

## Drinking Water and Your Health Lesson Plan

**Maryland Core Learning Goals:** *Goal 6: Environmental Science, Expectation 6.3*

**6.3** The student will analyze the relationships between humans and the earth's resources.

**6.3.2** The student will evaluate the interrelationship between humans and water quality and quantity.

*Optional: Expectation 6.4*

**6.4** The student will develop and apply knowledge and skills gained from an environmental issue investigation to an action project which protects and sustains the environment.<sup>1</sup>

**Core Objectives:** In a 30 to 50-minute lesson, the instructor will discuss drinking water and health with 8<sup>th</sup> grade students. The importance of safe drinking water is emphasized. The module also addresses what public health authorities and communities are doing to help maintain and improve drinking water quality.

Options are provided to modify and/or extend the module based on time available, as well as student interests and abilities.

Following the lesson students should be able to:

- Appreciate that water is essential to life
- Understand the consequences of not having clean water
- Recognize how water can be contaminated
- Know specific actions that individuals, governments, and communities can take to help protect the water

**Additional Objectives:**

Use additional resources provided to explore water and disease linkages, as well as specific actions to help prevent water-related disease.

**Vocabulary:**

**Core:** Water contaminants, acute and chronic conditions, storm sewage, sanitary sewage, water treatment, watershed, point source pollution, non-point source pollution

**Additional:** Clean Water Act, Safe Drinking Water Act, Environmental Protection Agency, Maryland Department of Health and Mental Hygiene, Maryland Department of the Environment, nitrates, lead, arsenic, disinfection byproducts

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<sup>1</sup> [http://mdk12.org/instruction/clg/environmental\\_science/goal6.html](http://mdk12.org/instruction/clg/environmental_science/goal6.html)

## **Materials:**

- *Drinking Water and Your Health* PowerPoint presentation
- Maryland Drinking Water page of M-EPHT site:  
<http://ideha.dhmh.maryland.gov/OEHFP/EH/SitePages/drinking-water.aspx>
- Handouts: vocabulary sheet and slide notes page
- Videos:  
EPA Water Quality Videos (in particular, Dastardly Deeds and the Water Pollution Monster is good, also "Think About your Drink" makes connections between health and drinking water)  
<http://water.epa.gov/aboutow/owow/videocontest.cfm>

## **ENGAGE**

### *Pre-assessment and Introduction*

Assess students' general knowledge about the importance of clean, safe water. Options for the pre-assessment include class discussion, small break out group discussions, or an activity such as showing students a glass of water from the tap and a glass of water from a local stream, rain water, or other water source. Is there a visible difference in the water? Which glass would they prefer to drink from and why? Additional class or small group discussion can focus in on whether any of them have ever been in a situation where they didn't have access to clean water (i.e., foreign travel, camping, etc)? What are some of the consequences of not having clean water?

Students will likely be familiar with importance of water and in particular efforts to clean up the Chesapeake Bay. The focus of this lesson is to build on this current knowledge and expand further on how clean water is essential to human health and what actions the students, communities, and the government can do to assure clean and safe water.

## **EXPLORE**

Introduce our reliance on water and its importance in our daily life. A presentation of the materials and additional resources provided in a short lecture format may be interspersed with class discussion and student activities. Some specific concepts to be addressed include the need for water on a daily basis, water use and ways to conserve it, and how we can protect our water.

Review the water cycle, stressing that there is no such thing as "new" water and we are reliant on nature to keep recycling the water we do have. Review the concept of a watershed, as well as sources of water (ground water, surface water) and where most of us get our water (community water systems or well water delivered to our tap

## **EXPLAIN**

Describe threats to our water from point and nonpoint sources, namely a review of some of the many contaminants that end up in our water. Differentiate between man-made and naturally occurring contaminants. Engage students in a discussion about how we can

assure our water is clean (prevent contamination, water treatment plants). Give a brief overview of the water treatment process. How do the students think communities can keep their water clean?

### **ELABORATE**

Explain how we protect our water, reviewing the main laws that help ensure our water is safe (Clean Water Act and Safe Drinking Water Act). Describe how water can affect our health both in the short term (acutely) or over the long term (chronically). Review what we can do to reduce the strains on our water system and help protect our water, as well as what the government is doing to track the health of our water. Students can break into small groups to discuss what they can do individually, as a school, or a community to help protect the water.

### **EVALUATE**

#### **Evaluation Options:**

- Respond to several brief constructed response (BCR) questions:  
Examples:
  - Why is water essential to life (include at least three reasons)?
  - Provide three examples of how water can become contaminated.
  - Identify at least three specific actions that can be taken to help protect our water.
- Construct a drinking water quiz based on the material, and include an answer key.
- Compose essay relating information learned about water and health.

#### **Individual or Group Project Options**

- Develop a drinking water education campaign (perhaps in the form of a video, poster, PowerPoint presentation, or brochure) highlighting the importance of drinking water to life, threats to drinking water, and what we can do to protect it.
- Write a letter to the governor or a state or local representative, discussing a specific concern about water and suggest actions or request funding/attention/more research to address the problem.
- Respond to a drinking water case study problem (i.e., their county is in an extreme drought and water supply is dwindling). Building on the concepts from the lesson, formulate a strategy of how to address the problem.
- Pretend that they are a national, state, county or school leader and present their plan to the class of what they are going to do to address water quality concerns.

## Resources and References:

Maryland EPHT site:

<http://ideha.dhmh.maryland.gov/OEHFP/EH/tracking/SitePages/Home.aspx>

Drinking Water section of M-EPHT site:

<http://ideha.dhmh.maryland.gov/OEHFP/EH/SitePages/drinking-water.aspx>

Environmental Protection Agency Teaching Resources:

<http://www.epa.gov/teachers/health.htm>

EPA Drinking Water Games and Activities:

<http://water.epa.gov/learn/kids/drinkingwater/gamesandactivities.cfm>

Chesapeake Bay Foundation:

<http://www.cbf.org/page.aspx?pid=1000>

National Oceanic and Atmospheric Association:

<http://www.noaa.gov/ocean.html>

Bill Nye the Science Guy “water cycle jump” rap: (1 min 31 secs)

<http://www.youtube.com/watch?v=BayExatv8IE>

CDC Healthy Water: <http://www.cdc.gov/healthywater/>

A Teacher’s Guide to Water Quality:

<http://yyy.rsmas.miami.edu/groups/niehs/ambient/teacher/water/Twater.html>

National Academy of Sciences Drinking Water Website: <http://www.drinking-water.org/flash/splash.html>

Nonprofit Water.org Lesson Plans:

<http://water.org/learn-about-the-water-crisis/lessonplan/>

EPA Office of Water:

<http://water.epa.gov/>

U.S. Environmental Protection Agency (EPA) Teaching Resources

<http://www.epa.gov/teachers/health.htm>

EPA Report Water on Tap: What you Need to Know:

[www.epa.gov/ogwdw000/wot/pdfs/book\\_waterontap\\_full.pdf](http://www.epa.gov/ogwdw000/wot/pdfs/book_waterontap_full.pdf)

EPA My Environment Query Tool:

<http://www.epa.gov/myenvironment/>

Environmental Health Career Website:

Meet the Experts: Environmental Health Professionals:

<http://experts.thinkport.org/envirohealth/default.aspx>

National Institute of Environmental Health Sciences (NIEHS) Curricular Material:

<http://www.niehs.nih.gov/health/scied/teachers/curricular/index.cfm>

Centers for Disease Control and Prevention (CDC) National Environmental Public Health Tracking Program:

<http://www.cdc.gov/nceh/tracking/>

Enviro Health Connections: Curriculum Resources:

<http://www.thinkport.org/CLASSROOM/CONNECTIONS/general/other.tp>

World Health Organization (WHO) water page:

<http://www.who.int/topics/water/en/>