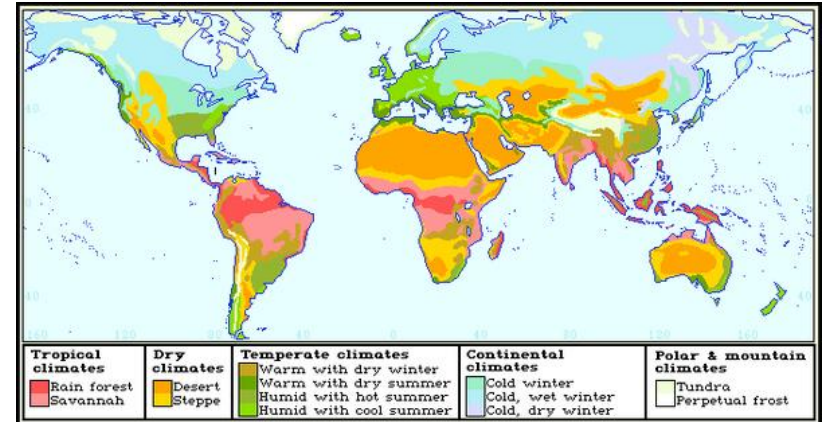




Weather and Climate

Unit Planning Team:

Deidre Sterner (FT), Nicole Harr (ET), Katy Engle (NS),
Dawn Buchanan (WS/BV), Brooke Bradley (LW/JD)





What is the typical weather in different parts of the world? How does this change throughout the year?

How can the impact of weather-related hazards be reduced?

Weather and Climate	
Students who demonstrate understanding can:	
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]
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.* [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]
The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :	

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. <ul style="list-style-type: none"> 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 Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). <ul style="list-style-type: none"> 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 Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. <ul style="list-style-type: none"> Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2) 	ESS2.D: Weather and Climate <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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) 	Patterns <ul style="list-style-type: none"> Patterns of change can be used to make predictions. (3-ESS2-1, 3-ESS2-2) Cause and Effect <ul style="list-style-type: none"> Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1) <hr/> Connections to Engineering, Technology, and Applications of Science Influence of Engineering, Technology, and Science on Society and the Natural World <ul style="list-style-type: none"> 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) <hr/> Connections to Nature of Science Science is a Human Endeavor <ul style="list-style-type: none"> Science affects everyday life. (3-ESS3-1)

Weather and Climate

Background knowledge videos:

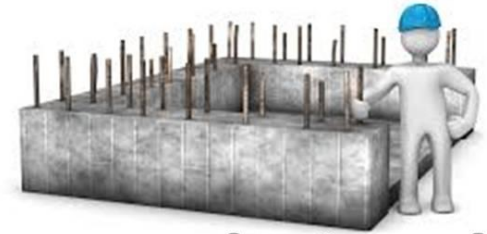
[ESS2D - Weather & Climate](#)

[ESS3B - Natural Hazards](#)

These videos are designed to assist in providing background knowledge with the associated DCI. The information in the videos follows the progression through high school.

Prior to 3rd grade, students should have knowledge, understanding of, and experiences with the following ideas:

- ★ Sunlight warms Earth's surface.
- ★ 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.



Foundational Knowledge

With the implementation of new standards, students may not have had opportunities to engage in these foundational understandings and ideas before 3rd grade. You may need to provide opportunities for students to experience these ideas as you move forward.

What is the typical weather in different parts of the world?
How does this change throughout the year?

How can the impact of weather-related hazards be reduced?



Big Ideas

- ★ Scientists record patterns of the weather across different times and areas so they can make predictions about what kind of weather might happen next.
- ★ Climate describes a range of an area's typical weather conditions and the extent to which these conditions vary over years.
- ★ A variety of natural hazards result from natural processes.
- ★ Humans cannot eliminate natural hazards but can take steps to reduce their impacts.
- ★ Claims can be made about the merit of a solution to a problem, citing relevant evidence from a variety of sources.



Weather and Climate

Students who demonstrate understanding can:

3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction. Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.

3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.

Clarifications:

- This provides a great opportunity to build connections with data tables and displays that students might encounter in ACT Aspire.

Disciplinary Core Ideas

ESS2.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)

Identify and
CLARIFY the
STANDARDS

Weather and Climate

Students who demonstrate understanding can:

3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*

Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.



Disciplinary Core Ideas

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)

Clarifications:

- Students will need prior experiences with natural hazards before making claims about the merit of a design solution

Identify and
CLARIFY the
STANDARDS

EARTH AND SPACE SCIENCE



UNIT: Weather

[View Unit](#)

CONCEPT:

[About Weather](#)

[Weather Data](#)

[Protection from Severe Weather](#)



UNIT: Climate

[View Unit](#)

CONCEPT:

[About Climate](#)

[Types of Climates](#)

Gather and
study the
RESOURCES

Discovery Education
Science Techbook Units



Week	Performance Expectation/DCI	Resource
<p style="text-align: center; font-size: 2em; font-weight: bold;">1</p> <p style="text-align: center;">Building Background Knowledge</p> <p style="text-align: center; color: red; font-weight: bold;">Day 1</p>	<p><u>Foundational Knowledge prior to 3rd grade</u> (this is covered in kindergarten with the NGSS. In order to build missing background knowledge you may need to review these concepts):</p> <ul style="list-style-type: none"> • Sunlight warms Earth's surface. • 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. 	<p>Pass out KLEWS chart and ask students the guiding questions in order to determine misconceptions.</p> <p>KLEWS Chart Using a KLEWS Chart Example KLEWS Chart</p> <ul style="list-style-type: none"> • What is weather? • What are the types of precipitation? • What causes weather to change? • What is the difference between the types of precipitation? <p>Make a large KLEWS chart for the whole class to record on. Watch Weather from Discovery Education and discuss with class.</p> <p>What is weather? What are the types of precipitation? What causes weather to change? What is the difference between the types of precipitation?</p> <p><i>Continued on next slide...</i></p>



Week	Performance Expectation/ DCI	Resource
<div data-bbox="92 405 123 459">1</div> <div data-bbox="40 628 181 732">Days 2-5 About the Weather</div>	<p>3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p> <p>Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.</p> <p>Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.</p>	<p>About Weather: DE Model Lessons Engage: Video: Today's Weather</p> <p>Exploration 1: About Weather Interactive Lab: Students explore conditions of the atmosphere (temperature, pressure, humidity, and wind) *Note: read Teacher's Guide*</p> <p>Exploration 2: Allow students to watch the interactive glossary page for weather video, animation, and to look at the images and record what they have found in their notebooks.</p> <p>Explore 3: Weather Smart: Heat, Wind, and Pressure and have students draw a diagram in their notebooks of how the three interact.</p> <p>Explain: Have students write down what they think affects the weather based on the above explore sessions in their notebooks. [Refer to guiding questions Model Lesson 1: Session 1]</p> <p>Elaborate: Teacher Guide: What Shall We Do Tomorrow? What Shall We Do Tomorrow? Interactive Lab Student Recording Sheet: What Shall We Do Tomorrow?</p> <p>Explain: After the Explore 3, have students interpret and analyze their data and describe any patterns they see and why these patterns are occurring based on the weather they tested.</p> <p>Evaluate: Constructed Response: About Weather</p>



Week	Performance Expectation/DCI	Resource
<div data-bbox="112 430 150 481">2</div> <div data-bbox="59 571 204 648">Weather Data</div> <div data-bbox="65 749 195 781">PART 1</div>	<p>3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction. Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change</p> <p>Teacher Background:</p> <p>Weather is the state of the atmosphere at one time and place, and can include precipitation, temperature, air pressure, and wind speed.</p> <p>Climate is the average weather at a location over many years. Climate includes temperature, rainfall, and winds.</p>	<p><u>Weather Data: DE Model Lessons</u> Guiding Questions: What tools do meteorologists use to collect weather data? What does each tool measure? How can data be presented so that it describes typical weather conditions?</p> <p>Engage: Video: <u>Tornado Destruction</u> ask students why they think forecasting the weather is important. How would graphing data go with forecasting? Video: <u>The Importance of Weather Forecasting</u> to give purpose to graphing weather data.</p> <p>Explore1: Go to Board and Watch Videos: <u>Types of Tools Used to Measure Weather</u></p> <p>Use the <u>Weather Instrument Cards</u> and play a whole group game (choose your own strategy) and then students will cut their own out and glue them in their notebook.</p> <p>Exploration 2: <u>Weather Data Game</u></p> <p>Exploration 3: Video: <u>Comparing Weather Data Charts</u></p> <p>Exploration 4: Video : <u>Weather Graphs</u> <i>Continued on next slide...</i></p>

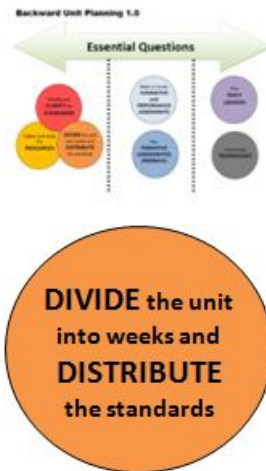


DIVIDE the unit
into weeks and
DISTRIBUTE
the standards

Week	Performance Expectation/DCI	Resource
<div data-bbox="112 401 150 456">2</div> <div data-bbox="57 543 202 625">Weather Data</div> <div data-bbox="63 720 197 756">PART 2</div>	<p>3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction. Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change</p> <p>Teacher Background:</p> <p>Weather is the state of the atmosphere at one time and place, and can include precipitation, temperature, air pressure, and wind speed.</p> <p>Climate is the average weather at a location over many years. Climate includes temperature, rainfall, and winds.</p>	<p>Explain: The students will take and record precipitation and temperature data daily. Rogers Precipitation Recording Sheet Rogers Temperature Recording Sheet</p> <p>Students and teachers will work together to make a claim and collect evidence about future weather based on current data collected.</p> <p>*Extension- students can research one place they would like to take and record daily precipitation and temperature data.* Precipitation Recording Sheet Temperature Recording Sheet</p> <p>Elaborate: Students will analyze their data to see patterns and record their information on page 3 of Hands-On Activity Analysis and Conclusion.</p> <p>Evaluate: Watch Video and Have Students Create a Constructed Response Using the DE Writing Prompt</p> <p>Constructed Response Weather Tools</p>



Week	Performance Expectation/ DCI	Resource
<p style="text-align: center; font-size: 2em; font-weight: bold;">3</p> <p style="text-align: center;">Weather Data continued</p> <p style="text-align: center;">Protection from Severe Weather</p>	<p>3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p> <p>Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.</p> <p>Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs.</p> <p>Assessment does not include climate change.</p> <p>Weather and Climate Activities/stations Board from DE could be used throughout the unit</p>	<p>Protection From Severe Weather: DE Model Lessons</p> <p>Engage: Storms on the Plains Activate Prior Knowledge and Create a Chart (see lesson)</p> <p>Explore 1: Explore the different types of severe weather and safety procedures using each <i>BrainPop</i> video below:</p> <p>Natural Disasters Flooding Tornado Hurricane Thunderstorm</p> <p>Explain: How do safety actions protect people in different kinds of severe weather? Complete Session 6 and 7</p> <p>Elaborate: Protection from Severe Weather, Map a Safety Plan with Rubric</p> <p>Evaluate: Assessment Probe: Weather Predictors Science Assessment Probes Page Intranet Password Protected</p>



Week	Performance Expectation/ DCI	Resource
<p style="text-align: center; font-size: 2em;">4</p> <p>About Climate</p>	<p>3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.</p>	<p><u>About Climate: DE Model Lessons</u></p> <p>Engage: <u>Video: What is Climate?</u> <u>Video: Weather and Climate</u> Create a KLEWS chart on climate (similar to the weather chart) You can also have students glue this chart into their interactive notebooks.</p> <p>Explore 1: <u>Read Interactive Text: What is Climate?</u> Go through <u>DE About Climate Session 3</u> of Model Lesson step by step.</p> <p>Explore 2: Read Interactive Text: <u>How Does the Water Cycle Affect Climate?</u> Watch Video: <u>Summary: The Sun, Water Cycle, and Climate.</u></p> <p>Explore 3: <u>Read Interactive Text: How Do Other Factors Affect Climate of a Region</u> Right after, have students explore the <u>Interactive Lab: About Climate</u> and fill out the <u>Student Guide Level 1</u></p> <p>Explain/Evaluate: Assessment Probes: Coldest Winter Ever & Are They Talking About Climate or Weather? <u>Science Assessment Probes Page</u> Intranet Password Protected <u>DE About Climate Unit Assessment</u></p> <p>We will be elaborating during the next session of climate entitled “Types of Climate: DE Model Lesson” next week.</p>



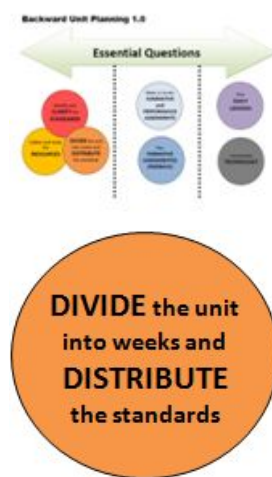
Week	Performance Expectation/ DCI	Resource
<p>5</p> <p>Weather Data continued</p> <p>Types of Climate</p> <p>PART 1</p>	<p>3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.</p>	<p><u>Types of Climate: DE Model Lessons</u></p> <p><u>Engage:</u> Option 1: Video: Global Climate Zones Option 2: Elementary Video Adventures Weather and Climate</p> <p><u>Explore: Options...</u> Climate Postcards Activity Part 2 - Grandma's Postcards World Climates Reading Passage</p> <p><u>Explain/Elaborate:</u> Assign students to a type of climate (you can choose individual, partner groups, or larger groups, depending on your class) Types of climates:</p> <ul style="list-style-type: none"> • Tropical • Temperate • Polar • Dessert <p>Climate Region Research Project Student Research Organizer Student groups will research a climate region and then create a presentation project on their information.</p> <p>*This will take multiple days because students will be researching on their own. *This can tie into writing, reading, and research standards!</p> <p><i>Continued on next slide...</i></p>



Week	Performance Expectation/ DCI	Resource
<p>5</p> <p>Weather Data continued</p> <p>Types of Climate</p> <p>PART 2</p>	<p>3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.</p>	<p><u>Explain/Elaborate continued:</u></p> <p>Students will then present on their climate type in front of the class using a board or poster.</p> <p>Students who are listening will use the <u>Types of Climate Matrix</u> to take notes while students are presenting.</p> <p>Summarize student learning together.</p> <p><u>Evaluate:</u></p> <p><u>Weather and Climate Assessment</u></p>



Week	Performance Expectation/ DCI	Resource
<p data-bbox="164 163 202 218">6</p> <p data-bbox="48 305 318 393">Creating Design Solution</p>	<p data-bbox="347 158 792 289">3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*</p> <p data-bbox="347 300 792 475">Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.</p>	<p data-bbox="1052 158 1371 185"><u>STEM Design Challenge</u></p> <p data-bbox="859 256 1574 311">This design challenge will incorporate everything learned on climate.</p> <p data-bbox="956 382 1468 409">Discovery Education: Create a Dog House</p>



Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

About Weather

Constructed Response: About Weather

[PDF Version](#) [Teacher's Guide](#)

Constructed Response: About Weather

About Weather



1. Weather is important in our daily lives. We listen to weather reports on the radio, watch them on television, and read about the weather in the newspaper, but what is weather? Explain what weather is and name at least two conditions included in a weather report.

2. How does the sun affect the wind? Explain your answer.

Assessments from Science Techbook Unit Concept:

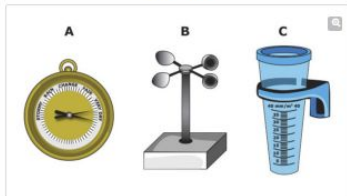


Constructed Response: Weather Data

[PDF Version](#) [Teacher's Guide](#)

Weather Data 1 Weather Data 2 Weather Data 3

Weather Data



1. Look at each of the images above. Write the name of the instrument. Describe in your own words what each instrument is used for.

A

B

C

Weather Data

Writing Prompt

What's the Weather?

[Copy/Edit Writing Prompt](#)



Get the Message: A Weather Report (Video Segment)



Brief Constructed Response: Weather Data: Weather Map (Constructed Response)

1. View the video segment about weather symbols. Then look at the table on the Brief Constructed Response.
2. Construct a weather map placing the weather condition symbols and temperatures in their correct locations.

Answer the following question: Which location is having both warm and wet weather? Use data from the map to support your choice.

Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

Assessments from Science Techbook Unit Concept:



Protection from Severe Weather

Protection from Severe Weather

Constructed Response: Protection from Severe Weather

PDF Version Teacher's Guide

Constructed Response: Protection from Severe Weather

Protection from Severe Weather 2

Protection from Severe Weather

Describe 3 types of severe weather and list at least one way to stay safe during each of them.

Save

Submit

About Climate

About Climate

Constructed Response: About Climate

PDF Version Teacher's Guide

Constructed Response: About Climate

About Climate



City	Average January Temperature	Average July Temperature
St. Louis, MO	-6°C	23°C
San Francisco, CA	9°C	17°C

1. St. Louis, Missouri and San Francisco, California are two U.S. cities located at about the same latitude. The table lists the average temperature in January and July for the two cities. What comparison can you make about the climates of St. Louis and San Francisco in January and in July? Does the location of the two cities affect their climate? Explain your answer.

2. Are weather and climate the same? Explain your answer.

Save

Submit

Constructed Response: About Climate: Skiing Trip

PDF Version Teacher's Guide

Constructed Response: About Climate: Skiing Trip

Skiing Trip



Baron's family lives in Washington, DC. In September, they start planning a ski vacation in the mountains outside of Denver, Colorado. They plan to go in January. Baron's older brother Jordan just visited about the trip. He saw that there won't be any snow in Colorado and it will be a wasted trip. When Baron asks his brother to explain why, Jordan says, "Look at a map! Washington, D.C. and Denver are near the same latitude. Therefore they must have the same climate. It is 70 degrees outside right now. There is no snow when it is 70 degrees outside!"

1. Analyze, evaluate, and critique Jordan's explanation for why he thinks there won't be any snow in Colorado in January.
 - a. Why does Jordan think that there won't be snow in Colorado in January?
 - b. What parts about his explanation are correct?
 - c. What parts about his explanation are incorrect?
 - d. What is Jordan not thinking about?
2. Even if the climate in the mountains of Colorado and in Washington DC were the same, should he expect it to be 70 degrees in Colorado in January? Why or why not?
3. Would the mountains of Colorado be a good place to go skiing in January? Explain your answer and back it up with evidence you have collected.

Make or locate
SUMMATIVE
and
PERFORMANCE
ASSESSMENTS

Assessments from Science Techbook Unit Concept:



Types of Climates

Types of Climates

Constructed Response: Types of Climates [PDF Version](#) [Teacher's Guide](#)

Constructed Response: Types of Climates

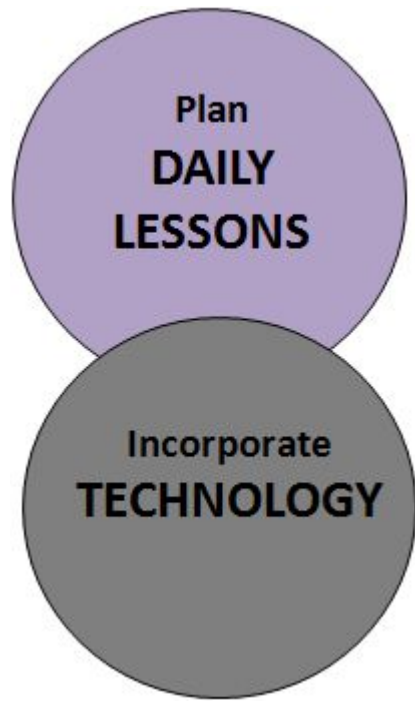
You will need about 15–20 minutes to complete this brief constructed response.

Earth has many types of climates. Some are hot, some are cold, and some have different temperatures at different times of the year. Some climates have a lot of rain or snow, and other climates are very dry.

Describe the temperature of a polar climate and how much precipitation it receives. Where on Earth would you find a polar climate?

Describe the climate where you live. Does the area receive little rainfall or a lot of rainfall? Are the temperatures almost always warm, mostly cold, or both warm and cold? Use your answers to classify the climate in your area as tropical, temperate, or polar.

[Save](#) [Submit](#)



Additional Resources:

[Weather and Climate Activities/stations Board from DE](#)

Station activities could be used throughout the unit

WWW.stemworks.com

STEM Resources from Discovery Education:

[The Whaddaya Know Quiz Show](#)

[Science Lab: Weather - Interactive](#)

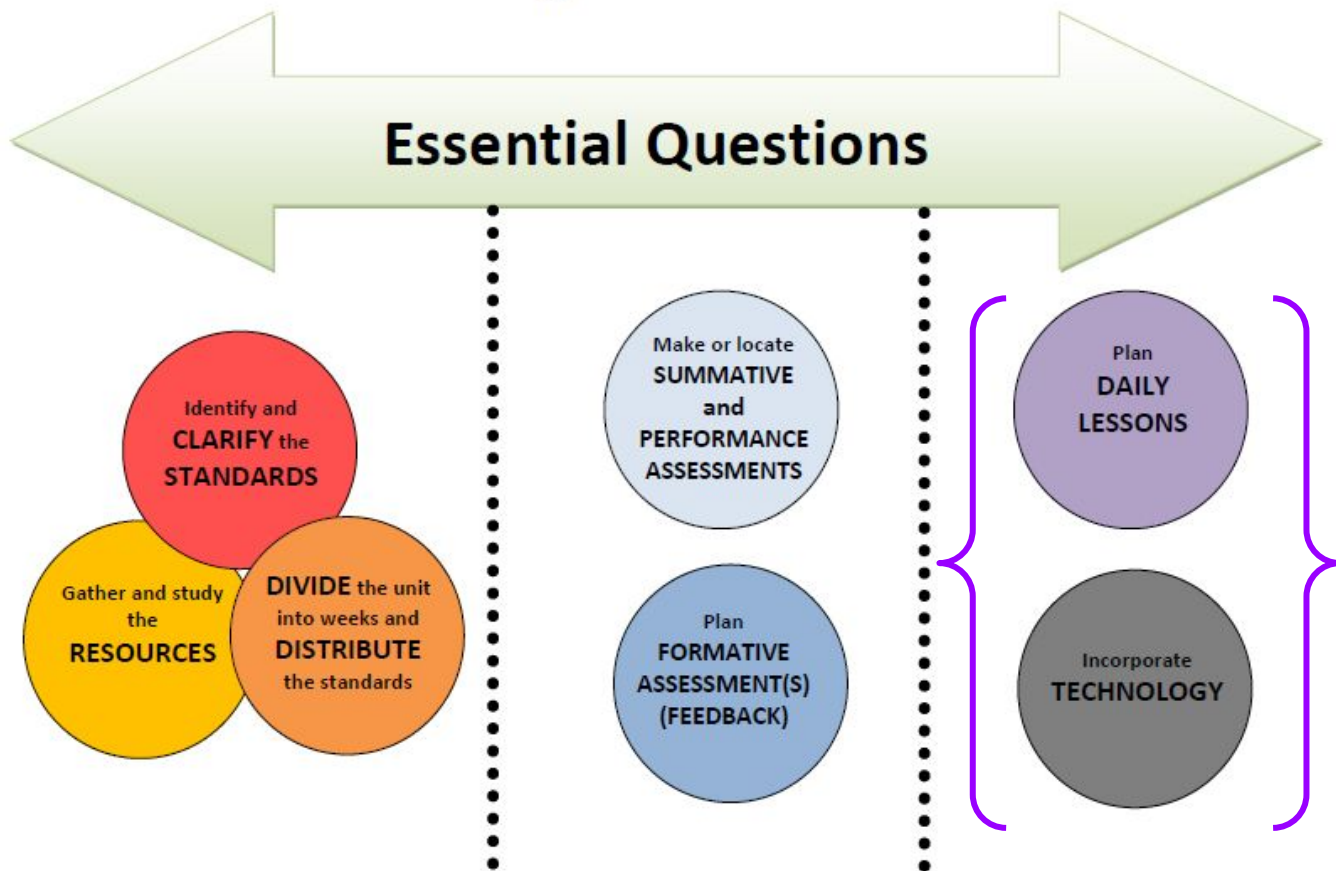
[Lightning: Staying Safe-Reading Passage](#)

Connections To 3rd Grade Literacy Unit

- Sarah, Plain and Tall
 - Drought
 - Fire (cause and effect)
- The Storm -severe weather



Backward Unit Planning 1.0



Now you're
ready to
plan your
daily
lessons!