

EXPLORING ECOLOGY



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:

- Walking with Nature
- How Plants Grow
- The Effects of Acid Rain
- Mini Biome
- What's on your Plate?
- Booklist

WALKING WITH NATURE

ACADEMIC STANDARDS:

Life Science- Grade K: Physical and Behavioral Traits of Living Things

Life Science- Grade 1: Basic Needs of Living Things

Life Science- Grade 2: Interactions within Habitats

Life Science- Grade 3: Behavior, Growth and Changes

Life Science- Grade 4: Earth's Living History

Life Science- Grade 5: Interconnections within Ecosystems

Life Science- Grade 6: Cellular to Multicellular

OBJECTIVE: Observe found items, both natural and human made, around the school and discuss their importance to the environment and nature.

MATERIALS: *My Nature Walk Observations* sheet, double sided, one per student
Clipboards
Pencils

PROCEDURE:

1. Discuss with the students the importance of good observations for a scientist. Explain the terms natural, human-made, and environment. Explain that today, the students will use their power of observation to explore their environment both inside the classroom and outside the school.
2. Write two headings on the classroom board: *Natural Items* and *Human-Made Items*.
3. Ask students to name items that are natural or found in nature. Write their answers under *Natural Items*.
4. Ask students to name items that are human made. Write their answers under *Human-Made Items*.
5. Ask the students what the difference is between natural items and human-made items. How can we tell the difference?
6. Pass out the *My Nature Walk Observations* sheet. Explain that today the class will focus on their power of observation.
7. Give the students 5-10 minutes to look around the room and make their observations. What do they see, smell, hear and feel? Ask them to write or draw their observations in the appropriate boxes under the column "Inside the Classroom"
8. Now head to a quiet area outside the school. Have the students find a spot to sit, and just as they did in the classroom, give them 5-10 minutes to look around them and make their observations. Ask them to write and/or draw their observations in the appropriate boxes under the column "Outside the School"
9. Now tell the students that they are to study the environment outside. This is everything that is around them. Depending on your space, you can encourage students to explore the area and not just stand in one spot. They are to write and/or draw four items that are natural and four items that are human-made.
10. Once they have their items listed, ask them to think about why those items are important to nature or humans.
11. Finish the discussion either outside or inside the classroom. Ask the students to share one item they found that was natural and one that was human made. This list of observations can be written on the board.
12. Ask the students some follow up questions. Here are some examples:
 - a. Why are the natural items important and why are the human-made items important?
 - b. How would the playground look different if no one was allowed there?
 - c. Can they share examples where people have helped plants or animals near their school or home?
 - d. Is it important to protect natural environments? Why or why not?
 - e. How would their observations be different if they were in a busy city or on a farm?

My Nature Walk Observations

Inside the Classroom

Outside the School

I see	I see
I smell	I smell
I hear	I hear
I feel	I feel

My Nature Walk Observations

Human-Made Items	Natural Items
<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>	<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>
<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>	<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>
<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>	<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>
<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>	<p>I see _____</p> <p>It is important because _____</p> <p>_____</p> <p>_____</p>

HOW PLANTS GROW¹

ACADEMIC STANDARDS:

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Life Science- Grade 4: Earth's Living History

Life Science- Grade 5: Interconnections within Ecosystems

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 RAIN²

ACADEMIC STANDARDS:

Life Science- Grade 1: Basic Needs of Living Things

Life Science- Grade 4: Earth's Living History

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>

MINI BIOME³

ACADEMIC STANDARDS:

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Life Science- Grade 5: Interconnections within Ecosystems

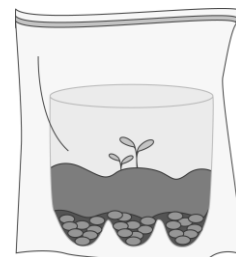
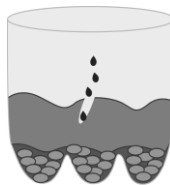
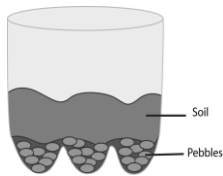
OBJECTIVE: To observe how plants grow and water cycles in a biome.

MATERIALS:

2-liter soda bottle	Gallon size resealable plastic storage bag
Pebbles	Potting Soil
Seeds (whatever is available)	Water

PROCEDURE:

1. Cut the soda bottle in half.
2. Fill the bottom of the soda bottle with ½ inch - 1 inch of pebbles.
3. Pour soil on top of the pebbles. There should be twice as much soil as pebbles in the bottle.
4. Make a hole down into the soil about as deep as a fingernail.
5. Sprinkle a few seeds into the hole and cover it up with soil.
6. Water the seeds till until the water starts to collect at the bottom of the pebbles.
7. Place the bottle in a plastic bag and seal it.
8. Place in a sunny place and observe for a few days.



WHAT IS HAPPENING?

A *Biome* is an ecological community, like a rainforest, desert, or prairie.

The plant should sprout within three to four days. Everything the plant needs is in the bag. The water will start going through the cycles of *evaporation* out of the soil or plant leaves. Next, *condensation* of the water vapor will occur on the bag, and then *precipitation*, like rain will bring water back to the plant. The water in the biome is continuously recycling, giving the plant enough moisture. Plants create their own food with the use of sunlight, through a process called *photosynthesis*.

EXTENSION:

Investigate changing the biome to represent other environments such as a rain forest, desert, or plain by changing the amount of water and light. Try different plants and find out which is more suited to which environment.

WHAT'S ON YOUR PLATE?⁴

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Life Science- Grade 5: Interconnections within Ecosystems

OBJECTIVE: For students to understand that all living creatures, including humans, depend on the earth for food.

MATERIALS: blank sheets of paper optional: magazines to cut pictures out of
Writing utensil

PROCEDURE:

1. Introduce the following words to the students: Consumer (a living creature that eats something else), Producer (plants) Herbivore (consumer of plants), Carnivore (consumer of animals) and Omnivore (consumer of plants and animals).
2. With the students, create a list on the classroom board of the food they ate for lunch today.
3. Ask them what each item had to consume to grow. For example, the students drank milk for lunch. The milk came from a cow. Cows eat grass. Grass receives nutrients from the soil. Continue this process for the rest of the food on the list.
4. Once the list is completed, have them identify the consumers, producers, herbivores, carnivores and omnivores.
5. Now have students think of what they had for dinner the night before or their favorite meal. Have them complete the same process that you did for lunch. They can write, draw or cut pictures out of a magazine to complete their project. Once the list is completed, have them identify the consumers, producers, herbivores, carnivores and omnivores.
6. Discuss with the students their observations during this process. What similarities and differences did they see? What food chain surprised them the most?

EXTENSION:

Have students research the manufacturing that happens before food ends up on our plate. For example, we buy milk from the store. The store gets the milk from a dairy processing plant where it is tested, pasteurized, and packaged. It is delivered to the plant in refrigerated milk trucks directly from the farm. Older students can go further in depth about the sterilization and processing that happens to the food during the manufacturing process.

Discuss with students what would happen if part of the process was impacted, both negatively and positively. For example, if there was a drought and the farmer didn't have a good yield, how would that impact the cows?

⁴ Inspired from "What's for Dinner?" activity found in *Project Wild*



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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