

Lesson Title: *Claws, Coats and Camouflage: How Animals Adapt to their World*

Topic: Animal Adaptations

Grade Level: 5th



Alignment Tables

LIFE SCIENCE - CONTENT

Lesson Objective 1	Students will read various statements about animal adaptations and answer if they agree or disagree with the statement.
Michigan GLCE	L.EV.05.25: Describe the attributes of organisms that help them survive. L.EV.05.27: Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.
NSE standard	<u>Life Science</u> - Diversity and Adaptations of Organisms <u>Unifying Concepts and Processes</u> - Evolution and Equilibrium
MR. H2O	Evolution
5E step	ENGAGE/EVALUATE SECTIONS - PRE/POST ASSESSMENT
Thinking Level	Cognitive (Yellow level)

LIFE SCIENCE - CONTENT

Lesson Objective 2	Students will complete a bubble map graphic organizer on adaptations, breaking down the concept of adaptation into the categories of: Fitting In, Staying Safe, Getting Food, and Making A New Generation with examples of each.
Michigan GLCE	L.EV.05.25: Describe the attributes of organisms that help them survive. L.EV.05.27: Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.
NSE standard	<u>Life Science</u> - Diversity and Adaptations of Organisms <u>Unifying Concepts and Processes</u> - Evolution and Equilibrium
MR. H2O	Evolution
5E step	EXPLAIN SECTION
Thinking Level	Structure, Organize, Relate (Orange level)

LIFE SCIENCE - CONTENT

Lesson Objective 3	Students will identify what an endangered animal is, why an animal becomes endangered, and describe a selection of endangered animals in Michigan.
Michigan GLCE	L.EV.05.25: Describe the attributes of organisms that help them survive. L.EV.05.27: Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.
NSE standard	<u>Life Science</u> - Diversity and Adaptations of Organisms <u>Unifying Concepts and Processes</u> - Evolution and Equilibrium
MR. H2O	Evolution
5E step	ELABORATE SECTION
Thinking Level	Cognitive (Yellow level)

SCIENCE PROCESSES - INQUIRY

Lesson Objective 4	Students will work in teams to create a new species of animal in a "Design-A-Species" challenge choosing adaptations to suit their animal's environment.
Michigan GLCE	S.IR.05.11: Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Take the lead in doing activities and performing hands-on exploration of the materials.
Process Skill	Classifying and Sorting
5E step	EXPLORE SECTION
Thinking Level	Convergent Generalizing (Red level)

SCIENCE PROCESSES - INQUIRY

Lesson Objective 5	Students will collect data about their new species of animal on a "Design-A-Species" worksheet, including a description of the environment, their animal, and the five adaptations they chose.
Michigan GLCE	S.IR.05.02: Design and conduct scientific investigations. S.IR.05.11: Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Record results and discuss outcomes from activities.
Process Skill	Collecting data
5E step	EXPLORE SECTION
Thinking Level	Cognitive (Yellow level)

SCIENCE PROCESSES - INQUIRY

Lesson Objective 6	Students will justify in writing the reasons they chose each of their adaptations for their animal.
Michigan GLCE	S.IR.05.08: Evaluate the strengths and weaknesses of claims, arguments, and data. S.IR.05.11: Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Record results and discuss outcomes from activities.
Process Skill	Communicate
5E step	EXPLORE SECTION
Thinking Level	Divergent Thinking (Green level)

SCIENCE PROCESSES - INQUIRY

Lesson Objective 7	Students will communicate orally their "Design-A-Species" animal to their peers justifying the adaptations they chose based on their animals environment.
Michigan GLCE	S.IR.05.11: Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Record results and discuss outcomes from activities.
Process Skill	Communicate
5E step	ELABORATE SECTION
Thinking Level	Divergent Thinking (Green level)

SCIENCE PROCESSES - INQUIRY

Lesson Objective 8	Students will investigate the question: <i>What happens if an animal cannot adapt to its changing environment?</i>
Michigan GLCE	S.IR.05.01: Generate scientific questions based on observations, investigations and research.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Ask questions and form hypothesis.
Process Skill	Investigating
5E step	ELABORATE SECTION
Thinking Level	Divergent Thinking (Green level)

SCIENCE PROCESSES - REFLECTION AND SOCIAL IMPLICATIONS

Lesson Objective 9	Students will review their peers' "Design-A-Species" animal and evaluate whether or not they think the animal will survive its environment with the adaptations given it.
Michigan GLCE	S.IR.05.08: Evaluate the strengths and weaknesses of claims, arguments, and data. S.IR.05.11: Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Record results and discuss outcomes from activities.
5E step	ELABORATE SECTION
Thinking Level	Value, Evaluate, Judge (Blue level)

SCIENCE PROCESSES - REFLECTION AND SOCIAL IMPLICATIONS

Lesson Objective 10	Students, in teams, will brainstorm ideas on what humans can do to help prevent endangered animals from going extinct.
Michigan GLCE	S.IR.05.13: Describe the effect humans and other organisms have on the balance in the natural world.
NSE standard	<u>Science as Inquiry</u> - Abilities necessary to do scientific inquiry: Ask questions and form hypothesis.
5E step	ELABORATE SECTION
Thinking Level	Divergent Thinking (Green level)

Materials for Students (Refer to Appendices for Forms)

Per group of two or three for EXPLORE/ELABORATION ACTIVITY

1 "Design-A-Species" Application

Per entire group for EXPLORE ACTIVITY

1 Box of Adaptation Props as follows:

- Faux fur (for cold climates)
- Ziploc bag of Crisco (blubber)
- Small ears (lose less heat)
- Large ears (lose heat)
- Sunglasses with LARGE eyes (nocturnal)
- Vampire teeth (carnivore)
- Tan felt
- Spotted felt (tan with spots drawn on)
- Claws (felt with paper clips or clothes pins)
- Sponges (water conservation)
- Scuba flippers or fins(for aquatic movement)
- Nose plugs (for desert animals or animals that dive underwater)
- String (tentacles)
- Helmut (shell)
- Wooden dowels (long legs)
- Toothpicks (quills or spikes)
- Bottle marked poison, venom or ink
- Any other available resources. Sample resources pictured below:



A collection of magazines and books on animal adaptations as follows (or similar):

- NG Kids (May 2003, August 2008, December 2002, April 2008, April 2007)
- NG World (May 2002)
- NG Explorer! (October 2007)
- Zoo Books Wild Dogs
- *How Do Animals Adapt?* by Bobbie Kalman

Per student

- 1 Pencil
- 1 Pre-Assessment/Post-Assessment ANTICIPATION GUIDE
- 1 Blank BUBBLE MAP for EXPLAIN with mini circles with the words "Fitting In," "Staying Safe," "Getting Food," and "Making a New Generation" to glue on the graphic organizer
- Endangered Animals - How Can I Help? slips

Materials for Teacher (Refer to Appendix and Reference sections)

Computer (with Internet connection, if video clips are not pre-downloaded)
 Video clips of Octopi (one of camouflage and one of squeezing through small hole)
 Beanie baby - Octopus
Claws, Coats and Camouflage by Susan Goodman
 Michigan Endangered Animals Cards
 "Hat" or bag for students to draw from and collect responses in
 Song (Mp3 format) - "Adaptation" by Animal Trax

LESSON OVERVIEW

This lesson is planned for a one-hour class period. If time is shortened, the music clip at the end will be eliminated and the EXPLORE and EXPLAIN sections of the lesson plan will be cut to 12 minutes.

Lesson Plan Component	Materials*	Time
Pre-Assess	Anticipation guide	5 min
Engage	Beanie baby, computer, video clips	5 min
Explore	Box of props/"Design-A-Species" application, collection of magazines and books	15 min
Explain	Book, BUBBLE map	15 min
Elaborate	Michigan Endangered Cards, How Can I Help? slips	10 min
Evaluate	Anticipation guide, adaptation song	10 min

* Represents a summarized list-see detailed list above for more description.

PRE-ASSESSMENT (5 minutes)

Teacher introduces the lesson on animal adaptation and asks students to complete an ANTICIPATION GUIDE using their prior knowledge about animal adaptation. Refer to the APPENDICES for pre-assessment handout and grading guidelines.

ENGAGE (5 minutes)

*Fifth graders, inside my box I have an animal that we are going to begin our lesson discussing. {Pull out octopus beanie baby}. It's not a real animal, of course! Can anyone tell me what this animal is? {Students answer octopus. If not, teacher tells them it is an octopus and that octopi (or octopuses) are found in every ocean of the world, in almost every depth. Octopi live in small holes and crevices in rocks and coral.} Students, I'm going to pass the octopus to the person to my left and I want you think about this question: **What means does the Octopus have to survive in its environment?** As you receive the octopus, please tell me your name and one thing you think helps an octopus survive in its habitat and pass it to the next person. At this time the students begin passing the beanie baby and starting the discussion. The teacher can start to get the discussion rolling. Students may answer such things as it can change colors to hide, or it can squeeze in the coral for protection or that it has ink that squirts to avoid predators, or they have tentacles with strong suction to get a better grip on their predators. Students may not have any of these ideas and the teacher will prompt to think about the physical characteristics of the octopus and how it might help them survive. This also serves as a means of formative assessment of student's background knowledge on animal adaptations as it relates to the octopus.*

*Now we are going to watch two video clips on Octopi. Pay attention to what the octopus does in each clip. Teacher shows students two video clips on Octopi. One exhibits the AMAZING camouflage physical qualities of an octopus and the other one shows the octopus' ability to squeeze into very small places because of its body structure and lack of bones. The teacher will then ask the students the question: **What physical qualities of the octopi did you see that you think help the octopi survive in its environment?** {i.e., the ability to change skin color for camouflage and no bones enabling the octopus to squeeze through tiny cracks and crevices} Teacher asks a student or two to share their thoughts. The video clips are pretty amazing and the students should be intrigued further about animals and their ability to adapt to their environment.*

EXPLORE (15 minutes) - "Design-A-Species"

Science Process Skills: Classifying/Sorting, Collecting Data, Communicating

Now that students are engaged with the idea of animal adaptation, they will next participate in an exploration activity called "Design-A-Species." Students will work in teams to create a new species of animal. They will get to choose props from a box that represent various animal adaptations. They then will explain where their animal

lives and why they chose those adaptations. This activity is intended to get the students inquiring why animals have certain physical characteristics (like big ears, or 2 sets of eyelashes, or webbed feet, etc) or why animals behave in certain ways (migration, hibernation, traveling to different locations to have babies, etc). As students are making their selections, they will have the opportunity to refer to various books and magazines on animal adaptations.

*Now that you have learned a little about how the octopus has certain physical characteristics that help it survive in its environment, you are invited to participate as junior scientists, in teams, in the "Design-A-Species" challenge. You will be given a selection of physical characteristics and behaviors to choose from for your new species. You will need to think about this question: **What physical and/or behavioral characteristics will my new animal need in order to survive in the environment I had selected?** You and your partner will make your selections and write your choices on the "Design-A-Species" application. You will then explain why you choose those physical characteristics and what environment your new species of animal will live in (e.g. desert, Artic, rainforest, etc). You may also create a name for your new species. (Teacher will explain that this is not possible at the present time, but just imagine it for purposes of this activity!) The teacher will also make accessible books and magazines for the students to refer to if they choose. See References.*

The teacher (senior scientist) will then bring out a big box of various items (see materials list) that represent physical traits that an animal can have (e.g. claws or thick fur) or certain behaviors (e.g. migration, or hibernation). The senior scientist will then explain and clarify what each of the props included in the box represent (e.g., sunglasses with big eyes for night vision, pillow for body fat, etc.) without giving away what habitat they might be good for or the purpose of the adaptation.

When the junior scientists are done, the teacher will explain that we are going to learn more about animal adaptations at this point and then we will come back together as a committee and review our selections and vote as group if we think the new animal should be approved based upon its ability to survive in its chosen environment.

EXPLAIN (15 minutes)

During the EXPLAIN section of the lesson the teacher reads aloud the book, *Claws, Coats and Camouflage: The Ways Animals Fit Into Their World* by Susan E. Goodman. {In the interest of time, the teacher will only select to read aloud one example per category and briefly mention the others on the back of each type of adaptation. For example, "Fitting In: Water" there are 2-4 examples of animals and how this adaptation applies to them}. As the teacher reads aloud, the students listen and interact with their peers and the teacher discussing the new terminology and the

types of adaptations and creating BUBBLE maps on the new information as discussed in more detail below.

Before beginning the read-aloud the teacher hands out a BUBBLE THINKING MAP to each student (see Appendices for a blank map and an example completed map) and pencils. The teacher then recaps what we have done so far. *Fifth graders, so far we have watched a video and we observed two ways an octopus survives in its environment. {i.e., the ability to change color to camouflage itself and the ability to squeeze through tiny spaces as a means of protection}. Then you participated in a "Design-A-Species" challenge to create a new species of animal providing your new animals with certain items to help it survive in its environment. Does anyone know what science word we call "an animal's ability to change either its body characteristics or its behavior to better suit its environment?" {Students may or may not answer with the term "adaptation"}. The term we use to describe this ability to change to meet the needs of the environment is called "adaptation." Now we are going to read a book called Claws, Coats, and Camouflage that will explain to us in more detail why and how animals adapt. Animals can adapt by changing their physical characteristics (like the octopus and its camouflage) or its behavior. As we read we will learn about 4 reasons animals adapt: "fitting in," "staying safe," "getting food," and "making a new generation." As we read, we will be filling in examples for each reason for adaptation, as well as an example animal that uses that type of adaptation. You can list an example animal of each category either based upon an example in the book or one that you learned about in your "Design-A-Species" activity or one that you knew about before we started today. {After reading aloud each category, the teacher pauses to allow the students time to write the types of each adaptation and to add example animals.}*

See Appendices for blank handout and a sample completed handout.

KEY TERMS FOR EXPLAIN and BUBBLE MAP

Adaptation = occurs in the body of an animal or in the way it behaves in response to a changing environment. Some adaptations occur quickly and others take millions of years.

Types of Adaptation = Physical and Behavior; a physical adaptation is a change in the body of an animal and a behavior adaptation is a change in the way an animal behaves.

Examples of Physical Adaptation = split hooves with rubbery bottoms for a secure grip on uneven, rocky ground (e.g. mountain goat); eyes on top of the head for being on the lookout for prey (e.g. frog); blubber (e.g. walrus); camouflage, etc.

Examples of Behavioral Adaptation = hibernation because of lack of food in the winter (e.g. bears); sleeping in burrows during the day to avoid the heat (many desert

animals); drinking water droplets from dew; using echolocation in low-light conditions (e.g. bats and dolphins), pretending to be dead (e.g. opossum).

Reasons for Adaptation = "fitting in," "staying safe," "getting food," and "making a new generation" as explained further in the following examples:

Fitting In - Water (e.g. fish have "gills" to take oxygen from the water)

Fitting In - Forest (e.g. orangutan's long arms for climbing, hanging and swinging in trees)

Fitting In - Cold (e.g. a llama's coat is very long and thick)

Fitting In - Heat (e.g. tortoises get most of their water from the plants they eat)

Fitting In - Night (e.g. large eyes on the night monkey to take in more light at night)

Staying Safe - Camouflage (e.g. the octopus we saw in the opening video clip!)

Staying Safe - Bluffs and Disguises (e.g. some butterflies have fake eye-spots on their wings to make them look scary)

Staying Safe - Warning Colors (e.g. poison dart frogs with colors that say "stay away from me...I'm trouble!")

Staying Safe - Hard to Eat (e.g. the porcupine; predators have starved to death because their mouth was full of porcupine quills)

Staying Safe - Safety in Numbers (e.g. many fish band together in schools)

Getting Food - Great Hunting Tools (e.g. talons on a red-tailed hawk)

Getting Food - Plant Eating Tools (e.g. the proboscis on a butterfly for gathering nectar)

Getting Food - Camouflage (e.g. the scorpionfish that looks like a rock that waits on the ocean floor for its prey)

Getting Food - Letting Food Come to You (e.g. the spider's web)

Getting Food - Letting Someone Else Do the Work! (e.g. sea gulls, vultures, coyotes and raccoons)

Making a New Generation - Attracting a Mate (e.g. male peacocks)

Making a New Generation - Keeping Them Safe (e.g. kittens, humans, penguins, etc.)

Making a New Generation - Feeding Them (e.g. robins have to hunt for their babies food)

ELABORATE (10 minutes)

Now that we have learned about animal adaptation and how various different animals adapt to their environment, let's re-visit our Design-A-Species activity. At this time, students will share their created species telling the committee what adaptations they chose, why and what environment it would live in. The group will discuss if they think the animal will survive or not based upon their new knowledge on animal adaptation. On the back of the Design-A-Species application, there is a place for the students to jot down some notes/suggestions for improvement based upon the recommendations of the committee.

Now using what you now know about how animals adapt and survive, what do you think would happen if an animal's habitat was being destroyed or altered and the animals could not adapt or could not adapt quick enough? Students should answer: the animals would die or become threatened or endangered.

The teacher then asks the students what animals did they know of that are endangered? {Students may respond with answers like "polar bears," or "sea turtles" or "elephants" or "rhinos" or "panda bears."} The teacher will then ask the students if they think habitat loss and destruction and the resulting endangerment of animals only occurs in other countries and parts of the world. The teacher then asks the students if they were aware that this very thing is happening in Michigan right now. Students then take turns selecting an endangered animal from Michigan out of a "hat" and reading some facts to the group listed on the back. {Examples include: the Indiana Bat, the Kirtland's Snake, the Lynx, the Piping Plover, the Kirtland's Warbler, the Hungerford's Crawling Water Beetle, the Cougar, the Hines Emerald dragonfly, the Peregrine Falcon, the Redside Dace, the Regal Fritillary butterfly, and the Smallmouth Salamander}. The teacher then shares any personal connections at this time to any of the animals discussed. (For example, in my case, when we camp at Tawas State Park we see many signs about the Piping Plover and are always on the lookout for them, or how the Peregrine Falcon has been introduced to downtown Detroit and they used to perch outside my office window, or how once I was walking down our road when there was a mass hatching of Kirtland's Snake and how there were hundreds of them alongside the road.)

The teacher hands out to the students Endangered Animals-How Can I Help? slips (see attached) and then instructs the students to (individually) reflect upon some ways to help with habitat loss and endangerment of animals and each write ONE idea on their slip of paper. Examples might include: protecting habitats permanently in parks and nature preserves, inquiring locally of park rangers to see if there is any ways to help, don't pollute, leave trees and patches of habitat remaining on new construction sites, planting native trees and plants on your land, visiting the local zoo and learning more about the endangered or threatened animals, checking out books at the local library to learn more, etc. After students write down an idea, the teacher will collect the slips and drop them in the "hat" and ask students to take turns drawing them out and reading the suggestions. The teacher can supplement the slips of paper/suggestions written by students with the abovementioned suggestions.

CONNECTION TO THE REAL WORLD - Summarized

Many students have heard of endangered animals and often think of them as something that is a faraway problem, like that of pandas in Southeast Asia, or black rhinos in Africa or sea turtles in the ocean. Very little students know that there are in fact endangered animals right here in Michigan in our very own backyards and there are many things we can do to make a difference.

EVALUATE/CONCLUSION (5 minutes)

The students now go back to their pre-assessment ANTICIPATION guide and complete the T/F portion of the anticipation guide on the "after" side of the form.

The teacher then summarizes what adaptation is, the types of adaptation, some examples of each and what happens when animals cannot adapt because of habitat destruction or loss and plays the song "Adaptation" by Animal Trax (optional). Students listen and identify the animal mentioned {camel} and some of its adaptations.

Lesson Plan Differentiation (Ways to Meet Diverse Learners)

Multiple Intelligences

To meet the needs of students with multiple intelligences, I have included activities in all of the types of intelligences: visual-spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, verbal-linguistic, logical-mathematical, and naturalistic. The multiple intelligences and a description of the activities included in this lesson plan are as follows:

Multiple Intelligence Category	Activity
Visual-spatial	Engage/Explore - Students participate visually with the video clips of the octopi and their adaptations. In addition, students will be drawing their new species in the "Design-A-Species" challenge.
Bodily-kinesthetic	Engage/Explore - Students will be physically passing an octopus beanie baby as they identify one adaptation of the octopus to its environment. Students also are kinesthetically engaged with the "Design-A-Species" props as they create their new species of animal.
Musical	Evaluate - Animal Adaptations Song - Students listen to this song at the end of the lesson and identify the animal mentioned in the song and what adaptations are mentioned.
Interpersonal	Explore - Students work in groups during the "Design a Species" challenge.
Intrapersonal	Elaborate - Students personally reflect on "how they can help during the endangered animals' activity.
Verbal-Linguistic	Explore/Elaborate - Students will write reasons why they chose the adaptations they did for their new species, as well as explain their reasoning verbally to the group.
Logical-mathematical	Explain - Students will categorize animal adaptations and create a graphic organizer

	organizing the information.
Naturalistic	ALL - Because this lesson is on animal adaptations, the student with strengths in the Naturalistic intelligence is automatically engaged.

English Language Learners

To meet the needs of ELL, I will be reading aloud the pre/post assessment so that students who struggle with reading or if English is not their first language, they will not be at a disadvantage. In addition, during the explore activity, "Design-A-Species," the students will be working with props and partners, so that the ELL student can be paired with a student who can help with the reading and writing. The students will also have access to lots of books and magazines during that time that include detailed photos of animal adaptations. The students are also able to draw their new species in the "Design-a-Species" challenge.

Safety Recommendations (in alignment with the Council of State Science Supervisors)

In this lesson, students will be engaging in discussions about adaptations, watching video clips, selecting "props" from a box of possible adaptations in the "Design-a-Species" challenge, and learning about how happens when an animal cannot adapt. Students will not have access to any consumable products or hazardous materials. However, students will have to follow certain safety precautions during the lesson that are standard for all classroom activities as outlined by the Council of State Science Supervisors as follows:

- Enforcement of safety procedures (classroom safety rules)
- Unobstructed exits from laboratory (classroom)
- Emergency exit/escape plan posted (this should be standard in all classrooms)
- Live animals and students are protected from one another (students in this case)

Students will also have expectations set ahead of time on how they are to behave during the lesson. Teacher will instruct students on how to handle the materials, work in groups by being courteous and respectful to our fellow classmates, and how to take turns speaking during share time. In addition, if this student group moves to an area that would be in the hallway or commons area, precautions would be made to safeguard the students from any potential situations that could be unsafe. Students will be supervised at all times and boisterous conduct will not be tolerated.

References

Engage

Video Clips:

Google Video (2006) Octopus Escapes through a One-Inch Hole. Accessed September 21, 2008:

<http://video.google.com/videoplay?docid=4007016107763801953>

Google Video (2006) Crazy Octopus. Accessed September 21, 2008:

<http://video.google.com/videoplay?docid=1406502474882393849&q=octopus&pl=true>

Explore

Photo for "Design-A-Species" Handout:

SwitchZoo (2008). Make a New Species. Accessed September 24, 2008:

<http://switchzoo.com/zoo.htm>

Animal Adaptations Lesson Plan (as modified):

Access Excellence (2008). Activities Exchange - Animal Adaptations. Accessed September 24, 2008:

<http://www.accessexcellence.org/AE/ATG/data/released/0542-BehmLisa/>

Reference Material for Students on Animal Adaptations:

20 cool things about butterflies. (2008, August). *National Geographic Kids*

Albino animals: these animals face danger in the wild. (2007, April). *National Geographic Kids*

E.T. up a tree? (2002, May). *National Geographic World*

Fewer than 2000 adult red pandas live in the wild. (2003, May). *National Geographic Kids*

Kalman, B. (2000). *How do animals adapt?* New York: Crabtree Publishing Company.

Lions of the Kalahari dessert. (2008, August). *National Geographic Kids*

Owls: built to hunt. (2007, October). *National Geographic Explorer*

Survivor. (2002, December). *National Geographic Kids*

Explain

Book for Read-Aloud:

Goodman, S. E. (2001). *Claws, coats and camouflage*. Brookfield, CN: The Millbrook Press.

Endangered Animal Cards - Facts and Figures:

Michigan State University Extension (2003). Michigan's Special Animals. Accessed September 28, 2008:
<http://web4.msue.msu.edu/mnfi/data/specialanimals.cfm>

Endangered Animal Cards - Photos:

Piping Plover

Micro Solutions Computing Inc. (2006). Birdperch.com Photos. Accessed September 28, 2008: <http://www.birdperch.com/galldetq.asp?sp=00381007>

Cougar

National Wildlife Federation (2008). Endangered Cats. Accessed September 28, 2008: <http://www.nwf.org/cats/catsWest.cfm>

Lynx

National Wildlife Federation (2008). Endangered Cats. Accessed September 28, 2008: <http://www.nwf.org/cats/catsGreatlakes.cfm>

Indiana Bat

USDA Forest Service (2008). Indiana Bat: Frequently Asked Questions. Accessed September 28, 2008: <http://www.fs.fed.us/r9/wildlife/tes/indianabat.htm>

Peregrine Falcon

National Geographic (2008). Animals: Peregrine Falcon in Profile. Accessed September 28, 2008:
http://animals.nationalgeographic.com/animals/enlarge/peregrine-falcon_image.html

All Others

Michigan State University Extension (2003). Michigan's Special Animals. Accessed September 28, 2008:
<http://web4.msue.msu.edu/mnfi/data/specialanimals.cfm>

Evaluate

Animal Trax MP3. (2004) Adaptation. Purchased September 20, 2008:
<http://www.amazon.com/Adaptation/dp/B000QLYJ8C>

Science Education Safety

The Council of State Supervisors. (2005) General Lab Safety Recommendations.

Accessed September 23, 2008: <http://www.csss-science.org/safety.shtml>

Appendices

- A. Anticipation Guide - Animal Adaptations - Pre/Post-Assessments
- B. "Design-A-Species" Application - EXPLORE
- C. BUBBLE Thinking Map - Animal Adaptations - EXPLAIN
- D. Michigan Endangered Animal Cards - ELABORATE
- E. How Can I Help? Slips - ELABORATE