WE CARE ABOUT WATER.
IT'S WHAT WE DO.®

INDIANA
AMERICAN WATER

Making the Grade

An Investigation of Your Community's Water Quality

- **Grade Level:** 7-12
- **Objective:** Students will review and report on their community's Consumer Confidence Report to gain a better understanding of the quality of their drinking water.
- **Subjects:** Environmental Science, Chemistry, Public Speaking

INDIANA AMERICAN WATER

INTRODUCTION

Our drinking water sources can come from rivers, lakes, reservoirs, springs, groundwater wells and, in some cases, seawater. As surface and groundwater travel over and through the soil, various substances become dissolved into the water. In addition, water can also contain insoluble substances that remain suspended in the water. These dissolved and suspended substances can include naturally-occurring minerals, microscopic organisms and a number of contaminants associated with human activity. The following are descriptions of different types of contaminants that can be found in water:

- **Microbial Contaminants**, such as viruses and bacteria, can come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- **Inorganic Contaminants**, such as salts and metals, can be naturally-occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and Herbicides** may come from a variety of sources, including agriculture, urban stormwater runoff, and residential uses (i.e., lawn care products).
- **Organic Chemical Contaminants**, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production. For example, gasoline and diesel fuel contain an array of organic compounds that can be released into the environment from leaking fuel tanks. Other organic chemicals can make their way into the water via urban stormwater runoff or poorly maintained septic systems.
- **Radioactive Contaminants**, can be naturally occurring or may be the result of oil and gas production and mining activities.

To ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (EPA) has issued regulations that limit the amount of these substances that can be present in public drinking water supplies. Public water systems are required to monitor its water for these substances, and if found in concentrations above their acceptable limits, modify its treatment operations to reduce their levels. Water utilities are also responsible for making the results of these tests available to the public on an annual basis through the issuance of a water quality report called a Consumer Confidence Report.

DID YOU KNOW?

Private water utilities are required to test and monitor drinking water for more than 100 regulated contaminants.

MATERIALS NEEDED

- Your community or school's Consumer Confidence Report
- Pen or pencil
- Enclosed data sheets

INDIANA AMERICAN WATER

ABOUT YOUR CONSUMER CONFIDENCE REPORT

To inform the public about their drinking water quality, public water suppliers provide their customers with an annual water quality report called a Consumer Confidence Report (CCR).

The CCR provides detailed information about the drinking water source and quality and whether the water utility met all drinking water standards for the previous year.

It includes information on the following:

- **Source of supply:** If the source of water for your community comes from surface or groundwater supplies. It could be one or both.
- **Substance:** Water utilities test and monitor the water from source to tap. Tests are conducted for more than 100 substances/contaminants. The utility is required to include information on any substances that were detected in the water. NOTE: The utility tests for many more contaminants than what is listed in the CCR. It will only be listed if it was found. In some cases, non-regulated substances are measured, but maximum allowed contaminant levels have not been established by the government. These contaminants are shown for your information.*
- **Year Sampled:** When the last test was conducted. The frequency of testing, which varies based on the substance, is set by government requirements.
- **MCL and MCLG:** For potential contaminants, maximum contaminant level (MCL) values are established, indicating the highest level of substance (contaminant) allowed. These values are set by the federal government as part of the Safe Drinking Water Act. Many reports will also publish maximum contaminant level goals (MCLG). The MCLG is the goal level for that substance. This target, which is set for some contaminants, may be set lower than what is allowed.
- **Highest Amount Detected:** This represents the measured amount (less is better).
- **Range:** This indicates the highest and lowest amounts measured, if applicable.
- **Compliance Achieved:** A "Yes" means the amount of the substance met government requirements.
- **Typical Source:** Standard information on where the substance typically originates. This may or may not be the source of the contaminant for your community.
- **Definitions:** Reports often include definitions that the reader will need to fully interpret information on regulated substances and the assessment process.
- **Other important information about your drinking water:** May include information on whether fluoride is added to your water, answers to commonly asked questions, and where you can call if you have additional questions.

It's important that consumers be informed about their drinking water. A great place to start is to read your annual water quality report to see how the quality of your drinking water measures up against federal and state drinking water standards.

*NOTE: As indicated by the EPA, the presence of contaminants does not necessarily indicate that water poses a health risk. Drinking water may reasonably be expected to contain at least small amounts of some contaminants, as long as they meet federal and state drinking water standards.

INDIANA AMERICAN WATER

EXERCISE

For this exercise, students will review their community's water quality report to answer questions about the source of supply and water quality. Students will also gain an understanding of some of the regulated substances commonly found in many water quality reports. Once completed, the worksheet should be used as the basis for a presentation to the class or a home gathering. This will generate discussion, address common misconceptions about water quality and supply, and instill in citizens a sense of awareness, participation and responsibility about their drinking water.

WATER QUALITY WORKSHEET

Water in my home/school (circle the appropriate location) is provided by: _____

Location and utility contact information: _____

The source of water for my community: _____

Description of the distribution system: _____

_____

_____

Categories of substances that may be found in source water: _____

_____

_____

Description of key findings (use reverse if needed): _____

_____

_____

_____

_____

_____

_____

_____

Did the utility meet all drinking water standards? Yes No (circle one). If not, what was the violation? _____

_____

_____

_____

Other key information worth noting: _____

_____

_____

_____

Provide a copy of your CCR with this worksheet.

INDIANA AMERICAN WATER

TASKS

- Obtain a copy of your home, school and/or workplace water quality report from your water service provider's website. If your water is supplied by an individual well versus a utility, you may complete the worksheet for your school or place of work.
- Using the completed worksheet, and what you have learned, design a poster and presentation about the water quality report. Display the poster in class and at home. Gather your class or family, and present the results to them.

QUESTIONS

1. Review the list of regulated substances in your CCR. Which of them are naturally occurring and which are anthropogenic?
2. If the MCL for one contaminant is 10 ppb and another contaminant has a MCL of .1 ppm, which is permitted to be present in the water supply in greater concentration?
3. Does your community's water supply come from more than one source? If so, why might water need to be accessed from more than one source?
4. Does the source of your water vary during a given year? If so, explain.
5. Why do some regulated substances get tested more often than others?
6. After reviewing your water utility's water quality report, did it meet all drinking water standards?
7. Were there any violations in the report that you referenced? Explain.

EXTENSIONS - AT HOME

- Contact your water utility to see if your class or civic group can take a tour of your local water treatment facility. Follow the path of water from access, treatment, storage and delivery.
- If tours are not permitted, invite a representative from water utility to visit your class or civic group to discuss your community's water quality and treatment process.

COMMENTS

We want to know what you think. E-mail your feedback and/or suggestions for improving this lesson plan to joi.corrado@amwater.com.

NOTES

INDIANA AMERICAN WATER

DEFINITIONS

This includes terms often used in Consumer Confidence Reports.

- **AL (Action Level):** The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements, which a water system must follow.
- **Contaminant:** The presence of an unwanted constituent in material, physical body, water supply, natural environment, at a workplace, etc.
- **Drinking Water Regulated Substance:** A chemical or biological agent that may be present in drinking water and is regulated by federal, state and/or local agencies.
- **MCL (Maximum Contaminant Level):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **MCLG (Maximum Contaminant Level Goal):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **MRDL (Maximum Residual Disinfectant Level):** The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **NTU (Nephelometric Turbidity Units):** Measurement of the clarity, or turbidity, of the water.
- **pCi/L (picocuries per liter):** Measurement of the natural rate of disintegration of radioactive contaminants in water (also beta particles).
- **ppm (parts per million):** One part substance per million parts water, or milligrams per liter.
- **ppb (parts per billion):** One part substance per billion parts water, or micrograms per liter.
- **Safe Drinking Water Act of 1974:** The principal federal law in the United States intended to ensure safe drinking water for the public.

RESOURCES

- www.amwater.com – for links to water quality reports and information on the treatment process
- http://water.epa.gov/drink/contaminants/index.cfm - for information on regulated substances and contaminants

American Water" and the star logo are the registered trademarks of American Water Works Company, Inc. All rights reserved. American Water Works Company, Inc., together with its subsidiaries, is referred to as American Water.

In a world where everything we touch frequently changes, water is our constant. We've never stopped needing it to drink, to cook, to clean, to live. We'll always need it for sanitation, for fire protection, for watering our lawns and washing our cars.

It's easy to take water for granted. And because so many do, we don't.

We are scientists, environmentalists, innovators, and protectors. We are also residents and employees in the communities we serve. We understand how important, how precious, and how critical water is to daily life.

WE CARE ABOUT WATER. IT'S WHAT WE DO.®

Join us this year as we celebrate 125 years of service to our customers and our communities.

Visit **www.amwater125.com** to learn more about our company and our years of tradition of reliability, responsibility, service, innovation and excellence.

A special thanks to Ron Smith for developing the core content of this lesson plan. Ron Smith, a science educator from NJ, has been teaching biology, environmental science and interdisciplinary studies in the classroom, lab and field for 18 years. It was important for us that our lesson plans be crafted by an educator for educators. We appreciate his hard work.

Last updated: 12-2010