ACADEMY

FRONTIERS

INSIDE:
26 first-graders
Four live animals
One teacher-naturalist

The member magazine of the Academy of Natural Sciences of Drexel University

SUMMER 2013

President and CEO: George W. Gephart, Jr.
Vice President of Institutional Advancement: Amy Miller Marvin
Editor: Mary Alice Hartsock
Graphic Designer, *Academy Frontiers*: Stephanie Gleit
Supplement Design: Tabula Creative
Contributing Writers: Brigette Brown, Clare Flemming, Robert Peck, Roland Wall

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Please send questions or comments about *Academy Frontiers* to ans_editor@drexel.edu.

Academy membership includes a subscription to *Academy Frontiers*, free general admission to the museum, discounts in the Academy Shop and Academy Café, invitations to special events and exhibit openings, and much more.

For information about Academy membership, call 215-299-1022 or visit ansp.org/membership.

On the cover: *Reaching lengths of up to 4 feet, the venomous Vogel's pit viper can be found in the evergreen and tropical forests of Thailand, Cambodia, Laos, and Vietnam. Photographed by Mark Laita, the snake will appear alongside a dozen others in* Serpentine, *open through September 22 in the Academy's Art of Science Gallery. Photo © Mark Laita*

Academy Greetings

Dear Friends,

Summer is a great time for a break from your everyday routine. Some of us arrange family vacations, and others prefer to relax and take in the quiet of our city during the warmer months. Regardless of how you spend July and August, I hope you will consider incorporating a museum visit into your plans. Learning doesn't stop when the school year ends, and children and adults alike can benefit from an exploration of history, art, culture, and, of course, natural science.

With the guidance of Academy Vice President of Education Jacquie Genovesi, the Academy offers summer camps, programs for preschoolers, festivals, and more—all great ways to beat the heat. Throughout the year, we provide adult-friendly museum classes and field studies, environmental programs, special exhibits, and even mega-bad movies. We guide students toward successful careers through our STEM career days and Women In Natural Sciences program. We travel to a variety of schools, fairs, festivals, parks, and libraries to ensure our education programs reach as many people as possible. We are extremely fortunate to provide many of our programs to participants free of charge with the support of a number of generous contributors.

In this issue of *Academy Frontiers*, you will learn about several of our education programs, including our outreach lessons (more on page 8). These lessons enable us to bring the Academy experience into the classroom with live animals, dinosaur stories, and much more. Our experienced teacher-naturalists truly bring these lessons to life, as evidenced by the feedback we receive from schoolteachers and students. We hope the stories in this issue will encourage you to consider a donation to our education programs. With your help, we can extend our reach to individuals who may not otherwise develop a love for the natural and environmental sciences.

I hope you'll read our enclosed Sustainable Strategic Plan, which describes many of our initiatives for the next five years. We are eager to share our goals with you, our most loyal supporters. To those who donated to last year's Annual Fund, thank you. We could not reach our ambitious goals without your support.

All the best,

George W. Gephart, Jr.
President and CEO

Founded in 1812, the Academy of Natural Sciences of Drexel University is a world-class natural history museum dedicated to advancing research, education, and public engagement in biodiversity and environmental science.

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Exhibit IQ

Glow: Living Lights

Special Exhibits Gallery
Open Through September 29, 2013

Glow: Living Lights takes visitors on a journey through land and sea in pursuit of creatures with the incredible ability to produce their own light. Fireflies, glow worms, and rarely seen alien-looking creatures from the middle ocean are just a few of the animals lighting up the dark through a mysterious process called bioluminescence. Dramatic video, live organisms, rare preserved specimens, models, and hands-on activities will enlighten and engage families. Visitors can also examine mysterious glowing scorpions and don firefly and jellyfish costumes. *Glow: Living Lights* is produced by Exhibit IQ and supported by Aqua America, Inc.

Serpentine

Art of Science Gallery
Open Through September 22, 2013

Fine art photographer Mark Laita has traveled the world to photograph the beauty and danger of the world's most deadly snakes, from the Honduran milk snake to the black Pakistan cobra. This selection of a dozen colorful and alluring photographs from his latest book, *Serpentine*, depicts what he calls "the sensual attractiveness" of serpents, whose mystery and symbolism have fascinated humanity for thousands of years.

Mark Laita

Dinosaurs Unearthed

Dinosaurs Unearthed

Special Exhibits Gallery
October 12, 2013–March 30, 2014

Roaring, moving, life-size animatronic dinosaurs invade the Academy of Natural Sciences of Drexel University for a multi-sensory experience for the whole family. State of the art and scientifically accurate—down to the feathers on *T. rex*—*Dinosaurs Unearthed* features more than a dozen realistic, full-bodied dinosaurs, as well as skeletons, fossil casts of skulls, claws, and horns, real specimens of mosasaur and spinosaurus teeth, an *Oviraptor* egg, and the ever-popular coprolite (dino poop). A dig site for young paleontologists, chances to control dinosaur movement, and other activities encourage exciting hands-on exploration. Fee: $3 for members and groups; $5 in addition to museum admission for nonmembers.

Mary Alice Hartsock/ANS

A HEAD START ON EDUCATION

By Brigette Brown

Surrounded by boxes of green sponges—materials for a science project on grass-growing techniques—Academy Early Childhood and Community Programs Coordinator Tiffany Allen reminisces about the journey that led her to the Academy. She knows why she enjoys her job: awesome experiments, smiling faces, and the overall opportunity for creativity. But most of all, Allen simply loves the excitement that teaching science brings to the Philadelphia community.

In A Head Start on Science, a partnership between the Academy and the School District of Philadelphia, Allen provides inquiry-based, science-oriented lessons to both students and teachers. This PNC Grow Up Great With Science program was originally started with a grant from the Barra Foundation and has enabled more than 3,000 curious children to participate in interactive science workshops. The Academy has worked with more than 200 local preschool teachers through the program, helping them to build lesson plans that improve natural science education in the classroom.

"I love the versatility! Every day I learn something new and different," Allen says.

From the start, Allen was driven to educate. After obtaining her undergraduate degree, she worked at a highly reputable early childhood preschool program, where she taught toddlers using innovative hands-on activities. Later, she obtained her master's in museum education from the University of the Arts. She was an intern in the Philadelphia Museum of Art's preschool program, continuing to implement lesson plans and use museum art to explore ideas.

Allen arrived at the Academy about five years ago to coordinate the museum's programs for young children. At the Academy, Allen can explore new ways to reach the community by bringing the wonders of the natural world into a classroom and museum setting.

From the start, Allen was enthusiastic about growing and learning in this new environment alongside the many teachers and students she supports.

"My biggest challenge was the research! A lot of studying, reading, and listening to facts," she recalls. All of her programs must be exceptionally inventive to keep clever students and inquisitive teachers on their toes—and Allen does not disappoint.

Allen's resource-rich curriculum comes in handy while she's managing the Academy's Tiny Tot Explorers program—an outlet for toddlers to explore nature through crafts and games. Previous series included investigations into strange insects, ocean predators, and extraordinary rainforest fauna.

"Since students at that age are naturally curious, it's easy to present new ideas through science-based activities that can be integrated throughout the preschool classroom," she remarks.

Allen wants to explore more opportunities for educational outreach, such as additional Academy summer science programs for toddlers in local parks within the city. She says her inspiration comes from her love of nature, rooted in memories of childhood outings with her mother.

"I'm thankful she shared her love of nature with me, and I enjoy passing this love on to the teachers and students I work with," she says.

Just like the seeds of grass waiting to grow in those green sponges, the minds of students and teachers all over the city are fertile ground for new scientific ideas. It's Tiffany Allen's job to support their budding curiosity, and she loves every minute of it.

Jill Sybesma/ANS

UNCOMMON PALEONTOLOGISTS

It doesn't take much to get naturalists excited about fossils. When fossils are so plentiful that they're lying on the ground, naturalists just might feel like a band of *T-rex* on a scavenger hunt.

At least that's true for Academy Adult Programs Manager Jill Sybesma, who coordinated the May 4 Cretaceous Fossils Adult Field Study with Vertebrate Paleontology Collection Manager Ned Gilmore. The scientists accompanied 20 adult participants to a fossil-rich site at the Chesapeake and Delaware Canal spoil piles near Delaware City. In the 1800s, workers dug a canal in this area to connect the Delaware River and Chesapeake Bay. Their digging exposed sediment rife with fossils from the late Cretaceous period (97 to 65 million years ago)—and today the area is a gold mine for paleontologists.

Ned Gilmore/ANS

Gilmore taught fossil collecting techniques and displayed a sampling of fossils from this area, once a Cretaceous sea populated by oysters, squid, coral, sharks, and numerous marine invertebrates. Participants then searched for their own spoils, bringing back fossils for Gilmore to identify. He spotted oysters and an internal structure of a squid-like animal named *Belemnitella americana*, as well as rare fossils such as a specimen of a goose barnacle and several specimens of a tiny solitary coral. There were even two sharks' teeth—and Mark Steinhagen was thrilled to find one.

Steinhagen, a marketing and sales professional, signed up for the field study at the invitation of a family member, even though he hadn't collected fossils before. As soon as he started digging, he really began to enjoy it. Thanks to Gilmore's guidance, Steinhagen continued his research at home.

"Ned is like a walking encyclopedia," Steinhagen says. "His knowledge and expertise are mind-blowing. He knew all the scientific names for all the fossils and was able to answer every question."

Academy adult classes and field studies cover bug pinning, fossil collecting, nature photography, fish surveying, and more. Check ansp.org for future programs.

FIREFLIES IN YOUR BACKYARD

Anyone can be a naturalist. In each issue of *Academy Frontiers*, our scientists and staff share their knowledge to help you explore the natural world. In this issue, live invertebrate specialist Karen Verderame explains the glow of summer's most fascinating fliers.

Have you spotted some luminous creatures in your local park or backyard this summer? You may know these insects as lightning bugs or fireflies. Actually a type of beetle, fireflies have leathery front wings with the hind wings (which do all the flying) folded underneath when the insects are at rest. Although several species may live near you, you are most likely to see the common eastern firefly, *Photinus pyralis*. This firefly is about one-half inch long as an adult. It is adorned with a black head and blackish-brown upper wings that are outlined with a narrow yellow margin, and it has an orangey-red thorax (between the head and the abdomen) that has a black spot in the center.

Fireflies carry the chemicals luciferase and luciferin, and they use their nervous systems to ignite a chemical reaction to "turn on" their recognizable flashes. This mysterious phenomenon, called bioluminescence, is featured in the Academy's current special exhibit, *Glow: Living Lights*. Fireflies use their lights primarily to communicate with potential mates. Some species of female fireflies wait on the ground until they spot these flashes, and then they attract mates by answering with their own signals. Various firefly species have distinct signal patterns and different colored flashes.

Fireflies are commonly found in suburban and rural locations. These areas tend to be much darker than cities, which are filled with bright lights that can interfere with fireflies' signaling systems. Since most fireflies are nocturnal, it's easy to spot them at night. They linger near streams or standing water, in high grasses of meadows and suburban backyards, and near the edges of forests. You will only see them when it's hot and humid during the summer.

Fairmount Park in Philadelphia is a great place to find and observe fireflies because it offers plenty of waterways, trees, and uncultivated spaces. Pick an evening to visit, and try to spot fireflies in their natural environment. Track one firefly for several minutes to figure out its pattern of flashes. Bring a flashlight with a beam covered in blue paper so you can mimic the pattern without disturbing the fireflies.

YOU WILL NEED:
- Flashlight covered in blue paper
- Bug spray
- Medium glass jar with lid
- Tall grasses and leaf litter
- Small twig
- Cotton ball soaked with water
- Journal
- Pencil
- Watch or timer

To attract fireflies to your suburban backyard, you'll have to do a little planning. Start by mulching your yard with fall leaves to give firefly larvae a place to develop and find snails to eat. You also can ask a family member responsible for grass cutting to leave a small uncut patch or cut all the grass about 2–3 inches high. Plan to turn off any bright outdoor or indoor lights that could distract the fireflies.

Whether you're searching in a park or at home, bring an adult and a few materials to help you observe the fireflies and record your findings. Fill a glass jar with tall grasses or leaves for the fireflies to perch on, and add a cotton ball soaked in water. Catch several fireflies and place them into the jar. Are any of the fireflies signaling back and forth to each other? What patterns are they flashing? Record your findings in a journal. Then be sure to let the fireflies out of the jar after one hour so they can enjoy their life in the wild!

Pyractomena sp.

C. Riley Nelson

Mary Alice Hartsock/ANS

Adaptations

By Mary Alice Hartsock, Editor

Mike Kaczmarczik drinks his coffee black. It gives him the jolt he needs to keep up with elementary schoolers, not to mention an assortment of live animals. Plus, he simply doesn't have time to wait for a complicated coffee-shop concoction.

It's 7:30 a.m., and Kaczmarczik is preparing for an outreach lesson that will take place at a Philadelphia charter school. He has been checking radio traffic alerts and weather conditions since he arose at 6 a.m. After picking up breakfast, he arrives at the Academy to round up several live animals—today a hedgehog, baby alligator, snake, and hawk. He loads them into travel enclosures along with heating pads and towels to keep them comfortable on the road.

Emerging from the Live Animal Center with a glance at the clock, Kaczmarczik leads the way to a huge closet that is lined floor to ceiling with shelves of real animal skulls, bird wings, turtle eggs, snake skins, and other specimens. He selects a handful for the children to examine and touch after some deliberation about which specimens will best complement his lesson. With a GPS and printed directions in hand, he loads the animals and artifacts into the Academy on the Go vehicle, washes down a pastry with a swig of coffee, and is on the road by 8:34 a.m.

"The rush before a morning outreach builds up the adrenaline you need when you're teaching," Kaczmarczik says as he navigates through a congested area. "You can wake up with a headache, but as soon as you get in front of those kids, their enthusiasm makes you feel like Superman."

You won't doubt that characterization as you watch Kaczmarczik teach. He has pedagogy in his blood—he is the son of a teacher-naturalist who worked at the Academy more than 40 years ago. After studying physics at the undergraduate and graduate levels, Kaczmarczik began to volunteer at the museum in 2008 because of his love for animals and nature. Eventually hired as outreach coordinator, he designs the Academy's outreach lessons, communicates with schools, trains teacher-naturalists, and conducts outreach lessons that captivate kids and adults alike.

It's 9:30 a.m., and 26 first-graders are staring expectantly at Kaczmarczik.

"How many of you like animals?" he asks, and all hands go up. "How many of you really like animals? How many of you love animals?"

Arms wave as the students wiggle with excitement, and Kaczmarczik takes advantage of this energy to explain adaptations. These first-graders catch on quickly. Since their school's mission focuses on humans' connections to local and global environments, the students are keen investigators.

"We had already worked on adaptations, so the students knew the basics of it," says Kristina Skladaitis, the school's K–2 science teacher. "But to have live animals here and talk about the adaptations of those animals is something I can't give them."

To describe the importance of adaptations, Kaczmarczik introduces the concept of opposable thumbs. He picks up a water bottle with only his palm and clumsily tosses it to the floor. The kids giggle as he picks it up and tries to unscrew the cap without using his thumb.

Kaczmarczik then explains how animals use adaptations to survive in the wild. As he retrieves the Dumeril's boa, a 6-foot-long snake, from its enclosure, whispered gasps ring throughout the classroom. The children's eyes widen, their jaws drop, and several students draw their knees to their chests in awe.

As the boa encircles his torso, Kaczmarczik describes how not having arms and legs helps the snake slither on the ground. Her camouflaged skin enables her to blend into her surroundings as she hunts for food. Then she'll drop her wide lower jaw, another adaptation, to satisfy her appetite for enormous forest snacks.

"What kinds of things does it eat?" asks one student.

"Where is the heart?" inquires another.

"When are we going to get out the next animal?" a third asks.

The Academy conducts eight or nine outreaches per week during its busy season, and participants almost always share the glee of these Philadelphia first-graders. Academy teacher-naturalists like Kaczmarczik cater lessons to the needs of each audience. These educators also enable schoolteachers to extend outreach

(continued on page 11)

Outreach Coordinator Mike Kaczmarczik (left) describes the adaptations of Henson, a female Harris hawk. Many Academy live animal ambassadors must train for two years before they can travel outside the museum for outreach lessons.

February 4, 2013

Dear Mr. Mike,
Thank you for the the tatoos. My favorite part of your visit was seeing the chawk and the dinosaurs fossil. One thing I learned was dinosaurs are birds. I liked when I touched the fossil. I hope to see you again.

From,
Nora

(continued from page 9)

topics into their regular lessons by providing curriculum guides and other materials. While the Academy focuses primarily on schoolchildren from preschool through grade 12, educators also teach and set up experience tables at libraries, community centers, festivals, parks, summer camps, sports games, and retirement communities.

"Building enthusiasm is quite simple," says Academy educator Michelle Manella, who on the morning of Kaczmarczik's lesson is contending with a water main break near the school where she's headed to teach her own outreach. "As much as I get into it—and sometimes this may be by acting silly—the kids get into it. It's satisfying when you finish a class and you can see how much the kids enjoyed it."

Outreach lessons go beyond adaptations, focusing on habitats, animal coverings, animal communication, invertebrates, raptors, dinosaurs, geology, and other topics.

"Although we wish that every single student in the Delaware Valley could visit the museum, the reality is that many schools either cannot afford the trip or can't fit the trip into their school year," says Timshel Purdum, Academy director of education and lifelong learning. "Outreaches allow the Academy to share the joy of the natural world, the museum, and its collections with a few more people."

Kaczmarczik has big ideas for expanding outreach lessons to broader audiences. He hopes to train more teacher-naturalists so that he has time to consider developing additional outreach programs geared specifically toward adults. For now, though, he continues to polish his lesson plans. His philosophy has always been that you never learn about something once and simply remember it. But it sticks the more you hear about it.

"When something in a lesson creates a reaction, human curiosity takes over, and you want to know more," he says. "That's an incredible jumping off point—it sparks questions."

Academy outreach lessons are designed for little explorers (grades Pre-K–K) and small and large groups (grades 1–12) and can be customized for your group. All programs meet the new education standards for Pennsylvania and New Jersey. We also offer community programs and attend festivals and fairs where your guests can ask questions of our expert naturalists and see live animals or artifacts in a casual setting. Call 215-299-1060 to explore the possibilities.

GRANTING ACCESS TO SCIENCE

Many of the Academy's outreach lessons take place at Philadelphia schools that qualify for Title I, a program created by the United States Department of Education to ensure that each child has a fair and equal opportunity to obtain a high-quality education. Title I schools qualify as such when at least 40 percent of their students' family earnings meet the U.S. census' definition of low income. The Academy provides grant-funded outreach lessons free of charge to Title I schools.

The Academy is part of Pennsylvania's Educational Improvement Tax Credit program (EITC), which means that an eligible company can donate funds to support qualified innovative educational programs for students and receive a tax credit in return for the donation. Currently, a company can donate up to $750,000 and receive a 75 percent tax credit; a two-year commitment affords a 90 percent tax credit. These donations can support the Academy's Women In Natural Sciences program for young women in Philadelphia high schools or the Supporting and Enriching Natural Sciences Education in Schools program, which offers free museum admission, gallery lessons, or outreach programs to students at Title I schools. For more information on how your company can support the Academy through the EITC program next year, please contact corporatepartner@ansp.org, call 215-405-1542, or visit ansp.org/eitc.

Q: WHAT'S THE STORY BEHIND JOHN JAMES AUDUBON'S BUCKSKIN JACKET?

ANS Archives Coll. 2010-068; Photo by Will Brown

A: Many of us have heard of John James Audubon (1785–1851), early American naturalist, ornithologist, and artist extraordinaire. His role as the creator of the supersized double-elephant folio *The Birds of America* (1827–1838) solidified his lasting legacy in the overlapping realms of art and science.

Audubon obtained this buckskin jacket during his 1843 trip up the Missouri River. This expedition was his first and last to the American West and occurred at a period of great transformation on the frontier. He made the trip to gather information for a mammal book entitled *The Viviparous Quadrupeds of North America*. Like many other artifacts he collected, the jacket likely was a souvenir or a gift. Sweat stains, repairs, and worn spots indicate heavy usage—possibly by its original owner or an Audubon descendant.

The Academy Archives holds this garment, and a few other artifacts Audubon collected on the same trip, on deposit, courtesy of Ms. Alice Irwin, a member of the Audubon family. Recently Drexel University's Curator of Historic Textiles Clare Sauro showed us how to properly care for and store this fragile jacket, just as she does for the many clothing items in her care. *~ Clare Flemming, M.S., C.A., Academy Library and Archives; Robert M. Peck, Ph.D., Curator of Art and Artifacts and Senior Fellow of the Academy*

What have you always wondered about the Academy's history?

Please send your questions to ans_editor@drexel.edu, and we in the Academy Library and Archives will comb through our collections and respond to an intriguing question in the next issue.

POSITIVE PRODUCE

Are insects eating your garden vegetables? Before reaching for a pesticide, take a moment to learn about whether the insects may be beneficial to your garden or the surrounding ecosystem. Then consider integrated pest management alternatives that are economical, effective, and sustainable to human and environmental health.

Chemical pesticides can pose health risks for you, your family, and the environment. When pesticides are sprayed on plants, they can mix with rainwater and runoff, causing soil and groundwater contamination. Pesticides can come in contact with your clothes or exposed skin and enter the air you breathe, resulting in irritation of your skin, eyes, and respiratory system. Birds, pets, and other mammals that ingest insects, produce, or contaminated water near your garden may experience adverse health effects.

You can use simple alternatives to chemical pesticides to protect your health, your harvest, and your ecosystem. Be sure to inspect your yard for small amounts of standing water, which may attract mosquitoes. Find out which brightly colored flowers attract your garden visitors, and plant them near your garden to draw insects away from your vegetables.

Studying the life cycles and behaviors of garden visitors can reveal unexpected (and sometimes positive) ways they interact with your plants—and you'll learn more about local ecology. By limiting conditions such as food, water, shelter, and space that help these guests thrive, you may encourage certain pests to seek other habitats. *~ Brigette Brown*

Reviewed by Michelle Neidermeyer, PA Integrated Pest Management Program, and Jon Gelhaus, Ph.D., The Academy of Natural Sciences of Drexel University

The black swallowtail caterpillar is attracted to parsley.

GOT BUGS?

Observe your insect closely during the day and at night. Bring a chair or blanket to sit on, and wait quietly so that you do not disturb your garden visitor.

After you record your observations in a journal, visit the library or conduct research online to help answer the following questions. Take a few photographs to document the activity in your garden.

The Academy is a great place to get help in identifying your insect. During Bug Fest (August 10–11), our entomologists will be ready for your questions in our Ask a Scientist booth. Be sure to bring a specimen and all the data you've collected. Write down your questions and use our scientists as a resource!

- What does the insect look like?
- What does the insect eat? Is the insect a harmless visitor?
- If the insect eats my plants, can I tolerate its presence?
- What animals prey on this insect?
- Can I alter my garden or how I care for it to deter this visitor?
- How does this visitor reproduce, and how can I make sure its population doesn't expand?

SUBURBAN SUSTAINABILITY

By Roland Wall, Senior Director, Environmental Initiatives

"Urban sustainability" is an important concept in managing human and natural resources, and the Academy holds monthly forums that examine ways for cities to promote healthy environments and economies. With more than 50 percent of the U.S. population, including many of our members, living in suburban areas, we must also ask how people can live more sustainably outside the city.

Suburbs often have lower density populations and development, "sprawl," absence of commercial districts, and high use of automobiles. As a result, suburbs are often neglected in discussions of sustainability. Often they are criticized for negative ecological impacts. But demographics, building patterns, and relationships to city centers vary among communities. Below we list just a few ways you can live more sustainably in your suburban home.

CONNECT TO YOUR PLACE

Experience nature up close through parkland and walking trails. Use online maps and resources to better understand your landscape and environment.

UNDERSTAND YOUR LOCAL FOOD LANDSCAPE

Proximity to rural areas brings opportunities to buy food from local growers and better connect with your food sources.

KNOW YOUR WATERSHED

Everything that can be carried by stormwater ultimately ends up in a stream or river. Storm drains lead to waterways that may also provide drinking water. Impervious surfaces like driveways do not absorb water and are a key cause of stormwater runoff. Alterations may improve property values, particularly as water utilities begin to consider this factor in billing.

TAKE RESPONSIBILITY FOR YOUR ENVIRONMENT

Suburban homeowners often can use gardening, rain barrels, and green landscaping to reduce their environmental impacts.

REDUCE HOME ENERGY USE

Weatherizing and insulation alone can have enormous effects on your ecological footprint. Your finances and local ordinances may enable you to explore more sophisticated steps, such as home solar panels or geothermal wells.

THINK SUSTAINABLY

Whether you are in an urban high-rise, a forest cabin, or a cul-de-sac, sustainability is primarily a state of mind. Use common sense—recycle, use energy-efficient appliances, reduce miles driven, and conserve and re-use water. Your environment will thank you.

JAMES M. STEWART: AN ENVIRONMENTAL ADVOCATE

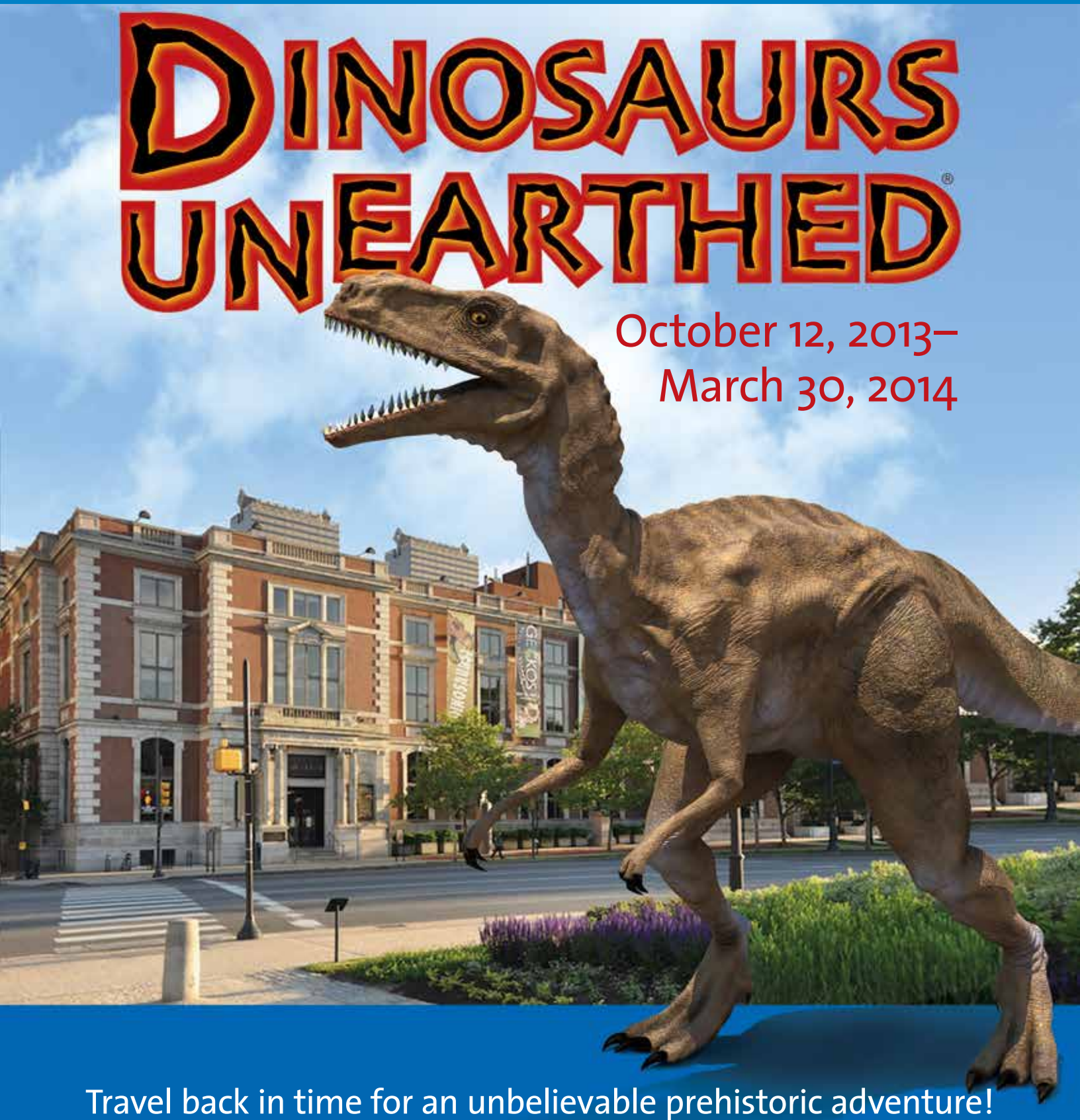
The Academy lost a good friend in April with the passing of James M. Stewart, an avid naturalist and valued member of our Board of Trustees from 1995 to 2004. Jim was a dedicated bird watcher and traveled the world hoping to spot rare bird species. For many years, he was a tireless supporter of the Academy with a particular interest in our ornithological work.

Jim frequently visited the Ornithology Collection, and he chaired a fundraising campaign for the department. When the Academy replaced our ornithology cabinets, Jim and his wife, Joly, contributed to the purchase, and a plaque on one of our hummingbird cases highlights their contribution. A founding member of the Wissahickon Valley Watershed Association, Jim was devoted to bird and land conservation along the Wissahickon, a tradition now carried on by his son Jamie.

UPCOMING EXHIBITION LIMITED TIME ONLY

DINOSAURS UNEARTHED®

October 12, 2013–
March 30, 2014



Travel back in time for an unbelievable prehistoric adventure!
Roaring, moving, life-size dinosaurs
invade the Academy this fall and winter.

Members get larger-than-life discounts on tickets to *Dinosaurs Unearthed*.
Renew today at ansp.org or by calling 215-299-1022.

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those who have contributed to the Academy between **March 1 and May 31, 2013**. Your generosity helps to fund our many programs of research and education, and we are tremendously grateful for your support.

In Support of the Academy-Drexel Affiliation
The Horace W. Goldsmith Foundation

In Support of the Academy's Endowment
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In Support of Academy Initiatives
Cynthia and Martin Heckscher

In Support of the Center for Environmental Policy
Wendy and Linda Henson

In Support of Education
Ms. Tammy Cook,
in honor of Ansh Shah's birthday
Ms. Kathryn Kailikole

In Support of the Harrison Expedition Project
Drs. Sheryl and George Talbot

In Support of Malacology
CEN PENN Beachcombers

In Support of Ornithology
Elizabeth Albert and Warren Palitz

In Support of Science and Research
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Francisco Borrero
The Cotswold Foundation
William Penn Foundation

Mike Kaczmarczik/ANS

Entomologist Stephen Mason guides a group through the Pine Barrens during an adult field study called Butterflies, Bugs, and Botany.

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Arleen Daidone and Deborah Telschow
Joseph I. Daily Jr.
Mr. J. Morris Evans
Ellen and Peter Evans
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Ms. Helen H. Ford
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Rita LaRue and Bernard Gollotti
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Mr. and Mrs. Steven B. Lewis
Mr. John R.H. Lightbourn
Ted and Sarah Lodge,
in honor of Dr. Ted Daeschler
Mrs. Jane C. MacElree
Mary Ellen Markovcy
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The McLean Contributionship
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Mr. and Mrs. Robert L. McNeil III
Ms. Helen Meyer
Mr. and Mrs. Jeffrey Moore
Martha H. and I. Wistar Morris III
Mr. Michael Musser
Michael Newbold,
in honor of Clement B. Newbold
Georgiana and Eric Noll
Mr. W. Gresham O'Malley III
Mrs. L. Rodman Page
Mr. and Mrs. Henry M. Paulson Jr.
Pennsylvania Historical and Museum Commission
The Philadelphia Cultural Fund
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Jackie and Stan Silverman
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Ms. Sarah Elgin Timberlake
Colton Weatherston Jr.


Jill Sybesma/ANS

Participants take notes during Blooms and Branches, an adult field study led by Dr. David Hewitt.

The Academy would especially like to recognize those who have joined or renewed their support in the Academy's Leadership Circles of Giving between **March 1 and May 31, 2013**.

Jefferson Circle

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Brian and Jennifer Merves Robbins
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Mrs. Joly W. Stewart

REVIEWING YOUR ESTATE PLANS

There are many times throughout your life when it makes sense to review and revise your estate plans. Changing your will at the time of a major life event provides an opportunity to think about how you would like your loved ones to be cared for upon your passing.

As you alter your estate plans, you also may consider incorporating charitable gifts to institutions that are important to you, such as the Academy of Natural Sciences of Drexel University. Here are some times when you may consider making changes to your estate plans:

MARRIAGE AND BIRTH

If you and your new spouse do not have wills, state laws will determine what your spouse and children receive upon your passing. To avoid complications, you may wish to set up wills that accurately reflect your wishes. At the birth or adoption of a child or a grandchild, you should also evaluate your current estate plan and consider adding the new family member as a beneficiary.

MOVING

Many states have different rules when it comes to estate taxes and property treatment. If you move from one state to another, it may make sense to consider how the laws of the new area in which you reside could affect your will.

PROMOTIONS AND RETIREMENT

An inheritance, a new job or promotion, or even retirement can have significant effects on your estate plans. Revising your estate plans can help you decide how to divide your estate and assets or set up trusts and bequests to efficiently invest your wealth. A sustainable investment in the Academy can contribute to the care of our world-renowned collections of more than 18 million biological specimens, our research in biodiversity and environmental science, and our public programs.

SUPPORTING THE ACADEMY

The Academy depends on contributions and support from people like you. Consider investing in our mission of advancing research, education, and public engagement in biodiversity and environmental science by including the Academy in your estate plans. It's a simple way to ensure your loved ones continue to have a place to explore and learn about the natural world!

For more information on ways to support our mission as you update your estate plans, please contact Amy Marvin, vice president of Institutional Advancement, at 215-299-1013 or marvin@ansp.org.

Mike Servedio/ANS

BUG FEST

On Saturday and Sunday, August 10–11, celebrate masters of deception at the Academy's sixth annual buggy festival. Examine insects that use camouflage or mimicry to stay safe from predators. Talk with an Academy entomologist about why insects are so important to the environment. Watch a magic show, cheer your favorite cockroach racer to victory in our famous Roach Race 500, see specimens, participate in activities, and watch creepy crawly demonstrations. More at ansp.org.

MAJOR ACADEMY SUCCESSES

CHARITY NAVIGATOR ★★★★ Four Star Charity

The Academy received Charity Navigator's coveted 4-star rating in April. The premier charity evaluator's highest-possible rating recognizes the Academy's fiscal health and commitment to transparency and accountability. About a quarter of evaluated charities receive this exceptional rating, indicating that the Academy outperforms most other charities in America.

MENSA, an organization open to anyone who scores in the top 2 percent on an accepted, standardized intelligence test, recently conducted a survey on science museums in North America. MENSA educators and scientists ranked the Academy of Natural Sciences of Drexel University as America's number two science museum, just behind the notable National Air and Space Museum in Washington, D.C. We are thrilled about this ranking!

Mike Servedio/ANS

ORCHID FESTIVITIES

In April, the Academy for the first time hosted the Southeastern Pennsylvania Orchid Society's International Orchid Show & Sale. More than 3,600 visitors viewed and purchased rare, bizarre, and beautiful orchids in full bloom and participated in lectures, tours, and activities. Save the date for next year's show, April 11–13, 2014!

Meredith Dolan/ANS

SUMMER SCIENCE FOR KIDS

Looking for a way to entertain the kids this summer? The Academy is hosting a fun and educational day camp for children ages 5 to 12 through August 23. Each week offers an exciting theme and off-site field trip, plus everything from dinosaurs to preserved specimens and live animals.

Children ages 3–5 and their favorite adults can explore nature through games, crafts, songs, and museum adventures during Tiny Tot Explorers on Wednesday mornings through August 21. More at ansp.org.

SCIENTISTS HONORED

In March, Academy Asia Center Director Dr. Clyde Goulden received Mongolia's highest award to foreigners, the Order of the Polar Star, for nearly two decades of study of the ecological and social effects of climate change in the country, as well as training of Mongolian students. In a separate honor, Dr. Jon Gelhaus, Academy curator of entomology and a Drexel professor, received the "Khubilai Khan" gold medal, the highest award from the Mongolian Academy of Sciences, for helping to develop biological science in Mongolia, establishing research facilities, and training Mongolian students.

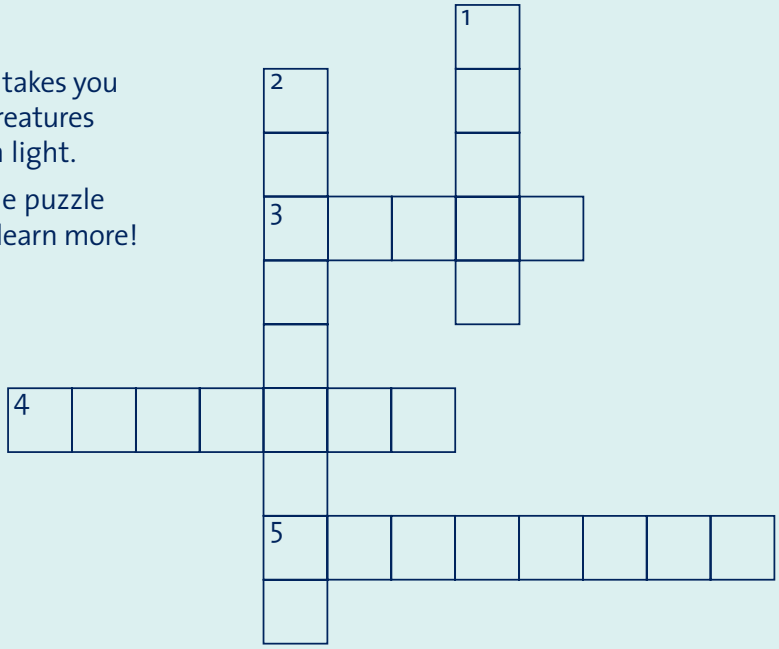
JUST FOR KIDS

WELCOME to the *Academy Frontiers* page for kids, one of the many great ways you can participate in the Academy's Kids Club!

WATCH IT GLOW

The Academy's special exhibit *Glow: Living Lights* takes you on a journey through land and sea in pursuit of creatures with the incredible ability to produce their own light.

Discover a few things that glow as you solve the puzzle using the clues below. Then visit the museum to learn more!



ACROSS

3. The sun gives us _____.
4. A beetle that glows is a _____.
5. This arachnid glows under fluorescent light and has a dangerous tail.

DOWN

1. The best time to see the stars is at _____.
2. These stinging, ocean-dwelling creatures produce their own light.

DID YOU KNOW...?

How did *Pachycephalosaurus* protect its young? – Jeremy, age 4

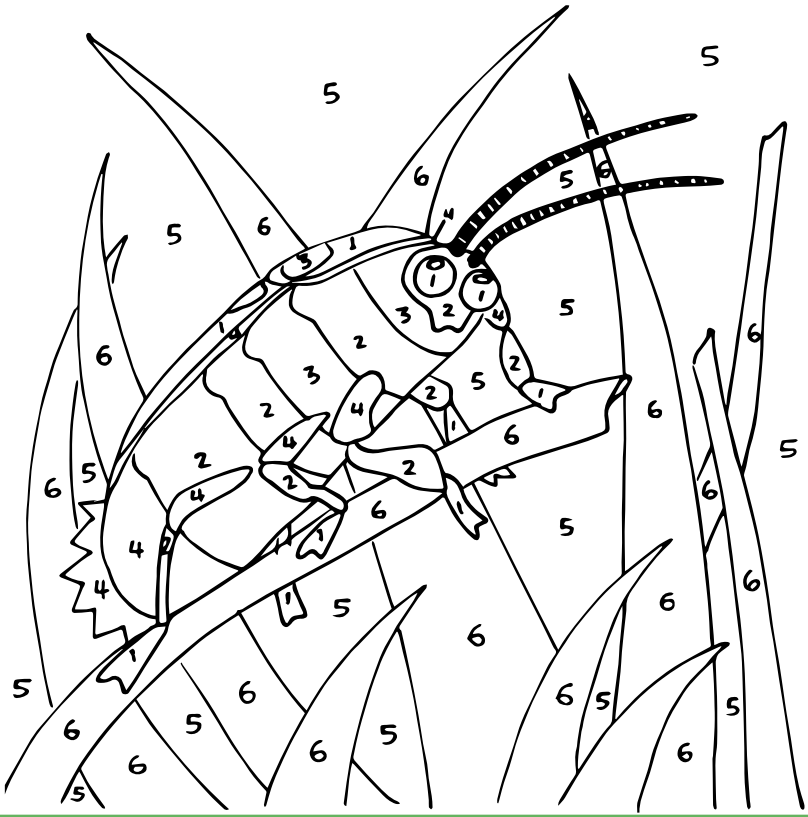
We know very little about the behavior of the dinosaur *Pachycephalosaurus*, as scientists have found only one complete skull and a few skull pieces. We do not have fossils, eggs, or nests from *Pachycephalosaurus* as we do from dinosaurs such as *Citipati*, a type of oviraptor, or *Maiasaura*, a type of hadrosaur. Based on current fossil evidence, we know all dinosaurs laid eggs, so we can say *Pachycephalosaurus* was an egg layer as well.

Do you have a question about the natural world?

Email **kidspage@ansp.org**, and if your question is chosen for Just for Kids, you'll win a prize!

COLOR BY NUMBER

Color the spaces below to see a firefly in its living colors. 1-Black 2-Brown 3-Red 4-Yellow 5-Dark Blue 6-Green



Christine Danowsky/ANS

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CALENDAR OF EVENTS

JULY

Academy Explorers Camp
Weekdays through August 23,
9 a.m.–4 p.m.

Tiny Tot Explorers
Wednesdays through August 21,
10–11 a.m.

AUGUST

Bug Fest
Saturday and Sunday, August 10 and 11,
10 a.m.–5 p.m.

Philadelphia Geek Awards
Saturday, August 17, 6:30 p.m.

Butterflies!
closed for maintenance
Monday, August 26–Friday, September 6

SEPTEMBER

Members' Night
Friday, September 20, 5–9 p.m.

Last day to see *Serpentine*
Sunday, September 22, 10 a.m.–5 p.m.

American Wildlife Art
with author David Wagner
Thursday, September 26, 6:30 p.m.

Last day to see *Glow: Living Lights*
Sunday, September 29, 10 a.m.–5 p.m.

OCTOBER

A Victorian Obsession:
The Natural World Under Glass
with author John Whitenight
Tuesday, October 8, 6:30 p.m.

Dinosaurs Unearthed
Exhibit Opens
Saturday, October 12, 10 a.m.–5 p.m.

Philadelphia Shell Show
and Festival
Saturday and Sunday, October 19–20,
10 a.m.–5 p.m.

Brownie and Junior Girl Scouts
Shell Patch Activity
Saturday and Sunday, October 19–20,
10 a.m.–5 p.m.

Mega-Bad Movie Night
Thursday, October 24, 6:30 p.m.

Free for members Fee Registration required

Unless otherwise noted, all events held at the Academy are free with museum admission.

Visit ansp.org for more information and to register.