5th Grade - Lesson 3.1
What's the Difference between Baking Soda and 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 add vinegar to baking soda and baking powder and observe that gas is produced in both but that the amount is different. Students develop an understanding that the amount of gas produced is a characteristic property of baking soda and baking powder and can be used to identify them.

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

  Students combine vinegar with baking soda and baking powder. In both cases, carbon dioxide gas is produced. Students develop an understanding that since a solid and a liquid were mixed and a gas was produced, the gas is a new substance and a chemical reaction took place.

Science and Engineering Practices

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 compare baking soda and baking powder when vinegar is added. They develop an understanding that the same amount of baking soda and baking powder should be mixed with the same amount of vinegar at the same time in the same way. Through this exercise, students identify and control variables in order to design a fair test. 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 vinegar interact with the molecules in baking soda and 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 vinegar with the molecules in baking soda and baking powder causes the production of carbon dioxide gas.