

ACADEMY

FRONTIERS

INSIDE:
Science and Literacy
for Success

The member magazine of the
Academy of Natural Sciences
of Drexel University
SPRING/SUMMER 2020



ACADEMY GREETINGS

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

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

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ON THE COVER: Children from Ms. Cynthia's Munchkin Romper Room create a dinosaur washing station after learning about paleontology with Mariah Romaninsky and the Academy's Science and Literacy for Success program. More on pages 8-11. Photo by ANS.

Dear Friends,

From the helm of the Academy of Natural Sciences, I have the privilege of leading scientists, educators, administrative staff and volunteers who create impact in our community every day. These individuals truly embody our vision — to connect people with nature in impactful ways. In this issue of *Academy Frontiers*, you will meet several of these dedicated members of the Academy team and hear about how they are learning more about the natural world and inspiring others to care for it every day.

The Academy has been at the forefront of integrating STEM (science, technology, engineering and math) into early educational frameworks for decades, providing learning support and science pathways for students and educators in the Philadelphia area. In this issue's feature, you will meet Mariah Romaninsky, a leader in the Academy's Learning Department. She has worked alongside Jacquie Genovesi, now Vice President of the Center for STEAM Equity, as manager of our early childhood programming for more than seven years. Mariah's team's work on the Science and Literacy for Success (SLFS) program has had far-reaching impacts on the lives of Philadelphia preschoolers and their teachers and families. SLFS gives early childhood educators the ability to introduce a STEM-based early childhood curriculum to the eighth largest school district in the nation, changing how we educate our youngest learners and shape them into our next generation of scientists. Through the work of Mariah and her team, last year the Academy doubled the number of children enrolled in high-quality providers. And, after guiding teachers through on-site workshops and modeling and mentoring in the classroom, the percentage of early childhood providers with a high-quality rating nearly tripled from 22%!

You can learn more about Mariah's tremendous work and how SLFS is inspiring Philadelphians on pages 8-11. On pages 6 and 7, join our new Chief Learning and Engagement Officer, Niki Ciccotelli Stewart, as she reimagines how a refreshed, innovative STEAM-driven museum experience will welcome all members of our community in the months and years to come. You can also explore pages 18-19 to find out how volunteer Greg Aaron's work to organize a trip to Karluk Lake, Alaska, with Curator of the Academy's Diatom Herbarium Marina Potapova led to a surprising discovery about environmental changes (and particularly warming) in the region.

We are less than six months away from the 2020 Members' Night, when you can learn about work that leaders like Mariah, Niki, Greg and Marina are doing at the Academy every day. There are always many new and incredible things to see, and my family and I are constantly impressed by the research and activities on display on this special night. You will witness first-hand the treasures inside our cabinets and drawers, as well as meet our scientists and staff and learn about their fascinating research. I hope you will save the date (October 2, 2020) and plan to join us for this exciting night. As always, thank you for your outstanding support of the Academy.

With thanks and best wishes,



Scott Cooper, PhD
President and CEO



Jeff Fusco for ANS

FOUNDED IN 1812, the Academy of Natural Sciences of Drexel University is a leading natural history museum dedicated to informing and building a movement of environmentally engaged communities for a healthy, sustainable and equitable planet.

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A parent and child investigate a sinking and floating activity together during one of the STEM Family Days that are part of the Academy's Science and Literacy for Success program. More on pages 8-11

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As our nation faces the outbreak of COVID-19, we look forward to days of hands-on learning ahead. Our thoughts are with each and every one of our members and supporters. We wish you good health in the days and weeks ahead.

CALENDAR OF EVENTS

BUG FEST

Saturday and Sunday, August 8–9, 10 a.m.–5 p.m.




Join us on August 8 and 9 for our [annual celebration of insects!](#) See hundreds of live bugs, talk with real scientists, learn about insects from all over the world and see specimens from the Academy's behind-the-scenes collections. Eat bugs, get your face painted and relax as you enjoy a buggy show. Free for members or with general museum admission. 

SURVIVAL OF THE SLOWEST

Returning Soon to the Special Exhibits Gallery




Do animals always need to be the strongest, the biggest and the fastest to survive? Or can it sometimes be advantageous to be small or slow? Just ask a tortoise! In *Survival of the Slowest*, meet animals that have survived for millions of years despite being very slow, and learn about the puzzling sides of evolution and adaptation. Meet live animals, including a two-toed sloth, tarantula, chameleon and horned frog. Touch a tortoise, iguana, snake, hedgehog or gecko, catch live animal feedings and more!  *

WILDLIFE PHOTOGRAPHER OF THE YEAR

Dietrich Gallery
Opening Date TBD



© Yongqing Bao

Wildlife Photographer of the Year harnesses the power of photography to promote the discovery, understanding and responsible enjoyment of the natural world. Organized and produced by the Natural History Museum in London, it is one of the longest running and most prestigious photography competitions in the world. The exhibit of 100 winning images features the world's best nature photography and wildlife photojournalism. These stunning photographs tell thought-provoking stories about our planet that prompt us to think differently about the natural world and the future we want to create.  *

In light of the COVID-19 outbreak, all upcoming events and exhibits are subject to change. We apologize for the inconvenience.

As of the date of publication, all April and May museum events have been postponed or canceled. For the most up-to-date information on previously scheduled events and museum closings, please visit ansp.org/COVID-19.

We can't wait to see you in the museum again soon.

CALENDAR OF EVENTS

SUMMER CAMP Weekdays, July 6–September 4



Academy Science Camp invites campers ages 5–12 to learn about natural science and more! Each week of camp explores an exciting new theme such as dinosaurs, insects or animals and features an off-site field trip! Did you know you can save on summer camp with your membership discount? **We depend upon our campers, so we are asking you to consider reserving your summer camp spot now as we look forward to sunnier days ahead. We will fully refund any necessary cancellations.** More at ansp.org. 🇺🇸 🇨🇦

JUNE

Totally Turtles Weekend

Saturday and Sunday, June 6–7, 10 a.m.–5 p.m. 🇺🇸

Access to Science: Opening Doors to Autism

Sunday, June 7, 9 a.m. 🇺🇸 🇨🇦

Father's Day Special: Bring Your Favorite Adult for Free

Sunday, June 21, 10 a.m.–5 p.m. 🇺🇸

Dinos After Dark

Friday, June 26, 4–8 p.m. 🇺🇸

JULY

Access to Science: Opening Doors to Autism

Saturday, July 11, 9 a.m. 🇺🇸 🇨🇦

Dinos After Dark

Friday, July 24, 4–8 p.m. 🇺🇸

AUGUST

Access to Science: Opening Doors to Autism

Sunday, August 23, 9 a.m. 🇺🇸 🇨🇦

Final Day to See *Wildlife Photographer of the Year*

Sunday, August 23, 10 a.m.–5 p.m.*

Dinos After Dark

Friday, August 28, 4–8 p.m. 🇺🇸

SEPTEMBER

Grandparents' Day: Bring Your Favorite Adult for Free

Sunday, September 13, 10 a.m.–5 p.m. 🇺🇸

Final Day to See *Survival of the Slowest*

Sunday, September 20, 10 a.m.–5 p.m.*

Philadelphia Environmental Film Festival: Special Ticket Required

Wednesday–Sunday, September 23–27 🇺🇸 🇨🇦

Dinos After Dark

Friday, September 25, 4–8 p.m. 🇺🇸

Access to Science: Opening Doors to Autism

Saturday, September 26, 9 a.m. 🇺🇸 🇨🇦

OCTOBER

Members' Night

Friday, October 2, 5–9 p.m. 🇺🇸 🇨🇦

Dinos After Dark

Friday, October 23, 4–8 p.m. 🇺🇸

Access to Science: Opening Doors to Autism

Saturday, October 24, 9 a.m. 🇺🇸 🇨🇦

Door 19: Monster Mash

Thursday, October 29, 6–9 p.m. 🇺🇸 🇨🇦

Unless otherwise noted, all events held at the Academy are free with museum admission. Visit ansp.org for more information or to register.

* Fee for *Survival of the Slowest* and *Wildlife Photographer of the Year*. Family Plus members and above see these exhibits for free.

Purchase, upgrade or renew your membership today at ansp.org/membership.

🇺🇸 Free for members | 🇺🇸 Fee | 🇨🇦 Registration required

My Not-So-Typical Job

By Niki Ciccotelli Stewart, Chief Learning and Engagement Officer



Jennifer Buhl/Happy Hour Headshot

The Academy of Natural Sciences has an incredible legacy of collecting, scientific research and inspiring young minds. As a native of Pennsauken, NJ, I grew up — as so many of us did — marveling at the *T. rex* in Dinosaur Hall, studying the tiniest creatures in the dioramas and wondering about all these incredible specimens. So, it's with great excitement that, in spring 2019, I joined the Academy as the institution's first-ever Chief Learning and Engagement Officer, tasked with leading the talented staff in exhibits, learning and visitor services toward delivering an even more incredible museum experience.



I've spent my first twelve months at the Academy asking some critical questions about the future of our museum.

I'm often asked what a Chief Learning and Engagement Officer does, as it's not a typical job title. Essentially, it means I work alongside the teams that make your visit to the Academy great. I work with our visitor services team to help you have a welcoming, wonderful experience. I work with our exhibits team to design and create thoughtful displays of collections, artifacts and other wondrous objects. And, I work with our learning team to guide their work in creating and delivering programs and events that are inspiring and informative. These three teams engage with you each and every time you're here — and create the environment in which you can learn something new, discover something amazing, feel something important, and, hopefully, be inspired to take action toward a better future.

Another big part of my role is to ask critical questions about the future of learning and engagement in our institution. At its inception, the Academy was focused on collecting and research, as were most museums of that time. But nowadays, museums are more and more interested in relevance — being an important part of the communities in which they are located and having an impact on the people that live and work nearby.

With that in mind, I've spent my first 12 months at the Academy asking some critical questions about the future of our museum. Here's a sample of those questions.

What is a natural history museum's role in the modern world?
In the age of the internet, when information is available to us at every turn, what can a natural history museum offer that our smartphone screens cannot?

When the Academy's dioramas were created, they might have been the only way you could see what a polar bear looked like (without leaving Center City). But today, we can travel more easily, explore the Internet and find myriad media outlets talking about polar bears. In the modern world, it's no longer about being the only place that knows about polar bears ... it's about offering a new narrative and awareness of polar bears TODAY, while safely standing face-to-face with these magnificent, larger-than-life creatures.

What research are we doing at the Academy that informs the story of how our natural world is changing? How can we more readily share that with the public?

Our institution has no fewer than 60 scientists working behind the scenes on critical research, from understanding more about water quality in the Delaware River watershed to exploring evolutionary history in Antarctica. This research is paired with millions of specimens in our collection, all safely stored and accessible to researchers near and far. Most of this exciting work is done behind the doors and walls of the Academy, away from the public eye, but we're now exploring ideas for bringing all that work into the galleries to share with you.

Perhaps the most important question we've been asking this year is this: how can our museum make people's lives better?

We truly believe that the Academy has the expertise, collections and passionate staff to help build a movement of environmentally engaged communities that are working toward a healthier, more sustainable planet. We want to do this by helping you understand the natural world and inspiring you to care for it. And, we think that's possible through informing, initiating and convening critical conversations on the issues we're facing today, including climate change, evolution, water resources and biodiversity and extinction.

We are actively re-envisioning what our natural history museum can be in the coming years, and we're excited to begin making some great changes. You'll soon notice a refreshed look and feel in some of our galleries and gathering spaces, updated signage and stories in our galleries, and a bright, welcoming vibe permeating more and more spaces throughout the building. During your visit, you'll encounter an even more vibrant, energetic place with refreshed exhibits, stories and programs, one that inspires you to visit over and over again. A place where people of all ages come together to learn, laugh and explore issues related to the natural world. And a place where we can all stand together and truly become a force for nature. 🌱



SLFS students learn all about box turtle anatomy with the help of a puppet friend and Academy Manager of Early Childhood Programs, Mariah Romaninsky.

Science and Literacy for Success

By Mary Alice Hartsock

It's 10 a.m. on a windy Tuesday in February, and Academy Manager of Early Childhood Programs Mariah Romaninsky knocks on the front door of a West Philadelphia row home. She's greeted with a shower of hellos and smiles as she enters a warm living room filled with children's books, easels and brightly colored drawings. Even though she's reporting to work like any other day, she never quite knows what each day will bring. That's what happens when preschools are your "office."



AINS

SLFS students touch a turtle shell while learning about animal armor.

“You can teach the same lesson 12 days in a row, and each one will be completely different,” Romaninsky says. “I might be sitting on the floor, singing, laughing and even rolling around with the kids,” she says. “I might be reading books and singing songs with the class while the teacher helps a sick child or helping to hold a baby while teaching a lesson. Sometimes you’re just fitting into the day. It’s life, and the day-to-day is never the same.”

It’s work that Romaninsky loves.

Romaninsky visits different home-based childcare centers each day as part of the Academy’s program Science and Literacy for Success (SLFS), an initiative designed to enhance the quality of STEM (science, technology, engineering and math) and literacy instruction in classrooms. Created for teachers and children in under-resourced neighborhoods in Philadelphia, SLFS is the first program in Philadelphia to use a STEM-based curriculum in early childhood centers.

The SLFS team works to increase early childhood providers’ success in teaching STEM and literacy skills, better preparing children for kindergarten and increasing families’ interest in these areas. In 2019, the program reached more than 700 children, 55 teachers, 25 schools and family childcare centers and two community-based organizations.

Over 50% of the families served are from the federally designated Promise Zone of West Philadelphia, a 2-square-mile area home to 36,000 people and designated by the Obama administration as an area of deep and persistent poverty. The Academy is working with our families in West Philadelphia to identify and break down these systemic barriers to children’s success.



The day-to-day is never the same.

“We are working together as community partners.” Romaninsky says. “We are there to be a part of the scene and become not just an outside source, but friends and partners for real,” she says.

Having resources from and sharing knowledge with a partner like the Academy has made every difference for the teachers, students and families the program reaches. In 2019, the partnership between the Academy and early childhood providers resulted in a 100% increase in the number of children enrolled in high-quality providers. Now, 57% of early childhood providers have a high-quality rating, up from 22%, in part due to the guidance Academy staff provide in classrooms and learning centers.

Why Early Childhood?

High quality ratings for childcare centers are incredibly important, because without them, families may not have a place they can depend on to prepare children for success in STEM and literacy in kindergarten and beyond. Despite teachers’ best efforts, early childhood training programs and curriculums often fall short on STEM. SLFS serves as a supplemental curriculum, providing practical ways to implement science education within existing curriculums.

“Studies demonstrate that early science and math skill building not only improves pre-K literacy but also provides opportunities to exercise critical executive functioning skills that signal readiness for kindergarten,” Romaninsky says.

The Academy’s job is to find places for STEM to fit into existing curriculum units. For traditional preschool farm units, for example,



Teachers at an SLFS workshop show off their creations for a DIY coral reef in the classroom.

Romaninsky and the early childhood team might discuss the different types of animals on the farm and their counterparts in the wild. This conversation opens up opportunities to chat about the animals' basic needs, adaptations and more.

"We look for fun, scientifically accurate books that bring a way for the students to experience science in a nontechnical way," Romaninsky says. "If we're reading a book about arachnids, I may bring a tarantula puppet, and then we'll do any number of activities leading from the book."

While the teachers observe, Romaninsky demonstrates skills they can use when they reread the book with the class following her visit. After modeling the activity, Romaninsky will often watch the teacher do the activity and help them prepare to do the activity on their own, including brainstorming together about ideas for future lessons. They'll meet again for mentoring, discussing the teacher's and students' progress.

Romaninsky's team goes to larger childcare center classrooms to model hands-on teaching methods and activities. Then they help guide the teachers in implementing inquiry-based teaching methods.

"Modeling and mentoring for teachers in the classroom benefits all generations of kids coming through that classroom door — that



Through these experiences and the tons of resources, I have added more STEAM activities into our regular schedule. Mariah is the best and we are so thankful for her and the program."

— Adrienne Briggs

Owner, Operator and Educator, Lil' Bits Family Child Care

knowledge gets passed along for as long as that teacher teaches," Romaninsky says.

Owner, Operator and Educator at Lil' Bits Family Child Care Adrienne Briggs opened her learning center nearly 30 years ago. In the past three years, she has been working closely with Romaninsky and the Academy to strengthen the STEM and literacy activities she shares with her students.

"Mariah and the program have been heaven-sent because they have opened the door to so many experiences for myself and my students," she says. "We have been enlightened about bugs, worms and tortoises. These visits have been awesome. These were experiences that many may have never had."

This project was made possible in part by the Institute of Museum and Library Services. We are extremely grateful for the support of IMLS and the William Penn Foundation's Great Learning Program, as well as Boeing, for making our early childhood programs successful.



Children have fun with hands-on science at an SLFS Pre-K Family Day at the Academy.

Training at the Museum

New opportunities for students and their families don't end during the school day. Three times yearly, families are invited for special free days where they can do hands-on science and literacy activities while practicing using complimentary Family Learning Kits that support these skills. Families in Briggs' center look forward to bonding over these hands-on activities, as well as having the opportunity to explore the entire museum free of charge.

Museum opportunities also extend to teachers. Supplementing the classroom and in-home training for teachers, workshops and classes at the museum unite teachers from all over the city who are benefiting from the SLFS program. Many of the teachers the Academy collaborates with have a high school or GED degree or an associate's degree and are working toward improving their qualifications or toward a higher degree. The workshops and training that the Academy provides can help these individuals gain professional development hours that they can count toward advanced certifications.

Given that many early childhood curriculums lack strength in STEM, even teachers with advanced training, like Briggs, who has a master's degree in early childhood education, benefit from these experiences. For teachers working in home-based childhood centers, professional development workshops and one-on-one training increase comfort levels, interests in and understanding of how to build science, math and literacy skills among their students. One type of training activity they participate in involves having the teachers use Post-it notes to brainstorm science activities related to a variety of

science story books. The teachers then take the books (Post-its included) back to their classrooms and use the activities in their teaching.

"Through these experiences and the tons of resources, I have added more STEAM activities into our regular schedule," Briggs says. "Mariah is the best and we are so thankful for her and the program." 🌸

Descubre! Juega! Comparte!

Descubre! Juega! Comparte! (Discover! Play! Share!) pairs families from local community-based organizations with museum educators during out-of-school time for bilingual dramatic play focused on literacy and natural science. Developed for Latino and Hispanic families and community members, the program partners with ASPIRA, Inc. and Congreso de Latino to offer the Academy's successful STEM family workshops and museum days to underserved families in Philadelphia. These workshops help families increase children's interest, ability and engagement in early literacy and provide families with the resources to improve their early literacy knowledge and skills.



Changes Come to Library & Archives

Thanks to the generosity of many Academy supporters, we have completed the renovation for a modernized Library Research Center and new exhibit gallery. This bold effort links Academy science and collections to the visitor experience, effectively improves our organizational sustainability and responsibly stewards our valuable collections.

Photos by Jennifer Vess/ANS

FROM THE ARCHIVES

After a yearlong renovation, the elegant Library Reading Room at the Academy will soon open its doors as a new exhibition gallery with the exhibit *Wildlife Photographer of the Year*. The renovation creates the first new large space dedicated to exhibits in a decade.

The Library Reading Room is now called the William B. Dietrich Gallery in recognition of The William B. Dietrich Foundation's generous support of a major part of the renovation. The gallery will be dedicated to experiences and

exhibits, including shows focused on art and photography, that will appeal particularly to adults.

The transformed Library Research Center will offer greater access to the Library and Archives for staff scientists and researchers around the world while improving environmental conditions and security of the collections, preserving these treasures for future generations. The renovation project includes the McLean Wolf Rare Books Room, through the generosity of The McLean Contributionship,

and the Morris Reading Room, through the generosity of Martha and I. Wistar Morris III of Villanova, Pa. Turn to page 14 to read a list of more amazing supporters who have made the Library Research Center and new gallery project possible.

How do these renovations affect the beloved books and artifacts that reside inside the walls of the Library and Archives? And how are our librarians and archivists tackling the changes? The Academy's Brooke Dolan Archivist, Jennifer Vess, weighs in below.



How many people does it take to move a 200-year-old mineral cabinet? This is one of the many questions our Library and Archives staff has answered over the last year.

In May 2019, the Library and Archives closed its doors so that we could prepare for this monumental project. Construction is a long and messy process, and much of it took place in areas that house our precious collections.

So what did we do with those collections? We moved them.

With 2,000 linear feet of archives, dozens of paintings, hundreds of objects and thousands of rare books, the moving process is complex. Our first step was to find temporary spaces in other areas of the Library and Archives. Though we don't have much space to spare, we made use of every inch to house our objects (including statues, furniture and microscopes) as well as oversized archives and an extensive collection of glass negatives and lantern slides.

The majority of the collections, however, could not stay here at the Academy. During the renovation, our collection of some 50 portraits and oil paintings, along with a large portion of our rare books, was placed in a specialized art storage facility. We worked with professional art handlers to pack and move each item so that all were protected and returned to the Academy in the same condition as when they left.

The Archives, which includes documents, photographs, manuscripts and other materials, is a substantial collection. We have been very privileged to work with the Legacy Center Archives and Special Collections — the repository of the historic records of the Drexel University College of Medicine and its predecessor institutions (Women's Medical College of Pennsylvania and Hahnemann University). The Archives resided at the Legacy Center at Drexel's Queen Lane Campus, and we were able to provide some access for researchers on a limited basis. This move required time, expert movers and special carts designed for the movement of large amounts of records.

The move out took place over several months, and this winter we were engaged in moving everything back into the new space. Fresh new rooms, new compact storage in both the archives and the rare book room and a new HVAC unit to control temperature and humidity for the precious rare books will allow us to better protect the history of the Academy and the legacy of the natural sciences over multiple centuries. We anticipate reopening the library and archives to researchers in 2020.

And that 200-year-old mineral cabinet? It took four trained collection managers to safely move it. ~ Jennifer Vess, Brooke Dolan Archivist

ACADEMY SUPPORT

We would like to thank the generous supporters who made the Library Research Center and New Gallery project possible.

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GREG AARON: Playing a Vital Role in Scientific Discoveries

Additions to Diatom Collection Shed Light on our Changing Climate

Deep in the wilderness of Kodiak Island, Alaska, lies the isolated, 9-mile-long Karluk Lake. Known for its abundance of sockeye salmon and surrounding populations of Kodiak brown bears and bald eagles, the lake is also home to a rapidly changing population of diatoms — single-celled algae that have walls made of silica — essentially shells of glass. The lake is also the site of a scientific mystery that captured the attention of an Academy scientist and her volunteers.

In 1961, French scientist Emile Manguin described 55 species of diatoms from Karluk Lake. The samples, many of which were considered the types, or perfect examples, of the new species, have never been found, so scientists around the world can't consult them for research. Manguin left behind only drawings of the diatoms, which are not reliable enough to identify specimens.

Several diatom species that Manguin described from Karluk Lake are common in arctic and subarctic ecosystems, where they serve as important indicators of environmental conditions due to their sensitivity to temperature fluctuations and pollution. Scientists studying human-induced climate change in these areas must be able to consult type specimens of these species from scientific collections. Without Manguin's type specimens, however, researchers may misidentify species, lowering the quality of ecological models aimed at understanding past conditions and tracking current environmental changes.



Member and volunteer Greg Aaron collects diatom samples from Karluk Lake on Kodiak Island, Alaska

The first “fix” to the problem of missing types is to travel to the location where the original specimens were collected to recollect new ones for study. Marina Potapova, PhD, the curator of the Academy's Diatom Herbarium, knew that the only way to re-establish an understanding of these vital species was to return to Karluk Lake and collect them again. So Potapova's volunteer and Academy member Greg Aaron sponsored and organized an expedition to Karluk Lake to collect more local diatom species. After collection, Potapova would properly identify the collected specimens and designate epitypes, or additional, clarifying type

specimens provided when the original materials are missing, ambiguous or insufficient. She would also sequence their DNA, photograph the specimens and study their morphology, with the eventual goal of publishing these findings for further study by researchers around the world.

In summer 2019, Potapova, Aaron and Aaron's teenage daughter, member Cate Aaron, a junior at Merion Mercy Academy High School, traveled to Kodiak Island. There they were joined by the Refuge's Deputy Manager, Tevis Underwood, for the floatplane trip to Karluk Lake. During the team's time at the lake, Underwood provided access to the Fish and Wildlife Service's research cabin, operated the boat the Academy team used to collect samples, and provided security, keeping a trained

eye out for the local bears. His constant presence enabled the team to focus on their search for diatoms.

What the team found at the lake surprised Potapova. They discovered that the lake, which was always considered to have scant diatom populations, was full of benthic (bottom-living) diatoms — the basis of the lake's food chain. More importantly, she established that some of the diatom species that lived in Karluk Lake in the 1950s are no longer there. Kodiak Island has been warming in recent years, which has been affecting the feeding patterns of the bears and other wildlife.

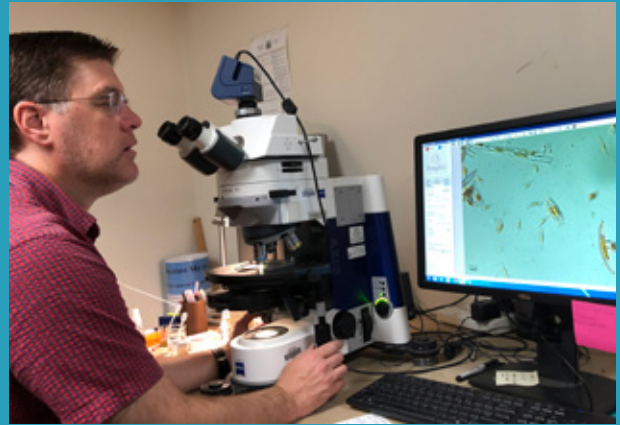
“Warming changes everything, including what the fish there eat,” says Potapova. “Everything there starts with diatoms, because they are at the base of the food chain.”

Is it possible that changes to the diatom population in Karluk Lake are occurring because of climate change? It's possible, the scientists say, but much more research is needed to make a clear determination. By identifying what species occur in a region, tracing population changes over time and storing their finds in scientific collections, taxonomists like Potapova provide the tools for applied biologists who study species as indicators of environmental change. ~Mary Alice Hartsock



Volunteer Cate Aaron and scientist Marina Potapova pause to examine a fish while collecting diatom samples from Karluk Lake

VOLUNTEERS MAKE A DIFFERENCE



Cate Aaron/ANS

From working in the galleries to assisting with fieldwork and collections care, Academy volunteers are critical to our success. Without Academy member and volunteer Greg Aaron, Diatom Herbarium Curator Marina Potapova would not have traveled to Kodiak Island, Alaska, in search of diatoms that could illuminate a mystery of missing type specimens 60 years in the making.

With an extensive teaching and research schedule, Potapova did not have time to organize and plan a trip to the remote Karluk Lake to try to find them again. Aaron, an Academy member who had been volunteering in the Herbarium for two and a half years at the time, took up the challenge — an undertaking that ultimately included hundreds of hours of planning and expedition logistics.

Aaron established a relationship with the staff of the Kodiak National Wildlife Refuge, which administers the lake, and he helped Potapova secure a research permit. He also planned the expedition logistics, including the rental of a floatplane that could land on the remote lake. His daughter Cate Aaron spent the summer volunteering at the Diatom Herbarium and assisted with the preparations. Both Aarons accompanied Potapova on the expedition, collected samples, took photographs and prepared specimens for inclusion in the collection.

“Without Greg, none of this would have happened,” Potapova says. “It’s a great example of how much volunteers can contribute to science.”

The Academy is grateful for the dedication of our volunteers and members. Thank you to Greg Aaron, Cate Aaron and the many other individuals whose generous contributions make our work possible.

Talking About Climate Change

By Mary Alice Hartsock



It's a Sunday afternoon in mid-winter, and you're sitting around the dining room table with your kids, their grandparents, a cousin and an opinionated great aunt. It's unseasonably warm for this time of year, and as you get up to turn down the thermostat, your nine-year-old asks whether it's because of climate change. Before you can begin to formulate a response to this complicated question, your aunt has jumped fervently into the conversation, your cousin's brow is furrowed and the kids' grandparents are unusually focused on their mashed potatoes.

Why is it that talking about our changing climate can lead to such discomfort among ourselves and our loved ones?

"The debate over climate change in the United States (and elsewhere) is not about carbon dioxide and greenhouse gas models; it is about opposing cultural values and worldviews through which that science is seen," writes Andrew J. Hoffman, University of Michigan professor and author of *How Culture Shapes the Climate Change Debate*.

"Those cultural values create a pattern of shared basic assumptions that tell us the correct way to perceive, think, and feel in relation to problems and situations we face. [...] As a result, when different groups view the same science through opposing cultural lenses, they see something very different."

Even the most dedicated advocates may feel uncomfortable disagreeing with a close relative or friend who doesn't share

their worldviews on climate change. This might be because of a desire to preserve a relationship or it may be due to something else, like concerns about creating awkwardness, spurring an argument, sounding "too smart" or sounding not smart enough.

So what do you really need to say or do to have an effective conversation about climate change? Are there times when you should (or even shouldn't) provoke or join in the conversation?

Below, we take you through some simple ways to approach a conversation about climate change with people in your life.

Little Kids

Whether you're talking with your own kids, your relatives, your students or your friends, you have the opportunity to guide small children as they explore the amazing nature of our planet. Through photographs, nature walks, museum and zoo visits, vacations or

special programming, help them understand different types of ecosystems. Talk about the many different types of animals and how these animals depend upon their habitats for food, water, shelter and space. If you think the kids are ready, you can pose questions about what they think would happen if the animals lost their habitats.

It's important to gauge what kids are ready to hear and to bring the facts to their level, asking them what they know and helping address any fears. Be honest about what's happening, but also help kids understand how individuals and organizations are working to address climate change. You can even help them focus on how they can make a difference, such as recycling, consuming less, reusing items and sharing their knowledge with others. Instilling good habits at a young age is vital for helping kids become lifelong advocates for the planet.

Elementary school-age children can

benefit from hearing age-appropriate facts about the greenhouse effect as a metaphor for global warming. *National Geographic* offers a basic video that explains this concept in simple, kid-friendly terms. On this site and many others, you can find experiments to help kids learn about climate change. Books are also great openers for creating conversation about our natural world and the changes it is undergoing every day.

Older Kids

High schoolers may have heard about climate change in the news, through school or from their friends, but don't assume that these older kids have mastered the basics, says the Academy's Kimberly Godfrey. As manager of the Academy's Women In Natural Sciences program, a free after-school and summer science enrichment program that has introduced hundreds of high school women to future careers in science and other professions, Godfrey talks about climate change with her students often. She notes the importance of dispelling common misconceptions about climate change for students who haven't had much exposure to these concepts early in life.

"Much of what's taught or shown to students about climate change is so far from home that there is a bit of disconnect to the issue," she says. "Why should I care if it doesn't impact me?' No one ever really says that, but not knowing how or why it impacts them here in Philadelphia puts climate change low on students' lists of priorities. Many inner-city students have to tackle daily obstacles that those of privilege rarely have to face."

Godfrey guides her students through an activity focusing on some of the main outcomes of climate change, such as sea level rise and changes in climate patterns. She then asks her students to think about what would happen if these climate events happened in their communities, prompting them to consider whether their own communities would have the resources to mitigate these issues and what the City of Philadelphia would do to support them.

In addition, the WINS students receive a talk about climate change and environmental justice in Philadelphia

from WINS alumna Zakia Elliott of Philadelphia Climate Works. Elliott leads a discussion of how climate change will exacerbate insecurities with food, energy, air quality, water quality and housing, which disproportionately affect minority and low-income communities. She works to help all communities recognize that climate change is not just an environmental concern, but that it is also a human-rights concern. Students are prompted to examine how different areas in Philadelphia are already impacted — for example, through heat islands in North Philadelphia and air quality issues affecting South Philly residents.

After you know they have grasped the basics on the real impacts of climate change, you can encourage older kids to learn additional ways to take action from advocates such as Greta Thunberg, Alexandria Villaseñor, Haven Coleman, Isra Hirsi and others who have created movements for young people to speak out about climate change. In addition to informing them about taking part in rallies or protests, you can suggest that students write letters, send emails or make calls to their representatives. You can also demonstrate the value of taking simple actions in their everyday lives, such as recycling, limiting single-use plastics, taking public transit and more.

Adults

Climate change is one of the more complex topics you may cover in your conversations with family and friends, and it's also one of the most important. Often you might not be prepared to "deliver the facts" that you feel are necessary to participating in an adult conversation on this topic. However, it's not always about directly communicating the science.

Whether you live with a partner, roommates or extended family, you can make your household conversations purposeful and action-oriented. Modeling small actions such as recycling, composting, avoiding waste, adjusting the thermostat, using sustainable household goods and voting for the environment can speak volumes to your housemates. If you feel comfortable discussing news articles with a partner or roommate, do so, and consider directing

your conversations toward actionable steps you can take to create change locally.

But sometimes, when it comes to those who don't share your beliefs, these conversations take on a new level of complication. Hoffman notes that even our word choices — for example, using "climate change" instead of "global warming" (a term more people believe in), "sustainability" or "green" could trigger certain types of reactions in conversation. Rather, he notes we should focus on sharing relatable information and searching for solutions that align with common values and promote a positive, shared future.

"We have to build the trust of those we are trying to influence, create a vision for the direction we might go, and most important, understand how to overcome people's fears and convince them to follow," Hoffman writes.

When approaching these conversations, think first about the timing. Are you celebrating a special occasion with your close friends or grandparents, for example? Maybe today's not the best day for the conversation.

Even when the timing is right, don't attack with facts. Instead, try to identify common values or find out what your friend or relative cares about, and then ask questions. For example, are they a nature lover? During their last hike, camping excursion, fishing trip or hunting expedition, what were the conditions like? Were any animals they normally see not there? Was the water colder or warmer than usual? Were the flows higher than usual due to excess rain? Even if you don't directly address the issue or say the words "climate change," you're likely to prompt closer examination of the subject and perhaps even spark a discussion about solutions. 🌱

Finding the Right Words

Even if you're focused on identifying closely with friends or relatives based on values rather than peppering them with climate change facts, having resources in your back pocket can help you approach conversations more confidently.

Visit ansp.org/talkaboutclimatechange for ways to speak with your loved ones.

Planting for the Environment

At the Academy of Natural Sciences, we believe that individual actions can truly make a difference. Each month of 2020, we're guiding our community in a conversation about how everyday choices can affect the health of our environment. This April, as the days begin to warm and we turn to nature for comfort, we're focusing on how planting something — from pollinator flowers and veggies to trees — can be an act of caring for our environment that helps us get closer to nature.

In *Plant the Tiny Seed*, Christie Matheson helps the youngest naturalists understand how tiny seeds bloom into stunning flowers. Through delicate collage and watercolor graphics and poetic, simple text, she demonstrates the steps involved in planting a few seeds,

taking care of them and watching them grow. Readers are encouraged to “push” the seeds into the pages, wiggle their fingers to water the seeds, tap the clouds to bring rain and clap to wake up the sun. They then can follow the growth of a zinnia and better understand the role it serves in a garden of bees, butterflies and other animals.

Find a digital copy of the book at your local library or on YouTube. Then, do the following activity (or help your kids plant a garden of their own) to learn more about the process at home. While you work, explain the main things that plants need to grow, including sun, water, soil and space.

Don't have the book on hand? No problem! Follow the prompts below and learn about planting on your own!

GRASS HEAD PLANT



Gather the following materials:

8–9 oz glass container or plastic cup
Organic Grass Seed (or small packet of cat grass, chia seeds or micro greens)

(Caution: Some non-organic grass seeds contain fertilizers that can be hazardous to humans)

Planting Soil

Knee-high Nylon Stockings

Permanent markers

Water

Eye and mouth stickers (optional)
just for fun, or you can draw right on your cup!

Start with an empty plastic cup.

Take one knee-high stocking and place it in the cup. Then fold the top of the stocking over the opening of the cup so the stocking is open inside the cup.

Pour 1 tablespoon of grass seed into the bottom of the knee-high stocking.

Next, pour 1 cup of dirt on top of the seed. Repeat until you get to the top. Recite this fun chant while pouring ... Take a scoop, pour it in, press it down and start again. When you get to the top, STOP!

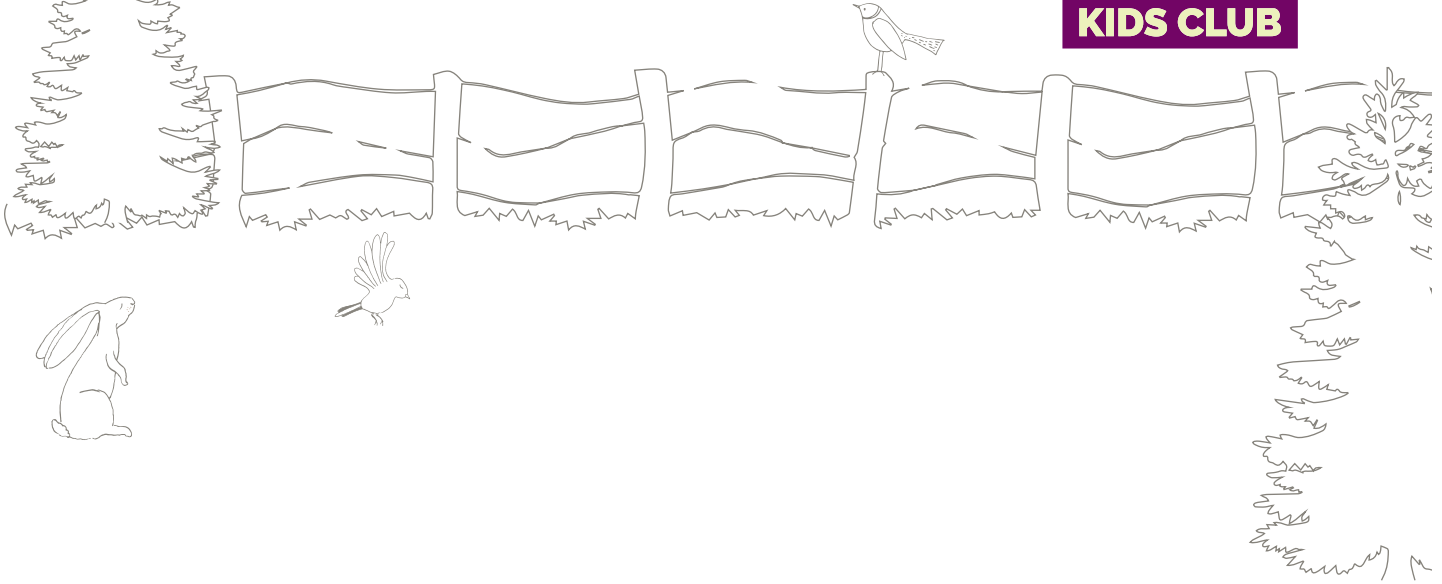
Have an adult carefully remove the knee-high stocking from the cup and gently move the dirt and seed to the bottom of the stocking. Be careful to keep the seed on the bottom and the soil on the top. Tie a knot on the open end.

Carefully flip the filled knee-high stocking upside down and place it back into the cup. Use stickers or permanent markers to make a face on the cup.

Generously water the stocking, ensuring the water soaks into the seed and soil. Place in a well-lit window and water daily. Be careful not to overwater it. Water should never pool in the cup.

Just for fun! After the grass “hair” grows, you can cut it, braid it or put it in a ponytail — it doesn't matter because it will keep growing!

Happy spring! Exercise your creativity to color a garden bed and take photos of the great outdoors!



KIDS CLUB

What is the coolest vegetable in the garden?

A rad-ish.

COLOR A GARDEN BED

Have you ever planted a garden or seen fruits and vegetables growing in a yard or in pots? Fill in this garden bed with whatever kinds of fruits, vegetables and plants you want using crayons or colored pencils. Then ask an adult to help you grow your very own grass using the activity to the left.

What kind of computers can worms fix?

Apples!



WILDLIFE PHOTOGRAPHER OF THE KIDS CLUB

Do you like to take pictures? Do you like nature? In celebration of our newest exhibit in the Dietrich Gallery, *Wildlife Photographer of the Year*, we're holding a photography contest for our Kids Club members. If you're a member of the Academy Kids Club, send a digital copy of your best nature photo (taken by you) by May 15, 2020, to membership@ansp.org. Let us know your name, age and member number. The winner will receive a free year of Academy membership at the Family Plus level, and we will share your nature photo on our blog and in a future member email.



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of DREXEL UNIVERSITY

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SAVE THE DATE FOR MEMBERS' NIGHT



Explore our behind-the-scenes collections and lab spaces
Talk with scientists 🌿 Enjoy the museum after hours

Learn more at ansp.org/members-night

FRIDAY, OCTOBER 2, 5–9 P.M.