

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-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
SCI.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.
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.K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
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.
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.2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

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)

Asking Questions and Defining Problems

Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)

Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Developing and Using Models

Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

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.A: Defining and Delimiting Engineering Problems

A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)

Ask questions, make observations, and gather information about a situation people want to change (e.g., climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

ETS1.B: Developing Possible Solutions

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. (K-2-ETS1-2)

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)

Structure and Function

The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

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

Formative Assessments

- 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 States of Matter Lesson 1 Assessment
- Mystery Science States of Matter Lesson 2 Assessment
- Mystery Science States of Matter Lesson 3 Assessment
- Teacher Observation
- Student projects/models
- Exit Tickets

Summative Assessments

- Tests/Quizzes
- Mystery Science Material Magic Performance Task
- [Mystery Science Material Magic Unit Assessment](#)
- Mystery Science States of Matter Performance Task
- [Mystery Science States of Matter Unit Assessment](#)
- [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</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</p>	<p>K-2-ETS1-1 Activities</p> <p>K-2-ETS1-2 Activities</p> <p>K-2-ETS1-3 Activities</p>

<p>from the natural world.</p> <p>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</p>	<p>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>	
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Career Readiness, Life Literacies, & Key Skills

PFL.9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.
PFL.9.1.2.CR.2	List ways to give back, including making donations, volunteering, and starting a business.
WRK.9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
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

NJSLS ELA

RI.CR.2.1. Ask and answer questions to demonstrate understanding of key details in an informational text, referring explicitly to the text as the basis for the answers. (2-PS1-4, K-2-ETS1-1)

RI.IT.2.3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in a sequence within a text. (2-PS1-4)

RI.AA.2.7. Describe and identify the logical connections of how reasons support specific points the author makes in a text. (2-PS1-2, 2-PS1-4)

W.AW.2.1. With prompts and support, write opinion pieces to present an idea with reasons or information. (2-PS1-4)

A. Introduce an opinion.

B. Support the opinion with facts, definitions, concrete details, text evidence, or other information and examples related to the topic.

C. Provide a conclusion.

W.WR.2.5. Generate questions about a topic and locate related information from a reference source to obtain information on that topic through shared and independent research. (2-PS1-1, 2-PS1-2, 2-PS1-3)

W.SE.2.6. Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic. (2-PS1-1, 2-PS1-2, 2-PS1-3, K-2-ETS1-1, K-2-ETS1-3)

SL.UM.2.5. Use multimedia; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

NJSLS Mathematics

MP.2 Reason abstractly and quantitatively. (2-PS1-2, K-2-ETS1-1, K-2-ETS1-3)

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

MP.5 Use appropriate tools strategically. (2-PS1-2, K-2-ETS1-1, K-2-ETS1-3)

2.DL.B.4 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-ETS1-1, K-2-ETS1-3)

