

What Do You Need?

Strand	Life Processes
Topic	Behavioral adaptations that help animal meet their basic needs
Primary SOL	3.4 The student will investigate and understand that adaptations allow animals to satisfy life needs and respond to the environment. Key concepts include a) behavioral adaptations.
Related SOL	3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources. Key concepts include c) populations and communities.

Background Information

Animals have various adaptations in order to survive. Behavior adaptations may be instinctive or learned. Examples of behavior adaptations include hunting in packs, hibernation, migration, raising tails to warn others of danger, and acting hurt to distract prey from offspring. Physical adaptations include claws used to climb or for defense, cheeks that expand to hold food to carry to a burrow, or long tails that help keep animals balanced as they climb or swing from tree to tree.

An example of a behavioral adaptation in a Virginia species is a behavioral change of the bald eagle. Eagles once avoided the presence of humans. Walking near an eagle's roost or feeding area along Virginia's rivers could cause the bird to fly off, returning a few hours or days later. Slowly, eagles have learned that humans are not a major threat and now will tolerate humans near nest sites and feeding areas. Although not all eagles are tolerant of human disturbances, the majority are not as bothered by the presence of humans as they once were. With the rapidly growing human population in Virginia, this behavioral adaptation will insure that eagles will be around for many years to come. This adaptation is not widespread throughout the United States eagle population.

Another example of behavioral adaptations in a Virginia species are some of the behaviors of gray squirrels. Gray squirrels will circle to the opposite side of the tree to avoid predators, always remaining just out of site. They will also flatten against the side of the tree because their gray coloring allows them to blend in with the bark. Squirrels communicate danger to other squirrels by making a chattering, barking noise or by flicking their tail back and forth.

Gray squirrels are commonly seen everywhere from woodlands to city parks in Virginia. Though they are terrific climbers, these squirrels do come to the ground in search of food such as nuts, acorns, berries, and flowers. Squirrels will typically gather and save a lot of their food all year round but this is definitely true when it comes to the fall of the year. When you see them collecting all their nuts just before winter it is because they are getting ready for winter and they want to make sure that they have enough food to last them. Squirrels have four front teeth that never stop growing so they don't wear down from the constant gnawing. Female squirrels typically give birth to two to eight offspring. Babies are blind and totally dependent on

their mothers for two or three months. Mothers may have several litters in a year, so most squirrel populations are healthy. Baby squirrels are called kittens

The main predators of squirrels are hawks, owls, and cats.

Materials

- Science journals
- Plastic sandwich bags — one per student
- Small ovals of light brown construction paper — (numbered based on which “tree” they will be from). You should have enough for about 2/3 of the class to have three.
- Small strips of light blue construction paper — (numbered based on which “pond” they will be from).). You should have enough for about 2/3 of the class to have three.
- Eight hula hoops or rope to make circles
- Three bandanas or hats to designate the hawks

Vocabulary

behavior, adaptation, defend, rearing, predator, prey, habitat

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Ask the students to recall the basic needs of all animals and as they name them, write them on the board or a chart. (oxygen, food, water, shelter (or cover), and space)
2. Ask the students why food and water are important to animals. List the responses.
3. Ask, “*What does shelter provide for the animals?*” Lead the students to include the following: a protected place to rest and sleep, a place to stay warm in winter, a place to store food, and a place to raise their offspring.
4. If possible, take the students outside to observe squirrels. One or two students can slowly walk up on a squirrel in a tree while others observe the squirrel’s behavior.
5. Tell the students that they will learn how hard it is sometimes for an animal to find shelter and food.
6. Tell the students that they are going to play two games about squirrels.
7. Take the students either to the gym or if weather permits, to the playground to play the games. Give each person a sandwich bag.

Procedure – Game 1: Hungry Squirrels

1. Explain to the students that in this game they will each be a squirrel. As a squirrel, their job will be to find enough food and water to survive. In order to survive, they will need three food pieces and three water pieces. Their food and water must be placed in their sandwich bag.
2. Place the four “tree” hula hoops or rope circles on the ground spread out from one another and the four “puddle” hula hoops or rope circles also spread out from one another, and in the same area as the tree circles. Students are now squirrels and the

“trees” are their shelter. The entire area of the four trees and four puddles is the squirrels’ habitat.

3. The rules for the game are:
 - a. Each squirrel must collect three pieces of food and three pieces of water.
 - b. The circles represent trees with food and puddles with water.
 - c. There are brown pieces of paper that represent pieces of food in four of the circles. These four circles represent trees. Each piece of food has a number on it designating the tree where it is found. (Tree #1’s pieces of food have a #1 on them, tree #2’s pieces of food have a #2 on them, etc.)
 - d. There are blue pieces of paper that represent water in the other four circles. These four circles represent puddles. Each piece of water has a number on it designating the area where it is found. (Puddle #1’s pieces of water have a #1 on them, puddle #2’s pieces of water have a #2 on them, etc.)
 - e. Each squirrel must walk on their tiptoes ONLY. Running or walking regularly means that a squirrel must return to the starting point, turn in any food or water the squirrel has collected, and begin its search again.
 - f. A squirrel may only have one piece of food from each “tree” and one piece of water from each puddle.
 - g. Squirrels will be released to search for food and water in small groups.
 - h. Once a squirrel has found three pieces of food and three waters, they must return to the starting point.
 - i. All food and water collected must be placed in the squirrel’s bag.
4. Allow the students to enter the habitat a few at a time. Explain to them that each time you release a few more squirrels into the habitat, it represents baby squirrels being born and becoming part of the group. Students will soon discover that there is not enough food and water for all the squirrels.
5. After a couple of minutes stop the squirrels and open a discussion about what happened as there were more and more squirrels born. Students will share their frustrations and successes in finding food and water. Ask, “What do you think real squirrels would do if there were too many of them in a habitat?” (move to a new habitat.) “What do squirrels eat?”
6. Have students return all their pieces of food and water, grouping them by numbers so they can be replaced in the trees and puddles. Once sorted, place the food pieces back in the trees and the water back in the ponds.

Procedure – Game 2: Hungry Squirrels and Hungry Hawks

1. Tell the students that we are going to play the game again, but this time with several hawks now added.
2. Designate three students as hawks. Give each hawk a bandana or hat to wear so that students know who is a hawk. Remind students that hawks are a major predator of squirrels.
3. Designate an area where captured squirrels will be taken. When they are taken to this area, they sit down in the area.
4. The rules of the game will remain the same except for the following changes:

- a. The hawks will be in the “forest” with the trees and puddles. Their goal is to capture squirrels.
 - b. Hawks are also only permitted to walk and must also walk on tiptoes.
 - c. A hawk may only capture one squirrel at a time. To capture a squirrel, the hawk must tag the squirrel. If a squirrel is tagged, the squirrel must go with the hawk to an area you have designated as “captured squirrels.”
 - d. The trees are shelter for the squirrels. However, because of the size of the trees in our game, only ONE squirrel can be inside a tree (inside the circle) at a time.
 - e. A squirrel can also “hide” from a hawk by circling the tree and staying on the opposite side of the tree from a hawk. A hawk may NOT reach across a circle to tag a squirrel.
 - f. Hawks must work alone. They may not team up on a squirrel to capture it.
 - g. It is still the responsibility of each squirrel to collect three pieces of food and three waters to survive. If a squirrel remains in a tree throughout the game, they will not be able to find enough food or water to survive.
5. Again, allow the squirrels to enter habitat a few at a time. Explain to them that each time you release a few more squirrels into the habitat, it represents baby squirrels being born and becoming part of the group.
 6. After a couple of minutes stop the squirrels and hawks, and open a discussion about having predators added. Ask, “Was there enough food for all the squirrels? Why or why not? What behaviors did the squirrels use to be able to collect enough food and water?”
 7. Students may wish to play the game multiple times with different students as squirrels and hawks. Remind students of the game rules each time.

Assessment

- **Questions**
 - Would you rather be a squirrel or a hawk? Why?
 - What other things might keep the size of the squirrel population at a supportable size in the habitat?
 - How would you change your behavior if you were a hawk or a squirrel and you weren’t finding enough to eat and drink?
- **Journal/writing prompts**
 - There has been a drought which has caused there to not be enough food and water for the current squirrel population in a habitat. Tell what you think will happen.
 - Scientists who study animals talk about “survival of the fittest”, how did our activity prove or disprove this statement? Use examples from what happened to you in the games.
- **Other**
 - Let students choose an animal and research their needs: shelter, food, water, and space. Identify predators. Students will create a model of a habitat meeting all needs of the animal. Include behavioral adaptations that help the animal survive when there are shortages of food and water and when predator populations rise.

Extensions and Connections (for all students)

- Take an “Around the School” field trip to look for animals, their food, predators, shelter, and water source. Be sure to include animals such as grasshoppers, ants, worms, spiders, etc.
- Invite a guest speaker from the forestry service or a conservation group to talk with the class.
- Use a video or video clip to reinforce the habitat discussion.

Strategies for Differentiation

- Do a picture-sort where students are given a group of pictures to sort in a chart according to the animal, what it needs to eat, where it needs to live, what space it lives in, and its predators.
- Have students invent their own animal and identify what it eats, where it lives, and its predators.
- A student with mobility difficulties might observe and record the activities involved in the Squirrel and Hawk games.