The Water We Drink
Grade Level: 3 (P4)
Water Quality

By Kellie Jones, Taylor Co. Elem. & Pam Tinker, Edmonson Co.

Overview: **Students will relate that the quality of their drinking water is subject to the condition of the environment and water found in streams and creeks in their community.**

Academic Expectations:
3.3.3 All organisms including humans, cause changes in the environment where they live. Some of these changes are detrimental to the organism or to other organisms; other changes are beneficial.

Essential Content:
Erosion
Pollution
Environmental Awareness – recycling, reducing, reusing
Environmental effects of landfills, livestock and excavation
Availability of community resources
Water cycle/states of matter
Water purification systems in the community
Different bodies of water and how they relate
Needs of living organisms
Food web

Skills:
Conducting simple scientific experiments including observation skills and collection of data
Water Quality Testing
Aquatic Organism Identification
Use of simple scientific equipment

Students will learn:

- **about the earth's lithosphere and the composition of soil.**
- **about erosion, watershed, water reservoirs and groundwater in their local community.**
- **about the travel of water through the water cycle and watershed.**
- **The basic needs of living organisms**
- **The food web including aquatic life in creeks and streams**
- **The process of purifying drinking water in their local community**
- **The piping system of reservoir water to the homes, schools and businesses in the community**

Essential Questions to Address:

How does the presence of certain organisms provide information about water quality?

How does human activity affect changes in the environment?

How can you help to protect the water quality in your area?

What is the relationship between the water you use in your home and the water cycle?

Links:
Kentucky Water Watch
http://www.state.ky.us/nrepc/water/wwhomepg.htm

U.S. Environmental Protection Agency
Education K-12 Resources
http://www.epa.gov/oar/oaqps/eog/educatn.html

Activities:

- **Make a model of a landfill**
- **Have the students collect their trash for a 24-hour period. The students compile the collected trash and look for items that could be recycled or reused**
- **Visit a local recycling plant and take items collected during the 24-hour period.**
- **Make a model of a natural water purification system using a large container, soil, sand and rocks**
- **Field trip to the local water purification plant**
- **Modeling a pipe system using paper towel rolls**
- **Visit streams at Clay Hill Memorial Forest to do water quality testing**
- **Food web – Do Project Wild "Eat or Be Eaten"**

- **Visit streams at Clay Hill Memorial Forest to identify aquatic organisms present in the streams**

Culminating Project:
Students will create a brochure that will present facts on water quality and the need for increased environmental awareness. This writing piece will be published and displayed in various areas in the school and used as a transactive piece for a working portfolio.

Lesson 1

Students will gain a better understanding of the effects of pollutions produced in landfills on the quality of drinking water in their community.

Teach the concept of the three parts of environment: lithosphere, hydrosphere and atmosphere. Focus on the lithosphere.
Illustrate the lithosphere in a drawing and create a model by using a large glass tank. Demonstrate and explain the make up of the crust of the earth including soil, rock and sand.

Track the travel of a wad of paper from a student's desk to a local landfill. Discuss the landfills and demonstrate how they are used by burying trash under a layer of soil inside the tank. In this model there should be a layer of soil and rock under the trash. Use colored Kool-Aid or powdered tempera paint in with the trash. Demonstrate the effects of pollutants in a landfill on the quality of water by pouring clean clear water into the tank. As it flows through the trash it will carry the Kool-Aid or paint to the bottom of the container and have discoloration.

Discuss and illustrate the path of ground water into our rivers and streams and how eventually the water reaches reservoirs for community drinking water.

Lesson 2

Students will have an understanding of ways to protect our environment by recycling, reusing, and reducing waste.

Have students collect trash that they would normally throw away within a 24-hour period. Place plastic on the classroom floor. Have each student pour out his or her collection of trash on the plastic. Have students set around the pile of trash and talk about the amount of trash that we as a class send to the landfill in one day. Discuss that amount of trash that our school would send to the landfill in one day.
Discuss recycling of various materials such as plastic, glass, aluminum and paper. Show examples of each. Have students remove and sort these materials from the pile of trash for the landfill. Talk about how the amount of trash going into our landfills could be greatly reduced by recycling.
Also discuss the concept of reducing and reusing some materials.
Field trip - Take the recyclable items to the local recycling center.

Video – Reading Rainbow "Junkyard Art". An artist recycles junkyard material and uses it for artwork.

Lesson 3

Students will be able to illustrate the water cycle.
Literature – Magic School Bus in the Water Works
Or watch the video
Follow the path of water from the water cycle into the ground water, to a reservoir, through a water purification plant through the story of the character of "Drip Drip"
Teach the water cycle by having student's role-play and model water molecules being heated and then cooled. Terms to cover: evaporation, condensation, and precipitation.
Have students illustrate and label the water cycle.
Including art – Students will create a salt-water painting with colored salt water. The water will evaporate and students will see first hand the effects of evaporation.

Lesson 4

Students will create a model of the natural purification process of groundwater.

Discuss groundwater. Demonstrate by making a class model inside a glass container with soil, sand and gravel. Show how drops of water are natural filtered as it passes through layers of tightly packed sand, soil and gravel.
Guide the students in making models inside 2-liter containers. Pour discolored dirty water through the model filters to show the natural purification process that occurs in the earths crust.

Field trip to the local reservoir, and water purification plant.
Educational link http://www.ec.gc.ca/water/en/nature/grdwtr/e_gdwtr.htm
http://www.ec.gc.ca/water/en/manage/qual/e_qual.htm

Lesson 5

Students will be able to demonstrate ways that water is transported from local reservoirs to our homes and businesses in our communities.

Students will work in groups to make a model of a pipeline by using empty paper towel and toilet paper rolls and show the flow of water from place to place.

Demonstrate the flow of water from our local reservoir to our school by using a simple map of our town. Highlight the path that water would flow through pipelines into our school and on to our restrooms and cafeteria. Discuss wastewater from our school and home and explain how it travels to our local wastewater treatment plant and is cleaned and put back into our local streams to be recycled again.

Visit the local wastewater treatment plant.

Lesson 6

Students will have a better understanding of water quality in their area and be able to determine the quality of the water by identifying living organisms in our local streams that lead to our water reservoirs.

Introduce the students to the water organism identification sheet and discuss different types of organisms that are present in water. Explain that the presents of organisms help scientist identify the quality of water.

Use the Windows on Science laser disc to show the students pictures of organisms that they will be identifying in local water sources.
Explain the water quality testing kit and demonstrate ways to take adequate water samples.
Equipment – old clothes, wading shoes, mesh nets and containers to hold the organisms that are found, Water testing kit.

Field Trip – The students will visit a local streams at Clay Hill Farm and search for living organisms under rocks and along the banks. Using the identification sheet they will determine the quality of the water present. Students will also use the Water Quality Testing Kit to determine the quality of water including the PH level, the presents of animal feces, phosphate, nitrate, dissolved oxygen and temperature of the water.

Culminating Project:
Students will create a brochure that will present facts on water quality and the need for increased environmental awareness. This writing piece will be published and displayed in various areas in the school and used as a transactive piece for a working portfolio.