

## Animal Adaptations for Survival

**5.LS1.1** Compare and contrast animal responses that are instinctual versus those that are gathered through the senses, processed, and stored as memories to guide their actions.

**7.LS1.6** Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.

**8.LS4.5** Obtain, evaluate, and communicate information about the technologies that have changed the way humans use artificial selection to influence the inheritance of desired traits in other organisms.

### *Supplies:*

- 10 washers mounted on a clay ball
- Deep plastic bin for paddling practice
- Bucket for ice water
- 3 Towels
- 10 standard unsharpened wooden pencils
- 5 empty cups
- 20 counter chips
- Lesson Binder

### *Consumables:*

- 1 Roll of Paper Towels
- Crisco
- Trash Bag
- 5 Ziploc Baggies
- Ice (from cafeteria)

Adaptations help animals survive in their ecological habitats. In this lab students will experience what it would be like to be an animal in a certain habitat both with and without their adaptation.

### **Pre-Lab:**

Please go over animal adaptations with the students before the lab activity is done. This section will provide some background knowledge on animal adaptations. Please feel free to turn it into a PowerPoint or discussion.

All organisms have adaptations that help them survive and thrive. Some adaptations are **structural**. Structural adaptations are physical features of an organism like the bill on a bird or the fur on a bear. Other adaptations are **behavioral**. Behavioral adaptations are the things organisms do to survive. For example, birdcalls and migration are behavioral adaptations.

Adaptations are the result of evolution. Evolution is a change in a species over long periods of time.

Adaptations usually occur because a gene **mutates** or changes by accident! Some mutations can help an animal or plant survive better than others in the species without the mutation.



For example, imagine a bird species. One day a bird is born with a beak that is longer than the beak of other birds in the species. The longer beak helps the bird catch more food. Because the bird can catch more food, it is healthier than the other birds, lives longer and breeds more. The bird passes the gene for a longer beak on to its offspring. They also live longer and have more offspring and the gene continues to be inherited generation after generation.

Eventually the longer beak can be found in all of the species. This doesn't happen overnight. It takes thousands of years for a mutation to be found in an entire species.

It is important to remember that most mutations do not provide benefits to the species. More often than not they are harmful. For example, the bird could have been born with a mutation that gave it no beak. The bird would have been unable to eat much and would have died early without passing on the harmful genes.

Over time, animals that are better adapted to their environment survive and breed. Animals that are not well adapted to an environment may not survive. The characteristics that help a species survive in an environment are passed on to future generations. Those characteristics that don't help the species survive slowly disappear.

Adapted from <http://www.nhptv.org/natureworks/nwep1.htm>

### **Lab Setup:**

There will be three stations or centers each with a different adaptation for the kids to experience. They are:

*The Polar Plunge* – Students will dip their hand in icy water first without anything on it and then with a double layer bag with Crisco in the middle. Students will be able to see the affects of blubber/layers of fat on keeping arctic animals sheltered from the cold.

*Webbing Waters* – Students will paddle their hands through a bin of water first without any assistance and then with a sandwich baggie over their hands to mimic webbing. Students will be able to see how webbing aids in faster swimming away from predators or to prey.

*Depth Perception Challenge* – Students will practice threading a pencil through a washer with both eyes and then with one eye closed and make note of the difficulty. Students will then drop chips into a cup in front of them once without the depth perception goggles and once with. Students will be able to see the advantage having both eyes on the front of their head for predators vs. the side of their heads for prey animals.

Set up each station before class and go over the activity and how students are to behave at each station before the activity happens. It is recommended to have one person at each of the water-based station in order to keep the mess controlled. Paper towels and cloth towels have been provided in order to assist with this. Please thoroughly clean AND dry everything off before returning the kit to the CSO.

### **The Polar Plunge**

*Set Up:* Set up a bucket of ice water with ice from the cafeteria with towels and paper towels

When students come to the station, instruct them that they can only participate if they will use proper behavior and not flick water over anyone. Students will put their middle three fingers in the cold ice water mixture for about five seconds. Have them dry off their hands on the towel provided. Next let the students put their hand into the bag with a Crisco barrier. See if they can hold them in a little longer or ask them if they are not as cold as before. Make sure they don't keep their fingers in there for too long so they don't get frostbite. When they are done have students immediately wipe any Crisco off their hands with the paper towels as much as they can. Put the wet towels neatly in a trash bag to keep them from keeping everything else wet. Clean and dry the bucket and Crisco can.

## **Webbing Waters**

*Set Up:* Fill the provided bin one-half to two-thirds of the way full with room temperature water. Have a towel on hand for drying up hands and spills.

When students come to the station, instruct them that they can only participate if they will use proper behavior and not flick water over anyone or the floor. Have the students take turns swirling their hands through the water with their fingers spread wide apart. Tell them to note how it feels verbally or in their science journals. Next have each student put their hands in a Ziploc bag (please re-use these bags, one or two per class should work just fine) and spread their fingers wide again. Let them take turns gently swooshing their hands inside the plastic bin, this time while wearing the plastic bag as a glove. It does not matter if water gets in the bag, but try to keep the bag from being fully submerged in order to demonstrate the technique without the extra drag water in the bag would produce. Have students note how much easier they could move through the water. Ask what they think the webbing let them do easier. To clean up please dry out the bin and put the wet towels neatly in the plastic garbage bag included in the kit.

## **Depth Perception Challenge**

*Set Up:* This station is the best one to let kids do alone if you do not have enough hands to help oversee all of the stations. This station requires enough washers mounted in clay and pencils for each student to have one of each; it also requires each pair of students to have a cup of chips.

Students will try to thread the pencil through the washer while holding one in each hand at arms length away from their body. They will note how easy or hard this is to them. Students will then close one eye and repeat the procedure and note if it is harder or easier than the first time it was done. After they have experimented with this a few times, they will pair off and try to do the chip drop.

Give each student about 10 chips and a cup. Have the student place the cup on the ground and hold the chips in their hand. Now have each student try to drop the chips into their cup. Have him do this with all of the chips one at a time. Note how many chips landed in the cup. Have the students put the depth perception goggles on. You can tell them that these goggles will simulate how they would see without depth perception. Now have the students repeat the same activity of dropping chips into the cup. See if each person can get more or less chips in the cup with the depth perception goggles on. To clean up have students put the chips back in the bags they came in and stack the cups back together and put in the kit. Also neatly put the clay washers and pencils in the bag to return to the kit as well.

Please return the kit in better condition than you were issued it and email the kit director anything is broken or missing and let them know how the lesson went.

# Animal Adaptations for Survival

## Student Worksheet

Name: \_\_\_\_\_

These stations are designed to help you learn about how animal adaptations can help an animal survive. The stations do not have to be done in the order on the sheet. When you get to a station, answer the questions for that section only. Please keep the stations neat and behave responsibly.

### **Polar Plunge:**

1. How long could you hold your fingers in the cold bucket?
2. After putting the Crisco bag on your fingers, how long could you hold your fingers in the ice bucket?
3. What kind of adaptation is this station an example of?
4. What kind of animal would have this type of adaptation? Name at least *two*.

### **Webbing Waters:**

1. Was it easier to swim push the water around easier with your hand or with your hand inside the plastic bag?
2. What kind of adaptation is this station an example of?

3. What kind of animal would have this type of adaptation? Name at least *two*.

### **Depth Perception Challenge:**

1. Was it easier or harder to thread the pencil through the washer after you closed one eye?
2. How many chips did you get in the cup without using the goggles?
3. How many chips did you get in the cup using the goggles?
4. How did using the goggles feel? How did it affect your vision?
5. What kind of adaptation is this station an example of?
6. What kind of animal would have this type of adaptation? Name at least *two*.