solutes in liquid solvents increases with increasing temperature.

SOLUTE	COLD WATER	HOT WATER	TIME TO DISSOLVE
Salt	TAKES TIME TO DISSOLVE	EASILY DISSOLVED	
Sugar	TAKES TIME TO DISSOLVE	EASILY DISSOLVED	
KNO_3	TAKES TIME TO DISSOLVE	EASILY DISSOLVED	

Molecular Size and Solubility

- **Small molecules are often more soluble than larger molecules.**

LABORATORY ACTIVITY 2.8 FACTORS SOLUBILITY

SOLVENT	REFINED SALT	ROCK SALT
Water	EASILY DISSOLVED	TAKES TIME TO DISSOLVE

SOLVENT	REFINED KNO_3	KNO_3 CRYSTALS
Water	EASILY DISSOLVED	TAKES TIME TO DISSOLVE

Effect of Stirring

- ✓ Stirring only increases the speed of the process - it increases the movement of the solvent that exposes solute , thus enabling solubility.
- ✓ As molecules in liquid substances are in constant move, the process would take place anyway, but it would take more time.