Unit 1: Matter and its Interactions

Content Area: **Science**
Course(s):
Time Period: **Generic Time Period**
Length: **4 weeks**
Status: **Published**

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-PS1-1), (2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reaction

- 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)

Standards

Science --

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.

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.

ELA/Literacy —

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.2.7 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)

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 four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2)

Essential Questions

2-PS1

Properties of Matter

Essential Unit Question: *How do the properties of materials determine their use?*

Student Learning Objectives:

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

a question (2-PS1-1). *How can we sort objects by their observable properties?*

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

SWBAT Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Concepts that will be taught:

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

2. Heating or cooling a substance may cause changes that can be observed.

3. Patterns in the natural and human designed world can be observed.

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

5. Every human-made product is designed by applying someknowledge of the natural world and is built using materials derived from the natural world.

6. Simple tests can be designed to gather evidence to support or refuse student ideas about causes.

Students who demonstrate understanding can:

Students who understand 1-3:

- 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.

Students who understand 4-7:

- 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

* Absorbency

- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of each.

Changes to Matter

Essential Questions:

How can objects change?

Are all changes reversible?

Student Learning Objectives:

SWBAT 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.

Concepts that will be taught:

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

2. Different properties are suited to different purposes.

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

4. People search for cause-and-effect relationships to explain natural events.

5. Events have causes that generate observable patterns.

6. Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible,

and sometimes they are not.

Students who understand will be able to:

Students who understand 1-3:

• 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.

Students who understand 4-6:

• 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:

* Examples of reversible changes could include materials such as water and butter at different temperatures.

* Examples of irreversible changes could include:

- cooking an egg

- freezing a plant leaf

- heating paper

Activities

1. How can you tell what is inside? Intro Activity to states of matter (canisters full with small solids and liquids)

2. Classify various materials by observable feature in small groups or pairs using picture cards

3. STEAM Problem: The 3 Little Pigs need a home that cannot be blown down by the Big, Bad Wolf. Solve the problem by designing and building the actual house (2-PS1-2)

4. 2-PS1-3 Everything we see is made of matter and matter can be broken down into smaller parts (atoms).

*Activity Build a structure, disassemble it, then build another structure using the same parts. Use locks or Legos, or can print off rectanges on paper and have your students use their imagination! What can they create using just small rectangular pieces of paper? Then have them

5. Show students slides on SMARTboard depicting matter in various states due to temperature differences. For every slide ask the following questions:

1. What state is the original object in - solid, liquid, gas?
2. How did it change state - through heating or cooling?
3. What is the new state of matter – solid, liquid, gas?
4. Is the change reversible?

Materials & Resources

McGraw Hill Science book Unit E

*Chapter 9, Lessons 1-3

www.mysteryscience.com

- opaque sanisters full with small solids and liquids

-Picture cards depicting solids and liquids to sort

- baking soda, cornstarch, flour, salt, dry beans, index cards, straws, scrap paper, cardstock, tape, rulers.

-Legos, blocks, printed out paper rectangles, tangrams of same shape

-SMARTboard

Assessment

Class discussions

Vocabulary Game / Quiz

Classroom Experiments

Observe Performance Task
(Project)

End of unit written assessment

Mystery Science assessment

Accommodations and Modifications

-Use of scribe

-Partnered with classmate

-Use of scribe

-Adaptive computer to type assignments

-Adjustable tables and lab equiptment within reach

-Flexible seating

-Additional time and/or small-group for testing

-Additional time and/or small-group for assignments

-Captioned videos

-Visual and tactile instructional demonstrations

-Computer with voice output, selling and grammar checker

-Preferential seating

-Tactile drawings and graphs, and three-dimensional models

-Directions repeated/clarified. Check for understanding.