Stayin' Alive

Fran Baldwin

Overview: Animal Adaptation. The purpose of this lesson is to familiarize students with the variety of structural and behavioral animal adaptations. Throughout the viewing of the video, students will discover some amazing animal adaptations and understand the relationship of these adaptations to their ability to survive. As a culminating activity, students will work in groups to complete a WebQuest project by researching an animal and how it has adapted to a particular biome.

Grades: 3-5

Time Allotment: 60 minutes
Culminating Activity may be done on a separate day depending on time restrictions.
Research will be used as an assessment and time will vary according to available resources and teacher scheduling.

Subject Matter: Science: Animal Adaptation

Learning Objectives:

Students will be able to:

- Identify and explain specific structural and behavior adaptations of different animals
- Investigate and understand that behavioral and structural adaptations allow animals to respond to life needs
- Locate, identify, and describe a biome
- Work cooperatively with a group of 3-4 students to research and record information from a WebQuest on biomes and animal adaptations
- Present a multimedia project orally to the class reporting research findings.

Standards

The objectives listed may be used in part to address the following Virginia Standards of Learning: Virginia Department of Education: http://www.pen.k12.va.us/go/Sols/home.shtml

1. The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. (VA SOL 3.4-2)

2. The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. (VA SOL 3.5-3)

3. The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. (VA SOL 3.6-1)

4. The student will read and interpret data represented in bar and picture graphs. (VA SOL 3.2)

5. The student will demonstrate comprehension of a variety of printed material. (VA SOL 3.5)

6. The student will use strategies to read a variety of printed materials. (VA SOL 3.4)

7. The student will record information from print and non-print resources. (VA SOL 3.10)

8. The student will develop basic technology skills. (C/T 5.2)

9. The student will process, store, retrieve, and transmit electronic information. (C/T 5.3)

10. The student will communicate through application software. (C/T 5.4)

Media Components

Video:
Nature Works, #101 ***Adaptation: Structural and Behavioral***

United Streaming:
Birds
Segment: Birds Have Special Feet, Claws and Legs (01:12)
Segment: Birds Have Beaks (01:22)
This video is located at the web site: http://www.unitedstreaming.com . Here you will enter your school's password and username. Under search, type in the title of the video and this will take you directly to its location.

Technology hardware and software:

TV/VCR/
COMPUTER with Internet Connection
Multimedia Software – Power Point/Hyperstudio/Kid Pix

Web Site:
Bookmark the following Web site for small group research.

Sea World Animal Information Database
http://www.seaworld.org/infobook.html
This site offers a database of many animals that students can use for additional research on animals.

Materials and Teacher Preparation

- The teacher should preview and cue the video as indicated in the Learning Activity section and have United Streaming video clips downloaded for easy access. The teacher should have the Internet sites book marked prior to student use.

- **Introductory Activity**

Book: Animal Fact/Fable by Seymour Simon or list of animal facts and animal fables.
Each group should be given two large cards taped to tongue depressors labeled "FACT" and "FABLE".

- **Culminating Activity**:

Bird Beaks Activity

- Paper cups: 1 per student
- Food items: marbles (glass, various colors and sizes)
- Rubber bands (tan, red, green)
- Pennies (some with red nail polish dots)
- Colored toothpicks
- Beak types: plastic spoons (for 1/3 of the class)
- Chopsticks or tweezers (for 1/3 of class)
- Tongue depressors or popsicle sticks (for 1/3 of the class)
- Butcher paper for large graph
- Colored paper tokens approximately 2" square (different color for each food item)
- Bird posters and charts, photographs of birds in different habitats
- Kitchen timer or stopwatch for feeding frenzies
- Blanket for substrate
- Colored markers
- Glue sticks

Introductory Activity

1. The teacher should distribute cards for introductory activity and have students in small groups at tables if possible.
2. The teacher will introduce the activity by asking" Have you ever heard the expression "blind as a bat?" Are bats really blind? Encourage students to discuss within their groups whether this is true, a fact, or false, a fable, and then hold up one of their cards to indicate their group response.

3. Introduce the book Animal Fact/Animal Fable by sharing the information on bats. Explain the activity to the class by saying: There are many amazing facts about animals that may seem incredible and yet are still true. Some facts are almost too amazing to believe.

4. Tell the class they are now going to participate in an activity in which they must decide if an animal fact is true, a fact, or false, a fable. Say: I will read aloud one of these facts or fables.

You and your group will discuss your ideas and hold up one of your cards indicating your response.

5. Begin by reading the animal fact/fable answering the question "Are bats blind?" and continue to read other facts/fables as students respond with their cards.

Learning Activities

1. Cue Nature Works Video #101 ***Adaptations: Structural and Behavioral*** to 2:05 right after the penguin segment when you hear "survive in harsh weather."

2. Say to students: Today you will be learning about some amazing animal features called "*adaptations*." Write the word on the board and tell students that adaptations are the special features or behaviors an animal has that help it survive in its environment.

3. Provide the students with a **Focus for Media Interaction** by saying: "Living things can have two kinds of adaptations. Listen in our first video clip for the kind of adaptation that tells about the physical features of an animal." **START** at 2:05 and **FREEZE FRAME** at 2:16 where you see the term *structural adaptations* and a picture of a walking stick. Ask: "What kind of adaptations are physical features called?" (structural adaptations).
Say: "Look at the picture of the walking stick. What kind of structural adaptations do you see?" (looks like a stick). "How might that help it survive?" (camouflage; to help hide from predators).

4. Provide the students with a **Focus for Media Interaction** by saying: "Let's look and listen for other examples of structural adaptations. Be ready to tell me about at least one and how it helps the animal survive." **RESUME** at 2:16 and **PAUSE** at 2:55 where you see the illustration of the porcupine. To check student comprehension asks: "What were some structural adaptations you saw and how did they help the animals survive?"
Possible responses:

1. *bullfrog* – green color helps camouflage and strong leg muscles make it a great jumper to escape from predators
2. *horned owl* – excellent hearing and night vision to help it locate prey; talons to catch prey; beaks to tear prey apart
3. *porcupine* – quills make it difficult to catch; has coarse hair with tiny barbs to protect it from predators

5. Provide students with a **Focus for Media Interaction** by saying: "Some animals act or behave in special ways to help them survive. Listen for two things a porcupine might do to protect itself and what these adaptations are called." **RESUME** at 2:55 and **PAUSE** at 3:20 when you see *behavioral adaptations* on the screen. Ask: "What do we call these special actions?" (behavioral adaptations) "What did the porcupine do that was a behavioral adaptation?" (swat attacker, turn its back). **STOP** the video and prepare for United Streaming clips.

6. Say: "Birds have excellent examples of structural adaptations. By looking at birds' feet and beaks you can tell a lot about the way it lives. Do you think all birds' feet are alike? Would a

pelican have the same kind of feet as a woodpecker? Why or why not? We're going to watch a short video clip which shows how birds' feet help it adapt to its environment." Provide a **Focus for Media Interaction** by saying: "In the first clip I want you to look and listen for the difference between a pelican's feet and a woodpecker's feet and how their feet help them." **START** United Streaming video clip: ***Birds have special feet, claws, and legs.*** **PAUSE** at 00:21 when you hear "the bird can peck away for food." Ask: "How are a pelican's feet different from woodpeckers?" (a pelican has webbed feet to help it swim; a woodpecker has sharp claws to help it climb so it can peck at the tree bark)

7. Ask: "Have you ever wondered how a bird can sleep while perching on a limb?" Provide a **Focus for Media Interaction** by saying: "In the next clip look and listen for the difference between the claws of birds that feed on other animals and birds that perch on tree limbs." **RESUME** and **PAUSE** at 00:54 when you hear "this makes it possible for the bird to sleep while perching." Ask: "What is special about the claws of a bird who feeds on other animals?" (powerful claws to grasp, rip, and tear into the food they catch). Ask: "How are the claws of birds that perch on tree limbs different?" (three toes in front and one in back to help them grip the tree branch).

8. Some birds have very different legs. Provide a **Focus for Media Interaction** by saying: "In the next clip listen to how the special structure of a heron's legs helps it get food." **RESUME** and run until the clip **STOPS** at 1:12 automatically. Ask: "What is special about the structure of the heron's legs?" (long legs and feet that spread out for sure footing and wading into the water for food; knees move backwards to allow it to easily bend into the water).

9. Ask: "Did you know that birds have no teeth? Because they have no teeth or hands they must depend on their beaks or claws to help them get food." Provide a **Focus for Media Interaction** by saying: "In the next clip listen for how the heron and the pelican use their beaks to catch fish in unusual ways." **START** United Streaming Video clip: ***Birds Have Beaks.*** **PAUSE** at 00:30 when you hear "as he flies back to shore." Ask: "How does the heron use its beak to catch fish?" (stabs at a fish with its sword like beak, throws it into the air, catches with its open beak and swallows it whole.) Ask: "What is special about the structure of the pelican's beak?" (it has a pouch) Ask: "How does the pelican use its pouch to help it catch fish?" (to hold and store fish as it flies back to shore).

10. Provide a **Focus for Media Interaction** by asking: Say: "Birds' beaks are designed to do different things. In the next clip listen and observe some different bird beaks and how these birds use them in different ways." **RESUME** and **PAUSE** at 00:50. Ask: "What were some of the different birds we saw and how did they use their beaks in different ways?"
Note: The teacher may wish to pause after each bird to have students observe more closely the design of specific beaks.

Possible responses:

1. *woodpecker*- stabs at bark to get at insects; beak is hard and strong
2. *bald eagle*- uses beak for tearing
3. *many other birds* - beaks are designed for picking up grain or seeds.

11. Say: “Have you ever wondered how a parrot is able to talk? Does anyone know?” Provide a **Focus for Media Interaction** by saying: “In the next clip, listen to how a parrot uses its beak and what is special about the parrot that allows it to talk.” **RESUME** and **PAUSE** at 1:03. Ask: How does the parrot use its beak? (to climb and hang from a perch) “What is special about the parrot that enables it to talk?” (it has a special tongue).

12. Say: “How do you think birds eat if they don’t have teeth?” Provide a **Focus for Media Interaction** by saying: “In the last clip listen for the different ways birds use their beaks.” **RESUME** and allow the clip to **STOP** automatically at the end. Ask: “What are some different things birds us their beaks for?” (picking up food, catching food, building a nest, preening their feathers) Ask: “How do birds eat without teeth?” (swallow their food whole).

Culminating Activity

Bird Beaks

1. Say: “We are now ready to find out just how important the structure of a bird’s beak is to its survival and the kind of food it is able to eat.”
Say: “Birds live in different habitats and share these habitats with many different types of birds. How do you think they are all able to live in the same place and still have enough food?” (accept all possible answers).

2. Explain the activity by saying: “We are going to pretend we are birds all trying to find food. I am going to give each of you a tool to use as your beak. The paper cup “stomach” will be used to collect your food. When you are given the signal to feed, you must use your tool “beak” to collect the food by lifting a food item one at a time into the cup. You may not scoop it into your cup or turn your cup over in any way. Your cup must stay upright the whole time.” (Demonstrate to make sure everyone understands.)

3. Have students spread out their towels or blanket on the floor to serve as the substrate (ground surface). This is preferably done as a whole group but may be done in smaller groups. Explain that the *substrate* is the ground surface where the food is found. Distribute one type of beak to every third student so the beak types are equally spaced. Stress again that they are to pick up only one food item at a time, and that their stomach cups must remain upright.

4. Distribute one food item around the feeding surface. At your command start the feeding frenzy and allow students to feed for approximately 30 seconds. When the time is up, have them count their food items. They receive one colored token for each five food items. (Allow students to round to the nearest five.) Each food type is assigned a certain color token. Designate one person per bill type to collect the tokens and glue them in a vertical line on the graph. While the graph is being completed, collect all the food items and have the students stand by for another round. Repeat each round with a new food item, tally, and record the results as before.

5. After each food item has been recorded individually, discuss the results with your students. Which beak collected the most of each food item? What do they think would happen to their bird if only one food item was available? How would a forest fire or cutting down trees affect

the availability of food in the forest? How would the change from the rainy season to the dry season affect the area available for finding food?

Explanation:

6. Discuss with the class the results displayed on the graph for each food item and beak type. Which of the beak types feed most successfully on which food item? Was one beak type successful with more than one food item? Did your earlier observations about beak and feet types help you to understand how birds feed side by side but utilize different food items?

Extension of activity:

7. Have students predict how successful each beak type will be when all of the food items are available at one time. Using the same scoring method as in the previous rounds, tally the results for each food item and graph the results. Were the students' predictions about feeding success accurate? Did the birds with specific beak types feed on only certain food items? Was it easier to successfully obtain food items when only one food item was available at a time or when all items were available?

Helpful Teacher Hints for Multimedia Projects:

1. The teacher and students should be familiar with the software they will be using to create their presentations. If necessary, train one student from each group how to use the software. This will free the teacher up to work with individual groups on their project planning.

2. Be sure students know the time limits they will have on the computer. Have students complete their research and create a story board for their presentation prior to going to the computer. Storyboards should present page layouts for each page of the presentation including colors, font size, and animation. It is a good idea to limit the number of pages for each presentation to help students stay focused on the main ideas of their research. This prior student planning will keep groups focused on their task and help prevent wasted time on the computer.

3. Give students different jobs while creating their multimedia presentation such as Clip Artist, Keyboarder, Animation Specialist, and Page Layout Designer. This will allow each student time at the keyboard.

4. Be sure students know what will be expected of them. Create a rubric to hand out to each group so students will know how their grade will be determined.

5. Allow groups to complete a self-evaluation and classmates to complete a peer evaluation for each group presentation in addition to a teacher evaluation. This gives students more ownership in their project.

Cross-Curricular Extensions

Language Arts:

After viewing several animal myths and legends at the following site, have students create their own legends about how animals obtained certain structural characteristics.

Animal Myths and Legends http://www.planetozkids.com/oban/
This site has legends about how different animals came to be which may be used as models for their own animal stories

Have students research animals at the Sea World Animals Abound site or in books to discover additional amazing facts. Allow them to create their own pages for a class Animal Fact/ Animal Fable book.

Art:

Have students create their own bird creations using model magic or another sculpting medium. Their bird must have specific structural adaptations and be placed in a particular habitat (shoebox dioramas work well with this). Students should write up a short description of their bird and habitat and explain how their body characteristics help them survive.

Students can create a flipbook of creative birds. Each student page is divided into three sections; one for the legs and feet, one for the body and one for the neck and head making sure each body part matches the others. Each section is then separated and compiled into a class book allowing for a multitude of combinations.

Science/ Geography:

Journey North: A Global Study of Wildlife Migration
http://www.learner.org/jnorth/
Students can track the migration wildlife and join in a collaborative project on line. Have students keep track of migration routes and stops on a world map.

Science/Math:

Have students observe birds in the wild and create a graph of the types of birds seen in their local surroundings. Research the birds to find out the food they eat and how they fit into the food chain.

Students can research particular birds, (i.e. the largest and the smallest). Create a graph on sizes and weights to make comparisons using Microsoft Excel or other graphing software.

Use the graph created in the Bird Beaks culminating activity to have students create and answer questions using the graph data.

Music:

Have students research and listen to specific bird calls. Have a bird calling contest to see which students can do the best bird call imitation.

Community Connections:

1. Visit a local zoo and arrange for someone who works there to discuss various behavioral and structural animal adaptations with your students. As your students tour the zoo they may look for other examples of animal adaptations.
(Take virtual tours of zoo Web sites to view animals if there is not a zoo in your area.)

2. Take a tour of your local area park and take digital photos of local wildlife. After returning to the classroom, show the photos as a slide show using Power Point. Identify and discuss animal adaptations of the local wildlife.

3. Invite an exotic animal veterinarian to your class to discuss some amazing animal adaptations of exotic animals.

4. Invite a Forest Ranger or Animal Wildlife Refuge representative to the class as a guess speaker to discuss the affect of land development on the scarcity of wildlife habitats. Often they will bring animals from the refuge.

5. Write the American Wildlife Federation for information on adopting an endangered animal or an acre of rain forest.

References:

Bird Beaks activity retrieved on December 2 from
http://www.aqua.org/

Simon, S. Animal Fact/ Animal Fable.

Berger, M. (1997). Don't Believe It! Fibs and Facts about Animals. Scholastic, Inc. New York, New York.

Ricciuti, E. (1975). Strange Animal Myths Explained. Walker Publishing Co.

FACT OR FABLE?

Are elephants afraid of mice?
Not really. But mice can make noises that make elephants uneasy causing some elephants to trumpet in alarm.

Are owls wise?
No. An animal such as an owl cannot use its brain to think the way human beings do. In order to be wise, a person must be able to think.

Do snakes sting with their tongue?
The forked tongue of a snake looks as though it stings but it does not. The snake's tongue helps it smell things and track down its prey. Poisonous snakes bite with fangs, or special hollow teeth, through which poison passes to the victim.

Are pigs dirty?
Pigs are no dirtier than other animals. Like many other animals, they like to take baths in the mud. The mud keeps them cool on hot days and protects them from pesky insects. Pigs also like to bathe in water.

Do bears hibernate?
Bears do not really hibernate. When an animal hibernates it breathes very slowly. It does not move or eat. Its heart hardly beats. Its body stays very cool. It spends the whole winter this way. This doesn't happen to bears, although their body temperature drops a little. Even though a bear sleeps through most of the winter, it can move around and eat on a mild winter day. Female bears also have their cubs in their winter dens.
Polar bears do not sleep during the winter. Neither do bears that live in the warm parts of the world such a southeastern Asia.

Do camels store water in their humps?
In a way they do and in a way they don't. The camel's hump is mostly fat, not full of water as many people think. The camel uses the fat when it cannot find food. Its body burns the far for energy. This produces some water in the body.

Does an ostrich hide its head in the sand?
An ostrich never hides its head in the sand. The ostrich is built for running at great speeds and when frightened it runs as fast as 35 mph. An ostrich can kick if cornered.

Does a groundhog tell you when spring is coming?
Groundhogs sleep for the winter in their underground burrows. They end their sleep in the spring. The story is that the groundhog peeks its head out of its burrow on Feb. 2. If it sees its shadow it will return to its burrow for six more weeks. Groundhogs don't always come out on Feb. 2, but will wait until it's warm. They you will know winter is over.

Do cats hate water?
Not really. They just don't like to be cold or soaked just like you don't. They aren't afraid to fish for frogs and fish near a pond. Some cats swim like the tiger that bathes in water and often catches fish or turtles.

Is a goose really "silly as a goose?"
Although geese are very noisy and strut about in ways that look foolish, geese are not being silly. Their noise and movements are part of their "language" that other geese understand. When a goose stands with its neck stretched and head held high this means that the goose in on the alert.

Do hyenas laugh?
No. They hyena is really barking. When it gets excited it makes a bark that sounds like laughter.

Are bats blind?
No bat is "blind as a bat." Bats can see, although some kinds of bats have very small eyes. Most bats use their ears instead of their eyes to find their way in the dark. They listen for the echo of tiny, high pitched squeaks made as they fly so they will know where things are and what they are.

Does a gorilla beat its chest when it is going to attack?
No. A gorilla beats its chest because it is excited, and it can get that way for many reasons. Sometimes it's just because they feel good. Other times it may be to scare away its enemies. Gorillas are gentle animals and would never attack unless they felt in danger.

Do bulls hate the color red?
Bulls do not hate the color red. They can't even see it because they are colorblind. It is the movement that attracts the bull.

Do cobras dance to music?
The music of a snake charmer's flute seems to make a cobra dance; however, the cobra doesn't hear the music because snakes can't hear. It looks like it's dancing because the snake charmer's hands alarm it as they move near the snake. The snake is just getting into position to strike the hands.

Do penguins live at the North Pole?
Not a single penguin lives at the North Pole. Penguins only live in the Southern Hemisphere. Most of them are found along the frozen edge of Antarctica. Other penguins live on the southern shores of Africa, South America, Australia, and New Zealand.

Does a porcupine shoot its quills?
No. A porcupine cannot shoot its quills at an enemy. The quills are sharp as needles and are loosely attached to the skin. When frightened the porcupine can make its quills stick up. The quills come off at just a touch.

Can all monkeys hang by their tails?
Most kinds of monkeys do not have tails. Some do and use them to grab and hold onto branches. This kind of tail is called a "grasping" tail. It is almost like an extra hand.

Do toads give you warts?
The skin of toads looks bumpy and warty, but you can't get warts from touching it. Some kinds of toads have smooth skin. Warts are caused by a virus that has nothing to do with frogs.

Other amazing animal facts:

Hummingbirds can beat their wings 200 times a second.

Monarch butterflies migrate from Canada to Mexico for the winter – a distance of 2,000 miles.

Horses sleep lying down as well as standing up.

If a starfish loses and arm, it will grow a new one.

A horseshoe crab is not really a crab at all, but it is a close relative to the spider.

The "horn" of the rhinoceros is not made of bony material but of fibers, like hair.

The hermit crab does not carry its own shell. It lives in the empty shell of a snail or similar creature.

Box turtles can live more than 100 years.

Cyber Zoo WebQuest Worksheet

Researcher: _____ **Recorder:** _____

Navigator: _____ **Reader:** _____

Biome: _____

What is a biome? _____

Places the biome is found

_____

Characteristics of the biome (list 4)

1. _____

2. _____

3. _____

4._____

Types of animals found in the biome

_____

_____

Common adaptations of many of the animals in the biome

_____

_____

_____

_____

Animal chosen to research _____

Structural adaptations:

_____

_____

_____

_____

Behavioral adaptations:

_____

_____

_____

_____

How do these adaptations help the animal survive?

_____

_____

_____

_____

Resources:

_____

_____

_____