

Impacts of Droughts in Texas

Overview

Students learn about the impact droughts have on humans and the environment.

Estimated Time

One class period.

Materials

Powerpoint with teacher explanations as a guide to the lesson activities. [Slides are numbered in slide notes to correspond to directions below.]

Master copies of **Student Worksheet 1: Drought in Texas** 4 square notes

Master copies of **Student Worksheet 2: Summary of Droughts** activity (includes map of Texas)

11x 17 or larger poster paper for each student group

Class map of Texas (large map—recommend using at least size 11x17 paper, traced or printed)

Colored pencils or markers for each group—6 or more colors for each group

Links to articles to be used by groups in the Gallery Walk activity

[North Texas water pipeline article](#)

[East Texas article](#)

[South Texas/Valley article](#)

[Central Texas articles](#)

[Drought in Texas 4part article](#)

[Wall Street Journal article](#)

[Water rights laws](#)

[Marfa area water background story](#)—(a bit dated)

[Texas water crisis—2019](#)

[NPR—maps and graphics](#)

[Central Texas](#)

[Texas water shortage 2020](#)

[Lessons and maps about Texas drought 2020](#)

[Article on droughts post Harvey—2018](#)

Learning Objectives

After completing the lesson, students will be able to:

- **Describe** the impacts of too little water on the people of Texas.
- **Explain** environmental and human caused reasons there is drought in some regions of Texas.
- **Describe** how climatologists relate climate change to the more frequent droughts in Texas

Opening the Lesson

1. Ask students to think about these opening questions and discuss with a partner:
 - What places in Texas have suffered from too little water/drought in the past few years?
 - Where are these places in Texas located? (Relative location)
2. Have students discuss the questions from step 1 as a whole group, perhaps have a few students identify these places on a large map of Texas.
3. Discuss results of student survey from the closing of Lesson 1

If survey questions were loaded to Google Forms or another digital format the data/results will be easier to display and analyze.

If needed, go over teacher directed notes on the definition of drought from lesson 1 power point.

Developing the Lesson

4. Students will be divided into regional drought groups. You can double up the groups for larger classes.

Assign students to groups of four. Tell students that they will become experts on drought regions in Texas. Randomly assign past droughts to the student groups. To allow for “luck of the draw” put drought regions names on strips of paper and have one student from each group draw for the group. Seven drought areas would be used for a class of 28 with four in a group, repeating one of the areas for the seventh group. For larger classes, repeat additional drought areas.

GROUPS:

1. Panhandle [Amarillo and environs]
2. West Texas [Permian basin area]

3. The Valley [Eagleford basin]
4. Central Texas [Austin/San Antonio area]
5. North Texas [Dallas, Fort Worth region, and areas west]
6. East/Southeast Texas [Houston, Gulf Coast, Lufkin area]

For those Global Learners—Tell students they will need to be able to answer these questions after their lesson: [A power point slide of these questions is included but hidden.]

- What places in Texas suffer from too little water/drought?
 - What are the impacts of too little water on the people of Texas?
 - What are the main reasons there is drought in certain regions of Texas?
 - How can humans control or plan for too little water in both urban and rural areas?
 - How do climatologists relate climate change to the more frequent droughts in Texas?
5. Pass out **Student Worksheet 1: Drought in Texas** 4 Square to each student. They can use this for their own notes while reading.
 6. Have students read articles about drought in Texas. Articles for each region have been provided along with other articles that may be of interest. Students can also research on their own using teacher provided links or appropriate search engines.

After filling out **Student Worksheet 1**, students should be able to complete the following as a group or individually:

- Identify where in Texas your assigned region is located.
 - Determine the source/s of water in your assigned region such as rivers, aquifers, lakes, rainfall, pipelines, etc.... and be prepared to label it on a large class map of Texas.
 - Describe impacts both by people and on people when too little water is present.
7. Student groups will complete a group poster using the following format. Display in the classroom:

Geography of Drought

Describe the physical geography of the area

Places/Regions assigned

Place: _____

Describe the human geography of the area (urban, rural, high or low population, cultural landscape, etc.)

Impacts on the environment and society of the region.

8. Re-divide students into new groups for an Expert Groups/Jigsaw Activity: Have the first 4 groups call out their letter A, B, C, D at each table/group of desks. Then have the remaining 3 or 4 groups call out their letter E, F, G, H. Assign letters to tables/desk group so there are up to 8 groups with the same letter. For example, all A's will be in one group, all B's in another group and so on. Students will move to the designated desk/table group.
9. Pass out **Student Worksheet 2: Summary of Droughts** activity to all students. This has a chart and map of Texas included for student use when concluding the lesson. Direct students to use Worksheet 2 to take notes as each expert tells about their region.

Allow students 10 minutes to tell their new group about their drought region. In expert groups students will learn about 2 more droughts, identifying the region's location, source/s of water and 2-3 big ideas on how people and the environment are affected by drought in the region. At the end of 10 minutes tell students to return to their original groups (Drought regions).

10. Gallery Walk:

- Since students did not get to rotate among all groups, use a Gallery Walk for students to complete Student Worksheet 2. Students in groups A, B, C, D will go to posters of groups E, F, G, H while E, F, G, H groups will go to posters of groups A, B, C, D. Set a timer for 10 minutes for students to complete their Student Worksheet 2 chart.
- Class map: At this time remind Group Leaders to shade and label the area their group was assigned on the large class map.

[Another option is to designate one student as an expert or docent for each group. That student will stay at the group station while others move to new groups. The student who remains will relate the drought info/findings to the other groups of students that rotate to their station. This process will continue until everyone has notes on all regions/areas. The expert would then be able to get the complete notes from another student or the teacher could provide it to the expert student.]

Concluding the Lesson

11. In original groups, have students complete their own map of Texas (Student Worksheet 2) based on the class map created by the group leaders during the Gallery Walk activity. Students will map drought areas with name and other information assigned.
12. Ask students to discuss what patterns they observe on their own Student Worksheet 2 chart and map and the class map. Are there any patterns they observe within their region related to municipal v agriculture v industry v recreation sectors? Are there patterns related to other regions that are observable? Discuss all reasonable findings.

13. Have students discuss and answer the Essential Questions to make sure they understand the impacts of drought in Texas. These could be divided up, the students could choose 2, questions could be used as an exit ticket, etc....
- Identify what places in Texas suffer from too little water/drought.
 - Describe the impacts of too little water on the people of Texas.
 - Explain the main reasons there is drought in certain regions of Texas.
 - Discuss how we can control or plan for too little water in both urban and rural areas.
 - Identify how climatologists relate climate change to the more frequent droughts in Texas.

Worksheet I:
Drought in Texas

Name _____ Date _____ Period _____

Geography of Drought in Texas	Region Assigned: _____
Describe the physical geography of the area:	Describe the human geography of the area: (urban, rural, high or low population, etc..)
List places in assigned area:	Impacts on the environment and society/ people of the region:

Worksheet 2:
Summary of Droughts

Name _____ **Date** _____ **Period** _____

1. Complete the chart for your signed region first. 2. The other sections will be completed during a class activity.

Drought in Texas	Physical Geography of the region	Human Geography of the region	Places impacted in the region	Impacts on the environment and society of the region
1. Panhandle region [Amarillo & environs]				
2. West Texas [Permian Basin area]				
3. The Valley [Eagleford basin]				
4. Central Texas [Austin/San Antonio area]				
5. North Texas [Dallas, Ft. Worth region and areas west]				
6. East/Southeast Texas [Houston, Gulf Coast, Lufkin areas]				

Drought in Texas map

Label the regions on your map

Shade the regions by assigned colors shown on the class map

Annotate/Make a few short notes within each region about places affected:

- ◆ Source/s of water in the region
- ◆ Who is impacted the most in each region:
 - Municipal/urban areas
 - Agricultural areas
 - Industrial areas
 - Recreational areas

Legend

Panhandle
West Texas
The Valley
Central Texas
North Texas
East/Southeast Texas

