

Robin Mahoney

ECOLOGY OF ISLE ROYLE
Michigan Teachers Backpack Adventure
June 2006

PERSONAL STATEMENT

Isle Royale was a way for me to rekindle my passion for ecology and geology and to reconnect with nature. This was a new and rewarding experience for me to take back to my classroom and share with my eighth grade students. I have camped at Lake Superior Provincial Park in a tent with showers and laundry facilities, and have gone on day long hikes in this area with family, but have never attempted camping or hiking in an area as remote as Isle Royale. This was my first experience as a backpacker. I knew that the rugged terrain as well as hiking very long distances would be tough, but I was up for the challenge.

I would have to say that the greatest motivation on Isle Royale came from my team members as well as instructor Tom Beery. As an educator I have taken many university courses that required group participation. Many times in group activities there seems to be a consensus that a few do all the work that everyone benefits from. Ecology of Isle Royale was not the case. Each and every person in this group went above and beyond what was expected in this type of course, there was not one complaint. We shared our water, food, conversation, laughter, and humor. When I went back and reviewed Candy's book, I realized how correct she is in saying that Isle Royale brings out the best in us. The courtesy and consideration that every member provided actually set the mood for the entire trip. Ecology of Isle Royale course is one of the most positive and rewarding educational experiences I have ever endeavored.

Rolf and Candy Peterson are my next source of inspiration on Isle Royale. I enjoyed the pre-course readings; I was also moved by Candy's book. She speaks from the heart and I had a difficult time putting the book down until it was completed. Meeting Candy and Rolf in person was an exciting event. The day that we met up with them they had just returned from collecting

bird data. They had been up since 4:00 a.m. and you could tell they were exhausted. With smiles on their faces they were more than willing to take time to explain their wolves and moose research on Isle Royale in detail. This is another example of Isle Royale bringing out the best in people. Moose antlers, skulls of wolves, and a deformed wolf's vertebrate were shown and explained. We discussed environmental, educational, and personal concerns as well. Then we all were invited into Bangsund Cabin, as Candy often refers to it in her book. Rolf and Candy Peterson are humble and down to earth people. This visit with them has inspired me to share as much of my experience on Isle Royale as possible with my students. It also motivates me to instill a great appreciation for wildlife, and the ecosystems they live in.

My last source of inspiration comes from the clear water of Lake Superior and inland lakes of Isle Royale. I took many pictures of clear water from the shores and docks as we hiked on Isle Royale. Then a wonderful interaction took place which put things into perspective for me. We had arrived at Three Mile which was the longest hike of our Isle Royale adventure. I had given John my water bottle to fill and was cooling off my feet in Lake Superior. As John handed me my water he said "Just what you ordered madam, 2006 Lake Superiors finest". I took a drink and replied "and just the right temperature". Our fresh water from all the great lakes is one of our most valuable resources. I want all of my eighth grade students to realize that as humans we do have an effect on all the ecosystems that surround us. Therefore as citizens who all use this system it is our responsibility to make choices that will benefit all organisms within it.

Ecology of Isle Royale
LESSON PLANS
Section 1 Lesson 1

SUBJECT LIFE SCIENCE, GEOGRAPHY, MATH	TOPIC INTRODUCTION TO ISLE ROYALE NATIONAL PARK FOCUS QUESTION IN WHAT WAYS CAN I DEVELOP AN AWARENESS OF AND SENSITIVITY TO THE NATURAL WORLD?
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GOAL STATEMENT:
TO USE ISLE ROYALE NATIONAL PARK AS AN EXAMPLE TO DEVELOP AN APPRECIATION OF THE BALANCE OF NATURE AND THE EFFECTS ORGANISMS HAVE ON EACH OTHER, INCLUDING THE EFFECTS HUMANS HAVE ON THE NATURAL WORLD.

- OBJECTIVE(S):**
- STUDENTS WILL USE A MICHIGAN ROAD MAP TO DETERMINE THE DISTANCE BETWEEN THEIR CURRENT LOCATION AND ISLE ROYALE.
 - STUDENTS WILL BE ABLE TO DESCRIBE VARIOUS INTERESTS OF ISLE ROYALE NATIONAL PARK.
 - STUDENTS WILL BEGIN TO DEVELOP AN AWARENESS OF AND SENSITIVITY TO THE NATURAL WORLD.

- APPLICATION DETAILS**
- **GRADE LEVEL:** EIGHT (8)
 - **DURATION OF LESSON:** 1- 2 CLASS PERIOD
 - **SITE REQUIREMENTS:** CLASSROOM
 - **RISK MANAGEMENT:** NONE
 - **MATERIALS LIST:**
 - MICHIGAN ROAD MAP (6-8) FOR GROUPS
 - ISLE ROYALE NATIONAL PARKS BROCHURE FROM THE NATIONAL

PARK SERVICE (6-8)

- PICTURES TAKEN ON ISLE ROYALE EXPEDITION.

CONTENT BACKGROUND:

AS WITH ALL NATURAL ECOSYSTEMS, ISLE ROYAL OFFERS AN EXAMPLE OF A SENSITIVE BALANCE OF NATURE. BECAUSE OF THE EFFECTS ORGANISMS HAVE ON EACH OTHER AND HOW HUMANS AFFECT THE NATURAL WORLD, THE BALANCE IS EASILY DISRUPTED. PEOPLE ARE BECOMING MUCH MORE AWARE OF THEIR EFFECTS ON THIS BALANCE OF NATURE. THIS LESSON FOCUSES ON MAKING OUR YOUTH MORE SENSITIVE AND AWARE OF THEIR ACTIVITIES THAT ARE DESTRUCTIVE TOWARDS THE ENVIRONMENT

METHODS:

SMALL, LARGE GROUP ACTIVITY

PROCEDURE:

1. AROUSE STUDENTS' CURIOSITY IN ISLE ROYALE BY SHARING THE EXPERIENCE OF YOUR EXPEDITION TO ISLE ROYALE.
2. VIEW PICTURES FROM YOUR ISLE ROYALE EXPEDITION.
3. PLACE STUDENTS INTO SMALL GROUPS; HAND OUT BROCHURE FROM THE NATIONAL PARK SERVICE ON ISLE ROYALE. EXPLAIN TO STUDENTS THAT EACH GROUP WILL BE ASSIGNED A SECTION TO READ, DISCUSS, AND REPORT BACK TO ENTIRE CLASS AN OVERVIEW OF THEIR SECTION OF THE BROCHURE.
4. HAVE SMALL GROUPS MAP YOUR EXPEDITION TO ISLE ROYALE AND CALCULATE THE DISTANCE IN MILES USING THE MICHIGAN ROAD MAP.

ASSESSMENT:

STUDENTS WILL WRITE IN JOURNAL VARIOUS INTERESTS OF ISLE ROYALE NATIONAL PARK THAT APPEAL TO THEM.

EXTENSION:

HAVE A PUZZLE TABLE AVAILABLE THROUGHOUT THE YEAR WITH AN ISLE ROYALE THEME.

**Ecology of Isle Royale
LESSON PLANS
Section 1 Lesson 2
Entire school year**

SUBJECT

GEOGRAPHY, CULTURE, HISTORY,
LANGUAGE ARTS, EARTH SCIENCE

TOPIC

EXPERIENCING ISLE ROYALE FROM A
HISTORICAL PERSPECTIVE.

FOCUS QUESTION

WHAT HISTORICAL PERSPECTIVE DOES
DOROTHY SIMONSON, AND ISLE ROYALE
FISHERMEN ILLUSTRATE?

GOAL STATEMENT:

ILLUSTRATE HISTORICAL AND CULTURAL ACTIVITY IN THE PAST ON ISLE ROYALE. THEN CONTINUE THE DEVELOPMENT OF AN APPRECIATION OF THE BALANCE OF NATURE AND THE EFFECTS ORGANISMS HAVE ON EACH OTHER INCLUDING THE EFFECTS HUMANS HAVE ON THE NATURAL WORLD. COLLECT WEATHER DATA THROUGHOUT THE SCHOOL YEAR, AND COMPARE IT TO HISTORIC DATA COLLECTED BY SCHOOL TEACHER DOROTHY SIMONSON.

OBJECTIVE(S):

- STUDENTS WILL COLLECT, RECORD, AND GRAPH CURRENT AS WELL AS HISTORIC WEATHER DATA TO COMPARE ANY CLIMATE CHANGES ON ISLE ROYALE
- STUDENTS WILL BE ABLE TO LOCATE AND LABEL NAMES OF PLACES ON ISLE ROYALE USING A USGS MAP.
- STUDENTS WILL BE ABLE TO RECOGNIZE AND APPRECIATE THE BALANCE OF NATURE AND THE EFFECTS ORGANISMS HAVE ON EACH OTHER, INCLUDING THE EFFECTS HUMANS HAVE ON THE NATURAL WORLD.

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHT (8)
- **DURATION OF LESSON:** ENTIRE YEAR CAN BE DAILY, WEEKLY OR ON MONTHLY BASES.
- **SITE REQUIREMENTS:** CLASSROOM
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST**
 - USGS MAP OF ISLE ROYALE
 - BOOK: THE DIARY OF AN ISLE ROYALE SCHOOL TEACHER
 - FILM: FISHERMEN OF ISLE ROYALE
 - BOOK: THE PLACE NAMES OF ISLE ROYALE
 - INTERNET SITE TO COLLECT WEATHER DATA

CONTENT BACKGROUND:

ISLE ROYALE NATIONAL PARK IS A UNIQUE PLACE OF HISTORICAL SIGNIFICANCE. MOST INDIVIDUALS ARE UNAWARE OF THE HISTORICAL VALUE THAT UNFOLDS WITHIN THIS ISLAND. THERE IS A VAST ARRAY OF HISTORICAL RECORDS DETAILING HUMAN ACTIVITY ON ISLE ROYALE. FOR EXAMPLE THE AMERICAN INDIANS INHABITED THE ISLAND AS FAR AS 4,500 YEARS AGO. REMNANTS OF COPPER MINING, LOGGING, RESORTS, AND SHIPWRECKS AND STILL EVIDENT. THIS LESSON WILL EXPLORE IN MORE DETAIL MANY OF THESE HISTORIC ACTIVITIES ON THE ISLAND. THE FILM ENTITLED FISHERMEN OF ISLE ROYALE, AND BOOK ENTITLED THE DIARY OF AN ISLE ROYALE SCHOOL TEACHER WILL ALSO PROVIDE HISTORICAL BACKGROUND OF HUMAN ACTIVITY ON ISLE ROYAL. BY COLLECTING WEATHER DATA THROUGHOUT THE SCHOOL YEAR, AND COMPARING IT TO HISTORIC DATA COLLECTED, I WILL TIE THIS ACTIVITY INTO A UNIT ON WEATHER.

METHODS:

INDIVIDUAL, SMALL, LARGE GROUP ACTIVITY

PROCEDURE:

1. HAVE USGS MAP OF ISLE ROYALE LOCATED IN AN AREA OF EASY ACCESS.
2. INTRODUCE DOROTHY SIMONSON AND EXPLAIN THAT THE CLASS WILL BE READING HER DIARY THROUGHOUT THE SCHOOL YEAR TO

- GET A FEEL FOR LIFE ON ISLE ROYALE IN THE EARLY 1930'S. YOU COULD DISCUSS HER BACKGROUND AND MENTION THAT IT IS THE START OF THE GREAT DEPRESSION. SEPTEMBER 13, 1932 IS HER FIRST ENTRY YOU PROBABLY SHOULD START THAT DAY.
3. AS NAMES AND PLACES ARE MENTIONED IN DOROTHY'S DIARY USE THE BOOK THE PLACE NAMES OF ISLE ROYALE TO PROVIDE STUDENTS WITH FACTUAL BACKGROUND INFORMATION. FIND THE LOCATION ON THE ISLE ROYALE MAP AND MAKE SMALL LABEL WITH STICKY NOTE OR INDEX CARD CLOSE TO LOCATION SO STUDENTS CAN ACTUALLY SEE THE LOCATION.
 4. SHOW FILM ENTITLED FISHERMEN OF ISLE ROYALE TO GIVE STUDENTS MORE HISTORIC BACKGROUND OF ISLE ROYALE.
 5. START COLLECTING WEATHER DATA ON NOVEMBER 20, 1932 FROM DIARY (FOR THE PAST DATA), AND INTERNET SITE (FOR PRESENT DATA) ON ISLE ROYALE. APRIL 29, 1933 IS DOROTHY'S LAST RECORDED DATA FOR WEATHER
 6. STUDENTS CAN NOW GRAPH AND COMPARE THEIR DATA.

ASSESSMENT:
 PARTICIPATION IN COLLECTING, RECORDING, GRAPHING DATA OF WEATHER.

EXTENSION:
 READ PARTS OF THE BOOK ENTITLED DIARIES OF AN ISLE ROYALE FISHERMAN.

**Ecology of Isle Royale
 LESSON PLANS
 Section 2 Lesson 1
 Supplement to current unit on ecology**

<p>SUBJECT LIFE SCIENCE</p>	<p>TOPIC ECOSYSTEMS FOCUS QUESTION WHAT ARE THE ABIOTIC AND BIOTIC FACTORS WITHIN A GIVEN HABIT?</p>
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GOAL STATEMENT:
 TO UNDERSTAND THE CONCEPTS OF ABIOTIC AND BIOTIC FACTORS, AND APPLY IT TO DIFFERENT HABITATS WITHIN AND ECOSYSTEM.

OBJECTIVE(S):

- STUDENTS WILL BE ABLE TO DEFINE WHAT ABIOTIC AND BIOTIC FACTORS ARE.
- STUDENTS WILL IDENTIFY ABIOTIC AND BIOTIC PARTS OF AN ECOSYSTEM.
- STUDENTS WILL RECORD ABIOTIC AND BIOTIC PARTS OF A GIVEN HABITAT.
- STUDENTS WILL DESCRIBE POSSIBLE INTERACTIONS BETWEEN TWO BIOTIC AND ABIOTIC FACTORS.

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHTH (8)
- **DURATION OF LESSON:** 1-2 CLASS PERIODS (DEPENDS ON CLASS)
- **SITE REQUIREMENTS:** CLASSROOM
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST:**
 - LIFE SCIENCE TEXTBOOK OF STUDENT
 - SCIENCE JOURNAL
 - DVD ENTITLED ISLE ROYALE IMPRESSIONS (ABOUT 20 MINUTES)
 - POSTER BOARD OR LARGE PIECE OF WHITE ART PAPER
 - OVERHEAD ABIOTIC AND BIOTIC FACTORS OR CHALK BOARD

CONTENT BACKGROUND:

ABIOTIC FACTORS PERTAIN TO NONLIVING COMPONENTS OF THE ENVIRONMENT. SPECIFIC EXAMPLES WOULD BE WATER, WIND, ROCKS, TEMPERATURE, LIGHT INTENSITY, AND SOIL COMPOSITION. BIOTIC FACTORS PERTAIN TO LIVING OR ONCE LIVING COMPONENTS OF THE ENVIRONMENT. ALL PLANTS AND ANIMALS WOULD BE EXAMPLES OF BIOTIC FACTORS. THIS LESSON WILL ILLUSTRATE POSSIBLE INTERACTIONS OF BIOTIC AS WELL AS ABIOTIC RELATIONSHIPS THAT WILL MAKE CONNECTIONS TO DIFFERENT HABITS ON ISLE ROYALE.

METHODS:

INDIVIDUAL, SMALL, AND LARGE GROUP ACTIVITIES.

PROCEDURE

1. INTRODUCE TO STUDENTS THE CONCEPTS OF ABIOTIC AND BIOTIC FACTORS. EITHER USE YOUR CURRENT TEXTBOOK OR CONTENT BACKGROUND PROVIDED TO ESTABLISH A DEFINITION.
2. USE OVERHEAD ENTITLED **ABIOTIC AND BIOTIC FACTORS** OR CHALKBOARD AND HAVE STUDENTS COPY THE CHART INTO THEIR JOURNAL.
3. EXPLAIN TO STUDENTS THAT THEY WILL BE VIEWING THE ECOSYSTEM OF ISLE ROYALE NATIONAL PARK. THEY ARE TO RECORD THE ABIOTIC AND BIOTIC FACTORS THAT THEY SEE IN THEIR JOURNALS.
4. AFTER VIEWING DVD DIVIDE STUDENTS INTO SMALL GROUPS TO DISCUSS AND COMPARE THE ABIOTIC AND BIOTIC FACTORS WRITTEN IN JOURNALS. EACH SMALL GROUP WILL THEN DETERMINE IF THERE ARE ANY POSSIBLE INTERACTIONS BETWEEN THE ABIOTIC AND BIOTIC FACTORS AND SHARE THEIR FINDINGS WITH CLASSMATES.
5. EACH STUDENT WILL THEN DESCRIBE IN THEIR JOURNAL POSSIBLE INTERACTIONS BETWEEN TWO BIOTIC AND ABIOTIC FACTORS.
6. END LESSON BY HAVING STUDENTS SHARE THEIR POSSIBLE INTERACTIONS.

ASSESSMENT:

- STUDENT WILL CREATE A SMALL POSTER THAT SHOWS AT LEAST FIVE BIOTIC AND FIVE ABIOTIC FACTORS THAT WERE SHOWN ON DVD.

EXTENSION

- STUDENT WILL CREATE A SMALL POSTER THAT SHOWS AT LEAST FIVE BIOTIC AND FIVE ABIOTIC FACTORS IN A TERRESTRIAL OR AQUATIC ECOSYSTEM.

ABIOTIC AND BIOTIC FACTORS

<p style="text-align: center;">Abiotic</p> <p style="text-align: center;">Nonliving components of the environment (water, rocks, wind, temperature, light intensity and soil composition)</p>	<p style="text-align: center;">Biotic</p> <p style="text-align: center;">Living components of the environment (plants and animals)</p>
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Supplement to current unit on ecology

SUBJECT LIFE SCIENCE	TOPIC RELATIONSHIPS WITHIN AN ECOSYSTEM FOCUS QUESTION WHAT ARE THE RELATIONSHIPS BETWEEN COMMON ANIMALS AND PLANTS ON ISLE ROYALE?
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GOAL STATEMENT:

TO INCREASE UNDERSTANDING OF COMMUNITY INTERACTIONS BETWEEN COMMON ANIMALS AND PLANTS IN A GIVEN ECOSYSTEM. APPLY THIS KNOWLEDGE TO VARIOUS COMPONENTS WITHIN THE ECOSYSTEM, SUCH AS PREDATOR/PREY RELATIONSHIPS, TERRITORY, COMPETITION, AND SURVIVAL WITHIN A POPULATION OF A COMMUNITY.

OBJECTIVE(S):

- STUDENTS WILL CONSTRUCT INQUIRY CARDS.
- STUDENTS WILL COLLECT, ORGANIZE AND COMPLETE RESEARCH ABOUT COMMON ANIMALS AND PLANTS OF ISLE ROYALE USING A VARIETY OF RESOURCES.
- STUDENTS WILL BE ABLE TO DESCRIBE PARTS OF AN ECOSYSTEM.
- STUDENTS WILL BE ABLE TO DRAW CONCLUSIONS ABOUT PREDATOR/PREY RELATIONSHIPS.

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHTH (8)
- **DURATION OF LESSON:** 2-3 CLASS PERIODS (DEPENDS ON CLASS)
- **SITE REQUIREMENTS:** CLASSROOM OR MEDIA CENTER (DEPENDS ON AVAILABLE RESOURCES)
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST:**
 - LIFE SCIENCE TEXTBOOK OF STUDENT
 - ISLE ROYALE ECOSYSTEM RELATIONSHIP INQUIRY CARDS (PROVIDED AT END OF THIS LESSON)
 - RESOURCE MATERIAL FOR STUDENTS TO USE SUCH AS CRITTERS OF MICHIGAN POCKET GUIDE

- FIELD GUIDES, AND INTERNET
- INDEX CARDS 3 X 7 INCHES (25 FOR EACH GROUP)
- SCISSORS TAPE OR GLUE

CONTENT BACKGROUND:

EVERY ECOSYSTEM IS COMPRISED OF A COMMUNITY, POPULATION, AND INDIVIDUAL ORGANISMS. THE FOCUS OF THIS LESSON IS FOR STUDENTS TO MAKE THE CONNECTION BETWEEN ORGANISMS, POPULATIONS, AND COMMUNITIES WITHIN AN ECOSYSTEM. A COMMUNITY CONSISTS OF ALL THE VARIOUS ANIMALS AND PLANTS. POPULATIONS ARE MADE UP OF MEMBERS OF THE SAME SPECIES OF ORGANISM. AS AN EXAMPLE OF A COMMUNITY WITHIN AN ECOSYSTEM I HAVE SPECIFICALLY CHOSEN TO USE ISLE ROYALE AS MY CASE STUDY. BECAUSE FEWER ORGANISMS INHABIT THE ISLAND IT OFFERS A UNIQUE ENVIRONMENTAL COMMUNITY TO STUDY RELATIONSHIPS OF SPECIES IN THEIR HABITAT.

METHODS:

INDIVIDUAL, SMALL, AND LARGE GROUP ACTIVITIES.

PROCEDURE:

PREPARATION: MAKE ARRANGEMENTS FOR USE OF MEDIA CENTER AND RESOURCE MATERIALS NEEDED.

HAVE ALL NECESSARY MATERIALS PREPARED AHEAD OF TIME FOR STUDENTS.

1. STUDENTS SHOULD HAVE SOME PRIOR KNOWLEDGE OF THE TERMS COMMUNITY, POPULATION, TERRITORY, HABITAT, PREDATOR AND PREY BEFORE STARTING THIS LESSON.
2. EXPLAIN TO STUDENTS THAT THEY WILL BE EXPLORING COMMUNITIES OF COMMON ANIMAL AND PLANT ORGANISMS. THEY ARE TO FIND SPECIFIC INFORMATION ABOUT EACH ORGANISMS, SIZE, HABITAT, FOOD SOURCE (PREY), AND PREDATORS. PLACE STUDENTS INTO SMALL GROUPS, AND PASS OUT SHEET ENTITLED ISLE ROYALE ECOSYSTEM RELATIONSHIP INQUIRY CARDS
3. EXPLAIN TO STUDENTS THAT THEY ARE TO CUT OUT THE PLANTS AND ANIMALS ON THE SHEET. THEN GLUE OR TAPE IT TO THE BLANK SIDE OF THE INDEX CARD. HAVE AN EXAMPLE AVAILABLE FOR STUDENTS TO VIEW.
4. ON THE BACK SIDE OF THE INDEX CARD STUDENT WILL PLACE INFORMATION ABOUT SIZE, HABITAT, FOOD SOURCE (PREY), AND PREDATORS.

5. WHEN CARDS ARE COMPLETED, BRING CLASS TOGETHER FOR A LARGE GROUP DISCUSSION TO COMMUNICATE THEIR FINDINGS.
6. DISCUSS ISLE ROYALE AND ITS UNIQUE ANIMAL AND PLANT POPULATIONS.
















ASSESSMENT

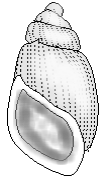









THE INFORMATION PROVIDED DURING RESEARCH WILL BE COLLECTED AND VIEWED.

EXTENSION

REPEAT THIS LESSON BY CREATING STUDENTS LOCAL ECOSYSTEM OF ANIMALS AND PLANTS, THEN COMPARING IT TO ISLE ROYALS COMMUNITY OF ANIMALS AND PLANTS.

ISLE ROYALE ECOSYSTEM RELATIONSHIPS INQUIRY CARDS

<p>Common Loon</p> 	<p>Various Aquatic Plants</p> 	<p>Eastern Timber Wolf</p> 	<p>Deer Mouse</p> 	<p>Red Fox</p> 
<p>Snowshoe Hare</p> 	<p>Balsam Fir</p> 	<p>Little Brown Bat</p> 	<p>Zooplankton</p> 	<p>Red Squirrel</p> 
<p>Green Frog</p> 	<p>Blacknose Shiner</p> 	<p>Western Painted Turtle</p> 	<p>Beaver</p> 	<p>Paramecium</p> 

<p>Snail</p> 	<p>River Otter</p> 	<p>Northern Blue Butterfly</p> 	<p>Wood Lily</p> 	<p>White spruce</p> 
<p>Moose</p> 	<p>Yellow Perch</p> 	<p>Quaking Aspen</p> 	<p>Algae</p> 	<p>Broad-Winged Hawk</p> 

FOR BACK OF INDEX CARDS

<p>Size of organism:</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism:</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism:</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of Organism:</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism:</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>
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<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>
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<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>	<p>Size of organism</p> <p>Habitat</p> <p>Prey (my food source)</p> <p>Predators (hunts me for food)</p>

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**Ecology of Isle Royale
LESSON PLANS
Section 2 Lesson 3**

Supplement to current unit on ecology

<p>SUBJECT LIFE SCIENCE</p>	<p>TOPIC ENERGY FLOW THROUGH AN ECOSYSTEM FOCUS QUESTION HOW ARE THE FEEDING RELATIONSHIPS OF AN ORGANISM RELATED TO THE FLOW OF ENERGY WITHIN AN ECOSYSTEM?</p>
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<p>GOAL STATEMENT: TO UNDERSTAND THE CONCEPT OF TROPHIC LEVELS, AND, APPLY THAT FEEDING RELATIONSHIP TO ENERGY THAT FLOWS THROUGH AN</p>

ECOSYSTEM.

OBJECTIVE(S):

- STUDENTS WILL WRITE VOCABULARY TERMS INTO THEIR JOURNAL.
- STUDENTS WILL BE ABLE TO DETERMINE AND THEN CATEGORIZE PLANTS AND ANIMALS INTO DIFFERENT TROPHIC (FEEDING) LEVELS.
- STUDENTS WILL DESIGN FOOD CHAINS TO SHOW ENERGY FLOW.
- STUDENTS WILL BE ABLE TO DESCRIBE AN ENERGY PYRAMID.

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHT (8)
- **DURATION OF LESSON:** 1 CLASS PERIOD (DEPENDS ON CLASS)
- **SITE REQUIREMENTS:** CLASSROOM
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST:**
 - LIFE SCIENCE TEXTBOOK OF STUDENT
 - SCIENCE JOURNAL
 - ISLE ROYAL ECOSYSTEM RELATIONSHIP INQUIRY CARDS CREATED IN PREVIOUS LESSON
 - CHALKBOARD

CONTENT BACKGROUND:

A FOOD CHAIN IS A MODEL TO ILLUSTRATE HOW ENERGY FLOWS THROUGH AN ECOSYSTEM. THERE ARE TROPHIC LEVELS OR FEEDING LEVELS IN A FOOD CHAIN. THE FIRST LEVEL IS CALLED A PRODUCER; THESE ORGANISMS MAKE OR PRODUCE THEIR OWN FOOD. PLANTS ARE PRODUCERS AND THEY OBTAIN ENERGY FROM SUNLIGHT. CONSUMERS OBTAIN ENERGY FROM EATING OTHER ORGANISMS. THERE ARE THREE DISTINCTIVE FOOD LEVELS FOR CONSUMERS. PRIMARY CONSUMERS, KNOWN AS HERBIVORES, ARE THE SECOND TROPIC LEVEL AND EAT PRODUCERS TO OBTAIN ENERGY. SECONDARY CONSUMERS, KNOWN AS CARNIVORES, BELONG TO THE THIRD LEVEL. THEY ARE MEAT EATERS

AND OBTAIN ENERGY FROM PRIMARY CONSUMERS. THE LAST LEVELS IS CALLED TERTIARY CONSUMERS, OR TOP CARNIVORES, AND OBTAIN THEIR ENERGY FROM OTHER CONSUMERS. DECOMPOSERS OBTAIN ENERGY FROM EATING DEAD DECOMPOSING ORGANISMS. AN ENERGY PYRAMID IS USED TO ILLUSTRATE HOW ENERGY DECREASES AS IT IS TRANSFERRED FROM ONE TROPHIC LEVEL TO THE NEXT.

METHODS:

INDIVIDUAL, SMALL, AND LARGE GROUP ACTIVITIES

PROCEDURE:

1. HAVE STUDENTS WRITE TERMS AND DEFINITIONS INTO THEIR JOURNALS (**PRODUCER, PRIMARY CONSUMER, SECONDARY CONSUMER, TERTIARY CONSUMER, AND DECOMPOSER**).
2. EXPLAIN TO STUDENTS THAT THEY WILL COPY TABLE FROM CHALKBOARD INTO JOURNALS. PLACE AN EXAMPLE OF YOUR CHART OF TROPHIC (FEEDING) LEVELS ON CHALKBOARD FOR STUDENTS TO COPY.
3. PLACE STUDENTS BACK INTO THEIR SMALL GROUPS AND PASS OUT THEIR CARDS. THEY WILL THEN DECIDE WHICH COLUMN TO PLACE ANIMALS AND PLANTS. (ALLOW 15 – 20 MINUTES TO COMPLETE)
4. BRING CLASS TOGETHER TO DISCUSS THEIR FINDINGS OF TROPHIC (FEEDING) LEVELS AND HAVE STUDENTS VOLUNTEER TO FILL IN YOUR CHART ON CHALKBOARD.
5. EXPLAIN THAT STUDENTS WILL NOW DESIGN A FOOD CHAIN TO SHOW ENERGY FLOW. BE SURE THEY INCLUDE THE SUN (HEAT ENERGY) IN THEIR FOOD CHAIN.
6. CLOSE WITH A DISCUSSION ON ENERGY PYRAMIDS. BE SURE TO COLLECT CARDS FOR LESSON 4

ASSESSMENT

EACH SMALL GROUP WILL DESIGN A FOOD CHAIN AND SHARE WITH CLASSMATES.

EXTENSION

HAVE STUDENTS DRAW AN ENERGY PYRAMID OF THEIR CHOICE AND LABEL THE CORRECT ORGANISM AND ITS LEVEL IN THE PYRAMID.

**Ecology of Isle Royale
LESSON PLANS
Section 2 Lesson 4**

Supplement to current unit on ecology

SUBJECT LIFE SCIENCE	TOPIC FOOD WEB CONNECTIONS FOCUS QUESTION WHAT ARE THE POSSIBLE FEEDING RELATIONSHIPS WITHIN A GIVEN ECOSYSTEM, AND IF A SPECIES IS REMOVED WILL IT CHANGE THE FLOW OF ENERGY THROUGH THE WEB?
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GOAL STATEMENT:

TO DEVELOP AN UNDERSTANDING OF THE CONNECTION BETWEEN THE FEEDING RELATIONSHIPS OF ORGANISMS IN AN ECOSYSTEM. THEN TO REALIZE THAT ALL ORGANISMS ARE AN IMPORTANT COMPONENT OF A FOOD WEB, AND THAT REMOVAL OF A SPECIES, LOSS OF HABITAT, DISEASE, OR COMPLETION DISTURBS THE NATURAL BALANCE WITHIN AN ECOSYSTEM.

OBJECTIVE(S):

- STUDENTS WILL CONSTRUCT FEEDING RELATIONSHIPS IN A FOOD WEB WITHIN A GIVEN ECOSYSTEM.
- STUDENTS WILL BE ABLE TO EXPLAIN THE DIFFERENCE BETWEEN FOOD CHAIN AND FOOD WEB.
- STUDENTS WILL DETERMINE IF REMOVING A SPECIES FROM THE WEB HAS AN EFFECT ON THE FLOW OF ENERGY THROUGH THE WEB.
- STUDENTS WILL BE ABLE TO DETERMINE WHICH SPECIES REMOVED FROM WEB HAS THE GREATEST IMPACT ON FOOD WEB.
- STUDENTS WILL BE ABLE TO PREDICT HOW CHANGES WITHIN THE ENVIRONMENT MAY INCREASE/DECREASE A POPULATION SIZE

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHT (8)
- **DURATION OF LESSON:** 1-2 CLASS PERIODS (DEPENDS ON CLASS)
- **SITE REQUIREMENTS:** CLASSROOM/GYMNASIUM/SCHOOL YARD
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST:**
- LIFE SCIENCE TEXTBOOK OF STUDENT

- ECOLOGICAL STUDIES OF WOLVES ON ISLE ROYALE 2005-2006
- COPY AND ENLARGE THE ISLE ROYALE ECOSYSTEM RELATIONSHIP INQUIRY CARDS
- CONSTRUCTION PAPER OR POSTER BOARD
- BALL OF YARN

CONTENT BACKGROUND:

FOOD WEBS ILLUSTRATE A MORE COMPLEX FEEDING RELATIONSHIP AMONG ORGANISMS. IN A FOOD WEB MANY ORGANISMS FEED FROM MORE THAN ONE TROPHIC LEVEL. AS SPECIES ARE ELIMINATED FROM A FOOD WEB THERE IS AN AFFECT ON THE FLOW OF ENERGY. THE PREY OF THE ORGANISM ELIMINATED WOULD HAVE AN INCREASE IN POPULATION. THERE ARE OTHER FACTORS SUCH AS LOSS OF HABITAT, COMPETITION, AND DISEASE THAT REGULATE POPULATION'S SIZE WITHIN AN ECOSYSTEM. ALL THESE FACTORS WITHIN AN ENVIRONMENT DISTURB THE NATURAL BALANCE WITHIN AN ECOSYSTEM.

METHODS:

INDIVIDUAL, SMALL, AND LARGE GROUP ACTIVITIES

PROCEDURE

1. EXPLAIN TO STUDENTS THAT THEY WILL BE CREATING WEB CARDS TO USE IN AN ACTIVITY. EACH STUDENT WILL BE RESPONSIBLE FOR CREATING ONE CARD. USE A SET OF INQUIRY CARDS MADE IN LESSON TWO, AND ATTACH THE MATCHING CARD TO ENLARGED ORGANISM WITH A PAPER CLIP. TELL STUDENTS THEY ARE TO GLUE THE ORGANISM TO POSTER BOARD. THEN FLIP IT OVER AND WRITE DOWN THE PREDATOR AND PREY INFORMATION FROM THE INQUIRY CARD.
2. PUNCH HOLE AND ATTACH STRING TO CARD SO STUDENTS CAN WEAR AROUND THEIR NECK.
3. DEPENDING ON THE SIZE OF CLASSROOM, AN ALTERNATIVE LOCATION MAY BE NECESSARY FOR THIS ACTIVITY. PLACE STUDENTS INTO A LARGE CIRCLE AND EXPLAIN THAT THEY WILL BECOME THE ORGANISM THEY ARE NOW WEARING. ALL ORGANISMS WILL BE INTERACTING WITH OTHER ORGANISMS TO CREATE A FOOD WED.
4. BEGIN BY HAVING THE FIRST ORGANISM ROLL THE BALL OF YARN TO ANOTHER STUDENT AND THEN EXPLAIN TO CLASS HIS FEEDING RELATIONSHIP WITH THAT ORGANISM. STUDENTS WILL CONTINUE TO HOLD ONTO THE YARN AS THEY ROLL THE BALL TO THE NEXT STUDENT AS THEY CONTINUE THIS ACTIVITY. A WEB WILL FORM AS ORGANISMS CONTINUE THEIR FEEDING RELATIONSHIPS.
5. THE TEACHER WILL REMOVE AN ORGANISM FROM THE WEB AND THE CLASS WILL HAVE A DISCUSSION TO DETERMINE WHAT EFFECT IT HAS ON

- THE OTHER ORGANISMS WITHIN THE WEB.
6. DISCUSS WITH STUDENTS ABOUT WHICH SPECIES REMOVED FROM THE WEB WILL HAVE THE GREATEST IMPACT ON THE FOOD WEB.
 7. CLOSE WITH A DISCUSSION ON OTHER FACTORS THAT MAY REGULATE POPULATION SIZE WITHIN AN ECOSYSTEM.

ASSESSMENT
 STUDENTS WILL CREATE A FOOD WEB USING TEN ISLE ROYALE ORGANISMS. ALL ORGANISMS MUST BE LABELED AS A PRODUCER, CONSUMER, OR DECOMPOSER.

EXTENSION
 CREATE A FOOD WEB USING ALL THE ISLE ROYALE ORGANISMS THAT HAVE BEEN INTRODUCED. ALL ORGANISMS MUST BE LABELED AS A PRODUCER, CONSUMER, OR DECOMPOSER.

**Ecology of Isle Royale
 LESSON PLANS
 Section 3 Lesson 1
 End of the Year Project**

<p>SUBJECT LIFE SCIENCE, EARTH SCIENCE ,GEOGRAPHY, HISTORY, LANGUAGE ARTS</p>	<p>TOPIC ISLE ROYALE PAST AND PRESENT FOCUS QUESTION WHAT PART OF THE ISLE ROYALE NATIONAL PARK EXPERIENCE CAPTIVATED YOUR INTEREST?</p>
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GOAL STATEMENT:
 TO DEVELOP AN UNDERSTANDING OF ISLE ROYALE’S PAST THROUGH A HISTORICAL PERSPECTIVE OF HUMAN ACTIVITY ON THE ISLAND, AND TO APPRECIATE ISLE ROYALE NATIONAL PARKS PRESENT HISTORY AS AN INTERNATIONAL BIOSPHERE RESERVE.

- OBJECTIVE(S):**
- STUDENTS WILL COLLECT, ORGANIZE AND COMPLETE RESEARCH ABOUT ISLE ROYALE NATIONAL PARK.
 - STUDENTS WILL PREPARE A POWER POINT PRESENTATION AND PRESENT THEIR FINDINGS TO FELLOW CLASSMATES.
 - STUDENTS WILL BE ABLE TO SHARE THEIR EXCITEMENT ABOUT ISLE ROYALE NATIONAL PARK.

APPLICATION DETAILS

- **GRADE LEVEL:** EIGHT (8)
- **DURATION OF LESSON:** 5-8 CLASS PERIODS (DEPENDS ON CLASS)
- **SITE REQUIREMENTS:** MEDIA CENTER, COMPUTER LAB, AND CLASSROOM
- **RISK MANAGEMENT:** NONE
- **MATERIALS LIST**
- RESOURCE MATERIAL AND INTERNET SITES ABOUT ISLE ROYALE (SEE BIBLIOGRAPHY AT END)
- RUBRIC PROVIDED AT END OF LESSON
- FOLDER FOR EACH STUDENT
- HALF SHEET OF WHITE PAPER FOR STORY BOARD (12 FOR EACH STUDENT)

CONTENT BACKGROUND:

NUMEROUS THEMES CONCERNING ISLE ROYALE NATIONAL PARK HAVE BEEN INTRODUCED TO STUDENTS THIS YEAR. THE PRIMARY FOCUS OF THIS PROJECT IS TO HAVE THE STUDENTS PRESENT THEIR FAVORITE PART OF THE ISLE ROYALE EXPERIENCE. ISLE ROYALE HAS SOMETHING OF INTEREST FOR EVERYONE TO EXPERIENCE. IT COULD BE HISTORICAL, GEOLOGICAL, CULTURAL, WILDLIFE, NATURE, OR ANY ASPECTS THAT SPARK INTEREST. MY RESOURCES ARE LIMITED SO I CAN ONLY BRING THE ISLE ROYAL EXPERIENCE TO THE CLASSROOM TO SHARE WITH MY STUDENTS.

METHODS:

INDIVIDUAL AND GROUP ACTIVITY

PROCEDURE:

1. RESERVE MEDIA CENTER OR COMPUTER LAB MANY MONTHS IN ADVANCE. START A LIST OF TOPICS AND POST IT SHORTLY AFTER SCHOOL RESUMES. AS THE SCHOOL YEAR PROGRESSES AND TOPICS ABOUT ISLE ROYALE ARE DISCUSSED ADD TO THE LIST. THERE SHOULD BE ENOUGH TOPICS FOR STUDENTS TO COMPLETE PRESENTATIONS.
2. PREPARE FOLDERS FOR STUDENTS IN ADVANCE WITH NAME, CLASS PERIOD AND GROUP NUMBER ON OUTSIDE OF FOLDER. PLACE STORY BOARD CARDS AND RUBRIC INSIDE FOLDER.
3. EXPLAIN TO STUDENTS THAT THEY WILL BE SIGNING UP FOR PRESENTATION TOPICS AND GOING OVER RUBRIC.
4. STUDENTS SHOULD SPEND ONE TO TWO CLASS PERIODS USING REFERENCE MATERIALS THAT HAVE BEEN COLLECTED FOR RESEARCH. WHEN STORY BOARDS ARE COMPLETED STUDENTS ARE READY TO BEGIN USING POWER POINT.
5. ALLOW STUDENTS AT LEAST THREE TO FOUR DAYS TO PREPARE THEIR POWER POINT USING COMPUTER LAB OR MEDIA CENTER.
6. DEPENDING ON AVAILABILITY OF A LCD PROJECTOR PRESENTATION CAN TAKE PLACE IN CLASSROOM OR COMPUTER LAB.

ASSESSMENT:

STUDENT WILL BE EVALUATED ON THE COMPLETION OF THE PROJECT.

EXTENSION:

CREATE A COLLAGE SHOWING THEIR ISLE ROYALE NATIONAL PARKS INTERESTS.

NAME _____ **HOUR** _____ **DATE** _____

**Project
Science Power Point Presentations**

DUE DATES

1. You must have storyboard cards 1-6 prepared by (Date)
2. You must have storyboard cards 7-12 prepared by (Date)
3. You will begin Power Point Project in computer lab (Date)
4. You must have slides completed by (Date)
5. Oral presentations will be completed (Date)

We have created an extensive list of topics about Isle Royale National Park. Your class presentation will cover an area of Isle Royale that captivated your interest. Guidelines are as follows:

- Power point presentations must be completed in class. A grade will be given for quality time spent on presentation during daily class time.
- Storyboard must be completed and agreed upon by teacher before student is allowed to begin work on power point presentation in lab. There must be one card for each slide to be presented. They are to be numbered 1-12 and can be placed on half sheet of white copy or typing paper. Points will be deducted from presentation if storyboard is late.
- A title will be required and will be the first slide of your presentation.
- You will be required to complete a total of at least 12 slides, which also includes title and works sited slides.
- Content of each slide must include factual data that has been researched from web site and library resources.
- Presentation must have three URL's from list provided or Internet sites that you have located. Furthermore, you must have at least one source that you will include from library or other source. These will appear on your last slide called works sited.
- Grammar and spelling will count, be sure to use spell-check.
- Each slide must contain a background, images, and speaker notes.
- Points will be taken off your presentation if you are not courteous during other presentations. This means listen quietly and intently to others while they give their presentations.

Rubric Project Evaluation

You will be evaluated on the following guidelines for a total of two hundred and forty one (241) points.

12	Storyboard to include title and 5 other slides. 1-6 <hr/> date and signature of teacher 2 4 6 8 10 12 (possible points for each card)	
12	Storyboard to include 5 slides and credits sited. 7-12 <hr/> date and signature of teacher 2 4 6 8 10 12 (possible points for each card)	

35	Quality time spent daily working on power point presentation in class. (possible points for each day) 5 10 15 20 25 30 35	
60	Providing twelve slides in presentation that are completed. 5 10 15 20 25 30 35 40 45 50 55 60 (possible points for each slide completed)	
20	URL's and library source used in presentation. Must include three Internet web sites inserted and one library source also inserted. 5 10 15 20 (possible points for each insert)	
24	Grammar and spelling (possible points for each slide) 2 4 6 8 10 12 14 16 18 20 22 24	
36	Factual data provided and researched, also speaker notes provided for each slide. (possible points for each slide) 3 6 9 12 15 18 21 24 27 30 33 36	
24	Provided background, images, graphics and sound on every slide. (possible points for each slide) 2 4 6 8 10 12 14 16 18 20 22 24	
18	Courteous during classmates presentations. (possible points for each day of presentations) 6 12 18	

Total _____

Michigan Benchmarks

Section 1 Lesson 1
SOC.II.2.MS.2

Social Studies/Geographic Perspective

Locate, describe, and compare the ecosystems, resources, and human environment interactions of major world regions.

SCI.II.1.HS.6

Science/ Reflecting

Develop an awareness of and sensitivity to the natural world.

MAT.II.3.MS.6
Section 1 Lesson 2
ELA. I. 1.MS1

Math

Apply measurements to describe the real world and to solve problems.

English language Arts

Use reading for multiple purposes, such as enjoyment, clarifying information, and learning complex procedures.

SOC.II.2.MS.1

Social Studies/Geographic Perspective

Locate, describe, and compare the ecosystems, resources, and human environment interactions of major world regions.

	Atmosphere and Weather
SCI. V.3.HS.1	Explain how interactions of the atmosphere, hydrosphere, and geosphere, create climates and how climates change over time.
	Constructing
SCI.I.1.HS.1	Ask question that can be investigated empirically
SCI.I.1.HS.2	Design and conduct scientific investigations.
SCI.I.1.HS.3	Recognize and explain the limitations of measuring devices.
SCI.I.1.HS.4	Gather and synthesize information from books and other sources of information.
	Reflecting
SCI.II.1.HS.6	Develop an awareness of and sensitivity to the natural world.
Section 2 Lesson 1	Ecosystem
SCI.III.5.HS.1	Describe common ecological relationships between and among species and their environments.
	Constructing
SCI.I.1.HS.1	Ask question that can be investigated empirically
SCI.I.1.HS.4	Gather and synthesize information from books and other sources of information.
	Reflecting
SCI.II.1.HS.6	Develop an awareness of and sensitivity to the natural world.
Section 2 Lesson 2	Ecosystem
SCI.III.5.HS.1	Describe common ecological relationships between and among species and their environments.
	Constructing
SCI.I.1.HS.4	Gather and synthesize information from books and other sources of information.
	Reflecting
Section 2 Lesson 3	Ecosystem
SCI.III.5.HS.2	Explain how energy flows through familiar ecosystems.
	Constructing
SCI.I.1.HS.1	Ask question that can be investigated empirically
SCI.I.1.HS.4	Gather and synthesize information from books and other sources of information.
	Reflecting
SCI.II.1.HS.6	Develop an awareness of and sensitivity to the natural world.
Section 2 Lesson 4	Ecosystem
SCI.III.5.HS.2	Explain how energy flows through familiar ecosystems.
SCI.III.5.HS.3	Describe general factors regulation population size in ecosystems.
	Reflecting
SCI.I.1.HS.1	Ask question that can be investigated empirically
	Reflecting
SCI.II.1.HS.6	Develop an awareness of and sensitivity to the natural world.
Section 3 Lesson 1	Best Practices in Technology Intrgration
Technology Grade 8	Multimedia/PowerPoint Research (Topic of choice)

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