Grade 6

Is There Sufficient Water Supply in Lake Chesdin?

Major Topic: Water is essential to life and human actions can impact it.

PBL Question: There a problem with the water supply in Chesterfield County. Your duty as an employee of the Environmental Protection Agency is to inform the community about the impact and the actions that community members should take.

Length: 5 90-minute periods

<table>
<tr><th colspan="2">Stage 1 – Desired Results</th></tr>
<tr><td colspan="2">Established Goals
The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. (SOL 6.5 a, e, f)</td></tr>
<tr><td>Understandings:

Students will understand that…

-water is found in abundance in most living things.
-as the universal solvent, water is essential to life.
-water is important for agriculture and public health -protecting and maintaining water resources are essential to a community.</td><td>Essential Question(s):

-How do humans impact our water supply?
-Why are water conservation measures important?
-Why is water important to living things?</td></tr>
<tr><td colspan="2">Student objective (outcomes):

Students will know…
-the variety of ways that water is needed and used in a community
-a number of strategies to conserve water in their everyday lives
-the correlation between availability of a water supply and appropriate usage

Students will be able to…
-analyze rainfall data from public records
-compare water and energy savings using various water conservation devices
-discuss various water conservation techniques
-discover the amount of water in various fruits and animals</td></tr>
<tr><th colspan="2">Stage 2 – Assessment Evidence</th></tr>
<tr><td colspan="2">Performance Task(s):

-Create posters that shows a variety of ways that community residents can conserve water</td></tr>
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-Completed data table showing the percentage of water in various fruits and animals
-Completed chart comparing the various water conservation devices
-Write a letter to the editor of a newspaper sharing recommendations for water restrictions and water conservation measures

Other Evidence: N/A

Stage 3 – Learning Plan

Technology:

- Computer lab for research and Internet access

Materials:

- Letter of concern from community members about wilting plants in garden and an additional letter about a creek drying up (not included)
- Lab Activity – "How Much Water is in a Fruit?" (reference activity's material list for this lab)
- Water Amounts in Fruits and Vegetables Table
- Southeast Regional Climate Center Data
- Worksheet – "How Much Water Do You Use?"
- Information sheets (not included) on WaterSense Devices (or computer lab if available)
- WaterSense Device Question Sheet and Chart (not included)
- Chesterfield Observer article, "Call for mandatory water conservation…"
- Grading Rubric for Letter to the Editor (not included)

Lesson Format:
Day 1 & 2:

Engage – Introduce PBL scenario: Chesterfield County has received several letters from community members who are concerned about their water supply in Chesterfield County. Your job is to inform the community about the impact and the actions that community members should take.

Introductory News Flash – Letter of concern about wilting plants in garden and an additional letter about a creek drying up.
Brainstorm possible explanations for wilting of plants and creek drying up in small groups, then share as a whole class discussion.

Explore – Students complete lab activity "How Much Water is in a Fruit?" and research the amount of water in various animals using the Internet. Students will share results and complete a chart showing water percentages for plants and animals. They will be given a table for Water Amounts in Fruits and Vegetables (included). For homework, the students will create a graph of the water percentages of at least 5 of the plants/animals.

Explain - Brainstorm why plants and animals are composed of so much water – remind students about water being the universal solvent.

Day 3:

Second News Flash – The Southeast Regional Climate Center has reported the rainfall totals for the Amelia location (closest to Chesterfield).

Explain - Class discussion – Is there a problem with the water supply, and what should we do? Using a computer, students will research various methods of water conservation. After choosing one, they will create a mini-poster illustrating their chosen water conservation method. In small groups, students will share their posters with each other. In whole group, volunteers will share and class will discuss which methods they believe will promote the most water savings.

Day 4:

Elaborate – Question: Which water device do you predict will conserve the most water? Share 5 devices: faucet, showerhead, toilet, urinal, or irrigation system.
In small groups using a computer or information fact sheet, students are assigned one water device to research in small groups. As a class, each group will share their information about their device to the rest of the class. Using shared information, each student will complete a watersense device chart (not included). Students will analyze the data chart and summarize their findings. As a two-day homework assignment, students will record their water use at home using, "How Much Water Do You Use?"

Day 5:

Third News Flash – share excerpts from actual article from "Chesterfield Observer" Aug. 2012 edition highlighting facts about actual drops of water level in Lake Chesdin and Swift Creek Reservoir. Students should take notes on important facts in newspaper article. Share information about Chesterfield County voluntary, mandatory, and emergency water conservation restrictions.

Evaluate – Using the data from previous sessions (rainfall data, news flashes, computer research, posters, water sense devices, and newspaper article), each student will write a letter to the editor of our local newspaper recommending what type of water restriction measures are needed at this time. Letter should include type of restriction supported by 3 reasons and 5 examples of water conservation measures that community members can enact in order to limit their water consumption. Students may choose to use some the data collected from their "How Much Water Do You Use?" homework assignment in their letter. Students will be evaluated based on a teacher made rubric.

*Lesson format adapted from UBD design by Grant Wiggins and Jay McTighe, 2004

Name Date

How Much Water Do You Use?

STUDENT RESOURCE **4.4**
HOMEWORK SHEET

❶ Use the chart below to track your daily water use over two days. Put a check in the second column each time you do a listed activity. Calculate each activity's total water use by multiplying the number of checks by the number in the third column. (For showers, multiply the total number of minutes spent in the shower by 5.)

Activity	Number of Times Over 2 Days (✓)	Amount of Water (gallons)	Total Amount of Water Used (gallons)
Washing hands		0.5	
Taking a shower (number of minutes*)	*	5 gal per minute	
Taking a bath		40	
Flushing a toilet		5	
Brushing teeth (water running)		1	
Brushing teeth (water off)		0.25	
Food and drink		0.5 per day	
Total			

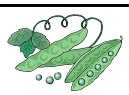
❷ How much water did you use over the weekend?

_____

Water Amounts in Fruits and Vegetables

The tables provide the percent water of some common raw fruits and vegetables.
Fruits and vegetables water with **85% or more water** can help you stay hydrated.

Fruits		Percent Water
Strawberries		92
Watermelon		92
Grapefruit		91
Cantaloupe		90
Peach		88
Cranberries		87
Orange		87
Pineapple		87
Raspberries		87
Apricot		86
Blueberries		85
Plum		85
Apple		84
Pear		84
Cherries		81
Grapes		81
Banana		74

Vegetables		Percent Water
Cucumber		96
Lettuce (iceberg)		96
Celery		95
Radish		95
Zucchini		95
Red Tomatoes		94
Green Tomatoes		93
Green Cabbage		93
Red Cabbage		92
Cauliflower		92
Eggplant		92
Sweet Peppers		92
Spinach		92
Broccoli		91
Carrots		87
Green Peas		79
White Potato		79

Health Matters Program. (2011). Water Amounts in Fruits and Vegetables. Adapted from Water Content of Fruits and Vegetables prepared by Sandra Bastin, Foods and Nutrition Specialist and Kim Henken, Extension Associate for ENRI. Information taken from Bowes & Church's Food Values, 1994.