

**STEAM SUBJECT:** Chemistry

**Lab:** Salt Saturation

**Grades:** 5-8

**Learning Objectives**

Students will be able to:

- develop a model to describe solubility
- collect data to provide evidence of saturation

**ENGAGE:**

Ask students the following questions:

- Have you heard the word **soluble** before?
- Can you name something that is soluble in water? Can you name something that is not soluble in water?
  - Show students what happens when we add sugar to water. *It completely blends with the water.* Things like salt and sugar are soluble in water while things like sand or plastic are not.
- How much salt can you dissolve in water?

**Solution  
Formation**

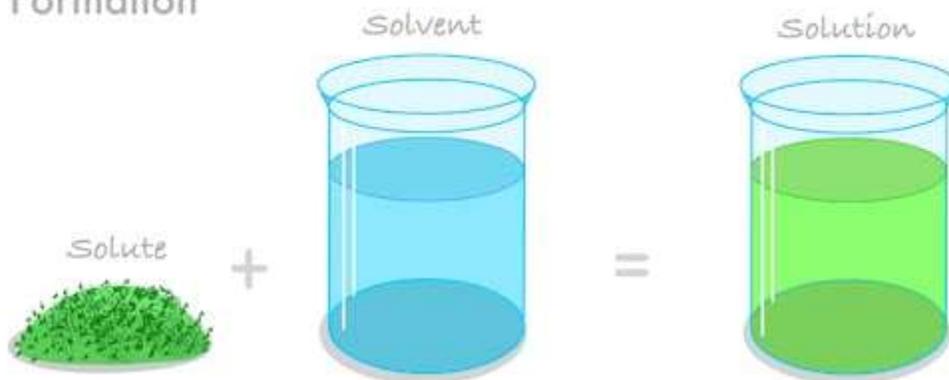


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**EXPLORE:**

**Salt Saturation Experiment**

Using analytical methods students will determine exactly how much salt a cup of water can dissolve before it becomes fully saturated.

**Materials needed per student:**

- Clear bottle or cup (some sort of stirring utensil needed if cup is used)
- ~100 grams of salt
- Measuring scale/Balance (cooking scale is perfect)
- Measuring cup (measuring at least 1 cup)
- Water
- Teaspoon
- Paper and pen/pencil

**Procedure:**

1. Copy down the table listed below on a separate piece of paper.
2. Weigh the empty bottle/cup using the balance/scale and record the weight on the table.
3. Use a measuring cup to pour in one cup of water into the bottle/cup. Weigh it again and record the weight.
4. Use the teaspoon to pour one teaspoon of salt into the bottle/cup with the water and mix well until the salt fully dissolves.
5. Repeat step #4 until the mixing does not dissolve the salt, which means that the solution is fully saturated with salt.
6. Weigh the bottle with the salt water solution and record it in the table.

Weight of <b>Bottle</b>	_____g
Weight of <b>Water</b> & <b>Bottle</b>	_____g
Weight of <b>Water</b> , <b>Bottle</b> & <b>Salt</b>	_____g
Weight of <b>Water</b>	_____g
Weight of <b>Salt</b>	_____g

**Data Analysis:**

From the experiment, three pieces of data were collected:

1. the weight of just the bottle
2. the weight of the bottle with water
3. the weight of the bottle with fully saturated salt solution.

Using your data, calculate the weight of just the water and salt.

- (Weight of **Water** & **Bottle**) - (Weight of **Bottle**) = Weight of **Water**
- (Weight of **Water**, **Bottle** & **Salt**) - (Weight of **Water** & **Bottle**) = Weight of **Salt**

## EXPLAIN

When water is fully saturated with salt, can it dissolve any more salt?

No, since it is fully saturated, it means that it already dissolved as much salt as it can. Think about a mixture you've probably made, Kool-Aid! When making Kool-Aid, the Kool-Aid powder and sugar are the solutes, and the water is the solvent. The resulting Kool-Aid juice is the solution and when the water cannot dissolve anymore Kool-Aid powder and sugar, no matter how hard one mixes, it is fully saturated.

- **Review STEAM Vocabulary:**
  - **Solute:** Substance dissolved in another substance. Example salt or sugar.
  - **Solvent:** Liquid that dissolves a solid, liquid, or gaseous solute. Water is known as the universal solvent.
  - **Solution:** Mixture of solute and solvent
  - **Saturated:** When a solution cannot dissolve any more of a solute
  - **Soluble:** A substance is soluble if it can be dissolved in a liquid.
- **Watch videos to learn more about saturation:**
  - Solutes + Solvents = Solutions:  
<https://www.youtube.com/watch?v=QNYQGTHa2hM>
  - The Great Picnic Mix Up: Crash Course Kids #19.1 and explore different kind of mixtures: <https://www.youtube.com/watch?v=jA0PzblYPUM>

## EVALUATE:

Students can distinguish between solutes and solvents.

Students can share the results of their saturation experiment and create a poster with pictures or drawings to describe what happened with the salt and water.

Can they repeat the experiment with other solutes and solvents?

