



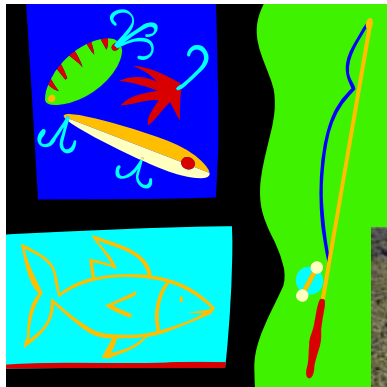
River Habitat Unit

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River Habitat Educational Unit

Summary:

Water is the life blood of living organisms, society, and energy systems. Developing knowledge and interest within the youth of tomorrow is crucial to developing the skilled workers to design, invent, and develop the technologies to ensure clean rivers, streams, healthy habitats and still serving the water needs of society. An important challenge facing all in the 21st century is the management of our finite water resources. Society must contend with limited resources and still satisfy growth and progress, more demand from both traditional and new water users, and resulting issues that are often contentious and difficult to resolve. As growing populations require more water to meet their needs, people will need to make wise decisions about water because competition for the limited water resources is increasing.

Agriculture, fish, wildlife, recreation, business, and industry and urban areas are major water user groups that have significant water needs and have significant impact on water quality and the environment. This unit will introduce various aspects of river habitats to support educators as they teach the relations between water and the environment while they also develop links to energy, science, technology, engineering and mathematics. The need for high quality comprehensive education of our future generation is key to solving the challenges of the future. Students and teachers in education have a great need to develop knowledge, awareness, awareness and passion so they can develop the skills and knowledge as they progress through their education and on to becoming the workers, scientists and engineers of tomorrow.

This instructional unit is focused on early learners in the 4-8 grades and takes the elements of wild land interpretation and formalizes that knowledge into lessons and background information to support educators in developing field trips, providing additional information, and educating their students in this important and impacting field. This unit contains a warm up exercise and 7 lesson plans that teachers and educational outreach professionals can use out in nature, preferably by a river or stream to teach students about River Habitats. This unit was developed as a deliverable of an internship with the Idaho National Laboratory (INL) supporting their Idaho Science, Technology, Engineering and Mathematics (i-STEM) and Energy for Educators outreach programs. These lessons are developed for educators who will then be able to use this information as starting points in their classrooms and then customize them for their unique needs.

Subject(s) introduced:

Educational sub sections included in this unit include but are not limited to: science (life science, earth science, physical science, etc), environmental education, cause and effect, scientific inquiry, systems, order, natural resources, biology, and more.

Overview:

The importance of a healthy riparian area involves many different niches to coexist with one another to create a productive river and stream habitat. The niches that will be looked at in this unit will involve river habitats, watersheds, river channeling, floodplains, vegetation growth, entomology, and exotic species.

Purpose:

These activities will enhance educators' and students' understanding of rivers health and demonstrate potential effects on human and wildlife habitats.

Objectives:

1. Identification of a river habitat
2. Identification of a floodplain and vegetation.
3. Identification of watersheds and channeling of water and subsequent erosion.
4. Identification of common entomology in local rivers.
5. Identification of invasive species and impacts in local habitats.
6. Identification of pollution impacts in local habitats.

Activities:

This unit is designed to support several independent activity stations (lessons). Teachers should choose which of the following stations they will do based on time, age of the students and the environment of the stream. Some of the material can be performed in the classroom if the time at the river or stream is insufficient. Also, the stations can be performed in parallel and teachers can integrate student group cooperative learning if time is limited. The lessons are planned for grades 4-8 but can be simplified or increased in complexity for younger or older students at the teacher's purview. The first step will be to prepare the students for the trip, ensure they have adequate clothes and shoes, and coordinate the materials, lessons and make sure that all students have a journal, a pencil, material listed below, and arrange for transportation to the stream or river.

All activities are documented using the standard lesson plan format found at "<http://www.energyforeducators.org/requirements/Master%20Template%2009.doc>", are under review for insertion into the "Energy for Educators Website" "www.energyforeducators.org", and the first draft on line in December, 2010 and should be constantly updated by educators as they fill out and update the energy for educator's resources.. This resource of free curriculum supports educators engaging in Science, Technology, Engineering and Math (STEM) and this unit is in direct support of the science element of the STEM curriculum. These educators and scientists were part of the review and advising team for this unit, providing education validation and review to supplement the skills learned in wild lands interpretation education at the University of Montana Western.

Safety Consideration:

All water activities carry an element of risk and the teacher is encouraged to have adequate help, perform a safety lesson with their students before they travel to the stream or river, have and enforce good safe practices, and take safety and first aid supplies.

Opening Activities (Optional):

To begin the day and to get warmed up, the educator could have students play a game (like the attached version of Capture the Flag) when they arrive at the stream or river and allow the educators and guest speakers time to set up their stations. This game of Capture the Flag adds variation to incorporate nature connections, building teamwork, and still let everyone have fun if there is time available during the field trip. This game can set the stage for the riparian zone field experience at a stream or river park area.

Warm Up Activity:

The **Riparian Warm Up Game** is described in Appendix A and should be the first element of the field trip.

Allow up to 30 Minutes for the Warm Up Game.

While the students are engaged in the warm up activity, prepare the seven stations in accord with the prepared lessons planned.

Unit Activities:

The students will be divided into groups of three to seven individuals (or adjusted as required to engage the students in parallel). The teacher will follow the prepared lesson plans for each station. Each station will be planned for 30-45 minutes due to time constraints, student age and ability. The students may not be able to do all stations on the field trip and may be taught using a jigsaw cooperative process (www.jigsaw.org) where these teams learn independently and then come together to teach the other students and share in their new knowledge and experiences.

Prior to starting at the various stations, a group discussion on what the students will be looking for when learning about the streams quality could be held. After group discussion, have the student teams visit pre established areas where they can see and experience hands-on information expanding knowledge of many niches of a healthy stream as they participate in the seven stations.

These Lesson Plans are prepared as a guide and offered as support for seven learning stations. Individual modifications may be applied to focus content on the individual skills and capabilities, age and needs of classrooms and students.

Station Activities;

- **Station 1: What is a River Habitat? Found in Appendix B**
 - *An overview of the various aspects that make up river or stream habitats.*
- **Station 2: River Habitat Flood Plain Found in Appendix C**

- *Teaching the students to recognize a flood plain, riparian zone, and impacts on river habitats.*
- **Station 3: An Example of Channeling Found in Appendix D**
 - *Introducing the impacts of erosion and the ever changing face of watersheds.*
- **Station 4: Entomology in a River Habitat Found in Appendix E**
 - *Introducing this valued ecosystem and the critical need for these organisms in a healthy habitat.*
- **Station 5: Invasive Species Found in Appendix F**
 - *Introducing the disastrous impacts invasive species have on habits and bio-cultures.*
- **Station 6: Pollution in the River Habitat Found in Appendix G**
 - *Educating students on the nature of pollution and impacts on local and global watersheds.*
- **Station 7: The Watershed Found in Appendix H**
 - *An introduction teaching students about the water cycle, watersheds, and impacts of pollution, contaminates and transport.*

Closing Activity:

Once all stations are complete, journals updated, and student discussions concluded a closing activity can be engaged to celebrate success. The closing activity would be designed by the teachers but could have students work in groups to make posters about any aspect of what they learned about river habitat and then display them in their school.

Resources and Materials: Resources and material required for the stations are detailed in each section. The following list is provided as a guide and may be adjusted due to educator needs:

- Stream or River Habitat
- Science Journal
- Pencil
- Paper
- Paper Towel
- Water-base Markers-blue, black, brown, red,
- Spray bottle filled with water
- Colored Pencils and crayons
- Shoe boxes
- Construction paper
- Scissors
- Nets
- Rubber Gloves
- Garbage Bags
- Portion Cups
- Sugar
- White vinegar

- Salt
- Citric acid
- Tap Water
- Cotton Swabs
- Magnifying Glasses
- Insect Identification Guide
- Safety Equipment (shoes, waders, etc)
- Collection Jars
- Watershed maps
- Watershed Maps can be found at the EPA Surf Your Watershed site http://cfpub.epa.gov/surf/huc.cfm?huc_code=04080206 or www.epa.gov/students/surf_your_watershed.htm and background info on your watershed can be found at the Know Your Watershed site www.ctic.purdue.edu/KYW/brochures/GetToKnow.html
- Local Fish and game Office
- Field Guides for plants and invasive species and river habitats
- Book: *A River Ran Wild* written by Lynn Cherry
- Hand Out: Natural Inquirer Invasive Species Volume 8, Number 1 page 5-6
- Watershed Handout
- All resources should be available in local stream area.
- Invasive plant species identification pamphlets (typically will be provided by local fish wildlife or environmental agency).
- Possible Guest Speakers:
 1. Fish and Game
 2. Local Fishing Guide
 3. Local Research and Education Foundations
 4. Department of Lands
 5. Sierra Club
 6. Local County Agent
 7. Department of Wildlife
 8. County Ground and Water Conservation District
- Other Resources:
 1. Project WET
 2. Project WILD
 3. Water Education Foundation
 4. Fish and Game
 5. Henry's Fork Foundation

Conclusion:

This River Habitat Unit and associated activities is provided to help educators share knowledge and interpret that knowledge in ways that help students learn and become excited. Environmental concerns can be understood by even the youngest school children. Providing them with a background of information and an opportunity to actively use that information, they will begin to develop a feeling of stewardship for their world. Using activities that develop environmental stewardship in students will hopefully

become a basis for action in their future lives and be one of many steps they take in life long learning.