

Personal Statement

Though I obviously enrolled myself in the class, I left home on the 18th of June with a great deal of trepidation. *Would I be able to handle the hiking? Would I get along with my classmates? Would I enjoy the wilderness? Would I be able to take anything I did or learned back into the classroom?* Fortunately, a day into the trip I was able to answer each of these questions with an unambiguous yes!

Perhaps the greatest aspect of the course was its experiential character. As an educator, this is the current buzzword in science, and now more than ever I can see why. When you see it, feel it, hear it, smell it and experience it, you learn it. The deep emersion into the ecology of Isle Royale formed permanent memories in my brain, from which I will not only cherish, but also rely upon for stories, lessons and stimulation in my teaching.

I've got a volume of anecdotes I can tell students, from our close moose encounter on the first day, to the last day we had the privilege of meeting Rolf Peterson, a wildlife ecologist whose reputation and dedication far precedes him. In addition to being able to gain my students' attention with my storytelling, I too have many ways of supplementing existing units in Biology and Geophysical Science. Perhaps the greatest, and most unforeseen benefit of this course was the true inspiration I gained.

A bit detached from nature in the suburban area I live, I had forgotten the restorative power of wilderness. My increased energy as a result of it was alone moving. Being able to observe new species of wildlife, like loons, was truly awesome and seeing plants, like the pink ladyslipper, had me using the word awe-some in very genuine way. This direct contact with nature has strengthened my commitment to give future students outdoor experiences; it is sad to say I forgot how valuable they are. And equally valuable as my wilderness experience, was the interactions with the other teachers! I did not anticipate learning so much from the course participants. Having been with teachers that possessed an impressive accumulation of knowledge and teaching experience, I felt quite humbled and privileged by their presence. Their evident love of the profession and continued goal of self-improvement was utterly motivating. Their energy and dedication strengthened my desire to be a better teacher. And as I look through my journal, I am reminded of their many ideas for lessons, books, professional development and even classroom management. So enriching and motivating was the Ecology of Isle Royale course, just today I recommended it to a colleague. Hopefully they will take stock of my heartfelt suggestion.

Loons and Moose and Wolves – Oh my!

Goal Statement – Using the Isle Royale ecosystem, students will:

- Learn various organisms common to IR
- Trace the flow of energy through the living organisms
- Assign organisms to trophic levels
- Explain how abiotic and biotic components can limit ecosystems
- Understand and graph predator-prey relationships

Michigan Curriculum Framework Benchmarks

Math (2006)

- A2.4.2 Graph lines given appropriate information

Science (2000)

- (C) I.1.4 Gather and synthesize information from books and other sources of information
- (R) II.1.6 Develop an awareness of and sensitivity to the natural world
- (LEC) III.5.1 Describe common ecological relationships between and among species and their environments
- (LEC) III.5.2 Describe how energy flows through familiar ecosystems
- (LEC) III.5.3 Describe general factors regulating population size in ecosystems

Measurable Objectives

1. Create a food web with at least ten species found on Isle Royale.
2. Discuss the relationship between producer, primary consumer, secondary consumer and tertiary consumer.
3. Classify the ten species to their appropriate trophic level.
4. Explain what a limiting factor is and list four examples.
5. Draw a generalized graph of the population of wolves and moose over the last four decades.

Grade level: 7-10

Materials – wildlife field guides or encyclopedias, string/yarn, tape, thirty 4x6 index cards, graphing calculator or graphing paper, outdoor or large space, computers with Internet access (optional)

Day 1

1. Each student will choose an index card out of a hat. The index cards have a specific plant or animal species written on them that are members of the Isle Royale ecosystem.
 - a. Examples: balsam fir, snowshoe hare, red fox, river otter, grey wolf, moose, loon, zooplankton, black spruce, pink ladyslipper, bald eagle, osprey, sphagnum moss, pitcher plant, belted kingfisher, phytoplankton, black-throated warbler, wood lily, bunchberry, pileated woodpecker, mosquito, beaver, wood fern, dragonfly
2. The student should then use the resources available (see the bibliography for wildlife field guides or encyclopedias & computers) to research their species. They are responsible to learn the basic ecological characteristics, including where the organism is found, what it eats, what eats it, what limits its abundance and possible adaptations.
 - a. Their notes should be brief enough to fit on the back of their 4x6 index card!

Day 2

1. With cards in hand, take the students outside or to a large area and make a large circle. The teacher will act as the sun, holding the ball of yarn. Explain to the students they will be creating an Isle Royale food web by throwing the yarn to each other.
 - a. This will visually and kinesthetically illustrate the interconnections among species. Students will know what their species eats and what eats it based upon the prior day's research.
2. Return to the classroom to elaborate on the food web by explaining the flow of energy. Introduce trophic levels and the 10% rule of energy transfer.
 - a. To check their knowledge create horizontal grouping of the trophic levels. That is, write producer, primary consumer, secondary consumer and tertiary consumer on the board, from bottom to top. Going around the room, have each student come up to the board to assign their species to the correct trophic level.
 - i. Because of the way the trophic levels are positioned, it would also be an opportune time to introduce energy pyramids!
 - b. Students should copy the organisms in each trophic level into their science journal.
3. To assess their understanding students should create individual definitions for producer, primary consumer, etc. in their science journal. (Likely, homework.)

Day 3

1. So that students may “visit” Isle Royale, have them circulate around the room to observe various photos of the ecosystem.
 - a. Google Images is a good source. Be sure to use color!
2. Instruct the students to view a list all the environmental components that they see, organizing them in two lists – abiotic and biotic.
3. As a whole class, discuss their observations then pose the question “What might limit the population of your species or any species on Isle Royale?”
 - a. From here a discussion of limiting factors will ensue – availability of food, space, and water, wide temperature ranges, poor soil, snow, disease, predation, etc.
4. Next, pose the question “How might species on Isle Royale overcome or adapt to these limiting factors?” Have students discuss this prompt in a cooperative think-pair-share format.
5. To assess their understanding students should create an individual definition and list of limiting factors in their science journal.

Day 4

1. Having discussed predation as a biotic limiting factor, today students will examine the predator-prey relationship between wolves and moose. Do NOT tell them what the relationship is....let them graph the data first, then deduce it.
 - a. Using the data (1958-2000) found in an excel file at http://www.isleroyalewolf.org/data/Wolf_Moose_numbers.xls , students can use their graphing calculator or graph paper, to plot the points.
 - b. Host a discussion of the relationship.
 - c. For in-depth information regarding the 2005-2006 season, see Peterson’s “Ecological studies of wolves on Isle Royale”.
2. To assess their understanding of predator-prey relationship students should complete the activity called “Hare Today, Gone Tomorrow”, found in “Biology with the TI-83 plus”. (I cannot include it due to copyright laws.)
 - a. This activity examines another well-known predator/prey relationship and includes eight analysis questions.

Annotated Bibliography

- *These reference sources allow teachers and students to research the various plants and animals found on Isle Royale. They include the pictures, habitat, and niche so that one may understand where the organism is found, what eats it, what it eats, how long it lives, etc.*
- *“Ecological Studies of Wolves on Isle Royale” provides a detailed account of the wolf population from 2005 to 2006*
- *“Biology with the TI-83 Plus” is a workbook with fourteen activities utilizing their graphing calculators.*
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