

What is Drought?

Objective

Students will conduct an experiment to explore the effects of drought.

Background

What is drought? Most of us think of drought as “no rainfall,” but it’s not that simple. Drought occurs when there is less rainfall than expected over an extended period of time, usually several months or longer. Drought is a normal part of climate, and it can occur almost anywhere on Earth.

A shortage of rainfall can result in major impacts on agriculture, municipal water supplies, tourism and recreation, energy production, river navigation, and the environment. For farmers drought means there is not enough water in the soil for crops to grow normally or for pastures to produce enough grass for livestock. For farmers who rely on irrigation to produce their crops, drought may be a shortage of water in reservoirs, streams, or groundwater, and irrigation may be restricted due to these shortages.

Drought has many causes. It could be lack of rainfall; it could be lack of snowfall from mountains far away; or it could be caused when water supplies aren’t sufficient to meet everybody’s needs.

Winds cause weather patterns to move around the globe, including the clouds that bring rain. Over the years, these patterns become routine, creating what we know as our climate. But sometimes these patterns change, and we receive less (or more) rainfall than we are expecting. In temperate locations like the US, the main winds are called the jet stream. These move around the atmosphere in a pattern of ridges and troughs. The behavior of jet streams change with each of the four seasons. In general, jet streams have regular patterns that are unique to each season of the year. But sometimes these jet stream patterns change and cause unusual weather, with some areas getting less (or more) precipitation than they are expecting. If an area has a jet stream pattern that has large ridges and/or troughs that remain in place for a long period of time, then the area will experience drought.

Background Source: National Drought Mitigation Center, University of Nebraska-Lincoln, <http://www.drought.unl.edu/>; Oklahoma Mesonet, <http://www.mesonet.org/public/>

Science

1. Read and discuss background and vocabulary.
—Students will discuss what effects drought might have on the soil.
2. Students will work in pairs to conduct this experiment. If possible, have another class conduct the experiment at the same time to compare the climate in different classrooms.
—Add 2 tablespoons of soil to a Petri dish.
—Add 1 tablespoon of water to the Petri dish.
—Use the thermometer to take the temperature of the soil at this time.

Oklahoma Academic Standards

GRADE 6
Life Science: 2-1,4. Earth Systems: 2-4

GRADE 7
Earth Systems: 2-6

GRADE 8
Earth Systems: 3-1

Materials

Petri dish

water

garden soil (not potting medium)

thermometer

graph paper

computer/library access

Vocabulary

climate—the average weather conditions of a particular place or region over a period of years

drought—a period of dry weather, esp. a long one that is injurious to crops

ridge—an elongated raised or elevated region which has relatively high atmospheric pressure

temperate—having or associated with a climate that has four distinct seasons and is usually mild, without extremely cold or extremely hot temperatures

trough—an elongated and narrow or shallow hollow (as between waves or hills) with relatively low atmospheric pressure.

—Set all the Petri dishes in the same area of the classroom.

—Students will take the temperature of the soil at the same time each day for five days.

—Students will make notes on how dry or moist the soil appears.

—Students will graph the temperature of the soil over the five days.

—Create a graph with a color-coded key to display each pair of students' information across the five days.

3. Discuss the results of the experiment.

—How would the soil temperature affect the growth of crops. — Students will research to find the answer.

—Are some crops more affected than others?

4. When soil moisture is low and no rain comes, crops fail. Water stored in the soil acts as a reservoir of available water for plant use. When the soil profile has good soil moisture, crops can draw on this water to survive longer between rain events without stress. In drought conditions, even when it rains, the soil may not absorb enough moisture to make up for the deficit.

—Students will use the scientific method and design an experiment to discover how much moisture it takes for dry soil to recover moisture.

5. Students will research the effects of temperature on Oklahoma's top crops: wheat, hay, peanuts, cotton, rye, corn, soybeans, oats.

—Students will determine which of Oklahoma's top crops are most likely to be affected by drought.

—Students will display data in a chart or graph.

Extra Reading

Chambers, Catherine, *Drought (Wild Weather)*, Heinemann, 2007.

Ditchfield, Christin, *Water (True Books; Natural Resources)*, Children's, 2003.

Gifford, Clive, *Flooding and Drought (Looking at Landscapes)*, Evans Brothers, 2005.

Hamilton, Virginia, *Drylongso*, Sandpiper, 1997.