



Pollution in the River Habitat

Station 6

Marc Seifert

Time Frame:	Standards:
30-45 Minutes based on age and development level.	The educators implementing this activity will determine appropriate standards based on age and student activity. Idaho standards are referenced for example only. http://www.sde.idaho.gov/site/content_standards/
Objectives:	
<p>Learn to recognize pollution in a River Habitat?</p> <p>Looking at river/stream habitat, students can:</p> <ul style="list-style-type: none"> • Identify the components of river or stream habitat pollution sources • Learn about pollution impacting habitat organisms and bioculture • Become aware of both visible and invisible pollution • Learn that they can make a difference and that every little step makes a difference 	
Background Information:	
<p>Pollution of river and stream habitats is contamination of the habitat. Contamination comes from many sources, most often human interaction in the environment. Contemporary pollution sources range from trash, mining, runoff, spills, sewage systems, industrialization, acid rain, groundwater contamination, and many other sources. Regardless of the source of pollution; impacts are often very damaging to the habitats. Pollution impacts plants and organisms in the water bodies and is damaging to both individual species and entire biological communities. Every one can make a difference and even small steps can have good impacts and reduce pollution in the habitats.</p> <p>Pollution levels are normally measured by testing the water and the other elements of the river or stream habitat. Tests may include contaminants, dissolved oxygen, bacterial content, turbidity or clarity, sedimentation rates, salinity, pH, heavy metals, fertilizer, and adverse temperature. Meaningful tests should be tested over several years, at different depths and locations, and results trended and analyzed using accurate testing laboratories. This learning station can raise awareness of the students and offer new insight to them as they go forward and develop into the workers and researchers of the future.</p>	
Materials:	
<ul style="list-style-type: none"> • Guest Speaker: Such as a Local River Guide, EPA specialist, Department of Health Specialist, Regional Water Department Scientist or other local expert on water quality and local river health • Informational handout on pollution, sources, impact, mitigation, etc. (typically supplied by the guest speaker or educator) • Copies of the book, <u>“A River Ran Wild”</u> 	



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- Clipboards
- Rubber gloves
- Plastic garbage bags
- Extra Adult Helpers
- Portion cups
- Sugar
- White vinegar
- Salt
- Citric acid
- Tap Water
- Cotton Swabs
- Journal
- Pencil
- Colored pencils or crayons

Procedure:

The Guest Speaker could talk to the students and show them about the river or stream habitat, typical sources of pollution, and impacts on the associated wildlife in the river or stream habitat. Potential subjects to engage the students may include:

- Discussions with students on their knowledge of habitat pollution and the impacts on biocultures
- Asking students how they think rivers and streams get polluted
- Building student background by reading the book, [A River Ran Wild](#), as a group activity before the field trip to the river habitat
- Discussing the stages of river impacts described in the book, discussing the impacts and addressing what was involved to clean the river habitat.
- Discussing how to keep river habitat clean
- Discussing clean up and mitigation methods
- Involving the guest lecturer in discussions of local polluted creeks, streams, or other water ways that are unsafe for human use
- Fostering additional discussions concerning local water body problems and what can help, even if it is little steps.

This field trip can focus on two aspects; both the visual and hidden pollution aspects of a river/stream habitat. This first activity could be effectively performed at the river or stream habitat. The second activity on clear liquid pollution can be performed back in the classroom if time constraints limit field time. Students will participate in this simple pollution (litter pick up) exercise at the river/stream habitat.

- Students would pick up as many sources/types of pollution as possible and place them into plastic bags
- Document where and what litter was picked up in the journal



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- Discuss if any of the litter has the ability to spread contamination (example, a used car oil bottle with residue as compared to a piece of paper)
- Perform the pickup for a short time, 5-7 minutes or adjusted based on available time
- Discuss the student's findings, address possible impacts and potential solutions, and preventions.
- Discuss pollution that may be present, but not seen since the visible pollution is often in the form of litter
- Students should take the litter and place it in dumpsters for proper disposal after recording the information and discussing potential impacts
- As an additional activity, repeat the litter pickup, recording, and discussion activity throughout the year.

The clear liquid pollution exercise will be performed to illustrate that not all pollution can be seen and help students understand that clear water isn't necessarily free of pollutants,

- Place 5 clear liquids into portion cups. The liquids should have definite tastes easy to recognize. Examples include;
 - sugar water
 - white vinegar
 - salt water
 - water mixed with citric acid
 - tap water
- Confirm that the liquids look clean and clear
- Taste each liquid using cotton swabs (dispose of swab after each taste) and record what they taste like
- Discuss that some kinds of pollution can't be seen, that they have potential impact, and the importance of not flushing contaminants down the drain
- Complete the science journals and share results.

The students in this station will prepare to share their new knowledge with the other teams of students later when they all assemble as part of the Jig-Saw learning and sharing process.

Assessment:

Students will share their new found knowledge of their habitat's pollution aspects, demonstrating knowledge of how the habitat is susceptible to pollution and discussing the sensitivity of the bio-culture to impact.

Students will complete their Journal entries and document what they learned in preparation to sharing with the other students as part of the Jig Saw learning and sharing process (or other equivalent process).



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The following sample note card is supplied as an example to engage students and aid in data collection.

Sample Pollution Note Card
Kinds of Pollution I Found in the River Habitat:
Location:
Cause:
Effect:
Solution:

Additional Content:

The book, *A River Ran Wild*, by Lynne Cherry (Houghton Mifflin Harcourt)

An independent book review is included below. <http://www.carolhurst.com/titles/riverranwild.html>

(Book Review: This is a beautifully done biography of a river. By focusing on the life in and around the Nashua River, Cherry brings history, ecology and progress into view. The illustrations alone are a history book. We start with the pristine river surrounded by woods and, around the text page facing that illustration, we see the birds and animals that once lived in and around the Nashua. The first humans arrive and find and use the bounty of the river. Soon a Native American settlement can be seen there. Later the first Europeans arrive and the first small farm with a small Waterloo is seen. As the farm turns to city, the mill grows larger. At each stage, items taken from the river or made by its power are isolated and placed around the text. When we look at the river at this stage, it is a polluted mess and the campaign starts to clean it up. At the end of the book there is fishing on the river again but, realistically, it doesn't get back to its original pristine state.)

<http://www2.scholastic.com/browse/lessonplan.jsp?id=808>

<http://www.ukrivers.net/>

<http://www.ukrivers.net/pollution.html>

References:

State Fish and Game Office, Department of water resources, EPA, etc.

The Watercourse 2000, 2002, and 2004. The Watercourse U.S.A. Bozeman Mt.

<http://projectwet.org/>

Project Wet, Bozeman Mt. <http://projectwet.org/>