

Major Rivers: a Texas Water Education Program

Lesson Plan Objectives and Descriptions Grade 4

Lesson 1: Water in Texas

Objective: Students will become aware of the importance of water to Texas.

Activities: To begin the program, students complete the pretest. They observe water and answer questions about its properties and importance and then read page 2 of the workbook story. Students investigate the effects of temperature changes on ice. The teacher shows the video and then discusses the video with the students. The video gives an overview of the history of water resource management in Texas and explains why we need to conserve water.

Lesson 2: The Water Cycle

Objective: Students will identify the various steps in the water cycle: precipitation, surface runoff, percolation, evaporation and condensation.

Activities: Students read page 3 in the workbook, discuss it, and sing the water cycle song. The teacher demonstrates the water cycle. Students complete laboratory activities demonstrating evaporation, condensation, and percolation. Students complete the exercise on page 4.

Lesson 3: Texas Water Supply and Water Planning

Objective: Students will identify basic facts about the water supply in Texas, including regional differences in rainfall, the amount of water supplied by surface water and by groundwater, and learn about the state's major rivers and aquifers. Students will also understand the importance of water planning and identify water management strategies used to ensure adequate water supply.

Activities: Students read page 5 in the workbook and study the maps on pages 6 and 7. They learn facts about the major rivers of Texas, discuss the major aquifers map, and compare rainfall in different regions of Texas. Students create a groundwater/surface water model and investigate the effect of soil stratification on groundwater/surface water supply. They complete the "Water: Coursing through History" activity where students role-play the water needs of various water users historically compared to today. The concept of water planning in Texas is discussed and illustrated with a transparency of Regional Water Planning Groups and an Internet exercise using TWDB's website. The teacher conducts a review exercise of water supply information through the "Water Baseball" game. Students complete the exercise on page 8.

Lesson 4: Watersheds and River Basins

Objective: Students will understand the concepts of river basins and watersheds and be able to identify their river basin and local watershed. Students will create changes in a simulated streambed to evaluate the effects on water flow rates and directions.

Activities: Teachers discuss the definition of a watershed, shows the river basin transparency, passes out a river basin worksheet, and then reads the story about Texas river basins in the teacher's guide. Teachers pause at the end of the description of each river basin and ask students to identify that river basin on their worksheet. Students read page 9 in their workbook, discuss it, and complete the exercise on page 10. Teachers help students find information about the watershed(s) they live in on EPA's website. Students do an outdoor experiment investigating the impact of water flow on water systems and complete the data sheet.

Lesson 5: How Our Water Use Affects Our World

Objective: Students will identify various uses of water, including municipal, agricultural, industrial, recreational, and electric generation. Students will differentiate between point source and nonpoint source pollution. Students will recognize that most water pollution is caused by human activity within the watershed.

Activities: Students read page 11 in their workbook and discuss the ways we use water and the types of pollution. Students do an activity called "Frankie the Fish Story" to demonstrate examples of nonpoint and point source pollution. Teachers bring students to a nearby water source and identify areas of point source and nonpoint source pollution and complete the exercise on page 12 of the workbook.

Lesson 6: Water Treatment and Distribution

Objective: Students will identify the steps and processes of the water distribution system in Texas - wells and reservoirs, pipelines, water and wastewater treatment plants, septic systems, and recycled water.

Activities: Students read page 13-15 in their workbook and teachers lead a discussion about the story and the process of water treatment and distribution using the workbook and an overhead transparency. Students complete a laboratory activity investigating the steps of the water treatment process using the worksheet provided. To study water distribution, students practice reading water meters and calculating monthly water usage for a household. Students complete the exercise on page 16.

Lesson 7: Using Water Efficiently

Objective: Students will review which home water activities use the most water, identify water conservation practices, and assess their individual water conservation practices.

Activities: Students read page 17 in their workbook and discuss the water use pie chart in the workbook and why water conservation is necessary. Students make lists of typical household water uses and play a game grouping these water use activities into high, medium, and low water use categories. They play a detective game to search for wise and unwise use of water around their school using the worksheet provided. Students complete the exercise on page 19. They read pages 18 and 20 of the workbook and teachers discuss ways that people can cut down on water use. Teachers use stories about water-wasting scenarios to have students role-play more "water smart" endings to the stories.

Lesson 8: Review and Posttest

Objective: Students will exhibit an understanding of the importance of water to Texas.

Activities: Teachers hand out and discuss the Major Rivers Home Information Leaflets. They discuss the home water use survey and encourage students to conduct the survey with their parents. Students make conservation checklists to keep track of how well they are conserving water. Teachers conduct a follow-up discussion about the results of the survey, conduct a review quiz, and administer the posttest. Students write about what they have learned and pass this knowledge on to other students in the school.