

# Is there a difference between baking powder and baking soda?



*Explore the differences between baking soda and baking powder.*

**Setting:** Indoors

**Time:** < 10 minutes

**Concepts:** acids-bases; chemical reactions

**Skills:** observing, comparing & contrasting

## Subject(s):

- ✓ Chemistry

## Ages:

- ✓ 3-5
- ✓ 6-8
- ✓ 9-11

## Materials:

- Clear containers - 4
- Baking powder
- Baking soda
- Measuring spoons – 5 mL (1 teaspoon), 15 mL (1 tablespoon)
- Vinegar
- Water

## What to do!

1. Place 15 mL (3 level teaspoons) of baking soda in each of two clear containers.
2. Add 30 mL (6 teaspoons) water to one container and 30 mL vinegar to the other container.
3. What do you see happening?
4. Using clean spoons, place 5 mL (1 level teaspoon) baking powder in each of two different clear containers.
5. Add 30 mL water to one container and 30 mL vinegar to the other container.
6. What do you see happening this time?
7. What was similar and different when you mixed the baking powder and baking soda with water and with vinegar?

## What's happening?

With each of these powders, you caused a chemical reaction that created bubbles. The formation of bubbles means that a gas is being produced. The gas that was produced is carbon dioxide (CO<sub>2</sub>). You should have observed that each powder reacted differently when mixed with the water and vinegar.

Baking soda contains only sodium bicarbonate and an acid must be added to release the carbon dioxide gas. In this experiment, vinegar is the acid, but in baking, cream of tartar or buttermilk could also be used as a source of acid so that bubbles are made.

# Is there a difference between baking powder and baking soda?

Unlike baking soda, baking powder will release carbon dioxide gas just with the addition of water. The ingredients on a baking powder package will show that baking powder is a mixture of baking soda (sodium bicarbonate) and one or more other chemicals. These chemicals are dry acids that are activated by the addition of water.

## Why does it matter?

Baking and creating new recipes requires an understanding of chemical reactions to produce baked goods with different textures and consistencies. Acid–base reactions are very commonly used to make baked goods rise and have a light or spongy texture.

To produce light, fluffy cakes and breads, a gas must be released during the cooking process. This gas is usually carbon dioxide, which is produced by both baking powder and baking soda; however, this simple experiment demonstrates that the two ingredients do not act in the same way.



## Investigate further!

- Look at the ingredients on a commercial package of baking powder. Based on your observations what does baking powder contain?
- Hold a lit match over the mouth of the container as the bubbles are produced. Since carbon dioxide is produced, the flame will flicker and go out.