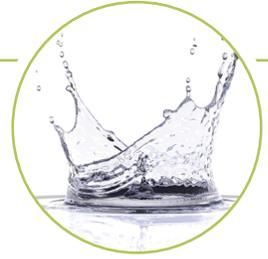


Water Quality Awareness

A Carolina Essentials™ Activity



Overview

This demonstration is an engagement activity that increases students' awareness of the current state of global water quality and availability. The United Nations releases annual reports on global water quality around a theme, with updated water quality statistics. The data can be turned into true/false or multiple choice questions and used as a friendly class competition. This activity uses the UN water quality poster from 2013.

Earth Science, Environmental Science, and Life Science
Grades: 6–12

Essential Question

What is the current state of the global water supply?

Activity Objectives

1. Increase student awareness of global water quality.
2. Increase student awareness of global water use.

Next Generation Science Standards* (NGSS)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information <ul style="list-style-type: none">• Students will use UNESCO water quality data to evaluate global water quality. They will demonstrate their understanding with discussion or written response.	ESS3: Earth and Human Activity <ul style="list-style-type: none">• Students will link human activities like agriculture to global water quality and availability.	Stability and Change <ul style="list-style-type: none">• Students will understand how human activities directly lead to changes in global water quality and availability.

Disposal

Filter the soil out of the cup and dispose of it in a trash can. Colored water can go down the drain.

Activity

Procedures

1. Divide students into groups of 3 or 4.
2. Give each student a cup or beaker that is 3/4 full of clean water.
3. Give each group soil, green and yellow food coloring, and cocoa powder.
4. Project (or ask) the water quality questions and allow students to answer them.
5. Check answers with students. (Answers are in red.)
6. If students miss a question, they will pollute their cup of water with the appropriate type and amount of pollution. (Amounts are in blue.)

Continued on the next page.

TIME REQUIREMENTS



PREP | **ACTIVITY**
15 min | 15 min

Teacher Prep: 15 min

Student Activity: 15 min

MATERIALS (PER GROUP)

1 8-oz plastic cup (clear) or 50-mL beaker per student

Clean tap water

Soil to represent sediment runoff and pollution (1 cup of soil in a sealable bag per group of 4 students)

Green food coloring to represent agricultural pollution (1 dropper bottle per group of 4)

Yellow food coloring to represent industrial waste (1 dropper bottle per group of 4)

Cocoa powder or hot chocolate mix to represent sewage (1/4 cup cocoa or 1 packet of hot chocolate mix per group of 4)

HELPFUL LINKS

[Water Quality Poster](#)

[The United Nations World Water Development Report 2016](#)

[The United Nations World Water Development Report 2015](#)

[The United Nations World Water Development Report 2014](#)

REFERENCE KITS

[LaMotte® AP® Environmental Science Water Quality Assessment Package](#)

[Inquiries in Science®: Testing Water Pollution Multi-Class Equipment Set](#)

[AM-12TesTab Water Investigation Kit, LaMotte](#)

[Carolina® Bacterial Pollution of Water Kit](#)

[Lab-Aids Qualitative Introduction to Water Pollution Kit](#)

[Water Pollution: Coliform Presumptive Test Kit](#)

[Biotic Indicators of Water Quality, Biorama™ Preparation](#)

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Student Procedures

1. Answer each question below.
2. For each question that is incorrect, you will “pollute” your cup of water as your teacher directs.
3. Within your group, discuss the answers to the follow-up questions.

Teacher Preparation and Tips

Students may complete the questions individually and then check answers together as a class or each question can be discussed and checked one-at-a-time.

To save time, have all materials on student desks before the activity begins.

Students can discuss questions as a group or write the answers in a notebook.

Remember that this is an introductory activity to get students thinking about water on a global level.

Content

Water Quality Awareness

1. What percent of people worldwide do NOT have access to improved sources of drinking water? (add a pinch of soil)
A. 11% B. 33% C. 55% D. 77%
2. What percent of people worldwide do NOT have access to improved sanitation? (add 3 drops of yellow food coloring)
A. 11% B. 33% C. 55% D. 77%
3. In developing countries, _____ of sewage is discharged untreated directly into water bodies. (add pinch of cocoa)
A. 20% B. 40% C. 60% D. 80%
4. Industry dumps about _____ MT of polluted waste in water every year. (add 3 drops of yellow food coloring)
A. 100–200 MT B. 300–400 MT C. 500–600 MT D. 700–800 MT
5. The most common agricultural chemical contaminant found in groundwater aquifers is _____. (add 3 drops of green food coloring)
A. ammonia B. nitrate C. phosphate D. sulfate
6. About how many people die each year due to inadequate water supply, sanitation, and hygiene? (add pinch of soil)
A. 3,500 B. 35,000 C. 350,000 D. 3,500,000
7. Which ecosystem has suffered the greatest degradation in biodiversity? (add 3 drops of green food coloring)
A. estuaries B. fresh water C. oceans D. salt water marshes

Discussion

Ask students the following questions:

1. Look inside your cup. If this represents global fresh water and water quality, what inferences can you make about human health? *The dirtier the water, the more health problems there will be.*
2. What might be local contributions to fresh water pollution? *Answers will vary but may include examples of local industrial waste, construction runoff, or agricultural runoff.*
3. What can you do to reduce fresh water pollution? *Answers will vary but may include conservation techniques and pollution cleanup.*

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TEACHER NOTES