

## VIRTUAL LAB: SOLUTIONS

Solutions are **homogeneous mixtures**. This means that you can combine substances together, they do not chemically combine, and the substance being dissolved spreads out evenly through the liquid. (Homo = same) All mixtures can be separated by physical means, such as evaporation, distilling, a centrifuge (spinning fast to separate substances), filters, etc.

Solubility is a physical property. How is the solubility of a substance/compound determined? In a solution, the substance being dissolved is the **solute**. The substance that dissolves the solute is the **solvent**. *In general, the substance present in the largest amount is considered to be the solvent.* One way to increase the rate at which most solids dissolve is to *increase the temperature* of a solvent. This speeds up the movement of its particles and causes more solvent particles to contact the solute. As a result, solute particles are pulled loose from the surface faster. A **saturated solution** is a solution that has dissolved all the solute it can hold at a given temperature. If the temperature increases, the amount of solid that can dissolve usually increases. An **unsaturated solution** is any solution that can dissolve more solute at a given temperature.

In the Virtual Lab, you will test the solubility of a compound. You will choose different amounts of solutes and observe how they dissolve at different temperatures.

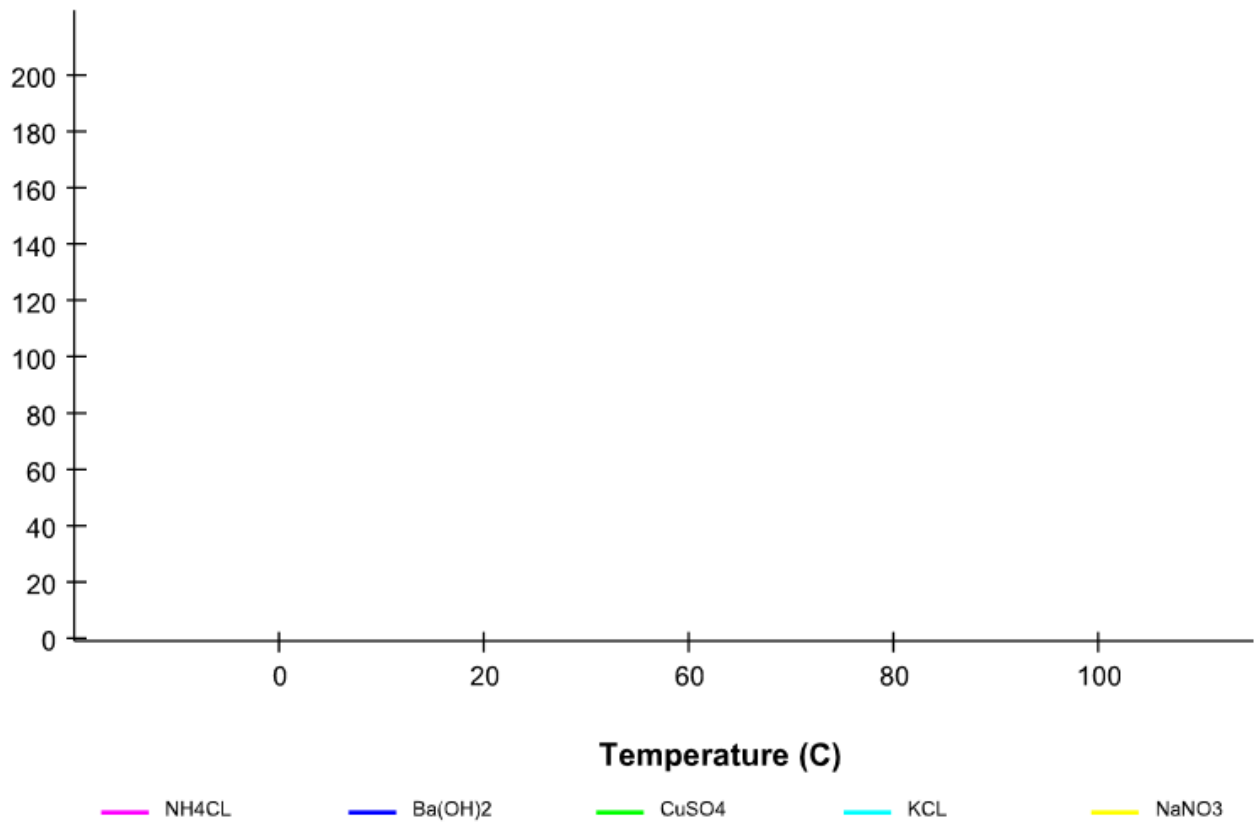
**Question: what is the difference between a solute and solvent?** \_\_\_\_\_

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### Procedure:

1. Select a compound formula. Use your Journal to state a problem about the effect of temperature on the solubility of the compound and record it in your Journal.
2. Make a hypothesis about temperature and saturation for a solute and record it in your Journal.
3. Test your hypothesis by determining the solubility of the selected compound at a given temperature. Select a temperature setting by clicking it. Then, add compound to the water using one of the measuring spoons at the top of the screen.
4. Continue placing compound into the water until saturation is reached. When the solution is saturated, undissolved compound will appear at the bottom of the beaker. Click the Undo button to remove your last spoonful of compound from the beaker.
5. Repeat the process until you find the saturation point within a gram.
6. Use the Table to record the amount of solute it took to reach saturation at each temperature.
7. Continue the process using the same compound and different temperature settings. Analyze the results of your experiment and record them in your Journal.
8. Click the Graph button to see the results of your experiments. Draw conclusions about temperature and saturation of a solute and record them in your Journal.

Temperature °C	NH <sub>4</sub> CL	Ba(OH) <sub>2</sub>	CuSO <sub>4</sub>	KCL	NaNO <sub>3</sub>
0					
20					
60					
100					



Question 1 : State a problem about the effect of temperature on the solubility of a compound?  
(This should be in the form of a question!)

Question 2 :Make a hypothesis about temperature and saturation of the solute? (This should be a statement based upon the purpose!)

Question 3 : How will you test your hypothesis? (List the steps you used in this lab to test the compounds.)

Question 4 :Analyze your experiment and your data about saturation. (What does your data say?)

Question 5 :What conclusions can you draw about temperature and saturation of the solute?  
(Hypothesis true or false, data that supports hypothesis.)