

**Unit: Physical Science: Material Properties & Engineering; Material Properties, Classifying Materials; Material Changes & Phases of Matter; Material Inventions, Engineering; Materials, Properties, & Engineering**

**Duration: 5-10 wks.**

<b>Desired Results</b>		
<p><b>Performance Expectations:</b></p> <p><b>2-PS1-1</b> Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p> <p><b>2- PS1-2</b> Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for the intended purpose.</p> <p><b>2- PS1-3</b> 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.</p> <p><b>2- PS1-4</b> Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</p> <p><b>K-2-ETS1-1</b> Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <p><b>K-2-ETS1-2</b> Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as</p>	<i>Transfer</i>	
	<p><i>Meaning</i></p> <p><b>ENDURING UNDERSTANDINGS: Crosscutting Concepts</b></p> <p><i>Students will understand that...</i></p> <p>Students consider the pattern that different materials share similar properties. Students test the effect a material’s properties have on its function.</p> <p>Students consider the pattern that different materials share similar properties. Students test the effect a material’s properties have on its function.</p> <p>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.</p> <p>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.</p> <p>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</p>	
	<i>Meaning</i>	<i>Meaning</i>
	<p><i>Acquisition</i></p> <p><b>Disciplinary Core Ideas</b></p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> <li>● Materials have a set of unique</li> </ul>	<p><b>Science and Engineering Practices</b></p> <p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> <li>1. Students define the problem that a hat is needed to shade the sun. They carry</li> </ol>

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.

properties that determine their use. Clothes are made of material, and we wear them to protect us. We choose clothing based on its properties. For example, if it was hot outside we would wear something light and opaque to protect us from the sun. DCIs: PS1.A, ETS1.A, ETS1.B

- One interesting property of materials is whether they are an insulator (a material that does not allow the movement of heat) or a conductor (a material that moves heat easily). If you know which property a material has, you can choose the best one for your purpose! DCIs: PS1.A
- Another property of materials is if they are meltable or not. If a material is meltable, it melts into a liquid when you heat it up! All meltable material melts at different temperatures. Some may melt in your hands, while others need fire. This property is useful because you can heat a substance, melt it, pour the liquid into any mold, let it cool and harden again to make different shapes. DCIs: PS1.A, PS1.B
- Over time, inventions of materials with new properties have helped solve problems. New materials are constantly being invented and made into products that could be available in the future. DCIs: PS1.A, ETS1.A, ETS1.B, Foundational ETS1.C
- Building materials--like wood, concrete, and steel-- all share an

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.

2. 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.
3. 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.
4. 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.
5. 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.

Inquiry Questions:

1. Why do we wear clothes?
2. Can you really fry an egg on a hot sidewalk?
3. Why are so many toys made out of plastic?

	<p>important property, strength. They are easy to build with because you can combine many small pieces and make a bigger structure. But those aren't the only materials you can use to build! Paper doesn't seem like it has the right properties for building--it's flexible and isn't strong. Surprisingly, you can change the properties of paper to make it stronger and a better building material. DCIs: PS1.A, ETS1.B, ETS1.C</p>	<ol style="list-style-type: none"><li>4. What materials might be invented in the future?</li><li>5. Could you build a house out of paper?</li></ol>

**Evidence**

**Evaluation Criteria**

**Assessment Evidence**

**PERFORMANCE TASK(S):**

**OTHER EVIDENCE:**

**Unit assessment**

**Learning Plan**

*Summary of Key Learning Events and Instruction*