ANIMALS ALL AROUND

Hands-on learning! Students see, discuss, and touch animals, covering the topics of Adaptations, Life Cycles, Food as Energy, Family Characteristics. Discovery Center reptiles, amphibians, mammals, and birds are used during this tour. (Available as a "Museum-to-Go.")

4th GRADE

Standards:
Science
Language Arts
Social Studies

Life Science

Standard 1. CELLS:
Conceptual Strand 1: All living things are made of cells that perform functions necessary for life.
GLE 0407.1.1. Recognize that cells are the building blocks of all living things.

Teacher Questions, Pre-Tour
Q: Suggestion: Show students pictures of human cells from different parts of the body (skin, organ, etc.). Ask how these cells are different, and how they are alike. What is their function in the body?

Teacher Questions, Post-Tour
Q: Show students pictures of animal cells from the same parts of the body as the human cells (skin, organ, etc.) What is the function of these cells? How are animals and humans alike?

Standard 2. INTERDEPENDENCE:
Conceptual Strand 2: All life is interdependent and interacts with the environment.
GLE 0407.2.1. Analyze the effects of changes in the environment on the stability of an ecosystem.

Teacher Questions, Pre-Tour
Q: Describe a wetland ecosystem (amount of water, type of plants, animal species, food chains and food webs). This is the type of ecosystem you will visit at the Discovery Center. To understand and apply the answers to this and the subsequent post-tour question, the students should walk the boardwalk loop with their chaperones before leaving the Discovery Center.]

Teacher Questions, Post-Tour
Q: Recall your visit to the Discovery Center and your walk on the boardwalk. Suppose that Murfreesboro had several years of very dry weather (little rainfall). How might that affect the wetland ecosystem? What might happen if there was a lot of rainfall?
What effect on the wetland ecosystem might there have been if the city had decided to drain the wetland (that was considered as a plan long ago!)

Standard 3. FLOW OF MATTER AND ENERGY:

Conceptual Strand 3: Matter and energy flow through the biosphere.
GLE 0407.3.1. Demonstrate that plants require light energy to grow and survive.

Teacher Questions, Pre-Tour
Q: Do we make our own food? (No).
Q: What organism CAN make its own food? (Only green plants)

Teacher Questions, Post-Tour
Q: Divide the class into small groups of 3-4 students. Give each group 4 cups (labeled with group number or name) filled with potting soil, and have them plant seeds --- radish or marigold. Keep the pots on a window sill or other place where they get sunlight/daylight. When the sprouts are about 1-2" tall, take 2 pots from each group and place these in a closet or under a box in a dark part of the classroom. Continue to water all plants, but keep the 'dark' plants away from light. Compare the plants exposed to sunlight/daylight to the plants kept in the dark. Which plants grew better? (For a more dramatic comparison, this experiment may be continued until the plants kept in light flower or otherwise mature.)

GLE 0407.3.2. Investigate different ways that organisms meet their energy needs.

Teacher Questions, Pre-Tour
Q: How do plants get energy? How do animals get energy? How do humans get energy?

Teacher Questions, Post-Tour
Q: At the Discovery Center, you saw some of the animals that are used for programs. How do these animals meet their energy needs? How might this be different from the animals that live in the wetlands adjacent to the Discovery Center?

<u>Standard 4. HEREDITY</u>:
Conceptual Strand 4: Plants and animals reproduce and transmit hereditary information between generations.
GLE 0407.4.1. Recognize the relationship between reproduction and the continuation of a species.

Teacher Questions, Pre-Tour
Q: Were there cats and dogs when your grandparents were little? How about wild animals, like raccoons or opossums? (may have to show a picture for some students who have never seen wild animals). Since dogs or cats or wild animals don't live as long as humans, explain why there are still cats, dogs, raccoons, and opossums today? (They reproduce, or have babies, which mature and reproduce in turn).

Teacher Questions, Post-Tour
Q: You saw some animals on your Discovery Center tour that normally live in the wild, like the box turtle or milk snake. In order for their species to not die out, what must happen? (Most individuals in the species must be able to reproduce). What can affect reproduction in the wild? (good habitat, food supply, ability to avoid predators, number of young, etc.)
[For advanced students, a discussion of the dangers to wild habitats by feral animals (domestic animals who are 'wild' and hunt for their food), such as cats, might be appropriate. This discussion could lead to what might happen if there is unchecked reproduction of pet animals.]

Standard 5. BIODIVERSITY AND CHANGE:
Conceptual Strand 5: A rich variety of complex organisms have developed in response to a continually changing environment.
GLE 0407.5.1. Analyze physical and behavioral adaptations that enable organisms to survive in their environment.

Teacher Questions, Pre-Tour
Q: Name a plant and an animal that live in a desert habitat. How does each meet its needs for food, water, and shelter, and space? Is this a physical adaptation (color & shape, body system like blood circulation or nutrition, etc.) or a behavioral adaptation (something the plant or animal does)? [This exercise may be done with some research in the library or at home. Note: Being active at night when it is cooler is a physical adaptation to the desert heat. Also, some animals aestivate during the summer in order to conserve energy and stay cool. Some desert animals, like the sidewinder (rattlesnake) are lighter colored, like the desert sand, in comparison with their woodland cousins, which are much darker in color. This physical adaptation has taken place over time.]

Teacher Questions, Post-Tour
Q: Name some plants and animals that live in a wetland habitat like that at the Discovery Center. How does each meet its needs for food, water, and shelter, and space? Is this a physical adaptation (color & shape, body system like blood circulation or nutrition, etc.) or a behavioral adaptation (something the plant or animal does)? [This exercise may be done with some research in the library or at home.]

GLE 0405.5.2. Describe how environmental changes caused the extinction of various plant and animal species.

Teacher Questions, Pre-Tour
Q: What is one LARGE group of animals that have gone extinct that we know about? (Dinosaurs). What environmental changes might have been the cause of this? [Note: This website http://www.answers.com/topic/why-did-dinosaurs-become-extinct has a short discussion; scientists are not certain of the cause of dinosaur extinction, and there are several theories.]

Teacher Questions, Post-Tour
Q: Besides environmental changes, what changes that humans cause affect native plants and wildlife? [Habitat loss/reduction due to urbanization; pesticides that kill plants which birds need for food; water pollution that affects species (like mussels) upon which other animals depend.

Physical Science

Standard 9. MATTER:
Conceptual Strand 9: The composition and structure of matter is known, and it behaves according to principles that are generally understood.
GLE 0407.9.2. Explore different types of physical changes in matter.

Teacher Questions, Pre-Tour
Q: What are the three states of matter? (Solid, liquid, gas). Using the states of matter, how could you change water from a liquid to a solid? From a solid to a liquid? From a liquid to a gas?

Teacher Questions, Post-Tour
Q: At the Discovery Center, you discussed the water cycle. List all the ways water exists in the world (lakes, rivers, puddles, ocean, snow, glaciers, rain, etc.). What conditions cause the changes water goes through as it becomes ice, rain, snow, or a cloud?

Language Arts

Recommended Reading:

Nonfiction:

City Animals (Zoobooks Series) by John Bonnett Wexo.
Ducks, Geese, & Swans (Zoobook Series) by John Bonnett Wexo
Hamsters, Gerbils, Guinea Pigs, Rabbits, Ferrets, Mice, and Rats: How to Choose and Care for a Small Mammal (American Humane Pet Care Library) by Laura S. Jeffrey. (Ages 5 and up, 48 pages).
Learning to Care for Small Mammals (Beginning Pet Care With American Humane) by Felicia Lowenstein Niven. (Grades 3 and up)
Nocturnal Animals (Zoobooks Series) by John Bonnett Wexo. (Grades 4 and up)
Owls (Zoobooks Series) by Timothy L Biel. (Grades 4 and up)
Salamander Rain: A Lake & Pond Journal by Kristin Joy Pratt-Serafini. (Grades 3 and 4).
Skunks and Their Relatives (Zoobooks) by John Bonnett Wexo. (Grades 4 and up)
Turtles (Zoobooks Series) by Timothy L. Biel. (Grades 4 and up)
Snakes! (Zoobook Series) by John Bonnett Wexo. (2001).
Snakes! Strange and Wonderful. Laurence Pringle. (2009). Elementary.

Fiction:

(Hybrid: fiction and nonfiction) Near One Cattail: Turtles, Logs And Leaping Frogs by Anthony D. Fredericks. (Ages 4 and up)
The Magic School Bus Gets Eaten: A Book About Food Chains by Pat Relf. (ages 4 and up, 32 pages).

For teachers:

Ranger Rick's NatureScope series titles:

Amazing Mammals, Part I (1998, National Wildlife Federation, McGraw-Hill)
Amazing Mammals, Part II (1998, National Wildlife Federation, McGraw-Hill)
Endangered Animals: Wild and Rare (1997, National Wildlife Federation, McGraw-Hill)
Let's Hear It for Herps (1997, National Wildlife Federation, McGraw-Hill)
Wading Into Wetlands (1997, National Wildlife Federation, McGraw-Hill)

Social Studies

Standard 3. GEOGRAPHY:
Content Standard 3.0: Geography enables the students to see, understand and appreciate the web of relationships between people, places, and environments. Students will use the knowledge, skills, and understanding of concepts within the six essential elements of geography: world in spatial form, places and regions, physical systems, human systems, environment and society, and the issues of geography.
GLE 4.3.02 Recognize the interaction between human and physical systems around the world.

Teacher Questions, Pre-Tour
Q: Where does the water in your house come from? (the city? The county? A well?) Where do you think the water in a wetland comes from? Why is clean water important?

Teacher Questions, Post-Tour
Q: Where does a wetland come from? Why would a source of water, especially clean water, have been important to early Tennessee people? (Both native Americans and early European settlers).

Standard 6. INDIVIDUALS, GROUPS, and INTERACTIONS:
Content Standard 6.0: Personal development and identity are shaped by factors including culture, groups, and institutions. Central to this development are exploration, identification, and analysis of how individuals and groups work independently and cooperatively.
GLE 4.6.01. Recognize the impact of individual and group decisions.

Teacher Questions, Pre-Tour
Q: How are changes made at your school? (for example, if you wanted different types of food in the cafeteria?) How are changes made in your city/county? In your country? In the world?

Teacher Questions, Post-Tour
Q: The wetlands and the Discovery Center building and property used to be owned by a bottling company. How do you think the changes were made for this property to be used for a museum and the wetlands preserved so that you could visit with your classmates or families?