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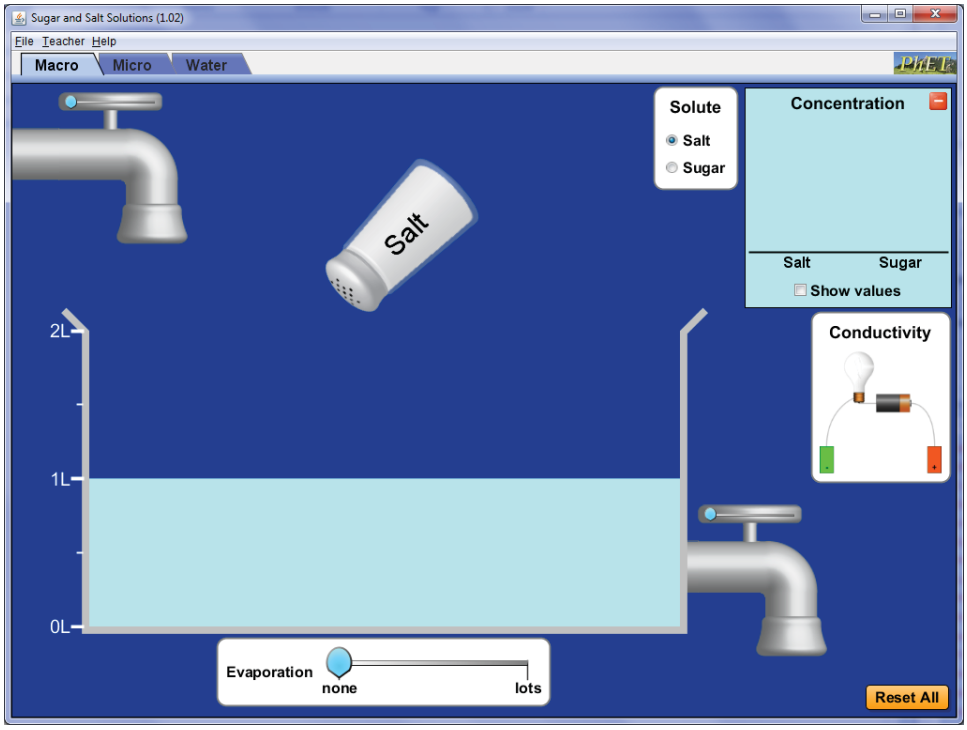
Sugar and Salt Solutions
Exploring Common Substances Using a PhET Simulation

Sugar and salt are both white crystalline solids commonly found in the home. This exercise allows you to investigate how these compounds might be distinguished from each other.

This simulation may be downloaded from the PhET website at http://phet.colorado.edu/en/simulation/sugar-and-salt-solutions.



Purpose

In this experiment, you will explore the behavior of sugar and salt in water and attempt to classify these substances into categories.

Materials

Each lab group will need the following:

computer with online access

Procedure

Part I: Open Exploration

1. Open the "Sugar and Salt Solutions" PhET simulation. Take five minutes to explore the functions available. Share with a partner at least two interesting items that you discovered. Record these discoveries in the space provided.

Part II: Macro (First Tab)

1. Make the light bulb glow. Record your observations in Table 1.

Table 1. Macro Exploration		
Compound	**What Happens to the Light Bulb? (Glows/Does not glow)**	**Observations**
Water		
Salt		
Sugar		

2. Make the light bulb glow as brightly as possible. Explain your procedure.

3. Explore what happens to the sugar and salt solutions with the evaporation slider. Describe what happens during the evaporation process for a solution.

Procedure (continued)

4. Using Table 2, classify sugar and salt as either an electrolyte or a nonelectrolyte:

Table 2. Electrolyte/Nonelectrolyte Reference		
Substance	**When Added to Water**	**What Happens to the Light Bulb?**
Electrolyte	Conducts electricity	Glows
Nonelectrolyte	Does not conduct electricity	Does not glow

a. Sugar: _____

b. Salt: _____

Part III: Water (Third Tab)

1. What happens as you add sugar or salt to water? Fill in Table 3 with what you find.

Table 3. Water Exploration			
Compound	**Electrolyte or Nonelectrolyte?**	**Drawing**	**Observations**
Salt			
Sugar			

2. Using the observations made with salt in water and sugar in water; propose one possible explanation for the light bulb glowing under the "Macro" tab.

Extension

Table A. Ionic/Covalent Compound Reference		
Compound	**Types of Atoms**	**When Added to Water**
Ionic	Metal + nonmetal	Breaks apart into ions in solution
Covalent	Nonmetal + nonmetal	Does not break apart into ions in solution

Part IV: Micro (Second Tab)

1. What happens when other compounds are added to water? Fill in Table B with what you discover.

Table B. Micro Exploration				
Compound	**Break Apart or Stay Together?**		**Electrolyte or Nonelectrolyte?**	**Ionic or Covalent?**
	Prediction	**Observation**		
Salt ($NaCl$)				
Sugar ($C_{12}H_{22}O_{11}$)				
Calcium chloride ($CaCl_2$)				
Sodium nitrate ($NaNO_3$)				
Glucose ($C_6H_{12}O_6$)				

Periodic Table

1. Using the "Periodic Table" button, work with your partner to identify two other combinations of elements that might be considered an ionic compound. Explain your reasoning.

2. Using the "Periodic Table" button, identify two combinations of elements that might be considered a covalent compound. Explain your reasoning.