

Winter Adaptations

The onset of winter brings change which affects all animals. Animals respond to this change in three basic way: migration, hibernation and resistance. This lesson gives students the opportunity to explore these themes through a hands-on winter adaptations activity.

Grade Level: 3rd Grade

Phenomena:

How do animals prepare for and survive the winter?

Objectives:

- Students will list three adaptations that animals use to survive the winter.
- Students will describe at least two challenges that animals face in the winter.
- Students will create a skit to demonstrate how animals survive in winter weather.

Materials:

- Pictures of animals
 - Animal pelts (optional)
- For each group of ten students:*
- Blindfold
 - Spoon with yard-long string tied to it
- For Adaptation Skits:*
- Coyote– hide, thick winter coat
 - Big Horn Sheep– Hide, white crayons
 - Worms– Garden shovel
 - Lizards– ice pack, pillow
 - Bats– wings
 - Mountain Lion– snow shoes
 - Jack Rabbit– rabbit ears, newspaper nest
 - Mice– sleeping mask, white sheet

Time Considerations:

- Preparation: 20-30 minutes
- Activity 1: 10-15 minutes
- Activity 2: 10 minutes
- Activity 3: 10-15 minutes
- Activity 4: 10-15 minutes
- Conclusion: 5-10 minutes



Next Generation Science Standards

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Science and Engineering Practices (SEP):

Planning and carrying out investigations.
Asking questions and defining problems.

Disciplinary Core Ideas:

3-LS1 From Molecules to Organisms: Structures and Processes

Cross Cutting Concepts:

Cause and Effect
Structure and Function

Excellence in Environmental Education Guidelines

- **Strand 2.2– The Living Environment. C) Systems and Connections–** Learners understand basic ways in which organisms are related to their environments and to other organisms.
—Describe ways in which an organism's behavior patterns are related to it environment. Identify examples of environmental change and discuss how these changes may be helpful or harmful to particular organisms.

Background

To survive the harshness of winter, many animals have developed different behavioral, physiological, and morphological adaptations:

Migration is a common effect of winter upon animals, notably birds. However the majority of birds do not migrate. Some butterflies also migrate seasonally.

Hibernation is a state of reduced metabolic activity during the winter. These animals "sleep" during winter and only come out as warm weather returns. For example, gophers, bears, frogs, snakes and bats hibernate.

Some animals store food for the winter and live upon it

instead of hibernating completely. This is the case of squirrels, beavers, skunks, badgers and raccoons.

Adaptation is observed when an animal endures winter by changing in ways such as color or musculature. The color of the fur or plumage are changed to white in order to be confused with snow and thus, to retain their cryptic coloration year round. Examples are the ptarmigan, the arctic fox, the weasel, the white-tailed jack rabbit or the mountain hare.

Some fur-coated mammals grow a heavier fur coat during the winter. This improves the heat-retention qualities of the fur. The coat is then shed following the winter season to allow better cooling. The heavier winter coat made this

season a favorite for trappers who sought more profitable skins.

Snow also affects the ways animals behave, as many take advantage of the insulating properties of snow by burrowing in it. Mice and voles typically live under the snow layer.

Read background information and gather all lesson materials.

Activity 1: Coyote Pounce



Polar Bears hibernate and adapt during temperature changes

http://media.photobucket.com/image/polar%20bear/marybeparker/polar_bear.jpg?o=92&sortby=sevendaysview

Preparation

Begin the lesson by playing the game coyote pounce:

Doing the Activity

Have students sit in a circle. (If there are more than 10 students, split the group in half). A second adult leader will be needed for each group.

Have the leader introduce the following challenge: One student at a time will be blindfolded while the a spoon is placed quietly on the floor to one side of them. The leader will then slowly pull the spoon across the floor. The blindfolded student will have one

chance to stick out their hands and “catch” the spoon.

Rotate the blindfold around the group so everyone has a chance to try the activity and several chances to see other people try to “catch” the spoon.

NOTE: This activity works best on a carpet.

Activity 2: Game Discussion

At the end of the activity, ask students what they think this game might represent (Give them some clues if you have to).

Explain the spoon represented a prey animal (for example a mouse) moving under the snow. The blindfolded student represented a predator trying to catch the prey (for example, a coyote).

Talk about the differences between playing the game on a loud tile floor versus carpet. This represents the difference of a prey animal moving around in the summer, versus during the winter months under the snow, which dampens sound.

Ask students what advantage did the mouse have? What about the coyote? Would the coyote have had as much success in the winter versus summer? Would the mouse? Did coyotes learn better ways to capture the mouse from other groups?

Ask the students what word describes a change in behavior and/or self that better suits an organism to where it lives? (Adaptation!)

Activity 3:

Struggles of Winter & Adaptations Brainstorm

Discuss the challenges animals face in winter. Brainstorm as a class a list of the challenges. Record this list on the board. Some things to note are: less available food (plants or animals), cold temperatures, lack of camouflage, different plants, lots of snow.

Discuss possible responses that animals have to the challenges you listed on the board.

Group students' answers under main headings: migration, hibernation and adaptation. Then have students explain (and fill in the gaps) what these terms mean.

NOTE: These headings will be used for a Venn Diagram later on in the lesson.

Explain that migration means to move from one region to another on a regular schedule to find food or to reproduce.

Explain that hibernation means to slow down your body during the winter so as to not need food or water. This is similar to sleeping, but is not like sleeping all winter.

The last method for animal survival during the winter is adaptation. This is probably the hardest for students to understand. Ask what animals are seen in the winter. How do these animals make it through the winter? Discussion should lead to fur, fat and feathers. Animals use these three means to survive the winter.

Activity 4: Adaptation Bios and Skits

Divide the class into groups of three or four.

As students sit in their groups, be sure to demonstrate how this activity works by using one of the animal cards or props.

Each group will receive a bio card and props associated with their animal.

Students are to use their props and the information on their bio cards to create a short skit that explains how their animal has adapted to the harsh winter environment.

After you explain the activity, have one person from each group come up to you and get their card and props.

Students should begin by reading their card out loud to the group. Then designate roles: reporter, the animal, and dressers.

Give students some time to create their skit. Walk around the room and help the students if needed.

Conclusion

Let each group present their skit to the rest of the class.

Ask students to name 3 ways in which animals respond to winter struggles

Ask students to name examples of each.

Create a Venn diagram with the information and the three headings



Birds Migrating

<http://www.songbirdgarden.com/store/prodimages/MigratingBirds.jpg>

Assessment

Assess students informally by their participation in the class discussion and by their ability to answer questions.

Formally assess students by their ability to match the pictures of the animals with their winter survival method in Activity 3. To reinforce the different winter adaptations, have students break off into groups. Have each group consider or research different regions of the country and what animals are found in each region and how would they prepare for winter. For example, one group could focus on a desert region in the Western United States and talk about plants, animals, and insects found locally and how that list changes throughout the year.

Extensions

Have students present to one another and make sure biomes unfamiliar to the students are introduced.

Have students consider how humans adapt to winter. Which kinds of adaptations do people use? Are they similar to the student's favorite animal?

Allow students to explore animal pelts to compare which animals have the best fur to survive the winter.

Older students: Conduct "Fur, Fat and Feathers" experiment to see which is the best insulator. Have a student come to the front of the class. On the left hand, have student coat hand with lard and then cover with a latex glove. On the right hand should be the latex glove only. Insert a CBL temperature probe in both gloves and place hands in an ice bath. Record temperatures and graph. Record student observation and feeling in hands. Repeat with down feather glove and a fur lined glove. As a class, review graph and student observations to determine which is a better insulator to survive the winter months. Discuss the animals that use these methods.

Younger students: Play "Winter Adaptation Concentration." Students match cards of animals to their winter adaptations (similar to the game "Memory").

Adapt- to withstand the force or effect of something, in this case, winter

Adaptation- A change in structure or function that helps plants and animals survive.

Hibernate- to pass the winter in a sleeping or resting state

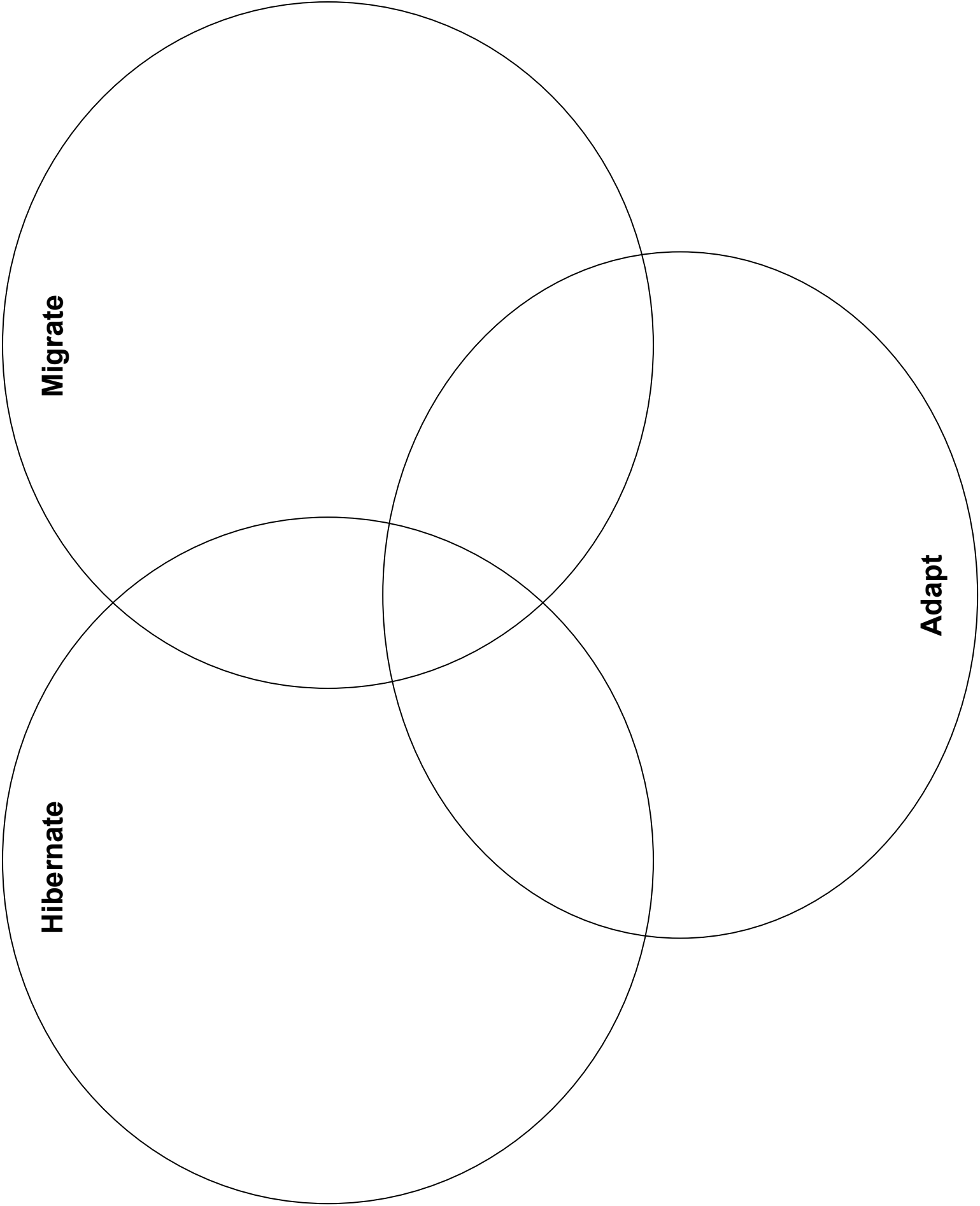
Migrate- moving from one region to another on a regular schedule to find food or to reproduce.

Sources

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- <http://web.dps.k12.va.us/parkave/sciani3-4.htm>
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- <http://www.thewildclassroom.com/bats/adaptations.html>
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Images:

- <http://www.songbirdgarden.com/store/prodimages/MigratingBirds.jpg>
- http://media.photobucket.com/image/polar%20bear/marybeparker/polar_bear.jpg?o=92&sortby=sevendaysview



Migrate

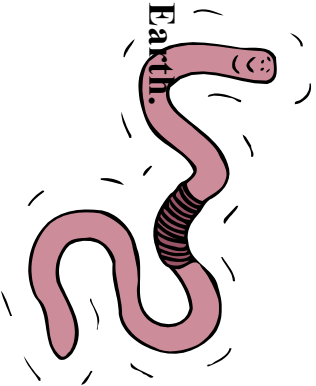
Hibernate

Adapt

Worms

Worms are tricky creatures that people mistake a lot. During the winter months, instead of remaining near the surface where the ground can freeze.

Worms move farther down into the soil in an effort to stay warm. When the summer return, worms return to upper part of the Earth.

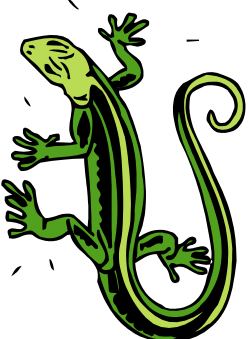


Lizards

There are many different kinds of lizards that live in the Great Basin Desert. When the winter months arrive, lizards

move into their holes to sleep through the season.

In the spring when the temperatures begins to rise, these cold blooded reptiles awake and are active once again in the warmer weather.



Coyote

The coyote is a swift animal that preys on small rodents, rabbits, and sometimes a dead carcass of another animal in the Great Basin Desert.

During the winter the coyote continues to hunt, but grows extra fur in order to remain warm in the cold winter temperatures of the desert.



Big Horn Sheep

Big Horn Sheep live in the mountains of the Great Basin Desert. They feed on grass, sage brush, and other low growing plants. During the winter

months they move to warmer areas of the desert in search of food. Big horn sheep also grow a thicker coat and whiter fur to stay warm.



Bat

Bats are nocturnal animals, which means they are most active at night.

When winter approach-



es bats can do one of two things. Depending on the type of bat, some bats will find a safe spot to sleep through the winter. Or they will fly to a warmer area and continue their nightly flights and hunts for insects.

Mountain Lion

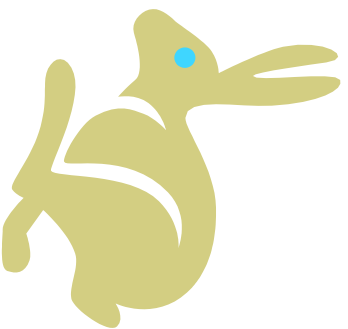
Mountain lions are secretive animals that are not seen very often at all. Mountain lions usually hunt over large spaces. During the winter they hunt in

smaller areas where prey usually live. Mountain lions also use their big paws like snowshoes as they track. their prey through deep snow.



Jack Rabbit

A jackrabbit is not a rabbit at all! It's the largest member of the hare family. Instead of hibernating in winter, jackrabbits build a nest at the base of shrubs and continue searching for food at night. As it sleeps through cold winter days, jackrabbits will lessen blood flow to their ears in order to keep their bodies



Mice

There are many kinds of mice that run around the Great Basin Desert.

When winter months come, these small rodents do one of two things. Some mice scurry to their dens to sleep through the cold months. While still others stay awake and move under the snow. The snow



keeps these mice warm and safe from predators!



Arctic Woolly Bear Caterpillar



Caribou



Ermine

<http://stalio.deviantart.com/art/White-Ermine-65484103>

