

### **Personal Statement:**

I have wanted to hike Isle Royale since I was little kid - every summer we would visit Copper Harbor and I would see the boat leave and wonder what the island would be like. Then in college I took field class after field class and fell in love with the outdoors even more than I already was. I expanded my camping experience to include backpacking. And then there it was - a grad class - in the field - on Isle Royale. I knew I could not pass up this opportunity. Not only would I get to hike the island, but I would be in the company of my colleagues and with a guide who knew Isle Royale inside and out. The opportunity turned out to be an amazing experience. During my time on Isle Royale I learned not only about the island, but also about myself, personally and as a teacher.

The amount of knowledge I came back with is unbelievable. Although I do not remember every fact that was spouted off, Brian's lessons opened a curiosity to find out more. We asked question after question. I scribbled in my Rite in the Rain. I came home and ordered some of the books that Brian had our group bring out on the trail. I became aware of the intricacies of the ecosystem and that there is also a human history on the island. In addition to the science and history of Isle Royale, I learned how to implement the "Leave No Trace" principle and successfully carry out a week long trip in the backcountry. I am confident that I could plan a future trip on my own. I would love to have the opportunity to introduce my students to learning in the field or even eventually backpacking.

My favorite part of the trip was the constant conversations among the participants as colleagues. Brian said he had never had a group that was quite as talkative as we were - even while in the midst of a 9 mile day. But from day one, we were talking about what we do in our classrooms and then of course what we wanted to do in our classrooms upon return. The ideas were great. Knowing that there are other teachers with just as much passion to bring real world examples and experiences back to the classroom was invigorating and inspiring.

I cannot wait to bring Isle Royale to my classroom. What better way to start a lesson than with a few photos of the teacher playing with moose bones? The lesson plans I developed focuses on wolves and will slide nicely into my ecology unit in my 9<sup>th</sup> grade Bio class. However, I also ended up with a long list of many other ideas for lessons that could be done in an Environmental Science class (which is what I hope to eventually teach). My experiences on Isle Royale will be an invaluable asset as I design future lessons for my classroom.

## **Isle Royale: Applied Ecology**

The following is a three lesson mini-unit on Isle Royale that can easily be integrated into an existing Ecology Unit. Specific examples from Isle Royale (in particular the wolf) are used as applications of the students' gained knowledge on food webs, populations and predator/prey cycles, and conservation. These topics should be introduced before completing the following application lessons. These applications integrate math, English, and technology into a science curriculum.

### **Benchmarks:**

SCI.III.5.HS.1: Describe common ecological relationships between and among species and their environments.

SCI.III.5.HS.2: Explain how energy flows through familiar ecosystems.

SCI.III.5.HS.3: Describe general factors regulating population size in ecosystems.

SCI.III.5.HS.4: Describe responses of an ecosystem to events that cause it to change.

SCI.II.1.HS.6: Develop an awareness of and sensitivity to the natural world.

MAT.III.1.HS.2: Organize data using tables, charts, graphs, spreadsheets and databases.

ELA.11.HS.3: Synthesize and evaluate information to draw conclusions and implications based on their investigation of an issue or problem.

**Grade/Class:** 9<sup>th</sup> Biology

**Application 1 (15 points):**

**Objective 1:** Students will gain an understanding of wolf pack behavior, habitat, life cycle, and importance within an ecosystem - including food webs.

**Assessment/Evaluation:** Online notes (5 points)

**Objective 2:** Students will be able to construct a logical food web of an ecosystem given basic background information.

**Assessment/Evaluation:** Online food chain and web (10) points

**Materials:**

- Internet Access
- WISE classroom set up (go to <http://wise.berkeley.edu/>). Take some time to familiarize yourself with how WISE works and how you can manage your students work.
- IWC Wolves Project (from the WISE Home page, click on WISE Teacher's PET: Main Menu, click on Projects, click on All Project Families, then click on Wolves. The link for IWC Wolves Project is at the bottom right. The Wolves in Your Backyard link at the top right will be used in Application 3).

**Procedure:**

In this lesson students will explore the wolf as a species and its place in the ecosystem as a top predator.

**Engage:** Have a number of wolf artifacts (pelts, skulls, etc) around the room at the beginning of the hour. A running PowerPoint of wolf photos will also work if you do not have artifacts at your school. Have students brainstorm what they know and what they would like to know about wolves on the board as a class.

**Explore:** Students will begin by completing Module A: Learn About the Gray Wolf from the WISE program IWC Wolves. In this module students are required to do readings and keep notes on wolf pack behavior, habitat, and life cycle.

**Explain:** Discuss students' findings and answer any questions, making sure there are no misconceptions. Tie in previous lessons on ecosystems and have students speculate as to the wolves' importance.

**Extend:**

In Module B, students will explore the wolves place in the ecosystem and eventually construct a food web involving the wolf. Encourage students to explore the other Modules and the International Wolf Center's Home Page if time permits.

Note: When students are asked to complete Alpha Reading: A Closer Look at Population Dynamics, the Isle Royale link does not work. Instead, provide the

students with the Wolves & Moose on Isle Royale brochure from [www.isleroaylewolf.org](http://www.isleroaylewolf.org) (I blocked out the graph, since the students are required to create this graph in the next lesson) or pages 141-146 in *A Superior Wilderness*.

**Application 2 (15 points):**

**Objective:**

Students will be able to construct and interpret a predator prey graph.

**Assessment:** Labeled graph (7 points) and critical thinking questions (8 points)

**Materials:** Class set of worksheets, slide show of Isle Royale research photos

**Procedure:**

In this application, students will apply their knowledge of predator prey cycles to the Isle Royale wolf and moose populations.

**Engage:** Brief slide show of my own photos showing Isle Royale and Rolf Peterson's research to introduce them to the island and the study (pages 150-151 in *A Superior Wilderness* discusses this research).

**Explore:** Students will complete the attached worksheet where they will construct a predator prey graph and then interpret it. Enclosed are both the original data from ([www.isleroaylewolf.org](http://www.isleroaylewolf.org)) and a simplified data table. I will have my students use the simplified data so they can draw the graph by hand. It shows the same trends as the original data, but does not need to be graphed in Excel. They will need to use dual y-axes to show the trend, since moose numbers are so much greater than wolf numbers. The left y axis should be in increments of 10, from zero to 50 for the wolves. The right x axis should be in increments of 500, from zero to 2500. Each y axis will have 5 increments - see answer key for correct set-up. Explain to students that they are able to have different increments because they are comparing a trend, not exact quantities. Encourage students to use their notes from *Gray Wolves/Gray Matter* and the brochure they received yesterday to answer the critical thinking questions.

**Explain:** Discuss the students' answers the worksheet. Fill in any holes to the story of the wolves and moose of Isle Royale they may have missed.

**Extend:** Ask students to think about other factors that may affect the population cycles of wolves not on Isle Royale. This is to get them thinking for tomorrow.

**Application 3 (40 points):**

**Objectives:**

Students will be able research a controversial conservation issue and convey their opinion, supported with facts, in a five paragraph essay.

**Assessment/Evaluation:** Five paragraph essay (40 points)

**Materials:**

- Internet Access
- WISE classroom set up (go to <http://wise.berkeley.edu/>). Take some time to familiarize yourself with how WISE works and how you can manage your students work.
- Wolves in Your Backyard Program (from the WISE Home page, click on WISE Teacher's PET: Main Menu, click on Projects, click on All Project Families, then click on Wolves. The Wolves in Your Backyard link is at the top right of the page.

**Procedure:**

Students should complete the Activities Wolf Controversies and Management Options in the WISE program Wolves in Your Background. In addition to filling in the online notes, have students create two column notes, one labeled "Reasons to Protect Wolves" and the other labeled "Reasons the Wolves do Not Need Protection." They should add to BOTH sides of the notes, regardless of their opinion, as they complete the Activities. Encourage students to also use the previous lessons information to add to the notes. After completing the notes, students will be writing a five paragraph essay on their opinion. See the attached rubric for directions and grading criteria. It is assumed the students are familiar with five paragraph essays and MLA formatting (My MLA guidelines are attached). You may also want to provide some of the resources listed in the Bibliography for students to use.

## Bibliography:

Daerr, Elizabeth. *A Howling Success*. 2000. National Parks Conservation Association Magazine. 1 Nov. 2004.  
<[http://www.npca.org/magazine/2000\\_issues/november\\_december/wolves.html](http://www.npca.org/magazine/2000_issues/november_december/wolves.html)>

An article discussing the need to continue protecting the Gray Wolf. I could not find it online again, but have a hard copy.

*International Wolf Center Community*. 2006. International Wolf Community. 21 Aug. 2006. <<http://www.wolf.org/wolves/index.asp>>

A website for basic wolf information.

*International Wolf Center Community: Gray Wolves/Gray Matter*. 2006. International Wolf Community. 21 Aug. 2006.  
<[http://www.wolf.org/wolves/learn/educator/gwgm/gwgm\\_main.asp](http://www.wolf.org/wolves/learn/educator/gwgm/gwgm_main.asp)>

This is the main page for the Gray Wolf/Gray Matter curriculum used in application 3. It is a great online lesson.

*The Feds Push the Gray Wolf Back into the Dark Ages of Protection*. 2003. The Humane Society of the United States. 21 Aug. 2006.  
<[http://www.hsus.org/wildlife/wildlife\\_news/the\\_feds\\_push\\_the\\_gray\\_wolf\\_back\\_into\\_the\\_dark\\_ages\\_of\\_protection.html](http://www.hsus.org/wildlife/wildlife_news/the_feds_push_the_gray_wolf_back_into_the_dark_ages_of_protection.html)>

An article discussing the current status of the Gray Wolves' protection in the US.

Miller, Kenneth and Joseph Levine. *Biology*. New Jersey: Prentice Hall, 2004.

My high school text. The Isle Royale wolf and moose population is discussed and shown on a graph on page 126. The idea for the five paragraph essay came from an "Issues in Biology: Does the Gray Wolf Population need protection?" on page 128.

Peterson, Rolf and John Vucetich. *The Wolves and Moose of Isle Royale*. 2006. Michigan Technological University. 21 Aug. 2006. <<http://www.isleroyalewolf.org/>>

This website provided the data for application 2. It also has a number of other resources about the wolves and moose of Isle Royale. The authors of this website are the scientists conducting the research.

Peterson, Rolf and John Vucetich. *The Wolves and Moose of Isle Royale Brochure*. Michigan Technological University.

This is a brochure that I received while on Isle Royale, discussing the wolf and moose populations in a concise way.

Shelton, Napier. *Superior Wilderness: Isle Royale National Park*. Houghton, MI: Isle Royale Natural History Association, 1997.

I used this book for the chapter "Wolves, Moose, and the Balance of Nature;" however, it also covers many other Isle Royale topics.

*WISE: The web-based Inquiry Science Environment*. 2006. Berkley. 21 Aug. 2006. <<http://wise.berkeley.edu/>>

This is the website that will allow you to run the IWC Wolves Program (AKA Gray Wolves/Gray Matter) and the Wolves in Your Backyard Program. Take the time to familiarize yourself with it. It does a lot. There are also MANY other science lessons available.

*Wolves*. 2006. Defenders of Wildlife. 21 Aug. 2006. <<http://www.defenders.org/wildlife/new/wolves.html>>

A website with basic wolf information. Biased towards conservation and protection.

## Wolf and Moose Populations on Isle Royale

Graph the following data of the wolf and moose population on Isle Royale. Use dual y-axes to show the trend, since moose numbers are so much greater than wolf numbers. The left y axis should be in increments of 10, from zero to 50 for the wolves. The right x axis should be in increments of 500, from zero to 2500. Each y axis will have 5 increments. Be sure to label and title your graph.

Year	Wolves	Moose
1959	20	563
1966	26	765
1969	17	1268
1970	18	1295
1973	24	1435
1977	34	1143
1978	40	1001
1981	30	863
1982	14	872
1983	23	932
1985	22	1115
1990	15	1216
1995	16	2422
1996	22	1163
1998	14	699
2001	19	900
2002	17	1100
2003	19	900
2006	30	450

### Critical Thinking Questions

1. Can an ecosystem support an infinite number of moose? Why or why not? \_\_\_\_\_  
\_\_\_\_\_

2. If wolves did not live on Isle Royale, what main factor would determine the amount of moose the island could support? \_\_\_\_\_

3. What other factors may influence population numbers? \_\_\_\_\_  
\_\_\_\_\_

4. Is predation a density-dependent or density-independent factor? \_\_\_\_\_  
\_\_\_\_\_

On Isle Royale, the moose have a predator - the wolf. Use your graph to answer the following questions.

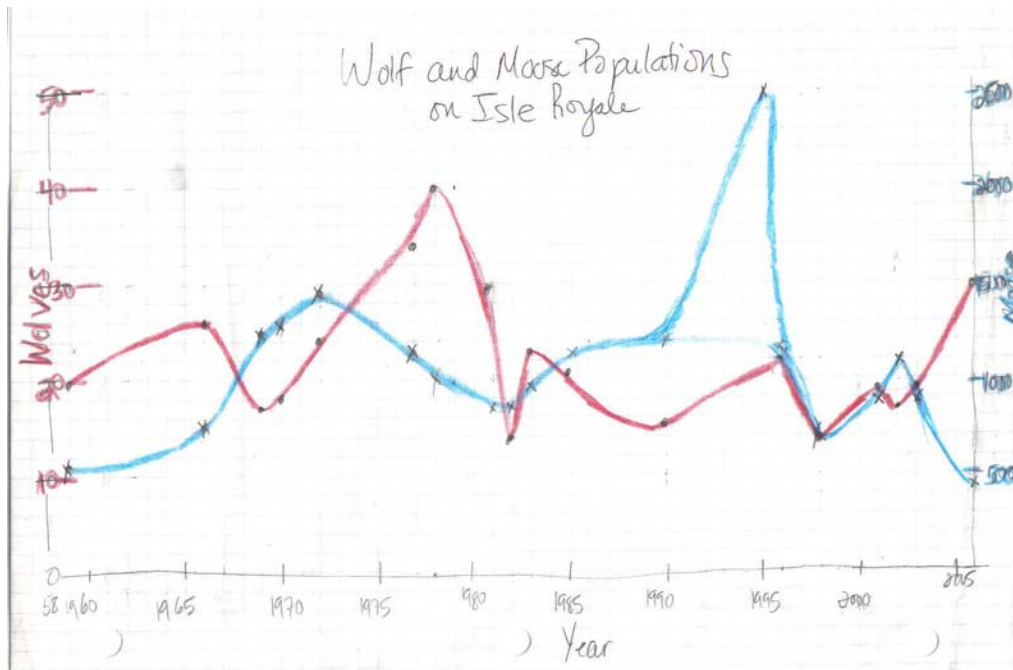
5. When the moose (prey) population increases, what happens to the wolf (predator) population? Why? \_\_\_\_\_  
\_\_\_\_\_

6. What causes the moose population to decrease? When this happens, what happens to the wolf population? \_\_\_\_\_  
\_\_\_\_\_

7. Why is this interaction between predator and prey called a cycle? \_\_\_\_\_  
\_\_\_\_\_

8. Why is this cycle so easily studied on Isle Royale? \_\_\_\_\_  
\_\_\_\_\_

## Answer Key Wolf and Moose Populations on Isle Royale



1. No - limiting factors/carrying capacity
2. Food supply
3. Predation, Competition, Natural Disasters, Disease, etc
4. Density-dependent
5. Wolf population increase because it has more food
6. The moose population will decrease as there are more predators hunting it. Eventually the wolf population will decrease because it will run out of moose to eat
7. Because this pattern will continue to repeat itself - it maintains a balance
8. Because the number of variables is decreased and the populations are more easily monitored because of the small, contained space

### Does the Gray Wolf Need Protection?

You will be writing a five paragraph essay on whether or not you think the gray wolf needs protection. Your first paragraph should be an introduction and give background information. The last sentence of the first paragraph should state your opinion and list your reasons - this is your thesis. (Ex: The gray wolf should be protected because a), b), and c). Your middle three paragraphs should explain your three reasons (one in each paragraph), with support from your research. Your last paragraph should restate your thesis and conclude your paper. You may use your WISE notes, textbook, graphing assignment, or other online or print resources. You will be required to use MLA formatting. Be sure to convey your understanding of ecology and conservation issues as you form your argument. Please use this rubric as you write and turn it in with your notes and final draft.

\_\_\_\_ /5 Notes in Columns

(Reasons to Protect Wolves/Reasons the Wolves do Not Need Protection)

\_\_\_\_ /5 Introductory Paragraph with thesis

\_\_\_\_ /5 Reason One, with supporting details

\_\_\_\_ /5 Reason Two, with supporting details

\_\_\_\_ /5 Reason Three, with supporting details

\_\_\_\_ /5 Conclusion, with thesis restated

\_\_\_\_ /5 Understanding of conservation/ecology issues shown

\_\_\_\_ /5 Works Cited and Citations

\_\_\_\_ /5 Title/Spelling/Grammar/Typed or written in blue/black ink

\_\_\_\_ /40 TOTAL

DUE: \_\_\_\_\_

## MLA Citations

### Making reference to works of others in your text

In MLA style, referring to the works of others in your text is done in two ways. When you make reference to someone else's idea, either through paraphrasing or quoting them directly, you:

- provide the author's name (or the title of the work) and the page (or paragraph) number of the work in a **parenthetical citation**
- provide full citation information for the work in your **Works Cited list**

This allows people to know which sources you used in writing your essay and then be able to look them up themselves, so that they can use them in their scholarly work. Here are some basic guidelines for referring to the works of others in your text.

### Parenthetical Citations

MLA format follows the author-page method of citation. This means that the author's last name and the page number(s) from which the quotation is taken must appear in the text, and a complete reference should appear in your works cited list (see Your Works Cited Page, below). The author's name may appear either in the sentence itself or in parentheses following the quotation or paraphrase, but the page number(s) should always appear in the parentheses, not in the text of your sentence.

#### Examples:

Wordsworth stated that Romantic poetry was marked by a "spontaneous overflow of powerful feelings" (263).

Romantic poetry is characterized by the "spontaneous overflow of powerful feelings" (Wordsworth 263).

Wordsworth extensively explored the role of emotion in the creative process (263).

\*\*\*If the work you are making reference to has no author, use an abbreviated version of the work's title. For non-print sources, such as films, TV series, pictures, or other media, or electronic sources, include the name that begins the entry in the Works Cited page.

\*\*\*Notice that you must cite even if you paraphrase, not just when you quote!

\*\*\*For our purposes, you may cite at the **END OF EACH PARAGRAPH**. In reality, you must include a parenthetical quotation each time you use someone else's ideas (even if this means that you have many in one paragraph).

## Your Works Cited List

The works cited list should appear at the end of your essay. It provides the information necessary for a reader to locate and be able to read any sources you cite in the essay. Each source you cite in the essay must appear in your works-cited list; likewise, each entry in the works-cited list must be cited in your text.

### List Format

- Begin your works cited list on a separate page from the text of the essay under the label Works Cited (with no quotation marks, underlining, etc.), which should be centered at the top of the page.
- Make the first line of each entry in your list flush left with the margin. Subsequent lines in each entry should be indented one-half inch. This is known as a hanging indent.
- Double space all entries, with no skipped spaces between entries.
- Keep in mind that underlining and *italics* are equivalent; please use *italics* throughout your essay.
- Alphabetize the list of works cited by the first word in each entry (usually the author's last name),

### Basic Rules for Citations

- Authors' names are inverted (last name first); if a work has more than one author, invert only the first author's name, follow it with a comma, then continue listing the rest of the authors.
- If no author is given for a particular work, alphabetize by the title of the piece and use a shortened version of the title for parenthetical citations.
- Capitalize each word in the titles of articles, books, etc. This rule does not apply to articles, short prepositions, or conjunctions unless one is the first word of the title or subtitle.
- Underline or italicize titles of books, journals, magazines, newspapers, and films.
- Use quotation marks around the titles of articles in journals, magazines, and newspapers. Also use quotation marks for the titles of short stories, book chapters, poems, and songs.
- List page numbers efficiently, when needed. If you refer to a journal article that appeared on pages 225 through 250, list the page numbers on your Works Cited page as 225-50.

### EXAMPLES:

#### Books:

Author(s). *Title of Book*. Place of Publication: Publisher, Year of Publication.

#### **Book with one author:**

Henley, Patricia. *The Hummingbird House*. Denver: MacMurray, 1999.

**Book with more than one author:**

Gillespie, Paula, and Neal Lerner. *The Allyn and Bacon Guide to Peer Tutoring*. Boston: Allyn, 2000.

\*\*\*If there are more than three authors, you may list only the first author followed by the phrase et al. (the abbreviation for the Latin phrase "and others") in place of the other authors' names, or you may list all the authors in the order in which their names appear on the title page.

**An article in a periodical (such as a newspaper or magazine):**

Author(s). "Title of Article." Title of Source Day Month Year: pages.

When citing the date, list day before month; use a three-letter abbreviation of the month (e.g. Jan., Mar., Aug.). If there is more than one edition available for that date (as in an early and late edition of a newspaper), identify the edition following the date (e.g. 17 May 1987, late ed.).

**Magazine or newspaper article:**

Poniewozik, James. "TV Makes a Too-Close Call." *Time* 20 Nov. 2000: 70-71.

Trembacki, Paul. "Brees Hopes to Win Heisman for Team." *Purdue Exponent* 5 Dec. 2000: 20.

**An article in a scholarly journal:**

Author(s). "Title of Article." *Title of Journal* Vol (Year): pages.

**Basic Forms for Electronic Sources:**

\*\*\* Author(s). Name of Page. Date of Posting/Revision. Name of institution/organization affiliated with the site. Date of Access <electronic address>.

**A web site:**

Felluga, Dino. *Undergraduate Guide to Literary Theory*. 17 Dec. 1999. Purdue University. 15 Nov. 2000 <<http://omni.cc.purdue.edu%7Efelluga/theory2.html>>.

Purdue Online Writing Lab. 2003. Purdue University. 10 Feb. 2003  
<<http://owl.english.purdue.edu>>.

\*\*\*If no author is given for a web page or electronic source, start with and alphabetize by the title of the piece and use a shortened version of the title for parenthetical citations.

**This handout was condensed from the Purdue Online Writing Lab. I DID NOT follow the MLA rules of citations, but I did not want you to have to wade through the webpage or the actual MLA handbook. There are many more rules in MLA, I included those that were necessary and those you would most likely use. If you need to know how to cite something that is not listed on this handout, please ask!!!**

Works Cited

Purdue Online Writing Lab. 2003. Purdue University. 10 Feb. 2003  
<<http://owl.english.purdue.edu>>.

### Example Paper & Works Cited

**Here is an excerpt from a paper I wrote this summer for a college class that had to follow MLA format. Remember that the Works Cited should be on its own page, but I was trying to save paper!**

#### A Natural History of the Sharp-shinned Hawk

*Accipiter striatus*, or the Sharp-shinned Hawk, is a member of the class Aves (birds), the order Falconiforme (hawks, kites, eagles, falcons, and Old World vultures), the family Accipitridae (hawks), and the genus *Accipiter*. Accipiters are “short-winged, long-tailed, forest-dwelling raptors;” accipiter means “bird of prey” (Clark and Wheeler 13). There are three species of accipiters in North America: the Cooper’s Hawk, the Northern Goshawk, and the Sharp-shinned Hawk.

Sharp-shinned Hawks are forest dwelling birds and are common throughout North America. Their breeding habitat is generally in the northern forests and western mountains and they prefer forests of spruce, aspens, or pines (Johnsgard 249). They are seen in greatest numbers when they migrate to the Florida Keys and Central America (Clark and Wheeler 156). Sharp-shinned Hawks may also be found in more populated areas hunting at bird feeders (Camfield 4).

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#### Works Cited

- Camfield, A. 2004. *Accipiter striatus*. Animal Diversity Web. 28 Jul. 2005  
<[http://animaldiversity.ummz.umich.edu/site/accounts/information/Accipiter\\_striatus.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Accipiter_striatus.html)>.
- Clark, William S. and Brian K. Wheeler. *Peterson Field Guides: Hawks*. Boston: Houghton Mifflin Company, 1987.
- Johnsgard, Paul A. *Hawks, Eagles, and Falcons of North America: Biology and Natural History*. Washington: Smithsonian Institution Press, 1990.