



# Science Experiment: Mystery Powder in the Kitchen & Game Project: Food Science

**TIME:** 50 Minutes

**GRADE LEVEL:** 4-7

**OBJECTIVE:** Youth will investigate powders to solve a crime!

**MATERIALS:** • Data table, pencil • Purple grape juice, white vinegar, Iodine • 3 cups, each with 1 teaspoon of baking powder • 3 cups, each with 1 teaspoon of flour • 3 cups, each with 1 teaspoon of baking soda • 3 cups, each with 1 teaspoon of the mystery substance • 3 pipettes or eyedroppers • Paper towels • Sticky notes (to use as labels)

**PRIOR TO ACTIVITY:** Campers are going to become detectives to figure out the mysterious powders.

## What to Do:

1. Make labels for the powders and liquids listed below and arrange in a grid on a table.
2. Get 3 cups containing each powder (9 in total), and line them up under their labels (see illustration). Your cups with the mystery substance come later! The mystery powder was the powder found at the crime scene and is linked to the criminal!
  - a. The Mystery Substance: Have a counselor pick one of the three powders you're testing (baking soda, baking powder, or flour), and add a teaspoon each to 3 cups.
  - b. The person should keep the identity of the powder a secret-after all, this is a mystery you're supposed to figure out! When you've finished testing, tell the person what you think the mystery powder is-were you right
  - c. Test, observe, and record:
3. Put 5 to 10 drops of grape juice in one cup of baking powder. What happens? Record your observations on the data table. Now try the grape juice on the other two powders, recording your observations each time.
4. In some cases, a chemical reaction will occur. Signs of a chemical reaction include foaming, fizzing, or a change in color. But sometimes no chemical reaction can be seen. Can you tell the difference?
5. Repeat step 3.
6. Test all the liquids with all the powders and write your observations on the data table. Use a new pipette with each liquid. 7. Test the mystery substance: Get 3 cups containing the mystery substance and line them up next to the grape juice, vinegar, and iodine. Test and record your observations. (Hint: the mystery powder is one of the three powders you already tested!)
  - a. Compare data and draw conclusions

## Reflect:

1. Did your observations about the mystery substance match any of the three powders you tested?
2. By comparing your data, can you figure out what the mystery substance is?

## Apply:

1. In this activity, you performed an experiment and analyzed data like a scientist does. 2.
2. A chemical will react in the same way every time, as long as the conditions are the same.
3. You set up the experiment so that each powder was tested in exactly the same way. Then you observed the chemical reactions closely and recorded your data.
4. When you drew conclusions about what the mystery substance was, your conclusions were supported by scientific evidence

Source: Utah State University Crime & Spy Science 4-H Aggie Adventures for Kids