**Chem 11 – Intro activity for Solution Chemistry** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blk: \_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_

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| Rubric Categories | **Beginning** | **Developing** | **Accomplished** | **Exemplary** |
| **Discussion** | o Discussion questions are ***not*** answered completely and ***do not*** connect concepts explored in lab to theory. | o Discussion questions ***somewhat*** answered completely and ***somewhat***  connect concepts explored in lab to theory | o Discussion questions are ***mostly*** answered completely and ***mostly*** connect concepts explored in lab to theory. | o Discussion questions are answered completely and connect concepts explored in lab to theory |

This activity requires the use of a computer. Please go to the web address: <http://phet.colorado.edu/en/simulation/sugar-and-salt-solutions> and click ‘run now’ (*or google ‘phet’ then choose ‘chemistry simulations’ then choose ‘Sugar and Salt Solutions’ then ‘run now’*

**Instructions:** *Take a minute to familiarize yourself with the simulation. Then complete the worksheet by running the sim and answering the following* ***10*** *questions.*

Q: How is electricity defined? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Using the *Macro* page, start by checking off the ‘show values’ in the *concentration* box. Begin *shaking* the **NaCl** until you get approximately 0.25 mol/L. Drag the *conductivity* circuit to the solution and place the electrodes (the green and red bar) in the solution. What do you notice? *Draw a picture of the ‘brightness’ of the lightbulb.*
2. Start adding water to the solution (fill to 2L). What *proper* term can you use to describe what you are doing to the solution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *(take a look at the concentration!)*. Predict what will happen to the conductivity compared to the original solution, then drag the circuit into the solution. Make a comparison between the conductivity of the original solution to this one. *Draw a pic of the lightbulb.*
3. Using the *faucet* on the right of the container, release 1L of the solution so it is back to 1L. Predict what will happen to the conductivity? Now test the conductivity and take observations. *Explain, using comparisons, what you noticed.*

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1. Predict what will happen to the concentration of the solution and the conductivity when you evaporate the water. Evaporate as much water as possible while keeping the conductivity circuit in the solution. *Write down your findings and explain what you noticed.*

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1. **Reset all**. Now complete steps **1)** to **4)** using **sugar**. Compare the salt solution and sugar solution. *Write down any similarities and differences between the solutions.*

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1. Using the *Micro* page, add the **NaCl** to water to notice the effect of what is occurring to the molecules of salt. *What happens to an ionic compound when it is added to water?*

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1. **Reset the page**. Now add the **sucrose** molecules to water. *What happens to a covalent molecule when it is added to water?*

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1. **Reset the page**. Now add the **NaCl** again to the water. Add water to the 2L mark. *Does this help you to explain why a diluted solution will conduct less electricity?*

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Now evaporate the water until there is 0.5L. *Does this further help explain why a solution conducts electricity?*

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Now evaporate all the water. *What happens to the dissolved salt?*

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1. **Reset the page**. Go to the *Solute* box and click the right arrow to note the other solutes available. Try out the different solutes. See if you can write down the **chemical equations** for the following solutes dissolving in water.

**NaCl 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ C12H22O11 🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CaCl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NaNO3 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Note: Water is NOT included in the reaction… What??? Well, if water is **not** a reacting particle or a product…

1. **WHAT IS THE PURPOSE OF WATER IN A SOLUTION REACTION?**

*Use the Water page to help you answer this!*

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