

2nd Grade Unit 2 - Matter: Properties and Changes

Content Area: **Science**
Course(s): **Science Grade 2**
Time Period: **MP2**
Length: **22 days**
Status: **Published**

NJSLS - Science

SCI.2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
SCI.2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
SCI.2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
SCI.2-PS1-3	Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
SCI.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

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.(2-PS1-1)

Analyzing and Interpreting Data

Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2, K-2-ETS1-3)

Constructing Explanations and Designing Solutions

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

Engaging in Argument from Evidence

Construct an argument with evidence to support a claim. (2-PS1-4)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)

Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)

A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

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)

ETS1.C: Optimizing the Design Solution

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

Crosscutting Concepts

Patterns

Patterns in the natural and human designed world can be observed. (2-PS1-1)

Cause and Effect

Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

Events have causes that generate observable patterns. (2-PS1-4)

Energy and Matter

Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)

Influence of Engineering, Technology, and Science on Society and the Natural World

Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (2-PS1-2)

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

Scientists search for cause and effect relationships to explain natural events. (2-PS1-4)

Rationale and Transfer Goals

How do properties of materials determine their use?

How can objects change?

Are all changes reversible?

In this unit of study, students demonstrate an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of patterns, cause and effect, energy and matter, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations, designing solutions, and engaging in argument from evidence.. Students are also expected to use these practices to demonstrate an understanding of the core ideas.

Enduring Understandings

Different kinds of materials can be compared and classified by color, texture, hardness, and flexibility.

Not all materials are appropriate for the same purpose because of their properties (strength, flexibility,

hardness, texture, and absorbency).

By observing an object, you are able to see other uses for its pieces.

Some materials can be changed by heating or cooling, but other changes are irreversible.

Essential Questions

How can we sort objects into groups that have similar patterns?

Can some materials be a solid or a liquid?

What should the three little pigs have used to build their houses?

In what ways can an object made of a small set of pieces be disassembled and made into a new object?

Can all changes caused by heating or cooling be reversed?

Content - What will students know?

- Patterns in the natural and human-designed world can be observed.
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.
- Matter can be described and classified by its observable properties.
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Different properties are suited to different purposes.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs.
- Objects may break into smaller pieces and be put together into larger pieces or change shapes.
- A great variety of objects can be built up from a small set of pieces.
- People search for cause-and-effect relationships to explain natural events.
- Events have causes that generate observable patterns.
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

Skills - What will students be able to do?

- Observe patterns in the natural and human-designed world.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
- Plan and conduct an investigation to describe and classify different kinds of material by their observable properties. Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.
- Design simple tests to gather evidence to support or refute student ideas about causes.
- Analyze data from tests of an object or tool to determine if it works as intended.
- Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. (Assessment of quantitative measurements is limited to length.) Examples of properties could include: Strength, flexibility, hardness, texture, or absorbency.
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of each.
- Describe and classify materials using physical properties.
- Collaboratively plan and carry out investigations
- Analyze and interpret data in order to determine which materials are best suited for an intended purpose.
- Break objects into smaller pieces and put them together into larger pieces or change shapes.
- Make observations (firsthand or from media) to construct an evidence-based account for natural

phenomena.

- Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- Observe patterns in events generated due to cause-and-effect relationships.
- Construct an argument with evidence to support a claim.
- Construct an argument with evidence that some changes caused by heating or cooling can be reversed, and some cannot.

Activities - How will we teach the content and skills?

- Mystery Science Material Magic Anchor Phenomenon
- Mystery Science Material Magic Lesson 1
- Mystery Science Material Magic Lesson 2
- Mystery Science Material Magic Lesson 3
- Mystery Science Material Magic Lesson 4
- Mystery Science Material Magic Lesson 5
- Mystery Science Material Magic Lesson 6
- Whole group instruction and discussion.
- Read Alouds
- Group and Individual Projects
- Hands-on discovery when possible; creating models
- Webquests/Internet “field trips”

Evidence/Assessments - How will we know what students have learned?

- Mystery Science Material Magic Lesson 1 Assessment
- Mystery Science Material Magic Lesson 2 Assessment
- Mystery Science Material Magic Lesson 3 Assessment

- Mystery Science Material Magic Lesson 4 Assessment
- Mystery Science Material Magic Lesson 5 Assessment
- Mystery Science Material Magic Lesson 6 Assessment
- Mystery Science Material Magic Performance Task
- Teacher Observation
- Student projects/models
- Exit Tickets
- [Grade 2 Science Unit 2 Benchmark](#)

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
<p>Patterns in the natural and human-designed world can be observed.</p> <p>Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.</p> <p>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</p>	<p>Kindergarten: A situation that people want to change or create can be approached as a problem to be solved through engineering.</p> <p>Kindergarten: Asking questions, making observations, and gathering information are helpful in thinking about problems.</p> <p>Kindergarten: Before beginning to design a solution, it is important to clearly understand the problem.</p> <p>Kindergarten: Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.</p>	<p>K-2-ETS1-1 Activities</p> <p>K-2-ETS1-2 Activities</p> <p>K-2-ETS1-3 Activities</p>

21st Century Life and Careers

WRK.9.1.2.CAP.1

Make a list of different types of jobs and describe the skills associated with each job.

Career Readiness, Life Literacies, & Key Skills

TECH.9.4.2.CI.1

Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

TECH.9.4.2.CI.2

Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

TECH.9.4.2.CT.1

Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).

TECH.9.4.2.CT.2

Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).

TECH.9.4.2.CT.3

Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

TECH.9.4.2.IML.3

Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Interdisciplinary Connections/Companion Standards

NJSLS ELA

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)

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)

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

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. (2-PS1-4)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3)

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1, 2-PS1-2, 2-PS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1, 2-PS1-2, 2-PS1-3, K-2-ETS1-3)

NJSLS Mathematics

MP.2 Reason abstractly and quantitatively. (2-PS1-2, K-2-ETS1-3)

MP.4 Model with mathematics. (2-PS1-1, 2-PS1-2, K-2-ETS1-3)

MP.5 Use appropriate tools strategically. (2-PS1-2)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1, 2-PS1-2, K-2-ETS1-3)

English Language Arts

The CCSS for English Language Arts can be incorporated in this unit in a number of ways. Students can participate in shared research, using trade books and online resources, to learn about the properties of matter. As students explore different types of materials, they can record their observations in science journals, and then use their notes to generate questions that can be used for formative or summative assessment. Students can add drawings or other visual displays to their work, when appropriate, to help clarify their thinking. To teach students how to describe how reasons support specific points an author makes in a text, teachers can model the comprehension skill of main idea and details using informational text about matter. Technology can be integrated into this unit of study using free software programs (e.g., Animoto) that students can use to produce and publish their writing in science.

Mathematics

Throughout this unit of study, students have opportunities to model with mathematics and reason abstractly and quantitatively. During investigations, students can collect and organize data using picture graphs and/or bar graphs (with a single-unit scale). This can lead to opportunities to analyze data and solve simple put together, take-apart, and compare problems using information presented in these types of graphs. Some examples of ways to sort and classify materials in order to create graphs include: Classifying materials as solids, liquids, or gases. Classifying materials by color, shape, texture, or hardness. Classifying materials based on what they are made of (e.g., wood, metal, paper, plastic). Classifying materials based on potential uses. With any graph that students create, they should be expected to analyze the data and answer questions that require them to solve problems.

