2nd Grade Unit 2 - Exploring Matter: Properties, Pieces, and Changes

Content Area: **Science**
Course(s): **Science Grade 2**
Time Period: **MP2**
Length: **36 days**
Status: **Published**

NJSLS - Science

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.
2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
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.
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.
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.
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.
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.

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)

Obtaining, Evaluating, and Communicating Information

Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)

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)

ESS2.C: The Roles of Water in Earth's Surface Processes

Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

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, 2-ESS2-3)

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

In this unit, students step into the roles of scientists and materials engineers to explore the physical world around them. Students will investigate, classify, and test a variety of materials based on their observable properties, such as color, texture, flexibility, and hardness, to understand how the structure of matter dictates its function. Through hands-on exploration, students will discover that all objects are made of smaller pieces that can be disassembled and rebuilt into completely new structures. Additionally, students will analyze how heating and cooling can change the properties of different materials, distinguishing between changes that are reversible (like melting ice) and those that are irreversible (like baking a cake).

Enduring Understandings

Matter can be described and classified by its observable properties.

Different properties make different materials suited for specific purposes.

A great variety of objects can be built from a small set of pieces.

Heating or cooling a substance may cause changes that can be observed, and some of these changes are permanent while others are temporary.

Essential Questions

How can we use the properties of a material to sort, test, and choose the best resource for a job?

How can small, individual pieces be used to build entirely different structures?

What happens to materials when we heat them up or cool them down, and can they ever go back to the way they were?

Content - What will students know?

- Matter can be described, measured, and sorted using specific properties such as color, texture, hardness, flexibility, and absorbency.
- A material's properties determine what it is good for.
- Large objects are often made from a smaller set of pieces or components.
- When an object is disassembled, its pieces do not disappear; instead, those exact same pieces can be used to build something completely different.
- Adding heat (heating) or removing heat (cooling) can change the physical state or appearance of a material.
- Some changes are temporary and can be undone.
- Some changes are permanent and cannot be undone.

Skills - What will students be able to do?

- Plan and carry out simple tests to describe materials based on their observable properties.
- Group and sort a variety of objects into categories using data collected from their own observations.
- Analyze test data to determine which material is best suited for a specific, real-world task.
- Justify their material choices using data-based reasoning.
- Take apart a multi-piece object (like a block tower, a puzzle, or a linking-cube design) and use only those same pieces to construct an entirely new, functional object.
- Explain or draw how a set of small pieces can create different shapes and structures.
- Predict what will happen to a material when it is heated or cooled, and observe the actual results.
- Classify changes as permanent or temporary based on evidence.

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

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
Patterns in the natural and human-designed world can be observed. Every human-made product is designed by applying some knowledge of the natural world	Kindergarten: A situation that people want to change or create can be approached as a problem to be solved through engineering. Kindergarten: Asking questions,	K-2-ETS1-1 Activities K-2-ETS1-2 Activities

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.	making observations, and gathering information are helpful in thinking about problems. Kindergarten: Before beginning to design a solution, it is important to clearly understand the problem. 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.	K-2-ETS1-3 Activities

Career Readiness, Life Literacies, & Key Skills

9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.
9.1.2.CR.1	Recognize ways to volunteer in the classroom, school and community.
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).
9.1.2.CR.2	List ways to give back, including making donations, volunteering, and starting a business.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
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).
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).
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
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

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.
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.
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.
RI.AA.2.7	Describe and identify the logical connections of how reasons support specific points the author makes in a text.
W.AW.2.1	With prompts and support, write opinion pieces to present an idea with reasons or information.
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.
W.SE.2.6	Prioritize information provided by different sources on the same topic while gathering ideas and planning to write about a topic.
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.