

North Pole Bureau of Investigation

Case #1225: Case of the Christmas Cookie Mystery

Teacher Directions

Materials Needed:

For each group:

6 small containers with different white powders labeled 1, 2, 3, 4, 5, & 6
(Baking soda, baking powder, corn starch, flour, powdered sugar, and baby powder)

3 small dropper bottles filled with testing liquids
(Water, vinegar, and iodine solution)

Box of toothpicks

Strips of wax paper

Squares of aluminum foil (for heating samples)

Tweezers or tongs

Small candle (with aluminum foil as holder)

Matches

Mystery Samples

You will need to prepare 3 mystery samples by mixing equal amounts of each powder listed below. Each group should be given a small amount of each mixture to test.

Mystery Sample 1: Flour, corn starch, and powdered sugar

Mystery Sample 2: Flour, baking soda, and powdered sugar

Mystery Sample 3: Flour, baking soda, and baby powder

Expected Results:

Students should discover that Mystery Sample 2 is the correct mixture to make Mrs. Claus' special cookies. Her recipe calls for flour, baking soda, and powdered sugar. This sample will fizz in vinegar, turn black in iodine, and melt/bubble when heated.

The two other samples would not be used for her special cookies. Mystery Sample 1 does not fizz in vinegar, so it would not contain baking powder (or baking soda). Mystery Sample 3 has a distinctive odor (from the baby powder) and would make nasty cookies.

Project Tips:

I divide students in groups of 3 - 4 students. Each student is responsible for testing at least one of the 6 powder samples. They will need to share their results with the other group members. The group will need to decide their procedure for testing each Mystery Sample. I stress the need to keep samples separate to prevent contamination and poor results. My 7th graders also need to review proper safety procedures.