

Wetland and Water Activities & Resources for Educating and Engaging Youth



HWR Wetland/Water Quality Curriculum (4th-8th grade focus)

- Life Downhill (model demonstration of what happens to our water resources downhill from non-point source pollution)
- Broken Water (hands-on demonstration of how a wetland works as a filter)
- Journey to the Bottom of the Pail (macro-invertebrates study/biotic index)
- Wetland Equation (hands-on demonstrations that explain what makes a wetland a wetland)

Life Downhill

- Enviroscape model
- Powder Tempera paints – variety of colors
- Watering can/mister

You can also find resources on how to make your own model in Project WET, WOW (The Wonders of Wetlands.)

Various models can be purchased from the following suppliers:

- Nature Watch (www.nature-watch.com)
- Carolina Biological Supply Company (www.carolina.com)
- NASCO Science (www.eNasco.com/science)










Broken Water

- Glass Pyrex liquid measuring cup
 - Strainer
 - Sponges
 - Cheese cloth
 - Moss
 - Vegetable oil/water mix – Simulates motor oil
 - Peppermint flavor & red food coloring mix – Some pollution you can only smell and some you can only see
 - Dirty water mix – Simulates construction run-off
 - All “pollutant” mixes in one container
- 
- The background of the slide features several concentric, glowing blue circles that resemble ripples on water, scattered across the lower half of the page.









PYREX

1 litre

900 ml

700 ml

500 ml

300 ml

1000 ml

800 ml

600 ml

400 ml

200 ml

MADE IN USA



Journey to the Bottom of the Pail

- Dishpans
- Ice Cube Trays
- Tweezers
- Eye Droppers
- Microscopes
- Petri dishes
- Bug boxes
- Key to Macro invertebrate Life in the River Poster
- Water sample from local pond, lake, river, etc.

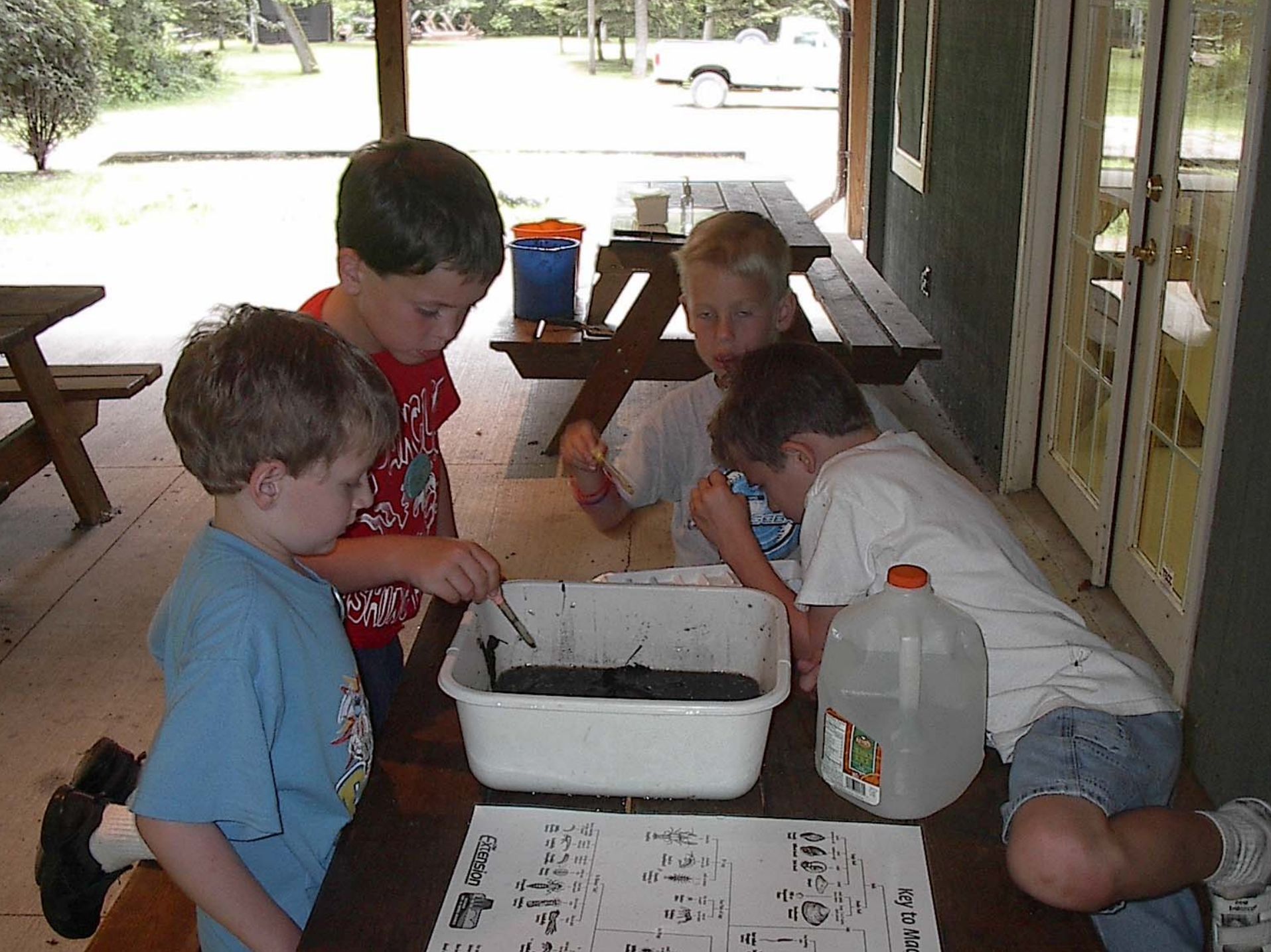




vertebrate Life in









HECKROOT

Wetland Equation

- SOIL + WATER + PLANTS = WETLAND
- Needed materials include:
 - Sandy soil demonstration
 - Clay bowl
 - Wetland soil
 - Wet sponge
 - Sphagnum moss
 - Wetland cornucopia demonstration
 - Dirty water

Water Quality Testing



- Hach Kits

(HWR uses with high school/college students)

(Also used in the Watershed Tour Education Trunk - “Chemistry Set” Station.)

- LaMotte Green Water Monitoring Kit

(HWR uses with 4th-8th grade students)



HWR Resources Available for Youth Educators

- WERC (Watershed Education Resource Center) site – provides water quality testing & monitoring equipment, storm drain stenciling materials, pond study equipment, etc. for checkout
- Teaching kits and trunks
 - The Watershed Tour
 - Alien Invaders

All resources available for checkout are free, but require a \$50 security deposit.

The Watershed Tour

➤ Station topics include:

- Groundwater
- Watersheds
- Benthic Macro-invertebrates
- Water quality testing
- Waterfront development and its affects (pollution, etc.)
- Water conservation
- Wetland delineation
- Water cycle game

The Watershed Tour
Education Trunk

The Watershed Tour Education Trunk
PACKING MAP
Layer 1

The
Watershed
Tour
Education Trunk

The Watershed Tour Education Trunk
PACKING MAP
Layer 3

THE WATERSHED TOUR TRUNK



Station Card #1

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"Development Debate" Station Card


Part One: "The river they are changing"

- Look at maps A, B, and C. These maps represent serial views of the same watershed. Map A is the original look. (To simplify map interpretation, the borders of the watershed and the streams at the various land areas align with grid lines.)
- As a group, discuss your observations.
 - What happens to the amount of forested land as you go from Map A to Map C?
 - What happens to the amount of farmland as you go from Map A to Map C?
 - Which map has the most land devoted to human settlements?
 - Which map has the most land devoted to agriculture?

"From the Ground Up" Station Card

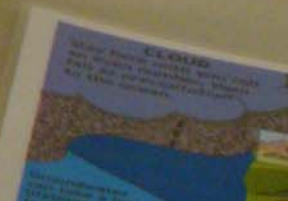
Part One: Terminology

- On the worksheet match the following vocabulary terms to their definitions:
 - bedrock
 - impermeable
 - percolation
 - water table
 - aquifer
 - unsaturated zone



Part Two: Like a sponge

- Construct a model that illustrates each of the terms above, using only the following materials:
 - 2 identical sponges
 - 1 shallow pan
 - 4 cups of water
- On the worksheet, draw a picture of your model and label all parts.
- Answer the questions on the worksheet, using the terms from Part One.
- Clean-up:
 - Wring out the sponges as much as possible.
 - Carefully pour the water from the pan back into the pitcher.
 - Wipe up any spills.



Macromania Station Card

Part One: Benthic Macroinvertebrates 101

- What are "benthic macroinvertebrates"?
 - "Benthic" means occurring at the bottom of a body of water.
 - "Macro" is the opposite of "micro", and means that the object is large enough to see without a microscope.
 - "Invertebrate" means that the animal does not have a backbone.
- Why identify them?
 - If we know what species of invertebrates are living in a stream or river, we can determine the biotic index. Some species of invertebrates are sensitive to pollution, and others are tolerant. If pollution-sensitive species are present, it is an indicator of good water quality. If only tolerant species are present, it could be a sign that the stream or river is in trouble.

Part Two: Go Fish!

- Each person gets a deck of cards and a sorting sheet. (If there are more than 6 people in your group, you can work in pairs.)
- As you draw each card, read the name of the macroinvertebrate and its life cycle stage.
- Place each card on its corresponding place on the sorting sheet.

Part Three: Use the Water Quality

- Complete the Macromania Worksheet to determine the biotic index for your deck of cards.

Benthic Bugs Station Card

Part One: Benthic Macroinvertebrates 101

- What is a "benthic macroinvertebrate"?
 - "Benthic" means occurring at the bottom of a body of water.
 - "Macro" is the opposite of "micro", and means that the object is large enough to see without a microscope.
 - "Invertebrate" means that the animal does not have a backbone.
- Why identify them?
 - If we know what species of invertebrates are living in a stream or river, we can determine the biotic index. Some species of invertebrates are sensitive to pollution, and others are tolerant. If pollution-sensitive species are present, it is an indicator of good water quality. If only tolerant species are present, it could be a sign that the stream or river is in trouble.

Part Two: Go Fish!

- Each person gets a deck of cards and a sorting sheet. (If there are more than 6 people in your group, you can work in pairs.)
- As you draw each card, read the name of the macroinvertebrate and its life cycle stage.
- Place each card on its corresponding place on the sorting sheet.

Part Three: Use the Water Quality

- Complete the Macromania Worksheet to determine the biotic index for your deck of cards.

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GROUP 2

GROUP 1

Group 2 organisms survive in water of lower quality than Group 1 organisms. Group 1 organisms can only survive in water of high quality. If most of your macros are in Group 1, you have excellent quality water.

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Macromania Cards



GROUP 1 - Sensitive to pollutants

GROUP 2 - Semi-Sensitive to pollutants

GROUP 3 - Tolerant to pollutants



Mayfly Larva

Stonefly Larva

Caddisfly Larva

Dragonfly Larva

Damselfly Larva

Hellgrammite

Water Penny Larva

Hellgrammite

Crayfish


Snails: Gilled or Crib

Clam

Midge Larva



"Your Lucky Day" Station Card #1



Part One: Your very own piece of waterfront property! You have just received very interesting news from a lawyer. A distant uncle of yours has passed away, and even though you have never met him, he has left you a valuable inheritance: 2 acres of beautiful, undeveloped waterfront property AND 1 million dollars, so you can afford to build whatever you want on the land!

1. Each person in your group gets one of the activity sheets, numbered 1-6. Make sure each group member has a different number. If your group has more than 6 members, partners can share an activity sheet.
2. Using the map, design your map. Remember, it is your map. It must be 255 feet by 255 feet, approximately 30 feet by 30 feet. Tell your instructor that you are ready to begin.



Map C



Map B



"Development Detaché" Station Card

Part One: "The land that is a changing..."

1. Look at map A, B, and C. These maps represent several views of the same waterfront area in different colors. The empty map represents the location of the waterfront area along with grid lines.
2. As a group, discuss your observations.
 - What happens to the amount of forested land on the map over time?
 - Which map has the most and least forested land?
 - Where are most of the houses constructed?
 - What effect might these house developments have on the waterfront?
 - What do you have to do to develop waterfront?

Part Two: Determine the area of land coverage for each map.

1. Use the "Area of Land Coverage" worksheet. Each member of your group may work with an area of the map to determine the area of land coverage. If there are any questions, ask your instructor. The person calculating the area coverage for the entire map will be an additional land coverage area.

Part Three: The worksheets for questions 1 and 2 are attached. The worksheets are attached to the station card. Although you may not have a calculator, you may use a calculator to help you with your calculations.

Station cards #1, #2, and #3 are laid out on a table. A large sheet of paper with a hand-drawn map of a waterfront area is also visible. The map shows a coastline with various colored areas representing different land uses. A ruler is placed across the map for scale.



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Alien Invaders

➤ Clean Boats, Clean Waters

- Use model boats/trailers/vehicles to practice finding aquatic plants on boats, trailers, and vehicles.

➤ Aquatic Invasive Animals

- Fishing activity to fish out the invasive animals/fish

➤ Aquatic Invasive Plants

- Card identifying/matching game (match picture with text)

Questions?





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