



Shutterfly Photo Story Lesson Plan

Subject: Science – Next Generation Science Standards

Grade level: 2

Lesson Title: Chemical Reaction: Reversible or Irreversible

Common Core/State Curriculum Standards:

NGSS.2-PS1-4 Matter and its Interactions

Students who demonstrate understanding can:

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

[Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
<p>Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).</p> <ul style="list-style-type: none"> Construct an argument with evidence to support a claim. <p>-----</p> <p><i>Connections to Nature of Science</i></p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none"> Science searches for cause and effect relationships to explain natural events. 	<p>PS1.B: Chemical Reactions</p> <ul style="list-style-type: none"> Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns.

Common Core State Standards Connections:

• English Language Arts Standards – Reading – Informational Text – Grade 2

Key Ideas

CCSS-ELA-Literacy.RI.2.1 Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text. (2-PS1-4)

CCSS-ELA-Literacy.RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4)

Integration of Knowledge and Ideas

CCSS-ELA-Literacy.RI.2.8 Describe how reasons support specific points the author makes in a text. (2-PS1-4)

• English Language Arts Standards – Writing – Grade 2

Text Types and Purposes

CCSS-ELA-Literacy.W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because*, *and*, *also*) to connect opinion and reasons, and provide a concluding statement or section.

ISTE NETS for Students:

2. Communication and Collaboration:

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students will:

- b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.

Learning Objectives:

- Students will be able to describe and classify different kinds of materials by their observable properties.
- Students will determine which materials have the properties that are best suited for an intended purpose.
- Students will make observations on how an object's materials can be reused to create a new object.
- Students will construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

Students Learning Targets:

- As a result of this lesson, students will analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
- As a result of this lesson, students will be able to evaluate a problem in a new and novel situation.
- As a result of this lesson, students will apply the step-by-step design process to solve a problem.
- As a result of this lesson, students will identify observable properties of real world objects.
- By creating their own published storybook, students will learn to communicate ideas and information to specific audiences, as well as strengthen their familiarity with the writing process.

Instructional Strategies:

- Discussion (small/large group) – class discussions on the writing process
- Direct instruction - providing foundational information for the lesson
- Cooperative learning – collaboration on storyboards, peer review/editing
- Independent practice – creation of a science book using the Photo Story iPad App

How Students Will Use Shutterfly Photo Story:

Students will create a Photo Story book demonstrating their understanding of the chemical reaction caused by heating or cooling substances. Students will record their observations using photos, drawings, and lab reports. Students will record their argument with evidence that some changes caused by heating or cooling can be reversed and others are irreversible.

Required Materials/Lesson Length:

Materials:

- Matter-related library books
- Sentence strips for word cards
- Materials to test: water, butter, chocolate, egg, leaf, and paper
- iPads with Photo Story App
- Internet access

Lesson Length: Two to Three Weeks working in school and at home

Resources:

Books:

- Mason, Adrienne. *Touch It! Materials, Matter, and You* (Primary Physical Science)
- Gibbons, Gail. *How a House is Built*
- Stille, Darlene. *Matter: See It, Touch It, Taste It, Smell It* - The states of matter (solids, liquids, and gases) are explained and demonstrated. Includes an experiment to try:
<http://books.google.com/books/about/Matter.html?id=JxLYKx9ul2EC>
- Ross, Michael Eisohn. *What's the Matter in Mr. Whiskers' Room*

Procedures/Activities: (*What will the teacher and students do?*) (*Prior Knowledge. Opening Activity, Step-by-Step Learning Activities, Closure, Post-Instruction Reflection*)

Opening Activities:

- Explain to students that they will be scientists as they study matter and chemical reactions.
- All materials have different properties such as: strength, flexibility, hardness, texture, and absorbency.
- Materials can sometimes be reused and recycled for different purposes.
- Materials can be changed through heating and cooling.
- Throughout the lesson, students will have an opportunity to create a science storybook about matter and chemical reactions using an iPad and the Shutterfly Photo Story app.
- Show some examples of science storybooks.

Learning Activities:

- Have students write in their classroom journals about the observable properties of common materials, including color, texture, hardness, and flexibility.
- Have students record the changes between states of matter as a result of temperature change.
- Have students recognize states of matter as solid, liquid or gas and record their observations.
- Key Vocabulary:
 - Matter – Everything that takes up space.
 - Mass – How much something weighs.
 - Materials – Supplies.
 - Force – Push or pull.
 - Properties – color, size, shape, texture, weight, flexibility, absorbency, etc.
 - Construct – To build or put together.
- Have students find out what substances dissolve in water. Can all substances be turned back to their original form after they mix with water or will they stay that way forever? Try dissolving flour, sugar and sand in a beaker of water, what happens? Is it what you expected? Is melting ice an irreversible change? How about cooking an egg? Have students record their findings in Photo Story.

Closure:

Students will present their multimedia Shutterfly Photo Story books about chemical reactions that are reversible and irreversible to their class and share their Photo Story book with their parents. As a culminating activity, each student will receive a published and printed copy of his or her Shutterfly Photo Story book. Printed copies of the students' books will be shared in their classroom and school libraries.

Reflection:

Discuss with students how well they rate their knowledge of chemical reactions. How did they enjoy creating their chemical reactions that are reversible and irreversible book? What was their favorite activity?

Differentiation:

Additional differentiation will be determined after formative assessment.

- Invite students to read their books to peer reading buddies with the assistance of parent volunteers.

Special Education/ESL Accommodations & Modifications:

- Have students work closely with an adult during the writing process.
- Write vocabulary, e.g. solid, liquid, on the board and read words aloud. Vocabulary words can also be visually demonstrated using an illustration or action and redefined in very simplistic terms.
- Have students create their chemical reactions that are reversible and irreversible books collaboratively, rather than independently.

Extensions:

- Have students think of other materials that would behave in a similar manner, i.e. have similar properties, as the matter they are manipulating.

Assessment:

- Teacher observations
- Classroom work participation
- Completed Photo Story book about chemical reactions that are reversible and irreversible.