



# the CEED

THE CENTER FOR ENERGY EFFICIENT DESIGN

## Weather Data Tracking

<b>Grade Level</b>	2 <sup>nd</sup> Grade	<b>Subject</b>	Science
<b>Objective(s):</b> The student will: -Identify different sources of tracking weather -Explain how to use weather data -Record weather data		<b>SOL Addressed:</b> The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include  a) identification of common storms and other weather phenomena; b) the uses and importance of measuring, recording, and interpreting weather data; and c) the uses and importance of tracking weather data over time.  <b>Common Core Standards:</b> 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	
<b>Materials Needed Per Class of 30</b>  <b>and</b>  <b>Prior Knowledge</b>	<ul style="list-style-type: none"> <li>- One barometer</li> <li>- One Wireless Weather/Moon Forecast Station (<a href="http://www.hometrainingtools.com/wireless-weather-moon-forecast-station/p/AS-DIGWBHT/">http://www.hometrainingtools.com/wireless-weather-moon-forecast-station/p/AS-DIGWBHT/</a> )</li> <li>- One anemometer</li> <li>- One wind vane</li> <li>- One rain gauge</li> <li>- One thermometer for classroom use</li> <li>- Internet access to CEED website</li> </ul> Optional <ul style="list-style-type: none"> <li>• iPad</li> <li>• GoPro</li> </ul> <p>TSW have prior knowledge of different types of precipitation and weather tools to utilize them properly. Also, TSW have some knowledge about graphs and graphing simple data.</p>		
<b>Ways to differentiate this lesson plan</b>	<ul style="list-style-type: none"> <li>• <b>EXTENSION</b> for Higher Level Learner- TSW monitor and lead a daily weather forecast for the class. They could use “Morning Work” time to gather data on the weather tools. During this time, or a more convenient time, the students could give a weather report to be recorded on a GoPro or an iPad.</li> <li>• <b>MODIFICATIONS</b> – TSW work in groups of two or three, depending on the area of need. Higher students will assist the lower students.</li> </ul>		

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Instructional Activities

<p style="text-align: center;"><b>Introduction/ Anticipatory Set</b></p>	<p><b>Anticipatory Set:</b> How does weather affect us? Let’s look at some tools. I will give you 3 minutes to walk around and observe the tools and I want you think back if you have seen these types of tools before and where you have seen them used.</p> <p><b>Questions to ask students:</b></p> <ul style="list-style-type: none"> <li>• How does a barometer help us with weather?</li> <li>• Why do you think we need to measure weather?</li> <li>• How is it important to our class to keep track of the weather?</li> <li>• What are some ways we can observe weather with these tools?</li> <li>• How many weather tools do you have at your house?</li> <li>• Can you think of a unique way to keep track of the weather?</li> </ul>	<p><b>Introduction:</b> When we think of weather, what do you think of? Does it always have to be raining, snowing, sleeting, or hailing for weather to happen?</p> <p>Today we will learn about ways to collect data and graph it. We will be observing and collecting data in a few different ways. Different weather tools give us different information. What do you think different tools may measure? It is important to observe different tools to see if we can compare or contrast the different tools? Why?</p> <p>We will split into groups of 3-4 and we will discuss the tools. Talk about anything that comes to your mind when you see the tools and we will learn more about them as we use them.</p>
<p style="text-align: center;"><b>Guided Practice</b></p>	<p>Research Shows that students learn best when they are</p> <ul style="list-style-type: none"> <li>• actively engaged and thinking in the classroom</li> <li>• drawing conclusions by analyzing data, models or examples and by discussing ideas</li> <li>• working together in self-managed teams to understand concepts and to solve problems</li> <li>• reflecting on what they have learned and on improving their performance</li> <li>• interacting with an instructor as a facilitator of learning</li> </ul> <p><b>Sample Facilitator Questions for the Activity:</b> TSW investigate different ways to use weather tools</p> <p>Walk around and ask students questions like:</p> <ul style="list-style-type: none"> <li>- How do you use that weather tool?</li> <li>- What are you doing with the weather tool to make it work?</li> <li>- When you look at this tool, how could you graph it from day to day?</li> <li>- Why do you think we would need this tool for a weather report?</li> <li>- How does weather affect you in what you do every day?</li> </ul>	

## CEED Instructional Activities

<b>Independent Practice</b>	<p>In groups of 3-4, have students work together to decide how to use the materials. Take students outside and have them measure the things they think the tools measure. Have students brainstorm ideas for how to graph this data from day to day. Walk around and assist students so that learning can be analyzed and assessed. Also ask questions to direct students in the right direction.</p> <p>Once coming back inside from exploring the weather tools, have the students graph the data in a way that they think will show the similarities and differences from day to day.</p> <p>In the following days, have students go outside and monitor the weather tools, adding to the discussion more and more every day to ensure the students' understanding of the tools and how they are used to record data. For five days, have the students go outside and graph the weather tools and data they find in whatever way they think will be best to show their data. After the first five days, the next week will be used to discuss their data and how they could better graph their data in order to compare the data in the most effective way. Give students options of a bar graph, a circle graph, or a picture graph and have them decide if one of these graphs is the best way to show the data. When they go out for the next five days, have discussions with the students about the different materials and their uses. Then, as a group, discuss how to chart the data and compare and contrast it.</p> <p>Additional Activities (depending on time of lesson):</p> <ul style="list-style-type: none"> <li>-Have students discuss different placements of tools in different areas around the school and whether or not they think they would receive different results</li> <li>-Have one of each weather tool for each group and have them collect their own data in their own way and decide if their data or tools collected data differently.</li> </ul>
<b>Closure (Summary of Lesson)</b>	<p>At the end of the unit, have students discuss and clarify what they have learned about the weather tools. Have them write a paragraph (at least 5 sentences) about weather tools and how they are important to our lives. Also, have the students compare the data they found and discuss anything that they found to be important in their collection of data. Collect paragraphs as an additional assessment of knowledge of the content.</p>
<b>CEED Building Application/ Sensor Data</b>	<p>Display CEED website (<a href="http://ceed.frco.k12.va.us/">http://ceed.frco.k12.va.us/</a>) and click on Data Dashboard. You should view the "More Pictures" data for this age group. TSW use the website to compare temperatures, water temperatures, and whether or not the solar panels are generating electricity and why that is. TSW use the data on the website to compare what is going on at the CEED building as to what is going on at their particular school.</p>
<b>Assessment</b>	<p>Throughout the entirety of the unit, have the students go outside and track data. Assess learners in knowledge and understanding of the tools and their uses as the time progresses. Assist students where necessary to ensure they understand the material. The students will also write a paragraph during the closure portion of the lesson. Collect paragraphs about weather tools and the importance of these tools as an additional assessment of knowledge.</p>

### INQUIRY LEARNING RESEARCH PROCESS GUIDELINES

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## Instructional Activities

The following table is just one guideline to use for developing your own inquiry materials. The seven steps in the Learning Research Process include not only how people learn but also how research is conducted. The heart of the design, the three-stage learning cycle of exploration, concept invention or formation, and application is embedded in the middle. In addition to these three stages, this design takes into account that learners need to be motivated to spend the time required for understanding complex subjects and that learners need to build this new knowledge onto prior knowledge. These are similar to the 5E and 7E learning models.

### The Learning-Research Process

Steps in the Learning-Research Process	7E Equivalent	Component of the Activity
<b>1. Identify a need to learn.</b>	Engage	An issue that excites and interests is presented. An answer to the question <i>Why?</i> is given. Learning objectives and success criteria are defined.
<b>2. Connect to prior understandings.</b>	Elicit	A question or issue is raised, and student explanations or predictions are sought. Prerequisite material and understanding is identified.
<b>3. Explore</b>	Explore	A model or task is provided, and resource material is identified. Students explore the model or task in response to critical-thinking questions.
<b>4. Concept invention, introduction, and formation</b>	Explain	Critical-thinking questions lead to the identification of concepts, and understanding is developed.
<b>5. Practice applying knowledge.</b>		Skill exercises involved straightforward application of the knowledge.
<b>6. Apply knowledge in new contexts.</b>	Elaborate and Extend	Problems and extended problems require synthesis and transference of concepts.
<b>7. Reflect on the process</b>	Evaluate	Problem solutions and answers to questions are validated and integrated with concepts. Learning and performance are assess

Hanson, D. (2006). *POGIL Instructor’s Guide to Process-Oriented Guided-Inquiry Learning*. Lisle, IL: Pacific Crest