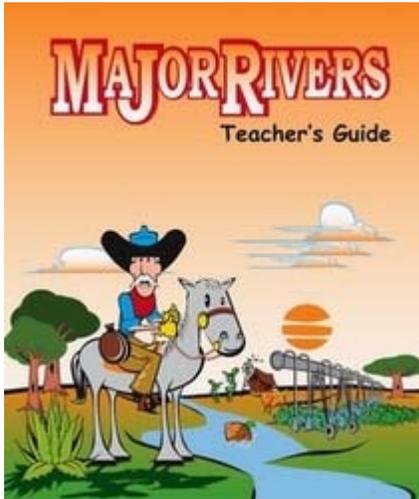


## Major Rivers: A Texas Water Education Program



Major Rivers and his horse Aquifer makes learning all about water in Texas irresistibly fun. Major Rivers is a 4<sup>th</sup> and 5<sup>th</sup> grade water education curriculum designed to teach students about Texas' major water resources, how water is treated and delivered to their homes and schools, how to care for their water resources, and how to use them wisely. The program's host, Major Rivers (named for the major rivers of Texas), and his horse Aquifer cover these topics in eight lessons that include a variety of activities in science, math, language arts, social studies and other subjects. The Major Rivers teaching package includes a teacher's guide with pre/post tests, overhead transparencies, an introductory video, and 30 full color student workbooks and home leaflets. The cost per kit is about \$45 (based on order #s).

The Lower Colorado River Authority (LCRA) originally launched the Major Rivers program in 1989, and released an updated version in 2002 with a new look, more hands-on activities, and Internet resources. In the spring of 2003, the Texas Water Development Board (TWDB) (the state agency charged with water planning in Texas) and LCRA worked together to produce a new statewide version of Major Rivers that integrates water planning with the water supply lesson and includes historical stories about Texas river basins. In January 2006, TWDB launched a new kids webpage that features interactive online learning activities that complement the topics covered in Major Rivers (<http://www.twdb.state.tx.us/kids>). From 2003 to 2006, TWDB has distributed a total of 4450 teacher kits and 3861 sets of additional classroom materials to 115 entities including water management districts or suppliers, and regional education service centers. TWDB will continue to make Major Rivers available statewide on an annual basis, and anticipates that many more entities will bring this program to local schools. The program has received very positive evaluations from participating teachers.

The program contains seven main lessons and one review lesson. Each lesson has a corresponding section in the student workbook, and many lessons have corresponding workbook exercises. There are also optional extension and enrichment activities at the end of each lesson. The lesson objectives not only define important knowledge and skills related to water, but they also support many of the Texas Education Agency's TEKS and TAKS objectives for social studies, science, language arts and math. A chart showing the program correlations to the TEKS and TAKS objectives is provided in the teacher's guide. A detailed description of each lesson and the TEKS objectives chart are available online at <http://www.twdb.state.tx.us>.

Contact Linda Ruiz McCall at the TWDB for more information on how to bring Major Rivers to classrooms in your area ([Linda.McCall@twdb.state.tx.us](mailto:Linda.McCall@twdb.state.tx.us) or (512) 463-5836).



The Texas Water Development Board is the state agency charged with collecting and disseminating water-related data, assisting with regional planning and preparing the State Water Plan for the development of the state's water resources, and administering cost-effective financial programs for the construction of water supply, wastewater treatment, flood control and agricultural water conservation projects. For more information on water conservation in Texas, please go to TWDB's website at [www.twdb.state.tx.us](http://www.twdb.state.tx.us)

### **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.