

**Drought in Georgia**  
**Standards-Based Activities and Background Information**  
**for Earth Science Teachers**

**Lesson 1**  
**What is Drought?**  
**Perspectives and Definitions of Drought**

**Teacher Background Information**

Droughts are not sudden catastrophic events like hurricanes and earthquakes. They take place over time, but they still cause economic stress and devastation.

Depending on whom you ask, you will find multiple definitions for the term “drought.” Imagine a farmer going several weeks without rain. To a farmer whose crops needed rain, that rainless period would be defined as a drought. A meteorologist looks at trends and normal conditions over time. The meteorologist compares years to years to years. Therefore, any period of time in which precipitation is less than normal could be called a “drought.” For a water manager whose job is to provide water to businesses and homes, a drought is any deficiency in the water supply that affects water availability and water quality. Imagine a hydrologist whose work involves monitoring streamflow. Hydrologists study the distribution of water. They may research the flow or discharge of water along a river or over a dam. They often work as a team with other scientists. If a hydrologist notices a decrease in precipitation and streamflow over an extended period of time, he or she would consider that to be a drought situation. So, a person’s perspective helps to define what a drought is.

During this lesson students will have the opportunity to look at a drought from multiple perspectives. Their own experiences with drought conditions will help them define what a drought is and what the term means to them.

Drought can occur anywhere. All droughts begin with a deficiency of precipitation, explains Don Wilhite of the National Drought Mitigation Center. He explains that droughts can be meteorological, agricultural and hydrological.

- Meteorological drought - can come and go as frequently, and as quickly, as rainstorms do and occurs when there is a precipitation deficiency compared to normal levels over time.
- Agricultural drought - is based on soil moisture levels in the top 24 or so inches of the soil where plants need it and where conditions change dramatically with one good rainstorm. Available soil moisture is the principal factor affecting plant growth and yield. Agricultural drought conditions reset every year.

- Hydrological drought - is much deeper and long-lasting than other forms of drought. Hydrological conditions (surface and groundwater levels and flows) are measured continuously, drought or not, so it covers a longer time period with no resetting.

**Language:**

- **drought** – a drought is a period of drier than normal conditions that results in water-related problems. It is caused by a lack of precipitation at critical growing periods or may last long enough to affect hydrology (Moreland, 1993).

NOTE: Web sites cited in this document were accessible as of February 2007.

**What is Drought?**  
Perspectives and Definitions of Drought

**Key Words:** drought

**Desired Outcomes**

**Goals:**

**S6E3. Students will recognize the significant role of water in earth processes.**

- a. Explain that a large portion of the Earth's surface is water, consisting of oceans, rivers, lakes, underground water, and ice.

**Understandings:**

**Students will understand that...**

- drought and water use impact the availability of water resources
- a large portion of Earth's surface is water, yet only a very small percentage of that water is available for consumption
- a drought is a period of drier-than-normal conditions
- droughts affect water supplies, agricultural production, stream water quality and habitat, recreation, navigation, and forest resources.

**Essential Questions:**

- What role does water play in earth processes?
- What is drought?
- What are some community impacts of drought?

**Students will know...**

- the significant role of water in earth processes
- key vocabulary
- how communities are affected by drought.

**Students will be able to...**

- discuss the significant role of water on Earth
- operationally define drought from a number of perspectives
- write about how drought might affect them and their community.

**Lesson Hook:**

- Show students the poster of the boy swinging over the dry lakebed. Have students look closely at the poster. Without talking to anyone, have students write down what is wrong with the picture. Then have them write what they think might have caused the situation in the picture. Have students pair up and then share their ideas with a classmate. Bring the class back together and discuss their ideas. Then, show students actual pictures of droughts found at <http://www.drought.unl.edu/gallery/gallery.htm>. Give each group of

students a drought-related picture without any background information. Let the groups discuss and decide what might have caused the situation in the picture. Allow groups time to present their pictures and possible causes to the entire class.

### Assessment

#### Performance Tasks:

News article

Guided by a rubric, students will write an interview from the point of view of experts in the field who have concerns about the effect the continuation of a drought will have on the community.

#### Other Evidence:

- Students' written responses upon first viewing the drought poster (lesson hook)
- Participation in group discussions as observed by the teacher
- Teacher observations

### Plan of Action

#### Tasks:

##### Part A: Setting the Stage: 15 minutes

1. Write the word "drought" on the board. Tell the students that all of the pictures (see Lesson Hook) are the result of a drought. Explain to students that a large portion of the Earth's surface is water (oceans, rivers, lakes, underground water, ice). Place three glasses in the front of the room. Pour 97ml of water into the first glass. In the second glass, pour 2ml of water. In the third glass, pour 1ml of water. Explain to the class that the glasses combined represent all the water in the world. Have them guess which glass represents available usable water (the glass with 1 ml). Identify the glass with 97ml as representing all the salt water in the world while the glass with 2ml represents the fresh water that is frozen in glaciers. Fresh water that is available for people to use as drinking water is a small percentage of all the water in the world. During times of drought, a greater percentage than normal of that available water is contained as a gas in the atmosphere instead of in liquid form where it would become part of lakes, streams, rivers, and underground water sources that people could use.

##### Part B: Point of View: 90 minutes

1. Explain to students that the exact meaning of the word "drought" varies, depending on the point of view of the person explaining it. For example, a farmer might explain drought differently than a meteorologist, who might

explain drought differently than a water manager, who might explain drought differently than a hydrologist.

2. Divide the class into groups of 4. Each group will represent one of the following roles: farmers, meteorologists, water managers, and hydrologists. Assign a role to each group and give each group the appropriate information card (**Student Activity Sheet #1**). Have students read the cards in the group and discuss. Students should research the role further and study together. Have students brainstorm and create a list of concerns regarding drought based on their assigned role.
3. Count off within each group and then pull all the 1's, 2's, 3's, and 4's from each group together to form new groups. Each group should now have a farmer, a meteorologist, a water manager, and a hydrologist expert in it.
4. Within the new groups, students will teach the other students in their group about their role. Students should compare and contrast the four perspectives on drought by asking and answering questions such as:
  - a. What is the farmer most concerned about the drought affecting?
  - b. How might the drought ultimately impact the farmer?
  - c. What has to occur for a meteorologist to consider it a time of drought?
  - d. What is the water manager most concerned about the drought affecting?
  - e. How is a hydrologist's point of view similar to that of the meteorologist? How is it different?
5. Then pull all the groups together to discuss the elements that the points of view have in common, and work with the students to develop a general definition of drought. Share this definition with the class: "drought is a period of drier than normal conditions that results in water-related problems (Moreland, 1993)." Compare this definition with the one the class wrote.
6. Ask students the following questions:
  - a. What is their point of view on drought?
  - b. Can drought affect them?
  - c. Share examples of how drought affects them.
  - d. What personal experiences have they had with drought?
  - e. Are they aware of any historically significant drought situations?

### **Part C: In the News: 90 minutes in class/45 minutes as homework**

1. Ask students to write a brief news article about how drought might affect them and their community. Tell them that the town is experiencing a drought. We are not sure what effect the continuation of the drought will

have on us as a community. Various experts in the field have concerns. Students will write interviews from the point of view of the experts. Students may choose to interview “experts” from Lesson 2, “Point of View.” Provide the photos of drought from the lesson hook activity. Allow students to use those photos as a reference for their own illustration/diagram. Provide students with a copy of the rubric and discuss expectations before students begin to write (**Student Activity Sheet #2**).

2. Conclude by having students share their articles with the class. This can be done orally in small groups or as a whole class presentation.

### **Additional Resources:**

#### **Web sites:**

- [www.ConserveWaterGeorgia.net](http://www.ConserveWaterGeorgia.net)
- <http://ga.water.usgs.gov/edu/gadroughts.html#drought>
- <http://www.drought.unl.edu/gallery/gallery.htm>
- <http://drought.unl.edu/kids/index.htm>

#### **Books for Teachers**

The Watercourse. (1999). *Project WET*. Bozeman, Montana.

#### **Books for Students**

Stanley, Jerry. (1992). *Children of the Dustbowl: The True Story of the School at Weedpatch Camp*. New York, NY: Crown.

### **Lesson Plan Template**

Wiggins, G., & McTighe, J. (2004). *Understanding by design professional development workbook*. Alexandria, VA: Association for Supervision and Curriculum Development.

## TEACHER - Copy and Distribute to Groups

### What is Drought? Student Activity Sheet #1 Perspective Cards

#### FARMER

**A farmer is** a person who grows field crops, has orchards, vineyards, or market gardens, and does so with the prospect of selling the produce as food. Farmers may, however, provide raw materials for industrial purposes, such as cereals for alcoholic beverages, fruit for juices, hides for leather, and wool or flax for yarns and cloth-making. Farmers may also be involved in rearing livestock for meat, milk, or other substances (<http://en.wikipedia.org/wiki/Farmer>).

**To a farmer, a drought is a period of moisture deficiency that affects the crops under cultivation. Even two weeks without rainfall can stress many crops during certain periods of the growing cycle.**

#### METEOROLOGIST

**A meteorologist is** an individual with specialized education who uses scientific principles to explain, understand, observe or forecast the earth's atmospheric phenomena and/or how the atmosphere affects the earth and life on the planet (<http://www.ametsoc.org/policy/whatisam.html>).

**To a meteorologist, a drought is a prolonged period when precipitation is less than normal.**

#### WATER MANAGER

**A water manager** coordinates decisions about water use and allocation through a proactive outreach and planning process with many kinds of water user groups. A water manager might work in state or local government or in private business (The Watercourse. (2002). *Discover A Watershed: Watershed Manager*. Bozeman, Montana.).

**To a water manager, a drought is a deficiency in water supply that affects water availability and water quality.**

#### HYDROLOGIST

**A hydrologist is** a person who applies scientific knowledge and mathematical principles to study water-related problems in society: problems of quantity, quality and availability. Hydrologists may be concerned with finding water supplies for cities or irrigated farms, or controlling river flooding or soil erosion. They may work in environmental protection: preventing or cleaning up pollution or locating sites for safe disposal of hazardous wastes. (<http://ga.water.usgs.gov/edu/hydrology.html>).

**To a hydrologist, a drought is an extended period of decreased precipitation and streamflow.**



## TEACHER - Copy and Distribute to Groups

### What is Drought? Student Activity Sheet #2 In the News! Rubric

Name: \_\_\_\_\_

CATEGORY	4	3	2	1
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors.	A few grammatical, spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.
Organization	Information is very organized with well-constructed paragraphs and subheadings.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not well constructed.	The information appears to be disorganized and leaves the reader unclear about author's point.
Diagrams & Illustrations	Diagrams and illustrations are neat, accurate and add to the reader's understanding of the topic. A caption for the illustration/diagram is provided.	Diagrams and illustrations are accurate and add to the reader's understanding of the topic.	Diagrams and illustrations are neat and accurate and sometimes add to the reader's understanding of the topic.	Diagrams and illustrations are not accurate and do not add to the reader's understanding of the topic.

<http://rubistar.4teachers.org/index.php>