

Variations for Survival

Wyoming Science, Language Arts

Objectives:

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

Background:

Members of a species are alike in many ways. However, individuals within a species show small differences. Variations are differences in appearance of an inherited trait among the members of a species. Variations can be observed in traits related to size, shape, behavior, function, and body parts. Most variations are minor and include differences in hair color, whisker length and flower color. Others may be major and quite apparent like a cat with six toes on each paw or an albino deer. All of these variations are inherited and can be passed down to the offspring from the parent organism.

Variations in individuals may affect their ability to survive in a changing environment. During the course of many generations, a variation that provides a survival advantage can become widespread in a population because individuals within it have a higher probability of reproducing.

Plant breeders take advantage of variations to produce improved crops. For example, U.S. potato farmers spend millions of dollars each year on pesticides, but insects become resistant to these pesticides. In Bolivia, a species of wild potato has hairs on its leaves that release a sticky chemical when touched. They act like flypaper and trap pests that feed on the leaves of the potato plant. However, these potatoes are very small. Through plant breeding, scientists have been able to combine the large size trait of U.S. potatoes with the insect-resistance trait of the Bolivian potatoes to develop a high yielding, large, insect-resistant variety of potatoes.

Activity Procedures:

1. Begin by showing students pictures of two related organisms that live in very different environments (see “page 2” for examples of organism pairs).
2. Provide each student with a copy of the short, summarized facts about these two organisms.
3. As a class, discuss and describe the environment in which each organism lives.
4. As a class, make a list of physical characteristics that are similar between the two organisms. Then make lists of the physical characteristics that are unique to each organism.



Standards

Science

Life Systems: 1.2, 1.3, 1.4, 1.5, 1.6

History & Nature of Science in Personal & Social

Decisions: 3.1A, 3.1B, 3.2C

Language Arts

5th Grade:

Writing: 2.1A, 2.1B, 2.1C, 2.1D, 2.1E, 2.1F, 2.2B1, 2.2B2, 2.2B3

6th Grade:

Writing: 2.1A, 2.1B, 2.1C, 2.1D, 2.1E, 2.2B1, 2.2B2, 2.2B3

Materials

- Pairs of pictures of related organisms that live in very different habitats and brief facts about each organism.
- Examples of organism pairs on page #2.
- Copies of short, summarized facts about the two organisms.
- Dictionaries and Thesauri for student use.

Estimated Time

90 Minutes

Grades 5-6

notes:

- Examples of organism pairs include: polar and black bears, snowshoe and jack rabbits, bumble and carpenter bees, prairie dogs and marmots, red or white-tailed deer and caribou, bobcats and lions, komodo dragons and lizards, water buffalo and bison, grey and arctic foxes.

5. You may find it helpful to use a graphic organizer such as a T-chart, to help your students organize this information.
6. As a class, discuss how these variations give each organism a survival advantage in its unique environment.
7. Model with the class the writing skills you want them to use on their own.

Teaching Tip:

For example, for a comparison paper, you might:

- Discuss the characteristics of a good paragraph, such as a topic sentence, supporting arguments and a conclusion.
 - As a class, write a paragraph about the similarities between the two organisms;
 - Write a paragraph for each animal about its unique characteristics, including errors and extraneous information that needs to be edited out.
 - As a class, write a poem using the format about the two animals.
8. Pair pictures of related organisms that live in different environments and have each student choose a pair for further research and writing.
 9. Have students write a comparison paper, a type of poetry, a research report, or make a poster or a brochure (assign one or give students a choice) describing how the physical characteristics of each organism provide it with a survival advantage in the environment in which it lives. Have a dictionary and a thesaurus available for students to use as they research and write.

Questions for Investigation:

1. Why do similar organisms live in different environments?
2. Describe how physical characteristics of organism provides it with a survival advantage in the environment in which it lives.
3. List some organism found in Wyoming? Can they be found in different environments? Why or Why not?



Bear Cousins

Polar bears and brown bears could be considered cousins that live in far-off lands. Like family members, they have many similar characteristics that indicate they are from the same family. Bears are characterized as having big barrel-shaped bodies covered with thick fur, and stout, strong legs. They have small, circular-shaped ears and elongated noses that end with black nostrils. The claws of a bear are quite ominous-looking and well-respected by all. Even though a polar bear and a black bear are very similar, they also have major differences. These differences help them survive in extremely different environments.

In the cold, frozen, barren world of snow and ice surrounding the vast Arctic Sea lives the aggressive polar bear. Polar Bears have many physical features that help them survive in this hostile environment. Their fur is transparent which allows sunlight to penetrate their black skin, that absorbs light and converts it into heat. The whiteness of their fur allows them to blend in with their snowy surroundings. One of the most amazing things about a polar bear is its paws. These wide paws, have non-slip pads that enable them to travel over the snow and ice without slipping. Everything about a polar bear makes it perfect for a climate where very few animals can survive.

In the more temperate forest regions lives the much smaller, timid black bear. The black bear is considered to be the smallest bear in North America. But all black bears aren't really all black. Some have rusty-brown or gray fur mixed in with the black that helps them to blend into their surroundings of dark forested pines. Its smaller size helps it to climb trees to remove birds' eggs and get honey from beehives. Whether the black bear knows it's small or just because it is timid, it avoids being seen and stays hidden in the foliage of the woods. However, the black bear does have very sharp claws and teeth that can rip open tree stumps and tear branches off trees. Black bears are definitely more suited for the forested woodlands. The black bear would not be comfortable going to visit his polar bear cousins up North.

Examples of Class Work That Integrates Writing Skills

SIMILARITIES BETWEEN BEARS

Claws	Small tail
Thick fur	1-2 cubs/year
Body build & shape	Live in den
Small ears	Store fat
Long nose	

vocabulary:

- *species*
- *trait*
- *environment*
- *contrast*
- *characteristics*
- *organisms*

DIFFERENCES UNIQUE TO THE POLAR BEAR

White, transparent,
Hollow fur
Black skin underneath
Large, wide, nonslip
Paws
Basically a carnivore

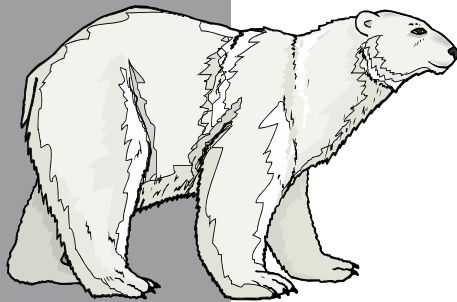
Snowy, cold environment
Long hind legs
Hunting techniques
Layers of blubber
Swims in the ocean

DIFFERENCES UNIQUE

Black & brown fur
Smaller paws
Omnivore
Forested environment
Shorter legs
Food gathering techniques
Climbs trees
Smaller in size



Poem in Modified Diamanté Format:



polar bear
gigantic furry white
prowling in the arctic wasteland
hunting eating sleeping
hiding in the darkened forest
timid agile
black bear

Modified Diamanté Format Used for Poem Above:

noun
adjective adjective
phrase beginning with participle* that describes what they
do and where they do it
participle participle participle
phrase beginning with a participle that describes what
they do and where they do it
adjective adjective
noun

* A participle is an action verb ending with "ing"