DOLPHIN RESEARCH CENTER
Adaptations

Grade Level: 3rd-5th

Objectives: Students will demonstrate their understanding of animal adaptations in a creative way by designing an animal labeled with adaptations appropriate to its environment and then writing about how their animal's adaptations help them survive in their environment.

Florida Sunshine State Standards:

Language Arts:

LA.B.1.2: The student uses writing processes effectively.

LA.B.2.2.5 The student creates narratives in which ideas, details, and events are in logical order and are relevant to the story line.

Science

SC.G.1.2.1 The student knows ways that plants, animals, and protists interact.

SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

SC.G.1.2.5 The student knows that animals eat plants or other animals to acquire the energy they need for survival.

National Standards:

Content Standard C (K-4) - Characteristics of organisms: Each plant or animal has different structures that serve different functions in growth, survival, and reproduction. For example, humans have distinct body structures for walking, holding, seeing, and talking.

Content Standard C (5-8) - Diversity and adaptations of organisms: Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Background: This is a useful lesson for incorporating animal adaptations into language arts. It fits well with Science or Social Studies when examining endangered animals, etc. This lesson introduces students to, or extends students' knowledge on, the concept of adaptation in animals with a focus on dolphins– the idea that certain animals have developed features which help them survive in their environment. With older children, this can lead into the concept of 'survival of the fittest.' From this

Key Terms

Adaptations: Changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.

Adaptations

lesson, students will show their understanding of the concepts discussed in a creative way. Dolphins are mammals, not fish.

What makes a dolphin a mammal?

1. They breathe air directly into their lungs.
2. They have hair at some point during their life cycle.
3. They are warm-blooded.
4. They give birth to live young.
5. They nurse their young.

The ocean can be a very harsh place for a mammal to live. However, dolphins are uniquely adapted for the marine environment. How have dolphins and other marine mammals come to live in an aquatic world? Scientists believe evolution holds the key to the answer. See ***Physiology*** Information file for more information.

Materials:

- Paper
- Crayons, markers
- Creativity!!!
- Pictures of animals with adaptations i.e. dolphins, giraffes, anteaters, elephants
- www.zoobooks.com (optional)
- www.dolphins.org
- Handouts of the different environments

Teacher Prep Notes: Have pictures of whichever animals' adaptations you will discuss to facilitate higher level thinking skills. Read aloud to the class a book on dolphins and their physiology. (See book list.) Visit website as a class prior to lesson as an introduction to dolphins and overall animal adaptations.

Procedures:

Begin lesson by talking about animals which have physical features which make them well suited to their environment. (With older children: survival of the fittest). This includes animals that are camouflaged to their habitat, features that allow animals to survive in their climate, and features that allow animals to get food and defend themselves. Physical features include:
EXAMPLES:

Elephant – trunk	Shark – sense of smell, ampulae of lorenzini
Giraffe – neck	Hunting dogs – ears, wet nose
Echidna – spines	Lion – color, claws
Gecko – fake tail	Polar bear – coat, color, claws
Skunk - smell	Kangaroo – hind legs, tail
Goat – surefootedness	Fish- gills, scales

Adaptations

FOCUS: How about marine mammals?
Dolphins- blowhole to breathe, flippers to steer, dorsal fin for stability, tail flukes for thermoregulation, tongue fringe when calves nurse, skin 12 times thicker than humans for protection and streamlining, counter shading (lighter on the bottom and darker on the top) as camouflage to blend in with the sunlight coming down if a predator like a shark is under them looking up, and to blend in with deeper water if a predator is above them looking down.

Animals gain and adapt their physical features over millions of years, but our task today is going to cut down that time just a little. Students will design an animal that is perfectly suited to its environment.

Task:
It is the future, the year 3000, and it is now possible for humans to build planets, and genetically engineer or create plants and animals to live on that planet. You are one of the scientists working on the animals, and it is your job to design and create an animal that will be perfectly suited to its environment on this new planet.

You need to pick one of the following environments of already created planets and create an animal which is going to be strong and resilient enough to survive in that environment. You need to consider how this animal is going to stay warm or cool, what it is going to eat, how it is going to get its food and water, and how it is going to care for its young to make sure they survive. Your animal must FIT INTO the existing food chain - it cannot be the top predator. (The one that can eat everything else and nothing can eat it).

ENVIRONMENTS
Select one of the following:
1: This planet is dark and cold most of the time. It is very mountainous. It rains almost all day. Because of the wet, dark conditions, the only plants that grow well are small mosses and fungi. Animals on this planet include a type of mouse, a nocturnal hunting large cat, fish, and a variety of insects.

2: This planet is dry and hot. Most of the planet is flat. Water is found in underground streams but there is little water on the surface of the planet. Most of the planet's surface is covered in sand, although there are patches of dry grass. When plants can get their roots down into the water table, they grow into tall trees with leaves at the top but not along the trunk. Plants, which are not connected to the water table, are small and dry, but they are edible. Animals on this planet include insects, a species of birds, which roost in the high trees, a sand-colored lizard, and a type of rat.

3. This planet is tropical: wet and hot. Most of the planet is covered by rainforest. The planet is very flat. Water collects in large pools and lakes, which have water in them all year 'round.

Adaptations

A species of poisonous plant grows thickly on the ground. The spines of this plant are poisonous, and any animal that steps on one is sure to die. The vegetation is plentiful, and includes leaves, fruits and nuts. Animals include carnivorous snakes, varieties of insects, monkeys, fish and birds.

4. This planet has a moderate climate. It never gets very hot or very cold, but stays mild all year 'round. It rains for part of the year and the water forms pools and lakes which dry up towards the end of the year and then the planet is very dry. The planet is partly mountainous and partly flat. Vegetation includes tall trees with high leaves and fruit, and a smaller plant, which bears nuts. However, these nuts are inside hard shells, which need to be removed before the nut can be eaten. Animals include rats and mice which live underground, insects, birds that nest in the tall trees, slow moving mammals which also live in the trees and a species of carnivorous nocturnal wolf.

When you are designing your animal consider the following:

- Size
- What does it eat?
- How will it catch/get food and water?
- How will it keep warm/cool?
- Where will it shelter?
- How will it protect/defend itself from predators?

Draw a labeled picture of your creature with its adaptations. On a separate sheet of paper, write a description (at least one half a page- three paragraphs) of your animal, its adaptations, and why/how it is suited to its environment. Give your animal a name. Congratulations! You've created a new animal!

Wrap Up: Have students present their animals to the class and display them for the school to admire, or compile their creations in a class book!

Taking it Further:

1. Have students complete a research paper based on readings that include both physical and behavioral adaptations as appropriate for the animal they have chosen. (Include a bibliography.)
2. Have students use knowledge of animal habitats and behaviors to produce a realistic painting or drawing of a selected animal.
3. Have students perform a skit using props to demonstrate how an animal's adaptations enable it to survive in a particular environment.

NOTE: This lesson is based on the lesson "Designer Animal," found at http://www.lessonplanspage.com/ScienceAnimalAdaptations58.htm.