# How can you make popcorn kernels dance?

**Materials:**
Baking Soda (1/4 tsp)
Vinegar (30 ml cup)
Water (125 ml cup)
Un-popped popcorn kernels (1tsp)
Measuring cup/Graduated Cylinder/Beaker
Shallow pan
Clear Cup
Teaspoon
¼ Teaspoon

**Procedures:**
1) Place the clear cup in the center of the shallow pan.

2) Add 1 teaspoon of popcorn kernels into the cup.

3) Draw the result.

4) Write three predictions or hypothesis of what will happen when each of the following steps occurs: You are writing **THREE** predictions or hypothesis. You are NOT measuring or pouring at this step.

- 125 mL (1/2 cup) of water is poured into the cup.
- 30 mL (1/8 cup) of vinegar is poured into the cup containing water.
- 1/4 tsp of baking soda is added to the vinegar/water solution (**without mixing**)

5) Pour 125 mL (1/2 cup) water into the cup and observe what happens. Draw what happens. Use a stopwatch to time any changes. Is this what you expected to happen? Why or why not?

6) Add 30 mL (1/8 cup) of vinegar into the water in the glass and observe what happens. **DO NOT STIR**. Draw what happens. Use a stopwatch to time any changes. Is this what you expected to happen? Why or why not?

7) Add 1/4 tsp of baking soda to the vinegar solution (**DO NOT MIX OR STIR**) and observe what happens. Use a stopwatch to time any changes. Is this what you expected to happen? Why or why not? Is this what you expected to happen? Why or why not?

**Questions:**

What do you think would happen if you tried this with paper clips, rice, or beans?

What do you think would happened if you replaced the baking soda with salt, flour, or sugar?

**NOT FOR THE STUDENTS:  FOR THE TEACHER POWERPOINT**

**What's happening?**

When the vinegar and baking soda are combined, a chemical reaction occurs between the acetic acid in vinegar and the sodium bicarbonate in baking soda. This causes a release of chemical energy and the formation of a gas (carbon dioxide).

Some gas bubbles that form will adhere (stick) to the outside of the popcorn kernels and raise them to the surface of the liquid. This is because the kernels and bubbles together have a lower density than water and thus rise to the surface of the liquid. At the surface, the gas bubbles burst, releasing the carbon dioxide into the air. Once the bubbles have burst, the density of the kernel is once again greater than that of water and the kernel sinks to the bottom of the glass.

**Why does it matter?**

Acid-Base reactions are often used in baking to make bubbles form in cakes or cookies as they are baking. This helps make baked goods light and spongy, rather than heavy and dense.