

Animal Adaptations--Snowshoe Hare/Cottontail Rabbit

Summary

The students will be able to compare the traits of species for physical abilities, instinctual behaviors, and specialized body structures that increase the survival of animals in a specific environment.

Analyze how structural and behavioral adaptations help organisms survive.

Define structural and behavioral adaptations.

Observe and identify specific adaptations of animals.

Give examples of structural and behavioral adaptations.

Recognize the distinct characteristics of two or more similar animals.

Describe physical adaptations exhibited by two animals and compare their differences.

Materials

Chalkboard or chart paper

Marker

Colored pencils

- [Animal Adaptation Cards](#) (pdf)

Student science journal/notebook

Internet access

Document Camera

Research resources (e.g., Internet, CDRoms, encyclopedia, etc.)

30 newspaper hole punch holes

30 white paper hole punch holes

Newspaper page

Drawing paper

Construction paper

Pencil

Books:

- *Science Kids Animal Disguises*

(Paperback), by Belinda Weber; ISBN:0753457725

- *Hidden Animals*

, by Millicent Ellis Selsam, ISBN13: 9780060252816; ISBN: 0060252812

- *Mimicry and Camouflage*

(Nature Watch Series), by Jill Bailey; ISBN13: 9780816016570 ISBN: 0816016577

- *Nature's Tricksters: Animals and Plants That Aren't What They Seem*

, by Mary Batten; ISBN 10: 0316083712, ISBN13: 9780316083713

- *Animals in Disguise*

(Curious Creatures), Martine Duprez, Helene, ISBN10: 0881066737,

- *Animal Camouflage in the Snow*

(Pebble Plus) by, Martha E. H. Rustad; ISBN13: 9781429633277 ISBN10: 1429633271

- *Clever Camouflage (Animal Attack and Defense)*

by, Kimberley Jane Pryor; ISBN13: 9780761444206 ISBN10: 0761444203

- *Animals With Crafty Camouflage: Hiding in Plain Sight*

(Amazing Animal Defenses) by Susan K. Mitchell. ISBN13: 9780766032910 ISBN10: 076603291

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- *The Midnight Dance of the Snowshoe Hare*

by, Nancy White Carlstrom; ISBN97803992 27462

- *How Snowshoe Hare Rescued the Sun: A Tale from the Arctic*

, by Emery Bernhard; ISBN9780823410439

- *Cottontail Rabbits*

(Pull Ahead Books), by Kristin Ellerbusch Gallagher; ISBN97808225 36239

Article:

Sisson, R. (March 1980). "Deception: Formula for Survival," *National Geographic*,:394415.

Background for Teachers

Science language students should use: inherited, environment, species, offspring, traits, variations, survival, instincts, population, specialized structure, organism, life cycle, parent organism, learned behavior

In order for animals to survive, they need to be able to adapt. In this lesson we will look at the types of adaptations animals can and do make. In a perfect world, animals would not need to adapt. However, with constant changes to their *environment*, animals must adapt or face extinction. 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 will slowly disappear. An adaptation or *variation* is a trait that makes an animal suited to its *environment*. 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. This adaptation happens in the form of changing an animal's genetic traits. The thick fur coat of an arctic fox is a *structural adaptation*. It helps protect it against the cold weather. The shape of a bird's beak, the number of fingers, color of the fur, the thickness or thinness of the fur, the shape of the nose or ears are all examples of *physical adaptations* which help different animals survive.

Other adaptations are behavioral or *learned behavior* (behavior that an organism must learn in order to survive.) *Behavioral adaptations* are the things organisms do to survive. It has to do with the things animals do to help them survive and compete in their environment. Some of these behaviors may be *instinct* (a natural or inherent aptitude, impulse, or capacity) and some may be *learned*. For example, birdcalls and migration are behavioral adaptations. For orangutans, building a nest correctly is a learned behavior. For proboscis monkeys, excellent swimming is an instinct, or a behavior that an organism is born with. Moving in large groups is also a *behavioral adaptation*; it helps protect the members of the group from predators.

Intended Learning Outcomes

Use science processes and thinking skills.

Communicate effectively using science language and reasoning.

Instructional Procedures

Invitation to Learn:

Begin with a folk tale:

"There is an imaginary animal, the WHATSIT. The WHATSIT lives in woods. Men and larger animals hunt it. Most WHATITS are born with white fur, making them easy to spot amongst the trees. Some WHATSITS are born with brown, speckled fur. These are far more difficult to spot. Since they are easier targets for hunters, far more white WHATITS are hunted and killed than speckled ones. Each time a speckled one mates with a white one, half the offspring is speckled. Eventually the amount of white furred ones available to breed is smaller than the number of speckled ones. More offspring are born with speckles than with white fur. This animal has adapted, and now the majority has speckled fur instead of white fur. Eventually the white furred ones will disappear altogether."

There are many examples of this type of adaptation--physical/structural adaptation. Because this adaptation occurs over generations, it is slow in changing. In some cases, the inability of animals to adapt quickly enough has led to their being threatened or suffering extinction. Behavioral adaptation can happen far more quickly. The more intelligent an animal, the faster it can learn to make behavioral changes in order to survive. Animals adapt in many ways in order to survive. Here is an imaginary example of animal adaptation.

Share another folk tale:

"A group of animals live in the environment SOMEWHERE. In this environment, a large number of their offspring die each year, after being attacked by wild animals. The group of animals can make changes to their environment and behavior in order to protect the offspring. These animals can build things, usually a home for their offspring. They can develop behavioral adaptations that make them more efficient, including speed, endurance, cunning, and highly specialized sense organs or physical features for avoiding their predators. They can ensure that the children only go out in groups, protected by a heightened sense of awareness, speed and agility, or disguises, all of which help them to escape or elude predators."

All of these are behavioral changes, and can happen almost overnight. The speed with which they happen depends on the intelligence of the animals and their ability to work as a community.

Instructional Procedures:

A. Understanding Structural and Behavioral Adaptations

From the two folktales given, discuss the adaptation concepts that students infer from the two stories. Students write in their science journals/notebooks a definition for structural adaptations and behavioral adaptation. Students can share their written definitions.

Students investigate structural and behavioral adaptations by sorting Animal Adaptation Cards. Copy the cards onto six different colors for classroom management purposes. This activity can be used to preassess student understanding of structural/behavioral adaptation concepts. As they work in small groups sorting the cards, circulate around the class asking the students to justify their placement of the different animal adaptation cards in categories. This is a great time for the students to analyze what determines structural and behavioral adaptations. Listening to their justification can help drive the direction of teaching. Check the students' work using the Animal Adaptation Cards Answers. Animal (Adaptation Cards and answers are attached.)

After sorting the Animal Adaptation Cards, debrief with the students the information learned from the activity. Students write a reflection paragraph on the concepts understood from the activity.

B. Comparing Adaptations of two animals--Snowshoe Rabbit and Cottontail Rabbit

Start by writing the words "rabbit" and "hare" on the chalkboard and ask students to describe the differences and similarities of each animal. (Use a Venn Diagram to show the differences/similarities).

Ask: "What are the similarities and differences between the rabbit and hare?"

Believe it or not, there are actually several differences between a rabbit and a hare. Physically, the hare has longer ears and hind legs. In general, the hare is just overall larger than a rabbit. They also have different lifestyles. The hare is a solitary animal, while the rabbit enjoys living in groups. The hare just makes a slight hole on top of the ground to sleep, while the wild rabbit prefers a burrow below ground. At birth, the hare is fully furred, has his eyes open and will hop within moments of being born. A baby rabbit is hairless and blind. It must adjust to this new world before it is ready to "hop around."

Now, write "snowshoe hare and cottontail rabbit" on the board. Following the same idea, ask the students what they know about these two mammals and write their answers on the board.

Use the following books:

- *Animal Camouflage in the Snow*

(Pebble Plus), by Martha E. H. Rustad; ISBN13: 97814296 33277 ISBN10: 1429633271

- *Cottontail Rabbits*

(Pull Ahead Books), by Kristin Ellerbusch Gallagher; ISBN97808225 36239

Ask: Why is this beautiful rabbit called a hare? What characteristics do the two animals have that are similar and different?

Students work in groups to research and organize the information, recognizing the distinct characteristics of the snowshoe hare and the cottontail rabbit. Student purpose for this activity is to understand the adaptations that these two animals use for survival.

Use the following information to compare the two animals.

Use the Internet to see actual pictures and read information. Take the students to the Web sites listed below. Ask them to find information on the color, size, weight, physical features, habitat, behavior, young and food of the snowshoe hare and the cottontail rabbit. Information can be generated for them to read. You can use a projection camera to read and observe the pictures about the snowshoe hare and the cottontail rabbit.

- [Identifying and Deterring Rabbits](#)
- [White Creatures Changing with the Season](#)
- [Cottontail Rabbits](#)

Alternatively, provide a variety of books for the students to read. Selections can be made from the Book Resources below.

Use the following background information on the snowshoe hare and cottontail rabbit Like the Arctic Fox, the gorgeous fur on this hare changes color with the seasons. In winter, the fur is white to match the snow. In summer, the fur turns brown and serves as a marvelous camouflage in nature. Show pictures from the Internet site and notice just how well the hare blends in on the picture. You would probably completely overlook him in the wild. When the hare hears a noise, he remains perfectly still. The Snowshoe Hare also has fur on his feet to protect him from the freezing ground. Notice the black tipped ears. Emphasize the feet covered with fur to protect them from the freezing ground.

He is called a snowshoe hare because of the tracks his large feet leave in the snow. His toes can be spread out for balance, and the wide toe and slender heel track resembles a snowshoe impression.

In addition to his leaping abilities, the snowshoe hare has remarkable running and swimming skills. Thus, he is often able to avoid capture by a predator. One of the main differences is that snowshoe hares have larger back feet than cottontail rabbits; due to their larger hind feet they are able to sprint across slippery surfaces.

The cottontail rabbit is a stocky animal with large hind feet, long ears, and a short, fluffy tail that resembles a cotton ball. Its long, coarse coat varies in color from reddishbrown to a black or grayishbrown. The underparts are white. This is because rabbits feet are very furry, and they do not always leave clear tracks. Their front feet are pointy, unlike those of other rabbits. Cottontails have very keen sight and hearing. When danger is sensed, the animal will usually freeze in place until the danger has passed, but he will flush readily if approached too closely. Rabbits normally move slowly, in short hops or jumps, but when frightened they can achieve speeds up to 18 miles per hour over a short distance. They often zigzag to confuse a pursuing predator. Cottontails prefer to live and forage among the edges of open fields and meadows, areas of dense high grass, in wood thickets, along fencerows, forest edges and along the borders of marshy areas. Dense forests and thickets attract cottontails at high elevations, especially birch/red maple forests, hemlock and rhododendron areas within oakhickory forests, blueberries, mountain laurel and coniferous forests. Cottontails are largely nocturnal, active from early evening to late morning. In summer, cottontails feed almost entirely on tender grasses and herbs; crops such as peas, beans, and lettuce are also eaten. In winter, bark, twigs and the buds of shrubs and young trees are eaten. Cottontail rabbits can be difficult to track because of

their shallow and furry track marks. However, how they move and leave their tracks is unique to how they run.

Student Reflection in Science Journals:

Provide time for the students to reflect in their journal/notebooks their understanding.

Summarize and describe the physical adaptations exhibited by the snowshoe hare and cottontail rabbit and compare their differences.

Describe how some characteristics could give a species a survival advantage in a particular environment.

Activity Connected to the Lesson:

Camouflage: An Adaptation of Survival

Camouflage and protective coloration, natural selection, are important to animal survival. Natural selection is the process that makes sure that the animals and plants that are best adapted to their environment will survive and reproduce. It is often described as "survival of the fittest" because animals that don't suit their surroundings are more likely to die and not leave offspring. Some animals are always one color while others change with the season or material they are resting on. Other good animals to talk about for natural selection include: snakes, chameleons, and rabbits.

Ask: What is camouflage? (Camouflage uses two or more colors to create a matching pattern that let an organism blend into its surroundings.)

Ask: What is protective coloration? (Protective coloration is an adaptation in which color matching is used to match the background.)

Explore why the ability to change color with the seasons is so important to animals. The following simulation allows a hands-on activity that strengthens the student understanding about camouflage as a survival adaptation.

Snowshoe Hare Simulation Objectives:

Describe the importance of coloration in avoiding predator attacks.

Relate environmental change to changes in organisms.

Explain how natural selection causes populations to change.

Materials:

Sheet of white paper

Newspaper

Tweezers

Colored Pencils

Clock with Second Hand

30 newspaper circles (made with hole punch)

30 white circles (made with hole punch)

Purposes:

In this lab, you will simulate how predators locate prey in different environments. You will analyze how color affects an organism's ability to survive in certain environments.

Procedure:

Place a sheet of white paper on the table and have one person spread 30 white circles and 30 newspaper circles over the surface while the other person isn't looking.

The "predator" will then use tweezers to pick up as many of the circles as he can in 15 seconds.

This trial will be repeated with white circles on a newspaper background, newspaper circles on a white background, and newspaper circles on a newspaper background. Generate a data chart in student science journals/notebooks. Record the data.

Analysis:

What did the experiment show about how preys are selected by predators?

What hare coloration is the best adaptation for a dark (newspaper) background? How do you know?

What would you expect the next generation of hare to look like after trial 1? What about the next generation after trial 3?
How does the simulation model natural selection?

Extensions

Research:

Discover more animals that use other techniques for survival.

Camouflage--Watch the following videos on How sea animals use camouflage.

- [Cool Underwater Creatures](#)
- [The Ultimate Guide: Octopus: Cuttlefish Camouflage](#)
- [Mimicry-Looking at animals that use mimicry](#)

Art:

Students color a rabbit to match various surfaces around the classroom. Have your students stick their camouflaged rabbits around the room using transparent tape. Remind students that they are not allowed to hide the rabbits under desks or behind curtains. The goal is for the rabbits to blend with their surroundings: placing them out of plain sight defeats the purpose of the activity.

Have students work individually or in small groups to design an imaginary animal. They can use modeling clay, paper and crayons or markers, or other art supplies. Have each group give a name to their animal and develop a fact sheet. The fact sheet should include habitat, diet, gender, behavior and physical characteristics. Once the students are finished, display the animals and have the students examine the animals and make predictions about habitat, behavior and diet based on the animal's visible characteristics. Then have the students share their fact sheets with the class.

Writing:

Have students develop a set of "why do" questions about animals and plants and do research to find the answers. For example: Why do zebras have stripes? Why do roses have thorns?

Family Connections:

Students could use the Internet to research animal adaptation.

There are many different interactive activities/games on the Internet that reinforce animal adaptation concepts. Students play an interactive game about animal adaptation.

Interactive technology sites:

- [Animal Adaptation](#)
- [Animals](#)

Assessment Plan

Use the notes made in the students' science journal to see if more understanding is needed.

Students draw a snowshoe hare, or a cottontail rabbit in seasonal camouflage.

Students find out the names of animals whose colors change with the seasons, such as the snowshoe hare, polar bear, whitetailed deer, and horned owl. Describe each animal's natural habitat. Identify their predators.

Students collect information and ideas about how camouflage makes a difference for predators and their prey. Then orally present to the class.

Students write an observational/research report on an animal adaptation. (For example, camouflage, mimicry, etc.).

Students choose two animals from the Animal Adaptation Cards. Describe physical adaptations exhibited by the two animals and compare their differences. Then write a compare and contrast essay.

Authors

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