

WEATHER, CLIMATE, & NATURAL HAZARDS (3.ES.NGSS)

UNIT AT A GLANCE

ACTIVITY 1 - Weather Trackers

QUESTIONS: How can two different areas have different weather conditions?
How can we collect weather data for our area?
What tools can we use to measure weather conditions?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity 1: Lesson 1A: 55–60 min. Lesson 1B: 75–80 min. Lesson 1C: 55–60 min., 2 classes	Weather conditions vary in different regions. Weather observations: weather changes throughout the day and from day to day.	<ul style="list-style-type: none"> Analyze weather data from a different region and compare data with own region. Raise questions about weather and how it varies. Make weather observations. Begin long-term weather data collection.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Interpret weather data. Determine what different weather instruments measure. Organize data on a chart and log. 	Obtaining, Evaluating, and Communicating Information Analyzing and Interpreting Data Plan and Carry Out Investigations Patterns	PE at Lesson Level Determine that weather conditions vary across the country and around the world. Organize and record weather data over a period of time. Formative Assessment Science Talk Journal Entries Activity Pages

ACTIVITY 2 - Air is All Around

QUESTIONS: What are we measuring when we place a thermometer in the schoolyard?
How does temperature change throughout the day and over a period of several weeks?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity 2: Lesson 2A: 45–50 min., 2 classes Lesson 2B: 55 min., 2 classes Lesson 2C: 50–55 min., 2 classes Lesson 2D: 50–55 min., 2 classes	The temperature changes throughout the day. The temperature varies from place to place. The temperature at the beach or shore is cooler than the temperature inland.	<ul style="list-style-type: none"> Use thermometers to investigate changes in temperature throughout the day and in different locations. Investigate how air is all around. Use models to explain the sun's uneven heating of Earth.

ACTIVITY 2 - Air is All Around - Continued

Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Obtain and evaluate information about air. Investigate how the temperature differs from place to place (shade vs. sun) and at different times of the day (morning, afternoon, evening). Investigate how different materials (land and water) absorb heat at different rates. Make sense of data from investigations. 	<p>Plan and Carry Out Investigations</p> <p>Asking Questions</p> <p>Developing and Using Models</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Patterns</p> <p>Cause and Effect</p>	<p>PE at Lesson Level</p> <p>Develop and use a model to determine the heating effects of the sun on land and water.</p> <p>Determine how lighter warm air and heavier cool air affect the changes in temperature from place to place.</p> <p>Formative Assessment Activity Pages</p> <p>Summative Assessment Science Talk Journal Entries</p>

ACTIVITY 3 - Air Has Pressure, Too!

QUESTIONS: What is air pressure and how does it affect weather?
How can patterns in changes in air pressure be used to in weather forecasting?

Time to Complete	Phenomena	Summary: Students Will...
<p>Preparation: 20 minutes</p> <p>Activity 3:</p> <ul style="list-style-type: none"> Lesson 3A: 50 min., 2 classes Lesson 3B: 50 min., 2 classes 	<p>Pressure is greater at the bottom of a container than at the top of a container.</p> <p>Air pressure is greater at sea level than at high altitudes.</p>	<ul style="list-style-type: none"> Use a model to determine that air pressure is greater at lower altitudes. Use a barometer to collect air pressure data over a period of time. Build a model of an aneroid barometer.
<p>Students Figure Out How To:</p> <ul style="list-style-type: none"> Use a model of water under pressure to relate to air pressure. Use patterns in data to forecast changes in weather. Use step-by-step directions to build a prototype. 	<p>Construct Explanations and Design Solutions</p> <p>Developing and Using Models</p> <p>Patterns</p> <p>Cause and Effect</p>	<p>Performance Expectations (PE) at Lesson Level and Assessment</p> <p>PE at Lesson Level</p> <p>Use a model to construct an explanation of air pressure.</p> <p>Determine how to use data from daily observations of barometric pressure to forecast changes in weather.</p> <p>Formative Assessment Activity Page Journal Entry (3A)</p> <p>Summative Assessment Science Talk Journal Entries</p>

ACTIVITY 4 - When the Air Moves

QUESTIONS: What patterns can we find in wind observation data to predict future weather conditions?
What is the effect of wind speed and direction on other weather conditions?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 minutes Activity 4: Lesson 4A: 45–50 min., 2 classes Lesson 4B: 45–50 min., 3 classes	The speed and direction of the wind varies from place to place and throughout the day.	<ul style="list-style-type: none"> Make observations of the speed and direction of the wind at various locations on the schoolyard. Be introduced to a design challenge to find the best wind speed and direction for launching a kite.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Design and build an anemometer. Use patterns in wind direction to forecast future weather conditions. 	Analyzing and Interpreting Data Asking Questions and Defining Problems Developing and Using Models Patterns Cause and Effect	<p>PE at Lesson Level</p> Analyze and interpret patterns in data to determine if the direction and speed of the wind can be used to predict future weather conditions. <p>Formative Assessment</p> Activity Pages Science Talk (4A) <p>Summative Assessment</p> Anemometer model Science Talk Journal Entries

ACTIVITY 5 - Clouds

QUESTIONS: What is the effect of cloud cover on temperature?
How can we find out how clouds form and produce rain?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 20 min. Activity 5: Lesson 5A: 55–60 min., 2 classes Lesson 5B: 50–55 min., 2 classes Lesson 5C: 50 min., 2 classes 3–4 days of observations	Water in a puddle disappears. Clouds move across the sky. Clouds change shape. Clouds can form near the ground (fog).	<ul style="list-style-type: none"> Investigate what happens to the water in a puddle. Make cloud observations. Analyze data to determine that water in a puddle evaporates. Obtain information about clouds using text.

ACTIVITY 5 - Clouds - Continued

Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Use cloud types to forecast changes in weather. Develop a model to show where water goes when it evaporates and how clouds form. 	<p>Constructing Explanations and Designing Solutions</p> <p>Developing and Using Models</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Planning and Carrying Out Investigations</p> <p>Cause and Effect</p>	<p>PE at Lesson Level</p> <p>Carry out an investigation to determine where the water in a puddle goes after it rains.</p> <p>Develop a model to demonstrate how clouds form and how it rains.</p> <p>Formative Assessment</p> <p>Activity Page Science Talk <i>Rain Maker Observation Log</i> Class Discussion</p> <p>Summative Assessment</p> <p>Journal Entry Video Narration/Science Talk</p>

ACTIVITY 6 - It's Raining! It's Pouring!

QUESTIONS: What is the effect of cloud cover on precipitation?
How can we find out how much rain or snow has fallen in different areas?

Time to Complete	Phenomena	Summary: Students Will...
<p>Preparation: 10 min.</p> <p>Activity 6:</p> <p style="margin-left: 20px;">Lesson 6A: 50–60 min., 2 classes</p> <p style="margin-left: 20px;">Lesson 6B: 50–60 min., 2 classes</p> <p style="margin-left: 20px;">Lesson 6C: 50–60 min., 2 classes</p>	<p style="color: purple;">Rain falls from the clouds in the sky.</p> <p style="color: purple;">Precipitation comes in different forms.</p>	<ul style="list-style-type: none"> Make and record observations of precipitation. Collect data on precipitation amounts. Observe a model of how freezing rain occurs. Obtain information to determine how rain, snow, sleet, and freezing rain occur. Obtain information from text to describe how there are different climates on Earth.
<p>Students Figure Out How To:</p> <ul style="list-style-type: none"> Use a radar weather map to determine where it is raining and where it might rain next. Develop a model to explain how rain, snow, sleet, and freezing rain occur. Determine the climate of a certain location. 	<p>Obtaining, Evaluating, and Communicating Information</p> <p>Developing and Using Models</p> <p>Engaging in Argument from Evidence</p> <p>Cause and Effect</p>	<p>Performance Expectations (PE) at Lesson Level and Assessment</p> <p>PE at Lesson Level</p> <p>Obtain information using text and models about different forms of precipitation.</p> <p>Formative Assessment</p> <p>Rain gauge models Science Talk Activity Page</p> <p>Summative Assessment</p> <p>Journal Entries Science Talk</p>

ACTIVITY 7 - Wild Weather

QUESTIONS: How does severe weather affect humans, and what precautions can be taken to prepare for severe weather hazards?

Time to Complete	Phenomena	Summary: Students Will...
Preparation: 15 min. Activity 7: Lesson 7A: 65–75 min. Lesson 7B: 50 min., 2 classes Lesson 7C: 50 min., 2 classes Added building and presenting time	Destruction from Hurricane Katrina. Children’s accounts of destruction of Hurricane Katrina	<ul style="list-style-type: none"> • Obtain information about the destruction of Hurricane Katrina from video and text. • Brainstorm ideas of how to prepare for severe weather. • Develop and test a model of a house to withstand the wind and water destruction of a severe storm.
Students Figure Out How To:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> • Develop and test a model of a house to withstand the wind and water destruction of a severe storm. • Obtain information about different severe weather events. • Develop a public service announcement to convince people to take precautions to reduce the impact of severe weather events. 	<ul style="list-style-type: none"> Obtaining, Evaluating, and Communicating Information Developing and Using Models Engaging in Argument from Evidence Constructing Explanations and Designing Solutions Cause and Effect 	<p>PE at Lesson Level</p> <p>Obtain information using video, text, and models to determine the impact of severe weather events. Use information to develop a model to reduce the impact of severe weather events.</p> <p>Summative Assessment</p> <p>Respond to text Student models Activity page Student presentations Public service announcements Science talk</p>