Elementary Lesson Plan #2

GRADE(S): 3rd, 4th, 5th

TOPIC: Surface Water Supplies

TITLE: On the Surface

OVERVIEW: The water that we use every day in Texas comes from one of two sources: surface or ground water. Surface water is from rivers and lakes. Ground water flows or is pumped from below the surface. An underground source is called an aquifer.

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS:

Science, 3rd Grade
(b) Knowledge and Skills
(3.3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making 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
(C) represent the natural world using models and identify their limitations

(3.11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:
(A) identify and describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, nonrenewable, or inexhaustible resources.

English Language Arts and Reading, 3rd Grade
(b) Knowledge and Skills
(3.12) Reading/inquiry/research. The student generates questions and conducts research using information from various sources. The student is expected to:
(E) interpret and use graphic sources of information, including maps, charts, graphs, and diagrams (2-3)

Social Studies, 3rd Grade
(b) Knowledge and Skills
(3.16) Social studies skills. The student applies critical thinking skills to organize the use of information acquired from a variety of sources including electronic technology. The student is expected to:
(E) interpret and create visuals including graphs, charts, tables, timelines, illustrations, and maps
Science, 4th Grade
(b) Knowledge and Skills
(4.3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making 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
(C) represent the natural world using models and identify their limitations

Social Studies, 4th Grade
(b) Knowledge and Skills
(4.22) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of sources including electronic technology. The student is expected to:
(B) analyze information be sequencing, categorizing, identifying cause-and-effect relationships, comparing, contrasting, finding the main idea, making generalizations and predictions, and drawing inferences and conclusions
(C) organize and interpret information in outlines, reports, databases, and visuals including graphs, charts, timelines, and maps
(F) use appropriate mathematical skills to interpret social studies information such as maps and graphs

English Language Arts and Reading, 4th Grade
(b) Knowledge and Skills
(4.13) Reading/inquiry/research. The student inquires and conducts research using a variety of sources. The student is expected to:
(D) interpret and uses graphic sources of information such as maps, graphs, timelines, tables, and diagrams to address research questions

Science, 5th Grade
(b) Knowledge and Skills
(5.3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making 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
(C) represent the natural world using models and identify their limitations

Social Studies, 5th Grade
(b) Knowledge and Skills
(5.25) Social studies skills. The student applies critical-thinking skills to organize and use information acquired from a variety of sources including electronic technology. The student is expected to:
(B) analyze information be sequencing, categorizing, identifying cause- and-effect relationships, comparing, contrasting, finding the main idea, making generalizations and predictions, and drawing inferences and conclusions
(C) organize and interpret information in outlines, reports, databases, and visuals including graphs, charts, timelines, and maps
(F) use appropriate mathematical skills to interpret social studies information such as maps and graphs

English Language Arts and Reading, 5th Grade
(b) Knowledge and Skills
(5.13) Reading/inquiry/research. The student inquires and conducts research using a variety of sources. The student is expected to:
(D) interpret and use graphic sources of information such as maps, graphs, timelines, tables, and diagrams to address research questions (4-5)

DID YOU KNOW?

Surface water is the water that is in rivers, lakes, streams and reservoirs.

Runoff is the excess water that flows downhill after a rain to form pools, streams, creeks, and rivers.

Firm yield is the amount of surface water that can be called upon during an extended drought.

Drought is a prolonged period of lower than normal rainfall.

TEXAS RIVER FACTS

- The longest river in Texas is the Rio Grande, which begins its 1,896 mile course as the runoff from melted snow in Colorado. In the continental U. S., The Rio Grande is second only to the Missouri and is one of the world’s longest rivers. It also forms part of the United State’s border with Mexico.
The Red River is the second longest river in Texas and forms the state border with Oklahoma and Arkansas. It is the only major Texas river that is part of the Mississippi drainage basin.
The Sabine River, which forms part of the Louisiana/Texas border, discharges more water into the Gulf of Mexico than any other river along the Texas Gulf Coast.
• The 600 mile-long Colorado River is the longest river completely located within one state
LEARNING EXPERIENCE:

GENERAL TIME FRAME: Approximately 45 minutes.

Materials:

Each student needs:
- Two blank maps of Texas
- Pencil and markers or map colors
- Map of Texas river basins
- Map of Texas lakes and reservoirs

Advanced Preparation:

1. Obtain all materials listed in Materials section.
2. Obtain maps of the Texas river basins and lakes and reservoirs (see Resources). These may be for each student or a large one for the class.
3. Obtain map of the major cities in Texas.
4. Make two copies of blank Texas maps for each student.

Procedure:

1. On one map, each student will make a draw and label the 15 major rivers in Texas.
2. On the other the students will draw and label the major lakes and reservoirs.
3. On these maps the students will locate and label the location of the following major Texas cities: Austin, Brownsville, Corpus Christi, Dallas, El Paso, Ft. Worth, Houston, Odessa, San Antonio.
4. By using the information on the maps, have the students hypothesize as to what is the water source for each city.

Teacher Talk:

1. Go over definitions and the Did You Know? section.
2. Tell students that currently ground water and surface water each supply roughly equal shares in meeting the State’s water needs. As the ground water supplies are depleted over time, it is projected that by the year 2050, surface water will supply 70% of Texas’ water needs.
3. Have the students make their maps and hypothesize as to which source the cities use.
Answers to city water use:

- Austin- Colorado River and various reservoirs
- Brownsville- Rio Grande River and Falcon-Amistad Reservoir
- Corpus Christi- reservoir
- El Paso- Rio Grande River and ground water
- Ft. Worth- various reservoirs
- Houston- Lake Houston and Lake Livingston, and Trinity and Sabine River Basins
- Odessa- reservoir and ground water
- San Antonio is the only city that relies totally on ground water from the Edwards-Balcones Fault Zone Aquifer for its water supply but is now making plans to obtain surface water.

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<th>Teacher Questions</th>
<th>Possible Replies</th>
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<td>1. Why would a city use only a surface supply of water?</td>
<td>1. There may not be an underground source available or the underground water has some water quality problems such as high mineral content.</td>
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<td>2. Are the surface supplies constant?</td>
<td>2. No, the surface supply depends entirely on precipitation. During periods of heavy precipitation, the excess water overflows or is released from lakes and reservoirs and eventually flows into the Gulf of Mexico. In periods of drought, more water may be pumped from available underground sources or conservation methods are implemented until there is more rain to replenish supplies.</td>
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RESOURCES:

Literature on water conservation by the Texas Water Development Board. View and order currently available brochures at [http://www.twdb.state.tx.us/assistance/conservation/pubs.htm](http://www.twdb.state.tx.us/assistance/conservation/pubs.htm), contact Patsy Waters at patsy.waters@twdb.state.tx.us, fax the form to (512) 936-0812, call (512) 463-7955, or write to:

Conservation  
Texas Water Development Board  
P.O. Box 13231  
Austin, Texas 78711-3231

Maps of Texas River Basins, Aquifers, and Regional Reservoir Basin Maps are available on TWDB’s website at [http://www.twdb.state.tx.us/mapping/index.htm](http://www.twdb.state.tx.us/mapping/index.htm)
EXTENSION: Students may build a relief map of clay that includes a river basin. Vary the precipitation rates so that flooding and drought processes can be visualized.