

## 2<sup>nd</sup> Grade - Lesson 5.1

### Changes Caused by Heating and Cooling

#### NGSS Alignment

#### Performance Expectation

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 investigate the effect of heating and cooling butter. Room temperature butter becomes a liquid when heated and goes back to a soft solid when cooled.*

#### 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 put room temperature solid butter in hot water and observe the butter melting. They then put the liquid butter in ice water and observe the butter become solid again. Students see an animation showing what is happening to the molecules in the butter when it is heated and cooled to help explain the melting and solidifying.*

#### Crosscutting Concepts

##### Cause and Effect

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

*Students put room temperature solid butter in hot water and stir the butter while the teacher stirs the butter but does not heat it. The butter that is stirred and heated melts but the butter that is stirred and not heated does not melt. Students conclude that the heating caused the butter to melt. Students also conclude that cooling the melted butter causes it to harden again.*