

**FEMMES Capstone Fall 2020**  
**Comparing Solubility Activity**

**Short (3 min) YouTube video on how to lead the activity (click on the link below):**

<https://www.pinayhomeschooler.com/2015/10/simple-experiments-solubility-of.html>

**OBJECTIVES:**

- Discovering which substance dissolves in water
- Why the said substance dissolves faster in water

**MATERIALS NEEDED:**

- salt, sugar, flour, chalk powder
- 4 bottles of water
- teaspoon
- stirrer

**Steps (refer to Youtube video on how to proceed):**

1. Set up four cups of water (clear cups) and have your salt, sugar, flour, and chalk ready
2. Observe each substance carefully
  - a. What color is it?
  - b. What does it feel like (describe the texture)?
  - c. What does it smell like?
3. Take a spoon and scoop each substance into its own cup of water
  - a. Wipe the spoon clean between each substance!
4. Stir for 30 seconds
5. What do you observe? How do the cups of water look?
  - a. Clear? Cloudy? All liquid? Are there any solids?
  - b. What dissolved?

**Findings:**

1. Salt and sugar easily dissolved in water after stirring. They have grainy texture and are crystalline thus making it more soluble in water.
2. Flour and chalk powder partially dissolved, most of the powdered portion resided at the bottom of the bottles. They have powdery and dry texture, thus making it hard to dissolve in water.

#### FOR OLDER KIDS

Now, for older children who can grasp complex explanations... I prepared a visual and hands-on demonstration for Mavi to understand how the substance are more soluble, partially soluble and insoluble. Make sure though that when you try to discuss this with your kids, he/she is already familiar with the elements in the periodic table and can understand what “attraction” means, similar to the concept of magnetism. The link I provided is the one where I introduced the Periodic Table to Mavi in a fun and interesting way.

#### BACKGROUND SCIENTIFIC INFO:

##### SOLUBLE SUBSTANCE

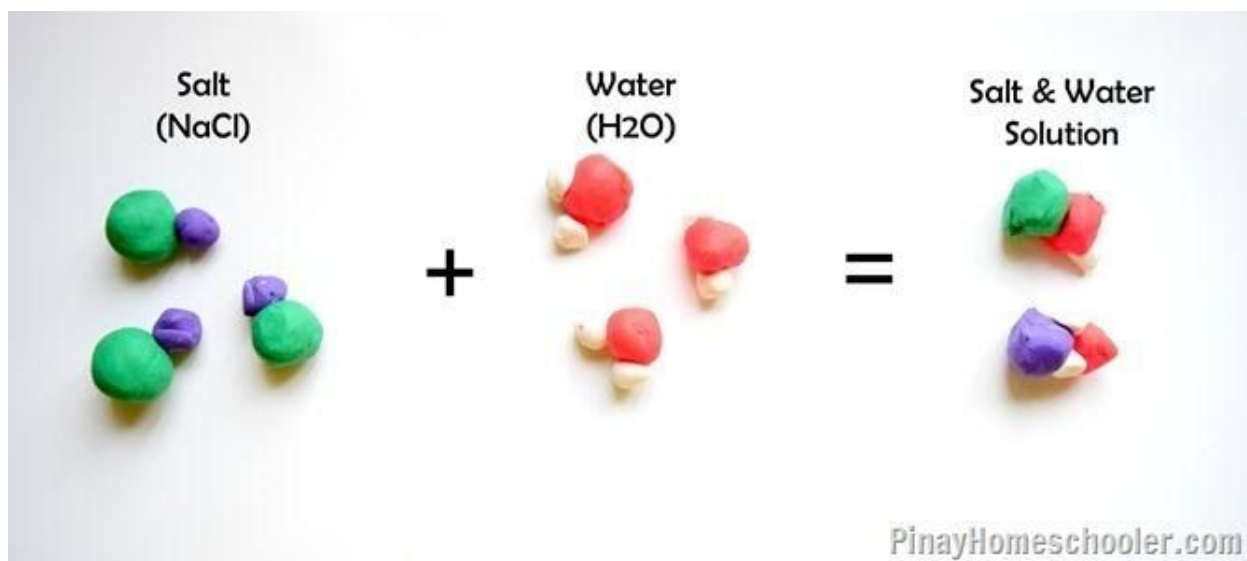
I used **plasticine** to demonstrate the chemical composition of salt and water to Mavi.

*Salt is composed of: sodium (Na<sup>+</sup>) in green and chloride (Cl<sup>-</sup>) in purple.*

*Water is made up of H<sub>2</sub>O, hydrogen (H<sup>+</sup>) in white and oxygen (O<sup>-</sup>) in red.*

When mixed with water, the salt molecules are easily “attracted” to the water molecules. It’s like the positive and negative attraction in magnetism (polarity). Thus, sodium (Na<sup>+</sup>) is attracted to oxygen (O<sup>-</sup>), while chloride (Cl<sup>-</sup>) is heavily attracted to the two positively charged hydrogen (H<sup>+</sup>).

Because of the strong attraction between molecules in the two substances, salt is easily dissolved in water.



### PARTIALLY SOLUBLE

For partially soluble substances, the molecules that made up the flour or chalk have weak attractions with the molecules of the water. Thus some have dissolved but most of it didn't and the result are the residues found at the bottom of the bottles.

### INSOLUBLE SUBSTANCE

For insoluble substances (don't dissolve in water) like oil, the molecular contents are NOT attracted to water. This means they do not mix with water and if you combine them, you will definitely see the separation.

Though some advanced students can explain that this is because oil is a non-polar substance and can only be dissolved with another non-polar substance, the way I explained it to Mavi is that oil molecules are just so heavy that water molecules can't "bond" with it.

Oil  
(Non polar)



+

Water  
(H<sub>2</sub>O)



=

Water and Oil



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