



# Entomology in the River Habitat

## Station 4

Marc Seifert

<b>Time Frame:</b>	<b>Standards:</b>
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 included as an example. <a href="http://www.sde.idaho.gov/site/content_standards/">http://www.sde.idaho.gov/site/content_standards/</a>
<b>Objectives:</b>	
<b>Learn to recognize River Habitat Entomology and the value these organisms bring to the river habitat</b>	
Looking at river/stream habitat, students can: <ul style="list-style-type: none"> <li>• Identify the major components of river or stream entomology</li> <li>• Recognize relative productive health of the river habitat,</li> <li>• Recognize basic entomology elements, and</li> <li>• Analyze how these components meet the organism’s needs</li> </ul>	
<b>Background Information:</b>	
River habitats foster complex interactive systems ranging from the small to large animals in the food chains. The animals and plants living in river habitats depend on each other for food.	
For example, the water plants obtain their energy from sunlight, making their own food (a process called photosynthesis). The plants, also known as producers, are eaten by herbivores (plant eating animals) such as snails, water fleas, insects, and freshwater shrimps. These primary consumers, in turn, are eaten by small fish and insects that are then eaten by yet another carnivore, such as trout. The large trout are a top predator in most river habitats and are not normally preyed upon (other than by man). These plants and animals are linked together in a food chain. The health of a river is often indicated by the diversity and relative quantity of small invertebrates in the food chain. Also, the insects are often the first indicators of stress, pollution, or impacts on river habitats and are very important to monitor often.	
<b>Materials:</b>	
<ul style="list-style-type: none"> <li>• Guest Speaker: Local expert such as a Local River Guide, County Agent, or State Fish and Game Specialist</li> <li>• Nets</li> <li>• Jars</li> <li>• Field microscope or magnifying glass</li> <li>• Science journal</li> <li>• Pencil</li> </ul>	



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- Colored pencils or crayons
- Insect identification guide (typically available and supplied by the guest speaker, educator, or local fly shop, etc.)
- Safety Equipment – Good shoes or waders

### Procedure:

Invite the guest speaker to discuss the local entomology, variety of insects and small aquatic life, the value and impact the insects and aquatic life can have on river habitat, and show examples of the aquatic organisms they may encounter.

During this station's lesson, students and the guest speaker could gather local organisms and analyze them to learn about the local habitat. Students could gather insects to learn about common aquatic insects and their interactions with other species at the river habitat. Gathering insects is often successful where there are stones in a fast moving current, and also where there is vegetation growing in the water or at the sides of the river. Following is an example of the methodology to collect insect samples in the river habitat.

- The students can collect insects and aquatic life by holding a small net in the currents downstream of stones, vegetation and logs. When the students disturb the stones vegetation and logs, the small organisms flee allowing the students to trap them in the net. All organisms will be placed in jars for examination.
- Students should plan on wading to perform this collection (Note - the teacher should establish safe practices and have students work in the buddy system during this phase of the field trip).
- Identify insect types by using an insect identification guide.
- Designate a team member to record all observations in the journal.
- Have students do a quick river habitat student by completing a count of the insects and aquatic life in location.
- Once the count is completed, perform some sort of calculation to document their findings. They can use the tools provided by their guest speaker, use the field river health calculation chart shown below, or develop their own guides with help from the teacher, speaker, etc.
- Students can draw conclusion about how insects impact the river habitat and include the information in the journal.
- The "River Health Calculator" below is an example of how students could gather and demonstrate the health of a river.
- Students could also be challenged to create and draw a chart and add their calculations in their journals.

These elements could also be used to share their new found knowledge and help the students prepare to share their new knowledge with the other teams of students later when they all assemble as part of the Jig-Saw learning process.



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### Assessment:

Students will document their findings by drawing illustrations and charts in their journal showing the types of insects and the locations they were found in the habitat.

Students will share their knowledge of their animal habitats, demonstrating knowledge of how the observed entomology of the habitat is a system, and the discussing the interactive value the insects bring to the river habitat.

Students will complete their Journal entries and document what they learned in preparation to sharing with the other students during the jigsaw learning and sharing sessions.

### Additional Content:

Journal entry examples for engaging students and fostering discovery:

*For each type of Insect (or organism) found in the Habitat, note:*

*Type of organism*

*Location organisms found (deep water, slow water, bank, plants, flood plain, etc)*

*Describe value the organism brings to the habitat*

*Describe impacts observed on river habitat health*

*Describe what other organisms in the habitat are dependent on the others*

*Add any other observations, questions, comments*

*Repeat for each Insect (or organism) found in the Habitat*

*Alternately, Consider Printing out Note Cards similar to This Example for Field Data Collection.*

#### Field Note Cards Example - Insect and Habitat

Type of Insect (organism) organism

Location of the organisms (deep water, slow water, bank, plants, flood plain, etc)

Describe the value the organism brings to the habitat

Describe the impacts on river habitat health

Describe what other organisms in the habitat are dependent on this organism

Other observations?



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### *Attached River Health Calculator Worksheet – optional lesson extension:*

The attached River Health Calculator is included as an example of how students might record and illustrate their data to illustrate one element of relative river habitat health. The guest speaker or teacher may choose to modify or substitute metrics and rubrics to meet the expected outcomes of the field trip or habitat and adjust to basic student age and capability. This method doesn't directly measure the contamination of the river as it is not a water test, but indirectly illustrates impact organisms that are sensitive to water quality. Creating and printing copies of these charts and note cards ahead of the field trip may help students with collection of information, facilitate journal entries and give students something to refer to on the field trip.

### **References:**

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

<http://www.cdm.org/biosite/BioSITE-Curriculum/journal/River-Habitat-Intro.pdf>

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

<http://projectwet.org/>

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

<http://sfr.psu.edu/youth/sftrc/lesson-plan-pdfs/BioticIndexCard.pdf>

<http://www.amentsoc.org/publications/online/bap-guide.html>



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*Additional Content Attachment*

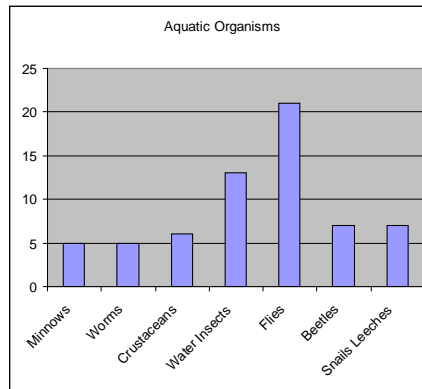
### FIELD RIVER HEALTH CALCULATION CHART

(example – not real data)

Other Mayflies (13)	Nymphs (4)	Bugs or Beetles (7)
Minnows (5)	Worms (2)	Caddis larva (9)
Snails (5)	Damselflies (4)	Dragonflies (6)
Leeches (2)	crayfish (6)	Flat Worms (3)

**Circle any organism group that you find. Then add up their scores (in brackets), and divide your answer by the number of groups you circled.**

Example Scores





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### FIELD RIVER HEALTH CALCULATION CHART (example)


**Determine Categories with the guest speaker or teacher and plot or make a table of the findings.**

#### Example Table

<b>Score 0-x</b>	Highly impacted stream
<b>Score x-y</b>	Impacted stream
<b>Score y-z</b>	Slightly impacted stream
<b>Score &gt; z</b>	Good quality stream

**Or create a bar chart plot.**