



Character Education Science FCAT Warm-Up



Self-Control

High School - March, 2008

Water Matters Day is March 15, 2008. Water Matters Day reminds us that we need to practice **self-control**, especially when it comes to protecting our environment. We all need to control the amount of waste we generate, fossil fuels we burn, garbage we throw away, and the amount of water we use.

Activity 1: Relationship between Aquifers and Wells

Sunshine State Standard SC.G.2.4

Background Information:

Water stored in the spaces (pore spaces) between particles and granular materials (rock and soil) is called groundwater. When the pore space is completely saturated, the zone holding the water is called an aquifer and the surface of the saturated zone is referred to as the water table. Aquifers are the primary source of fresh water here in Florida. The Biscayne Aquifer is the most used aquifer supplying all of Broward, Miami-Dade, Palm Beach, and Monroe counties. The aquifer is replenished by precipitation percolating downward through the soil, water moving horizontally through capillary action, and pressure from water moving from above (infiltration). Drinking water is extracted from supply wells that reach down 60 to 160 feet below the surface. The raw water is sent to treatment plants to be treated and then distributed to the public. When the demand for water is too high, the aquifer cannot recharge at a fast enough rate and therefore the water table is lowered, which impacts the water levels in the surrounding rivers, lakes, and streams.

Materials and Procedures:

Materials:

3-liter bottle, pump from a liquid dispenser, three dropper bottles, food coloring (blue, yellow, red), gravel, sand, a black marker, a pair of scissors, and a straw.

Procedures:

1. Fill three dropper bottles with water. Tint the water in each with a different color of food coloring.
2. Using the 3-liter bottle, cut off about $\frac{1}{2}$ the top. Remove the black bottom and fill the remaining clear portion with approximately 2 inches (2.5 to 3.7 cm) of gravel and then 2 inches of sand.
3. Pour in 2 to 3 inches (5 to 7.5 cm) of water colored blue with food coloring and mark the location of the water table with a black or blue marker.
4. Place the pump into the gravel with the tube extending into the water.
5. Pump water out of the model, catching the water in the cup.
6. Discuss how contaminants like oil and grease, raw sewage, car wash chemicals, and other surface contaminants can get into the groundwater. Demonstrate this by using the yellow food coloring on the surface of the sand and "rain" on your model. Pump more water out of the well. Observe results.
7. Place a straw in your model to represent a supply well. It should reach the same depth as your pumping well. Pour a contaminant (red food coloring) into the ground. Pump more water out of the pumping well. Have the students observe how the contaminants can percolate through the ground and reach the water supply.

Source: www.epa.gov/region01/students/pdfs/gndw_712.pdf

Additional Work

Have students record and discuss their observations. Students can also be asked to write a short report on

the Biscayne Aquifer and indicate the impacts that humans have on South Florida's source of fresh water. Students can also formulate plans and ideas to help alleviate or eliminate a lot of the problems facing the Biscayne Aquifer and its overuse. Broward County has a Well-Field Protection Program that regulates the storage, use, and handling of chemicals in the public drinking water well-fields.

Visit our web site for more information: www.broward.org/pprd/wellfield.htm

Activity 2: Water Conservation at Home**Sunshine State Standard SC.6.2.4****Objectives & Goals**

- Students will record their water usage at home over a seven day period
- Students will produce a pie chart breaking down their personal water usage
- Students will formulate a water conservation plan for their personal use at home

Step 1: On paper, have students individually list ways in which water is used and share these ideas as a group.

Step 2: At home, students are asked to undertake in a personal analysis of their water usage. Students must record the number of times each day that someone in their household performs the indicated activities related to water use. These include flushing the toilet, taking a short shower (less than 10 mins), taking a long shower (more than 10 mins), taking a tub bath, brushing teeth, washing dishes using running water, washing dishes by filling a basin, using the dishwasher, and washing clothes.

Step 3: At the end of the seven day period, students are asked to add up the total number of tallies in each column. After this process, under each individual column, indicating the various activities, students must multiply by the number of gallons of water used while performing each activity. The amount of gallons used per activity is as follows: flushing the toilet (5 gallons), taking a short shower (25 gallons), taking a long shower (35 gallons), taking a tub bath (35 gallons), brushing teeth (2 gallons), washing dishes using running water (30 gallons), washing dishes by filling a basin (10 gallons), using the dishwasher (20 gallons), and washing clothes (40 gallons). Using this information, the students will produce a pie chart comparing the various amounts of water being used performing the indicated daily activities. Students can compare their personal water usage with one another. Students can also calculate their individual water usage by taking the total number of gallons used and dividing that by the number of people within the household.

Step 4: Students should formulate a water conservation plan to implement at home. Good sources for water conservation information include the Broward County Environmental Protection Department's Water Resources web site www.broward.org/waterservices/water_restrictions.htm and the South Florida Water Management District's web site at www.sfwmd.gov. Students can submit a 2-3 page report explaining different methods they can use to help reduce water consumption and the positive impacts it will have on the environment.

Water Matters Day is March 15, 2008, from 9 am—3 pm.

The theme this year is "Working Water Solutions," which involves working with business leaders and elected officials to address issues facing Broward's future water resource challenge. Water Matters Day is about education, but it is also about having fun! The popular event is filled with workshops, giveaways and entertainment. The exhibits show how to save and protect water through landscape best management practices and through indoor conservation. Attendees also learn how to make their yards less water dependent and more inviting to native wildlife. Giveaways in the past have included native plants, garden mulch, and rain gauges. The freebies and activities help attendees apply what they've learned when they get home. And that's the most important lesson Water Matters Day has to teach. Visit www.broward.org/watermatters for more information.



Tree Tops Park



3900 SW Nob Hill Road, Davie, Florida