

5th Grade - Lesson 3.2

Exploring Baking Powder

NGSS Alignment

Performance Expectations

5-PS1-3: Make observations and measurements to identify materials based on their properties.

5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Measurements of a variety of properties can be used to identify materials. (5-PS1-3)

Students see that baking powder produces a gas when water is added but baking soda does not. Students develop an understanding that the production of a gas when water is added is a characteristic property of baking powder that can be used to identify it.

- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)

Students combine water and baking powder and observe the production of a gas. Since a solid and a liquid were mixed and a gas was produced, students conclude that the gas is a new substance and a chemical reaction took place.

Science and Engineering Practices

Developing and Using Models

- Develop a model to describe phenomena.

Students use molecular model animations to help explain the interaction between the molecules in vinegar and the components of baking powder that produces a gas.

Planning and Carrying Out Investigations

- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered.

Students take part in designing the investigation to identify which two ingredients in baking powder cause a gas to be produced when water is added. Students use a systematic approach of adding the same amount of water to all possible combinations of two of the three powders in baking powder. Multiple groups conduct the same experiment so several trials take place at the same time.

Crosscutting Concepts

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-PS1-1)

Students develop an understanding that the molecules in water interact with the molecules of baking soda and cream of tartar in baking powder to produce carbon dioxide gas. So students see that their macroscopic observations of the production of a gas can be explained on the sub-microscopic molecular level.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Students use molecular-level models to explain how the interactions of molecules in water with the molecules in the components of baking powder causes the production of carbon dioxide gas.