BROOKLYN CHILDREN'S MUSEUM

TEACHER TOOLS

"The best place to study nature is where you are."

– John Burroughs

Made possible with funding from

CHASE

BROOKLYN CHILDREN'S MUSEUM

Dear Teacher:

Welcome! ***Neighborhood Nature*** is the Museum's new opportunity for you and your students to take a trek through Brooklyn's natural habitats, from woodland field to ocean tide pools. This exhibit is designed to spark your students' desire to explore and discover. From place to place, they will hone their skills of inquiry, laying the foundation for scientific thinking as they gain greater understanding and respect for the natural world.

Children get a bug's-eye view inside a giant log, harvest play vegetables in the community garden, and touch live horseshoe crabs as they explore ways to protect our natural resources. Cutting-edge displays and technologies link young environmentalists to "Citizen Scientists" around the world.

In the adjacent **Science Inquiry Center**, your students can find field guides and other resources for eco-adventures in their own neighborhoods. The Science Inquiry Center is also home to a variety of live animals, including Fantasia—a 200-pound, 20-foot-long albino Burmese python! Workshops in the Museum's **Greenhouse** and **Garden** give kids an opportunity to get their hands dirty as they study botany, insects, and ecosystems.

We hope you will enjoy this Teacher Tools Professional Development Resource Materials Packet. Inside you will find an explanation of the content covered in *Neighborhood Nature* as well as suggested activities for you to do with your students to help you implement an inquiry-based, role-playing approach to learning, especially as it relates to Natural History, Science, and Environmental curricula. It is our hope that you will use this materials packet as a resource to further assist you in conveying *Neighborhood Nature's* educational concepts to your students and colleagues.

Look What's inside Neighborhood Nature Teacher Tools—

- What *Neighborhood Nature* Is About
- Exhibit Highlights
- Goals for Teachers and School Groups
- Suggested Classroom Activities
- Suggested Outdoor Exploration Activities
- Listing of Museum Resources
  - * Science School Adventures
  - * Professional Development for Teachers
  - * The Museum's Portable Collections Cases
- Nature Exploration Tips
- MORE Resources . . .
  - * Places to Go
  - * Websites
  - * Additional Curriculum Resources

What Neighborhood Nature Is About

Big Idea: Nature is Our Neighbor!

Main Message: *Investigating nature—the plants, animals, insects, and more that share my neighborhood help me to understand nature everywhere.*

The activities and exhibits invite visitors . . .

- to see where plants and animals live
- to learn what plants and animals do
- to experience how people, plants, and animals share a city home

Exhibit Highlights

Urban Woodlands Area

- Build a bug, find who lives under a log, study bird sounds, listen to urban birds, become a "Citizen Scientist," and put on a stump puppet show.

Classroom Science Connections—
Insects • Metamorphosis • Decomposition • Trees • Urban Birds

Freshwater Zone

- Get a fish-eye view in our **Pond** and study life in a drop of water.
- Create a footprint story and search for clues as nature detectives in our **Stream**; meet turtles and frogs.

Classroom Science Connections—
Water Cycle • Erosion • Freshwater Ecology • Life Cycle of Reptiles and Amphibians

Beach Intertidal

- Delve into a hands-on investigation of live horseshoe crabs, starfish, and/or mollusks up close.
- Design a seashell pattern, measure and weigh young "fish" at a fish research area, study water action in a wave tank.

Classroom Science Connections—
Arthropods • Marine Invertebrates • Fish Life Cycle • Tidal Zones

Community Garden

- Share gardening stories and role-play planting, harvesting, and watering plants.

Classroom Science Connections—
Plant Life Cycle • Gardening • Farming • Soil

Science Inquiry Center

- Everyone's a scientist in our resource-rich activity room—explore live animals, tools, objects, and activities through inquiry.

Classroom Science Connections—
Animal Diversity • Anatomy • Cultural Representations of Animals • Poetry

Greenhouse

- Look, smell, touch, and use the tools of a botanist to discover the world of plants.

Classroom Science Connections
Plant Growth and Change • Plant Diversity • Plant Structures • Ethnobotany • Soil

Goals for Teachers and School Groups

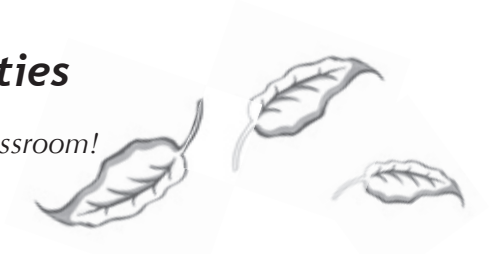
What we want students to learn—

- **The importance of a lifelong interest in and stewardship of our natural local and global environments;**
- A greater understanding and appreciation of the world of plants and animals, especially those that share our Brooklyn community;
- Skills of observation, description, looking things up, and using imagination that are the fundamental tools of scientific inquiry;
- Knowledge about how our local "neighborhood nature" extends to the entire "world of nature;" and
- Observing nature can be fun!

How we want students to learn—

With questions! Students coming to *Neighborhood Nature* can use their innate curiosity to build scientific inquiry skills through exploration and investigation of their local habitats. **With these new skills in-hand, we want students to more knowledgeably explore, discover, and learn to respect the natural environment locally and in the world-at-large.** Our aim is that they become "fearless learners."

Suggested Classroom Activities



Take Neighborhood Nature back to your classroom!

1. Budding Botanists/Grades 1-6

Use inquiry skills to explore the anatomy of plants we eat. Have each student bring in one fruit or vegetable from home. Guide them through an exploration by using their senses of sight, smell, touch, taste, and even sound. Have them draw what they see, looking at texture, patterns, shapes, and colors. Can they predict which are roots? Stems? Leaves? Fruits? Discuss "What I Wonder" questions about their plants. Cut their fruits or vegetables open. What is inside? Create a map of where the fruits and vegetables come from by looking at labels or by doing research. As an additional twist, start a small windowsill classroom garden by growing plants from kitchen scraps, such as "eyes" of potatoes, ginger buds, onions, and carrots. Record observations and changes over time.

Standards: *Meets Science and Art Standards.*
Related NYCDOE Units of Study: *Plant Diversity (1st grade), Plants and Their Environment (2nd Grade), Plant Characteristics (3rd Grade), Analysis, Inquiry, and Design (5th Grade).*
Neighborhood Nature Connections: *Greenhouse, Community Garden.*

2. Rocky Explorations/Grades 2-6

Have each student bring in a rock from home or the sidewalk. Have the class sort their rocks into categories based on color, texture, and/or weight. How many different ways can the rocks be sorted? Have the class line up their rocks based on size. Have students think of ways to predict and test for rock hardness and place the rocks in order from softest to hardest. Then perform a scratch test using Moh's Scale of Hardness (a universal scale to measure rock hardness) to determine the hardness of each rock (fingernail scratches surface: 2.5; penny: 3; paper clip or nail: 6.5).

For more info, see: www.childrensmuseum.org/geomysteries/cube/b2.html.

Have students experiment with using rocks to make streaks on paper. What relationships can students find between rock hardness and paper streaks? Use the rock samples to start a class rock collection (old egg cartons work well!), have students draw with soft rocks (chalk), or create a small stone garden, similar to those popular in Japan and China. Rock gardens help people remember their connections to the natural world. Fill a shallow pan with sand, arrange rocks, and use a comb to make patterns around the rocks.

Standards: *Meets Science Standards.*
Related NYCDOE Units of Study: *Matter and Its Properties (1st grade), Earth Materials (2nd Grade), Plant Characteristics (3rd Grade), Earth Science (5th Grade).*
Neighborhood Nature Connections*: Intertidal Beach, Stream.*

3. Decomposers Experiment/Grades 3-6

A garbage truck picks up our trash. In nature, who takes care of that job? Write down predictions and perform a controlled experiment of culture microbes. During a class walk or recess, collectively gather several non-living items (a dead leaf, potato chip, twig, rock, bottle cap). In the classroom, prepare a simple culture medium: add 1 box of *Jell-O* to 1 cup boiling water and stir; then add 1 cup cold water. Pour the liquid on petri dishes or any flat dish or bowl. Keep the dishes in a cool place. When ready, place the collected items flat on the culture dishes; seal the dishes by taping down the cover or placing it in a sealed zip lock bag. Label the bags. Keep one dish with only the culture medium as a control. Place the dishes in a warm, but not sunny, location. Make a class chart or have students keep a record of their observations in their journals. Give students 10 minutes for observations and note-taking each day for 3-5 days. Discuss what is happening: decomposers such as fungi will begin to produce spores and dark specks of bacterial colonies might also be visible. Did anything grow in the control dish? What kinds of items had the most microbes on them? Why do the students think that? Help students understand how decomposers exist to return nutrients to the soil. They are more abundant on items high in nutrients (tender plant tissues should show more microbe growth than a tough, woody stem). As an extension, try growing edible mushrooms in the classroom (see www.mushbox.com).

Standards: *Meets Science Standards.*
Related NYCDOE Units of Study: *Plant and Animal Characteristics (3rd Grade), Ecosystems (4th Grade) Environments (5th Grade), Diversity of Life (6th Grade).*
Neighborhood Nature Connections: *Decomposers in Urban Woodlands Area.*

Suggested Outdoor Exploration Activities



Get students outside and explore!

1. Catch the Chatter/Grades 1-6

Animals have a lot to say! They growl, chirp, tweet and twitter, buzz, and chatter. Choose an outdoor spot with your students. Sit in a large circle and listen closely for a few minutes. What sounds do they hear? Where are the sounds coming from? What animals do they think made the sound? What do all these sounds mean? What do they think the animals are saying? Focus on how living sounds differ from sounds from non-living sources. Back in the classroom, recreate nature's symphony by assigning different sounds to different students. Can they recreate the sounds of a pond? A forest? Squirrels chatting on a busy street? As an art extension, have students create comic strips using speak-bubbles between animals and other things found in nature. Students can also discuss non-verbal communication (some animals use sign language just like people who are deaf!) and even learn a few words in sign language.

Standards: *Meets Science and Art Standards.*
Related NYCDOE Units of Study: *Animal Diversity (1st Grade), Animals In Their Environment (2nd Grade), Animal Characteristics (3rd Grade), Exploring Ecosystems (4th Grade) Environments (5th Grade).*
Neighborhood Nature Connections: *Birding in Urban Woodlands Area.*

2. Nature Detective/Grades 1-6

Go on a nature hike outside the school. Look for evidence of animals in action. You might find animals and insects or traces that they've been there, such as footprints, paw prints, feather, fur, scent, or scat. What can students notice? Where can they find evidence of animals—in grass, dirt, snow, sand, or cement? If tracks are encountered, have students imagine how the animal moved. Was it taking little steps, big steps, or running? Back in the classroom, have students choose an animal and sketch what they think its track looks like. Then research what its real track looks like. Students may also invent an animal and create its footprint. Based on the track, can other classmates discover characteristics about that animal? Have students examine the soles of their own shoes. Can they draw the tracks they make when they wear their favorite shoes? Students can study the tracks that their own shoes make by sketching the designs of the bottom of their footwear (or by creating rubbings of the shoe patterns). Then, collect their drawings, shuffle their order, and pass them out to the students. Have them try to find the original shoe. What clues help them study and identify "people" tracks?

Standards: *Meets Science and Art Standards.*
Related NYCDOE Units of Study: *Animal Diversity (1st Grade), Animals In Their Environment (2nd Grade), Animal Characteristics (3rd Grade), Exploring Ecosystems (4th Grade) Environments (5th Grade).*
Neighborhood Nature Connections: *Freshwater Zone.*

3. Adopt a Tree/Grades 1-6

Have students locate a plant or tree on the school's block to adopt, recording observations every time they visit. Have students touch the leaves, feel the texture of stems, and sketch the shapes they see in the plant. Measure the tree trunk. Describe the feel of the bark. Can they identify what type of tree it is? Can they estimate its age? Are there any animals that use the tree as a home or resting spot? What evidence helps in discovering what animals are there? Observe the tree throughout the year and observe seasonal changes. Keep the street pit clear of garbage, and have students research what the tree needs to grow (such as fertilizer, compost, water, and sun). Students can write poems or stories about the tree's life. In the classroom, try growing a small tree from seed: avocado, grapefruit, lemons, and oranges grow easily in a pot. Contrast and compare its growth and characteristics with the adopted tree.

Standards: *Meets Science Standards.*
Related NYCDOE Units of Study: *Plant Diversity (1st grade), Plants and Their Environment (2nd Grade), Plant Characteristics (3rd Grade), Environments (5th Grade).*
Neighborhood Nature Connections: *Urban Woodlands Area.*

Museum Resources

Science School Adventures at the Museum

Bring your students to the Museum and let our educators lead the class on your chosen adventure.

For Grades 1-6—

- **Pond Ecosystem**. Investigate pond ecology from the inside out and explore the different organisms that live within the pond community.
- **Fantastic Fiber**. Explore a variety of raw plant fibers, cultural papers, and collection objects, and design your own paper.
- **Green Roof**. Become botanical architects by discovering sustainable construction techniques and constructing and designing a "green" roof.

For Grades 2-6—

- **Amazing Arthropods**. Investigate the amazing body structure of live arthropods such as horseshoe crabs and hissing roaches.
- **Woodland Animal Mythology**. Explore the Narragansett tribe's creation myths based on animal legends and discover woodland animal species.

Cost is $125 per adventure
Contact our Scheduling Secretary at (718) 735-4400 x118 for more information.

Professional Development for Teachers

Bring us to your school or arrange for a group of teachers to come to the museum to learn tips and techniques for how to bring Brooklyn Children's Museum magic into your classroom.

- **Teach More With Less**. Explore eye-opening methods and strategies that will help provide quality science teaching without funding compromises. Get sparked with exercises to get into the creative zone, increase your resources, and create homemade tools.
- **Kitchen Cabinet Science**
  Infuse plant and chemistry explorations into your lessons in a fun and fascinating way. Learn the Museum's most successful hands-on, inquiry-based activities that incorporate biology and culture.
- **Animal Concepts from the Museum to the Classroom**
  Discover techniques of teaching with inquiry skills and collection objects inspired by our galleries to bring the excitement of a museum animal experience into the classroom.

Cost is $150 for 3 participants, $25 for each additional participant.
Contact our Senior Manager for School Programs at (718) 735-4400 x123 for more information.

The Museum's Portable Collection Cases—A Museum in Your Classroom

Bring the excitement of teaching with museum objects to your classroom. Each case contains objects, media, books, and a teacher's guide with activities and other information.

- **Urban Naturalist Case**. Tools, collection objects, and more to explore New York wildlife and study nature in the city.
- **A Day at the Beach**. Study shore ecology from the inside out with plant and animal specimens, tools, collection objects.

Rental is $85 for two weeks (delivery and pickup in Brooklyn is included).
Contact our Scheduling Secretary at (718) 735-4400 x118 for more rental information.

Nature Exploration Tips

Before You Go—

- **Develop a Plan**, such as scavenger hunt with students. Have them put together a list of things to find before setting out. For example, find something an insect has nibbled on, a tree branch in the shape of a fork, or something with a smell.
- **Discuss Safety**. Wear appropriate clothing and shoes, leave unknown things untouched, and always stay with the group.

When You're There—

- **Look, Listen, and Sniff**. Have students realize that they can use their senses to notice nature anywhere. Please observe, but don't disturb.
- **Watch and Wait**. Encourage students to be still. They'll see more animals! Tools like magnifiers or binoculars can be helpful too, and may help low-vision students.
- **Draw and Write**. Bring paper and drawing materials. Students should make notes or draw what they discover and observe or use a disposable camera (especially for students that can't draw or write) to catch the wonder of nature.
- **Share and Compare**. Have students talk about what they notice. Help them ask questions and look for answers together. Make a list of things they know and don't know: What do we notice? What do we think happened here? How could we learn more? How are we like the animals you see? How are we different?
- **Remind students they already have their most important tool . . . themselves (and their senses)!**

MORE Resources . . .

Places To Go—

- *Big Apple Safari for Families: The Urban Park Rangers' Guide to Nature in New York City*. Sharon Seitz. Countryman Press, 2005.
- *Wild New York: A Guide to the Wildlife, Wild Places, and Natural Phenomena of New York City.* Margaret Mittelbach. Three Rivers Press, 1998.
- *Go Wild in New York City*. Brat Matsen. National Geographic Children's Books, 2005.
- *Exploring the Nature of New York*—CUNY: http://ive.cuny.edu/nynn/home.html.

Websites—

- *Nature: The Wild Side of New York*—PBS: www.pbs.org/wnet/nature/home.html.
- New York City Department of Parks and Recreation: www.nycgovparks.org/index.php.

Additional Curriculum Resources—

- *City Science*. Peggy Perdue & Diane Vaszily. Good Year Books, 1991.
- *Eco-Inquiry: A Guide to Ecological Learning Experiences for Upper Elementary/Middle Grades*. Kathleen Hogan. Institute of Ecosystem Studies,1994.
- *Hands-On Nature: Information and Activities for Exploring the Environment with Children*. Edited by Jenepher Lingelbach. Vermont Institute of Natural Science, 1986.
- *Ideas for Environmental Education in the Elementary Classroom*. Kath Murdoch. Heinemann, 1993.
- *Teaching Kids to Love the Earth*. Marina Lachecki, et. al. University of Minnesota Press, 1991.

BROOKLYN CHILDREN'S MUSEUM

BROOKLYN CHILDREN'S MUSEUM'S MISSION

The mission of Brooklyn Children's Museum is to actively engage children in educational and entertaining experiences through innovation and excellence in exhibitions, programs, and use of its collection. The Museum encourages children to develop an understanding of and respect for themselves, others, and the world around them by exploring cultures, the arts, science, and the environment. The Museum is recognized among cultural institutions for its leadership in addressing the educational, cultural, and social concerns of youth and families in our dynamic urban environment.

We are more committed then ever to our mission to create experiences and environment where children can be active, successful and confident learners by putting children at the center of the museum experience.

Developed by the Brooklyn Children's Museum

BROOKLYN CHILDREN'S MUSEUM

touch the world!