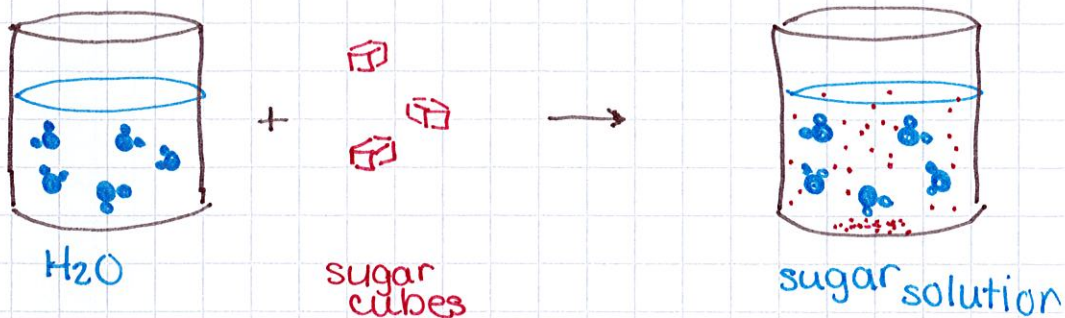# Solutions

H_2O sugar cubes   sugar solution

<u>solvent</u> - substance that does the dissolving

<u>solute</u> - substance getting dissolved

· What solutes dissolve in which solvents?

"Like dissolves Like"

| Polar solvents dissolve Polar solutes. | Nonpolar solvents dissolve Nonpolar solutes |

1. Ionic compounds are polar.

   Ex. NaCl

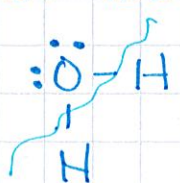formed when metal & nonmetal form ions - Na^+ & Cl^-

$NaCl_{(aq)} \rightarrow Na^+_{(aq)} + Cl^-_{(aq)}$

2. Polar molecules are polar. 1 side is different from the other side.

Ex. H_2O Ex. C_2H_5OH

1. Pure covalent molecules are nonpolar.

Ex. Br_2

$7 \times 2 = \dfrac{14e^-}{2}$

2. molecules that do NOT have 1 side different from the other.
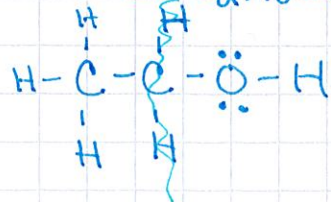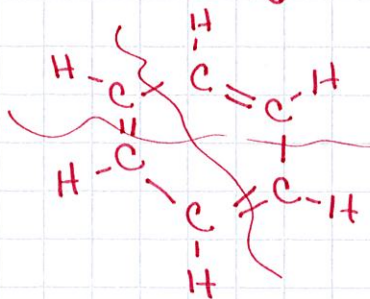
Ex. C_6H_6 Ex. CCl_4
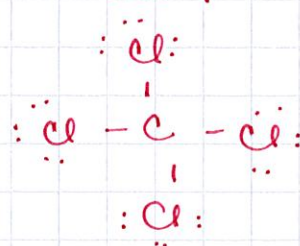
Ex(1) Can these solutes dissolve in these solvents?

solutes	solvents	Y or N?
(A) CH_4 NP	H_2O P	N
(B) K_2SO_4 P	H_2O P	Y
(C) $NaCl$ P	C_6H_4 NP	N
(D) C_3H_8 NP	C_2H_5OH P	N
(E) $C_{12}H_{22}O_{11}$ P	CF_4 NP	N
(F) $C_{12}H_{22}O_{11}$ P	$H_2O.$ P	Y

$\underline{CH_4}$

$\underline{C_3H_8}$
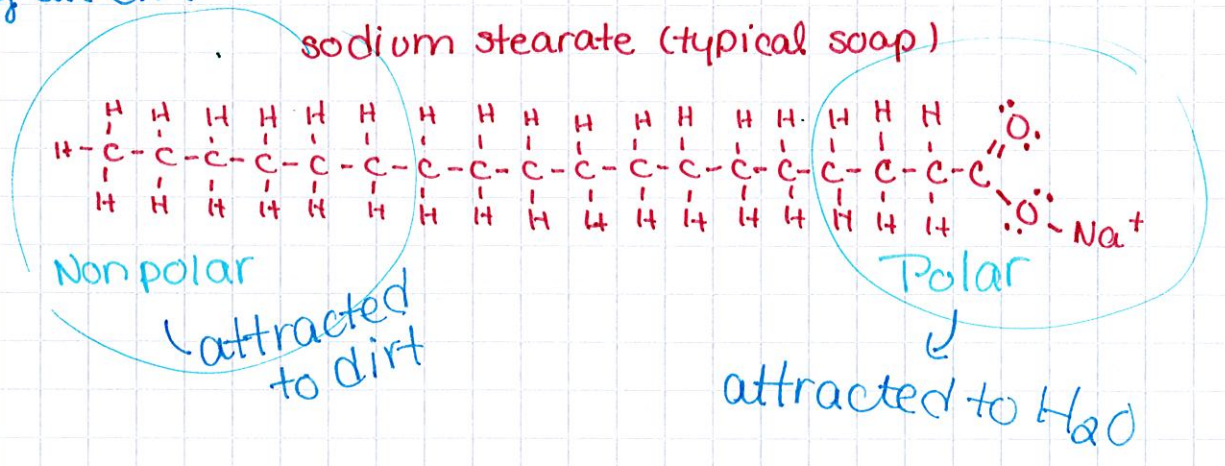
$\underline{C_{12}H_{22}O_{11}}$
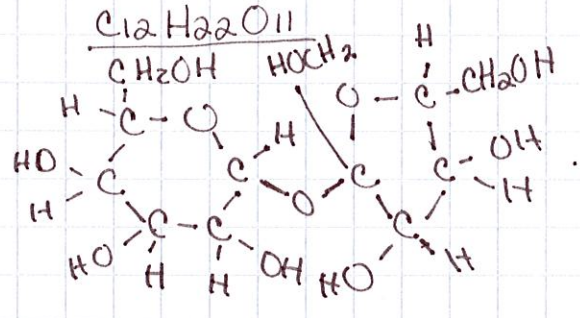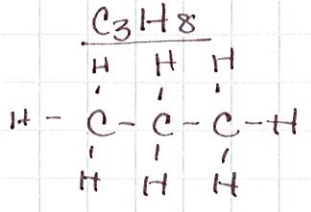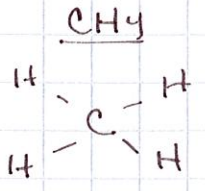
(2) what's the best way to remove dirt?
(Dirt is nonpolar.)

w/ H_2O only?   with soap & H_2O?

H_2O is polar.
It won't wash
away all dirt

works better!

sodium stearate (typical soap)

Non polar
↳ attracted to dirt

Polar
↳ attracted to H_2O

②

(3) why is it never a good idea to take too many vitamins?

water soluble vitamins	fat soluble vitamins
B & C	A, D, E, & K
can't o.d. on these.	can o.d. on these

Factors Affecting Solvation (dissolving)

(1) Surface Area - Increasing surface area makes solutes dissolve faster.

Why? more solute _____ available to touch solvent & dissolve

(2) Agitation (stirring) - makes solutes dissolve faster.

Why? solute & solvent collide more often.

(3) Temperature
(A) Solid solutes - higher temperatures dissolve solids faster than lower temperatures
Why? higher KE & move faster, collide more often

(B) Gas solutes - lower temperatures dissolve gases faster than higher temperatures
Why? lower temperatures, particles move slower, collide less often to stay in solution & not escape.