



The Importance of Science Communication and Community in Environmental Issues

This assignment is meant to get students to use their critical thinking skills when learning about science and science communication. Getting students to understand and communicate science with their peers is essential for advocating for environmental issues, especially when they are personally connected with the issues in their communities. This assignment is further created to get students to think critically about science communication and environmental issues in their communities, by engaging with a project with those same goals that is carried out every year at Upham Woods.



STEM for All Video Showcase Activity:

The National Science Foundation's STEM for All program is a platform where projects that involve science, mathematics, engineering, and or computer science from all around the United States are showcased as videos on the STEM for All website. This free presentation of videos about STEM-related projects is a great way to highlight all of the work many people and organizations are doing around the country and to further celebrate the students involved in the projects.

Before accessing the STEM for All website, answer the following questions:

- 1. Briefly explain what environmental education means to you. Do you think it is an important part of the science curriculum?
- 2. How often do you think about where your water comes from, and how you know it's safe and clean?

Click <u>here</u> to access the STEM for All website. Once on the website homepage, explore the different videos present, links available, and tabs on the page. After you have looked around the homepage, search "<u>Water Stories Summit</u>" (<u>https://stemforall2020.videohall.com/presentations/1707</u>) to watch

The University of Wisconsin–Madison does not discriminate in its employment practices and programs and activities on a variety of bases including but not limited to: age, color, disability, national origin, race, or sex. For information on all covered bases, the names of the Title IX and Americans with Disabilities Act Coordinators, and the processes for how to file a complaint alleging discrimination, please contact the <u>Office of Compliance</u>, 361 Bascom Hall, 500 Lincoln Drive, Madison WI 53706, Voice 608-265-6018, (relay calls accepted); Email: <u>uwcomplianceoffice@wisc.edu</u>.



Upham Woods Outdoor Learning Center N194 County Road N, Wisconsin Dells, WI 53965 (608) 254-6461 • <u>https://fyi.extension.wisc.edu/uphamwoods/</u>



Upham Woods' video on communicating science by creating water stories. If you have any questions or thoughts on what you see in the videos, you can comment by clicking on the "New Post" tab under the video and then type your question or comment in the text box.

After watching the "Water Stories Summit" video, answer the following questions:

- 1. Do you think participating in the Water Stories Summit makes science more interesting and accessible to young people?
- 2. What is one thing in the video that made learning more fun for these kids?
- 3. Look at the data sheet from the Upham Woods Water Stories Summit.
 - What do you think is the most significant piece of data on that sheet and why?
 - What about these data surprised you?
- 4. What could your school do to improve environmental awareness?
- 5. Can you think of anything in your community that promotes awareness of environmental issues? If not, can you think of something more your community could be doing?

Macroinvertebrates Foray Activity:

<u>Objective</u>: Learn how to find and identify macroinvertebrates that live in the bodies of water in your community!

<u>Background</u>: Macroinvertebrates are bio-indicator species meaning that their presence or absence teaches us something about that ecosystem. Different species of macroinvertebrates have varying levels of sensitivity to pollutants. Use the biotic index to find out which species are very sensitive to pollutants and which are not. Identify the macroinvertebrates using a dichotomous key.

What you will need:	What you will do:
 Mesh net or sifting device (spoons work, too!) Ice cube tray for sorting out your critters Boots or waterproof sandals (or go barefoot!) Species identification key 	 Find any size body of water With your sifting device, scoop and poke around in areas that appear to have a lot of decaying or dead biotic material (dead plants, old logs, muck, mud) Lift your sifting device out of the water and check out what critters you may have caught! Sort critters into separate sections of the ice cube tray full of water Use the species identification keys to identify your critters Try several spots – see how many different species you can find!

• Questions:

- What kind of critters did you find?
- Were there a lot of one kind or was there a lot of different ones?
- What kind of habitat did you find the most organisms?

The University of Wisconsin–Madison does not discriminate in its employment practices and programs and activities on a variety of bases including but not limited to: age, color, disability, national origin, race, or sex. For information on all covered bases, the names of the Title IX and Americans with Disabilities Act Coordinators, and the processes for how to file a complaint alleging discrimination, please contact the <u>Office of Compliance</u>, 361 Bascom Hall, 500 Lincoln Drive, Madison WI 53706, Voice 608-265-6018, (relay calls accepted); Email: <u>uwcomplianceoffice@wisc.edu</u>.









Group 3: These are semi-tolerant of pollutants. Circle each animal found.



For more information, call (608) 265-3887 or (608) 264-8948. Download and print data sheets from

watermonitoring.uwex.edu/wav/monitoring/sheets.html

© 2008 University of Wisconsin. This publication is part of a seven-series set, "Water Action Volunteers – Volunteer Monitoring Factsheet Series." All recording forms are free and available from the WAV coordinator. WAV is a cooperative program between the University of Wisconsin-Extension & the Wisconsin Department of Natural Resources. University of Wisconsin-Extension is an EEO/Affirmative Action employer and provides equal opportunities in employment and programming, including Title IX and ADA requirements.



Recording form for the Citizen Monitoring Biotic Index

Name:	Date:
Stream Name:	Time:
Location:	Site:
(County, Township, Range, Section, Road, Intersectio	n, Other)
At this point, you should have collected a wide variety of aquatic macroin-	Riffle Sampling

vertebrates from your three sites. You will now categorize your sample, using the chart (other side) to help you identify the macroinvertebrates found. The number of animals found is not important; rather, the variety of species and how they are categorized tells us the biotic index score. Before you begin, check off the sites from which you collected your sample (see right).

Γ	Riffle Sampling
Γ	Snag Areas, Tree Roots, Submerged Logs
F	Leaf Packs
F	Undercut Banks

You should have removed large debris (e.g. leaves, rocks, sticks) from your sample and placed this material in a separate basin (after removing macroinvertebrates from it).

- 1. Check the basin with the debris to see if any aquatic macroinvertebrates crawled out. Add these animals to your prepared sample.
- 2. Fill the ice cube tray half-full with water.
- 3. Using plastic spoons or tweezers, (be careful not to kill the critters ideally, you want to put them back in their habitat after you're finished) sort out the macroinvertebrates and place ones that look alike together in their own ice cube tray compartments. Sorting and placing similar looking macroinvertebrates together will help insure that you find all varieties of species in the sample.
- 4. Refer to the Key to Macroinvertebrate Life in the River and the Citizen Monitoring Biotic Index to identify the aquatic macroinvertebrates:
 - A. On the back of this page, circle the animals on the index that match those found in your sample.
 - B. Count the number of types of animals that are circled in each group and write that number in the box provided. Do not count individual animals in your sample. Only count the number of types of animals circled in each group.
 C. Enter each boxed number in work area below.
 - D. Multiply the entered number from each group by the group value.
 - E. Do this for all groups.
 - F. Total the number of animals circled.
 - G. Total the calculated values for all groups.
 - H. Divide the total values by the total number of types of animals that were found: TOTAL VALUES (b.) / TOTAL ANIMALS (a).
 - I. Record this number.

SHOW ALL MATH (Use space below to do your math computations)

No. of animals circled from group 1 x 4 =			
No. of animals circled from group 2 x 3 =			
No. of animals circled from group 3 x 2 =			
No. of animals circled from group 4 x 1 =	Index Total	How Healthy is the stream?	
		Excellent	3.6+
		Good	2.6 - 3.5
Total Animals (a): Total Value (b):		Fair	2.1 - 2.5
Divide totaled value (b)by total no. of animals (a)for index score:		Poor	1.0 - 2.0

Report your results online at www.uwex.edu/erc/wavdb or submit your data to your local coordinator. Call your local monitoring coordinator if you have questions about sampling or determining the Biotic Index Score.