Preparing for Drought

Grades 6-8
Social Studies (World Geography)

Objectives

Students will explore the effects of drought in a variety of global contexts.

Vocabulary

Drought- a long period of unusually dry weather
Fallow- land for crops allowed to lie idle during the growing season
Genetically modified seeds- seeds whose genetic material has been altered using techniques which transfer molecules from one plant to another to allow the expression of certain traits
Precipitation- water or the amount of water that falls to the earth as hail, mist, rain, sleet, or snow
Slash-and-burn- the cutting and burning of forests or woodlands to create fields for agriculture or pasture for livestock, or for a variety of other purposes

Background

Drought is defined as a period of time when there is not enough water to support agricultural, urban, human, or environmental water needs. Drought usually refers to an extended period of below-normal rainfall but can also be caused by anything that reduces the amount of liquid water available. Although what is considered "normal" varies from one region to another, drought is a recurring feature of nearly all the world's climatic regions. Agricultural drought occurs when there is not enough moisture for crop or range production. This condition can arise even in times of normal **precipitation**, depending on soil conditions, or agricultural techniques.

The U.S. Drought Monitor started in 2000. For many decades, March 1, 2005, through September 10, 2006, was the driest period on record in Oklahoma. Rainfall was 19 inches below normal, according to precipitation records from the Oklahoma Mesonet. The drought wiped out more than half the state's wheat crop in 2005, the worst harvest in more than 50 years. The drought also provided Oklahoma its worst wildfire season, up to that time. The 2005-2006 drought in Oklahoma was part of a severe worldwide drought affecting the central and eastern United States, Europe and the Horn of Africa. It caused severe food shortages in east Africa, the threat of wildfires in the central and eastern United States and abnormally dry conditions in Australia and Europe. Thirty-seven people died (seven in the United States and 30 in east Africa), and damage from food and water shortages, wildfires, etc., came to over $1million. Between 40- 50 million people were affected by the drought. Drought conditions also affected the Caribbean, central Europe and Asia.

Since 2006, Oklahoma has experienced another, more severe, drought. This time, the longest duration of drought in Oklahoma lasted 239 weeks beginning on November 2, 2010 and ending on May 26, 2015. The most intense period of drought occurred the week of October 4, 2011 where exceptional drought

affected 69.82% of Oklahoma land. In Oklahoma in 2011, a majority of pastures were classified as in "very poor" condition. The persistent heat and drought scorched grazing fields, devastated hay production, and corn production was devastated as well. Many cattle farmers made the choice to sell their cattle, due to difficulty watering them and high hay prices. In 2011, Oklahoma Forestry Services battled 1,745 fires, burning over 132,000 acres. By the end of the summer, 20 people in Oklahoma had died due to the heat. In 2011, the United States also faced widespread drought in over 81 percent of the land at various times. This drought caused estimated damage of more than $30 billion. Oklahoma alone lost more than $2 billion in drought-related agricultural losses between 2011 and 2012.

The effects of drought vary according to regional vulnerability. For example, subsistence farmers are more likely to migrate during drought because they do not have alternative food sources. Areas with populations that depend on subsistence farming as a major food source are more vulnerable to drought-triggered famine. Subsistence farming usually refers to farming which produces enough to feed the family that works a piece of land but not enough for the family to trade at a market. Subsistence farming persists today in sub-Saharan Africa and other developing parts of the world.

In the early days of American history, nearly every family practiced subsistence agriculture, with each family growing just enough to feed itself. With advances in agricultural technology over the years, one American farmer can now feed 155 people. Advanced methods also help modern American farmers survive adverse conditions such as drought and flooding.

Subsistence agriculture is frequently organic; often simply for lack of money to buy industrial inputs such as fertilizer, pesticides, farm machinery, and **genetically modified seeds**. It is not necessarily beneficial for the environment.

One form of subsistence agriculture is shifting cultivation, a practice common in the tropics. In this agricultural system, farmers typically abandon a given plot when soil fertility wanes and move on to more fertile land, often using **slash and burn techniques**. A considerable **fallow** period follows on the abandoned land. This was a technique also used by Native Americans and in early American history, when land was considered plentiful.

Additional Reading

Allaby, Michael, and Richard Garrett, *Droughts*, Facts on File, 2003.

Gifford, Clive, *Flooding and Drought*, Evans Brothers, 2005.

Gifford, Clive, *The Kingfisher Geography Encyclopedia*, Kingfisher, 2003.

Kerley, Barbra, *A Cool Drink of Water*, National Geographic Children's, 2006.

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Teacher Resources

Activity 1 (Social Studies): Global Drought Taskforce, 3-4 50-minute class periods

Demonstration: Drought Dominoes

The impact of drought can be either "direct" or "indirect." What does that mean? Well, to find out, let's think about dominoes. If you set up a long line of dominoes on the floor and knock the first domino in the line over, it will cause the second domino in the line to fall and hit the third, which will fall and hit the fourth, and so on.

If those dominoes were drought impacts, the first domino you knock over might be lack of rain to water pastures. The second domino might be the farmers' ponds drying up and pastures burning. The third domino might be that the farmers would not have water for their cattle, so they would need to sell them. Without their cattle, they might not have the income to purchase a new tractor to bale hay, which would be the fourth domino. The tractor dealer would then lose money, which would be the fifth domino. If enough farmers lose their cattle or crops, the dealership might not be able to employ as many people or may even have to close down—the sixth domino. The dealership closing would cause many more impacts in the community.

The farmers' pasture dying and ponds drying up would be the "direct" impact of drought. The dealer losing money and all of the other impacts would be the "indirect" impacts of drought.

All of the impacts in the example above would be "negative" impacts. But the impacts of drought aren't always all negative. How can this be? Well, let's think about the example of the farmers we talked about earlier. The farmers who sold their cattle might use the money they didn't spend on hay to feed them to hire a person to drill irrigation wells for their corn. The well-drilling business would make more money, so for them the drought might actually have a "positive" or good impact. However, the overall impact of drought in an area is almost always negative.

Procedures

- Read and discuss lesson background.
- Divide students into groups. Explain they have been appointed to serve on the Global Drought Taskforce and have been assigned a subcommittee. They will research drought topics and report to the taskforce. Students can use the
- Possible topics to assign groups are
    - Drought Impact- What are the effects of drought on farm production?
    - Farming Practices- What are some good farming practices to conserve water?
    - Drought-Tolerant Crops- What are some crops that can survive during a drought?
    - Livestock- How does drought impact farm animals?
    - Drought History- What are the five major droughts in Oklahoma history?
    - Economic Impact- What businesses might benefit from a drought, which might suffer?

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Standards

Oklahoma Academic Standards

Activity 1: Global Drought Taskforce

6th World Geography 5.4	Analyze regional problems of the western hemisphere having spatial dimensions
6th World Geography 5.5	Summarize the role of citizens as responsible stewards of natural resources and the environment

Activity 2: Comparing Drought in Oklahoma to Nation

6th World Geography 1.2	Integrate visual information, draw conclusions, and make predictions from geographic data and analyze spatial distribution and patterns by interpreting that data as displayed on globes, graphs, charts, satellite and other forms of visual imagery including data from bar and line graphs, pie charts, thematic maps, population pyramids, climagraphs, cartagrams, contour/relief maps, GIS systems, and diagrams.

Drought Maps from October 2000 through 2018

Activity 2: Comparing Drought in Oklahoma to Nation

Name: _____

Date: _____ **Class/Hour/Teacher:** _____

Directions: Look at the maps of Oklahoma and discuss the drought in Oklahoma.

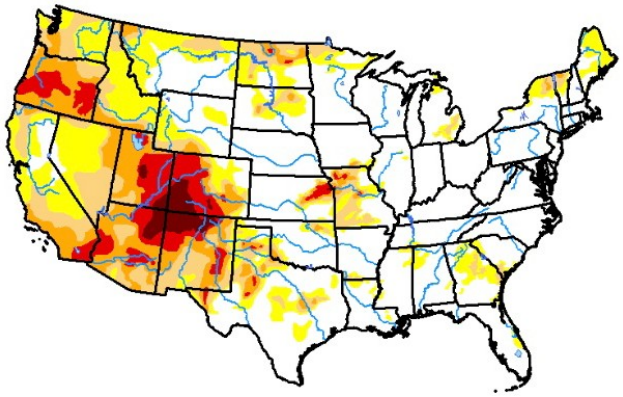
The **U.S. Drought Monitor** started in 2000. Since 2000, the longest duration of drought (D1-D4) in Oklahoma lasted 239 weeks beginning on November 2, 2010 and ending on May 26, 2015. The most intense period of drought occurred the week of October 4, 2011 where D4 affected 69.82% of Oklahoma land

Drought Classification

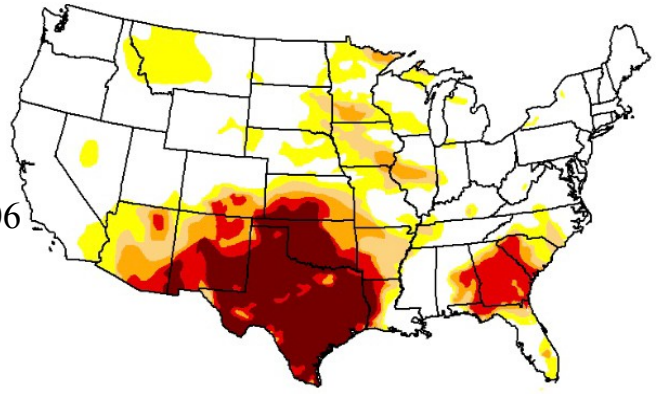
None | D0 (Abnormally Dry) | D1 (Moderate Drought) | D2 (Severe Drought) | D3 (Extreme Drought) | D4 (Exceptional Drought)

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2000-10-03	39.53	60.47	40.99	26.17	6.99	0.74	135
2006-10-03	44.59	55.41	34.48	16.52	6.81	0.14	113
2011-10-04	55.13	44.87	30.00	23.76	17.99	11.69	128
2018-10-02	52.65	47.35	28.96	17.03	7.27	1.73	102

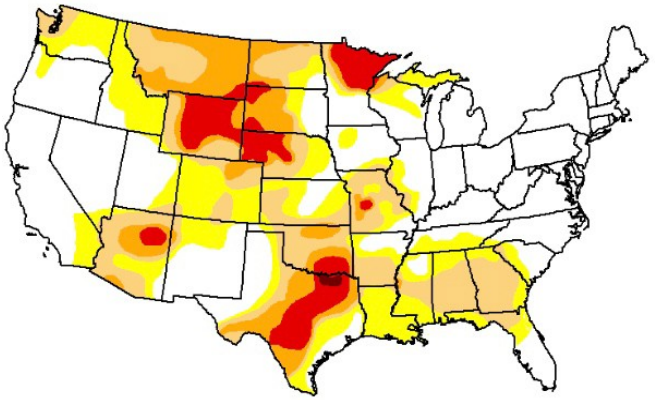
Oct 3, 2000



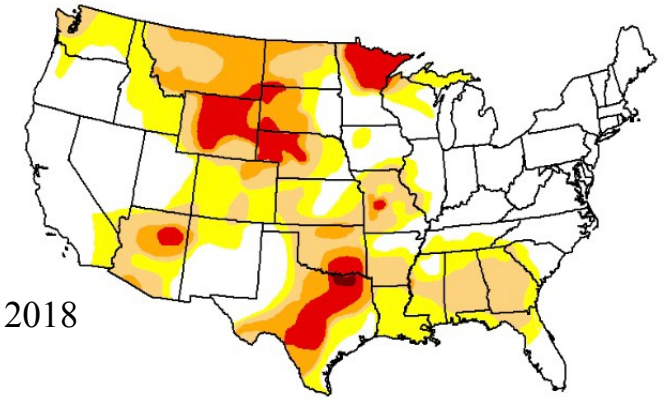
Oct. 3, 2006

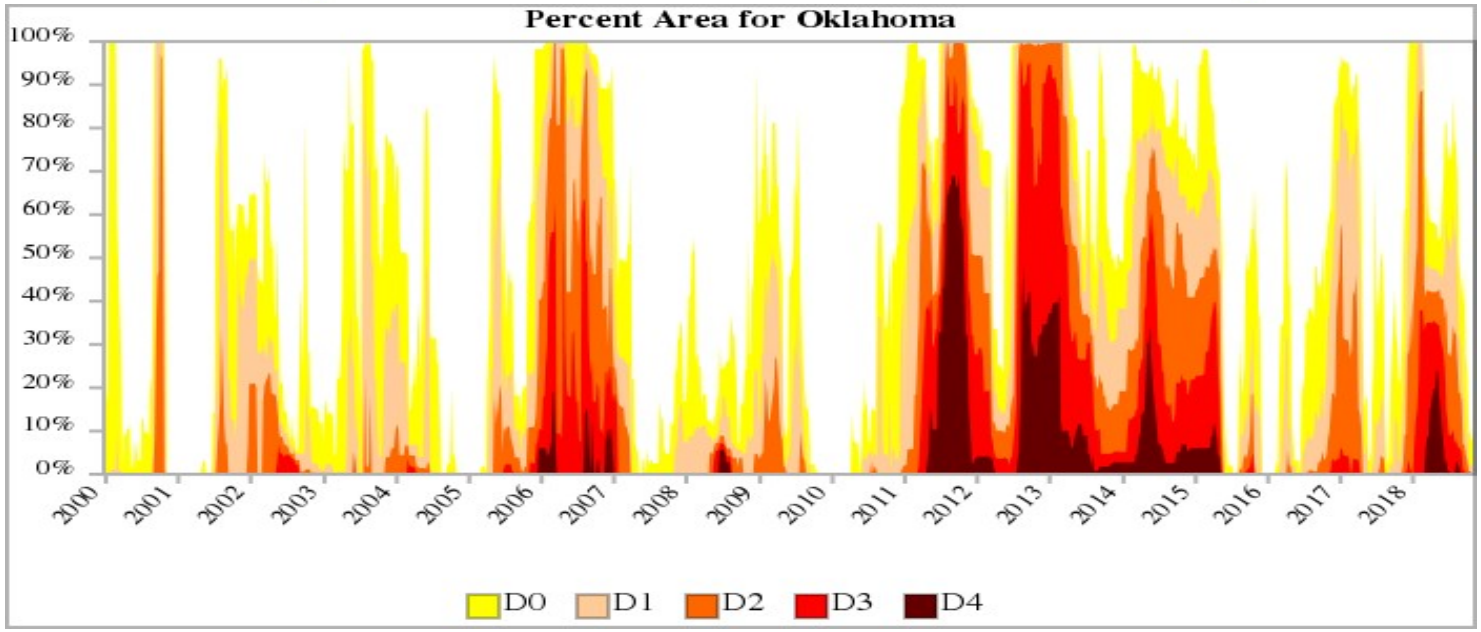


Oct. 4, 2011



Oct. 2, 2018





1. **What do you notice about the drought in Oklahoma? How did Oklahoma compare to other states? What year were you born? How did the drought in that year compare to other years?**