Water Conservation

RESET AN AEOP EFFORT aeop

Warm Up: 20 minutes
Activity: 2 hrs Wrap Up: 2 hrs

Authors

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SUBJECT/GRADE LEVEL

Subject Area: Science

Grade Level: 4th/5th Grade

Materials

Warm Up

- Water
- Globe or world map
- 1,000-ml beaker
- Salt
- 100-ml graduated cylinder or beaker
- 10-ml cylinder or small cup
- Eyedropper or glass stirring rod
- Small metal bucket or cup

ACTIVITY: Paper or plastic cups (1 per student plus extras)

- Markers
- Water jugs—one per group
- Copies of Household Water Use Cards—Student Copy Page (1 card per student)
- Copies of Group Daily Water Use Worksheet—Student Copy Page (1 per group)
- 2 identical containers, labeled "Round One" and "Round Two," large enough to hold the total of once up of water per group.

STANDARDS

Next Generation Science Standards:

MS-LS2-4: Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
MS- LS2-5: Biodiversity and Ecosystem Services Solutions Evaluate competing design solutions for maintaining biodiversity and ecosystem services. (Stability and Change) Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion.
MS-ESS3-1: 1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

English Language Arts Standards | Common Core State

CCSS.ELA-Literacy.RST.6-8.3 : Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
CCSS.ELA-Literacy.RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
CCSS.ELA-Literacy.RST.6-8.7: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

LESSON OBJECTIVE(S)

Students will use a conservation plan to utilize a combination of strategies to conserve and control surface and ground water resources. Understand the issues of water pollution and the importance of access to clean water. Experiment with filtering various substances from water by making their own simple water filters. Observe and draw conclusions based on their experiment.

CAREER CONNECTION(S)

Mentor Background: Mckay, Steven K (Kyle) is a research civil engineer with the U.S. Army Engineer Research and Development Center (ERDC) Environmental Laboratory (EL). He is stationed in New York City to facilitate cooperative research between the ERDC, local U.S. Army Corps of Engineers offices, the City University of New York, and other local partners.

STEM Careers: Environmental Engineer, Renewable Energy Scientist, Geo Scientist, Climatologist, Environmental Lawyer.

ENGAGEMENT

Brief Description: By allocating a limited water supply, students learn how their water use affects others in their community.

Procedures: Ask students to use a stopper and brush their teeth once with turning off the water while brushing their teeth and once leaving the water on while brushing their teeth. Measure after each to discover how much water was saved and how this affects their community.

EXPLORATION

Brief Description: By reflecting on their own water use and working together to allocate this limited but renewable resources, students can create a culture of water conservation that benefits the entire community.

Procedures: Give each person in the group one action card from the Household Water Use Cards. If a group has fewer than six people, students can have two actions. Actions are:
a. Brushing teeth
b. Washing hands
c. Washing dishes
d. Showering
e. Flushing the toilet
f. Washing clothes

EXPLANATION

Brief Description: Calculate gallons of water used in daily activities.

Procedures: Students should look at their Household Water Use Card and note how many gallons* of water the average person in the U.S. uses for their activity. Have students share with the other members of their group their assigned water use and gallons from their card. Let students think about how their daily use compares with the average use of a person on the card.
Students can use this website to help calculate the number of gallons.

ELABORATE

Brief Description: Show the class a liter (1,000 ml) of water and tell them it represents all the water(100percent) on Earth. Ask students to estimate how many milliliters of water they think would represent all of the freshwater on Earth.

Procedures: Make sure the students are very quiet so they can hear the sound of the drop hitting the bottom of the bucket or cup. This represents clean, fresh water that is not polluted or otherwise unavailable for use, about .003 percent of the total. Ask students where they believe most of the water on Earth is located. Refer to a globe or map. Discuss the important difference between saltwater and freshwater (the presence of salt, or salinity, makes salt water unfit for human consumption).

EVALUATION

Brief Description: Procedures:

By allocating a limited water supply, students learn how their water use affects others in their Community. Adaptations for IEP learners to do the activity with a shoulder partner.

Background is that water is plentiful for some people and places, but scarce for others. There are approximately seven billion people and counting living on planet Earth. Each one of these people needs water daily for drinking, cooking and cleaning. Moreover, water issues are local. While one part of the the world is flooding, another part may be in drought. Rainforests are places of plentiful water, but Deserts have little water. People have learned to live and thrive with the available fresh water. To ensure there is enough water for everyone to meet basic needs, people must carefully manage, protect and learn to use water in a manner that allows all members of a community to have enough water.

Assessments: Students will be challenged to design and build a water filtration device using commonly available materials. Students will be assessed through the following activities: Participation and contribution to class discussion Participation in Water Filter Activity Completion of Worksheet #2 – Water Filter Lab Worksheet.

REFERENCES

- The United States Geological Service. Water Use in the United States. A resource about water uses in the U.S. U.S. http://water.usgs.gov/edu/wateruse.html. (Accessed January 27, 2015.)

- The United States Geological Service. How much is your daily indoor water use? A tool to calculate indoor water use. http://water.usgs.gov/edu/sq3.html. (Accessed January 27, 2015.)

- Environmental Protection Agency. Water. WaterInformation on water including drinking water in the world. http://water.epa.gov/.(Accessed January 29, 2015.)