NPS

ActivitY

SHEETS

Activities to Accompany

Join a Stream Team!

For Grades 6 - 8

Objectives:

Activities offer students the opportunity to learn about multiple facets of waterbodies and pollution, including aquatic life (indicator species), local concerns, and public outreach through research, teamwork, and role-playing exercises.

Exercise:

Exercise I. Take Out the Trash
Exercise II. Environmental Conflicts
Exercise III. Adopt-A-Stream
Exercise IV. Macroinverte-whats?
Exercise V. Macroinverte-whats? Part 2: The Saga Continues

Time Required:

Individual exercises are designed to be approximately ½ hour to 45 minutes long. Exercise III is not designed as an in-class activity but can be used to build on one of the other exercises.

Curricular Standards and Skills:

Science:
- stream monitoring
- macroinvertebrates
- water quality
- species characterization

Social Studies:
- understanding people's behavior
- working with community groups

Language Arts:
- public speaking
- research

Thinking Skills:
- anticipating potential problems

Vocabulary:

conservation area	stakeholder
estuary	water resources
eutrophication	water quality
indicator species	watershed
macroinvertebrates	wetland
sediment	volunteer monitoring
soil erosion	coordinator

Web Sites:

The Shenandoah River
www.cbf.org/document.doc?id=235

Georgia Adopt-a-Stream Program
www.georgiaadoptastream.com/db/

Why Study the Stream-Bottom Macroinvertebrates? by the Isaac Walton League
http://www.people.virginia.edu/~sos-iwla/Stream-Study/StreamStudyHomePage/WhyStudyMacro.HTML

Macroinvertebrate Key by the Isaac Walton League
http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/Key1.HTML

Macroinvertebrate Identification Key Directions by the Isaac Walton League
http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/MacroKeyIntro.HTML

Practice Samples and Answer Pages by the Isaac Walton League
http://www.people.virginia.edu/~sos-iwla/Stream-Study/Samples/SampleIntro.HTML

Exercise I.

Take Out the Trash

Take a moment to imagine you are on a nice walk with a couple of your friends. The day is beautiful. The sunshine falls in patches on the path as it makes its way through the trees. The wind gently rustles the leaves. The creek gurgles lightly as it flows over and around the rocks in its path. What a beautiful stream, clear, sparkling...and full of trash! Yuck!

You look around and realize that the number of visitors to your favorite outdoor spot has grown over the years, and they have brought with them large amounts of trash. You and your friends decide to do something about the litter problem.

Work with the other members of your group to design a community outreach campaign that will encourage visitors to the stream not to litter. Your group will work together to design this campaign by answering the following questions:

Why Do People Litter?
Before you can fix the problem, you must understand why it happens. List some beliefs and behaviors that might lead to littering.

What kinds of beliefs and behaviors should replace the litter-causing behaviors?

Can People Change?
What kinds of activities should be part of this campaign? Some ideas are listed in the picture to the right.

Design a commercial, draw an advertisement, or create a public service announcement that would encourage people to stop littering.

Exercise II.
Environmental Conflicts

Farmer Frank's Fabulous Fertilizer Factory
After years of farming, Farmer Frank had grown tired of farming and is ready to try something new. He decides to convert his 100-acre farm into a fertilizer manufacturing plant. He applies to the city for the needed permits to change his farmland into a factory.

Farmer Frank thinks this will be easy. His land is located on the Shenandoah River, and he can use water from the river for his manufacturing needs. He has enough land for both the factory and the parking lot for the new workers, and the town will welcome the new jobs. What could be more perfect?

Well, not everyone is happy with Farmer Frank's plan. Environmental groups are worried about the amount of pollution that might be put into the river by Farmer Frank's factory. People who use the river for recreation are extremely unhappy about an ugly factory being built on the bank of their scenic river. Town residents aren't sure what to think. Some residents are happy about the new jobs, but others are worried about the increase in pollution. Local government officials are worried about following all the laws that deal with this kind of issue.

The town of Farmerville will hold a public meeting to give everyone a chance to talk about their worries and work on coming up with a compromise that will keep everyone happy. As a class, list the possible stakeholder groups in the box below. Then divide into groups, each representing a different stakeholder group. Fill out the "Meeting Preparation" worksheet to help you gather the information you will need for the meeting.

Where to Look for More Information

Use as many sources of information as you can to learn about the issues facing your stakeholder group. To find out more, you can use the Internet, write to local officials, or look for similar stories in the newspaper.

Here are two organizations' web sites presenting information about issues affecting the Shenandoah River:
1) Friends of the Shenandoah River (http://www.fosr.org/ problem.cfm)

2) Chesapeake Bay Foundation (http://www.cbf.org/ document.doc?id=235)

Stakeholder Groups
List all the possible groups that might be interested in attending the public meeting.

Meeting Preparation

Type of Interest Group: _____

What are your priorities and goals in this situation? What would you like to see happen? List them in order of importance if possible.

What are the benefits of your goals and priorities?

What are the drawbacks?

The Shenandoah River has a history of agriculture, industry, and pollution. How do you think the history of the river will affect your goals in this situation?

What laws will help you in this situation? What laws might make it more difficult to achieve your goals?

What other groups might help you achieve your goals?

What groups will be working against you?

What topics will cause disagreement between your group and the groups that oppose your goals?

What things might you have in common with the groups that oppose your goals?

What possible compromises might you be willing to make?

Exercise III.
Adopt-A-Stream

Many cities and states have established Adopt-a-Stream programs. Conduct an Internet search to find a program near you.

Your class can become Streamkeepers. Follow the five-step stream adoption process outlined here to develop your own Adopt-A-Stream program. This process is used as a model for stream stewardship programs across the country. By following these steps, you and your class will be well on your way to becoming Streamkeepers.

1. Investigate Your Watershed

Take some time to explore the area around your schoolyard. Is there a stream nearby? Begin the process by choosing a stream for your Streamkeeping efforts.

Once you have chosen a stream, collect and study all the information you can possibly find about the stream of interest and its watershed. Find out about the stream's history, geology, demography, land use, fauna, and flora.

Some Possible Sources of Information

- Local conservation districts
- Community groups
- Knowledgeable fishers and long-term residents
- City and county land-use planning departments
- City and county water management departments
- City and county storm water and wastewater divisions

- State department of fish and wildlife
- State department of environmental quality
- State department of natural resources
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
- Public or school library

Ask these groups for watershed maps, watershed management plans, aerial photographs, fish or wildlife inventories, and any other data or information you can think of.

2. Organize a Streamkeeping Group

Ask around to see if other people in your local area are interested in working to protect and enhance the condition of your stream and watershed. Try to include as many different types of people as you can. Make your group official by giving it a name, like "Friends of North Creek," "Little Bear Creek Alliance," or "Swamp Creek Streamkeepers."

Include a Variety of Groups

- Business people
- Teachers
- Neighbors
- Scout groups
- Classmates
- Politicians
- Religious groups
- Others

3. Identify Short- and Long-Term Goals

Next, establish short-term and long-term goals with your group. Short-term goals describe what you would like to accomplish over the next 6 months to 1 year. Long-term goals describe what you would like to accomplish over the next 10 to 20 years.

Examples of Short-Term Goals	Examples of Long-Term Goals
• Conduct a watershed inventory (gather information on watershed) • Develop and start a stream monitoring program to collect physical, chemical, and biological data on our stream • Stencil storm drains throughout watershed with "Dump No Waste, Drains to Stream" • Create an educational flyer to inform streamside landowners about stream do's and don'ts • Create and place stream identification signs • Conduct a community stream cleanup	• Maintain fish and wildlife populations • Protect remaining stream and wetland habitat • Restore and enhance degraded stream and wetland sites • Lobby for changes in land-use laws to afford more protection to streams and wetlands

4. Develop an Action Plan

Starting with your short-term goals, work out an action plan for each goal. This action plan usually answers the questions who, what (the goal), where, when, how, how much, resources available, and deadlines. Try to delegate responsibilities evenly to all members of the group. Give them tasks and ask them to report their findings at the next meeting.

5. Become a Streamkeeper

Put your plan into action. Carry out all the actions to achieve your short- and long-term goals. As a Streamkeeper, you become responsible for your adopted stream. You and your group will watch over the stream, monitor the health of the stream and surrounding watershed, and adjust your action plan according to your stream's changing needs.

The Adopt-A-Stream Foundation can keep you informed and up-to-date about Streamkeeping activities, programs, and materials.

Exercise IV.

Macroinverte-whats?

This discussion is from materials developed by the Izaak Walton League of America's Save Our Streams program (http://www.iwla.org/index.php?ht=d/sp/i/1977/pid/1977).

Little Critters Can Tell You Big Things

To learn more about how macroinvertebrates (small creatures that live in streams) can tell you a lot about the water quality and health of a stream, read the Web page "Why Study the Stream-Bottom Macroinvertebrates?" http://www.people.virginia.edu/~sos-iwla/Stream-Study/StreamStudyHomePage/WhyStudyMacro.HTML

1. Why do macroinvertebrates tell you more about water quality than fish do?

2. If you were the president of a small Streamkeeper organization with little money and you suspected pollution in a stream, why might you sample macroinvertebrates in the stream instead of hiring a laboratory to sample the stream water itself?

3. If you were a scientist trying to find out if a stream is polluted using the macroinvertebrate method and you did not have any data on the types of organisms that lived in the stream before there was a possibility of pollution, how might you find out if there is pollution?

4. What is the phrase that can be used to describe the role that macroinvertebrates play in alerting us to the possibility of stream pollution?

Exercise V.
Macroinverte-whats?
Part 2: The Saga Continues

Before You Get Started
Be sure you read the background information on "Why Study the Stream-Bottom Macroinvertebrates?"
http://www.people.virginia.edu/~sos-iwla/Stream-Study/StreamStudyHomePage/WhyStudyMacro.HTML

This activity is from materials developed by the Izaak Walton League of America's Save Our Streams Program.
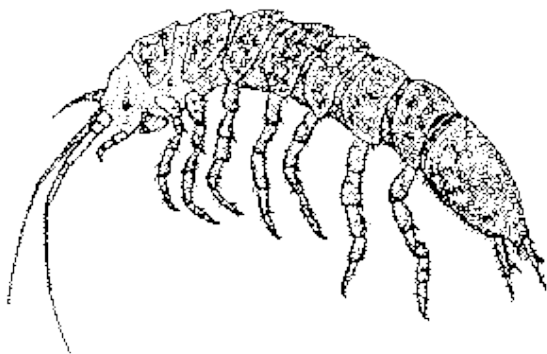
Background Information
In this exercise you will use a key to identify macroinvertebrate species in hypothetical water samples. You will use the numbers and types of organisms in six stream samples to determine water quality.

Macroinvertebrates are an Indicator Species
In other words, the presence or absence of certain kinds of macroinvertebrates can signal the presence of pollution in water.

Materials Needed
6 copies of the Sample Record and Assessment Sheet
1 copy of each of the 6 sample streams

Procedure
1. Begin with sample stream 1.

2. Use the identification key at the Web page
http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/Key1.HTML to identify the macroinvertebrate organisms represented in each stream sample. (Directions on how to use the key are provided at http://www.people.virginia.edu/~sos-iwla/Stream-Study/Key/MacroKeyIntro.HTML.)

3. Record your findings on the Sample Record and Assessment sheet.

4. Use the Macroinvertebrate Count section in the second half of the form to calculate the water quality index value and determine an overall water quality rating for each stream sample.

5. Repeat steps 1 through 4 for each sample stream, each time using a new Sample Record and Assessment sheet.

6. When you have completed all your sample assessments, check your results against the answers at http://www.people.virginia.edu/~sos-iwla/Stream-Study/Samples/SampleIntro.HTML