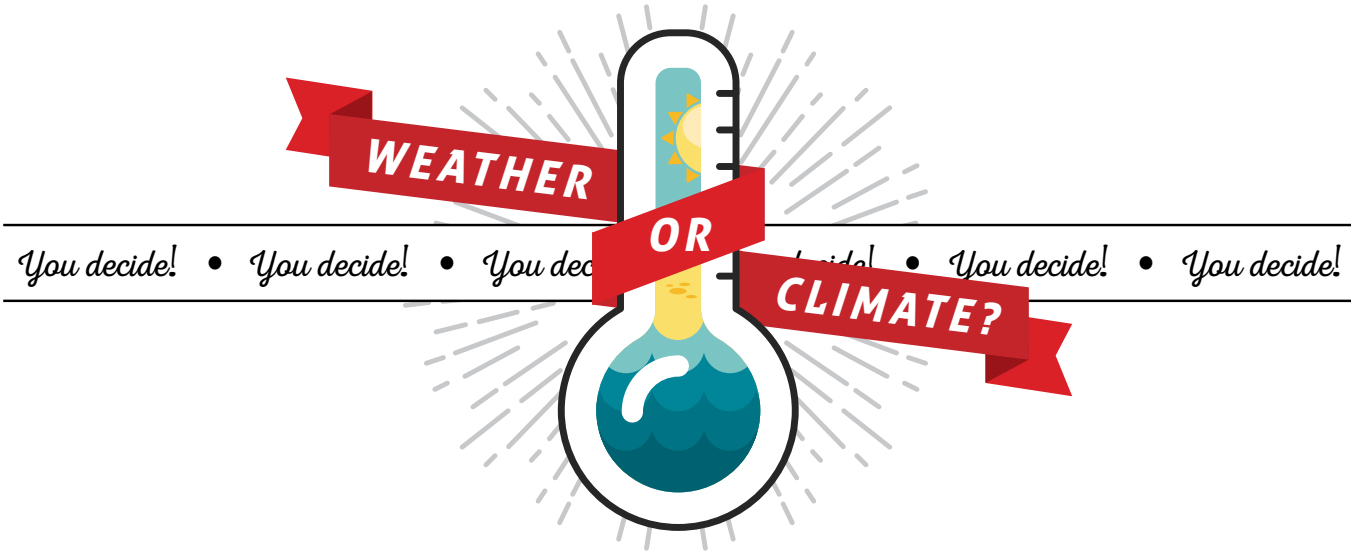


DESCRIPTION

Students use their understanding of the definitions of weather and climate to identify which of the two concepts is better represented by several figures that are presented during the activity.

GRADE LEVEL
6 – 12

OBJECTIVES

Students will:
- Synthesize the definitions of weather and climate
- Apply their knowledge to identify whether figures better represent weather or climate

TIME
20 MINUTES

COMMON CORE STATE STANDARDS

English Language Arts Standards » Science & Technical Subjects » Grade 6-8

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.

CCSS.ELA-LITERACY.RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

English Language Arts Standards » Science & Technical Subjects » Grade 9-10

CCSS.ELA-LITERACY.RST.9-10.4. 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 9-10 texts and topics.

CCSS.ELA-LITERACY.RST.9-10.7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

English Language Arts Standards » Science & Technical Subjects » Grade 11-12

CCSS.ELA-LITERACY.RST.11-12.4. 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 11-12 texts and topics.

NEXT GENERATION SCIENCE STANDARDS

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
	ESS2.D Weather and Climate (MS)	

BACKGROUND

Members of the public and media often confuse the concepts of weather and climate. This common misconception can lead to inaccurate conclusions about climate change.

Weather is a description of short-term atmospheric conditions. It can include temperature, humidity, precipitation, cloudiness, visibility, wind, and atmospheric pressure. These observations are used to describe the conditions over a short time period, from minutes to months.

Climate is the long-term pattern of weather in an area. It describes the average weather for a region over a longer time period, often defined as approximately 20-30 years or more.

MATERIALS

- *Weather or Climate? You Decide!* handout [1 per student]
- PowerPoint presentation **OR** prints of activity figures [1 set per every 2-4 students]
- Computer and projector

PREPARATION

1. Set up a computer and projector to show the video and to show the PowerPoint presentation if using to display the figures in this activity.

PROCEDURES

1. As an overview of the difference between weather and climate, show the following National Geographic video with Neil deGrasse Tyson: https://www.youtube.com/watch?v=cBdxDFpDp_k
2. Pass out a *Weather or Climate? You Decide!* handout to each student.
3. Ask students to take a few minutes to read through the definitions of weather and climate in the box at the top of the handout.
4. Once it seems like most students have had enough time to read the definitions, ask students for a volunteer to verbally summarize the difference between weather and climate for the class [answer: weather refers to atmospheric conditions in the short term, and climate is a long-term average pattern of weather, usually over approximately 30 years].
5. Begin the PowerPoint presentation or pass out printed sets of the activity figures (1 for every 2-4 students).
6. Explain that students will view seven numbered figures. For each, ask students to examine the figure and determine whether the figure better represents the concept of weather or climate. They will then circle the answer on their worksheet.
   a. Figure 1: television forecaster who is giving a prediction of the conditions in Flagstaff, Arizona for a 4-day period [answer: weather].
   b. Figure 2: map that displays the average temperature in the continental United States from 1961-1990, a 30-year period [answer: climate].
   c. Figure 3: satellite images of Elephant Butte reservoir in New Mexico during a drought. The top photo was taken in 1994, and the bottom photo was taken in 2013, 19 years later [answer: climate. Reservoirs require climatic lengths of time to fill and empty.].
   d. Figure 4: photo of a rain gauge in Fort Collins, Colorado. The rain gauge has collected precipitation from a recent rain event [answer: weather].
   e. Figure 5: map that displays the average precipitation in the continental United States from 1961-1990, a 30-year period [answer: climate].
   f. Figure 6: photo of a person walking in a snowstorm [answer: weather].
   g. Figure 7: graph of the average surface temperature on Earth since 1880 [answer: climate].

EXTENSIONS

1. Ask students to bring in figures from books or magazines that represent the concepts of weather and climate.
2. Direct students to find figures that represent weather and climate online.

ADDITIONAL RESOURCES

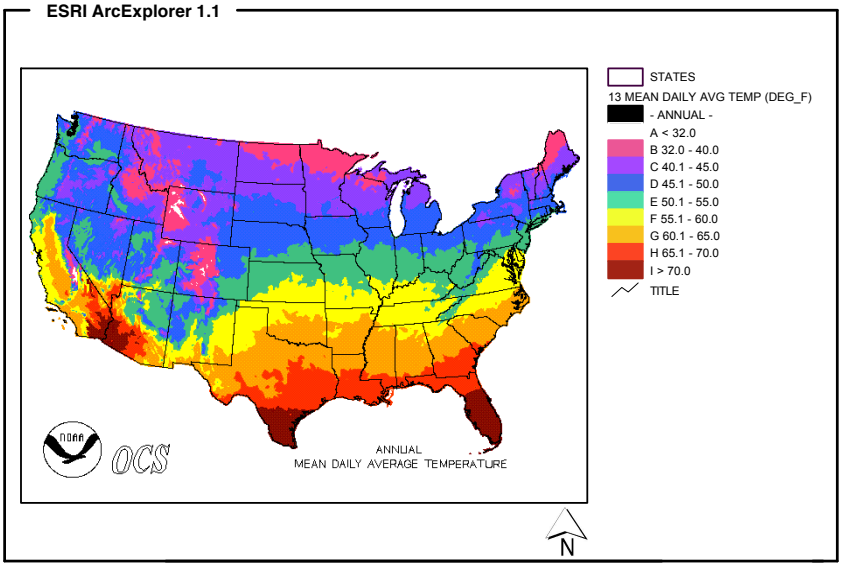
Website with helpful explanation of the difference between weather and climate:

National Oceanic and Atmospheric Administration, National Ocean Service. What is the difference between weather and climate? Published 07 Apr. 2014. Web. 07 Jan. 2015. <http://oceanservice.noaa.gov/facts/weather_climate.html>.

Figure 1. Forecaster in Flagstaff, Arizona

Source: wn.com

Figure 2. Average daily temperature in the continental United States from 1961-1990



Source: cdo.ncdc.noaa.gov/cgi-bin/climaps/climaps.pl

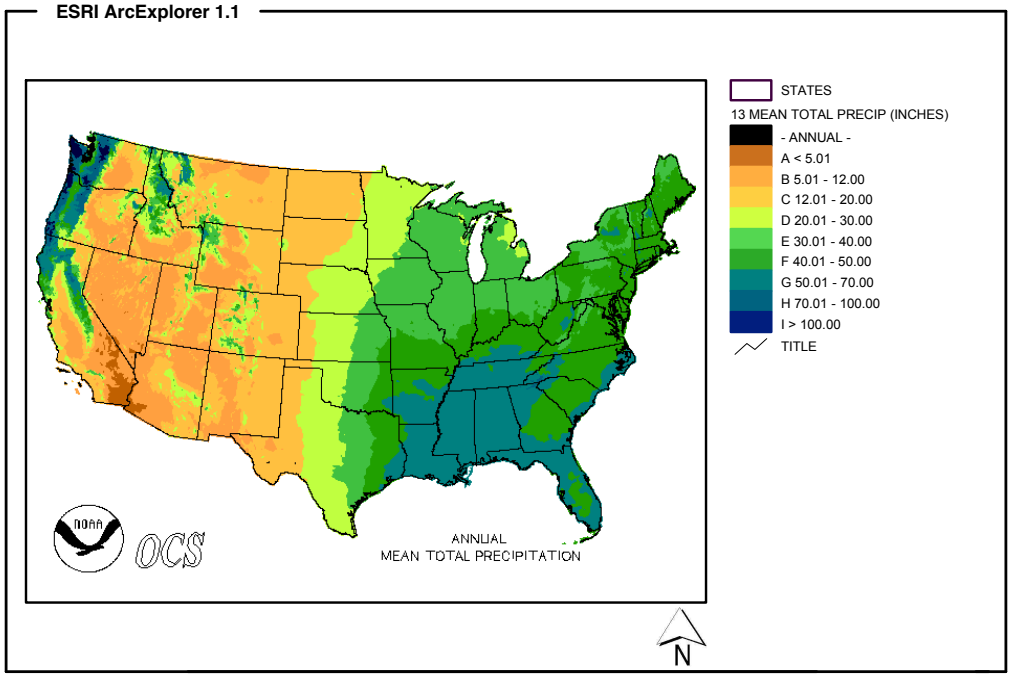
Figure 3. Lowered reservoir levels during drought, Elephant Butte, New Mexico

Source: earthobservatory.nasa.gov/IOTD/view.php?id=81714

Figure 4. Rain gauge in Fort Collins, Colorado

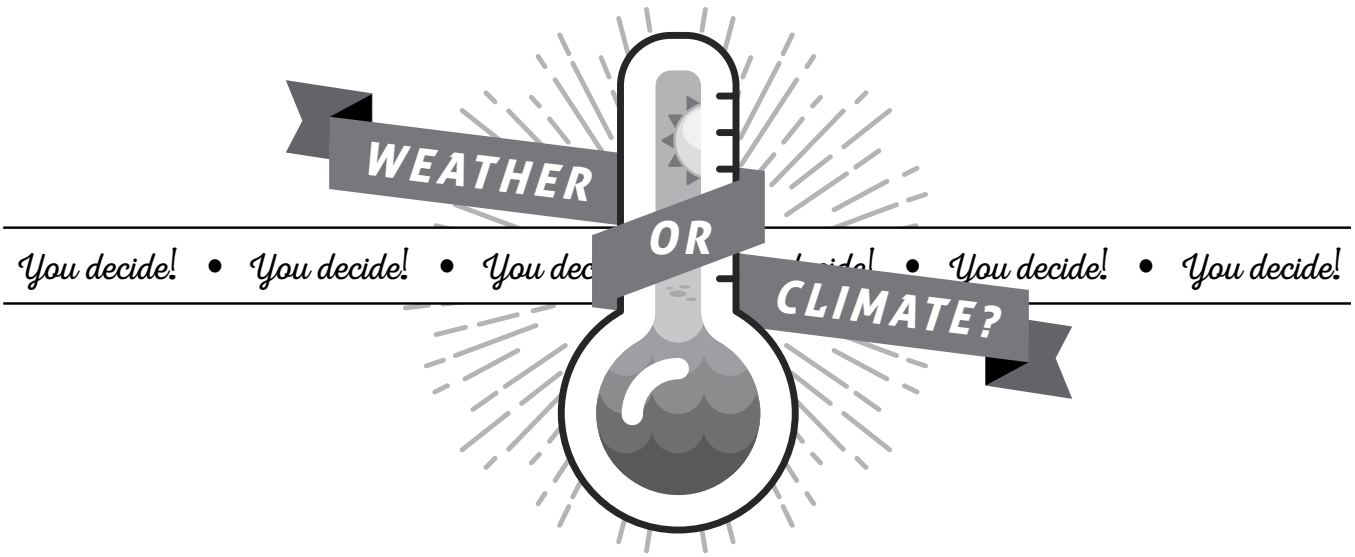
Source: pmm.nasa.gov/node/739

Figure 5. Average annual precipitation in the continental United States from 1961-1990



Source: cdo.ncdc.noaa.gov/cgi-bin/climaps/climaps.pl

Name _____ Date _____



The words **weather** and **climate** are used sometimes interchangeably, but they shouldn't be! Weather and climate are not the same, and you are about to become an expert at understanding the difference.

Weather is basically the way the atmosphere is behaving, mainly with respect to its effects upon life and human activities. The difference between weather and climate is that weather consists of the short-term (minutes to months) changes in the atmosphere. Most people think of weather in terms of temperature, humidity, precipitation, cloudiness, brightness, visibility, wind, and atmospheric pressure, as in high and low pressure.

Climate is the description of the long-term pattern of weather in a particular area. Some scientists define climate as the average weather for a particular region and time period, usually taken over [about] 30 years. It's really an average pattern of weather for a particular region.

Excerpted from: NASA - What's the Difference Between Weather and Climate?
www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html

DIRECTIONS

Please examine each of the numbered figures. Determine whether each figure better represents the concept of weather or climate, and circle the best answer below. Thank you.

FIGURE 1.	**WEATHER**	**CLIMATE**
FIGURE 2.	**WEATHER**	**CLIMATE**
FIGURE 3.	**WEATHER**	**CLIMATE**
FIGURE 4.	**WEATHER**	**CLIMATE**
FIGURE 5.	**WEATHER**	**CLIMATE**
FIGURE 6.	**WEATHER**	**CLIMATE**
FIGURE 7.	**WEATHER**	**CLIMATE**

ANSWER KEY

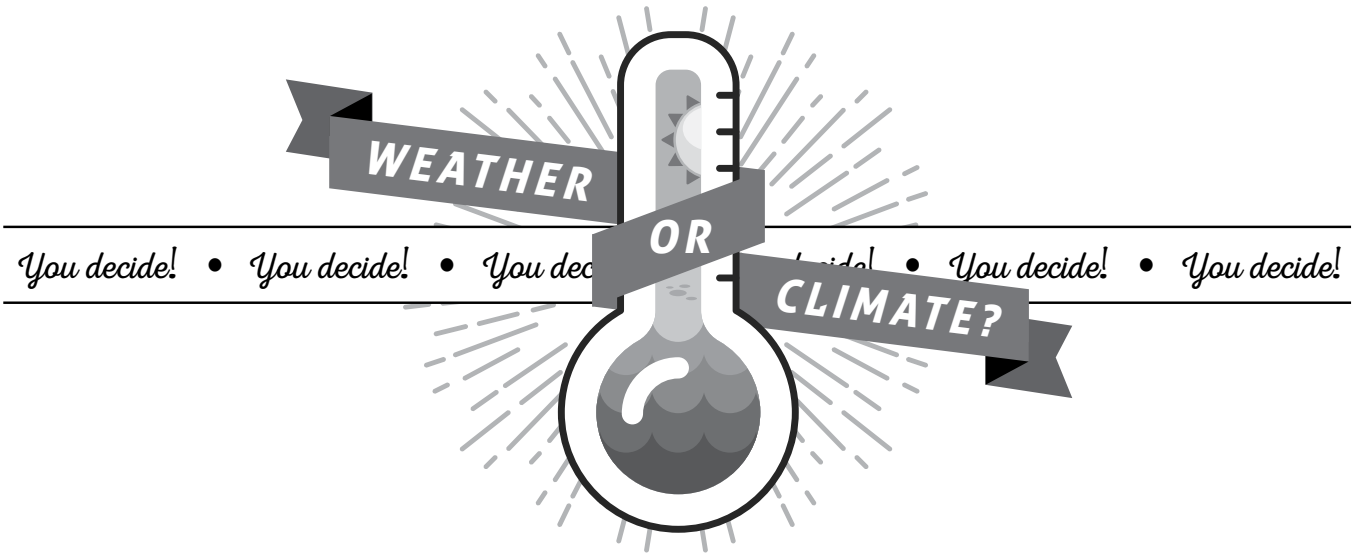


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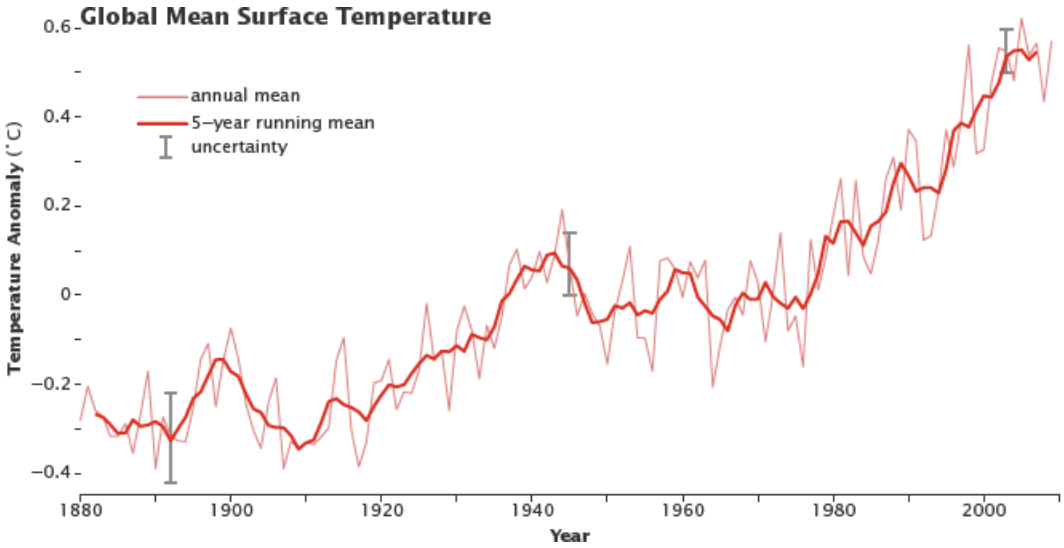
FIGURE 3.	**WEATHER**	**(CLIMATE)**
FIGURE 4.	**(WEATHER)**	**CLIMATE**
FIGURE 5.	**WEATHER**	**(CLIMATE)**
FIGURE 6.	**(WEATHER)**	**CLIMATE**
FIGURE 7.	**WEATHER**	**(CLIMATE)**

Figure 6. Snowstorm

Source: www.noaa.gov/features/monitoring_0209/coldwinds.html

Figure 7. Average global surface temperature



Source: earthobservatory.nasa.gov/Features/GlobalWarming/page2.php