Furry Friends

OVERVIEW:
Students will explore a diversity of mammals and their characteristics through experiential activities. They will learn about the food chain and food web, mammalian adaptations and the relationship mammals have with the rest of the forest community.

OBJECTIVES:
Students will be able to:
) Summarize biotic and abiotic factors that mammals need in order to survive.
) Identify a diversity of local mammals and their adaptations.
) Describe the interdependence mammals have within an ecosystem.
) Give examples of environmentally responsible considerations related to mammals.

VOCABULARY:

Abiotic Factor	Adaptation	Binocular Vision	Biotic Factor	Camouflage
Carnivore	Carrying Capacity	Consumer	Ecosystem	Estivate
Food Chain	Food Web	FWARPS	Habitat	Herbivore
Hibernate	Limiting Factor	Monocular Vision	Niche	Omnivore
Predator	Prey	Torpor		

NEXT GENERATION SCIENCE STANDARDS:
) The food of almost any kind of animal can be tracked back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. (5-LS2.A)
) Matter cycles between the air and soil and among plants, animals and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid or solid) back into the environment. (5-LS2.B)
) Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetations, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)
) Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

MATERIALS:
clothes pins with animal names
throwables
whiteboard and marker

PROCEDURES:
1. Introductory Activity: Who Am I? (found in activity glossary)
   A. Conduct activity while hiking to flat area.
   B. Debrief: What did the clothespins have in common? *Animals-yes. But all were mammals!* Which of those mammals are found in the San Bernardino National Forest? Bridge into discussion on characteristics of a mammal.
2. Characteristics of a Mammal Discussion
   A. Using information from "Who Am I," begin discussion on mammal characteristics.
   B. Explain that all mammals have hair, are endothermic, and nourish their young with milk.
   C. Explain that most mammals give live birth; a couple of exceptions are spiny anteaters and the duck-billed platypus (they are egg layers).
   D. Explain that mammals are **consumers**. Have students give examples of the following types of consumers: **herbivores** (deer, tree squirrels); **carnivores** (bobcats, mountain lions); **omnivores** (humans, ground squirrels, black bears).
3. Survival of a Mammal Discussion
   A. Review that in order to survive, all mammals have needs. Look around in the forest and have students come up with examples of **FWARPS**.
   B. Explain that mammals also have **adaptations** to survive.

C. Vision: Explain the structure and function of **monocular** and **binocular** vision.
   i. <u>Activity: Vision Ball Toss</u> (found in activity glossary)
   ii. Debrief: How was your vision different in each round? Why is it easier to judge depth perception with both eyes open? How would animals with wide-set eyes benefit as items approach from the side? Review monocular/binocular vision.
D. Use "Vision Ball Toss" to introduce **predator/prey**. Have students hypothesize a potential **food chain** in the forest around them. (mouse -> coyote, rabbit -> bobcat) Have students include themselves in a **food web** (grass -> cow -> human, corn->chicken->human). Keep in mind, very few mammals survive on humans for food.
E. **Torpor:** When metabolism decreases and the heart and respiratory system slow down. The function is to save energy (food/water). Animals in torpor do not wake up immediately like a human being woken up from sleep. Many small mammals exhibit a daily period of torpor that is adapted to their feeding patterns, which can be day or night (bat and shrew).
   i. **Estivation**: Summer torpor that enables an animal to survive high temperatures and scarce water supplies (hedgehogs).
   ii. **Hibernate**: Long term winter torpor as an adaptation to cold and food scarcity (ground squirrels).
   iii. Bears**:** Some scientist think that bears do not go into hibernation as typically thought because they may wake up and walk around and their temperature does not decrease significantly.
F. **Camouflage**: Have students predict the function of camouflage. Give examples of different animals and their camouflage (baby deer/spots, bobcat/spots and stripes).
   i. <u>Activity: Camouflage</u> (found in activity glossary)
   ii. Debrief: What was effective camouflage during the activity? How did you use it to help you be successful? How can both predators and prey benefit from the physical adaptation of camouflage?
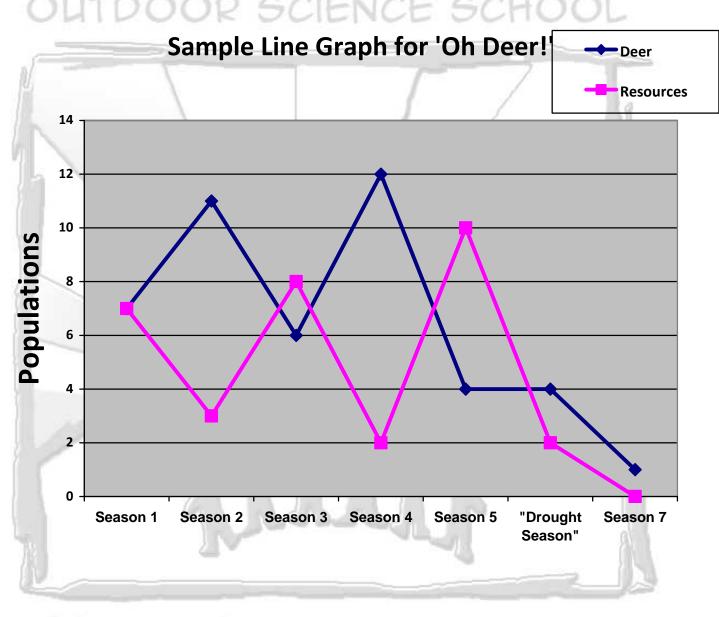
4. The Mammal's Role Discussion
   A. Ask students what their role/job is at home. *Going to school and helping with chores are common jobs for students.* Other animals fill roles, or **niches** in the environment too. For example, coyotes keep the rodent population down and squirrels help disperse seeds around the forest. Compare the **habitat** of humans in their hometown and forest animals. Describe the parts of those habitats and why they are needed.
   B. Explain that the students are currently in a squirrel habitat. Can they describe what may affect this habitat? Break the elements of FWARPS into **abiotic** and **biotic** factors of the squirrel **ecosystem**.
   C. Explain **carrying capacity**: There is a balance between any number of a population, like squirrels, and the amount of resources for them. That balance is determined by the resource in greatest demand, known as a **limiting factor.** Any part of FWARPS can be a limiting factor. Where space is a limiting factor on a school bus or in the dining hall for humans, the number of trees or burrows can be the limiting factor for some squirrels. Water is a limiting factor in the desert or other areas of drought. Protection is a limiting factor if there is a predator hunting or if a disease is spreading through an area. Food can be a limiting factor, too. Limiting factors determine what the carrying capacity, or healthy number, of a population is in its habitat.

5. *Experiment: Oh Deer*
   A. Conduct experiment. Graph results.
   B. Debrief: Why did we re-enact this instead of watching it in real life? How did the population change over time? Show them the graph to illustrate this inverse relationship between animals and resources. Predict what could happen over time. How was the deer population affected by the introduction of cougars? Analyze what would happen with more or less cougars/deer/resources. What does this experiment teach us about carrying capacity? *When the land cannot support the animals, animals die.*

6. Wrap Up
    A. [*What?*] Concisely review the major points of the lesson, all the way back from the introductory activity.
    B. [*So what?*] What was important for you to discover from the lesson? Why was it important for all of us to take this class?
    C. [*Now what?*] What can you now do with this information? What changes can you make in your life? What can you teach to others? Who will you tell? What will you say?
    D. Pass out beads after all students have contributed.

THINGS TO THINK ABOUT:
Special Needs: Keep in mind the abilities of the group and structure activities/experiment accordingly.
Time Fillers: If school does not have Feathered Friends this week, do the <u>Goggles</u> demonstration too.

Sample Line Graph for 'Oh Deer!'