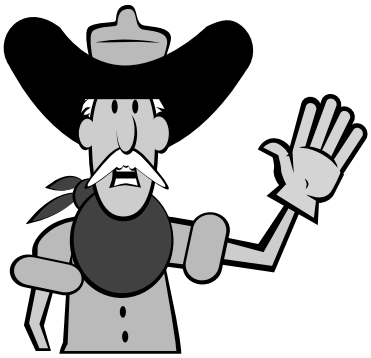

MAJOR RIVERS
TEXAS WATER EDUCATION PROGRAM

Teacher's Guide

Welcome to the revised edition of Major Rivers, a Texas Water Education Program for elementary students.

About Major Rivers

Major Rivers is designed to help fourth- and fifth-grade students learn about Texas' major water resources, how water is treated and delivered to their homes and schools, and how to care for their water resources and 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 teaching package includes student workbooks, pretest and posttest sheets, home information leaflets, overhead transparencies and an introductory video. This Teacher's Guide shows how to use these materials and contains additional learning activities.

Most teachers complete the Major Rivers program over a two-week period, typically as part of their social studies and science curriculums.

The History of Major Rivers

LCRA began developing Major Rivers in 1984 as part of its water conservation activities in the lower Colorado River basin.

In 1987 LCRA hired Educational Development Specialists, a California-based curriculum company, to help develop the program. LCRA also assembled an advisory group of teachers, curriculum directors, water utility officials, and other officials from throughout the lower Colorado River basin to determine subject matter and educational requirements. Field tests of the program in 1988 throughout the lower Colorado River basin played a significant role in shaping the final version of the lessons and of Major Rivers' depiction as a crusty, dusty Texas cowboy.

LCRA also reached an agreement with the Texas Water Development Board, the Texas Department of Health and the Texas Water Commission (now the Texas Commission on Environmental Quality) to distribute a statewide version of the program.

Formally launched in 1989, Major Rivers was an instant success. Students enjoyed the Major Rivers character as they learned about their water resources. Teachers appreciated a multidisciplinary program with a Texas focus that was correlated to state educational requirements. By the end of the 1990s, Major Rivers had reached more than 1 million fourth graders throughout Texas.

The program was revised in 1993 to include some additional activities and update the educational requirements correlation. In 2001, LCRA began work on a second revision, working with a curriculum consultant, LCRA staff and a Teacher Advisory Committee to produce a new edition for teachers in the lower Colorado River basin. Statewide interest in the curriculum grew and in 2003 LCRA, the Texas Water Development Board and many water providers and water management entities throughout the state began work on a new statewide version. In 2008, the program was revised once again to keep Major Rivers current with the latest Texas learning standards and the current 2007 State Water Plan. In addition, the student materials for the Major Rivers program are available in both English and Spanish-language versions.

What's New in Major Rivers

The new edition of Major Rivers has the look and feel of the prior program, while containing these additions and improvements:

- Correlation with Texas Essential Knowledge and Skills (TEKS) and Texas Assessment of Knowledge and Skills (TAKS) standards.
- All student materials are available in both English and Spanish-language versions
- The introductory video is available in DVD with captions in English and subtitles in Spanish
- The Teacher Resource CD-ROM includes electronic versions of the Teacher's Guide in addition to student worksheets, transparencies, maps, posters and links to other resources such at the TWDB Kids (http://www.twdb.state.tx.us/kids/index.htm) interactive games and animations.
- More "hands-on" learning opportunities for students, in keeping with TEKS.
- Additional activities that expand such topics as water quality and water planning and provide additional interdisciplinary activities in math, language arts, history and other subject areas.
- Links to Internet resources and information on how to incorporate these resources into your students' learning experiences.
- A new visual look that is cleaner and more appealing to a diverse audience while retaining the spirit and appeal of the original Major Rivers.

We hope you enjoy using this new, improved Major Rivers.

Acknowledgments

LCRA would like to thank these people for their hard work:

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TEACHING MAJOR RIVERS

Water in Texas is as important to our lives as the air we breathe. Yet our water supply is not always reliable in many parts of the state. Further, as our population continues to grow, greater and greater demands are placed on this limited resource. So it is important that we be aware of water — where it comes from, how our actions impact its quality, how we treat it, how much we use, and how we can use it wisely.

The Major Rivers Water Education Program is intended to help fourth-grade to fifth-grade students throughout Texas learn how we get and use water, how important it is for us to conserve water, and how to keep it clean. This program contains teacher and student materials focused on specific instructional objectives.

Objectives

The instruction in the program focuses on seven specific learning objectives.

1. **Water in Texas**
   Students will become aware of the importance of water to Texas.
2. **The Water Cycle**
   Students will identify the various steps in the water cycle — precipitation, surface runoff, infiltration, evaporation and condensation.
3. **Texas Water Supply and Water Planning**
   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 groundwater, and the state's major rivers and aquifers. Students also will understand the importance of water planning and identify water management strategies used to ensure adequate water supply.
4. **Watersheds and River Basins**
   Students will understand the concepts of river basins and watersheds and be able to identify their river basin and local watershed. Students will learn how the sediments that reach the Texas coastal bays are transported by river systems. Students will create changes in a simulated streambed to evaluate the effects on water flow rates and directions.
5. **How Our Water Use Affects Our World**
   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.
6. **Water Treatment and Distribution**
   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.
7. **Using Water Efficiently**
   Students will review which home water activities use the most water, identify water conservation practices both inside and outside the home, and assess their individual water conservation practices.
8. **Review and Posttest**
   Students will exhibit an understanding of the importance of water to Texas.

These objectives define important knowledge and skills related to water and support many of the Texas Education Agency's TEKS and TAKS objectives for social studies, health, technology, science, language arts and math. A chart showing the program correlations to the TEKS and TAKS objectives is on pages viii-xvi.

Instructional Planning

Procedures for each lesson are in this teacher's guide. The Teacher Resource CD-ROM contains the electronic version of the teacher's guide, lesson worksheets, transparencies, individual lessons and other resources. The Teacher Resource CD-ROM may be used to project transparencies and posters without an overhead projector. Alternatively, extra transparencies, worksheets or teacher's guides may be printed by using the files in the Teacher Resource CD-ROM. Each lesson usually can be completed in one- or two-class periods. Some lessons will take more or less time, depending on the pace of instruction and student interest. In most lessons, suggestions are provided for optional extension and enrichment activities that can help expand the outcomes of the program.

Materials

The program contains all the basic teacher and student materials needed for instruction. Additional materials are listed with each lesson. Included with the Major Rivers educational components are:

- Teacher's Guide Binder including these overhead transparencies:
  The Water Cycle
  Texas Average Annual Rainfall
  Major River Basins
  Major Texas Coastal Bays
  Regional Water Planning Groups
  Water Treatment and Distribution
- Teacher Resource CD-ROM including an electronic version of the Teacher's Guide
- Introductory Video DVD
- Program Evaluation Sheet
- Originals of the following:
  Pretest
  Posttest
  Groundwater and Surface Water Student Data Sheet
  Regional Water Planning Groups Worksheet
  Major River Basins in Texas Worksheet
  Streambed Simulation Student Data Sheet
  Frankie the Fish Data and Observation Sheet
  Water Treatment Laboratory Worksheet
  Lawn Watering Laboratory Worksheet
  Don't Be Clueless Worksheet
  Wa-Ter Your Choices? Cards
  Review Worksheets
  Water Puzzles
- 30 copies of the following:
  Student Workbook (available in English- and Spanish-language versions)
  Home Information Leaflet (available in English- and Spanish-language versions)

Other Materials Needed — Listed by Lesson

The following are comprehensive lists of materials need to complete each activity and exercise in the Major Rivers curriculum that are not included with a teacher set. The activities and exercises are designed to use as many readily available household supplies as possible. Prior to each lesson you may want to request assistance with gathering materials from the students and their parents. Once a set of materials is gathered it can easily be reused with proper care and cleaning.

LESSON 1

Cups
Water
Computer with TV connection/LCD or computer projector

For Change of Temperature Effects Investigation:
- Ice cubes
- Plates
- Clock
- Fan (to simulate wind)

LESSON 2

For teacher demonstrations of the water cycle:
- Tea kettle
- Two tea cups
- Hot plates
- Water

For student laboratory activities on water cycle:
- 3 or 4 different types of soil (clay, potting soil, sand, crushed gravel, etc.)
- 2 identical jars or glasses
- Tape
- Food coloring
- Bowl of ice water
- Water
- 3 to 4 two-liter clear soda bottles per group
- Liquid measuring cup
- Scissors
- Cotton cloth or nylon hose

For student water cycle demonstration:
- 4 eight-ounce clear plastic cups per group
- Plastic wrap
- Water
- Rubber bands
- Liquid measuring cups
- Watch or clock with a second hand

LESSON 3

Scheduled time in computer lab or classroom
Computer (with Internet access) with TV connection/LCD or computer projector
Map colors or colored pencils

For groundwater/surface water demonstration:
- Small aquarium or one-gallon pickle jar
- Aquarium gravel or pea gravel
- Glass jar or drinking glass
- Overhead projector
- Watering can
- Meat baster

For soil stratification investigation:
- 3 or 4 different types of soil (clay, potting soil, sand, crushed gravel, etc.)
- Water
- 1 two-liter clear soda bottle per student pairs
- Liquid measuring cup
- Scissors
- Plastic wrap or modeling clay

For Water Coursing Through History:
- Large bucket (The bucket should hold several gallons of water. The amount of water in the bucket should be visibly reduced when five spongefuls of water are removed.)
- Containers (Bowls or milk cartons with the tops cut off, 1 for each student.)
- Metric graduated cylinders
- 17 large household sponges (Cut three of the sponges into fourths, five into thirds, five into halves, and leave the last four whole. Increase or decrease the number of sponges to fit the number of students. Pieces of absorbent terry cloth can be substituted.)
- Various colors of food coloring or washable paints (Put several drops of food coloring of any color on all the sponges and sponge pieces just before passing out the sponge pieces.)
- Markers
- Poster board

For Water Baseball (optional):
- Group sets of 12 pieces of paper cut in two- by three-inch pieces

LESSON 4

Map colors
Scheduled time in computer lab or classroom
Computer (with Internet access) with TV connection/LCD or computer projector

For impact of water flow on water systems investigation:
- Meter tape measures
- Fine soil
- Sand
- Pebbles or fine gravel
- Rocks, bricks and/or wood blocks
- Ping-Pong balls or corks or foam peanuts
- Water source with ability to vary flow (water hoses)
- Stop watches or watches with second hands
- Playground area, stream table or aluminum roasting pan with diatomaceous earth

LESSON 5

Thermometers

Optional:

Scheduled time in computer lab or classroom

Computer (with Internet access) with TV connection/LCD or computer projector

For Frankie the Fish Activity:

aquarium (optional)

three-liter soda bottles with top cut off

black permanent marker

graduated cylinder and measuring spoons

pitchers with water

string

water

white poker chips

yellow sponges

washers

hot-glue gun

ruler

soil

brown sugar

molasses

detergent

shredded paper

scissors

food coloring – red and yellow

LESSON 6

Optional:

Scheduled time in computer lab or classroom

Computer (with Internet access) with TV connection/LCD or computer projector

For Water Treatment Lab:

Below is enough for four groups. Plan ahead a couple of weeks and ask students to bring these materials in from home. ***[Note: you will need at least 16 of the 20-ounce soda bottles and at least 12 small plastic cups.]***

4 small (four-ounce) plastic cups (such as an applesauce cup) containing one tablespoon alum (Buy it at any grocery store in the canning department.)

4 two-liter soda bottles containing 750 mL (24 ounces or three cups) water mixed with 230 mL (eight ounces or one cup) of garden dirt (Label these: "Source Water" or "Surface Water.") ***[Note: Mix water to soil in a 3:1 ratio.]***

4 clean two-liter soda bottles, cut in half without tops, labeled "Aeration"

4 clean two-liter clear soda bottles, cut in half without tops, labeled "Coagulation"

4 clean two-liter soda bottles, cut in half with tops labeled "Filtration"

4 rubber bands

4 stirring sticks

4 small pieces of old stockings or cheesecloth

4 eight-ounce plastic cups filled with gravel

4 eight-ounce plastic cups filled with sand

4 metric rulers

4 graduated cylinders or measuring spoons

4 stop watches or watches with a second hand

LESSON 7

Three-inch by three-inch pieces of blue, yellow and red paper for each student

For the Lawn Watering Laboratory:

- Student handout for Lawn Watering Laboratory
- Stopwatches (enough for every group of three students to have one)
- Lawn sprinkler and hose
- ***[Note: Use a spray-type sprinkler with a high precipitation rate (volume per minute) that covers at least a 10-foot by 10-foot square area. Rotating and oscillating sprinklers tend to have lower precipitation rates.]***
- Large graduated cylinders
- Small, medium and large-sized flat-bottomed straight-sided containers (small 4 x 4-inch plastic container, 8 x 8-inch foil baking pan and 9 x 13-inch baking pan)
- Ruler to measure inches and centimeters
- Student worksheets
- Blank sheet of paper
- Pencils, pens
- Masking tape
- Clipboard (one per group)

For Don't Be Clueless Investigation:

- Student handout for Don't Be Clueless investigation
- Metric rulers/measuring tapes
- Shovel
- Graph paper
- Computer with internet access for research

LESSON 8

No other materials are needed.

ADDITIONAL RESOURCES

Asimov, Isaac. *The Ocean Book*, Wiley.
Bellamy, David. *The River*, Clarkson Porter.
Cherry, Lynn. *A River Ran Wild*, Harcourt.
Cole, Joanna. *The Magic School Bus at the Water Works*, Scholastic.
Cole, Joanna. *The Magic School Bus, Wet All Over,* Scholastic.
Cole, Joanna. *The Magic School Bus on the Ocean Floor*, Scholastic.
Drutman, Ava. *Water*, Good Apple.
French, Vivian. *Why the Sea is Salty*, Harcourt.
Jacobs, Francine. *Sam the Sea Cow*, Walker and Company.
Goldish, Meish. *Science Poems and Songs for Young Learners*, Scholastic.
Molengraft, Lisa. *Oceans*, Instructional Fair.
Murphy, Bryan. *Experiments with Water*, Scholastic.
Peters, Lisa. *Water's Way*, Scholastic.
The Earth Group. *50 Simple Things Kids Can Do to Save the Earth*, Andrews and McMeel.
Using Water Series, Scholastic.

EPA Water Quality Protection Division Educator Resources
http://www.epa.gov/region6/water/edu/

River of Words (an environmental art and poetry watershed awareness program)
http://www.riverofwords.org/

U.S. Geological Survey Water Science for Schools
http://ga.water.usgs.gov/edu/

Water Environment Federation's curriculum materials (hands-on activities from The Water Sourcebook)
http://www.wef.org/AboutWater/ForEducators/CurriculumMaterials/

U.S. Geological Survey – La Ciencia del Agua para Escuelas (Spanish-language version of the USGS educational resources including a glossary)
http://water.usgs.gov/gotita/

TEXAS WATER DEVELOPMENT BOARD (TWDB) RESOURCES

Home page
http://www.twdb.state.tx.us

Major Rivers
http://www.twdb.state.tx.us/edu/MajorRivers/index.asp

Know Your Texas Water (a resource for teachers and other adults to learn about Texas Water resources and the State Water Plan)
http://www.twdb.state.tx.us/edu/KnowYourTexasWater/index.asp

TWDB Kids (animations and games for K-8 grade on Texas water resources)
http://www.twdb.state.tx.us/kids

Raising Your Water IQ (a water conservation curriculum for middle school)
http://www.twdb.state.tx.us/edu/RaisingYourWaterIQ/index.asp

Water IQ: Know Your Water (Texas Water Conservation Awareness Campaign)
http://www.twdb.state.tx.us/assistance/conservation/wateriq.asp

SCIENCE: FOURTH AND FIFTH GRADES		L	E	S	S	O	N		
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	1	2	3	4	5	6	7	8
(1) Scientific Processes (a) demonstrate safe practices during field and laboratory investigations.	TAKS Grade 5 Objective 1: Student will demonstrate an understanding of the nature of science.	■	■	■	■	■	■	■	
(b) make wise choices in the use and conservation of resources and the disposal or recycling of materials.	TAKS Grade 5 Objective 1	■		■	■			■	■
(2) Scientific Processes The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to: (a) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology;	TAKS Grade 5 Objective 1		■				■	■	
(b) collect information by observing and measuring;	TAKS Grade 5 Objective 1	■	■	■	■	■	■		
(c) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;	TAKS Grade 5 Objective 1	■	■	■	■	■	■	■	
(d) communicate valid conclusions; and	TAKS Grade 5 Objective 1		■	■	■	■	■		
(e) construct simple graphs, tables, maps and charts to organize, examine and evaluate information.	TAKS Grade 5 Objective 1		■		■		■	■	
(3) Scientific Processes The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to: (a) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;	TAKS Grade 5 Objective 1		■			■		■	
(c) represent the natural world using models and identify their limitations.	TAKS Grade 5 Objective 1		■	■	■	■	■		
(4) Scientific Processes The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to: ***Fourth Grade Only*** (a) collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses.	TAKS Grade 5 Objective 1	■	■	■	■	■	■	■	
Fifth Grade Only (a) collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, compasses, balances, hot plates, meter sticks, timing devices, magnets, collecting nets, and safety goggles.	TAKS Grade 5 Objective 1	■	■	■	■	■	■	■	
Fourth Grade Only **(6) Science Concepts** The student knows that change can create recognizable patterns. The student is expected to: (a) identify patterns of change such as in weather, metamorphosis, and objects in the sky.	TAKS Grade 5 Objectives 2 and 4: Student will demonstrate an understanding of the life sciences.		■	■	■				
Fifth Grade Only **(6) Science Concepts** The student knows that some change occurs in cycles. The student is expected to: (a) identify events and describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles; and	TAKS Grade 5 Objectives 2 and 4		■	■					

Continued on next page

SCIENCE: FOURTH AND FIFTH GRADES (Continued)		L	E	S	S	O	N	
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Fifth Grade Only (b) identify the significance of the water, carbon and nitrogen cycles.	TAKS Grade 5 Objectives 2 and 4		■	■					
(7) Science Concepts The student knows that matter has physical properties. The student is expected to: ***Fourth Grade Only*** (a) observe and record changes in the states of matter caused by the addition or reduction of heat; and	TAKS Grade 5 Objective 3: Student will demonstrate an understanding of the physical sciences.	■	■						
(b) conduct tests, compare data and draw conclusions about physical properties of matter including states of matter, conduction, density, and buoyancy.	TAKS Grade 5 Objective 3	■	■						
Fifth Grade Only (a) classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound.	TAKS Grade 5 Objective 3	■	■						
Fourth Grade Only **(10) Science Concepts** The student knows that certain past events affect present and future events. The student is expected to: (a) identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering and flow; and	TAKS Grade 5 Objective 4: Student will demonstrate an understanding of the earth sciences.			■	■	■		■	
(b) draw conclusions about "what happened before" using fossils or charts and tables.	TAKS Grade 5 Objective 4			■	■				
Fourth Grade Only **(11) Science Concepts** The student knows that the natural world includes earth materials and objects in the sky. The student is expected to: (c) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.	TAKS Grade 5 Objective 4	■	■						■
Fifth Grade Only **(11) Science Concepts** The student knows that certain past events affect present and future events. The student is expected to: (a) identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering and flow.	TAKS Grade 5 Objective 4			■	■	■		■	
Fifth Grade Only **(12) Science Concepts** The student knows that the natural world includes earth materials and objects in the sky. The student is expected to: (a) interpret how land forms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering.	TAKS Grade 5 Objective 4			■	■	■		■	

MATH: FOURTH AND FIFTH GRADES		L	E	S	S	O	N	
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(B) knowledge and skills									
Fourth Grade Only **(2) Number, Operation and Quantitative Reasoning** The student describes and compares fractional parts of whole objects or sets of objects. The student is expected to: (a) use concrete objects and pictorial models to generate equivalent fractions.	TAKS Grade 4 Objective 1: Student will demonstrate an understanding of numbers, operations and quantitative reasoning.			■					
Fifth Grade Only **(2) Number, Operation and Quantitative Reasoning** The student uses fractions in problem-solving situations. The student is expected to: (a) generate a fraction equivalent to a given fraction such as 1/2 and 3/6 or 4/12 and 1/3.	TAKS Grade 5 Objective 1: Student will demonstrate an understanding of numbers, operations and quantitative reasoning.			■					
Fourth Grade Only **(3) Number, Operation and Quantitative Reasoning** The student adds and subtracts to solve meaningful problems involving whole numbers and decimals.	TAKS Grade 4 Objective 1			■			■	■	
Fifth Grade Only **(3) Number, Operation and Quantitative Reasoning** The student adds, subtracts, multiplies, and divides to solve meaningful problems. The student is expected to: (a) use addition and subtraction to solve problems involving whole numbers and decimals;	TAKS Grade 5 Objective 1			■			■	■	
Fifth Grade Only (b) use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology);	TAKS Grade 5 Objective 1						■	■	
Fifth Grade Only (c) use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology), including interpreting the remainder within a given context	TAKS Grade 5 Objective 1			■			■	■	
Fourth Grade Only **(4) Number, Operation and Quantitative Reasoning** The student multiplies and divides to solve meaningful problems involving whole numbers. The student is expected to: (d) use multiplication to solve problems (no more than two digits times two digits without technology); and	TAKS Grade 4 Objective 1						■	■	
(e) use division to solve problems (no more than one-digit divisors and three-digit dividends without technology).	TAKS Grade 4 Objective 1			■			■	■	
Fifth Grade Only **(10) Measurement** The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems. (c) select and use appropriate units and formulas to measure length, perimeter, area, and volume.	TAKS Grade 5 Objective 4: Student will demonstrate an understanding of the concepts and uses of measurement.		■	■	■		■	■	

Continued on next page

MATH: FOURTH AND FIFTH GRADES (Continued)		L	E	S	S	O	N	
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Fourth Grade Only **(11) Measurement** The student applies measurement concepts. The student is expected to estimate and measure to solve problems involving length (including perimeter) and area. The student uses measurement tools to measure capacity/volume and weight/mass. The student is expected to: (a) estimate and use measurement tools to determine length (including perimeter), area, capacity and weight/mass using standard units SI (metric) and customary;	TAKS Grade 4 Objective 4: Student will demonstrate an understanding of the concepts and uses of measurement.		■	■	■		■	■	
Fifth Grade Only **(11) Measurement** The student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius). The student is expected to: (b) solve problems involving elapsed time.	TAKS Grade 5 Objective 4: Student will demonstrate an understanding of the concepts and uses of measurement.							■	
Fourth Grade Only **(13) Probability and Statistics** The student solves problems by collecting, organizing, displaying, and interpreting sets of data. The student is expected to: (b) interpret bar graphs.	TAKS Grade 4 Objective 5: Student will demonstrate an understanding of probability and statistics.			■			■	■	
Fifth Grade Only **(13) Probability and Statistics** The student solves problems by collecting, organizing, displaying, and interpreting sets of data. The student is expected to: (c) graph a given set of data using an appropriate graphical representation such as a picture or line graph.	TAKS Grade 5 Objective 5: Student will demonstrate an understanding of probability and statistics.			■			■	■	
Fourth and Fifth Grades **(14) Underlying Processes and Mathematical Tools** The student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to: (a) identify the mathematics in everyday situations;	TAKS Grades 4 and 5 Objective 6						■	■	■
(d) use tools such as real objects, manipulatives, and technology to solve problems.	TAKS Grades 4 and 5 Objective 6						■	■	■
Fourth Grade Only **(15) Underlying Processes and Mathematical Tools** The student communicates about Grade 4 mathematics using informal language. The student is expected to: (a) explain and record observations using objects, words, pictures, numbers, and technology.	TAKS Grade 4 Objective 6						■	■	
Fifth Grade Only **(15) Underlying Processes and Mathematical Tools** The student communicates about Grade 5 mathematics using informal language. The student is expected to: (a) explain and record observations using objects, words, pictures, numbers, and technology.	TAKS Grade 5 Objective 6						■	■	

READING – LANGUAGE ARTS: FOURTH AND FIFTH GRADES		L	E	S	S	O	N		
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(1) Listening/Speaking/Purposes									
(a) determine the purposes for listening such as to gain information, to solve problems, or to enjoy and appreciate.	TAKS Grades 4 and 5 Objective 1: Student will demonstrate a basic understanding of culturally diverse written texts.	■		■	■	■			
(4) Listening/Speaking/Culture									
(a) connect his/her own experiences, information, insights and ideas with those of others through speaking and listening.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3: Student will use a variety of strategies to analyze culturally diverse written texts.		■	■	■	■	■	■	
(5) Listening/Speaking/Audiences									
(a) adapt spoken language such as word choice, diction and usage to the audience, purpose and occasion.	TAKS Grades 4 and 5 Objective 1	■	■	■	■	■	■	■	
(b) demonstrate effective communication skills that reflect demands such as interviewing, reporting, requesting and providing information.	TAKS Grades 4 and 5 Objective 1		■	■	■	■	■	■	
(c) present dramatic interpretations of experiences, stories, poems or plays to communicate.	TAKS Grades 4 and 5 Objective 1	■						■	
(e) give precise directions and instructions such as for games and tasks.	TAKS Grades 4 and 5 Objective 1		■	■	■	■	■	■	
(f) clarify and support spoken ideas with evidence, elaborations and examples.	TAKS Grades 4 and 5 Objective 1		■	■	■	■	■	■	
(7) Reading/Fluency									
(a) read regularly in independent-level materials.	TAKS Grades 4 and 5 Objective 1	■	■	■	■	■	■	■	■
(b) read regularly in instructional-level materials that are challenging but manageable.	TAKS Grades 4 and 5 Objective 1			■	■	■	■		
(c) demonstrate characteristics of fluent and effective reading.	TAKS Grades 4 and 5 Objective 1	■	■	■	■	■	■	■	
(e) read aloud in selected texts in ways that both reflect understanding of text and gage the listeners.	TAKS Grades 4 and 5 Objective 1	■	■	■	■	■	■	■	
(f) read silently with increasing ease for longer periods.	TAKS Grades 4 and 5 Objective 1	■	■	■	■	■	■	■	■
(8) Reading/Variety of Texts									
(c) read for varied purposes such as to be informed.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3	■	■	■	■	■	■	■	■
Fourth Grade Only									
(g) paraphrase and summarize text to recall, inform and organize ideas.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3	■		■	■				
(9) Reading/Vocabulary Development									
(a) develop vocabulary by listening to selections read aloud.	TAKS Grades 4 and 5 Objective 1		■	■	■	■	■		
(10) Reading/Comprehension									
(a) use his/her own knowledge and experience to comprehend.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4: Student will apply critical thinking skills to analyze culturally diverse written texts.	■	■	■	■	■	■	■	■
(c) support responses by referring to relevant aspects of text and his/her own experiences.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4	■	■	■	■	■	■	■	■
(k) answer different types and levels of questions as well as test-like questions such as multiple choice, true-false and short answer.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4	■	■	■	■	■	■	■	■
(11) Reading/Literary Response									
(a) offer observations, make connections, react, speculate, interpret and raise questions in response to texts.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4	■		■	■	■	■		
(b) interpret text ideas through such varied means as journal writing, discussion, enactment and media.	TAKS Grades 4 and 5 Objective 1 TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4		■	■	■				

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READING – LANGUAGE ARTS: FOURTH AND FIFTH GRADES (Continued)		L	E	S	S	O	N	
Texas Essential Knowledge and Skills Objectives	**Correlating TAKS Objectives**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(13) Reading/Inquiry/Research									
(b) use text organizers, including headings, graphic features and table of contents to locate and organize information.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4			■	■				
(c) use multiple sources, including electronic texts, experts and print resources, to locate information relevant to research questions.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4			■	■	■			
(d) interpret and use graphic sources of information such as maps, graphs, timelines, tables and diagrams.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4	■	■	■	■	■	■	■	■
(f) produce research project and reports in effective formats using visuals to support meaning, as appropriate.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4	■		■	■				
(g) draw conclusions from information gathered from multiple sources.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4			■	■				
(15) Writing/Purposes									
(a) write to express, discover, record, develop, reflect on ideas and to problem solve.	TAKS Grades 4 and 5 Objective 3 TAKS Grades 4 and 5 Objective 4				■	■	■	■	■
(23) Viewing/Representing/Interpretation									
(b) interpret important events and ideas gathered from maps, charts, graphics, video segments or technology presentation.	TAKS Grades 4 and 5 Objective 4	■	■	■	■	■	■	■	■

SOCIAL STUDIES: FOURTH AND FIFTH GRADES Texas Essential Knowledge and Skills Objectives — No Social Studies TAKS in Elementary Grades	L 1	E 2	S 3	S 4	O 5	N 6	7	8
Fourth Grade Only **(1) History** The student understands the similarities and differences of Native-American groups in Texas and the Western Hemisphere before European exploration. The student is expected to: (a) identify Native American groups in Texas and the Western Hemisphere before European exploration and describe the regions in which they lived.				■				
(b) compare the ways of life of Native American groups in Texas and the Western Hemisphere before the European exploration.			■	■				
Fourth Grade Only **(2) History** The student understands the causes and effects of European exploration and colonization of Texas and the Western Hemisphere. The student is expected to: (a) summarize reasons for European exploration and settlement of Texas and the Western Hemisphere.				■				
(c) explain when, where, and why the Spanish established Catholic missions in Texas.				■				
(d) identify the accomplishments of significant impresarios including Moses Austin, Stephen F. Austin, and Martin de Leon and explain their impact on the settlement of Texas.				■				
Fourth Grade Only **(3) History** The student understands the causes and effects of the Texas Revolution, the Republic of Texas, and the annexation of Texas to the United States. The student is expected to: (e) identify leaders important to the founding of Texas as a republic and state.			■	■				
(4) History ***Fifth Grade Only*** (b) identify reasons people moved west.	■		■					
Fifth Grade Only (c) identify examples of U.S territorial expansion.			■	■				
(d) describe the effects of political, economic and social changes on Native Americans in Texas.				■				
Fifth Grade Only (f) explain how industry and the mechanization of agriculture changed the American way of life.			■	■	■	■		
(5) History ***Fourth Grade Only*** (a) identify the impact of various issues and events on life in Texas such as urbanization.	■		■	■	■	■	■	
Fifth Grade Only (a) analyze various issues and events of the 20th century such as urbanization, industrializations, increased use of oil and gas, world wars and the Great Depression.			■		■			
Fifth Grade Only (b) identify the accomplishments of notable individuals.			■					
(6) Geography ***Fourth Grade Only*** (a) apply geographic tools, including grid systems and legends to construct and interpret maps.			■	■				
Fifth Grade Only (a) apply geographic tools, including grid systems, legends, symbols, scales and compass roses, to construct and interpret maps.			■	■			■	
Fourth Grade Only (b) translate geographic data into a variety of formats such as raw data to graphs and maps.			■	■				
Fifth Grade Only (b) translate geographic data into a variety of formats such as raw data to graphs.				■			■	
(7) Geography The student understands the concept of regions. The student is expected to: (a) describe a variety of regions in Texas and the Western Hemisphere such as political, population, and economic regions that result from patterns of human activity;			■	■	■			
(b) describe a variety of regions in Texas that result from physical characteristics.			■	■	■			
(8) Geography (a) identify clusters of settlement in Texas and explain their distribution.			■	■				
(b) explain patterns of settlement at different time periods in Texas.			■	■				
(c) describe the location of cities in Texas and explain their distribution.	■		■	■				■
(d) explain the geographic factors that influence patterns of settlement and the distribution of population in Texas, past and present.			■	■				

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SOCIAL STUDIES: FOURTH AND FIFTH GRADES (Continued)	L	E	S	S	O	N	
Texas Essential Knowledge and Skills Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(9) Geography (a) describe ways people have adapted to and modified their environment in Texas.			■	■	■	■	■	
(b) identify reasons why people have adapted to and modified their environment in Texas.			■	■	■	■		
(c) analyze the consequences of human modifications of the environment in Texas, past and present.			■	■	■	■		
(11) Economics (b) identify the economic motivations for Anglo American colonization in Texas.			■	■				
(13) Economics (a) explain how people in different regions of Texas earn their living.			■	■	■			
(b) explain how geographic factors have influenced the location of economic activities in Texas.			■	■				
(c) analyze the effects of immigration, migration, and limited resources on the economic development and growth of Texas.			■	■				
(e) explain how developments in transportation and communication have influenced economic activities in Texas.				■				
(17) Citizenship (a) explain the meaning of selected patriotic symbols and landmarks of Texas, including the six flags over Texas, San Jose Mission and the San Jacinto Monument.				■				
(21) Science, Technology and Society (b) describe how scientific discoveries and technological innovations have benefited individuals, businesses and society in Texas.			■					
(22) Social Studies Skills (a) differentiate between, locate and use primary and secondary sources.			■	■				
(b) analyze information by sequencing, categorizing, identifying cause-and-effect relationships, comparing and contrasting.			■	■	■	■	■	
(c) organize and interpret information in outlines, reports, databases and visuals, including graphs, charts, timelines and maps.			■	■		■	■	
(d) identify different points of view about an issue or topic.			■					
(f) use appropriate mathematical skills to interpret social studies information such as maps and graphs.			■	■			■	
(23) Social Studies Skills (a) use social studies terminology correctly.			■	■				
(b) incorporate main and supporting ideas in verbal and written communication.			■	■				
(c) express ideas orally based on research and experiences.			■	■				
(d) create written and visual materials such as journal entries, reports, graphic organizers, outlines and bibliographies.			■	■				
(e) use standard grammar, spelling, sentence structure and punctuation.			■	■				
(24) Social Studies Skills (a) use a problem-solving process to identify a problem, gather information, list and consider options.			■	■	■		■	
(b) use a decision-making process to identify a situation that requires a decision, gather information, identify options, predict consequences and take action to implement a decision.			■	■				
(25) Social Studies Skills ***Fifth Grade Only*** (a) differentiate between, locate, and use primary and secondary sources.				■				
Fifth Grade Only (b) analyze information by sequencing, categorizing, identifying cause-and-effect relationships, comparing and contrasting.		■	■	■	■			
Fifth Grade Only (c) organize and interpret information in outlines, reports, databases, and visuals including graphs, charts, timelines and maps.				■	■			
Fifth Grade Only (f) use appropriate mathematical skills to interpret social studies information such as maps and graphs.				■			■	
(27) Social Studies Skills ***Fifth Grade Only*** (a) use a problem-solving approach to identify a problem, gather information, list and consider options.								■

LANGUAGES OTHER THAN ENGLISH: FOURTH AND FIFTH GRADES	LESSON							
Texas Essential Knowledge and Skills Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
School districts are strongly encouraged to offer languages other than English in elementary grades.	■	■	■	■	■	■	■	■

HEALTH EDUCATION: FOURTH AND FIFTH GRADES	LESSON							
Texas Essential Knowledge and Skills Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Fourth Grade Only (B) knowledge and skills			■		■	■	■	■.
Fourth Grade Only **(6) Influencing Factors** The student comprehends factors that influence individual, family, and community health. The student is expected to: (a) identify similarities in which healthy environments can be promoted in homes, schools, and communities; and								
(b) explain the importance of a community environmental health plan.			■		■	■	■	■
Fifth Grade Only (B) knowledge and skills					■	■	■	
Fifth Grade Only **(8) Influencing Factors** The student knows how various factors influence individual, family, and community health throughout the life span. The student is expected to: (d) identify environmental protection programs that promote community health such as recycling, waste disposal, or safe food packaging.								

TECHNOLOGY APPLICATIONS: THIRD THROUGH FIFTH GRADES	LESSON							
Texas Essential Knowledge and Skills Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
(B) knowledge and skills	■	■	■	■	■	■	■	■.
(4) Information Acquisition The student acquires electronic information in a variety of formats, with appropriate supervision. The student is expected to: (b) select appropriate strategies to navigate and access information on local area networks (LANs) and wide area networks (WANs), including the Internet and intranet, for research and resource sharing.								
(B) knowledge and skills	■	■	■	■	■	■	■	■.
(8) Information Acquisition The student acquires electronic information in a variety of formats, with appropriate supervision. The student is expected to: (d) acquire information including text, audio, video, and graphics.								