



## County Implementation Award Program (CIAP) Math and Science Lesson

<b>Unit Title:</b> What's up with the Weather? (Lesson 2: Parts A and B)
<b>Lesson Title:</b> How Does the Sun Affect Temperature? And How Can We Reduce the Harmful Effects of the Sun?
<b>Author:</b> K. Green
<b>Grade Level:</b> Kindergarten
<b>Time Frame:</b> 2 – 3 days
<b>Targeted Standard(s):</b> K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. CCSS.MATH.CONTENT.K.CC. C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies CCSS.MATH.CONTENT.K.MD. A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. CCSS.MATH.CONTENT.K.MD. A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute and describe the difference. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i>
<b>Short Description of Targeted Phenomenon:</b> Students will identify how the sun affects the temperature of different objects. Students will design and create a structure that minimizes the effects of the sun.
<b>Three Dimensions of NGSS</b>
<b>Science &amp; Engineering Practice/s (SEP):</b> <b><i>Planning and Carrying Out Investigations</i></b> <i>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</i> <i>Make observations (firsthand or from media) to collect data that can be used to make comparisons.</i> <i>(K-PS3-1)</i>

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)

**Crosscutting Concept/s (CCC):**

**Patterns**

Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

**Cause and Effect**

Events have causes that generate observable patterns.

**Disciplinary Core Idea/s (DCI):**

**PS3.B: Conservation of Energy and Energy Transfer**

Sunlight warms Earth’s surface. (K-PS3-1), (K-PS3-2)

**ESS2.D: Weather and Climate**

Weather is the combination of sunlight, wind, snow or rain, and temperature in a region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary to K-ESS3-2)

**Language Supports:**

CA CCSS for ELA/Literacy Connections: L. K .5c, 5d, 6; W. K .2, 3, 8; SL .K .1, 4, 5, 6

**Materials Needed:**

Rocks  
Sand  
Soil  
Water  
Light  
Color coded thermometers (from previous lesson)  
Sticky dots  
Pre-made chart to graph whole class results  
Supplies for structure (possible options include: straws, paper, rubber bands, tape, etc.)  
Worksheets

**Objective(s): Students will be able to:**

1. Identify how the sun affects different surfaces
  
2. Compare the temperatures of different objects
  
3. Build and evaluate a structure to mitigate the effects of the sun.

**How Math and Science concepts/skills/practices were integrated in this lesson:**

Students will use thermometers to measure and compare the temperature of objects inside and outside (in the sun).

**Possible Challenges /Misconceptions:**

Thermometers can be difficult to use.

If using artificial lights instead of the sun, there may be some misconceptions about the connection between heat/light and the sun.

**Formative Assessment:**

**Lesson Opening – Part A**

**Teacher Actions**

1. Remind students about what they learned the previous day/lesson.
2. Ask students to model again how a thermometer works.

**Student Actions**

1. Students share ideas and respond to questions. Students will also model how a thermometer works using their bodies.

**Lesson Introduction**

**Teacher Actions**

1. Have a variety of materials available to test including water, sand, rocks, soil. Have a least two of each sample. Place one of each sample outside on a sunny day and the other inside. This can also be completed by placing one of each sample under a heat lamp.
2. Ask students to predict what they think will happen when some of the samples are placed outside or under the lamp.

**Student Actions**

1. Students make predictions about how the light will affect the temperature of each sample. They can circle inside or outside on their data sheet.

**Body of Lesson**

**Teacher Actions**

1. Allow students to measure the temperature of the objects under the light/outside and inside/no light. Have student compare the light/no light objects.

**Student Actions**

1. Students use thermometers to measure the temperature of different materials under light and without light. Students can record their data on their [data sheet](#).

<b>Lesson Closure</b>	
<p><b>Teacher Actions</b></p> <ol style="list-style-type: none"> <li>1. Ask students what happens to objects when they are in the sun? Students should be able to identify that objects in the sun were hotter than objects without light. You can also ask students if they all heated up the same. Did they all end up the same temperature when outside?</li> <li>2. Make a bar graph of all the data. Provide 4 sticky dots to each group.</li> </ol>	<p><b>Student Actions</b></p> <ol style="list-style-type: none"> <li>1. Students share observations and determine which heated up more. They can answer the questions on their data sheet by drawing a picture or writing words.</li> <li>2. Students will place a sticky dot for each type of material on whether it was warmer inside or outside, making a bar graph.</li> <li>3. Students count how many were hotter inside vs outside for each material.</li> </ol>
<p><b>Summative Assessment:</b></p>	
<p><b>Other Teaching Resources:</b>  <a href="#">UV beads</a> are also a great way to determine the effect of the sun</p>	
<p><b>Lab Safety:</b>            Make sure to complete this on a warm, sunny day or use heat lamps inside.            If using heat lamps, make sure students do not touch the lamp as they can get very hot.</p>	
<p><b>Extensions (if any):</b>            Use different colors of paper on containers and place both in sunlight/heat lamp. Using the same thermometers as before, determine which one heats up more.</p>	

<b>Lesson Opening – Part B</b>	
<p><b>Teacher Actions</b></p> <ol style="list-style-type: none"> <li>1. Remind students about what they have learned over the past two lessons.</li> </ol>	<p><b>Student Actions</b></p> <ol style="list-style-type: none"> <li>1. Students share ideas and respond to general questions about the weather.</li> </ol>
<b>Lesson Introduction</b>	
<p><b>Teacher Actions</b></p> <ol style="list-style-type: none"> <li>1. Ask students to design a structure that could be used to limit the effects of the sun.</li> <li>2. Have students draw pictures of their designs and work together to complete a final design.</li> </ol>	<p><b>Student Actions</b></p> <ol style="list-style-type: none"> <li>1. Students plan a structure to reduce the effects of the sun. Students work in groups to design a structure.</li> </ol>

<b>Body of Lesson</b>	
<p><b>Teacher Actions</b></p> <ol style="list-style-type: none"> <li>1. Provide groups/pairs of students with supplies once they have a plan for design. Any supplies can be used but possible options include straws, paper, rubber bands, pencils, screens, etc.</li> <li>2. Ask students to build and test their structure. Structures can be tested using thermometers and placing the structure under a light to measure the temperature under the structure.</li> </ol>	<p><b>Student Actions</b></p> <ol style="list-style-type: none"> <li>1. Students build a structure and then test using thermometers.</li> <li>2. Data can be recorded on <a href="#">student data sheet</a>.</li> </ol>
<b>Lesson Closure</b>	
<p><b>Teacher Actions</b></p> <ol style="list-style-type: none"> <li>1. Have student compare the color of the thermometer with and without their structure.</li> <li>2. Share designs with the whole class. This can be completed as a presentation or as a gallery walk.</li> </ol>	<p><b>Student Actions</b></p> <ol style="list-style-type: none"> <li>1. Students share designs with others in the class.</li> </ol>
<p><b>Summative Assessment:</b> Students have built a structure, limiting the effects of the sun.</p>	
<p><b>Other Teaching Resources:</b></p>	
<p><b>Lab Safety:</b> Complete this activity on a warm, sunny day or use a heat lamp. If using a heat lamp, make sure students do not touch the lamp. Make sure students are using all materials safely</p>	
<p><b>Extensions (if any):</b></p>	