2 Science Unit 1: Material Properties (Material Magic)

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **9 Weeks**
Status: **Published**

Unit Overview

In this unit, students explore the properties of materials and matter! They describe and classify different types of materials by properties like hardness, flexibility, and absorbency, and they investigate how those properties are useful in meeting basic human needs (such as clothing and cooking). They also investigate how heating and cooling affect the properties of materials.

Standards

Scientific & Engineering Practices

- Students define the problem that a hat is needed to shade the sun. They carry out an investigation of the properties of the provided materials. Next, each student designs a solution by selecting materials to create a hat that blocks the sun.
- Students carry out an investigation to test if a material is an insulator. Analyzing the data, they determine which material they would use to pick up something hot.
- Students conduct an investigation to determine which type of candy will melt in hot water. Analyzing the data, students compare their predictions to what actually occurred. Students engage in an argument as to which candy to mail using evidence from the investigation to support their claim.
- Students use a new material to design solutions to solve a real life problem. Students engage in an argument for the merits of their design.
- Students design a solution to building a tall tower and a strong tower out of paper. They change the properties of paper by folding, bending and cutting paper.. Students model the building process by assembling small pieces in order to build an object.
- Students conduct an investigation where they examine the color and texture of three dry soil models. Then, they mix each soil model with water to create models of mud. Students put each type of mud through three separate tests and analyze their data to determine which mud would be best to build an adobe house.

Crosscutting Concepts

- Students consider the pattern that different materials share similar properties. Students test the effect a material's properties have on its function.
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- Students observe the pattern that different materials share similar properties. Students consider the cause and effect of heat being added to meltable substances. They observe that when heat (energy) is applied to a meltable substance (matter) it changes shape.
- Students observe the pattern that different materials share similar properties. Some materials have properties that cause them to be better suited to a purpose. They begin to explore how the structure of a designed object relates to its function.
- Students consider that matter, in this case paper, can be broken into smaller pieces or change shapes.
- Students consider the cause and effect relationship between a material's properties and its uses.
- Students observe the pattern that only certain types of soil have the properties that make them good for building adobe homes.

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.

Materials

Core Materials:

- Mystery Science
  - Why do we wear clothes?
  - Can you really fry an egg on a hot sidewalk?
  - Why are so many toys made out of plastic?
  - What materials might be invented in the future?
  - Could you build a house out of paper?
  - How do you build a city out of mud?

- Teacher Created Labs

Supplemental Materials:

- BrainPop resources
- NewsELA
- GRC Lessons
- TBSAID
- Nearpod Activities

Technology

Technology Literacy

• 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).

• 9.4.2.TL.2: Create a document using a word processing application.

• 9.4.2.TL.3: Enter information into a spreadsheet and sort the information.

• 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.

• 9.4.2.TL.5: Describe the difference between real and virtual experiences.

• 9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).

Technology - Data & Analysis

8.1.2.DA.1: Collect and present data, including climate change data, in various visual formats.

• 8.1.2.DA.3: Identify and describe patterns in data visualizations.

• 8.1.2.DA.4: Make predictions based on data using charts or graphs.

Technology - Effects on the Natural World

• 8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology.

• 8.2.2.ETW.2: Identify the natural resources needed to create a product.

• 8.2.2.ETW.3: Describe or model the system used for recycling technology.

• 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global

Evidence of Learning/Assessment

Formative Assessment

- Teacher Observation

- Quizzes
- Exit Tickets
- Labs

Summative Assessment

- Benchmark Tests
- Alternative Assessments: Performance Tasks & Projects

Accommodations & Modifications

Special Education

Follow IEP Plan which may contain some of the following examples…

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

504

Follow 504 Plan which may contain some of the following examples…

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

ELL

- Translation device/dictionary
- In class/pull out support with ESL teacher
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

At-risk of Failure

- Extra time during intervention
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passage

Gifted & Talented

- Independent projects
- STEM Projects
- Leveled Reading with Newsela

Interdisciplinary Connections

Connections to NJSLS - English Language Arts

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) New Jersey Department of Education December 2020 Page 37 of 200
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•W.2.1Write 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.2.7Participate 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.2.8Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1), (2-PS1-2), (2-PS1-3)

Connections to NJSLS - Mathematics

• MP.2 Reason abstractly and quantitatively. (2-PS1-2)
• MP.4 Model with mathematics. (2-PS1-1), (2-PS1-2)
• 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 fourcategories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1), (2-PS1-2)

Career Readiness, Life Literacies, and Key Skills

Critical Thinking and Problem Solving:

• 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).

Career Ready Practices

- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.