

## 2<sup>nd</sup> Grade - Lesson 5.2

### Changes Caused by Heating that Cannot Go Back Again

#### NGSS Alignment

#### Performance Expectations

2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

#### Disciplinary Core Ideas

##### PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

*Students consider the change that happens to cookie dough when it is heated and becomes a cookie. Students see a time-lapse video of cookies baking and expanding as gas is produced from reacting baking powder. This change involves a chemical reaction and is not reversible.*

#### Science and Engineering Practices

##### Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

##### Constructing Explanations and Designing Solutions

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

*Students help design an investigation to answer the question: Does baking powder produce more bubbles in water that is hot or cold? Students put the same amount of baking powder in two cups and add hot water to one cup and an equal amount of cold water to the other. Students see an animation showing that the hot water makes the reaction between the ingredients in the baking powder move faster and react faster to create more bubbles.*

#### Crosscutting Concepts

##### Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

*By adding hot water and cold water to separate samples of baking powder, students can conclude that heat causes the reaction to go faster and to create more bubbles.*