

Unit Overview	
Content Area: Earth and Space Science	
Unit Title: Weather and Climate	Unit: 3
Target Course/Grade Level: 3	Timeline: 30 Days
<p>Unit Summary:</p> <p>In this unit of study, students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards. The crosscutting concepts of <i>patterns, cause and effect</i>, and the <i>influence of engineering, technology, and science on society and the natural world</i> are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in <i>asking questions and defining problems, analyzing and interpreting data, engaging in argument from evidence, and obtaining, evaluating, and communicating information</i>. Students are also expected to use these practices to demonstrate an understanding of the core ideas.</p> <p>This unit is based on 3-ESS2-1, 3-ESS2-2, 3-ESS3-1, and 3-5-ETS1-1.</p>	
Learning Targets	
NJSLS-Science	
ESS2.D	Develop a model using an analogy, to describe how weather and climate are related.
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
Disciplinary Core Ideas	
SS2.D: Weather and Climate	

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1)
(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

Science and Engineering Practices

Planning and Carrying Out Investigations

- Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (2-LS2-1)

Analyzing and Interpreting Data

- Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Engaging in Argument from Evidence

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

NJSLS Connections

Primary Interdisciplinary Connections:

English Language Arts/Literacy:

- Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. RI.3.1
- Compare and contrast the most important points and key details presented in

two texts on the same topic. RI.3.9

- Write opinion pieces on topics or texts, supporting a point of view with reasons. W.3.1
- Conduct short research projects that build knowledge about a topic. W.3.7
- Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. W.3.9

Mathematics:

- Reason abstractly and quantitatively. MP.2
- Model with mathematics. MP.4
- Use appropriate tools strategically. MP.5
- Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. 3.MD.A.2
- Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in bar graphs. 3.MD.B.3

Unit Essential Questions

Unit Understandings

Unit Learning Targets (Outcomes) – Formative Assessment

Students who understand the concepts are able to ...

- Make predictions using patterns of change.
- Represent data in tables, bar graphs, and pictographs to reveal patterns that indicate relationships.
- Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. *(Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.)* Examples of data could include:

Average temperature

Precipitation

Wind direction

· Obtain and combine information from books and other reliable media to explain phenomena.

Cross Cutting Concepts:

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Integration of Technology: Interactive Whiteboard, Videos

Technology Resources:

Opportunities for Differentiation: Differentiation and support tips, which includes suggestions for ELL, struggling students, and accelerated students, are available below the instructional practice section of each model lesson.

Teacher Notes:

Career Ready Practices: *In this unit the following career ready practices are addressed*

CRP1: Act as a reasonable and contributing citizen and employee

CRP2: Apply appropriate academic and technical skills

CRP3: Attend to personal health and financial well-being

CRP4: Communicate clearly and effectively and with reason

CRP5: Consider the environmental, social and economic impacts of decisions
 CRP6: Demonstrate creativity and innovation
 CRP7: Employ valid and reliable research strategies
 CRP8: Utilize critical thinking to make sense of problems and persevere in solving them
 CRP9: Model integrity, ethical leadership and effective management
 CRP10: Plan education and career paths aligned to personal goals
 CRP11: Use technology to enhance productivity
 CRP12: Work productively in teams while using cultural global competence

Prior Learning- by the end of Grade __ , students understand that:

Kindergarten Unit 3: Weather

- 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.
- Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.
- Asking questions, making observations, and gathering information are helpful in thinking about problems

Evidence of Learning

Summative Assessment

End of Unit Earth Science Assessment
 Project Based Learning: Biomes travel brochure project
 Project Based Learning: Hurricane House Planning and Construction

Equipment needed: Whiteboard, laptops, headphones, and hands-on materials for lessons

Teacher Instructional Resources (Hyperlinks):

Modifications for ELL’s, Special Education, 504, and Gifted and Talented Students:

(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)

- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).

- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles
(http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

<u>ACTIVITIES</u>	<u>MATERIALS</u>
<p>1.1: What is Weather? Session 1: What are the ingredients of weather?</p> <p>Session Goal: Identify and describe components of weather (temperature, precipitation, air pressure, wind, and humidity).</p>	<ul style="list-style-type: none"> ● Activity Sheet 1: Weather or not ● Weather Watchers Journal ● Chart paper / whiteboard
<p>1.1: What is Weather? Session 2: How is weather measured?</p> <p>Session Goal: Learn how to collect weather data.</p>	<ul style="list-style-type: none"> ● Activity sheet 2: How to use a thermometer ● Thermometer (F and C) ● Plastic Cup ● Cold Water ● Activity Sheet 3: Measuring Weather
<p>1.1: What is Weather? Session 3: How can we create working models of weather instruments?</p> <p>Session Goal: Build and test working models of weather instruments.</p>	<ul style="list-style-type: none"> ● Activity sheet 4: Weather Instruments ● For Anemometer: paper cups, straws, pins, pencils ● For Rain Gauge: liter bottles, ruler, rubber bands ● For Barometer: straw, ruler, cardboard, tape
<p>1.1: What is Weather? Session 4: How does the water cycle affect weather?</p> <p>Session Goal: Describe the relationship between the water cycle and weather.</p>	<ul style="list-style-type: none"> ● Activity sheet 5: Water Cycle ● Activity Sheet 6: Rain in a bag

	<ul style="list-style-type: none"> • Plastic zipper bags, food coloring, water, measuring cup, clear tape
<p>1.1: What is Weather? Session 5: What role do clouds play in weather?</p> <p>Session Goal: Match cloud formations with weather conditions.</p>	<ul style="list-style-type: none"> • Activity Sheet 7: Clouds • Activity Sheet 8: Cloud Model • Construction paper, cotton balls, glue
<p>1.1: What is Weather? Session 6: How do meteorologists forecast the weather?</p> <p>Session Goal: Describe the interdependent components of weather in forecasting.</p>	<ul style="list-style-type: none"> • Activity Sheet 9: Forecasting Weather
<p>1.1: What is Weather? Session 7: What data have we gathered about our local weather?</p> <p>Session Goal: Discuss collected weather data and possible improvements for the future.</p>	<ul style="list-style-type: none"> • Weather Watchers Journal • Activity Sheet 10: Gathering Weather Data • Activity Sheet 11: I Have Who Has Cards
<p>1.2: Climate and Biomes Session 1: What is climate?</p> <p>Session Goal: Explain the connection between Earth's orbit and seasons in temperate zones. Identify and describe general characteristics of polar, tropical, and temperate climate zones.</p>	<ul style="list-style-type: none"> • Activity Sheet 1: Climate and Seasons • Flashlight • Markers
<p>1.2: Climate and Biomes Session 2: What are Earth's Biomes?</p> <p>Session Goal: Understand the concept of biome and make comparisons between biomes in each climate zone.</p>	<ul style="list-style-type: none"> • Activity Sheet 2: Earth's Biomes
<p>1.2: Climate and Biomes Session 3+ : Biome Tourism Project</p> <p>Session Goal: Research about climate zones and biomes. Research animals living in extreme conditions.</p>	<ul style="list-style-type: none"> • Activity Sheet 3: Biome Travel and Tourism • Activity Sheet 4: Biome Detail Outline

<p>1.3: Extreme Weather Session 1: What are tornadoes?</p> <p>Session Goal: Identify and describe general characteristics of tornadoes. Understand the damage that tornadoes may cause.</p>	<ul style="list-style-type: none"> • Activity Sheet 1: What's in your head? • Activity Sheet 2: Thunderstorms and Tornadoes • Egg in a bottle demo: glass bottle, hard boiled egg • Tornado tube: food coloring, 2 empty 1-liter bottles
<p>1.3: Extreme Weather Session 2: What are hurricanes?</p> <p>Session Goal: Identify and describe general characteristics of hurricanes. Understand the damage that hurricanes may cause.</p>	<ul style="list-style-type: none"> • Activity Sheet 3: Hurricanes
<p>1.3: Extreme Weather Session 3: What are winter storms?</p> <p>Session Goal: Identify and describe the general characteristics of winter storms. Understand the damage that winter storms may cause.</p>	<ul style="list-style-type: none"> • Activity Sheet 4: Winter Storms
<p>1.4: Hurricane House Session 1: What damage can extreme weather do to our homes?</p> <p>Session Goal: Identify hazards to property associated with extreme weather conditions. Understand the basic engineering design process.</p>	<ul style="list-style-type: none"> • Hurricane House Design Journal: Design Challenge Task, Introduction, Background • Engineering Design Process Poster
<p>1.4: Hurricane House Session 2: How can the shape of a house prevent wind damage?</p> <p>Session Goal: Understand the basic engineering design process. Design, build and test a model of a house capable of withstanding extreme weather.</p>	<ul style="list-style-type: none"> • Hurricane House Design Journal: Problem/Solution details, Make a plan/shape • Storm-proofing your house • Geo-Solid Blocks • Blower • Measuring Stick
<p>1.4: Hurricane House Session 3-4+: How do we build a hurricane-resistant house?</p> <p>Session Goal: Design, and build a model of a house capable of withstanding extreme weather.</p>	<ul style="list-style-type: none"> • Hurricane House Design Journal: Construction planning, suggested construction procedure, Our house design, Construction notes

	<ul style="list-style-type: none"> • Hurricane House Kit
<p>1.4: Hurricane House Session 5: How does our house design stand up to the force of wind?</p> <p>Session Goal: Test the Hurricane House Project</p>	<ul style="list-style-type: none"> • Hurricane House Design Journal: Danger: Hurricane Warning!, Hurricane House Evaluation Form • Student prepared hurricane houses • Blower
<p>1.4: Hurricane House Session 6: How did we do?</p> <p>Session Goal: Discuss and review Hurricane House Project</p>	<ul style="list-style-type: none"> • Hurricane House Design Journal: Design Team Reflection Form • Student prepared hurricane houses
<p>1.4: Hurricane House Session 7+: Revise and retest</p> <p>Session Goal: Redesign, build and test a model of a house capable of withstanding extreme weather</p>	<ul style="list-style-type: none"> • Student prepared hurricane houses • Additional hurricane house materials • Blower