

# FOOD LAB

## 2 Litre Pop Bottle-Volcano

Ag for Life

### Materials:

- 2 teaspoons of dish soap
- ½ cup of cold water
- 1 1/3 cups of white vinegar
- food colouring (optional)
- ½ cup baking soda and ½ cup water, mixed together
- empty 2 litre pop bottle

### Instructions:

- Combine the vinegar, water, dish soap, and 2 drops of food colouring into the empty 2 litre bottle.
- Mix the ½ cup baking soda and ½ cup water with a spoon
- Pour the mixture made in step 2 into the 2 litre pop bottle and make sure to take a step back as it erupts!
- Experiment mix-up: Try changing the amounts of vinegar, water, and baking soda to see how it changes the eruption!

### Food Chemistry:

#### The science behind the explosion...

- Baking soda and vinegar react together because one is a base and one is an acid. Baking soda is a basic compound called sodium bicarbonate and vinegar is a diluted solution that contains acetic acid. When you mix the two together it results in two reactions: an acid-base reaction and a decomposition reaction.
- When mixed together, the hydrogen ions in the vinegar react with the sodium and bicarbonate ions in the baking soda. Carbonic acid and sodium acetate are both formed from this reaction.
- In the decomposition reaction, the carbonic acid formed begins to decompose into water and carbon dioxide gas.
- The carbon dioxide then rises to the top of the mixture, which creates the bubbles and foam you see when you mix baking soda and vinegar.
- If you do this in a container with a narrow opening (such as a 2 litre pop bottle), the reaction will explode out the top!



### Food Chemistry

#### How does it relate to cooking and baking in the kitchen?

- Do you ever wonder why bread grows in size from when you first form the dough to when it comes out of the oven? Or why muffins are so small when they first go in the oven and bigger when they come out? This is also due to the power of carbon dioxide.
- Yeast is used in bread making. It is what makes the bread rise! Yeast is a single celled organism that uses a process called fermentation. The yeast breaks down sugar molecules into carbon dioxide and alcohol.
- As the yeast organisms feed off the sugars, carbon dioxide is released, which is why the dough volume increases. The carbon dioxide expands and moves as the bread dough warms and bakes in the oven.

Did you know: Baking soda can be used for the same thing – sort of. Baking soda needs to react with an acid to cause the carbon dioxide bubbles. It is usually used in recipes that have a more acidic environment. If a recipe uses yeast, it probably does not have an acid for baking soda to react with.



Interested in signing up for cooking classes? Head to our Nutrition and Cooking Programs:  
<https://www.agricultureforlife.ca/nutrition-and-cooking>

Ag for Life