



CreekFreaks

A project of the Izaak Walton League of America

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Module #10

Creek Freaks uses the Holding onto the Green Zone curriculum, developed by the Bureau of Land Management



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Introduction

The Izaak Walton League, founded in 1922, is one of the oldest and most respected conservation organizations in the nation. By taking a common-sense approach toward protecting our country's natural heritage, the League champions the motto "Defenders of soil, air, woods, waters, and wildlife." As new generations of conservationists are born, the League strives to educate youth about the importance of our nation's resources. The League's Creek Freaks program uses a curriculum called *Holding onto the Green Zone* which was developed by the Bureau of Land Management and the University of Wisconsin Cooperative Extension. Creek Freaks introduces youth to the importance of water quality, and intricate system of the riparian or "Green" zone.

The Izaak Walton League has partnered with OAR Northwest who will be delivering Creek Freaks curriculum during their Adventure Mississippi River trip. Adventure Mississippi River (AMR) blends real life adventure with technology to reach students both locally and beyond the Mississippi River watershed. AMR aims to inspire students to experience an adventure in their local environment, understand the potential environmental impacts of their actions, and engage in the rich history and diversity of species along the Mississippi River and its immense watershed.



Module #10

Holding onto the Green Zone Lesson: Can You See Pollution?

Pollution is sometimes hard to visualize. What does it look like? Can I see it? Can I smell it? If a body of water looks clean does that mean it is not polluted? If it looks dirty is it polluted? There is much uncertainty surrounding water quality. This activity addresses some of those uncertainties and discusses the importance of testing water quality.

Background

State and local agencies charged with protecting our nation's waters face increasing budget deficits and diminishing resources for monitoring waterway health. In fact, less than 20 percent of America's rivers and streams are being monitored at all. Of the few that are checked, less than half have been found safe for fishing, swimming, and other uses –often based on just one water quality test every five years!

Streams and wetlands provide habitat for fish and wildlife. They also provide important benefits for people – from flood protection and erosion control to drinking water and opportunities for recreation and education. When we turn on the tap, we often take for granted that the water is clean and safe. After all, our waters are protected by federal and state laws, right? The short answer is: Sort of. Although the Clean Water Act and other federal and state laws dramatically curbed some types of water pollution, that hasn't solved all our water quality problems. One reason is that the Clean Water Act focuses primarily on point-source pollution –pollution that comes from a distinct, identifiable source (or "point"). The U.S. Environmental Protection Agency (EPA) and state agencies have had great success in controlling pollution from factories, sewage treatment plants, and other point sources.

The threats to water quality today are less obvious than a factory pipe or sewage outflow – but no less harmful. Today's threats are the often unseen pollutants carried into waterways by rain, snowmelt, and other runoff including

- Fertilizers and pesticides from farm lands and suburban lawns
- Motor oil and ice melting chemicals from parking lots and community streets
- Bacteria from livestock and pet waste

This is called nonpoint-source pollution because it does not come from a single identifiable "point" – which also makes it much harder to eliminate.

The Clean Water Act does not provide effective tools to curb nonpoint-source pollution. Federal programs that address nonpoint-source pollution – including the Nonpoint Source Management Program and the Coastal Nonpoint Pollution Program – have made little progress in stemming the flow of pollutants from nonpoint sources because these programs are voluntary. In addition, the responsibility for regulating nonpoint-source pollution has largely rested on the shoulders of state and local authorities that often lack the funding and personnel needed to curb this growing threat.

CATEGORY: WATERS

CAN YOU SEE WATER POLLUTION?

Learning Objectives

To learn about water pollution and how to detect it.

Materials

Five clear glasses, sample of stream water (taken within 24 hours of the activity), isopropyl (rubbing) alcohol, food coloring, tap water (preferably from a municipal system), bottled spring water, tape/labels and a permanent marker (to label glasses with water samples), paper (either pads of paper, a sheet of paper on a clipboard, or note cards), and pens/pencils.

Activity Description

Before this activity begins, prepare five glasses with water samples. Label each glass with a capital letter and fill the glasses with the following samples:

- Glass A: Tap water
- Glass B: Bottled spring water
- Glass C: Tap water with a few drops of food coloring (enough to distinctly color the water)
- Glass D: Tap water with a capful of rubbing alcohol
- Glass E: Stream water

Ask the children to look at the glasses and decide which ones contain polluted water. Depending on the number of participants, you can have the children work in teams of 5 to 6 (which means you will need one set of samples for each group) or this can be done as a demonstration for the entire group. Tell the children that they should use their senses of smell and sight to judge the water quality.

Caution: Tell them **not** to taste any of the samples (they could get sick).

Have the children record their observations about each glass of water. Ask them to write down why they believe certain glasses of water are polluted and others are not. Then discuss the answers.

Discussion Questions

Which water samples do you think are polluted and why?

Answer(s): Responses will vary.

Is using sight and smell the best way to determine if water is polluted?

Answer(s): *No. Although smell and sight give you clues about potential pollution problems, they don't provide all the answers — and can even be misleading.*

That's why the Izaak Walton League developed the Save Our Streams program and Creek Freaks project for kids — to test water quality using science.

For example, finding out which insects and other underwater creatures can survive in the water will tell you a lot about the water quality. The water is not “polluted” because it has bugs in it. Some insects can only live in clean water! An unusual color may or may not mean there's a problem — perhaps an odd-colored soil washed into the water that day. You can use simple tools to measure chemicals and oxygen in the water to find out if the water is healthy for fish and wildlife — and you!

Before you jump into a creek, you can use your sense of sight and smell to look for clues to water pollution. If you do find a stream with an unusual color or a bad smell, tell an adult about it and ask them to call the county or city authorities to check it out — it could be a sign of pollution and may not be safe to play in. But to be sure about the quality of your water, you need to use scientific experiments, like the ones in League programs.

Following are specific talking points for each of the five samples.

Glass A: Tap water can be considered “polluted” because it contains chlorine, which is added to tap water in most parts of the country to make it safe to drink. Although chlorine is needed to kill bacteria in the water that could make you sick, chlorine is extremely toxic to fish and other aquatic life — if a pipe leaked chlorinated tap water into a stream, the chlorine would kill many of the fish and other aquatic animals living there.

Glass B: Some companies get their **bottled water** directly from mountain springs that are generally free from pollution — at least as far as fish and wildlife are concerned. However, these companies do not have to test spring water to make sure it is safe for drinking, so it may be safe for fish but not for you!

Many bottled water companies are now selling treated tap water — and even untreated tap water — in plastic bottles. If this tap water contains chlorine, it would be considered “polluted” for wildlife.

Glass C: Tap water with food coloring may “look” polluted because it has an odd color, but unusual colors are not always a sign of pollution problems. The color could be caused by dirt that washed into the stream — or by chemicals dumped there. The only way to know is to test the water.

Glass D: Tap water with rubbing alcohol looks clean but smells terrible. It obviously is polluted, even though it looks perfectly clear. Smells like this could be caused by sewage, chemicals, or natural gases. However, this is just a first clue in finding out whether the water is polluted.

Glass E: Stream water should look a little dirty and have plenty of life in it — plants, insects, other aquatic animals. If the water is very muddy or dark, it probably has too much dirt (also

called sediment) for fish and other aquatic animals to survive. This sediment can clog fish gills, smother fish eggs, and block the sunlight that water plants need to grow.

What did you learn about detecting water pollution? Name some types of pollution that could harm your stream.

Answer(s): *Just because water looks clean does not mean that it is clean and healthy — and just because water has dirt or bugs does not mean it is polluted.*

There are two basic types of pollution. The first kind of pollution comes from factories or industrial plants. This is usually easy to find and fix. The second kind comes from many sources and can be hard to identify, such as oil leaking from cars, dirt that washes away from construction sites, trash, and pet waste. Some of these we can see (like an oil slick on the water or a plastic bottle floating downstream) and some we can't see (such as chemicals that wash into the stream from someone's lawn).

How do these pollutants get in the water?

Answer(s): *Pollutants get into water by accidental spills, illegal dumping, or rainfall runoff that collects pollutants from the air and ground surfaces such as streets or farm fields and carries them into local waters.*

Are any of these pollutants in your (this) stream? Can you guess which of these might be a threat to the stream?

Answer(s): *Responses will vary.*

Estimated Time

15 to 30 minutes. Preparation time may vary, but allow for another 30 minutes to gather materials and organize samples.

Ages

Recommended for ages 5 to 8.

No adjustments needed for ages 9 to 11, although you can discuss potential pollutants and their impact in more detail.

For youth 9 to 11 and older, you can introduce the terms “point source pollution” for pollution from factories and “non-point source pollution” for pollution from farms, yards, and streets.

Credits

Adapted from “Measuring Stream Health Activities” from the *Hands On Save Our Streams — The Save Our Streams Teacher's Manual*, by the Izaak Walton League of America, 1994.

Related Sources

Young Ikes Activity Book — Ages 9 to 11, by the Izaak Walton League of America, 2011. Page 5 – Waters.



Mississippi Application

- 1) This is a good introductory lesson to pollution issues on the Mississippi, as well as an introduction to why we monitor water quality. As the OAR Northwest adventure crew travels down the Mississippi, observe them taking water samples, and learn how to take your own water samples. You will learn how to do chemical monitoring in future modules, but have students brainstorm about some things they may want to test for in the water. For example, revisit the lesson on the dead zones present in the Gulf of Mexico. What causes them? Could we test for nutrients on our local waterway and observe the contribution a local river has to the overall water quality in the Mississippi?



For more information and for additional activities please visit www.creekfreaks.net/library to download the Holding onto the Green Zone Action Guide.