Unit: Materials and Their Uses

Content Area: **Science**
Course(s): **Science - Grade 2**
Time Period: **1 marking period**
Length: **Weeks**
Status: **Published**

Unit Overview

- Students describe and classify materials by their properties. Then they identify a secret material by playing a game of Twenty Questions.
- Students compare the sizes of three different containers in different ways. They make a picture graph to show how much water each container holds.
- Students build bridges with different materials. They test the bridge materials to find out how strong they are and whether they absorb water. They analyze the data from the tests to determine which materials are best suited for the purpose of building a bridge.
- Students create different structures with the same small sets of materials. They compare the different structures that can be made with a single set of materials.
- Students mix different materials and observe how the properties change. They record and share with the class what they find out. Students go to the “Chef’s Kitchen” to look at materials before and after they are heated or cooled. They talk about whether the change can be reversed.
- Students go to the “Chef’s Kitchen” to look at materials before and after they are heated or cooled. They talk about whether the change can be reversed.

Transfer

Students will be able to independently use their learning to...

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question
- Analyze data from tests of an object or tool to determine if it works as intended.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
- Construct an argument with evidence to support a claim.

Meaning

Understandings

Students will understand...

- What everything is made of
- How liquids and solids are different
- How materials are used for different purposes
- How materials can be reused
- What happens when materials are mixed
- What happens when materials are heated or cooled

Essential Questions

Students will keep considering...

- What is everything made of?
- How are liquids and solids different?
- How are materials used for different purposes?
- How can materials be reused?
- What happens when materials are mixed?
- What happens when materials are heated or cooled?

Application of Knowledge and Skill

Students will know...

- What everything is made of

- How liquids and solids are different
- How materials are used for different purposes
- How materials can be reused
- What happens when materials are mixed
- What happens when materials are heated or cooled

Students will be skilled at...

- Planning and carrying out investigations.
- Analyzing and interpreting data.
- Constructing explanations and designing solutions.
- Engaging in argument from evidence.

Academic Vocabulary

classify

material

property

liquid

solid

absorb

waterproof

reuse

mixture

freeze

melt

Learning Goal 1 - Lessons 1,2,5

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

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LA.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).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
SCI.2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Target 1 - Lesson 1

Different kinds of matter exist. Matter can be described and classified by its observable properties.

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Target 2 - Lesson 2

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature.

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Target 3 - Lesson 5

Matter can exist as a mixture and have different characteristics.

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Learning Goal 2 - Lesson 3

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

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MA.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.
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.

Target 1 - Lesson 3

Different properties of materials are suited for different purposes. Make inferences about the uses of materials based on their properties.

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Target 2 - Lesson 3

Discuss how engineers study materials and develop new uses for them.

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Target 3 - Lesson 3

Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

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Learning Goal 3 - Lesson 4

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.

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LA.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).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
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.

Target 1 - Lesson 4

Different materials are suited to different purposes and can be reused.

- Different materials are suited to different purposes and can be reused.

Target 2 - Lesson 4

Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

- Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

Learning Goal 4 - Lesson 6

Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

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

Target 1 - Lesson 6

Heating or cooling a substance may cause changes that can be observed. These changes are melting and freezing.

- Heating or cooling a substance may cause changes that can be observed. These changes are melting and freezing.

Target 2 - Lesson 6

Sometimes these changes are reversible, and sometimes they are not.

- Sometimes these changes are reversible, and sometimes they are not.

Target 3 - Lesson 6

Construct an argument with evidence to support a claim that materials change.

- Construct an argument with evidence to support a claim that materials change.

Formative Assessment and Performance Opportunities

Lesson Game

Students test their understanding of key concepts with an education game.

Interactive Tutorial

Students can work independently to check their understanding in a safe environment that provides instant feedback but is not graded.

Interactive Student Notebook

Students record their understanding of both the reading and activity. Review during the lesson to gauge student understanding.

Vocabulary Cards
Students check their understanding of key vocabulary terms with digital flip cards.

Class Participation
Throughout the lesson, you'll have opportunities embedded in the lesson to check for student understanding.

Summative Assessment

TCI Assessment - What is Everything Made Of?

TCI Assessment - How are Liquids and Solids Different?

TCI Assessment - How are Materials Used for Different Purposes?

TCI Assessment - How can Materials be Reused?

TCI Assessment - What Happens When Materials are Mixed?

TCI Assessment - What Happens When Materials are Heated or Cooled?

Accommodations/Modifications

English Learners

- Focus on key vocabulary
- Continue teaching *properties* and *classifying*
- Connect to students' cultures
- Support the group work
- Focus on creating different designs rather than extreme designs
- Allow students to dictate answers
- Support students as they share results
- Give a word bank
- Create mixed ability groups

Students with Special Needs

- Model how to classify materials
- Make the reading notes more concrete
- Use only 2 of the 3 containers during Lesson 2 investigation
- Reduce the amount of materials in Lesson 3 investigation
- Simplify the investigation
- Take photos of extreme designs rather than having them draw them
- Cut materials in half for Lesson 5 investigation
- Show fewer videos

Advanced Learners

- Build a flowchart of categorization
- Use bodies to model solids and liquids
- Use different materials to explore how to tell a solid and a liquid apart
- Design a bridge structure
- Make designs with 2 extreme aspects
- Relate material properties to recycling bottles and cans
- Separate many materials at once

Unit Resources

TCI online manual

TCI online materials

TCI student textbook

TCI Kit

Vocabulary cards

21st Century Life and Careers

CAEP.9.2.4.A.1	Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.
CAEP.9.2.4.A.2	Identify various life roles and civic and work - related activities in the school, home, and community.
CAEP.9.2.4.A.3	Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Interdisciplinary Connections

MA.K-12.2	Reason abstractly and quantitatively.

MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
LA.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.
LA.RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
LA.RI.2.8	Describe and identify the logical connections of how reasons support specific points the author makes in a text.
MA.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.
LA.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 conclusion.
LA.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).
LA.W.2.8	Recall information from experiences or gather information from provided sources to answer a question.