

Target	1	2 (all of 1 plus)	3 (all of 2 plus)	4 (all of 3 plus)
LE 5.7 Preparedness	Does not complete formative or summative in an effortful and timely manner, is not engaged, does not arrive on time with class materials ready to learn, does not communicate when issues arise	Completes formative or summative in an effortful or timely manner, is sometimes engaged, sometimes arrives on time with class materials ready to learn, sometimes communicates when issues arise	Completes formative or summative in an effortful and timely manner, remains engaged, arrives on time with materials ready to learn, communicates when issues arise	Completes formative or summative in an effortful and timely manner, remains engaged, arrives on time with materials ready to learn, communicates when issues arise, and is reflective on strengths and challenges within your preparedness skill
LE 5.6 Precision	Recognizes the importance of products that are planned, edited, and completed with care	Attempts products that are planned, edited, and completed with care	Creates products that are planned, edited, and completed with minimal errors	Creates products that are planned, edited, and completed free from errors or need for revision
Hydro 6	I can identify solvent, solute and solution and create/interpret a diagram of solution at the molecular scale	I can recognize that polarity has a role in solubility	I can predict solubility based on polarity of solute and solvent	I can interpret/explain the consequence(s) of solubility with respect to pollution
MP3 Hydrosphere (Shape, Polarity, Solubility)	I can create a Lewis structure of a particle of a substance, and use it to predict the shape of a molecule.	(all of 1 plus) I can use electronegativities of atoms and shapes of molecules to predict polarity	(all of 2 plus) I can demonstrate an understanding of the relationship between polarity and solubility	(all of 3 plus) acid it!

### Solutions - The Golden Rule of Solubility“Like Dissolves Like”

**Objective:** To determine a pattern explaining what substances will dissolve in what solvents.

**Background:** A solution is a type of mixture where one substance is uniformly dispersed into another. The substance that is dispersed is called the **solute** (*from the Latin ‘solutus’ meaning: having been let loose*) and the one into which the solute is dispersed is called the **solvent** (*from the Latin meaning: letting loose*). The solute is broken up into individual molecules / atoms / ions and dispersed uniformly into the solvent. Because the dispersed particles are on the atomic scale, solutions appear homogeneous (uniform) to the unaided and aided eye even though they are made up of more than one substance.

The process of a solute separating into RP and dispersing into a solvent is called **dissolving**. The degree to which a solute will dissolve (*or the amount that dissolves*) into a solvent depends on the structures of the substances.

<b>Matching...</b>	Solution	The substance that does the dissolving
	Solute	The substance that is dissolved
	Solvent	The resulting mixture

**Procedure:**

At each bench, samples of two different substances have been added to the water and fuel.

*Do NOT invert the bottles. You can shake back and forth - but do NOT invert.*

Based on your observations, decide whether the added substance has **dissolved (is soluble)** or has **not dissolved (is insoluble)** in the water and in the fuel.

Go to the next bench at the “signal”.

**Data:** (*from background and notes....*)

What will the mixture look like if the substance **dissolves (is soluble)** in the solvent?

\_\_\_\_\_

The resulting mixture would be classified as a \_\_\_\_\_.

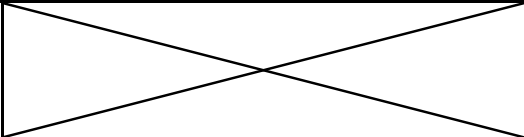
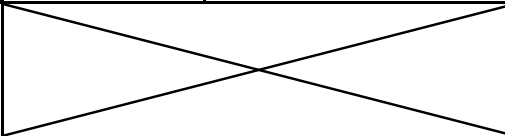
What will the mixture look like if the substance does **not dissolve (is insoluble)** in the solvent?

\_\_\_\_\_

Group members \_\_\_\_\_

Complete the table. Classify the substances as '**soluble**' or '**insoluble**'.

If '**insoluble**', note the evidence.

Substance, Formula State  (pure at benches)	Solubility in:			
	Water - (H <sub>2</sub> O)		Fuel - (mixture of hydrocarbons, C <sub>x</sub> H <sub>y</sub> )	
	evidence	soluble OR insoluble ?	soluble OR insoluble ?	evidence
Water _liquid_			insoluble soluble	
(Hydrocarbon) Fuel _liquid_		insoluble soluble		
Ethanol, CH <sub>3</sub> CH <sub>2</sub> OH _____		insoluble soluble	insoluble soluble	
Iodine, I <sub>2</sub> _____		insoluble soluble	insoluble soluble	
Sodium chloride, NaCl _____		insoluble soluble	insoluble soluble	
Sucrose, C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> _____		insoluble soluble	insoluble soluble	
Naphthalene, C <sub>10</sub> H <sub>18</sub> _____		insoluble soluble	insoluble soluble	
Vitamin C, C <sub>6</sub> H <sub>8</sub> O <sub>6</sub> _____		insoluble soluble	insoluble soluble	
Vitamin E, C <sub>29</sub> H <sub>49</sub> O <sub>2</sub> _____		insoluble soluble	insoluble soluble	
Urea, CO(NH <sub>2</sub> ) <sub>2</sub> _____		insoluble soluble	insoluble soluble	
Food oil, (triglyceride mix) ex: C <sub>30</sub> H <sub>62</sub> O <sub>6</sub> _____		insoluble soluble	insoluble soluble	

Any pattern stand out yet ? \_\_\_\_\_

**Analysis:**

What property about molecules did we just focus on in Hydro 5? \_\_\_\_\_

Organize the substances into those that dissolve in water and those that dissolve in fuel (*use Hydro 5 notes and practices and the models around the room to help you complete the table*)

Substances that dissolve in ....	Composition (# of Atoms)				Bonding (covalent / ionic)	Properties (of pure)	
	C	H	O	Other		general	(briefly justify)
Water (Solvent)							
1.							
2.							
3.							
3.							
2.							
1.							
Fuel (Solvent)							

With respect to what dissolves in what...

What patterns do you notice in composition? Explain ... If there are exceptions list them.

What patterns do you notice in bonding? Explain .... If there are exceptions list them.

What patterns do you notice in properties? Explain.... If there are exceptions list them.

