

## **SPLASH, FLASH, CRANK, SLIDE, ALIVE!**

This is a general science tour with plenty of hands-on action in the areas of life cycles, adaptation, fossils, energy, water cycle, friction, and gravity. Your class will explore Discovery Center animals, water table, shadow room, and super slide.

### **3rd 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 0307.1.1.** Use magnifiers to make observations of specific plant and body parts and describe their functions.

##### **Teacher Questions, Pre-Tour**

**Q:** What tools might we use to observe something more closely? (microscopes, magnifiers). Which of these is more easily used, more affordable, more portable? (magnifier). Why would you use a magnifier? (to see more details of an object, characteristics that you can't see with just your eyes).

##### **Teacher Questions, Post-Tour**

**Q:** At the Discovery Center, you were able to use magnifiers at the Fossil Station. Describe the correct way to use a magnifier (put it over the observed object and raise it toward your eye). How does using a magnifier help you understand more about how a plant or an animal lives?

##### **Standard 2. INTERDEPENDENCE:**

**Conceptual Strand 2:** All life is interdependent and interacts with the environment.  
**GLE 0307.2.1.** Categorize things as living or non-living.

##### **Teacher Questions, Pre-Tour**

**Q:** Define living and non-living. Look around your classroom. Besides your fellow students and your teacher, is there anything else living in your classroom? How would you classify rocks, shells, acorns --- are they living or nonliving? How did you decide your answer?

##### **Teacher Questions, Post-Tour**

**Q:** List some living things you saw at the Discovery Center that are not human. What are some things that are nonliving, but necessary for life for all of us? (air, water, soil --- nutrients for plants).

**GLE 0307.2.2.** Explain how organisms with similar needs compete with one another for resources.

##### **Teacher Questions, Pre-Tour**

**Q:** What do you think would happen in nature if there were two animals that lived in the same general area and ate similar foods? Would both be able to survive? Why or why not?

**Teacher Questions, Post-Tour**

**Q:** In Rutherford County, there are two species of squirrels---gray squirrels and fox squirrels. Both eat similar food and live in the same habitat. Both climb trees. How do you think they are able to handle the competition for food and space? (gray squirrels are “crepuscular”---that is, most active in the early morning and the early evening, while red squirrels are “diurnal” ---active during the daylight hours.)

**Standard 3. FLOW OF MATTER AND ENERGY:**

**Conceptual Strand 3:** Matter and energy flow through the biosphere.

**GLE 0307.3.1.** Describe how animals use food to obtain energy and materials for growth and repair.

**Teacher Questions, Pre-Tour**

**Q:** How do animals use food? (lead discussion to describe basic digestion process, including circulatory information to describe how nutrients get to cells for growth and repair)

**Teacher Questions, Post-Tour**

**Q:** Describe some of the animals you met at the Discovery Center and what they eat. (Owl eats mice; snakes eat mice; turtle eats ‘salad,’ mealworms, sometimes fruit). How is each animal adapted to eat what it needs? (talons and sharp beak for owl; ability to stretch mouth to swallow for snake, etc.)

What happens to the food these animals eat? (Most is used by the body for energy and repair. Since reptiles are “cold-blooded” they need the sun’s energy for warmth. At the Center all reptiles have a heat lamp.)

**Standard 4. HEREDITY:**

**Conceptual Strand 4:** Plants and animals reproduce and transmit hereditary information between generations.

**GLE 0307.4.1.** Identify the different life stages through which plants and animals pass.

**Teacher Questions, Pre-Tour**

**Q:** Review stages in the life of a plant (seed, sprout or seedling, mature plant, seeds).

**Teacher Questions, Post-Tour**

**Q:** Think of the life cycle of the animals you saw at the Discovery Center. What are the life stages for an owl? A snake? An amphibian, like a frog or toad? Which of these animals look like their parents as soon as they are born or hatched? Which go through stages of development before they look like their parents? Compare life cycles of plants and animals.

**GLE 0307.4.2.** Recognize common human characteristics that are transmitted from parents to offspring.

**Teacher Questions, Pre-Tour:**

**Q:** Sometimes people tell us we look like our Aunt Susie, or our Mom or Dad when they were young. Has that happened to you? (several answers). What characteristics are passed on in families? [hairline (straight or “widow’s peak”), curly vs. straight hair, ability to twist your tongue, attached or unattached ear lobes, color-blindness, hand-clasping (left or right thumb on top), allergies, freckles, handedness (left or right), dimples, cleft-chin].

### **Teacher Questions, Post-Tour**

**Q:** As we saw at our Discovery Center visit, animals in the center and in the wetland grow and develop into adults that resemble their parents. Compare the characteristics of a human being, of a mammal you saw, and of a reptile you saw. How are they alike? How are they different? (to make this easier, list physical characteristics for each, then list how they get food, water, shelter. Do they give live birth or lay eggs to reproduce?)

### **Standard 5. BIODIVERSITY AND CHANGE:**

**Conceptual Strand 5:** A rich variety of complex organisms have developed in response to a continually changing environment.

**GLE 0307.5.1.** Explore the relationship between an organism’s characteristics and its ability to survive in a particular environment.

### **Teacher Questions, Pre-Tour**

**Q:** What are your own characteristics? (Human, warm-blooded, etc.) How do these characteristics help you to survive in your environment? [How to meet your needs---food, water, shelter, in a suitable arrangement---and avoid danger (think “germs”).]

### **Teacher Questions, Post-Tour**

**Q:** After our visit to the Discovery Center, pick an animal that you met there, and describe its characteristics, including what it needs to live (food, water, shelter, in a suitable arrangement), to explain how it can survive in its environment. Also, describe the environment!

**GLE 0305.5.2.** Classify organisms as thriving, threatened, endangered, or extinct.

### **Teacher Questions, Pre-Tour**

**Q:** Define thriving, threatened, endangered, and extinct. (and extirpated!)

### **Teacher Questions, Post-Tour**

**Q:** Can you give some examples of animals in TN that fit each category? [THRIVING: deer; THREATENED: northern pine snake, western pigmy rattlesnake; ENDANGERED: Carolina northern flying squirrel, peregrine falcon, MANY mussel species, MANY darters (small beautiful fish), many others; EXTINCT: passenger pigeon, 9 species of mussels; EXTIRPATED: red wolves, gray wolves, Eastern cougar, red-cockaded woodpecker. <http://www.state.tn.us/environment/na/>

**Q:** What is a fossil? When you examined fossils at the Discovery Center, how were you able to tell whether a fossil was a plant or an animal? (sometimes easy to tell if the fossil resembles a modern-day plant or animal.) Discuss “Indian money,” aka crinoids stems. These plant pieces resemble the vertebrae of animals.

## 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 0307.9.1.** Design a simple experiment to determine how the physical properties of matter can change over time and under different conditions.

#### **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?

### **Standard 10. ENERGY:**

**Conceptual Strand 10:** Various forms of energy are constantly being transformed into other types without any net loss of energy from the system.

**GLE 0307.10.1.** Investigate phenomena that produce heat.

#### **Teacher Questions, Pre-Tour**

**Q:** When you run or play hard, you can feel your body get warmer --- you might even get sweaty. Why is that? (Stored energy is being used.) What do you call the type of energy that is stored in your body, ready to use? (Potential). What kind of energy do you call it when you are using it to play or work? (Kinetic energy).

**Q:** Where do you get the energy you use? (The food you eat.) How will you know if you have enough energy to do the work or play as you want to? (You have to eat food that provides protein, carbohydrates, and fat in the proportions you need for work or play, not “junk food” that provides empty calories.) YOU make the choices to have enough energy when you choose your food!

#### **Teacher Questions, Post-Tour**

**Q:** Did you notice a “warming” of your body, especially the parts touching the slide, as you went from the top of the slide to the bottom? What caused the heat? (Friction between your body and the slide).

### **Standard 11. MOTION:**

**Conceptual Strand 11:** Objects move in ways that can be observed, described, predicted and measured.

**GLE 0307.11.1.** Explain how the direction of a moving object is affected by unbalanced forces.

#### **Teacher Questions, Pre-Tour**

**Q:** What happens to a ball when you throw it? When a thrown ball is struck by a bat? When the ball is hit by a bat, then strikes the outfield fence? What forces act on the ball? Imagine these actions happening in outer space. What do you think would happen in each case? Why?

### **Teacher Questions, Post-Tour**

**Q:** What forces act on you when you went down the slide at the Discovery Center? What could you change to increase or decrease your speed when you slide? (Hint: Think about the clothing you are wearing/could be wearing, or what you could sit upon when you slide.) How do these suggestions work?

**GLE 0307.11.2.** Recognize the relationship between the mass of an object and the force needed to move it.

### **Teacher Questions, Pre-Tour**

**Q:** Can you push an empty student desk across the floor? How much force do you need to use to do this?

How hard would this task be if another student was sitting in the desk? What if three students were able to sit in the desk at the same time? Explain why the amount of force needed changes with each situation.

### **Teacher Questions, Post-Tour**

**Q:** Imagine that the slide at the Discovery Center was stretched out flat. If you sat on one end of it, would you then automatically slide to the other end? Why or why not? What force(s) act in this situation?

What force(s) helped you to go down the slide at the Discovery Center?

(Video: <http://mrhardy.wikispaces.com/Forces.swf>)

(Check out this interactive video: <http://www.wonderville.ca/asset/forces-of-wonder>)

## **Language Arts**

### **Recommended Reading:**

#### Nonfiction:

*A Drop Around the World* by Barbara McKinney. (1998). Ages 5 and up. **Lexile measure: 820L.**

*City Animals (Zoobooks Series)* by John Bonnett Wexo.

*Come to Your Senses (All Eleven of Them)* by Milan Tytla. (1993).

*Cool Gravity Activities: Fun Science Projects about Balance (Cool Science)* by James Hopwood.

*DK Eyewitness Books: Fossil* by Paul Taylor (2004). Ages 8 and up.

*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).

*Janice VanCleave's Energy for Every Kid: Easy Activities That Make Learning Science Fun* by Janice VanCleave (2005). Ages 9 and up.

*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)  
*Understanding Your Senses* by Rebecca Treayes (1997) Upper elementary.  
*Snakes! (Zoobook Series)* by John Bonnett Wexo. (2001).  
*Snakes! Strange and Wonderful* by 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 Explores the Senses* by Joanna Cole. (2001). Grades 1-4.  
*The Magic School Bus Gets Eaten: A Book About Food Chains* by Pat Relf. (ages 4 and up, 32 pages)  
*The Magic School Bus Inside the Human Body* by Joanna Cole. (2011). Grades 2-5  
*The Magic School Bus Wet All Over: A Book About the Water Cycle* by Pat Relf (1996). Grades 3-5.

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 3.3.02** Recognize the interaction between human and physical systems around the world.

#### **Teacher Questions, Pre-Tour**

**Q:** How do we heat our homes? (Electric heat pump, electric heater, wood fire place, etc.)

**Q:** Where does the energy come from to heat our homes? If electric, how is it generated and carried to our homes?

#### **Teacher Questions, Post-Tour**

**Q:** How are we—as a community, city, county, state, country—able to provide 'heat and light' on demand for our citizens?

**Q:** Is this true for all people in all countries?

**Q:** How might our (as a country) use of resources affect other people around the world? Is there anything we can do to use less energy? (turn lights off when you leave a room, don't let water run, etc.)

**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 3.6.01.** Recognize the impact of individual and group decisions on citizens and communities.

**Teacher Questions, Pre-Tour**

**Q:** Whether you live in the city or the county, you need services that can be provided to a group of citizens. Can you name some of these services? (light/electricity, water, heat, fire protection, crime prevention and protection, waster removal services, etc.)

**Teacher Questions, Post-Tour**

**Q:** Does each family buy its electric power individually from the source? (No, we usually buy it as a group, sometimes call a "coop" or cooperative, which helps save money for the individual family or consumer.) This is an example of citizens working as a group (cooperating) to provide something all of them need and use.