"EdZOOcating"

How many city kids—or any kids for that matter—do you know who've seen a live polar bear swimming under water? Not many, I bet. *EdZoocation*—a science enrichment program developed through the partnership of the Cincinnati Zoo and Botanical Garden in Ohio and the Clifton School of Expeditionary Learning, a public school in Cincinnati—hopes to change that. This innovative zoo partnership program brings the natural world into the lives of area third- and fourth-grade students, many of whom have never visited a zoo or seen a skunk, black rat snake, or red-tailed hawk, animals that live in natural areas not 15 km from their own neighborhoods.

Many children, especially those that live in urban areas, have little contact with nature. Some children develop a fear or dislike of animals due to their unfamiliarity with them. Others cannot afford to visit a zoo or participate in available programs. What information children do know about animals is often learned from television programs or movies. It is imperative that institutions like zoos reach out to these children—that was the impetus for the *EdZoocation* program.

Working Together

EdZoocation was not a new idea. The program had been in place at the Cincinnati Zoo for a number of years, undergoing minor reshaping to better meet the needs of participating schools. We knew that students enjoyed the program, but we questioned whether the program was as effective as it could be as an educational tool. A review of the mutual goals, needs, and efforts of both the zoo and participating schools indicated that a revision of the program was needed.

SCILINKS
THE WORLD'S A CLICK AWAY
Keyword: "Adaptations of Animals"
at www.scilinks.org
Enter code: SC040303

An initial meeting between the zoo and the fourth-grade teachers from Clifton School, followed by a roundtable discussion with teachers from other area schools that had participated in past programs, laid the foundation for the improved *EdZoocation*.

The program would work from a well-defined, structured, and organized curriculum based on specific national science education standards and would include multidisciplinary activities.

The program would be modular to fit the school's science curriculum, as students were learning similar concepts in the classroom. The zoo would provide expertise in wildlife and present content, as well as involve students in authentic experiences. Funding would be essential to provide the necessary materials and was pursued (and obtained) through the zoo's development department.

All of these needs were considered in the development of the pilot program, which was to be tested at Clifton School of Expeditionary Learning.

The Zoo to You

What resulted from this collaboration was a four-week program that focused on the national and state science standards related to habitat and adaptations of wildlife to their habitats. The *EdZoocation* team (teachers and zoo educators) developed and provided a curriculum guide containing an outline of the program for teachers,

CHILDREN

A zoo and an elementary school team up to prove opportunities for outdoor adventures can be found just about anywhere.

By Shasta R. Back

worksheets, activity pages, extensions, and information about the animals and habitats to be studied.

A 90-minute, zoo educator–led outreach lesson at the school kicked off the program. Students participated in an initial brainstorming session, which introduced the concepts and resulted in a list of the survival needs of living things—food, water, shelter, and space.

A discussion of habitat, where animals live and find these necessary things, followed. Students brainstormed a list of different habitats to demonstrate the diversity that exists. The students learned that animals live in different habitats because they have different needs and are adapted to certain habitats.

The objectives of the introductory lesson were for students to be able to

- define habitat and list its components;
- name several different types of habitats; and
- define and recognize adaptations and explain how they help animals survive.

Students observed the extraordinary swimming skills of a polar bear during their EdZoocation Zoo visit.

Students also learned about the manatee's skeleton while on tour.

In the classroom, students explored "habitat boxes" that were created by zoo educators.

MARK SMITH, CINCINNATI ZOO AND BOTANICAL GARDEN

Habitat Boxes

Next, students explored the "habitat boxes" the zoo educators brought. These boxes contained artifacts and objects—such as snowy owl feathers, seagrass, and acorns—that represented one of three focus habitats—the arctic, Eastern woodlands, and Florida wetlands. These habitats were selected because they can all be found in the United States and are thus more relevant to the students. Even most urban students have personal experience with the Eastern woodlands, as urban green spaces in the city tend to model woodlands.

In addition to the objects, the habitat boxes also included photographs or drawings representing the habitat, such as a hare blending into its surroundings. Students worked in small groups to determine which habitat their box represented and then presented their findings to the class. Certain objects, such as a polar bear's claw and porcupine's quill, were discussed in more depth to consider how they were adaptations.

Live Encounters

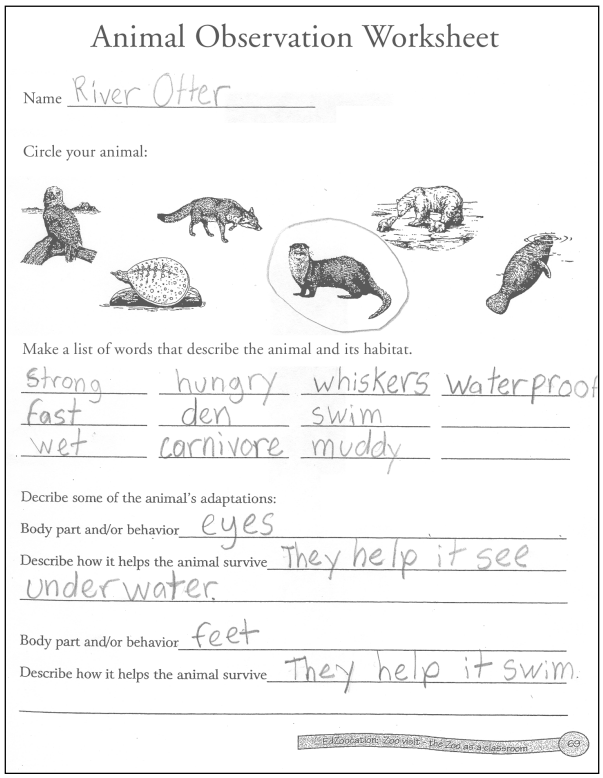
Lastly, the students were treated to an up-close encounter with live animals native to those habitats discussed in the classroom: a young American alligator, Florida king snake, and Eastern screech owl. The animals are part of the zoo's "Contact Collection." The animals and their "animal-ambassador" handlers have been conditioned and trained on appropriate handling techniques and use. Before the animals were brought into the room, the students were asked to stay calm, quiet, and seated to provide a comfortable atmosphere for the animals.

Each animal was discussed for about 15 minutes, focusing on the body parts and behaviors

Figure 1.

Zoo visit worksheet.

(A blank, downloadable version of this is available at *www.nsta.org/elementaryschool.*)



Animal Observation Worksheet

Name River Otter

Circle your animal:

Make a list of words that describe the animal and its habitat.

strong	hungry	whiskers	waterproof
fast	den	swim	
wet	carnivore	muddy	

Decribe some of the animal's adaptations:

Body part and/or behavior eyes

Describe how it helps the animal survive They help it see underwater.

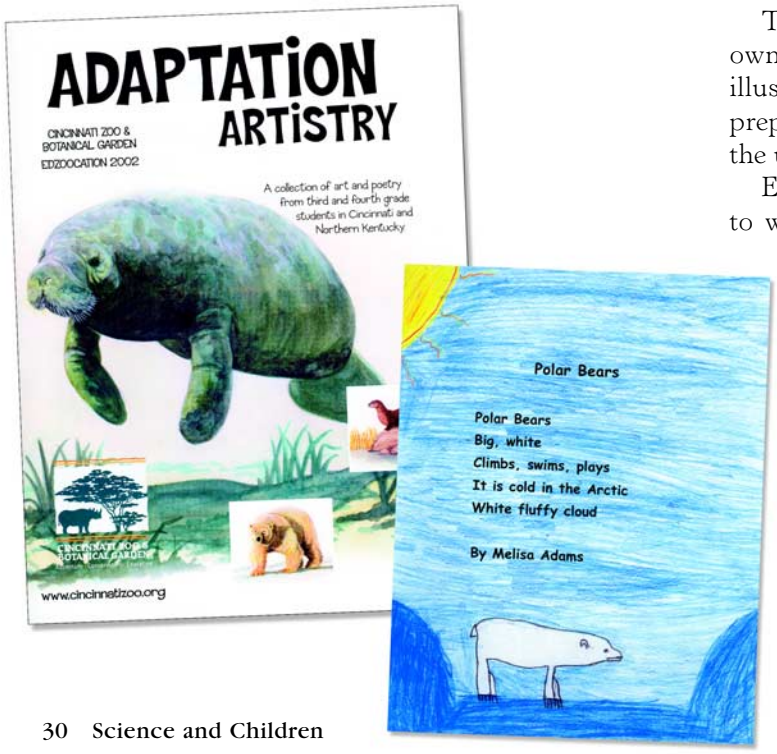
Body part and/or behavior feet

Describe how it helps the animal survive They help it swim.

EdZOOcation: Zoo visit - The Zoo as a classroom

Figure 2.

Students' poetry publication.



that help the animal find and catch its food. Meeting the animals was definitely the students' favorite part of the class. Though some were fearful of particular animals, such as the snake and alligator, most were in awe and excited. Even nervous students showed interest in learning about the animals and asked many questions.

The animal ambassadors helped guide the students' questions to emphasize where the animals live and how they fulfill their needs. The outreach class concluded as zoo educators challenged students to practice observation skills at home, noting adaptations they see in their pets or in animals in their neighborhood, and even in their family members!

Adaptations and Poetry

For the next three weeks, the students read and discussed with their teachers three books, loaned by the zoo, that illustrated adaptations of the manatee, polar bear, and river otter. By reading *Manatee Winter* by Kathleen Weidner Zoehfeld (1994), they learned about the adaptations of the manatee for living in an aquatic environment—such as flippers and a streamlined body—and became familiar with the threats a mother and calf face as they migrate to warmer waters in the winter.

The Polar Bear, written by Valérie Tracqui (1994), illustrated the polar bear's adaptations for catching seals, such as its claws and camouflage, and for staying warm in the Arctic—thick fur and blubber. *Animal Lives: The Otter,* written by Sandy Ransford (1999), recounts a year in the life of a river otter, introducing its adaptations for survival, such as having webbed feet and a waterproof coat.

The students also read other relevant books of their own choosing and drew pictures of the animals, clearly illustrating the adaptations in the picture. This helped prepare them to identify their animal's adaptations for the upcoming zoo visit and poetry writing.

Each week, the teachers also taught the students how to write one of three different forms of poetry—the couplet, name poem (acrostic), and cinquain. Each poem format was introduced by reading examples with the class. Then the particulars of each format were discussed. The class wrote one poem of each format together and then students individually wrote their own poems.

Learning at the Zoo

During the fourth week, the students, teachers, and chaperones visited the zoo and spent an entire day there. They engaged in free exploration time, enjoyed lunch, and participated in a two-hour interactive tour led by zoo staff.

The tour took students to exhibits that represented the three habitats studied in the classroom and focused on the adaptations of the manatee, softshell turtle, polar bear, snowy owl, grey fox, and river otter. Question and answer, discussion, problem solving, demonstrations, and activities were all components of the tour.

For example, students tried on a flipperlike sleeve over their arms to illustrate that manatee arms are based on a similar yet modified bone structure to our own, which not only increases their swimming ability but gives them the flexibility to guide vegetation to their mouths.

Later, students were given the following problem to solve, "Scientists have noticed that fewer otters are found in rivers and streams where large numbers of fish are found floating on the surface. What might be happening?" As the students tried to solve the mystery, they were encouraged with clues, including the fact that otters eat fish and that pesticides run into rivers and streams and make the fish sick. Eventually, the students came up with the idea that the otters were suffering from pollution by eating the poisoned fish.

Another simple activity demonstrated how animals, such as the grey fox, can hear better with large ears by having the students hold their cupped hands behind their ears.

The tour ended with 15 minutes devoted to observing one of the focus animals, taking notes on its adaptations on a student Animal Observation Worksheet (see Figure 1, page 30), and sketching the animal and its habitat.

When teachers asked what students thought of the program, they received overwhelmingly positive remarks. Not only did the students express that it was fun and exciting, especially to meet the live animals in the classroom and visit the zoo, they also mentioned that they learned a lot about the animals and what they do to survive.

Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

Grades K–4

Content Standards

Standard C: Life Science

- The characteristics of organisms
- Organisms and their environments

Standard F: Science in Personal and Social Perspectives

- Change in environments

Back to Class

Upon returning to the classroom, the students used their notes and sketches to express their understanding of how their focus animals are adapted to survive in their habitats. They wrote and illustrated three different poems as an assessment activity. Students received a grade based on the rubric of how well the animal's adaptations to its habitat were expressed, how well the illustrations complemented the words, and whether the poem was written in proper format.

Each student chose his or her best piece to be printed in a book entitled *Adaptation Artistry* (see Figure 2, page 30) and received a copy of the publication when it was completed.

A Successful Partnership

In the pilot program, both the zoo's and the school's needs were met as students were able to express an understanding of habitat and animal adaptations through their artwork and original poems.

As a result of that program's success, the Cincinnati Zoo and Botanical Garden has now partnered with more than a dozen elementary schools in the Greater Cincinnati/Northern Kentucky area in the *EdZoocation* program. Now, hundreds of urban children are learning about the wonders of the living world and recognizing their own place in nature through meaningful experiences while sharpening their skills in many subject areas—science, reading and language arts, and visual arts.

Hopefully more and more schools can come together in partnership with the resources in their communities to achieve greater goals, as *EdZoocation* has done. ■

Shasta R. Back is program coordinator for the EdZoocation Program at the Cincinnati Zoo and Botanical Garden in Ohio. She can be reached at shasta.back@cincinnatizoo.org.

Resources

National Research Council (NRC). 1996. *National Science Education Standards*. Washington, D.C.: National Academy Press.

Ransford, S. 1999. *Animal Lives: The Otter*. New York: Kingfisher.

Tracqui, V. 1994. *The Polar Bear, Master of the Ice*. Watertown, Mass.: Charlesbridge.

Zoehfield, K.W. 1994. *Manatee Winter*. Norwalk, Conn: Soundprints.

NSTA Connection

For web links to animal education programs at other zoos or science centers, visit *www.nsta.org/elementaryschool.*