Lesson: Baking Soda and Vinegar Reaction	Name:
Teacher:	Date:

Baking Soda and Vinegar Explosion Free Experiment Guide – STEM Scholars Hub

Florida State Standard: SC.5.P.8.2 – Recognize that gases are released when certain substances react with one another.
Florida State Benchmark: SC.5.P.8.3 – Investigate and describe how gas is produced in different reactions.
NGSS Performance Expectation: 5-PS1-4 – Conduct an investigation to determine whether mixing two or more substances results in a chemical reaction, such as the production of gas.

Objective: Observe and understand the chemical reaction between baking soda and vinegar, focusing on acid-base reactions and gas production.

Materials:

- Baking soda (sodium bicarbonate)
- Vinegar (acetic acid)
- Small container (cup or bowl)
- Tray or larger container (to catch spills)
- Optional: food coloring
- Safety goggles

Safety Precautions:

- Wear safety goggles at all times.
- Conduct the experiment in a well-ventilated area.
- Keep workspace clear of valuables.
- Handle all materials carefully to avoid spills or accidents.

Procedures

1. Introduction (10 minutes)

- Discuss what a chemical reaction is.
- Introduce the materials and explain that students will observe a reaction between baking soda and vinegar.

Questions (Check for Understanding):

1. What do you think will happen when vinegar is added to baking soda?

2. Have you seen a chemical reaction before? Describe it.

2. Experiment (20 minutes)

- Put on safety goggles.
- Add 1–2 tablespoons of baking soda to the small container.
- Slowly pour vinegar over the baking soda and observe the reaction.
- Optionally, add food coloring for visual effect.

Questions:

3. Describe what happens when the vinegar is added.

4. What bubbles or changes do you notice?

5. What gas is produced in this reaction?

3. Observation (10 minutes)

- Record any changes in color, formation of bubbles, or other visible effects.

Questions:

6. How does the mixture change after the reaction starts?

7. What evidence shows that a chemical reaction occurred?

4. Generalization (10 minutes)

- Explain the chemical reaction: baking soda (base) reacts with vinegar (acid) → produces carbon dioxide, water, and sodium acetate.
- Relate to real-world examples, such as baking or fermentation.

Questions:

8. Write the reactants and products of the reaction.

9. What type of chemical reaction occurs here?

10. Give an example of another situation where gas is produced.

11. How could the reaction be made faster or slower?

5. Assessment (10 minutes)

- Summarize what you observed in a short paragraph, including the roles of reactants and the gas produced.

Clean-Up:

- Wipe any spills immediately.
- Rinse containers and dispose of waste properly.
- Return safety goggles to the storage area.

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