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YOUTH DEVELOPMENT THROUGH VETERINARY SCIENCE 2

Fur, Feathers, Skin, and Scales

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Subject Overview and Background Information

All animals, including humans, are affected by their environment and require some type of outer protective layer. This outer covering, regardless of whether it is **skin**, **fur**, **scales**, or **feathers**, serves as a means of **physical protection** against injury, germs that may cause a disease, and changes in temperature from morning to night or from one season to the next. In some cases, the outer covering of an animal has specific markings or colors that may attract a mate, defend its territory against others, or serve as a type of **camouflage** to help it hide from other animals.

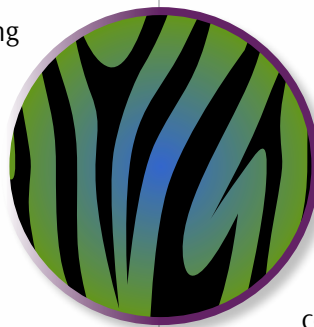
More specialized functions of skins or coats are seen in some animals. Frogs, for example, must live near lakes, streams, or ponds in order to keep their skin moist. The function of a frog's skin is to regulate the transfer of moisture and fluids, and frogs are also able to take in some oxygen across the moist skin in a process called cutaneous gas exchange (frogs also have lungs with which to breathe).

The scales of **fish** and **reptiles** serve as a type of "armored coat" that is very strong. The scales overlap and

protect the skin that lies underneath. Fish scales serve mainly as a protection against physical harm; in snakes, the scales also help prevent water loss. When fish grow, they add new material to existing scales; "age rings" can be counted on individual scales to determine how old a fish is. When snakes grow, they develop a new layer of scales beneath their old one, which they then shed. This process is called **molting**.

Birds and mammals are warm-blooded animals and use their coats (feather for birds and fur for mammals) to insulate their bodies. Fur and feathers also help keep the animals dry, and in birds, the light weight and special shape of the feathers helps them fly. Many birds and mammals live all year in environments that are cold and snowy in the winter but warm and colorful in the summer. As a form of protection, these animals have one type of coat for the winter (generally thick and white) and another type of coat for the summer (thinner and more varied in color). Both types of coats help camouflage the animals, and the process of shedding part or all of the fur and feathers and replacing them with a new coat is called molting, just like in reptiles.

Many health problems can be detected by observing changes in an animal's skin or coat. Parasites (small



organisms that live on animals) such as fleas or mites can cause fur or feathers to fall out or skin to become reddened, patchy, or irritated. In snakes, living in an unsanitary environment can lead blisters to form on the skin of the underbelly, which can be life-threatening if not treated properly. Parrots and other birds may lose their feathers if they are infected with a virus or are overstressed. In goats, bacterial infection of the skin can cause lesions and loss of fur. In many species, an allergic reaction is characterized by itchy skin, loss of fur or feathers, and swelling. Whenever a caretaker notices these or other changes associated with an animal's skin or coat, it is important to consider consulting a veterinarian.

◆ Activity Concepts and Vocabulary

- **Camouflage (kam-uh-flahzh):** Methods animals use that allow them to blend into the environment to avoid being seen by predators or prey.
- **Molting:** The process of shedding and replacing parts or all of one's coat or outer covering (i.e., feathers, cuticle, skin).
- **Physical protection:** Preserving the body from injury or harm.

◆ Life Skills

- **Head:** critical thinking, learning to learn, wise used of resources
- **Heart:** cooperation, communication
- **Hands:** teamwork, self-motivation

◆ Subject Links

Science and Language Arts

◆ State Content Standards

Science

- Grade 4
 - *Investigation and Experimentation: 6a, 6c, 6f*
- Grade 5
 - *Investigation and Experimentation: 6h*
- Grade 6
 - *Investigation and Experimentation: 7c*

Language Arts

- Grade 3
 - *Listening and Speaking Strategies: 1.8*
- Grade 4
 - *Listening and Speaking Strategies: 1.7, 1.8*
- Grade 5
 - *Listening and Speaking Strategies: 1.5*
- Grade 6
 - *Listening and Speaking Strategies: 1.5*

◆ Purpose of Activity

The purpose of this activity is to have the youth explore different coverings that animals have and the reasons why they have them (e.g., human: skin and clothing; birds: feathers; bear: fur; reptiles: scales).

ACTIVITY

Fur, Feathers, Skin, and Scales

Overview of the Activity



This activity is divided into Part A and Part B. In Part A youth will observe the skin on different parts of their body, comparing the similarities and differences between skin in different areas. They will also have a chance to observe different types of fabric and record the similarities and differences they find.

In Part B youth will be given several pictures of different animals and will make observations about them. Based on their observations, they will make inferences regarding the environment in which each animal lives and how it is able to survive in that environment.

◆ Time Required

Approximately 75 minutes

◆ Suggested Groupings

Pairs or small groups

◆ Materials Needed for Each Pair

(*Materials provided in the curriculum)

- Magnifying glass
- Fabric samples: Different colors, patterns, materials, and textures
 - **Volunteer Tip:** *Free samples can be obtained from many fabric stores.*
- Flip chart paper
- Markers or other writing utensils
- *Animal coat photographs
- *Molting animal photographs

◆ Getting Ready

- Divide youth into pairs or small groups.
- Make one color copy of the animal coat photographs and molting animal photographs per group.
- Provide one magnifying glass per group.
- Provide each group with a piece of flip chart paper and colored markers.
 - **Volunteer Tip:** *On the day of the activity, ask the youth to dress for “Wacky Clothes Day.” Encourage them to wear different colors, patterns, textures, and seasonal clothing.*

Opening Questions

Ask the youth to respond to each question below by sharing their ideas verbally and/or by recording them on the flip chart paper provided.

1. What do you know about your skin? What purposes do you think skin has?
2. Describe what you know about different types of clothing. What purposes do you think clothing serves for humans?
3. What do you know about animal coats or coverings? What do you think some of the functions of coats or coverings are?
4. What are some things that skin, clothes, and animal coats or coverings have in common? What are some things about them that are different?

Procedure (Experiencing) A

1. Ask the youth to examine the skin on the outer and inner sides of their arms. Ask the youth to record their observations and make comparisons between these two locations.
2. Next, have the youth compare the skin on their palms and the backs of their hands. Ask the youth to record their observations and make comparisons with their observations from Step 1.
3. If available, provide the youth with magnifying glasses to observe their hands and arms in greater detail. Have them make comparisons with the observations they made in Step 2. Ask the youth to record their observations and comparisons on the flip chart paper provided.
4. Have the youth look at their clothing or fabric swatches. Encourage them to look for similarities and differences (e.g., colors, textures, and thickness). For each type of fabric, ask the youth to make an inference regarding the purpose an article of clothing made from that fabric might serve. Ask the youth to record their observations, comparisons, and inferences on the flip chart paper provided.

Procedure (Experiencing) B

1. Have the youth view the animal coat photographs provided. Using the flip chart paper and markers, ask them to record their observations and comparisons on the paper provided.
2. Based on their observations, ask the youth to predict where they think the animals might live based on the animals' coverings, as well as how their coverings might help them survive. Ask them to record their thoughts and the reasons behind their predictions.

Sharing, Processing, and Generalizing

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations. If necessary, use more targeted questions as prompts to get to particular points, such as:

1. What are some reasons you think we have more hair on the outside of our arms and hands than on the inside? What do you think the purpose(s) of this hair might be? Please explain your thoughts and ideas.
2. How do you think animals' coverings—bear's fur, bird feathers, fish scales, humans' skin and clothing—might help them survive where they live? Please explain and provide examples.

Concept and Term Discovery/Introduction

Volunteers need to ensure that the concepts of **physical protection**, **molting**, and **camouflage** have been introduced or discovered by the youth.

- **Note:** The goal is to have the youth discover the concepts and terms on their own. It helps if they can define terms and concepts using their own words.

Concept Application

1. Some animals live in environments that have very distinct seasons. It might become very hot in the summer and very cold in the winter. Look at the pictures of the cardinal (bird) and reindeer in the molting animal photographs. Notice the differences in their coats and explain why these animals might need to change their coats (a process known as molting).
2. Ask the youth to explore their neighborhood or local park. Ask them to look at the animals in that environment and notice the different animal coverings.
3. If the youth have pets of their own, ask them to look closely at their pet's coat or outer covering. Ask them to notice details, such as color and texture.

References

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- MSN Encarta. *Snake (reptile)*. MSN Encarta Web site, [http://encarta.msn.com/encyclopedia_761578341/Snake_\(reptile\).html](http://encarta.msn.com/encyclopedia_761578341/Snake_(reptile).html).



Reptile Scales



Andre Magill

<http://www.flickr.com/photos/amagill/2963840608/>



Reptile Scales



Jenny Downing

<http://www.flickr.com/photos/jenny-pics/2715258785/>



Reptile Scales

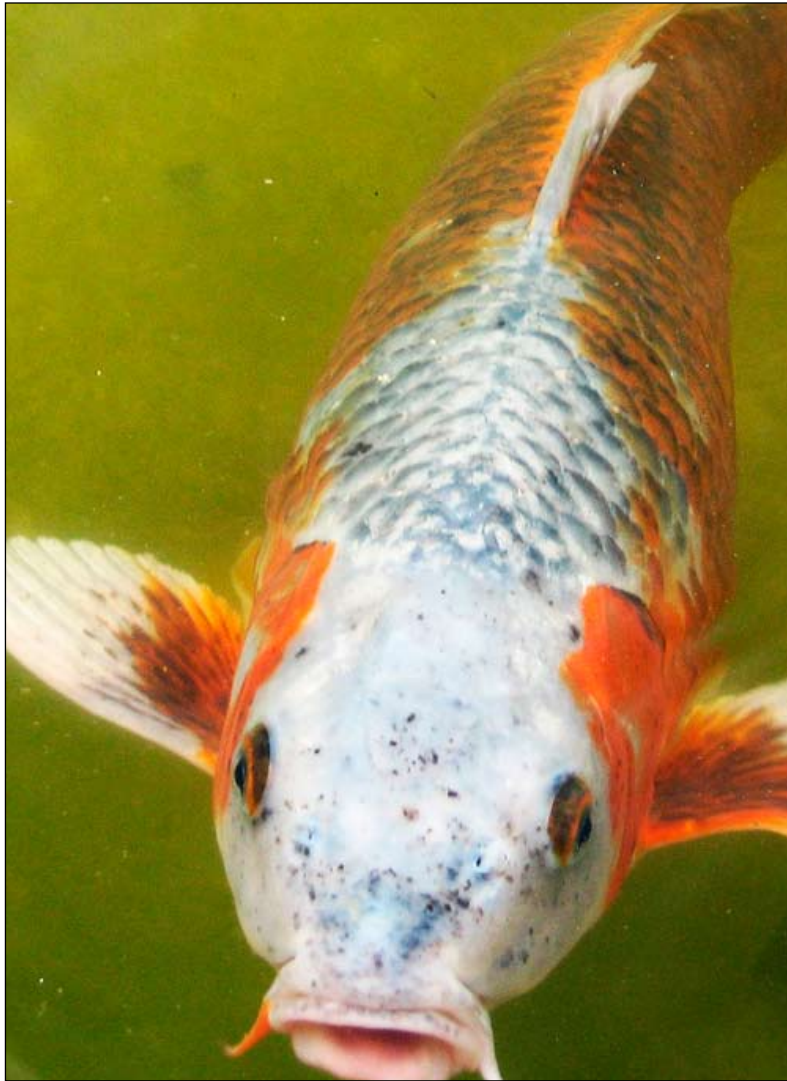


Scot Campbell

<http://www.flickr.com/photos/randomurl/538907018/>



Fish Scales



Corrie Barklmore

<http://www.flickr.com/photos/corrieb/2855396217/>



Fish Scales



Alexandra Lee

<http://www.flickr.com/photos/alexandralee/163379800/>



Bird Feathers



Rita Ballantyne

<http://www.publicdomainpictures.net/view-image.php?image=1037&large=1>



Bird Feathers



Sherri Hogue

<http://www.publicdomainpictures.net/view-image.php?image=823>



Bird Feathers



Nisheedhi Adukuri

<http://www.publicdomainpictures.net/view-image.php?image=761v>



Bird Feathers



Petr Kratochvil

<http://www.publicdomainpictures.net/view-image.php?image=84>



Mammal Fur



Petr Kratochvil

<http://www.publicdomainpictures.net/view-image.php?image=1184>



Mammal Fur



Geoff Doggett

<http://www.publicdomainpictures.net/view-image.php?image=536>



Mammal Fur



Petr Kratochvil

<http://www.publicdomainpictures.net/view-image.php?image=124&large=1>



Mammal Fur



Petr Kratochvil

<http://www.publicdomainpictures.net/view-image.php?image=208>



Molting Lizard



Melvin Baker

http://www.flickr.com/photos/i_level_news/456755318/



Molting Cardinal



Ellen Davis

<http://www.flickr.com/photos/ellen3davis/1342154140/>



Molting Reindeer

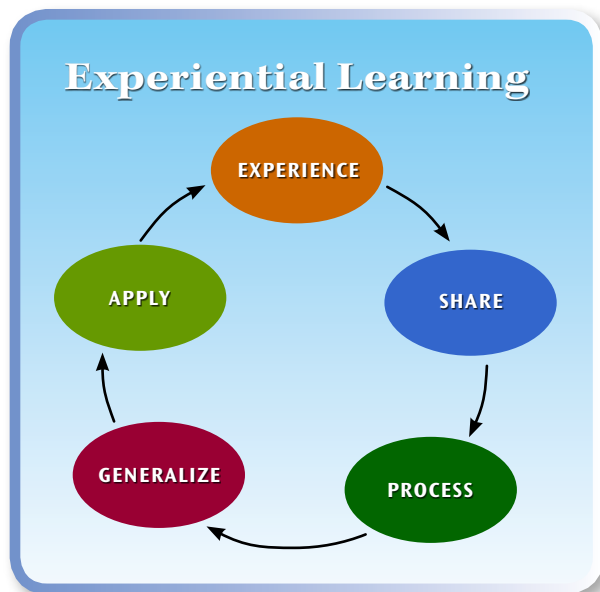


Mats Lindh

<http://www.flickr.com/photos/fiskfisk/2672918052/>

APPENDIX

The activity in this curriculum is designed around inquiry and experiential learning. Inquiry is a learner-centered approach in which individuals are problem solvers investigating questions through active engagement, observing and manipulating objects and phenomena, and acquiring or discovering knowledge. Experiential learning (EL) is a foundational educational strategy used in 4-H. In it, the learner has an experience phase of engagement in an activity, a reflection phase in which observations and reactions are shared and discussed, and an application phase in which new knowledge and skills are applied to a real-life setting. In 4-H, an EL model that uses a 5-step learning cycle is most commonly used. These five steps—Exploration, Sharing, Processing, Generalizing, and Application—are part of a recurring process that helps build learner understanding over time.



For more information on inquiry, EL and the 5-step learning cycle, please visit the University of California's Science, Technology, Environmental Literacy Workgroup's Experiential Learning Web site, <http://www.experientiallearning.ucdavis.edu/default.shtml>.

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