

RESOURCE LIBRARY

ACTIVITY : 1 HR 15 MINS

Weather Interconnections

Students view and discuss a video to create a concept map of interconnections in extreme weather. Next, they read encyclopedia entries to differentiate the terms *weather* and *climate*. Finally, students choose an extreme weather event on which to focus during the lesson and create an initial meteorological model of this event.

GRADES

6 - 8

SUBJECTS*Earth Science, Climatology, Meteorology***CONTENTS**

4 Videos, 2 Resources, 2 PDFs

OVERVIEW

Students view and discuss a video to create a concept map of interconnections in extreme weather. Next, they read encyclopedia entries to differentiate the terms *weather* and *climate*. Finally, students choose an extreme weather event on which to focus during the lesson and create an initial meteorological model of this event.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/weather-interconnections/>

In collaboration with



DIRECTIONS

This activity is part of the Climate Change Challenge unit.

1. Create a concept map of interconnections in extreme weather based on students' responses to a short video.

- Play the Extreme Weather: Interconnections in Extreme Weather video (2:17) to introduce the topic of extreme weather. Begin a concept map using students' responses to the questions below. List examples of extreme weather events inside circles in a visible place, then use responses to the second question to connect events with lines, writing students' ideas nearby.
 - Ask: What *extreme weather events* are discussed in this video? (Droughts, heat waves, typhoons, powerful storms, and flooding.)
- To elicit knowledge from the Carbon Concerns lesson, ask students:
 - *How do you think these extreme weather events connect to Earth's climate?* (Student responses may vary, but will help give a sense of their current understanding regarding the differences between weather and climate.)

2. Support students as they read to differentiate the terms *climate* and *weather*.

- Distribute copies of the first two sections (*Understanding Weather* and *Understanding Climate*) of the Weather or Climate...What's the Difference? article to pairs of students.
- In each pair, assign one student to read and annotate the *Understanding Weather* section and the other to read and annotate the *Understanding Climate* section. Direct students to pay special attention to statements relating these two terms.
- Distribute the Weather Interconnections Meaning Maker handout and prompt students to define the terms *climate* and *weather* with their partners. (The key distinction from this article is that weather is a day-to-day phenomenon, whereas climate is the pattern of weather over long periods of time, usually decades.)
- Solicit definitions from volunteers to ensure that pairs are on the right track. Then assign students to complete the rest of the *Weather Interconnections Meaning Maker* handout using their understanding from their partner discussion of the readings.
- Prompt students to consider and describe in words on their chart how each term is distinct from the other.

3. Assign students an extreme weather focus and facilitate the creation of an initial meteorological model of this event.

- Explain to students that the next few activities will focus on an extreme weather event of their choice: droughts, hurricanes, or tornadoes.
- Form small groups of three to four students based on their preferences for each of these events, and provide each group a link to the appropriate resource(s) relevant to their weather type and its impacts:
 - Droughts: [Extreme Weather: Droughts](#) (3:01)
 - Hurricanes: [Hurricanes 101](#) (2:42)
 - Tornadoes: [Tornadoes 101](#) (3:00) / [Upturning Tornadoes](#) (5:16)
- Instruct each small group to use their assigned video to determine and record causes and effects of their extreme weather event on the T-chart in Part A of their *Extreme Weather Model Builder* handout.
- Assign each small group to use the video and their chart to draw an initial systems diagram model of their extreme weather event in Part B of their [Extreme Weather Model Builder](#) handout. This model should include:
 - A visual depiction of the event itself.
 - At least three causes of the extreme weather event labeled.
 - At least three effects of the extreme weather event labeled.
 - Arrows and accompanying plus and minus signs to show the relationships among causes and between causes and effects.
- Ask students who considered the same extreme weather event to mingle, forming pairs from different groups to compare and contrast their initial models. Ask students to consider:
 - *How is your work similar to, or different from, others who studied the same extreme weather event?*
- Prompt students to make brief notes on their initial model of any elements from their peer's diagram that they would like to incorporate in later revisions, and to give their peers at least one piece of positive feedback regarding their work.

- Lead a final debrief discussion to elicit students' ideas about the common themes of meteorological conditions that lead to, and result from, the extreme weather events.

Tip

Step 1: The *Teacher Toolkit* has a video and article on [Concept Map](#) that may be helpful for concept mapping extreme weather events with students. It is important that students differentiate between extreme weather events and their consequences. For example, drought is an extreme weather event, and wildfires are a potential and destructive consequence.

Modification

Step 2: The *Weather or Climate...What's the Difference?* article is leveled to accommodate readers at multiple levels. Additionally, encyclopedic entries for *weather* and *climate* provide another opportunity to make the distinction between these two terms clear to all students.

Tip

Step 3: Consider having students perform additional online research to add to their list of the causes and effects of their extreme weather events.

Tip

Step 3: Use the [Q Design Pack on Systems Thinking](#) from the Institute of Play to support students in creating and discussing their systems diagrams. See p. 33 on *Causal Maps*, specifically.

Informal Assessment

Informally assess students' prior and developing knowledge of the factors leading to extreme weather events by examining their initial model in the *Extreme Weather Model Builder*.

OBJECTIVES

Subjects & Disciplines

- Climatology
- Meteorology

Learning Objectives

Students will:

- Read to compare and contrast the terms weather and climate.
- Create an initial model of an extreme weather event.
- Link causes and effects of multiple types of extreme weather.

Teaching Approach

- Project-based learning

Teaching Methods

- Discussions
- Multimedia instruction
- Reading

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
 - Life and Career Skills
 - Initiative and Self-Direction
 - Social and Cross-Cultural Skills
- Critical Thinking Skills
 - Remembering
 - Understanding
- Science and Engineering Practices

- Developing and using models

National Standards, Principles, and Practices

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **CCSS.ELA-LITERACY.RST.6-8.4:**

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

NEXT GENERATION SCIENCE STANDARDS

- **Crosscutting Concept 2: Cause and Effect:**

Cause and effect relationships may be used to predict phenomena in natural or designed systems.

- **MS-ESS2-5:**

Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

- **Science and Engineering Practice 2:**

Developing and using models

- **Science and Engineering Practice 8:**

Obtaining, evaluating, and communicating information.

Preparation

What You'll Need

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per pair, Monitor/screen, Printer, Projector, Speakers

PHYSICAL SPACE

- Classroom
- Computer lab

GROUPING

- Large-group instruction
- Large-group learning
- Small-group learning
- Small-group work

BACKGROUND & VOCABULARY

Background Information

Weather describes the state of the atmosphere at a specific place and a short span of time. Six key variables contribute to weather: temperature, precipitation, pressure, wind, humidity, and cloudiness. Scientists and forecasters precisely measure these variables with tools such as a thermometer, barometer, and anemometer. In contrast, climate is the typical pattern of weather over the course of many years. Climate determines the frequency of particular weather events through the decades, as well as the distribution of organisms within ecosystems across Earth's surface.

Extreme weather events include hurricanes, tornadoes, and droughts. Each of these extreme weather events has the capacity to powerfully influence the lives of humans, and can sometimes even be deadly. Extreme weather can also lead to other destructive impacts. For example, droughts can increase the frequency of wildfires, and hurricanes can lead to storm surges.

Prior Knowledge

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Recommended Prior Activities

- [Carbon All Around](#)
- [Global Trends](#)
- [Heating Up](#)
- [Local Emissions](#)
- [Our Greenhouse](#)

Vocabulary

Term	Part of Speech	Definition
climate	<i>noun</i>	all weather conditions for a given location over a period of time.
drought	<i>noun</i>	period of greatly reduced precipitation.
extreme weather	<i>noun</i>	rare and severe events in the Earth's atmosphere, such as heat waves or powerful cyclones.
hurricane	<i>noun</i>	tropical storm with wind speeds of at least 119 kilometers (74 miles) per hour. Hurricanes are the same thing as typhoons, but usually located in the Atlantic Ocean region.
tornado	<i>noun</i>	a violently rotating column of air that forms at the bottom of a cloud and touches the ground.
weather	<i>noun</i>	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.
wildfire	<i>noun</i>	uncontrolled fire that happens in a rural or sparsely populated area.

For Further Exploration

Articles & Profiles

- [National Geographic: Weather](#)
- [National Geographic: All About Climate](#)

Instructional Content

- [National Geographic: Resource Library: Collection: Climate Change](#)
- [National Geographic: Resource Library: Collection: Climate](#)
- [National Geographic: Resource Library: Collection: Catastrophic Weather Events](#)
- [National Geographic: Resource Library: Collection: Weather](#)

