



County Implementation Award Program (CIAP) Math and Science Lesson

Unit Title: What's Up with the Weather
Lesson Title: Experimenting with Thermometers
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Grade Level: Kindergarten
Time Frame: 30 – 60 minutes
Targeted Standard(s): NGSS: K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. MATH 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> CCSS.MATH.CONTENT.K.MD. B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. <i>(Optional activity)</i>
Short Description of Targeted Phenomenon: Objects can have different temperatures and thermometers are tools that can be used to measure the temperature.
Three Dimensions of NGSS
Science & Engineering Practice/s (SEP): <i>Planning and Carrying Out Investigations</i> <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</i>

data to support explanations or design solutions. Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

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

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 particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

Language Supports:

Materials Needed:

Variety of thermometers
Color coded thermometers (1 per group/pair)
Ice
Pre-made paper thermometer (for charting)
Worksheets (click [here](#) to download)

Objective(s): Students will be able to:

1. Understand that temperature is a factor in determining weather.
2. Use thermometers to accurately measure temperature.
3. Compare temperatures of different objects and sort based on temperature

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

Students will use thermometers to compare the temperature of objects and identify them as hotter/colder or higher temperature/cooler temperature.

Possible Challenges /Misconceptions:

Thermometers can be difficult to read especially when small

Formative Assessment:

Students will be able to use their bodies to model how a thermometer works.
Students will create a chart that identifies the temperature of different objects.

Lesson Opening

Teacher Actions

1. Ask students what they already know about weather. Questions may include: what are different types of weather? When happens when it is hot or cold outside? etc. Accept any answer and continue as students share responses.
2. Ask students how we know how hot or cold something is? Guide students to the idea that temperature is a measure used to determine how hot or cold something is. Ask students how we measure temperature? Some students may know that a thermometer is used to measure temperature, others may not.

Student Actions

Students share ideas and respond to general questions about the weather.

Lesson Introduction

Teacher Actions

1. Ask students if they have seen any thermometers and who may use thermometers (doctors, moms/dads, chefs, scientists). Bring out different kinds of thermometers as they identify them (Galileo thermometer, ear thermometer, meat thermometer, glass thermometer, fish tank thermometer, etc.). Add any thermometers they may not have identified. Ask students if they have ever seen or used these types of thermometers or what they might measure the temperature of. Allow students to answer/share.
2. Explain how a thermometer works, especially the glass thermometer. When the temperature goes up/gets hotter, the liquid in a thermometer goes up. When

Student Actions

Students participate in discussion. Students share/answer questions. Students model how a thermometer works.

<p>the temperature goes down/gets colder, the liquid in a thermometer goes down.</p> <p>3. Have students' model this using their bodies. Example: Show me what would happen to the liquid in a thermometer when the temperature is extremely cold. Students should try to scrunch up. Show me what would happen to the liquid in a thermometer that is extremely hot. Students should try to stretch their bodies.</p>	
<p>Body of Lesson</p>	
<p>Teacher Actions</p> <ol style="list-style-type: none"> 1. Show students one of the color-coded thermometers. Explain to students that these thermometers work just like other thermometers but that the colors help us identify the temperature. 2. Provide students pairs with a color-coded thermometer. Allow them to explore by place the thermometer in different types of materials (water, sand, in their hand, on the table, etc.). 3. Make sure to have some tubs/cups with ice and others with water to allow students to try out the thermometers. Also, have cup of hot/warm water for students to try. Make sure to have an adult to help with the hotter temperature. 	<p>Student Actions</p> <p>Students use thermometers to measure a variety of objects. Students choose which objects to measure. Students can record numbers if able or order objects by temperature.</p>
<p>Lesson Closure</p>	
<p>Teacher Actions</p> <ol style="list-style-type: none"> 1. Collect supplies and have students share their observations. What happened when you put the thermometer on your desk? Your hand? The ice? The hot liquid? Have a pre-made thermometer on a piece of butcher paper (using the same colors as the fish tank thermometers) and chart the temperature of each item on the board. You may want to have students do this as well if they are able to write. If not, students can glue premade images 	<p>Student Actions</p> <ol style="list-style-type: none"> 1. Students share findings with class. 2. Cut out pictures of objects and sort based on temperature, gluing onto own sheet.

<p>onto their own drawing of a thermometer (see worksheets here).</p> <ol style="list-style-type: none">2. Ask questions about which is the coldest, the hottest? Students can also compare, hotter or cooler objects.	
Summative Assessment:	
Other Teaching Resources: These thermometers can be used and color coded.	
Lab Safety: <ol style="list-style-type: none">1. Make sure thermometers are used with objects appropriately2. If using hot water, make sure students are not touching the water3. Be careful not to spill the water.	
Extensions (if any): <ol style="list-style-type: none">1. Have students make practice thermometers using Ziploc slider bags and paper. Students can make their thermometer and use it to estimate the temperature of different objects and then test to see how close they were. The slider can be moved to different temperatures (See link below)2. Have students practice counting by providing students with a calendar with pictures of weather. Ask questions such as how many days were cloudy? Rainy? Sunny?	