

Getting Acquainted With Our Own Ecosystem (Using Isle Royale as a Model System)

Grade Level/s: 9-12
Course/s: Ecology, Biology, and Social Sciences

Karla Werner
WTCS
7221 M-123
(PO Box 58)
Paradise, MI 49768
kwerner@eup.k12.mi.us

This Unit Plan is my original work completed specifically for *Ecology of Isle Royale*. All work that has been adapted/adopted for use in this Unit Plan has been properly cited.

Signature

Date

Personal Statement: Ecology of Isle Royale

By Karla Werner

Isle Royale is a magical place not only for its ruggedness, but also for its ability to make one reconsider one's place in the world. My personal experience during the *Ecology of Isle Royale* course has motivated me to open my eyes to my own personal surroundings where I now feel at home and in awe. I finally realize the outdoor mecca I live in is primarily untapped and is also rugged and inspiring. My hope as an educator is to inspire students to realize what an amazing place we live in, and in turn have them learn how to preserve, conserve, and be outdoor stewards for the future. Our entire world is in the hands of our youth and it is up to us as educators to pass on the message and skills that will motivate students to make a difference in the world.

Isle Royale is a phenomenal place to analyze ecological succession, predator/prey relationships, boreal forest conditions, geological formations, human determination, flowers, trees, etc. The most amazing part of it all is how Isle Royale is a semi-closed ecosystem and has become an international biosphere reserve. Learning how animals have come to live on the island and shape its existence has made me ponder the animals on the mainland specifically in the upper peninsula of Michigan, since that is where I live and teach. It is my hope to have students make connections of biodiversity variation between the island and the mainland with a focus on predator/prey relationships and interactions within each ecosystem.

Overall, the course has revved up my enthusiasm to teach outdoor education. I know my Ecology students will benefit from my personal experience. I am very excited to bring the island home...to the classroom, that is!

What type of ecosystem do we live in? Introduction to Teachers

As a teacher that lives in the Upper Peninsula of Michigan, my students live in a very rugged natural environment. The goal of this unit is to get students acquainted with the environment to the point of having ownership. When a person is able to give a name to something, he begins to value it as the saying goes by Elaine Brooks (Louv 140). This unit with some tweaking could be used as a guide for a field trip to a close state park for other instructors that are not located in the Eastern Upper Peninsula of Michigan.

In getting acquainted with their own natural environment, my students will be studying Isle Royale National Park throughout the entire course of ecology/earth science since Isle Royale is an International Biosphere Reserve that serves as a solid model of land formation, ecological succession, migration, animal interaction, nutrient cycling, and more. In the state of Michigan, this covers many ecology, earth, and social science benchmarks. As the backbone for the course-ecology/earth science, "Superior Wilderness: Isle Royale National Park," by Napier Sheldon will serve as one of the textbooks.

Since there is only going to be three lessons from the entire course printed here, I will give you some insight that will lead you as an educator along the same path I plan to take prior to doing these lessons.

Introduction to ecology:

1. Home is Where the Habitat Is: Learning Experience 1 (Education Development Center, Inc. 1- 12). This module introduces students to the concepts of ecosystems and interaction of living organisms with in a given area. Students will create mini ecosystems using 2-liter pop bottles.
2. Introduction of Isle Royale as an ecosystem. Use of Isle Royale National Park maps. Students will read the information on the map and come up with the type of ecosystem they think Isle Royale is.
3. Reading of Sheldon will begin with pages 168 and 169- Isle Royale as an International Biosphere Reserve. This will follow with an explanation as to why Isle Royale is going to serve as our model in studying our own ecosystem. Students will first look at our ecosystem and continuously refer back to Isle Royale for a comparison.
4. Students should have a background in the history of their own area. For example, here in the Upper Peninsula there is a book specifically about the Paradise, Michigan area: "Back Trail an Upper Peninsula Boyhood," by George E. Christensen. My students will read this book prior to the following lessons so that they will be well aware of the changes that have occurred in our environment since the 1800's.

**** Regardless of how you get to this point, your students should have a prior knowledge of what an ecosystem is, what biotic and abiotic factors are, and basic understanding that in each ecosystem there is a natural hierarchy of animal interaction, which we refer to as the food chain or food web.

The ultimate goal will be to take data in some of the lessons to follow and bring the data back into the classroom to use as an analysis and comparison to Isle Royale as we go through the “Superior Wilderness” book. The data will be collected on a hiking excursion. This will be an overnight trip for us since we live right by Tahquamenon Falls, but for other educators that live elsewhere, each instructor will want to choose a state park close by that has some hiking trails and public camping either backcountry or car camping. If someone chooses to do these lessons and does not have a state park close enough to do a night trip, then he or she should try to do a weekend excursion through the school. This will take extra planning so think FAR ahead.

If you plan on taking the trip, make sure to let students know a few months ahead of time so that families can plan and help in the preparation. The following planning guide has been adapted from the “Lake Effects: The Lake Superior Curriculum Guide for Grades K-8,” by the Great Lakes Aquarium Lake Superior Center pages 139-145. For greater detail please refer to the actual planning guide, especially if you plan on taking a trip that is over 150 miles from home or is to Lake Superior. Here is a short list of must do’s.

WHEN?

May, June or September is an ideal month to take students to any state park. This trip would normally be taken on a Thursday, Friday, or Friday, Saturday.

WHERE?

In Michigan there is a guide called “Michigan Recreation and Camping Guide” created by the Department of Natural Resources that lists all the state parks and what each one has to offer. This can also be found online at www.michigan.gov/dnr.

HOW?

Plan, plan, and plan ahead!

1. Bureaucracy: check with your district offices to make sure the trip is approved for the students you plan on taking. Most schools will have a form to fill out as a “Request for approval of overnight trips.” This should be done at least a month ahead of time. Some districts require more time, so check early on.
2. Early planning: If you plan on taking the trip in the fall, you will need to get everything sent out to parents at the end of the summer with a letter explaining the trip along with a permission slip. If you plan on going in the spring, bring up the trip in the fall so students can start a family discussion at home and can plan for it.
3. Getting help: Do you need chaperones? Enlist them early on.

4. Insurance: Check with your district. You may be required to purchase “Camper’s Insurance” through your district. Some families will have protection under private plans. Also, driver’s insurance may need to be purchased as a rider if the drivers don’t carry insurance that is \$100,000/\$300,000 coverage. Remember that each student MUST wear a seat belt.
5. Fundraising: If this needs to be done, plan on a trip in the spring so students can raise money all year. Talk to locals and other teachers for ideas since there are LOTS out there.
6. Activities: Depending on how far you are traveling, you may want to make additional stops. Check out other places to see on the way there.
7. Getting Ready to Go:
 - a. Six weeks before leaving send home preliminary permission slips that include whether or not they want their child going, whether or not they want to chaperone and are able to drive other children, number of seatbelts, and amount of money it will cost. It helps if this is in checklist form. Also, make sure the school medical forms are up to date and in. You will also want to have an emergency contact number for each student.
 - b. Two weeks before leaving send out a letter with final information, the itinerary, contract for participation by the student, and the gear list.
 - c. One week before leaving have copies of all the drivers’ auto insurance placed on file at the school. Make sure the school secretary has the contact information of where you all will be staying. Set up tent groups. Three days before go through the menu with the students. Make sure everyone is satisfied. Keep in mind easy meals.
 - d. Two days before leaving set up car groups. Check for seat belts for each person.
 - e. The day before leaving review car, tent, and meal plans with students along with expectations and objectives. After school take three or four students grocery shopping. The instructor can push the cart and students can split up the list and get the items. Buy everyone a treat as a thank you.
 - f. The morning of...pack up and go!

For your information...if you plan on taking students on a field trip, you may choose to continue with the ideas collected on the trip using the following concepts:

Extensions and/or Connection to Other Units:

Once students study a somewhat closed ecosystem like Isle Royale and are able to compare it to where they live (Eastern Upper Peninsula in this case), the instructor can build upon the foundation this unit builds.

Options include:

Science

- Looking at the cycling of nutrients in a system. (LEC.III.5.HS.5) Isle Royale could be used again as a model and then as a comparison. One interesting component of this on Isle Royale is the study of nitrogen sources in moose and soil.
- Geology extension: use of the ecosystem of Isle Royale to trace backwards the steps to development of it beginning with the formation of surface features according to the Ice Age theory (EG.V.1.HS.1) This would relate to the chapter called *We Walk On the Past* in the “Superior Wilderness” book.
- Hydrosphere extension: continuing on after these lessons, study both systems with a focus on the abiotic components instead of the biotic components with a focus on human influence in both systems. (EH.V.2.HS.2)
- Interrelationship analysis with a focus on human influence on each system could also be done. (EAW.V.3.HS.4) This would relate to chapter called *People Come – and Go* and also *The Guardians* in the “Superior Wilderness” book.

Social Studies

- Students could look at the human influence on each system and then come up with ways to improve each system, particularly in their own environment. (Strand II.CS.2.HS.3)
- Students could research environmental issues facing the Eastern Upper Peninsula and come up with alternative resolutions, which can then be evaluated based on criteria they have identified in the issue. (Strand VI.CS.1.HS.1)
- Students could choose an alternative resolution to an issue in which they believe. They could then make a plan and conduct activities intended to advance their view on a matter of public policy (related to the environment). (Strand VII.CS.1.HS.2)

Note: For this unit (Isle Royale vs. Eastern Upper Peninsula), which contains three lesson plans, there is an overall grading unit found at the end of Lesson #3. You may want to make copies of this prior to starting the lessons, so students know what to expect.

What type of ecosystem do I live in? Introduction to Students

Lesson 1: Getting Acquainted With Our Own Ecosystem (Using Isle Royale as a Model System) Unit

Subject/Target Grade: Science, and Social Studies
High School (9-12)

Duration: Two 60-minute class periods

Materials:

- Leave No Trace Skills and Ethics booklet (*one per student or copies of No Trace card*)
- Newcomb's Flower Guide (*three or more for the entire class*)
- National Audubon Society Field Guides for Trees (Eastern Region), Wildflowers (Eastern Region), Insects, and Rocks (*one or more of each for the entire class*)
- A classroom set of National Geographic magazines. ***Note: the more current they are the better!

Michigan Curriculum Frameworks:

Science

- EH.V.2.HS.2: Describe how human activities affect the quality of water in the hydrosphere.
- LEC.III.5.HS.4: Describe responses of an ecosystem to events that cause it to change.

Social Studies

- Strand II.2.HS.3: Suggest ways people can help improve their environment.

Lesson Overview:

Students will be introduced to the idea of leaving no trace when they interact with the environment. In the process of analyzing the "Leave No Trace Skills" booklet, students will get a chance to practice some of the basic skills while becoming acquainted with some of the organisms in their environment. Students will be going outdoors to name biotic factors using field guidebooks. This will ultimately prepare them for the hiking trip in the lesson that follows.

Extensions include using the Michigan Environmental Education Curriculum Support lessons in the Ecosystem and Biodiversity Module that address Michigan ecosystems as a whole and also cover impact humans can have on their environment. This could be done prior to the hiking trip or afterwards in connection to what students saw on the trip.

Students will answer the essential question: What are No Trace Ethics and why are they critical to the survival of an ecosystem?

Objectives:

Students will be able to:

1. Recognize the importance of planning for a trip, especially a trip into the wilderness.
2. Recognize the importance of not picking flowers or tree leaves in the sense of seeing the flower or tree as part of the ecosystem as a whole.
3. Understand the basic duties and skills of camping.
4. Understand that if No Trace Ethics are not followed, overtime an ecosystem will suffer greatly changing the landscape and that it will have a negative impact on biodiversity.
5. Be able to key out a flower or tree based on characteristics of the entire flower or tree.

Advance Preparation: Select a place in the schoolyard prior to taking the class out that contains wild flowers, trees, insects, etc...

Background Information:

In this lesson students will begin by looking at some major human impacts on the earth including introduction of invasive species, sewage dumping into waterways, oil spills, etc... This will give them a sense of how carelessness can result in a bad outcome for the environment.

The students will then receive the “Lakes Region Leave No Trace Skill and Ethics” booklet. In this booklet they will learn some basic camping guidelines and some basic hiking guidelines that will direct them to having the least impact on the environment as possible. With this students should start to realize that they too have an impact on the environment.

Finally, as a wrap-up and a jumpstart for the hiking lesson, students will go into the schoolyard and use the Newcomb’s Wildflower Field guide and at least one of the Audubon Field Guides.

Newcomb’s Field Guide is somewhat like a dichotomous key, but is still unique. It is suggested that you familiarize yourself with it prior to use with students. On page 1 of the guide there is a Locator Key. One thing to keep in mind is that students may not have the vocabulary to identify all the plant parts. You can either go through some of it with them or let them look up the definitions within the guide itself while they are keying out flowers.

The Audubon Field Guides have the basic definitions in the front and then use tabs for location of the plant. Students will first see a picture, which should help in identification. One thing to keep in mind is that these guides are limited. There are definitely a lot of trees, flowers, etc... that are not pictured so it may possibly be a struggle. Once again, familiarize yourself with each guide prior to use.

While using these guides, students will be practicing no trace ethics.

Procedure:

1. *****PASS OUT STUDENT WORKSHEET** and have students put all their answers down as the entire class goes through the idea of No Trace Ethics.
2. **Introduction:** *What needs to be done before going on a trip?* Planning (itinerary), gear check, route planning, etc...

What makes a trip to the wilderness different than a trip to a city? Here students should start to discuss what type of gear they would need. You should also bring up the idea of treading lightly since we are just visitors to the area and do not want to disturb the residents (wild animals, trees, etc...). At this point you should key students in on the fact that they will be going on a hiking adventure that will include a night of camping soon! This should not be a surprise to them. As stated in the teacher introduction, you will want to let students know well ahead of time. Tell students that this is the permission slip they had to get signed and is the trip you have been talking about for at least a few weeks. ****Students should fill out the first part of the worksheet.**

3. Look at **human impact on the earth:**
For this, you could use National Geographic magazines. If you have a subscription, you could pass one out to each student and have him or her search for human impact on the earth. If not, use either the Internet or even some biology or ecology textbooks have some listed. Take a moment to discuss with students how each thing happened (oil spills, sewage dumping into waterways, air pollution, etc...). *Then ask students what could have been done to stop such things or what is being done?*
*****Note:** This is a topic that will be revisited throughout the course if you decide to follow the Sheldon book so skim the surface for now and have them keep it in mind.
4. Introduce the idea of **No Trace Ethics:** Pass out the booklet and give students a chance to flip through it. Then either assign different students to different topics or randomly call on students to discuss a topic of choice after they have had a few minutes to read through a topic or two. Go around the room discussing topics...and showing gear if you have it with you while discussing. You may want to even demonstrate use of gear as you go along. *****Students should be able to answer questions on their worksheet about what No Trace Ethics are.**

5. *Ask students how they can practice No Trace Ethics even in the schoolyard.* They should come up with answers that include not picking flowers, not throwing garbage etc... Tell them to take pictures not pieces of the environment with them. ***This is a good time to have students answer where and when No Trace Ethics are used. You may want to have students share answers to ensure that they incorporate every day life activities in the wilderness.
6. Introduce the idea that when you can **name something you tend to have more respect for it**. Have students name things that are important to them. Now ask them to name as many flowers found in the area you live as possible. Next try birds, etc... Get an idea of what students are familiar with. Then let them know that they are now going to get more familiar with their environment by naming biotic factors in the forest using field guides, while practicing No Trace Ethics.
7. Go through use of the **field guides** either outside or inside, but make sure everyone at least thinks they know how to do it. Remind students to practice No Trace Ethics while outside. Then head outside and have students work in groups of 2 to 4 to identify two organisms using the guides. **HOWEVER**, prior to using the guides, have students make up their own names for the tree, flower, etc...since they will be more likely to remember the real name that way. Make sure each group uses the Newcomb's Guide and at least one Audubon Guide since both use different methods. ***There is a place on their worksheet for this information.
8. Have students bring information inside as to what they identified. Then have each **group share with the class** what they found. Make sure each group member shares the made-up name first and then the real name at the end. This will be funny for the entire class.
9. As a wrap-up of the entire lesson have students write a **journal entry** on what No Trace Ethics are and how they employed them on their flower, tree identification mini field trip. Then have them add how and why they plan on using No Trace Ethics on their hiking trip soon to come.

Assessment Options:

1. Have students share journal entries to see if they caught on.
2. Have students use field guides to identify flowers another group identified to see if they come up with the same answer. This would have to be incorporated into the outside time so that each group hasn't shared yet.
3. Students could write a letter to another student explaining why they all should follow No Trace Ethics during their hiking adventure.

4. Plain observation of students while they are keying our plants will let the instructor know whether or not they caught on to the No Trace Ethics and then checking to see if they key out correctly or not will let the instructor know whether or not they are getting the hang of using the guides.
5. Check to see if students filled in their worksheets and participated.

Comments: It is critical to remind students that you will be wrapping up loose ends tomorrow and will be going on your adventure in a few days. Be specific by letting them know the entire plan: date, time, chaperones, food, sleeping arrangements, etc...

Name: _____

Date: _____

Hour: _____

The Beginning of Our Journey in Studying Our Ecosystem

DIRECTIONS:

List five things you need to do to prepare for a hiking trip.

- 1.
- 2.
- 3.
- 4.
- 5.

What are No Trace Ethics?

Where and when should No Trace Ethics be practiced?

What can happen if you don't practice No Trace Ethics?

List five major environmental changes due to human impact and lack of No Trace Ethics.

- 1.
- 2.
- 3.
- 4.
- 5.

Using the Field Guides:

Newcomb's Wildflower Field Guide-

Write down three vocabulary words that you didn't know prior to picking up this field guide and define them.

Choose a flower, tree, insect, etc...

Make up a name that describes it in your own terms: _____

Write down which guide you are using and the organisms name.

Guide: _____

Name: _____

Attempt to sketch the flower or organism including the stem, bark, leaves, etc...

Choose a second flower, tree, insect, etc...

Make up a name that describes it in your own terms: _____

Write down which guide you are using and the organisms name.

***HOWEVER, if you used an Audubon Guide last time, use Newcomb's Guide this time since they are different in how they have you identify the organism. More practice...

Guide: _____

Name: _____

Attempt to sketch the flower or organism including the stem, bark, leaves, etc...

Making Final Arrangements and Going on the Journey to Discover Our Own Ecosystem

Lesson 2: Getting Acquainted With Our Own Ecosystem (Using Isle Royale as a Model System) Unit

Subject/Target Grades: Science
High School (9-12)

Duration: Hiking excursion- See agenda (full class day, night, and following morning)
Instructors may wish to do this on a Friday and Saturday.
Depending on how close the school is should determine the
best days to go.

Materials:

In preparation- student journals, notes or pictures to review ecosystems

For the trip...

For teacher-

- Food for every meal
- Group camping gear: stove, cooking pots, dish soap, water filter, tents, tarp, park map, cooking pots, first aid kit ***NOTE: Make sure to check each students medical history.
- Field guides, extra class texts, journals (mini notebooks) for students to take notes
- Of course personal items and your own tent
- Schools digital camera

For students-

- All gear from gear list
- Class text: Superior Wilderness
- Day pack
- Water bottles
- Personal snacks

Michigan Curriculum Frameworks:

Science

- LEC.III.5.HS.1: Describe common ecological relationships between and among species and their environment. *On the trip discuss wolves during a night hike once you reach camp. If there are wolves in the area, make sure to include the correct statistical numbers, and then relate it back to Isle Royale.*

- LEC.III.5.HS.2: Explain how energy flows through familiar ecosystems. *On the trip discuss beaver and how they change the landscape. This could be done on the drive up to the falls due to all the peat lands. If you don't have beaver in your area, then explain how they change it on Isle Royale and find an animal to compare it to where you are.*
- Describe responses of an ecosystem to events that cause it to change. *On the trip discuss invasive exotic species such as Beech Bark Disease, and Sea Lamprey. Relate it back to Isle Royale and the Sea Lamprey there too.*
- EH.V.2.HS.1: Identify and describe regional watersheds. *When at the Upper Falls at Tahquamenon, discuss the length of the river, where it emerges and how large the watershed it. Go into detail about the falls and the foam. All of this information can be collected from the DNR Naturalist division if an instructor is not familiar. By arrangement, the students could get a tour from a naturalist that will explain some of these details.*
- Constructing New Scientific Knowledge (High School)-
 - o Gather and synthesize information from books and other sources of information.
 - o Ask questions that can be investigated empirically.
- Reflecting on Scientific Knowledge
 - o Show how common themes in science, mathematics, and technology apply in real-world concepts
 - o Develop awareness of and sensitivity to the natural world.

Lesson Overview:

Students will get introduced to the area in which they live on the trip. Regardless of time spent by students at the falls area or in other instructor's cases, students will become acquainted with the names of flowers, trees, insects, etc...along with getting a larger historical perspective on top of what they already read about in a book.

I know in the Tahquamenon Falls area there is a massive problem with exotic species, so this should make students aware of what is currently shaping their forest along with natural dwellers like the beaver that also play a crucial role.

Students will answer the essential question: What is found in our ecosystem and how do trees, animals, insects, etc...continuously shape our ecosystem?

Objectives:

Students will be able to:

1. Identify trees infected by exotic species.
2. Explain how wolves hunt, travel in packs, and raise young.
3. Identify where wolves are found in Michigan.
4. Identify wild flowers, trees, and insects using field guides.
5. Identify what watershed they live in.
6. Explain how beavers alter a landscape and name a place they could go see one.

7. Identify predators of the exotic Sea Lamprey.
8. Practice No Trace Ethics.
9. Work together in meal preparation, and camping duties.
10. Understand how biologists sample populations such as Sea Lamprey.

Advance Preparation: Make sure all students are ready and have the correct gear days beforehand. Carry extra gear if possible. Contact the park to make sure all arrangements are made.

Background Information: If you plan on coming to Tahquamenon Falls State Park in Paradise, Michigan this information will apply. If you decide to go to another state park, you will need to contact the park naturalist to get the information on the current populations of animals like beaver, wolf, river otter, etc...

As for Tahquamenon Falls State Park, this information was gathered from a DNR resource activity guide compiled by many naturalists throughout the state of Michigan and park naturalist Theresa Grattan.

Facts: The Tahquamenon watershed drains close to 790 square miles of surrounding land. The river itself is 94 miles long and starts west of Newberry where smaller streams come together.

Different water flows at the falls are as follows:

Spring flow is around 40,000 gallons per second

Summer flow is around 1500-2000 gallons per second.

Fall flow is slightly greater than Spring.

Winter flow is low due to parts of the river freezing (but never completely).

Organisms to look for (and study up on prior to coming):

Pileated woodpecker, river otter, beaver, wolves, black bears, moose, osprey, Sandhill cranes, White-throated sparrows, Winter wrens, American red-start, Snapping turtles, Sea lamprey, trout, Small mouth bass, perch, Bald eagles, Pink Lady Slippers, Spring Beauty, Trailing Arbutus, Canada Mayflower, Yellow Trout Lilies, Marsh Marigold, Pitcher plants, Sundew plants, Orange Hawkweed, Bunchberry, Twin flowers, Ox-eyed Daisies, Star flower, Buttercup, Blue Flag Iris and the list goes on...

Reason for brown water: tannic acids from tree bark (primarily Hemlock trees), but others play a role too.

Information on wolves can be gathered from the Timber Wolf Alliance. They publish a paper called the "Wolves of Michigan." www.northland.edu/timberwolfalliance.

Beech Bark Disease information can be obtained through Michigan State University Extension Bulletin E-2746 (reprinted October 2002).

Another great source about many of the animals found in the park is the “Seasonal Guide to the Natural Year: Minnesota, Michigan, and Wisconsin,” by John Bates. This guide gives vital information on wolf behavior, animal survival in harsh winters, etc... It is definitely worth looking at.

Depending on where you take students, you will need to alter the objectives and research the area prior to going with students.

Procedure:

1. Make sure all students remember to bring their gear the day of the trip. Have all permission slips and medical forms available to the school office. Get packed, get ready, and let's GO!
2. See attached agenda for park and hiking activities.
3. Once the morning comes after camping, make sure everyone cleans up the site well and has all their belongings. Thank the appropriate people and head back to school.
4. Have students do a final journal entry on the way back to school. If you have a long trip, you can discuss with students their favorite animal or flower they identified for the first time.

Assessment Options:

1. Have students make a brochure that introduces new flowers or trees, etc... that they didn't already know. It could even be on beavers or moose.
2. Have students write a story or a poem depicting their trip.
3. Have students draw a picture or make a collage that represented their trip.
4. As a class, pull together journal entries that explain the objectives.

Tahquamenon Falls State Park Packing List for Students

Keep in mind that we are only going for a night. Since we will be basically car camping you don't have to worry about packing light, but you will want to make sure that you bring a day pack (school backpack) to carry on the hike. It is important to have this because you will be journaling as we learn about some of the parks features and will also want water and possibly snacks available.

What to expect for weather: September

- A daytime range anywhere from 45-75 degrees F.
- Possibility of rain
- Cooler at night and in the morning (40-50 degrees F)

What to bring...

- ◇ Sleeping Pad
- ◇ Sleeping Bag (rated to 20 degrees F)
- ◇ Hiking boots or tennis shoes
- ◇ Sandals
- ◇ Daypack
- ◇ Water bottle
- ◇ Rain gear (coat, umbrella)
- ◇ One change of clothing for the next day
- ◇ Something to sleep in
- ◇ Fall coat or sweater
- ◇ Hat or bandana
- ◇ Winter hat
- ◇ Sunglasses
- ◇ Flashlight
- ◇ Unbreakable eating utensils (plate, cup, spoon, bowl... Tupperware works well for this)
- ◇ Pens, and pencils
- ◇ Personal toiletries, insect repellent, sunscreen lotion, hand disinfectant
- ◇ Any current medications should be given to teacher or chaperone

Optional:

- ◇ Personal camera
- ◇ Binoculars
- ◇ Small folding campchair
- ◇ Do not bring personal cell phones or electronics

Group gear provided by instructor(s):

- ◇ tents 2-3 people per tent
- ◇ tarp
- ◇ park maps
- ◇ stoves, fuel, cook pots
- ◇ water filter (just in case)

- ◇ first aid kit
- ◇ dish soap
- ◇ class journals
- ◇ field guides
- ◇ school digital camera

***Note: This was adapted from the Exploring Isle Royale with Isle Royale Institute gear list. Therefore, you may think of items that are useful when car camping that are not on the list since this list was primarily for backcountry camping.

ALL SCHOOL RULES APPLY.

Name: _____

Date: _____

Class: _____

Student Objectives and Itinerary for Nature Trip

Here is a list of objectives that you should be familiar with after your State Park visit. This is a hint, hint, wink, wink, as to what you should be taking clear notes in your journal on along with personal thoughts and inspirations. Keep track of this list!

Objectives:

Students will be able to:

1. Identify trees infected by exotic species. Pay close attention to how the exotic species infect beech trees.
2. Explain how wolves hunt, travel in packs, and raise young.
3. Identify where wolves are found in Michigan.
4. Identify wild flowers, trees, and insects using field guides. **YOU MUST IDENTIFY FIVE SPECIES.** Hint-It helps if you try to name it first yourself and then you look it up.
5. Identify what watershed you live in. You may want to note what exactly is a watershed in this discussion.
6. Explain how beavers alter a landscape and name a place they could go see one.
7. Identify predators of the exotic Sea Lamprey.
8. Practice No Trace Ethics. You will receive credit as to whether or not you did this.
9. Work together in meal preparation, and camping duties. You will receive participation credit.
10. Understand how biologists sample populations such as Sea Lamprey. Ask if you don't get it!

Student List for Hiking Adventure:

ANSWER THE FOLLOWING QUESTIONS AS YOU AFTERWARDS USING YOUR JOURNAL NOTES. These will be answered in class following your trip.

1. What is an exotic species?
2. Explain how beech bark disease infects trees.
3. How do beavers shape the landscape?
4. How is a bog formed?

5. What kind of plants can you find in a bog?
6. How do wolves hunt?
7. How do wolves raise their young?
8. Where are wolves found in Michigan?
9. What characteristics are the most useful in naming a flower or tree?
10. What do sea lamprey look like?
11. How did sea lamprey get into the Great Lakes?
12. What do sea lamprey eat? What eats them?
13. What is a watershed? Where's yours?
14. What is a nocturnal sense? List a few.
15. Name one animal that is nocturnal and explain how it is adapted to its environment.

Itinerary:

Thursday

Leave school at 9AM

Learn about bogs and peat lands on the way to the falls. JT

Tour the bog and learn about pitcher plants and Sundew plants NATURALIST

Tour the Upper Falls (naturalist guide): Learn about our watershed JT

Learn about Beech Bark Disease: take digital pictures JT

Begin hike around 11AM

- During hike stop and take digital pictures of flowers and trees keyed out. Each student must identify at least ten things by the end of the hike.
- Look for signs of beavers: beaver discussion JT
- Practice No Trace Ethics
- Have lunch on the trail
- Discussion of other animals found in the park (to include moose, wolves, river otter, etc...)

Arrive at the Lower Falls around 3:30PM

Learn about river critters: get in a dip for some (need sandals for this) NATURALIST

Learn about sea lamprey and bald eagles JT

Personal down time 5:30-7:30PM during meal preparation, meal time, and clean up.

Have a charades game to determine which group cooks and which cleans.

7:45-9:00PM Campfire stories, and s'mores

9:15PM Night Hike (learn about nocturnal senses) NATURALIST

10:30PM Quiet time

Friday

7:30AM Breakfast, coffee (for the instructors), wash dishes

8:00AM Clean-up, pack up

8:30AM Leave and head back to school

9:00AM Unload and go to class.

Note: JT stands for journal topics that go along with the objectives. NATURALIST signifies that a naturalist will run this program. Each program is usually 45 minutes to an hour long and is hands-on.

Sample Menu: Again, this is adapted/adopted from "Lake Effects: The Lake Superior Curriculum Guide for Grades K-8," by the Great Lakes Aquarium Lake Superior Center page 142.

Breakfast-

Dry cereal, bagels, cream cheese, jelly, peanut butter, fruit, and fruit juice.

Lunch-

Supplies for sandwiches, including turkey, ham, cheese, peanut butter, jelly, bread or rolls, mayo, mustard. Complimentary items including chips, fruit, pickles, and a treat (cookies, fruit roll-ups, etc...), lemonade or water since you will be on the trail.

Dinner-

Spaghetti with meatless sauce, garlic bread, and some type of veggie or fruit (carrots, celery, apples) is one meal option. Another is tacos, refried bean for vegetarians (or everyone), carrots, s'mores, and beverages.

Bringing It Home

Lesson 3: Getting Acquainted With Our Ecosystem (Using Isle Royale as a Model System) Unit

Subject/Target Grade: Science
High School (9-12)

Duration: Two 60-minute class periods

Materials:

- Journals
- “Superior Wilderness” book
- Student worksheet from the hike
- Digital pictures

Michigan Curriculum Frameworks:

- Constructing New Scientific Knowledge (High School)-
 - o Gather and synthesize information from books and other sources of information.
 - o Ask questions that can be investigated empirically.
- Reflecting on Scientific Knowledge
 - o Show how common themes in science, mathematics, and technology apply in real-world concepts
 - o Develop awareness of and sensitivity to the natural world.

Lesson Overview:

Students will get a chance to share their experience and a journal entry or two with each other. Then collectively as a class we will review some of the concepts learned by going through the questions that were presented on the student hiking worksheet.

Students will then get the opportunity to organize their journals to match up with chapters in the “Superior Wilderness” book since they will be using the book to continue the study of their natural environment.

Finally, students will get to choose what order the class will go through the “Superior Wilderness” book acknowledging that each chapter will take the class into some fundamental ecology or earth science concepts.

The essential question students will begin to address in this lesson is: What connection is there between Isle Royale and Tahquamenon Falls State Park?

Objectives:

Students will be able to:

1. Share their experience hiking with other students.

2. Explain some common features of Tahquamenon Falls State park and the surrounding natural area.
3. Begin to make connections between Isle Royale and Tahquamenon Falls State park by aligning journal topics with chapters.

Advance Preparation:

As the instructor you will want to download digital photos taken on the trip prior to this lesson. You will also want to be familiar with every image students took pictures of so that you can answer questions if they arise.

Background Information:

In this lesson, the only background information the instructor needs to know is a general idea of how students felt about the trip so that during sharing the experience is positive. If you have a student that didn't enjoy the trip, work on getting him or her to find something they did enjoy. Remember the main purpose of such a trip is to connect students with nature. I suppose knowing the names and details that explain the way trees and flowers function will be very helpful in keeping the students' interest.

If you did choose to have students make a collage or brochure depicting their trip as an assessment tool, then give them time to work on that first prior to sharing.

Procedure:

1. In wrapping up from the trip, if you choose one of the **assessment** tools in Lesson 2; give students time to work on that. Then move into the sharing.
2. Have students get in a large circle and hand one student a rock or stick. The rock or stick is the 'talking rock' or 'talking stick.' Whoever holds the rock or stick is the only person that can **share**. Give students the option to share something cool they saw, something funny that happened, or something new they learned. Keep it positive. Once the student has shared, then he or she will pass the rock or stick to whomever they want. Keep the sharing and passing going until everyone has shared including the instructor.
3. Once sharing is done, you will probably want to go through the **questions** on the student worksheet. Have students take out their journal and hiking worksheet. Give them sometime to answer the 15 questions. Tell them to do their best since some may not have the greatest notes. Walk around the room while they are working on this. This is a good way to gauge who was into the experience and who wasn't or who did the work and who didn't.
4. As a class go around and have each student answer one question. If they don't have the answer try to remind them of where you were when the answer was given and see if they can remember.
5. Next, have some students share some flowers and trees they **named**. This would be best to do with the **digital images** on a projector. Discuss some facts about some of the flowers and trees as much as possible.

6. Next, students will need to take out the “**Superior Wilderness**” book. They are to go through their journal and put the relevant pages with the relevant chapters in the book. This should take no longer than ten minutes.
7. Finally, as a class have students **vote on the order** they want to study Isle Royale and the “Superior Wilderness” book. Inform them that each chapter covers different ecological or earth science concepts for example the chapter titled “We Walk on the Past” covers earth science benchmarks. Give this as an example. You could do this in groups, but sometimes if a groups order isn’t chosen, the students rebel against the chosen order so as a class is the best option. Remind students as a summary that Isle Royale is an International Biosphere Reserve and serves as a wonderful ecological model to study specifically due to its transitional forests, island ecology, and the special adaptations of some animals and plants, yet it is still very similar to the Eastern Upper Peninsula.

Assessment:

1. Since this is the wrap-up lesson, the best assessment is the **grading rubric** for the entire unit. (Attached)

Comments: Keep in mind that these three lessons are building blocks for an entire course. They could also be used as a summary for an entire course. Either way, their function is to get students outdoors to open their eyes and have some fun. Since it is a quick trip with lots of content packed in, you may want to expand the trip to more days so students have even more down time to just enjoy the outdoors. Do what fits your students and your situation the best.

Grading Rubric: Getting Acquainted With Our Own Ecosystem (Using Isle Royale as a Model System)

Student Name: _____

Date: _____

Points awarded according to accomplishment throughout the three lessons.

_____/ 2 pts For being able to explain the importance of No Trace Ethics.

_____/ 5 pts For practicing No Trace Ethics during hiking excursion.

_____/ 2 pts For identifying flowers correctly using Newcomb's Wildflower Guide.

_____/ 2 pts For identifying a tree, flower, or insect correctly using Audubon's Field Guide.

_____/ 5 pts For identifying five different organisms during hiking adventure.

_____/10 pts For taking notes on topics listed in the student objectives.

_____/15 pts For answering the 15 questions in regards to the objectives.

_____/ 5 pts For organizing your journal to match chapters in the "Superior Wilderness" book

Participation Points:

_____/10 pts For actively participating in the preparation for the trip.

_____/20 pts For actively participating in the lectures and activities on the hike.

_____/10 pts For performing camp duties.

_____/10 pts For sharing with the class your experience on this trip.

_____/105 pts Total

Bibliography:

Getting To Know Our Own Ecosystem (Using Isle Royale as a Model System)

- Bates, J. Seasonal Guide to the Natural Year: Minnesota, Michigan, Wisconsin: A Month to Month Guide to Natural Events. Golden, CO: Fulcrum Publishing, 1997.
- Christensen, G. Back Trail: an Upper Peninsula Boyhood. Iron Mountain, MI: The Ralph W. Second Press, 1985.
- Education Development Center, Inc. What On Earth? Insights in Biology. Dubuque, Iowa: Kendall/Hunt Publishing Co., 1998.
- Great Lakes Aquarium at Lake Superior Center. Lake Effects: The Lake Superior Curriculum Guide for Grades K-8. Duluth, MN: Lake Superior Center, 1998.
- Leave No Trace, Inc./National Outdoor Leadership School. "Lakes Region: Leave No Trace Skills and Ethics." Leave No Trace Skills and Ethics Series. April 2001. <http://www.LNT.org>.
- Louv, R. Last Child in the Woods: Saving Our Children from Nature Deficit Disorder. Chapel Hill: Algonquin Books, 2005.
- Michigan State University Extension. "Biology and Management of Beech Bark Disease: Michigan's Newest Exotic Forest Pest." Extension Bulletin E-2746 Reprinted October 2002.
- National Audubon Society. Field Guide to Trees: Eastern Region North America. New York: Alfred A. Knopf, 1980.
- National Audubon Society. Field Guide to Wildflowers: Eastern Region North America. New York: Alfred A. Knopf, 2001.
- Newcomb, L. Newcomb's Flower Guide. Boston, MA: Little, Brown and Co., 1977.
- Sheldon, N. Superior Wilderness Isle Royale National Park. Houghton, MI: Isle Royale Natural History Association, 1997.
- Timber Wolf Alliance. "Wolves of Michigan." www.northland.edu/timberwolfalliance. 2005.

Extension Sources:

- Michigan Department of Environmental Quality. Ecosystems and Biodiversity Curriculum for Upper Elementary and Middle School Science and Social Studies. Mount Pleasant, MI: Central Michigan University, 2005.
- Peterson, R. and Vucetich, J. Ecological Studies of Wolves on Isle Royale: Annual Report 2005-2006. Houghton, MI: School of Forest Resources and Environmental Science, March 31, 2006.