

<p>Unit Title: Weather and Climate By: Cjonell Collins cjcollins@joliet86.org 3rd Grade Teacher</p>	
<p>Grade Level: 3rd</p>	
<p>Overview: This unit that I created is for a 3rd-grade teacher. The lessons/unit goes over what the difference is between weather and climate. Students will understand how weather patterns track for future predictions. The lesson also goes into climate and typical weather conditions for various areas and how they vary over the years. The unit provides photos from the LOC to see different types of weather hazards and how we prepare for those hazards.</p>	
<p>Aligned Standards: ESS2-1, ESS2-2, ESS3-1, ESTS 1-3</p>	
<p>NGSS Standards: 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. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</p> <p>CCSS ELA: RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (CCSS ELA) RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (CCSS ELA) RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (CCSS ELA) RI.3.9 Compare and contrast the most important points and key details presented in two texts on the same topic. (CCSS ELA)</p> <p>W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. W.3.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.</p> <p>CCSS Math: 3.MD.B.3 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. (CCSS MA)</p> <p>IL-Social Studies: SS.IS.5.3-5: Develop claims using evidence from multiple sources to answer essential questions. (IL-SS) SS.IS.7.3-5: Identify a range of local problems and some ways in which people are trying to address these Problems. (IL-SS)</p>	
<p>Enduring Understandings</p> <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) 	<p>Essential Questions</p> <ul style="list-style-type: none"> • How does the climate of a region affect daily life? (ESS2-2) • How can analyzing weather patterns help us understand the weather? (ESS2-1)

<ul style="list-style-type: none"> • A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts. (ESS2-2) 	<ul style="list-style-type: none"> • How can humans reduce the impact of natural disasters? (ESS3-1)
Transfer Goals	
<p>(Will be some or all of the skills listed below, plus any additional ones the groups feels important.)</p> <ul style="list-style-type: none"> • Asking questions (for science) and defining problems (for engineering) ESS2-1, ESS2-2, ESS3-1 • Developing and using models ESS3-1 • Planning and carrying out investigations ESS3-1 • Analyzing and interpreting data ESS2-2 • Using mathematics and computational thinking ESS2-2 • Constructing explanations (for science) and designing solutions (for engineering) ESS3-1 • Engaging in argument from evidence ESS2-2 • Obtaining, evaluating, and communicating information ESS2-1, ESS2-2, ESS3-1 	
Learning Objectives	
<ul style="list-style-type: none"> • I can use book and other media to gather information about climates in different regions of the world (e.g., equatorial, polar, coastal, mid-continental). • I can use books and other reliable media to gather information about different climates within regions of the world. • I can gather information about an area’s average temperatures and precipitation during various months over several years or an area’s average rainfall and temperatures during the rainy season over several years). • I can combine obtained information to provide evidence about the climate pattern in a region that can be used to make predictions about typical weather conditions in that region. • I can use the information I found to describe*: <ul style="list-style-type: none"> ○ Climates in different regions of the world. ○ Examples of how patterns in climate could be used to predict typical weather conditions. ○ That climate can vary over years in different regions of the world. • I can draw a graph to represent data • I can solve how many more and how many less problems • I can write an opinion piece on topics or texts. • I can describe and identify, including evidence about: <ul style="list-style-type: none"> ○ The given weather-related hazard (e.g., heavy rain or snow, strong winds, lightning, flooding along river banks). ○ Problems caused by the weather related hazard (e.g., heavy rains cause flooding, lightning causes fires). ○ How the proposed solution addresses the problem (e.g., dams and levees are designed to control flooding, lightning rods reduce the chance of fires) [note: mechanisms are limited to simple observable relationships that rely on logical reasoning] <p>*Suggestions for differentiation for the following student demographics. ELL, IEP, or enriched students:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Articles can be in translated into students own language , or pair students with a non-ELL student for clarification. <input type="checkbox"/> Texts may need to be modified or read to for IEP students <ul style="list-style-type: none"> <input type="checkbox"/> Rubric may be modified, Primary Source analysis tool may have examples <input type="checkbox"/> Notes may be provided for students that have writing goals 	
Library of Congress: Primary Sources	Materials/Supplies/Resources
<ul style="list-style-type: none"> • https://www.loc.gov/resource/cph.3a27080/ Earthquake picture • https://www.loc.gov/resource/cph.3a21575/ Hurricane picture • https://www.loc.gov/item/ggb2005019464/ Tornado picture 	<ul style="list-style-type: none"> • paper pencil • computers or other media • Open Ed Video: What is Weather? (shows weather vs. Climate) or Study jams: Weather and Climate. • Science notebooks • Note cards or sticky notes

	<ul style="list-style-type: none"> ● 1 cardboard base (approximately 25 cm by 25 cm) ● 30 straws ● 100 paper clips (one box) ● 20 straight pins ● 2 meters of string ● Sandbags- 250 grams ● Sand ● Popsicle sticks ● Cereal boxes ● Clay (to simulate cement) <p>Books:</p> <p>National Geographic: Extreme Weather</p> <p>Extreme Weather Systems</p> <p>Natural Disasters: What and Why?</p>
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Evidence of Learning

Example Performance Tasks	Example Evidence
<ul style="list-style-type: none"> ● For final assessment students will create a region flip book, pamphlet or poster describing the following items. <ul style="list-style-type: none"> ○ Climate of specified region ○ average temperature over the course of 6 months (should be in graph form) ○ average rainfall/precipitation over the course of 6 months (should be displayed as a graph) ○ students can list the pros and cons of that particular region as to if a person should live there and why. ESS2-1, ESS2-2 ● Build a small platform to test the structure- i.e. Tornado- a blow drier, or high-powered fan could be used to test structure Hurricane- same as above with a way to add water Earthquake- create an earthquake shake table for the structure to go on top. ESS3-1 ● After conducting the experiment students will complete the exit ticket answering the following questions. <ol style="list-style-type: none"> 1. What materials were useful to help your structure make it through the experiment? 2. What materials could you have used instead? 3. What materials could be used in real life to reduce the impact of the natural hazard that you created? 	<ul style="list-style-type: none"> ● What does the final project look like? <p>(ESS2-1, ESS2-2)</p> <ol style="list-style-type: none"> 1. Project should show understanding of region and its climate. 2. Graph should have required information, labels and should be accurate. 3. Pro and cons should represent an understanding of the assigned area. (Example: One pro for living in Florida is that because it is in the Southwest region of the U.S.it would be nice for a person who doesn't like cold weather.) <p>(ESS3-1)</p> <ol style="list-style-type: none"> 1. Project should show understanding of the essential materials needed for a structure in a assigned region.

Aligned Lesson Plan 1
(LOC Science Lesson for Unit 1: Weather and Climate)

Lesson Plan: Weather and Climate	Lesson Length: 7 days
Grade Level: 3rd	Related Unit: Weather and Climate ESS2-1, ESS2-2

Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> Climate describes patterns of typical weather conditions over different scales and variations. Historical weather patterns can be analyzed. (ESS2-1) A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts. (ESS2-2) 	<ul style="list-style-type: none"> How does the climate of a region affect daily life? (ESS2-2) How can analyzing weather patterns help us understand the weather? (ESS2-1)
Transfer Goals	
<ul style="list-style-type: none"> Analyzing and interpreting data ESS2-2 Using mathematics and computational thinking ESS2-2 Asking questions (for science) and defining problems (for engineering) ESS2-1, ESS2-2 Engaging in argument from evidence ESS2-2 Obtaining, evaluating, and communicating information ESS2-1, ESS2-2 	

Learning Objectives
<ul style="list-style-type: none"> I can use book and other media to gather information about climates in different regions of the world (e.g., equatorial, polar, coastal, mid-continental). I can use books and other reliable media to gather information about different climates within regions of the world. I can gather information about an area's average temperatures and precipitation during various months over several years or an area's average rainfall and temperatures during the rainy season over several years). I can combine obtained information to provide evidence about the climate pattern in a region that can be used to make predictions about typical weather conditions in that region. I can use the information I found to describe*: <ul style="list-style-type: none"> Climates in different regions of the world. Examples of how patterns in climate could be used to predict typical weather conditions. That climate can vary over years in different regions of the world. I can draw a graph to represent data I can solve how many more and how many less problems I can write an opinion piece on topics or texts. I can write an informative text to examine a topic I can write a narrative to develop real or imaginary experiences.

Library of Congress: Primary Sources	Materials/Supplies/Resources
<ul style="list-style-type: none"> https://www.loc.gov/resource/cph.3a27080/ Earthquake picture https://www.loc.gov/resource/cph.3a21575/ Hurricane picture https://www.loc.gov/item/ggb2005019464/ Tornado picture 	<ul style="list-style-type: none"> paper pencil computers or other media Open Ed Video: What is Weather? (shows weather vs. Climate) or Study jams: Weather and Climate. Science notebooks Note cards or sticky notes <p>Books:</p> <p>National Geographic: Extreme Weather</p> <p>Extreme Weather Systems</p> <p>Natural Disasters: What and Why?</p> <p>Why does it happen: Tornadoes, Hurricanes, and Typhoons</p> <p>See Inside Weather and Climate</p>

Lesson Plan

Engage: How can I get students interested in this?

- Teacher will show pictures from LOC (Library of Congress) that show different structures that have been affected by natural disasters.
- Students will use their Primary source analysis tool to make observations. * provided in folder
- Teacher will allow students to turn and talk and share observations
- Teacher will guide students to reflect on the pictures, students will guide students to write reflections on Primary Source analysis tool.
- Students will share reflections with their shoulder partner
- Teacher will guide students to write their questions on the Primary Source Analysis Tool.
- Students will share questions with their shoulder partner

* This could take one class period or 1 hour.

* Science Engineering Practice

Explore: What tasks/questions can I offer to help students puzzle through this?

- Students will view the video weather & climate on www.studyjams.com
- Students will take notes on the difference between the two in their science notebooks. * Guide students to listen and write down the difference between the two. Teacher may need to stop and discuss along the way. Items that are important may include:
 1. The difference between weather and climate (have student write a definition)
 2. The 6 elements of weather
 3. What drives the difference between weather and climate? (answer: the amount of precipitation and temperature determine the climate of a particular place. * teacher may need to provide definitions and elements to support special education students.
- Teacher may read a book about the weather and climate: ***See Inside Weather and Climate by: Katie Daynes and Russell Tate***
- After reading selection teacher may have students write down their own definition and two examples of each to be used as a summative. (1 point for each, $\frac{3}{4}$ correct could represent mastery.) if mastery not reached teacher may need to provide extra support. which could include: Anchor chart with important elements, another read aloud, video or class discussion
- Students will be broken up into groups to research a specific region (any or all regions can be given, or broken down by the natural disaster teacher is guiding students to learn about i.e. hurricanes, tornadoes, earthquakes)
- Groups will record the following data: average temperature, climate, amount of precipitation, most frequent disasters. (Information can be put in Science notebooks or teacher can create a google classroom slide for each group to report. (See created attachment in folder)
- Students will discuss recorded information and look for any patterns that may be present
- Students can create a bar graph of the average temperature in their region during a given month and compare that to another region from (students can compute how many more or less inches of rain in a given time period. (creating a graph may need to be reviewed) 3.MD.B3
- Students can use the following websites to complete activity

<http://www.weatherwizkids.com/kids-questions.htm>

<https://www.ready.gov/kids/know-the-facts>

<https://www.esa.int/esaKIDSen/Naturaldisasters.html>

Possible questions that students can discuss/ answer while researching:

1. Do you believe climate plays a role in where people decide to live? Why or why not?
2. How does climate affect daily life?
3. Why is understanding a climate of a particular area important?
4. Have students discuss their graphs and findings (3.MD.8)
5. What regions get more precipitation and why?
6. How would your life be if you lived in a different area with a different climate? Explain.

(Teacher should allow students to share their answers in small groups. While sharing, teacher will walk around to check for misconceptions and clear them up as a whole class after discussion.)

* 3-D learning occurs during this section

This portion of the lesson should take 1-2 days or 2- 60 min blocks.

Explain: How can I help students make sense of their observations?

- Have the students reflect upon their experiences and the Primary Source(s).
- Have the students write down questions they wondered about and want more information on.
- Include questions* and/or strategies teachers can utilize to help students connect their experiences to the essential question(s) and enduring understanding(s).
- Approximate how long this portion of the lesson should take.

- Students can use the PowerPoint (questions/slides already made, see folder) that they created to present the information to the class. (while presentations are going on audience will write questions that they still have about the region or natural disaster).
- Students can share results to class and clear up any misconceptions.
- Teacher can pose questions: Think about the pictures from the beginning of the unit, how would/could they change depending on the year of the disaster?
- Would the images damage still hold true today? Why or why not?
- How can images from the past help us prevent future disasters?

* Questions from above can be answered orally, in their science notebooks or as an exit ticket.

- ***Questions should be of higher order, to encourage student explanations and support of claims and/or evidence.**

***This part of the lesson should take 1 class period.**

*** 3-D learning occurs**

Extend/Elaborate: How can my students apply their new knowledge to other situations?

- Describe how the students will apply their new knowledge to new or similar situations.
- Include how the teacher can help the students make relevant connections to their observations, address misconceptions, and extend students' learning.
- Approximate how long this portion of the lesson should take.
- Give audience/other groups a notecard that they are still unclear about after the presentation for the group to research and answer at the end of the lesson/unit (students can choose up to 1 or 2 questions to address) or teacher can assign higher order question.
- Students could also tie writing into this by creating a report to share out information - **writing** options could be **research** based or opinion based (In your **opinion** what is the most interesting thing that you learned?) or **Narrative** (write a story about a person experiencing this natural disaster. (Teacher/Class could also read: *I Survived: Joplin Tornado* to tie in more Common Core standards. (use rubric to grade any writing, rubric in folder.) W.3.1, W.3.2, W.3.3

* This part of the lesson could take 1 to 2 days.

*3-D learning occurs

Evaluate: How can I help my students self-evaluate and reflect on the learning?

- Identify how students and the teacher can assess understanding.
- Describe how the lesson activities can help students demonstrate achievement of the learning objectives.
- Include examples (or descriptions) of evidence related to each learning objective.
- Approximate how long this portion of the lesson should take.
- For final assessment students will create a region flip book, pamphlet or poster describing the following items.
 - Climate of specified region
 - average temperature over the course of 6 months (should be in graph form)
 - average rainfall/precipitation over the course of 6 months (should be displayed as a graph)
 - students can list the pros and cons of that particular region as to if a person should live there and why.

*use the rubric in the folder to assess understanding.

* 3-D learning occurs during this section

This part could take 1-2 days.

Aligned Lesson Plan 2

(LOC Science Lesson for Unit 1: Weather and Climate)

Lesson Plan: Weather	Lesson Length:6-9 days
Grade Level: 3rd	Related Unit: Weather and Climate
Enduring Understandings	Essential Questions
<ul style="list-style-type: none"> ● A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts. (ESS3-1) 	How can humans reduce the impact of natural disasters? (ESS3-1)
Transfer Goals	
<ul style="list-style-type: none"> ● Asking questions (for science) and defining problems (for engineering) ● Developing and using models ● Planning and carrying out investigations 	
Learning Objectives	
<ul style="list-style-type: none"> ● I can describe and identify, including evidence about: <ul style="list-style-type: none"> ○ The given weather-related hazard (e.g., heavy rain or snow, strong winds, lightning, flooding along river banks). ○ Problems caused by the weather-related hazard (e.g., heavy rains cause flooding, lightning causes fires). ○ How the proposed solution addresses the problem (e.g., dams and levees are designed to control flooding, lightning rods reduce the chance of fires) [note: mechanisms are limited to simple observable relationships that rely on logical reasoning]. 	
Library of Congress: Primary Sources	Materials/Supplies/Resources
<ul style="list-style-type: none"> ● https://www.loc.gov/resource/cph.3a27080/ Earthquake picture ● https://www.loc.gov/resource/cph.3a21575/ Hurricane picture ● https://www.loc.gov/item/ggb2005019464/ Tornado picture 	<ul style="list-style-type: none"> ● 1 cardboard base (approximately 25 cm by 25 cm) ● 30 straws ● 100 paper clips (one box) ● 20 straight pins ● 2 meters of string ● Sandbags- 250 grams ● Sand ● Popsicle sticks ● Cereal boxes ● Clay (to simulate cement)
Lesson Plan	
Engage: How can I get students interested in this?	

- Describe how the teacher will capture students' interest.
- Include what kind of questions the students can ask themselves to further engage with the material?
- Identify the Primary Source(s) that can be used to observe and make connections.
- Approximate how long this portion of the lesson should take.

Teacher will begin by showing the Library of Congress picture from above. (since this is a continuation of the previous lesson teacher will direct students to consider the following questions.

1. What part of the structure seems weak?
2. What materials are used in the picture?
3. If there were people there, where could they go to be safe?

*This should take 1 hour

* Science Engineering Practice and Cross Cutting Concepts in this section

Explore: What tasks/questions can I offer to help students puzzle through this?

- Describe what hands-on/minds-on activities students will be doing.
- Include some probing questions teachers could possibly pose to encourage and/or focus students' on exploring and gathering more information related to the essential question(s).
- Approximate how long this portion of the lesson should take.

Students will watch video on YouTube <https://www.youtube.com/watch?v=QVZExL00MWA>

As student are watching the video students will be taking notes on the type of weather hazard and their impact on the earth and people in it. (see attachment in folder).

Students will watch the following videos on each hazard and take notes in the chart provided.

<https://www.youtube.com/watch?v=xKubdY2mHXc> Hurricanes

<https://www.youtube.com/watch?v=-s3UwOq1P1E> Tornadoes

<https://www.youtube.com/watch?v=AArne-wh Uc> Earthquakes

Students can also use the following websites to further their research.

<https://www.ready.gov/kids/know-the-facts>

Students will add to their chart to expand their learning.

Questions to consider: Questions will be answered in students science notebooks. Use as a summative or as a guide to re-teaching previous material.

1. How does the climate in a particular area determine the type of weather disaster that that place has? (this information will be gained from the previous lesson in this unit)
2. Think of 2 regions that you have studied, can the same precautions be taken when building a home in one region versus another? Explain, why or why not.
3. How are homes in different regions similar and different?

*students may play game in site that tests their knowledge on each disaster.

As a class teacher will show the following website <http://www.concretethinker.com/solutions/Disaster-Resistance.aspx>

- Teacher will read important information such as types of materials that are used to prevent certain hazards.
- Teacher will discuss terms and give examples of each that students may not know such as: concrete, separation wall, exterior wall, asphalt shingles, siding, panels, bricks. (teacher could also go on google to show pictures of each of the mentioned items.
- Other items that need to be included: houses on stilts, boards to board up windows, tornado shelter, sandbags.

*It may be a good idea to have students go around their building to locate such structures from the activity so they have a visual understanding as well.

* 3-D learning in this section

*This could take up to 1-2 days.

Explain: How can I help students make sense of their observations?

- Have the students reflect upon their experiences and the Primary Source(s).
- Have the students write down questions they wondered about and want more information on.
- Include questions* and/or strategies teachers can utilize to help students connect their experiences to the essential question(s) and enduring understanding(s).
- Approximate how long this portion of the lesson should take.

***Questions should be of higher order, to encourage student explanations and support of claims and/or evidence.**

Using their knowledge from the previous activity students will look at the pictures from the Library of Congress and consider the following questions.

1. Are there other materials that could be used that may have prevented the amount of destruction? If so, what?
2. If you were able to fix one thing on the structure, what would it be and why?
3. What determines the type of materials used in a natural disaster?

* Using the pictures in file to ask the following questions.

1. How does each protective item from above important to each structure?
2. What protective items do you see on these homes or buildings?
3. What other items could be used as well or in place of to make the structure safer?

*These questions can be answered in their science notebooks or given as an exit ticket to be used as a summative.

* Science Engineering Practice and Cross Cutting Concepts in this section

*This could take 1-2 hours.

Extend/Elaborate: How can my students apply their new knowledge to other situations?

- Describe how the students will apply their new knowledge to new or similar situations.
- Include how the teacher can help the students make relevant connections to their observations, address misconceptions, and extend students' learning.
- Approximate how long this portion of the lesson should take.

Elaborate

-Each student will be responsible for researching a weather related hazard and provide pictures/explanations for design solutions to that particular weather hazard. Students will turn in a paper about their topic. Students may use the websites from above to research.

-Topics could include:

- tornadoes
- thunderstorms
- flooding
- winter storms
- hurricanes
- earthquakes

Extend

* Students can create a safety plan for a given hazard that could occur if they were not in a safe place. i.e. home, building.

Questions to consider:

1. How would you get in touch with missing family members?
2. Where would you meet?
3. What if there was a fire also in your hazard, how would you handle that?
4. What if your neighborhood is being evacuated?

Teacher could use the fact sheets in the folder to help students who may need differentiation. see website for additional fact sheets on hazards. <https://www.fema.gov/media-library/assets/documents/34288>

* 3-D learning occurs

*This could take up to 2-3 days.

Evaluate: How can I help my students self-evaluate and reflect on the learning?

- Identify how students and the teacher can assess understanding.
- Describe how the lesson activities can help students demonstrate achievement of the learning objectives.
- Include examples (or descriptions) of evidence related to each learning objective.
- Approximate how long this portion of the lesson should take.
- Students will use the knowledge based on the region they were assigned to create a structure that could sustain the natural hazard for their region.

- Students will be given time to discuss within their group the kid friendly, classroom appropriate materials that they will need.
- Students will provide teacher with list (this could be used to determine understanding of region/natural disaster). or teacher may have students work together to bring in materials.
- Students will be given 3-4 days to build their structure. Rubric (in folder) could be used to score structure. To test structure see below for other option.

*possible testing options

(note: Natural hazard suggestions below can be changed depending on your region and or student interest. Fact sheet website and website on each hazard is provided again below.. <https://www.ready.gov/kids/know-the-facts>

<https://www.fema.gov/media-library/assets/documents/34288>

Build a small platform to test the structure- i.e.

1. Tornado- a blow drier, or high powered fan could be used to test structure
2. Hurricane- same as above with a way to add water
3. Earthquake- create an earthquake shake table for the structure to go on top.

After conducting the experiment students will complete the exit ticket answering the following questions.

1. What materials were useful to help your structure make it through the experiment?
2. What materials could you have used instead?
3. What materials could be used in real life to reduce the impact of the natural hazard that you created?

*This part of the lesson could take 3-4 days.

* 3-D learning occurs