

WILD ADAPTATIONS

Understanding Causes and Effects of Ecosystem Change

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Wild Adaptations

Understanding Causes and Effects of Ecosystem Change

Skill Level

Beginner

Learner Outcomes

The learner will be able to:

- Differentiate between the three main types of adaptations
- Explain common reasons for adaptations
- Value the importance for conservation

Educational Standard(s) Supported

5.LS4.2

Success Indicator

Learners will be successful if they:

- List the three main types of adaptations
- Give reasons animals need adaptations
- Identify a possible adaptation for a plant or animal given a situation

Time Needed

45 Minutes

Materials List

Copies of student passages
Wild Adaptation Activity Cards (Cut pages in half and laminate)

Introduction to Content

Students will examine various animal and plant adaptations, highlighting how they use these adaptations to meet various environmental requirements. Students then apply their knowledge by providing adaptations for a specific plant or animal to meet changing ecosystem requirements.

Introduction to Methodology

The lesson begins by pre-assessing students' knowledge of adaptations. There will be a group reading assignment and students work to identify adaptations for a specific species based on ecosystem changes. Then they work to apply their new-found knowledge.

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Terms and Concepts Introduction

Adaptation- a change or the process of change by which a species becomes better suited for its environment.

Setting the Stage and Opening Questions

Begin by showing the following video to the students:

<https://www.youtube.com/watch?v=fRX2JtKFUzk>

Say to the students, **“Today, we will learn about adaptations. Before we get started with today’s activities, I have a few questions to ask everyone.”**

- 1. How does climate change affect plants and animals?**
- 2. How are animals and plants tailored to their specific environments?**
- 3. What are different types of adaptations and their function?”**

Allow students to respond to each question above, then say, **“By the end of class today, you should be able to differentiate between the three main types of adaptations, explain common reasons for adaptations and value the importance of conservation.”**

Experience

Say to the students, **“Today, I am going to assign you one of four different passages to read and become an ‘expert’ in. In just a moment, I’ll pass out the passages, and you’ll read and highlight what you feel are the most important points of that passage. After everyone has finished reading, everyone will join a group of four, with one ‘expert’ from each passage in each group. You’ll then share what you learned from your passage with your group members, and they will share with you. Remember, it’s going to be important that you read and understand what your passage is talking about so you can share it with your group.”**

Pass out passages to each student, making sure you have an equal number of each passages. After students have finished reading, separate students into groups and have them share what they found from reading their passage with their group members. Encourage students to take notes on the important information.

Tips for Engagement

Ask learners to provide examples throughout the learning event. This encourages all students to remain engaged.

Incorporating activity cards focusing on native plants and animals brings the activity “closer to home” and may enhance learners’ involvement.

Share

After students have had a chance to share in their group, ask them to share what they think is the most important thing they learned from their passages today.

Process

Pass out one Wild Adaptions Activity Card to each group. Say, “**Each group now has a card that has an animal or plant with its description and an ecosystem change that has occurred. In your groups, work to identify adaptations that are needed by your plant or animal and write descriptions of those.**”

Generalize

Ask students to share their scenarios and the adaptations they identified. Follow up by asking the following questions:

1. Do plants and animals constantly adapt to their environments?
How?
2. What do you think is the main reason that animals need to adapt? (Human Influence)

Apply

Ask students, “**Think of a place in our area where humans have impacted the environment. What are some ways animals and plants adapt to help combat those changes?**”

Life Skill(s) from TIPP for 4-H

5th Grade

Participate in 4-H club meetings by saying pledges, completing activities, and being engaged. (Head)

When reading, consider ideas, thoughts, information, or messages that have been written. (Heart)

Speak clearly and effectively in group settings. (Hands)

Supplemental Information

Educational Standards Met

5.LS4.2: Use evidence to construct an explanation for how variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.

Passage 1: Survival in the Wild

Plants and animals have the hard job of surviving in a very wild world. How do they do it? There are many ways plants and animals have adapted in order to survive.

Camouflage is one way animals adapt to survive. For some animals, this means that their fur, scales, or skin are a similar color to the land around them. Deer, for example, have brown fur that blends in with the trees, so it's harder for predators to see them. This saves them from becoming prey to a larger animal. Some animals can actually change colors to match their environment. Many people think of chameleons when they think of this type of camouflage, but rabbits are a great example as well. Some rabbits' fur will change colors depending on the season. Their fur might be brown in the spring, summer, and fall to match the trees, but the brown fur will fall out and white fur will grow in the winter to blend in with the snow. This way the rabbit is safer from predators year-round.

Some insects, instead of blending in with their environment, look like something else that will deter animals from eating them. A walking stick looks just like a stick so that predators will pass it by without noticing it. Katydid's mimic leaves. Some moths and butterflies have designs on their wings that make them look like snakes or owls, to scare away their predators.

For some plants, however, they don't want to blend in; they want to stand out to survive! Many plants grow flowers with colorful petals to attract bees. The bees help pollinate the flowers so that they can produce new flowers.

Instead of hiding, some plants and animals develop structures that aim to hurt anything that tries to hurt them. Some plants develop thorns so that animals will not eat them. Some animals have extremely sharp teeth and claws so they can fight off other animals. Porcupines and hedgehogs even have spikes, called quills or spines, covering their backs so animals won't want to eat them!

Passage 2: Competing for Resources

The resources of any one environment are limited. Depending on which plants and animals share the environment, there may not be enough of everything to go around. All organisms need water, food and shelter to stay alive. These resources are beneficial, which means they are good for the organisms. When an environment is low on any of these things, organisms must compete for them. Those who get to the resources first have the best chance of survival. Being without water, food or shelter for very long is detrimental, which means it is harmful to organisms.

The resources in an area determine how big the plant and animal populations can be. Sometimes there are too many living things in an area. The weakest of the populations will not be able to get the resources they need. As the weak die out, the populations get smaller. Finally, the area's resources recover and can support them again.

Sometimes people will capture members of large animal populations and move them. They take them to another location with less competition. This helps the animals survive and multiply to increase the overall population.

Sometimes the government will allow hunting of large animal populations. Deer and rabbits can be a good food source for people. When there are too many of these animals in an area, they sometimes come into the cities looking for food. They often cause trouble. Hunting keeps the number of animals under control.

Passage 3: What's Eating You?

All the living things in an ecosystem have a role to play. Plants are producers. Inside their green leaves they have round discs called chloroplasts. These chloroplasts are in stacks called grana. A green substance called chlorophyll fills the chloroplasts. It is what gives plants their green color. The chloroplasts allow plants to use water, sunlight and carbon dioxide to produce their own food. That's why they are called producers.

When an animal eats a plant, energy that the plant got from the sun is transferred to the animal. An animal that eats plants is called an herbivore. Since it is the first animal in the food chain, it is also the primary. A consumer is an animal that eats plants or other animals. Consumers that eat only other animals are called carnivores. Consumers that eat both plants and animals are called omnivores.

Producers are critical to the survival of all living organisms in an ecosystem. Consumers depend on producers for the food which gives them energy. None of the other living things in the ecosystem would survive for long without producers.

Many plants make seeds by combining pollen from their flowers with pollen from other flowers. Water or wind occasionally help pollen get where it needs to go. Sometimes it is carried by animals, especially birds and insects.

Since some animals eat plants, it makes sense that animals sometimes help plants to reproduce, or make more plants. These animals that help plants reproduce by carrying pollen from one plant to another are called pollinators. Larger animals often help plants reproduce without even realizing it. Some seeds are caught in animal fur or eaten with fruit from the plants. The animal carries seeds from one place to another so plants can spread to new places. The seeds are deposited and grow in their new locations. Carrying and scattering plant seeds so they will have the opportunity to expand to new areas is called seed dispersal.

Passage 4: Adaptations

A behavioral adaptation is something an organism does, a behavior to help it survive. A common animal adaptation is migration, when animals travel to a different place so they can find food and survive. Migration usually takes place in the winter.

Sounds are behavioral adaptations animals make for different reasons. Bird calls are an example. It is a behavior the bird does to communicate to other birds. A lion humming is a behavior a lion does when it is content. They grunt when they move from one area to another. Female lions roar to protect the young, and male lions roar to display strength. Roaring is also a method of communication.

The movements animals make are behavioral adaptations. Bats are nocturnal animals, so flying is very tiring for them during the day. It is easier for them to fly at night when it is cooler. Raccoons like to come out only at night, too, and are not seen very often. There are less predators at night.

The interactions between animals can also be behavioral adaptations. The honey bee dance is a behavioral adaptation that attracts a honey bee to its mate. Honey bees also learn from other bees how to pollinate flowers and collect honey. The dance helps communicate information about food to other bees. A monkey removing parasites from another monkey's head is an example of an interaction.

A physical adaptation is a physical part of an organism that helps it survive. The fur on a bear is an example, because it is part of the bear's body structure and helps keep it warm during cold weather. The beak of a bird and the blue jay's color are both part of their bodies, helping them to survive. The ostrich has many thick feathers helping the ostrich look bigger to scare away predators. The ostrich also has a large mouth it uses to fight predators like cheetahs.

A life cycle adaptation is a process an animal goes through to help it survive. Before becoming a frog, the tadpole first hatched from an egg, which was laid by an adult frog. Atlantic salmon spend their early phase in rivers before traveling or migrating to sea to grow and mature. To complete their life cycle, they must return to their river of origin to release new eggs. Butterflies go through four stages of life. They start out as eggs, change into a caterpillar, then a pupa, and finally an adult butterfly. All are examples of life cycle adaptations.



African Elephant

Description: African Elephants are found throughout central and western Africa. An adult elephant will roam great distances up to 14 hours each day to eat up to 300 pounds of roots, grasses, fruit, and bark.

Scenario: The African Elephants have been wandering in search of water but cannot find any.



Prickly Pear Cactus

Description: The Prickly Pear Cactus is found throughout southwest North America. They produce fruit called tuna and can vary in height from one to seven feet tall. They bloom in late spring or early summer and stores a lot of water because it does not rain much. They have sharp spines to protect itself from predators. They prefer full sun and sandy soil.

Scenario: A disease called cactus anthracnose causes the plant to rot from the inside out.



Saucer Magnolia

Description: The Saucer Magnolia is native to the British Isles but has been taken around the world. It can grow to be up to 25 feet tall. Its fragrant flowers come in the spring and are ten inches wide. It likes full sun to partial shade with fertile soil.

Scenario: A new insect from Africa is accidentally brought over by humans that eats the flowers which drastically reduces the number of seeds each tree produces.



African Lion

Description: African Lions live in prides. These carnivores work together to prey upon large animals such as zebra or antelope. They are mainly nocturnal and may sleep up to 20 hours a day.

Scenario: A city expands into lion habitat causing overcrowding of lions and interactions with humans.



Aldabra Giant Tortoise

Description: The Aldabra Giant Tortoise is found mainly on the Aldabra Atoll. This herbivore feeds on grasses, plants and leaves.

Scenario: Because of rising waters, the atoll slowly becomes smaller until it sinks.



Giraffe

Description: Giraffes are found on the African savanna. They use their long legs, neck and tongue to reach the leaves and buds in the treetops and watch for predators.

Scenario: The trees develop a coating on their leaves that make the leaves poisonous.



Komodo Dragon

Description: Komodo Dragons are found on Indonesia's lesser Sunda Islands and are able to swim from island to island. These carnivores ambush their prey. They have over 50 strains of bacteria in their mouth that will end up killing any escaping prey.

Scenario: Their prey develops an immunity to the bacteria in their mouth.



Meerkat

Description: Meerkats live on the southern African plains. They live in burrows to keep cool and hide from predators. One or more members will serve as a lookout while the rest of the community forages for insects, lizards, birds and fruit.

Scenario: Due to several heavy rainstorms, the Meerkat burrows collapse.



North American Beaver

Description: North American Beavers are found throughout North America. They live in lodges made of branches and mud. Their powerful teeth and jaws are used to fell the trees used in their construction projects. These herbivores eat leaves, bark, roots, twigs and aquatic plants.

Scenario: Due to several strong droughts, many rivers and ponds dry up.



North American Black Bear

Description: The North American Black Bear is found throughout North America. Their diet consists of a wide range of food including roots, grasses, berries, insects, fish, mammals and garbage. During winter, they hibernate in dens of caves, hollow trees or any other warm and sheltered spot.

Scenario: The climate becomes colder which makes winter longer and summer colder.



Description: Red Pandas are found in the mountains of Nepal, northern Myanmar and central China. They spend most of their time in trees for protection from predators. Their diet includes bamboo, fruits, acorns, roots and eggs.

Scenario: Seventy percent of the trees are cut down which forces many of the pandas to the ground or to overcrowd the treetops.

Red Panda



Description: The Red Wolf is found only in North Carolina. They eat small mammals, insects, berries and occasionally deer. Their dens consist of hollow tree trunks, along stream banks or sand hills, and in abandoned dens. Red Wolves are mainly nocturnal and communicate by scent markings, vocalizations, facial expressions and body postures.

Red Wolf

Scenario: A disease kills many of the smaller mammals creating a food shortage.



**South African
Penguin**

Description: South African Penguins live on the south-western coast of African and several islands in the surrounding area. They forage in the open sea for fish, invertebrates and small crustaceans. They dig burrows to lay their eggs in and keep out of the heat.

Scenario: An oil spill kills off most of the fish population so now there is not enough to go around.



**Southern White
Rhinoceros**

Description: The Southern White Rhinoceros is found in parts of southern Africa. Rhinos eat grass. They lie in the shade and roll in the mud to keep cool and protect themselves from the sun. They have two horns they use for protecting or attacking. Rhinos have great hearing and smell.

Scenario: A fire destroys much of the grasslands.

Answer Key

Elephant: Structural

Lion: Behavioral

Tortoise: Structural

Giraffe: Physiological

Cactus: Physiological

Magnolia: Structural or
Physiological

Dragon: Any

Meerkat: Structural or
Behavioral

Beaver: Behavioral

Bear: Structural or Behavioral

Panda: Structural or Behavioral

Wolf: Structural or Behavioral

Penguin: Any

Rhino: Any

Note: these are not the only
answers. They are the most likely
type for the scenario.

Guided Group Discussion Help

Instructions: If a group is having difficulty, prompt the group with the following questions.

- 1) Ask group what need this is affecting (food, water, shelter or space).
- 2) Ask group what adaptation this is or affects.
- 3) Ask group what adaptation they would use to counteract this affect.