

How Much is Too Much? Finding the Solubility of Common Household Items in Water



Group Members: _____

Experiment Overview: In this experiment, you will find out how much salt, sugar, and Epsom salt can be dissolved in a given amount of water.

Background Information: In this unit, we have been learning about mixtures and solutions. Recall that a **solution** is a special kind of mixture in which you cannot see the different parts. We call this type of mixture a **homogeneous mixture**. A solution is made up of two parts: the solvent, and the solute. The **solvent** is what does the dissolving. The **solute** is what is being dissolved. In a sugar and water solution, sugar is the solute and water is the solvent.

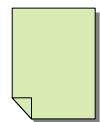
In this experiment, you will determine the solubilities of some common household items in water. The **solubility** of a material tells you how much of that material can be dissolved in a given amount of solvent. When a solvent cannot dissolve any more solute, we say that the solution is **saturated**. In this experiment, you will make saturated solutions of salt, sugar, and Epsom salts in water.

Materials Needed: Each group will require the following materials to complete the experiment...

- 1 stir stick
- 1 50 mL graduated cylinder
- 3 clear beakers
- 1 cup table salt
- 1 cup sugar



- 1 cup Epsom salts
- 3 plastic spoons
- water (300 mL)
- 1 lab sheet
- 1 thermometer



Safety: Please handle all materials carefully. **Do not eat or drink any of the experiment materials.** This is for your own safety. We will be using glassware that has been in contact with chemicals that would be very dangerous for you to eat.

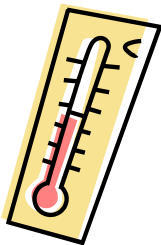


Procedure:

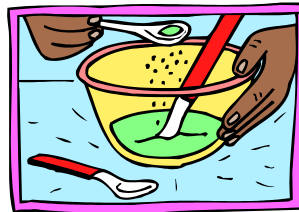
- 1) Measure 100 mL of water (2 x 50 mL) into a clean glass beaker.
- 2) Using the thermometer, record the temperature of the water on your lab sheet.
- 3) Add one teaspoon of salt (using the plastic spoon) to the water.
- 4) Gently stir the mixture, using the glass stir rod, until all the salt has dissolved.
- 5) Continue adding salt, one teaspoon at a time, until it will no longer dissolve after repeated stirring.
- 6) Record the amount of salt added (# of teaspoons).
- 7) Repeat steps 1-6 for sugar and Epsom salts.



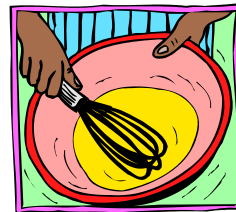
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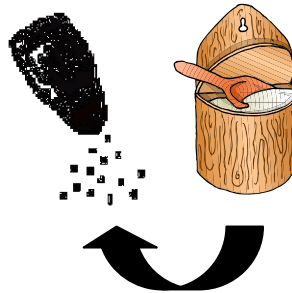
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How Much is Too Much?

Finding the Solubility of Common Household Items in Water

Question: How much salt, sugar, and Epsom salt will dissolve in 100 mL of water?

Hypothesis: Predict the solubilities of salt, sugar, and Epsom salts in 100 mL of water at room temperature. How many teaspoons of each do you need to make a saturated solution?

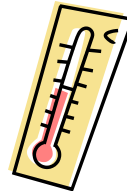


- If we add _____ teaspoons of **salt** to 100 mL of water, then it will make a saturated solution.
- If we add _____ teaspoons of **sugar** to 100 mL of water, then it will make a saturated solution.
- If we add _____ teaspoons of **Epsom salt** to 100 mL of water, then it will make a saturated solution.

Observations/Results:

1) Record the starting temperature of the water for each mixture below :

Salt _____ °C
Sugar _____ °C
Epsom Salts _____ °C



2) Use the chart below to record the amount of salt, sugar, and Epsom salts added in order to make a saturated solution. Use a single line to represent one teaspoon (see the example below).

Salt	Sugar	Epsom Salts

ex. ~~TTTT~~ = 5 teaspoons



Conclusion:



- 1) For each mixture, identify the solvent and the solute.

Mixture	Solute	Solvent
Salt + Water		
Sugar + Water		
Epsom Salt + Water		

- 2) Which solute was the *most* soluble in water?

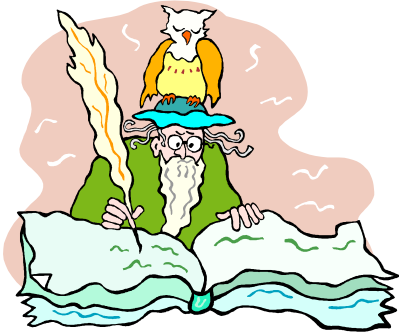
What was its solubility? (# teaspoons/100 g of water)

- 3) Which solute was the *least* soluble in water?

What was its solubility? (# teaspoons/100 g of water)

- 4) How could you increase the solubility of the solutes used (make more solute dissolve)?

Experiment Roles:



Scribe: This person records/writes information related to the experiment



Time keeper: This person makes sure that the group stays on task and gets their work done on time.



Materials Manager: This person will gather the materials required to complete the experiment.



Experiment Director: This person takes charge of doing the experiment. They make sure that the experiment is done properly.