

# Englewood Public School District

## Science

### Grade 2

### Second Marking Period

#### Unit 2: Properties of Matter

**Overview:** During this unit, students will demonstrate an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of patterns, cause and effect, 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 and analyzing and interpreting data. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 2-PS1-1, 2-PS2-1, and K-2-ETS1-3

**Time Frame:** 15 to 20 days

#### Enduring Understandings:

*Matter exists in three states – solid, liquid and gas.*

*Patterns exist in each property of matter.*

#### Essential Questions:

*How can we sort objects into groups that have similar patterns?*

*Can some materials be a solid or a liquid?*

Standards	Topics and Objectives	Activities	Resources	Assessments
<b>2-PS1-1:</b> <b>Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</b>  <b>2-PS2-1:</b> <b>Analyze data obtained from testing different materials to determine which materials have the</b>	<b>Topics</b>  Patterns and Types of Matter  Twenty First Century Skills: <ul style="list-style-type: none"> <li>Environmental Literacy</li> <li>The Four C's</li> </ul>	<b>Discovering Science:</b> Students will create a chart categorizing different types of matter. During this time, the teacher will review key content vocabulary. Students will then independently sort index cards with pictures of matter on them into three different matter piles. (MP.2)	<b>Discovering Science:</b> <ul style="list-style-type: none"> <li>National Science Teachers Association <i>Science and Children</i>, "What Causes the Different States of Matter?" December 2008, pages 56-59.</li> <li>Take an interactive quiz at <a href="http://www.neok12.com/quiz/STSMAT01">http://www.neok12.com/quiz/STSMAT01</a></li> <li>See an animation about</li> </ul>	<b>Formative Assessments:</b> Do Now/Ticket to Leave  Journal Entries  Students can participate in shared research, using trade books and online resources, to learn about the properties of matter.  Students can record their observations in science journals, and then use their
	<b>Objectives</b>  <b>Discovering Science:</b> Students will learn what matter is and explore	<b>Classifying Objects:</b> Students review the different		

properties that are best suited for an intended purpose.

**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.

different states of matter.

**Classifying Objects:**

Students will review different properties of matter and classify objects found in back pack or classroom.

**Properties of Solids-Bar Graphs:**

Students will classify different objects based on physical properties.

**Structure and Properties of Matter** (Lesson 2):

Student will explore different properties of matter and will create a class anchor chart.

**Structure and Properties of Matter (Lesson 4 - 6):**

Students will evaluate a series of objects for absorbency, strength and flexibility. Students will then evaluate which of the items would be best for each category based on their performance during testing.

**Properties of Materials:**

Understanding how materials behave in their natural state and under certain conditions will help them to understand why objects are made of specific materials.

parts of matter and then classify three objects found in parts of matter. Students must also list the property of each object and an object that is similar. (CRP4, CRP8, MP.4)

**Properties of Solids- Bar Graphs:**

Students will take a walk outside and choose three solid items to bring back to the class. In the classroom, each student shares each item and lists the item's properties. The whole group will determine two groups and then work in small groups to sort their items. Students will then create a bar graph with their results. (2.MD.D.10, MP.5)

**EXTEND:** Students choose two new properties and create a t-chart and bar graph in small groups. (8.2.2.C.1, 2.MD.D.10)

**Structure and Properties of Matter (Lesson 2):**

Students will work in small groups to observe the properties of various items. All information will be recorded in a chart. Students will create a class anchor chart on what properties were observed. (W.2.7, 6.1.4.B.9)

**Structure and Properties of Matter (Lesson 4- 6):**  
Students will work in small

matter at  
[http://www.harcourtschool.com/activity/states\\_of\\_matter/](http://www.harcourtschool.com/activity/states_of_matter/)

**Additional Text:**

Kerrod, Robin. Matter and Materials.  
Oxlade, Chris. States of Matter.  
Ross, Michael Elsohn. Whats the Matter in Mr. Whiskers Room.  
Walker, Sally M. Matter.

**Properties of Matter - Bar Graphs:**

Materials:

- Student journals/pencils
- Whiteboard or chart paper/markers
- 2 sticks for creating T-charts, one per group of students (optional)
- Magnets, one per group (optional)

**Structure and Properties of Matter (Lesson 2):**

**Materials:** (1 per group)

- Pipe cleaner
- Sticky bug

notes to generate questions that can be used for summative assessment.

**Benchmark Assessment:**

Exact Path

**Summative Assessments:**  
**Discovering Science**

Student participation and index card sort

**Classifying Objects:**  
Student worksheet  
classifying objects.

**Properties of Matter –Bar Graphs:**

Student journals  
Structure and Properties of Matter (Lesson Two):

**Structure and Properties of Matter (Lesson 2)**  
Student worksheets  
Class Anchor Chart

**Structure and Properties of Matter (Lesson 4-6):**  
Lab sheet from each Lesson  
Use rubric for scoring

**Properties of Materials:**  
Lab Papers

**Alternative Assessments:**  
Observe patterns in the natural

groups to test the strength of various objects. The first lab will focus on the absorbency of different materials. The second lab will focus on the strength of different materials. The final lab will focus on the flexibility of items. Each lab will require the students to follow the scientific method. (RI.2.1, 8.1.2.E.1, 9.2.4.A.6)

#### **Properties of Materials:**

A. **Balls:** Students compare how high balls made from different materials can bounce.

B. **Elastic Bands:** Students compare how much weight rubber bands of different thickness can hold. (Safety Note: Have students wear goggles)

C. **Fabric:** Students test how far different fabrics stretch when holding the same amount of weight.

D. **Flexibility:** Students build bridges out of various materials to hold a 100g weight without breaking.

- Marble
- Porcupine ball
- Feather
- Sand paper
- Twizzler
- Cotton ball
- Rock
- Popsicle stick
- Hand Lenses (each student)

#### **Structure and Properties of Matter (Lesson 4-6):**

##### **Lesson 4:**

- Sponge
- Paper Towel
- Wax Paper
- Graduated Cylinder
- Medium Bowl with Water
- Funnel

##### **Lesson 5:**

- Pipe Cleaners
- 3x5 Notecard
- Popsicle Sticks
- Washers

Note: Arrange desks so that they are 4 inches apart in order to create a bridge across the two tables

##### **Lesson 6:**

- Twizzler (one for each student)
- Yarn (one for each student)
- Marker (one for each student)

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.

Multiple choice tests.

Rubrics

Analyze data from tests of an object or tool to determine if it works as intended.

Checklists

Assess quantitative measurements (limited to length.) Examples of properties could include:

✓ Strength

**Properties of Materials**

- Balls of different materials.
- Rubber bands
- Paper clips
- 500 g weight
- 100 g weight
- Fabric Samples
- Paper

- ✓ Flexibility
- ✓ Hardness
- ✓ Texture
- ✓ Absorbency

Use the computer to explore the properties of matter.

Capstone projects

Students can collect and organize data using picture graphs and/or bar graphs (with a single-unit scale).

Students can add drawings or other visual displays to their work, when appropriate, to help clarify their thinking.

Technology can be integrated into this unit of study using free software programs (e.g., Animoto) that students can use to produce and publish their writing in science.

Students should be expected to analyze the data and answer questions that require them to solve problems using a graph.

**Accommodations and Modifications:**

**Students with special needs:** Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

**ELL/ESL students:** Students will be supported according to the recommendations for “can do’s” as outlined by WIDA –

[https://www.wida.us/standards/CAN\\_DOs/](https://www.wida.us/standards/CAN_DOs/)

This particular unit has limited language barriers due to the physical nature of the curriculum.

**Students at risk of school failure:** Formative and summative data will be used to monitor student success at first signs of failure student work will be reviewed to determine support.

This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time and will be made available with a certified instructor to aid students in reaching the standards.

**Gifted and Talented Students:** Students excelling in mastery of standards will be challenged with complex, high level challenges related to the complexity in planning and carrying out investigations and analyzing and interpreting data.

English Language Learners	Special Education	At-Risk	Gifted and Talented
<ul style="list-style-type: none"> <li>● Speak and display terminology</li> <li>● Teacher modeling</li> <li>● Peer modeling</li> <li>● Provide ELL students with multiple literacy strategies</li> <li>● Word walls</li> <li>● Use peer readers</li> <li>● Give page numbers to help the students find answers</li> <li>● Provide a computer for written work</li> <li>● Provide two sets of textbooks, one for home and one for school</li> <li>● Provide visual aides</li> <li>● Provide additional time to complete a task</li> <li>● Use graphic organizers</li> </ul>	<ul style="list-style-type: none"> <li>● Utilize modifications &amp; accommodations delineated in the student’s IEP</li> <li>● Work with paraprofessional</li> <li>● Use multi-sensory teaching approaches.</li> <li>● Work with a partner</li> <li>● Provide concrete examples</li> <li>● Restructure lesson using UDL principals (<a href="http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA">http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA</a>)</li> <li>● Provide students with multiple choices for how</li> </ul>	<ul style="list-style-type: none"> <li>● Using visual demonstrations, illustrations, and models</li> <li>● Give directions/instructions verbally and in simple written format. Oral prompts can be given.</li> <li>● Peer Support</li> <li>● Increase one on one time</li> <li>● Teachers may modify instructions by modeling what the student is expected to do</li> <li>● Instructions may be printed out in large print and hung up for the student to see during the time of the lesson.</li> <li>● Review behavior expectations and make adjustments for personal space or other behaviors as</li> </ul>	<ul style="list-style-type: none"> <li>● Curriculum compact -ing</li> <li>● Inquiry-based instruct -ion</li> <li>● Independent study</li> <li>● Higher order thinking skills</li> <li>● Adjusting the pace of lessons</li> <li>● Interest based content</li> <li>● Real world scenarios</li> <li>● Student Driven Instruct -ion</li> <li>● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple</li> </ul>

	<p>they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling)</p> <ul style="list-style-type: none"> <li>• Shorten assignments to focus on mastery of key concepts</li> </ul>	<p>needed</p> <ul style="list-style-type: none"> <li>• Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community</li> <li>• Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies)</li> </ul>	<p>ways to demonstrate their understandings.</p> <ul style="list-style-type: none"> <li>• Use project-based Science learning to connect science with observable phenomena.</li> <li>• Structure the learning around explaining or solving a social or community-based issue.</li> <li>• Collaborate with after-school programs or clubs to extend learning opportunities.</li> </ul>	
<p><b>Interdisciplinary Connections:</b></p> <p><b>ELA - NJSLS/ELA:</b>  <b>RI.2.1:</b> Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.  <b>W.2.7:</b> Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1)</p>				
<p><b>Social Studies:</b>  <b>6.1.4.B.9:</b> Relate advances in science and technology to environmental concerns, and to actions taken to address them.</p>				
<p><b>Integration of 21st Century Standards NJSLS 9:</b>  <b>9.2.4.A.6:</b> Explain why knowledge and skills acquired in the elementary grades lay the foundation for the future academic and career success.</p>				
<p><b>Career Ready Practices:</b>  <b>CRP4:</b> Communicate clearly and effectively and with reason.  <b>CRP8:</b> Utilize critical thinking to make sense of problems and persevere in solving them.</p>				
<p><b>Mathematics:</b>  <b>MP.2:</b> Reason abstractly and quantitatively. (2-PS1-2)  <b>MP.4:</b> Model with mathematics. (2-PS1-1),(2-PS1-2 )  <b>MP.5:</b> Use appropriate tools strategically. (2-PS1-2)  <b>2.MD.D.10:</b> 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 problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2)</p>				

### Integration of Technology Standards NJSL 8:

**8.2.2.C.1:** Brainstorm ideas on how to solve a problem or build a product.

**8.1.2.E.1:** Use digital tools and online resources to explore a problem or issue.

### Key Vocabulary:

**Matter:** what a physical object is made of

**Solid:** not a liquid or a gas, not loose or spongy

**Liquid:** neither solid or gaseous, flows freely

**Properties:** a special quality of something

**Flexible:** can be bent

**Hard:** something that does not easily bend, stretch or dent.

**Soft:** something that can easily bend, stretch or dent.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<b><u>Planning and Carrying Out Investigations</u></b> <ul style="list-style-type: none"><li>Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.(2-PS1-1)</li></ul> <b><u>Analyzing and Interpreting Data</u></b> <ul style="list-style-type: none"><li>Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)</li></ul> <b><u>Analyzing and Interpreting Data</u></b>	<b><u>PS1.A: Structure and Properties of Matter</u></b> <ul style="list-style-type: none"><li>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)</li><li>Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)</li><li>A great variety of objects can be built up</li></ul>	<b><u>Patterns</u></b> <ul style="list-style-type: none"><li>Patterns in the natural and human designed world can be observed. (2-PS1-1)</li></ul> <b><u>Cause and Effect</u></b> <ul style="list-style-type: none"><li>Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)</li></ul> <p>-----</p> <p>-----</p>

<ul style="list-style-type: none"> <li>Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)</li> </ul>	<p>from a small set of pieces. (2-PS1-3)</p> <p><b><u>ETS1.C: Optimizing the Design Solution</u></b></p> <ul style="list-style-type: none"> <li>Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)</li> </ul>	<p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p><b><u>Influence of Engineering, Technology, and Science, on Society and the Natural World</u></b></p> <ul style="list-style-type: none"> <li>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)</li> </ul>
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