

WEBQUEST: WATER IN TEXAS

Overview

Did you use water today? If you brushed your teeth, used a toilet, took a shower, ate a meal, or even breathed the air, chances are very good that water was involved. We use water in almost everything we do, and for most of the things we do that involve water, there is nothing we could use as a substitute.

In this activity, you will investigate who uses water in Texas, and how much they use. Water is a limited, precious resource, essential to almost everything we do. Will we have adequate water resources in the future? Many people in Texas don't realize who uses the most water, and how they use it. If we don't have an accurate picture of how water is used, we can't make a successful plan to conserve water.

You will investigate water use in Texas, and make recommendations on how to use water efficiently and wisely.

For information on the TEKS in this activity, see "Water In Texas WebQuest TEKS" included in this activity.

Introduction

You are part of a team hired by the state of Texas to make a water plan. It takes thoughtful planning to make sure that when you turn on the faucet, water comes out. (and that water will continue to flow for future generations of Texas) Texas relies on both groundwater from aquifers and surface water from rivers and reservoirs to provide enough water for everyone.

Your team will need to look at a lot of competing interests and different points of view, in order to come up with a plan that gives everyone enough water now and in the future. You will share your research with others on your team to develop a plan, but you will need data to support your plan. The solution does not have to be one that is currently used. Think creatively; original ideas are encouraged.

Quest(ions) and the Task

You are a member of a team assembled to determine how Texas will ensure citizens continue to have adequate water resources. You will be assigned to represent a region of Texas, and your task is to recommend measures that will help reduce water consumption by 10%.

Process

Making a plan to assure Texas has enough water is a complex process. In 1997, Senate Bill 1 created a regional water planning process in Texas. Texas is broken into 16 regional water planning groups, and each group develops a water plan for their region. The Texas Water Development Board coordinates the regional water planning process and incorporates the regional plans into a State Water Plan, which is updated every five years. As citizens, you have an important role in providing feedback to water planners. You will work in teams to come up with a plan that assures Texans will have enough water today, and into the future.

Water planning groups use many models in the water planning process. One model helps groups understand how much groundwater and surface water is available, called "groundwater availability models" or GAMs. Another is called a "Water Availability Model" or WAM. Models that include crop water use efficiency, weather conditions and soil moisture are used to estimate agricultural water use. Models also help planners figure out how much water people should NOT

use, leaving enough water in rivers and estuaries to balance the needs of people and wildlife (called environmental flows).

Your whole team will need to answer this question:

Why do we use models to think about water planning and how do we use these models?

Teams will consist of four members. Each team member will select one of the following roles to play. Choose the four roles that figure most prominently into the economy of your region.

Team Member	Representing (Customer Category)	Guiding Interest
Farmer	Irrigation	Adequate water to irrigate crops
Mayor	Municipal	Adequate water for residential (homes) and commercial (restaurants, schools, hospitals) uses
Manufacturer	Industrial	Enough water to run factories, manufacturing facilities, and other businesses
Power plant engineer	Electric Utility Generating Facility	Enough water to generate electricity for the town
Rancher	Livestock	Adequate water to raise livestock such as cattle, poultry, sheep, and hogs.
Mining Operator	Mining	Adequate water to extract and process oil and various minerals
Biologist	Environmental	Enough water in the rivers and estuaries to provide habitat for aquatic ecosystems

Your team will represent a specific regional water planning group in Texas, assigned by either your teacher, or by your own choice. (To see a map of the different regional water planning groups, go to http://www.twdb.state.tx.us/mapping/maps/pdf/sb1_groups_8x11.pdf)

Some regions will have plenty of water; others will be quite dry. Some regions have lots of agriculture, others will have more mining, or power plants, or ranching.

Each category of water user will have a different capacity to conserve water without inhibiting their ability to make a living. For instance, in order for a farmer to conserve water they might switch to more efficient irrigation methods. That way, they could use less water without affecting their yields. A rancher, on the other hand, might have to raise fewer animals in order to use less water. That could have a negative impact on the rancher's livelihood.

Each team member will explore resources to collect information and record their data. A summary of your individual research and a list of resources will be collected from each team member on the day of the presentation. The goal is to reduce water consumption.

The information each team member collects will be compiled to create one final group presentation. Your team must present your findings in an oral presentation, and it must be supported by one of the following products:

- A PowerPoint or other multimedia presentation
- A poster
- Summary Tables
- A report
- A web page
- Every presentation must include graphs that represent your findings.

Individual team members must answer the following questions:

Farmer

- How much water per year is used for irrigating crops in your region?
- In what ways would a water shortage affect your business?
- Why would you be interested in reducing water use?
- What factors discourage you from reducing water use?
- What are your recommendations for conserving water used for irrigated agriculture?

Mayor

- How much water per year do municipalities use in your region today?
- How will water use change as the population of your city grows?
- In what ways would a water shortage affect your city?
- What are your recommendations for conserving water used for municipal use?

Manufacturer

- How much water per year does industry use in your region?
- In what ways would a water shortage affect your business?
- What are your recommendations for conserving water used for industry?
- What would motivate you to conserve water?

Engineer

- How much water per year do steam-electric power plants need to operate in your region?
- In what ways would a water shortage affect your business?
- What are your recommendations for conserving water used for power generation?

Rancher

- How much water per year does livestock use in your region?
- In what ways would a water shortage affect your business?
- What are your recommendations for conserving water used for agriculture?
- Is water conservation as important from your perspective as from the farmer's perspective? Why or why not?

Mining Operator

- How much water per year does mining use in your region?
- In what ways would a water shortage affect your business?
- What are your recommendations for conserving water used for mining?

Wildlife or Aquatic Biologist

- In what ways does a healthy aquatic ecosystem benefit the health of people?
- In what ways are healthy aquatic ecosystems important to the Texas economy?
- In what ways would a water shortage affect local aquatic ecosystems?
- What are your recommendations for conserving water so there is enough for healthy ecosystems?

To answer your questions, use the resources listed in the Resources section of this WebQuest. Use only the resources listed.

Remember, water is a difficult issue, and team members won't always agree on things. You will have to compromise, negotiate, and create a plan that treats each water user fairly, while ensuring that all Texans have enough water. Your goal is a 10% reduction in water usage in your region.