



# Animal Coverings with Scope-On-A-Rope

By: Adrienne Lopez, LSU SOAR Coordinator



## It's a Matter of "Scale"

### OBJECTIVES

- To use Scope-On-A-Rope to heighten students' senses, hone their observation skills, and strengthen concepts such as magnification and scale.
- For students to gain an understanding of life science concepts: identification of characteristics and variation of organisms; structural adaptations of organisms.

### BACKGROUND

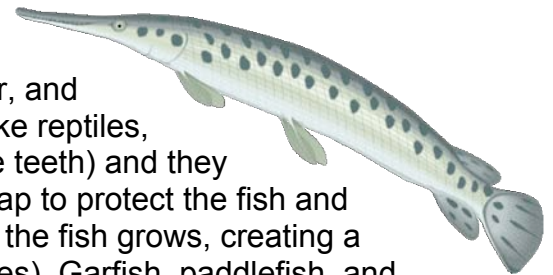
Reptiles have a tough, dry, scaly skin that protects them from predators and allows them to live in dry places by reducing water loss. Reptilian **scales** are made of **keratin**, like hair, and found in an overlapping arrangement. This creates a sort of environmental shield for the animal.

Snakes have special, elongated scales on their belly to help them crawl and climb. Some reptiles have scales that are modified into sharp spines or have bony plates underneath their



scales, called osteoderms, for extra protection (like a turtle's shell and the bony back of an alligator). Reptile scales can also be found in many colors to aid in camouflage or serve as warning to other organisms of their venomous nature. Although most reptiles shed their scales periodically, snakes shed their skin in a single piece.

Fish **scales** are smooth to help them glide through the water, and some reflect light to help camouflage them underwater. Unlike reptiles, the scales of bony fish are made of enamel and dentine (like teeth) and they can be detached individually from the skin. The scales overlap to protect the fish and to provide greater flexibility. In most fish, the scales grow as the fish grows, creating a ring pattern similar to that of a tree (ctenoid and cycloid scales). Garfish, paddlefish, and sturgeons have a different type of scale (ganoid) that is made up of thick bony layers that lack growth rings.



Cartilagenous fish, like sharks and rays, have a different type of outer covering than bony fish. Their tough skin is covered with placoid scales – small, spiny, irregular-shaped scales called dermal denticles ("skin teeth"). This gives them a sandpaper-like feel. These scales do not grow like the scales of bony fish – more are simply added as the shark's skin grows larger. The shape of these denticles is an indication of the shark's behavior (see website below).

### MATERIALS NEEDED

Scope-On-A-Rope\*

Snake skin\*

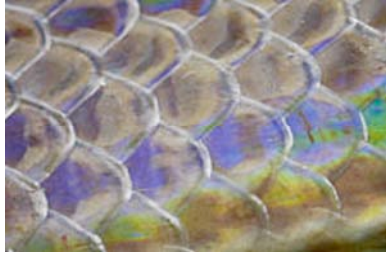
Fish scales/skin\*

Copies of "Scales Worksheet" (attached)

\*The Scope-On-A-Rope and miscellaneous reptile and fish scales can be borrowed from LSU.

## ACTIVITY

1. After reviewing a little background information with your students, hand out samples of snake skin for students to examine. Can you tell the difference between the scales on the back and sides of the snake compared to its belly? Why are the belly scales different?
2. Make sure each student has a copy of the “scales worksheet”. Use the 30x lens of SOAR to examine the snake skin. Can you see how the scales are connected to the skin? Press the *ON* button to see the difference in the appearance of the scales with different lighting. [**HINT**: The *ON* button polarizes the lighting, thus reducing reflection.] Take a snap shot by pressing the *REC* button, and view by pressing the *PLAY* button.



### Snake Scales

These photos are of the same snake's scales demonstrating the difference between reflected light (left) and polarized light (right). Notice the rainbow pattern on the left!

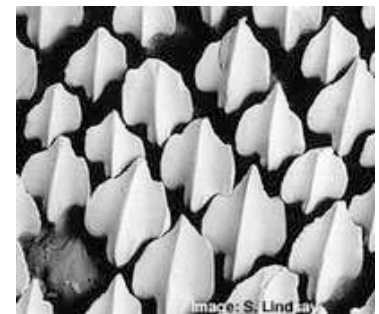
3. Have students draw the skin/scales in the first box provided on the worksheet. Encourage them to really look at the image and draw as much detail as they can. What does it look like? Can you compare it to anything familiar?
4. Now compare snake scales to those of a fish. Pass around some fish scales/skin and ask students to cite the differences. For older students, have them identify the three main types of fish scales. [There are more than three types, but these are the most common in Louisiana. See website below for more information.]



**Cycloid Scales**  
(scales grow as fish grows; the rings can tell a fish's age)



**Ganoid Scales**  
(scales that lack rings; they are bony and interlocking)



**Placoid Scales**  
(smaller scales called “skin teeth”; found in cartilaginous fish)

5. Examine the fish scales with the 30x lens of SOAR. Use the polarizing filter by pressing the *ON* button. Do the scales reflect light? Why would you think this is beneficial? Can you count the rings on the ctenoid/cycloid scales? If you have shark skin, examine it with the 30x and 200x lenses. How are these scales different? Why do you think they are called “skin teeth”? Have students draw an example of fish scales in the second box in the worksheet.

## LOUISIANA GRADE LEVEL EXPECTATIONS

	K	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	7 <sup>th</sup>
Science As Inquiry	4, 10	5, 11	6, 12	6, 15	7, 17	29	29
Life Science	24, 25	32	30	35	41	29	9

### ACTIVITY EXTENSIONS

**SCIENCE:** Observe animals in the schoolyard or at home. Discuss the features of animals that are beneficial in their environment. Put animals into basic groups: mammal, reptile, bird, etc.

**Life Science GLE's** = PK: 24, Gr. K: 25; Gr. 1: 34; Gr. 2: 35; Gr. 3: 38-39; Gr. 4: 48 & 52; Gr. 5: 29

**ELA:** Read a book to your class about an animal whose covering helps it to be camouflaged from predators. Have students write a story about an animal in its habitat.

**Writing GLE's** = K: 20, 24-25; Gr. 1: 26, 29; Gr. 2: 21, 24; Gr. 3: 22, 24; Gr. 4: 20, 23; Gr. 5: 18, 21

**ART:** Have your students create an imaginary animal with a certain type of body covering and explain how this covering helps it to survive. They can draw it, sculpt with clay, or use other methods in the creation process. **Visual Art Standards** = VA-CE-E1 & E5

### Websites for additional information:

<http://www.szgdocent.org/cc/c-slimy.htm> (about snake scales)

<http://www.amonline.net.au/fishes/students/scales> (Australian Museum fish site-great info!)

<http://www.biologycorner.com/worksheets/fishcolor.htm> (fish anatomy activity)



Third-grade students examine snake skin with the Scope-On-A-Rope.

This work was supported by a Howard Hughes Medical Institute grant through the Undergraduate Biological Sciences Education Program to Louisiana State University.

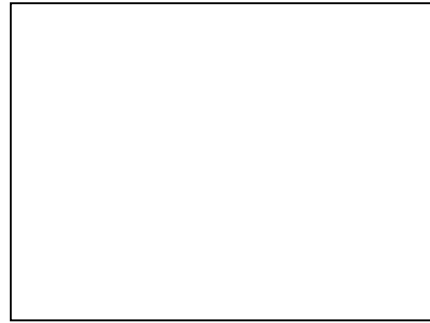


Name \_\_\_\_\_

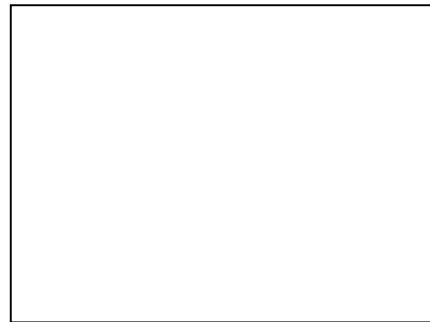
Date \_\_\_\_\_

### Scales Worksheet

Draw what the snake skin looks like when magnified (30x lens).



Draw what the fish scales look like when magnified (30x lens).



The snake's skin reminded me of \_\_\_\_\_.

One difference between the snake scales and the fish scales is:

---

---