Demo: oil and water don't "mix"

Why? Oil and water are <u>not</u> alike. They have different natures.

# 

## Aim: What factors affect solubility?

## I. The Nature of the Solute and Solvent

### 1) Molecular (covalent) substances



Remember: "Geometry determines Polarity"



# Let's apply this concept.

**Glucose** ( $C_6H_{12}O_6$ ) dissolves in water, but not in oil. What does this tell you about the polarity of glucose? Therefore, glucose is **polar**.

Wax dissolves in oil, but not in water. Therefore, wax is nonpolar.

Go to "Top Six Molecules" Handout; Note: Now, add alcohols, sugars, hydrocarbons to the chart. Chille\Chemistry 2

LDLtopsix

# "Like dissolves Like"

That is, to predict the solubility of a solute in a solvent, you need to consider the polarity of each.

Polar Solvents dissolve Polar Solutes

Nonpolar Solvents dissolve Nonpolar Solutes



Some common solvents listed in order of polarity:

water, methanol, acetone, pentane, benzene most polar most nonpolar

DEMO: Styrofoam dissolves in acetone

### 2) Ionic compounds aka "salts"

Table salt dissolves in water. Applying "LDL", does this mean table salt is polar?



You can think of water as so polar that it's almost ionic.

Therefore, all salts dissolve in water, **but** some dissolve so little that we say they are insoluble.

**DEMO**:  $CaCO_3$  in water RESULT: a cloudy mixture with most of  $CaCO_3$  settling to the bottom of the test tube

How can we predict the solubility of a salt? REFER to Table F.

Start with the  $2^{nd}$  half of the compound. Then, see if the  $1^{st}$  half is an Exception.



CuSO<sub>4</sub>

not an Exception soluble

Therefore, soluble