

**URBANA PARK DISTRICT
Anita Purves Nature Center**

SCHOOL TOUR: **WHAT'S IN A POND?**

TEACHER'S GUIDE

Grades: **3rd – 5th**

Program Length: **2 Hours**

Focus Concept: *A vernal pond is a unique, temporary wetland with specially adapted organisms.*

OBJECTIVES: Students will

1. List two adaptations of a pond animal
2. Describe and give an example of a pond food chain
3. Understand that a vernal (seasonal) pond is a temporary body of water that is filled in the spring
4. Define the term "vernal (seasonal) pond"
5. Understand that there is a diversity of plant and animal life in a vernal pond ecosystem

INTRODUCTION

Using dip nets, pans and “see” boxes, students will discover that there is much more to be found in a pond than fish, frogs, turtles and snails. A multitude of smaller aquatic invertebrates form very important links in the pond food chain by helping to break down plant material and dead organic matter and by becoming food for larger animals. Their methods of feeding, locomotion and behavior will be closely examined with the help of student worksheets and pond life cards. Because the vernal ponds in Busey Woods dry up every summer, organisms that require an abundance of water to live (fish, frogs or water turtles) are not likely to be found in the ponds. Students will be encouraged to compare the differences between a seasonal pond and one that retains water all year round. The diversity of life in the pond and its relation to water quality will also be explored.

Water is an essential life requirement for all living things and there are many extensions that can be done in the classroom. Some possible extensions include water pollution, groundwater, water cycle, fresh/salt water comparisons, properties of water, wetlands, weather, watersheds, water usage.

Common Core Standards Correlated

Area	Strand	Standard	Standard Numbers
English Language Arts	Speaking/Listening	Comprehension & Collaboration	3.SL.1, 3, 6 4.CL.1 5.SL.1
English Language Arts	Language		3.L.1 4.L.1 5.L.1

Next Generation Science Standards Correlated

Physical Science	Life Science	Earth & Space Science
5-PS3-1	3-LS1-1, 3-LS2-1 3-LS4-3, 3-LS4-4, 4-LS1-1, 5-LS2-1	

Illinois Learning Standards Correlated

Learning Area	Goal	Standard	Benchmark
Science	11	A	1f, 2b, 2d
	12	A	1a, 1b, 2a
		B	1a, 1b, 2b
	13	A	1a, 1c,
		B	1a
Social Science	17	B	1b
		C	2c

During your fieldtrip, students will work with a partner to fill out worksheets. **Before your visit**, please divide your class into two groups and assign each student a partner to work with within his or her group.

SUPPLEMENTAL ACTIVITIES

The activities listed below are intended to provide ideas to be used before and after the field trip. Some are more appropriate for older or younger students. Feel free to adapt the activities to your students' ability level.

PRE-VISIT ACTIVITIES

1. Have students brainstorm the theme "Pond Study" using a "Concepts, Experience, Prediction" method. Ask the students what things they think make up and relate to the theme of "Pond Study", and list them on the board. Then ask students to discuss any previous experiences they have had related to ponds. (For example, maybe they have visited a pond in a park or a farm pond.) Let them discuss their stories and experiences as a whole class and ask each other questions. Then have students predict what will happen when they visit the pond at Busey Woods. What do they think they will see and do? What types of plants and animals do they think they will find?
2. Have students brainstorm different animals they think live in or around a pond and how they interact with the habitat. Be sure they have covered all animal groups (mammals, birds, reptiles, amphibians, insects, etc.). Then divide the class into smaller groups. Have each group draw a mural of the animals in their natural surroundings. Post the murals in the room. After you visit to the Busey Woods pond, check to see how accurate the murals are.
3. Pond in a Jar: Fill two mayonnaise jars with water and let them stand overnight. Add one cup of sand, three pieces of Elodea (water plants available at pet stores), and a snail to each jar. Screw the lid on one jar and place both jars in indirect sunlight. Discuss the things in the jars and their relationship with each other. Make daily observations and record changes. Discuss the possible reasons for any changes.
4. "Boot Keys". (Adapted from *Connecting People and Nature*, Great Smokey Mountains Institute at Tremont) **During the field trip students will have the opportunity to practice using a taxonomic key to identify their organism.** (A copy of the key is enclosed. Some elementary school teachers may not have had the opportunity to use a key. See the back of the key for examples of the "questions" asked to identify the organism.) This activity can help introduce the concept of a key.

Explain that a key is like a puzzle. The clues in a key are followed until an organism is identified, and is basically answering a series of “yes-no” or “a or b” questions. Tell the class that they are going to practice making a key using their shoes (or writing implements). This may sound a little complicated, but once the items are in front of you, it shouldn’t be.

- Seat students in a circle. Ask each student to contribute one shoe to the group. (If you prefer, have each contribute one writing implement. Be sure a variety is used – pencils, pens, colored pencils, crayons, markers, etc.) Assemble all the items in the center of the circle. Ask the students how they might be able to distinguish between all the items. Appoint a student to write down the key as it is devised, or write it on the board or a flip-chart.
- Start by selecting an obvious difference that divides the items into **two** groups. (This is important – each step must have a “yes-no” or “it is a or it is b” type of division.) For example, it could be boots vs. shoes, or if they are all shoes, laced vs. not laced. For writing tools, it could be pens vs. pencils, or pencils vs. not a pencil (if items such as crayons and chalk are included). Divide the items into two piles based on the first difference and label them. For example, 1A-it is a laced shoe; 1B-it is a shoe without laces.
- Now further subdivide one group by another obvious difference. For example, shoes without laces (group 1B) could be further subdivided as shoes with Velcro closures and shoes without Velcro. Or if closure style is not the next obvious difference, they could be subdivided by color, size, shape, etc. (Remember, there should be two piles each time. So if color is used, it would be black vs. not black, not piles of black, brown, blue, and white.) Assign the next level a group name. For example, 1B, it is a shoe without laces; 2A, it is a shoe with Velcro or 2B it is a shoe without Velcro.
- Continue the process until all of the items in group 1A and group 1B are identified as individual items. Each division should tell the person using the key what the next step should be or what the item is. For example, 1B, the shoe does not have laces: go to step 2, Velcro or no Velcro. 2B, the shoe does not have Velcro; go to step 3. Step 3 could be slip-ons (3A) vs. buckles (3B). The shoe is a slip-on, go to step 4, which could be color, and so on, until you know whose shoe it is.
- Once the key has been completed, it should be tested. Have one student select an item from the pile and take it through the key to see how easy (or hard) it is to use the key you devised. Once the item is identified, return it to its owner, who is the next person to use the key. If necessary, discuss ways that the key could be changed to make it easier to use.

POST-VISIT ACTIVITIES

1. Continue the discussion of food chains/webs. Have the students think about the organisms that were found (refer to their worksheets) and use them to create food chains. Have students think about other animals that live in or around the pond and add them to the food chain.
2. Create a pond creature. Discuss some of the pond animals found during the visit and how they are adapted to live in the water and to survive the periods when the pond is dry. Have students use their imaginations to create a new, never before seen animal that could survive in the pond. If necessary, make a list with suggested adaptations. Draw a detailed picture (or make a model) and describe its adaptations. Have students present their drawings to the class, or display them around the room.

3. Have students research the life cycle of the animal they used for their worksheets. Have them start from birth, through the animal's young life, adulthood, and death. Describe each major stage, including information about its length, where the animal lives during that stage (e.g., in the pond, under the leaves at the bottom, on land in the forest, etc.), and any other important information they discover. Include a drawing of what the animal looks like at that stage.
4. Classroom Mini-Pond: Establish an aquarium for pond or stream animals, such as the one in the Field Station at the Nature Center. Find a nearby stream or pond (not Busey Woods) to collect water and small animals to observe. Be sure to include leaf litter for the bottom and a couple of sticks extending out of the water. Keep a diary on daily observations and changes.
5. Sea Monkey Zoo: Purchase a couple of packages of "Sea Monkeys" (brine shrimp) to grow in the classroom. They are very similar to the fairy shrimp found in Busey Woods ponds. Students can observe their growth, feed them, and learn something about deceptive advertising at the same time! Be sure to save the package wrapping to compare the picture of the "sea monkey" the real thing.
6. Making Scientific Tools: Have each student (or group of students) make tools that can be used to explore a pond. Rather than simply giving instructions to build a plankton net or water scope, challenge the students to design their own tools using materials from home. Help the students by describing the tools' functions and suggesting possible materials.

Take another field trip to a nearby pond to test the tools. (You may come back to Busey Woods to test your tools, but please do not remove samples to the classroom. Just call and let us know when you are coming.) Ask the students to take "readings" with their tools and to create an original chart or map that relays their findings to the rest of the class.

7. Where Does It Go?: Visit a water and sewage treatment facility to help students visualize what happens to the water they use and begin to understand why they need to conserve water.
8. Guest Lecturer: Call the Illinois State Water Survey and ask if a speaker can come and talk to your class. The Survey has a stream table and other demonstration materials to help students understand what happens to groundwater and the water cycle.

Pond Vocabulary

Vertebrate	Invertebrate	Abiotic	Biotic
Food chain	Food web	Predator	Prey
Producer	Consumer	Decomposer	Scavenger
Herbivore	Carnivore	Omnivore	Life cycle
Egg	Larva	Pupa	Adult
Nymph	Metamorphosis	Insect	Exoskeleton
Crustacean	Macroinvertebrate	Adaptation	Gills
Habitat	Wetland	Vernal Pond	Seasonal Pond
Aquatic	Community	Photosynthesis	Algae
Interaction	Water cycle	Aestivate (Spend a hot or dry period in a dormant state)	

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*Copies of this curriculum can be found in the Nature Center Teacher Resource Library. To obtain your own copy you must attend a workshop.

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