salt dissolves in water forming a solutionsolute
gets dissolvedsolvent
does the dissolvinga homogeneous mixture
b/c the components are indistinguishable

Aim: How do salts get dissolved by water?

all **ionić** compounds; NaCl is the most common example

Refer to the diagram in today's handout.

1) A salt water solution consists of **hydrated** ions. That is, the ions which make up the salt are separated from each other and surrounded by water.



2) We write aqueous (aq) alongside the symbols of the ions to indicate that they are hydrated.

3) The water molecules are attracted to the ions because they are **dipoles**.

<u>Remember</u>: water is a polar molecule (dipole) due to its polar bonds and asymmetrical shape.

3.4 2.2

4) The forces of attraction that exist between the water molecules and the ions are called **molecule-ion attractions**.



Note: the oxygen atom faces the (+) ion, while the hydrogen atoms face the (-) ion, because opposites attract; dashed lines represent the molecule-ion attractions

5) Chemical equations for dissolving in water:

a) **ionic** compounds (salts)

 $NaCl(s) = = > Na^{+}(aq) + Cl^{-}(aq)$

 $\begin{array}{rl} H_2O\\ CaF_2(s) &==> & Ca^{+2}(aq) &+ & 2\ F^-(aq)\\ \end{array}$ Check to see that the equation balances. That's why the coefficient of F⁻ is 2.

$$H_2O$$

 $KNO_3(s) ===> K^+(aq) + NO_3^-(aq)$

"Polys" stay together. That is, the water doesn't separate the NO₃⁻ into N⁺⁵ & O⁻² ions. Refer to **Table E**.

b) covalent (molecular) compounds







C6H1206 C6H1206 C6H1206 C6H1206

When covalent compounds dissolve

the water separates molecules from each other.

When ionic compounds dissolve the water separates ions from each other.

Other examples:

$$H_2O$$

$$CO_2 (g) ===> CO_2 (aq)$$

$$carbonated water (seltzer)$$

$$NH_3 (g) ===> NH_3 (aq)$$

$$ammonia water$$

$$CH_3OH (i) ===> CH_3OH (aq)$$

$$methanol$$