Lesson: The Magical Fizzing Potion!

Materials Needed:

- Baking soda
- White vinegar
- A clear cup or jar
- An empty plastic bottle (a small water or soda bottle works best)
- A balloon
- A small funnel (or a rolled-up piece of paper)
- A tray or baking sheet to contain any mess
- Measuring spoons (tablespoon and teaspoon)
- Optional: Food coloring
- Optional: Safety goggles for fun!

Lesson Plan

Part 1: The Fizzy Potion (5-7 minutes)

Goal: To introduce the reaction in a safe, observable way.

1. **Set Up:** Place the clear cup on your tray. Explain to the children that you are going to be scientists today and mix two simple kitchen ingredients to see what happens. Put on your fun safety goggles!
2. **The First Ingredient:** Have the 4-year-old help you scoop one tablespoon of baking soda into the clear cup. Ask Keely to describe what it looks like and feels like (a white powder, soft, etc.).
3. **The Second Ingredient:** Slowly pour a small amount of vinegar into the cup (about 1/4 cup). If you have food coloring, add a drop to the vinegar first for a colorful effect!
4. **Observe!:** Watch the fizzing and bubbling together! Encourage the children to use their senses (except taste!). What do they see? What do they hear? What does it smell like?

Guiding Questions:

- **For the 4-year-old:** "Wow, look at the bubbles! Is it loud or quiet? Does it look like soda pop?"
- **For Keely (7-year-old):** "What do you think is happening? The baking soda was a solid and the vinegar was a liquid. What is being made? (Guide her to the idea of a **gas** - the bubbles!). This fizzing is a **chemical reaction**. That's a fancy term for when ingredients mix and change to create something totally new, like this gas!"

Part 2: The Self-Inflating Balloon (10-15 minutes)

Goal: To apply the chemical reaction to do a "job" - inflating a balloon.

1. **Set Up:** Place the empty plastic bottle on the tray.
2. **Prepare the Vinegar:** Pour about 1/3 cup of vinegar into the plastic bottle.
3. **Prepare the Balloon:** This is the tricky part. Stretch the opening of the balloon a little. Place the funnel in the balloon's opening. Ask Keely to carefully add 2-3 teaspoons of baking soda into the balloon through the funnel. Help her gently shake the balloon so the powder settles at the bottom.
4. **Combine (but not yet!):** Carefully stretch the opening of the balloon over the mouth of the plastic bottle, making sure not to spill any baking soda inside yet. The balloon should be hanging

limply to the side.
5. **The Big Moment:** Ask the children for their predictions. "What do you think will happen when the powder in the balloon mixes with the liquid in the bottle?" Once they've guessed, let Keely lift the balloon up so all the baking soda falls down into the vinegar.
6. **Observe and Celebrate!:** Watch as the reaction fizzes up and the gas produced fills the balloon, making it inflate all by itself! You can gently touch the bottom of the bottle and notice that it gets a little cold.

Guiding Questions:

- **For the 4-year-old:** "The balloon is getting bigger! Is it magic? Where did the air come from?"
- **For Keely (7-year-old):** "Why did the balloon inflate? What filled it up? (The gas!). The new thing our reaction created is a gas called **carbon dioxide**. It's the same gas we breathe out, and it's what makes soda fizzy. Since the gas had nowhere else to go, it went up and filled our balloon!"

Part 3: Creative Extension - Volcano Art!

Goal: To use the reaction for a creative and fun sensory experience.

1. On your tray, make a small "volcano" shape out of play-doh or even just a pile of baking soda with a small crater in the middle.
2. Add a few drops of red or orange food coloring into the crater.
3. Give the children a small cup of vinegar and a spoon or dropper.
4. Let them slowly add vinegar to the "volcano" and watch the colorful lava erupt and fizz down the sides! They can experiment with how adding a little vs. a lot of vinegar changes the eruption.

Wrap-up and Assessment (3-5 minutes)

Gather together and talk about what you did. This is a great way to check for understanding.

- Ask both children what their favorite part was.
- Ask Keely to explain to you (or another family member) how you inflated the balloon without using your mouth. Encourage her to use the new words: **chemical reaction** and **gas**.
- Ask the 4-year-old to make the "fizzing" sound you heard during the experiment.
- Let Keely draw a picture of the experiment in a science notebook: one picture of the ingredients before, and one picture of what happened after (the fizzing cup or the inflated balloon).

The Science Explained Simply (For the Teacher)

You just demonstrated a classic acid-base reaction. Vinegar is an **acid** (acetic acid) and baking soda is a **base** (sodium bicarbonate). When they mix, they react to form new substances. The most exciting one for kids is the gas, **carbon dioxide**, which creates all the bubbles and fizz. This reaction also produces water and a type of salt. Because the reaction uses up heat from its surroundings, the bottle feels cold to the touch (this is called an endothermic reaction). You don't need to explain all of this, but having the background helps you answer questions!