

**RAMP UP - HAB Lesson Plan**

<b>Title of Lesson:</b>	Investigating Data with Weather Balloons
<b>Grade Level:</b>	3rd Grade
<b>AL COS Standard:</b>	<p>SC15.3.13 - Display data graphically and in tables to describe typical weather conditions expected during a particular season (e.g., average temperature, precipitation, wind direction).</p> <p>MA19.3.18 - Tell and write time to the nearest minute; measure time intervals in minutes (within 90 minutes.) a. Solve real-world problems involving addition and subtraction of time intervals in minutes by representing the problem on a number line diagram.</p> <p>Alabama Technology Standard 8 - Use technology tools to organize, interpret, and display data. Examples: spreadsheets, databases, electronic graphing tools</p>
<b>NGSS:</b>	3-ESS2-1 - Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season
<b>Learning Targets/Objectives:</b>	<ul style="list-style-type: none"><li>● I can collect and graph data about the weather conditions over time.</li><li>● I can interpret data from graphs.</li><li>● I can solve problems involving elapsed time.</li></ul>

<p><b>Materials Needed:</b></p>	<ul style="list-style-type: none"> <li>● <b>Video</b> <ul style="list-style-type: none"> <li>○ Wheeler School Talk - Weather Tools &amp; Instruments: <a href="https://www.youtube.com/watch?v=72aqCxzviHQ">https://www.youtube.com/watch?v=72aqCxzviHQ</a></li> </ul> </li> <li>● <b>Worksheets</b> <ul style="list-style-type: none"> <li>○ Weather Data Collection Sheet – located on HAB Kit resources page on the RAMP UP website (linked at the bottom of this section)</li> <li>○ HAB Data Scavenger Hunt - located on HAB Kit resources page on the RAMP UP website (linked at the bottom of this section)</li> </ul> </li> <li>● <b>Website</b> <ul style="list-style-type: none"> <li>○ Weather.com</li> </ul> </li> <li>● <b>HAB RAMP UP Kit</b> <ul style="list-style-type: none"> <li>○ All materials needed for the HAB experiment are included in the kit.</li> </ul> </li> <li>● <b>Other</b> <ul style="list-style-type: none"> <li>○ Pencils</li> <li>○ Thermometer or other weather tools if you have them</li> </ul> </li> </ul> <p>Links to the video and worksheets can also be found on the HAB Kit Resources page <a href="https://uahrampup.org/hab/">https://uahrampup.org/hab/</a></p>
<p><b>Preparation:</b></p>	<ul style="list-style-type: none"> <li>● Fill out the Pre-Flight Checklist on the uahrampup.org website</li> <li>● Read through HABSAT launch guide and make sure you have all the included materials from the kit.</li> <li>● Launching the balloon requires an open field or space. It is also helpful to have at least one other adult to help with the launch.</li> <li>● HABSAT cannot be launched if there is any precipitation, so ensure weather conditions work for your launch.</li> </ul>

<p><b>Lesson Logistics:</b></p>	<ul style="list-style-type: none"> <li>● Whole group lesson</li> <li>● Students will have some independent work to complete.</li> <li>● Balloon to be launched in open field/area</li> <li>● 4-day lesson</li> </ul>
<p><b>Vocabulary Words:</b></p>	<ul style="list-style-type: none"> <li>● weather</li> <li>● HAB</li> <li>● temperature</li> <li>● altitude</li> </ul>
<p><b>Safety Considerations:</b></p>	<ul style="list-style-type: none"> <li>● The HAB is made of latex. Ensure that no one touching the HAB or the materials that were in the box with it are allergic to latex.</li> </ul>
<p><b>Engage:</b> <b>Day 1</b></p>	<p><b>Step 1:</b> Have students create their own KWL chart independently writing down everything they know or want to know about the weather. Prompt students by talking about what weather tools they know about, weather vocabulary, seasons, etc.</p> <p><b>Step 2:</b> Allow the students to share the things they put on their own KWL charts with the class to create a class chart to hang in your classroom throughout the 5-day lesson.</p> <p><b>Step 3:</b> Based on the amount of things students already know, fill in any basic weather information students may need to know. Show students the video, <i>Wheeler School Talk - Weather Tools &amp; Instruments</i>, that talks about different tools that meteorologists use to gather data about weather to report.</p> <p><b>Step 4:</b> Engage with students about which of the weather tools from the video they have interacted with before. Talk about using a thermometer or a rain gauge (<i>would be helpful to have these tools to show students</i>). Tell students that we will be using a HAB in order to collect data, just like meteorologists use.</p>

	<p><b>Step 5:</b> Give each student the Weather Data Collection sheet and view the weather on Weather.com. Fill in the information on their sheet together as a class today.</p>
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<p><b>Explore:</b> <b>Day 2</b></p>	<p><b>Step 1:</b> Have each student get out their Weather Data Collection sheet and complete it with a partner. Go over the data as a class to ensure everyone has the correct data.</p> <p><b>Step 2:</b> Ask students to review the tools that were talked about in the video yesterday, and remind them that the class will be launching a HAB that will collect weather data.</p> <p><b>Step 3:</b> Use the Balloon Launch Guide and materials to launch the HAB in an open field or area (all materials included in HAB kit).</p> <p><b>Step 4:</b> Come inside from launching the balloon and track the balloon with students, talking about how far the balloon is traveling (vocabulary: distance), how fast it is traveling (vocabulary: speed), and how high the balloon has gone (vocabulary: altitude). Notice the temperature the balloon is reading and talk with the class about comparing that to the temperature that they collected on their daily recording sheet.</p> <p><b>Step 5:</b> Send students home with the “How to Track Your Balloon” directions (included in HAB kit) and tell them they can track their balloon after school as well.</p>
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**Explain:**

**Day 3**

**Step 1:** Have students independently complete their weather data collection form. Discuss the answers as a class, ensuring that everyone has the same information.

**Step 2:** Talk with students to see if they are seeing any weather patterns. This would be a good time to talk about the season and have them make connections, like wearing jackets in winter, starting to get warmer in spring, etc. Ask students if anything about the weather data is surprising to them so far.

**Step 3:** Discuss the HAB launch with students and ask if anyone watched at home. Show students the map and track the path that the balloon traveled. Have students make predictions about why they think the temperature changed throughout the balloon's flight. Explain the connection between altitude and temperature with students.

**Step 4:** Create an elapsed time challenge question for students. Using the information from the HAB's flight (instructions included in HAB kit), give students the HAB's flight launch time and the landing time. Students will work independently to find the amount of time that the balloon was in flight. Have students submit their answers.

<p><b>Extend:</b> <b>Day 4</b></p>	<p><b>Step 1:</b> Have students independently complete their weather data collection form. Discuss the answers as a class ensuring that everyone has the same information.</p> <p><b>Step 2:</b> Tell students that they are going to choose 2 of the following data sets (temperature, high, low, humidity) and create bar graphs for each day.</p> <p><b>Step 3:</b> After students complete their graph, tell them they will be acting as meteorologists by predicting the next day's weather. They will complete their weather prediction for the following day using the data they have collected from the week. Remind them of the video they watched the first day about the HAB being a tool that meteorologists use.</p> <p><b>Step 4:</b> Review the elapsed time challenge problem and solution. Recognize the students who got it right or got the closest.</p> <p><b>Step 5:</b> Introduce students to the data graphed from the HAB (instructions included in HAB kit). Show them how to navigate the website. Allow students to work in partners to complete the HAB Data Scavenger Hunt worksheet.</p>
<p><b>Evaluation:</b></p>	<p><b>Step 1:</b> Revisit the KWL chart allowing students to add to the L column as a class. Have them write down at least one thing on their personal KWL chart that they learned.</p> <p>Teacher can use KWL chart, as well as other student products to evaluate students' understanding of weather, elapsed time, and reading graphs.</p>