Thank you for inviting COSI on Wheels into your school! To enhance your students' experience, we encourage you to continue to explore wildlife and wildlife habitats in your classroom or home.

Extension Activities:

- Habitat Observation
- How Plants Grow
- The Effects of Acid Rain
- What's For Dinner?
- Whose Scat is That?
- Booklist

HABITAT OBSERVATION

ACADEMIC STANDARDS: Life Science 1.1, 1.4, 2.1, 2.5; Scientific Ways of Knowing K.3, 3.2, 4.2, 5.5, 6.2

OBJECTIVE: Observe an animal in its habitat.

MATERIALS:
Notebooks
Pencils, crayons
Live Animal in room or outside

PROCEDURE:

If you have an animal in your room, observe its habitat. List its specific food, water, shelter, and space needs. Observe the animal in its habitat at different times of the day. Record your observations in your field notebook.

If you don't have an animal in your room, look out the window or go for a short field trip outside and locate a specific habitat (Remember that a habitat is any area that contains the food, water, shelter, and space suitable to an animal's needs, so even if you live in a city, it probably provides a suitable habitat for a much wider variety of wildlife than you might expect). You may wish to hang a bird feeder to attract birds to the area or flowers to attract insects. Observe the habitat at different times of the day. Look under rocks, up in the trees, and any other places that wildlife may be hidden. List specific food, water, shelter, and space offerings the habitat provides. List the animals that are observed. Match the animal to its food, water, shelter, and space.

HOW PLANTS GROW[1]

ACADEMIC STANDARDS: Life Sciences 2.3, 2.5; Scientific Ways of Knowing K.3, 3.2, 4.2, 5.5, 6.2

OBJECTIVE: Explore how plants turn sunlight into food through a process called photosynthesis.

MATERIALS:

Some household plants	Book on Plant Care
Plant fertilizer	Paper
Scissors	

PROCEDURE:

1. Take two clippings from one plant. Put one in a glass of water and the other in a glass with no water. Check each day to see how long the one with no water can survive.
2. Water the other plants each week for several weeks. Fertilize some of the plants but not all of them. Label the fertilized plants.
3. Ask yourself the following questions for fertilized and unfertilized plants and record the results in your field notebook.
   - Did any of the plants start to droop?
   - Did any of the plants have yellow leaves that fell off?
   - Did the plants grow toward the light?
4. See what happens when a plant doesn't get light:
   - Cut 3 paper shapes about 2 inches by 2 inches. Circles and triangles work well, but you can experiment with other shapes, too.
   - Use paper clips to clip the paper shapes to a large leaf of a plant. Either an indoor or an outdoor plant will do.
   - Leave one paper cutout on for 1 day, a second on for 2 days, and a third on for a week.
   - How long does it take for the plant to react? How long does it take for the plant to return to normal?

EXTRA INFORMATION: Photosynthesis means to "put together using light". Plants use sunlight to turn carbon dioxide from the air and water into food. When the plant gets enough of these things, it produces a simple sugar called *glucose*, which it uses immediately or stores in a converted form of starch. We don't know exactly how this happens, but we do know that chlorophyll, the green substance in plants, helps it to occur.

1 http://www.ed.gov/pubs/parents/Science/plants.html

THE EFFECTS OF ACID RAIN[2]

ACADEMIC STANDARDS: Physical Science 4.2; Scientific Inquiry 2.5, 3.5; Scientific Ways of Knowing 4.2

OBJECTIVE: Observe the effect of acid rain on various materials.

MATERIALS:

Chalk	White Vinegar
4 Bowls	Plant Leaves

PROCEDURE:

1. Place a piece of chalk in a bowl with white vinegar.
2. Place a second piece of chalk in a bowl with tap water.
3. Place a plant leaf in a bowl with white vinegar.
4. Place a second leaf in a bowl with tap water.
5. Leave the dishes overnight.
6. The next day, observe what changes have occurred to the specimens.

The experiment with chalk allows you to see the effect of acid rain on marble and limestone (two common building materials) because chalk is made of calcium carbonate, the same compound that makes up marble and limestone. The experiment with the leaves allows you to see how acid rain can affect plant life, even if it is somewhat removed from an urban setting.

EXTRA INFORMATION: Acid rain is produced when chemicals like sulfur dioxide and nitrogen oxides are released into the atmosphere from the burning of fossil fuels by automobiles, electric power plants, and smelting and refining facilities (they are also emitted by some biological processes). The gases combine with atmospheric water vapor to form sulfuric and nitric acids. When rain or some other form of precipitation falls to the surface, it is highly acidic, and is widely believed to have a detrimental effect on the affected areas.

Acid rain eats away at almost any material exposed to the weather for a long period of time including items in nature, like leaves, as well as human-made objects, like limestone statues. Human-made materials gradually deteriorate even when exposed to unpolluted rain, but acid rain accelerates the process. Acid rain can cause marble statues carved long ago to lose their features. Acid rain has the same effect on buildings and monuments. Repairing acid rain damage to houses, buildings, and monuments can cost billions of dollars and the damage it can do to the environment can take years to repair.

2 Parts taken from: http://www.angelfire.com/ks/boredwalk/mats.html

WHAT'S FOR DINNER?

ACADEMIC STANDARDS: Life Science 1.2, 1.4, 2.5, 3.3, 4.5, 5.2, 5.3

OBJECTIVE: To create a food web and explore food sources for different organisms.

MATERIALS:

- Drawing paper
- A ball of yarn/string
- Scissors
- Markers, crayons, colored pencils
- Tape

PROCEDURE:

1. Assign each student a different plant, insect, bird, or other animal. Make sure that one student is the SUN as well.
2. Have the students draw a picture and write the name of the chosen organism.
3. Tie a piece of yarn around the top of the picture, so the picture can hang around the student's neck.
4. Have the class make a circle around the room. Make sure that all the students are wearing their pictures for now they are representing what is on his/her picture.
5. Give the ball of yarn to the student representing the sun.
6. Have the student announce their plant, insect, bird, other animal, or sun, as well as if their organism is a producer, herbivore, carnivore, or omnivore.
   Producer – organisms which are able to use light energy from the sun to produce their food (plants).
   Herbivore – animals which eat only plants.
   Carnivore – animals which eat other animals.
   Omnivore – animals which eat both plants and other animals.
7. The student then needs to hold onto the end of the string and throw the ball to an organism that it gives energy to (is consumed by).
8. Have the student explain why he/she threw the ball to that particular organism.
9. Then the next student holding the ball of yarn repeats steps 6-8, trying to guess which organism is next on the food chain.
10. Repeat this process until the chain ends. Once the chain can go no further, cut the string and begin again with the sun and a new piece of string.
11. Perform this activity several times until there are many overlapping and intertwining strings. Each string represents a food chain, and together they create a web.

WHAT HAPPENED: When multiple chains are formed a huge web of yarn will be created. This is a representation of a food web. A **food web** is an interconnected set of food chains in an ecosystem. This activity reveals what different organisms eat/use to get energy. Many students will end up being part of more than one chain. From this the students will discover that producers, herbivore, carnivores, omnivores, and the sun depend on one another. What animals are the predators looking for? What animals are the prey looking out for?

EXTENSIONS:

Have one or two of the students in the web let go of their string and step away. How does this affect the other animals on that chain? Will the chain maintain its' structure, or will a new chain have to be formed?

Create a food web(s) by taping all of the drawings to the wall and connecting a string to the organisms which eat/are eaten by each other. Remove any drawings which do not have a string connected. What type of ecosystem/habitat would the food web(s) be found in? (jungle, forest, desert, etc.)

What kinds of plants or animals could be added to make new food webs out of the remaining organisms? Brainstorm to create the largest food web possible by using the drawings and any other plants and animals you can come up with.

WHOSE SCAT IS THAT?

ACADEMIC STANDARDS: Life Science K.6, 1.4, 3.3**;** Scientific Inquiry 1.9, 2.5, 5.3

OBJECTIVE: To be able to identify animals through examination of their scat.

MATERIALS:

- Clay or Play dough
- Small Bones (Fish or chicken bones that have been cleaned)
- Fur or fake fur (Can be found at any fabric store)
- Leaves
- Grass
- Egg shells
- Pine Nuts or any Nuts
- Rubber gloves
- Teasers
- Large cups
- Water
- Paper towels
- Student Identification Chart

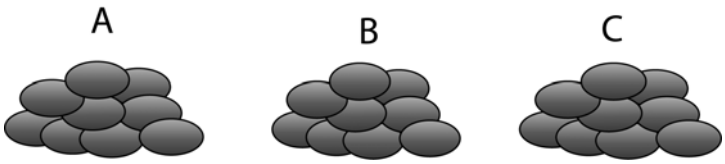
PROCEDURE: This needs to be done prior to class by the teacher.

1. Cut up the leaves and grass.
2. Cut the fur off from the fabric so you have fur clippings.
3. Break up the bones and eggshells into smaller pieces.
4. Break up the clay or play dough into three different piles. One pile will be the scat of an herbivore, one of a carnivore, and one of an omnivore.
5. Mix up the leaves and half the nuts into one of the piles of clay.
6. Mix the bones and fur into the second pile of clay.
7. Mix the eggshells, nuts, and a few bones into the last pile of clay.
8. Make multiple small balls or pellets of the clay mixtures. Make sure to keep the piles separated.
9. Leave the faux scat out overnight so that the balls or pellets harden.

CLASS ACTIVITY: Break the students into groups of three or four. Discuss the differences between herbivores, carnivores, and omnivores, such as diet, teeth, and body shape.

1. Label the scat piles as A, B, and C.
2. Each group needs three pairs of gloves, a cup of water, paper towels, three teasers, and an identification chart.

Whose Scat is That?



3. Take three sheets of paper towels and label them A, B, and C.
4. Get one sample from each scat pile.
5. The students will then work together to break up the scat to find the undigested materials left inside.
6. Rinse off the materials in the cup and lay them out on the paper towel labeled for that specific scat.
7. Using the identification chart and the materials found in the scat, the animal can be identified.

WHAT HAPPENED: Scat is one way to identify animals and learn about a variety of animals. The shape of scat can tell you what type of animal made that particular dropping. Scat can also be broken up to see what types of food the animal consumes. The contents of the scat, whether it be plants or bones, lets investigators know what the animal is and its diet.

ANSWER KEY:

 ***Raccoon*** • Omnivore • Diet: fruits, nuts berries, insects, rodents, frogs, eggs and crayfish.	 **Whitetail Deer** • Herbivore • Diet: tender shoots and leaves from all sorts of trees, vines, plants and bushes; fruits, vegetables, nuts (acorns are a real favorite), grains, mushrooms and mosses.	 **GREY WOLF** • Carnivore • Diet: bison, elk, deer, musk oxen, beaver, muskrat, rodents etc

STUDENT SCAT IDENTIFICATION CHART

		Scat Sample A	Scat Sample B	Scat Sample C
Diet:	Plants			
	Nuts			
	Fur			
	Bones			
	Eggs			
	Grass			

Check the box for each item found in the scat.

Animals in this habibat:

 ***Raccoon*** Omnivore	 **Whitetail Deer** Herbivore	 **GREY WOLF** Carnivore

Wildlife - (Grades K-6)

Books at the Columbus Metropolitan Library, 96 South Grant Ave.

PICTURE BOOKS

Someone Walks By by Polly Carlson-Voiles, 2008 Picture Book CARLSON
Readers follow a set of mysterious tracks, through a winter in the northwoods. Along the way, they encounter frozen wood frogs, a bear in her den, sleepy chipmunks and many other creatures.

Where Once There Was a Wood by Denise Fleming, 1996. Picture Book FLEMING
Deer live in the woods, rabbits live in meadows, fish live in creeks, and people live in houses. We all need homes. But we need not destroy one while building another. This eloquent book shows young readers how people and animals can live side by side.

If You Were My Baby: A Wildlife Lullaby by Fran Hodgkins, 2005. Picture Book HODGKINS
Just as baby duck and baby possum bask in the loyal care of a parent, so does baby human. Baby mountain goat is guided up the highest cliffs. Baby beaver will build well. Baby human will soar in her own sky, and delight in nature's wonders.

NONFICTION

Poop: A Natural History of the Unmentionable by Nicola Davies, 2004. j573.49 D256p
Scientists who study animal feces find out all sorts of things, such as how many insects a bat eats or just what technique a T. rex used to devour a triceratops 70 million years ago. Take a peek at Poop and find out all you need to know-what it's for, where it goes, and how much we can learn from it.

Nature's Secret Habitats Science Projects by Ann Benbow, 2010. j577.078 B459n
Learn all about habitats with the great life science experiments in this book.

Animal Life: The Incredible Visual Guide by Richard Walker, 2009. j590 W183a
Chronicling the massive array of living animals around the globe with stunning imagery, "One Million Things: Animal Life" explores animal diversity and biology, all the major classes of animals, and the animals' lifestyles, habitats, and ecosystems.

Home for a Tiger, Home for a Bear by Brenda Williams, 2007. j590 W721h
Learn about the habitats of these and many other animals as you travel around the world meeting all sorts of creatures in their natural environments.

Actual Size by Steve Jenkins, 2004. j 591.41 J52a
In this visually stunning book, seeing is believing as Jenkins illustrates animals both large and small at their actual size.

Animal Tracks & Signs by Jinny May Johnson, 2008. j591.479 J676a
How do you find (or avoid) animals? By following the clues they leave behind-tracks, nests, meal leftovers, even dung! With exciting photographs and fact-packed illustrations.

Animals on the Edge by Sandra Pobst, 2008. j591.68 P739a
Examines numerous threats to animals in the wild, raising awareness of each species, and detailing the extent and urgency of the problem. Also encourages young animal lovers to take an active role in the preservation of creatures great and small.

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