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Welcome Letter

Dear Educators,

As we start the school year, we at the Phillip and Patricia Frost Museum of Science want to let you know how much we value your work as educators and want to be there to support your efforts with programming that helps students develop a passion for science and technology.

Although there are still challenges with education, last year was a big step in getting back to normal. This return to normalcy is a result of your hard work to provide a safe and effective learning environment where students can grow in scientific and technological literacy. During our interactions with educators over the last school year, we saw firsthand how teachers helped their students navigate the complex educational landscape to achieve success. I personally observed two clear trends in these interactions. First, basic science understanding and experience with tools of scientific inquiry



are increasingly important to prepare students for the critical thinking necessary to avoid the pitfalls of misinformation. Second, supporting curiosity and scientific thinking outside the classroom, at places like Frost Science, is increasingly important. This guide lays out how we are helping you to adapt to the shifting needs of today's students.

Frost Science is dedicated to making lasting connections to educators and their students where they are. These engagements are centered around our museum facilities, such as experiencing a show in the Frost Planetarium and interacting with the exhibitions on the Frost Science campus. Alternatively, they can engage with an in-person outreach specialist who visits their school or community meeting place. In addition, we are excited to host a series of high-quality special exhibitions, such as *Ultimate Dinosaurs*. We are committed to providing opportunities for discovery and inquiry-based learning that fits with the evolving needs of your school or organization.

Through your hard work and creativity, you have shown that science education can withstand the challenges of our times. We want to build on that great work and hope you will join us at Frost Science this year to help us ignite and grow your students' passion for science and technology.

Dr. Douglas Roberts

VP of Science Education and Director of the Frost Planetarium

Phillip and Patricia Frost Museum of Science



Field Trips @ Frost Science

Bring science lessons to life through inclusive educational experiences with Frost Science.

Museum general admission allows you and your students to explore the museum through a selfguided experience. Free curriculum resources are available on the museum's website to assist you in connecting your visit to your classroom curriculum.

2022-2023 Pricing	General Admission*	Frost Planetarium Show Add-on	Enhanced Field Trip Add-on
August 17 – December 22	\$12.95	\$2.00	\$5.00
January 9 - June 7	\$14.95	\$2.00	\$5.00
June 8 - August 15	\$15.95	Not offered	Not offered

^{*}All prices are per student. Please note that the museum requires a ratio of 1 chaperone per every 10 students. These chaperones are free of charge. Additional chaperones pay the same rate as the students. Frost Science membership or other discounts may not be used in conjunction with field trip and group rates. For questions regarding special needs groups, email fieldtrips@frostscience.org. Please see the field trip FAQ for more information at frostscience.org/fieldtrips.



Enhanced Field Trips

You and your students can dive deeper into science with a 45-minute facilitated, hands-on learning experience in our Knight Learning Center. Led by a museum educator, topics include marine science, earth science, space, and engineering with standards-aligned options for grades Pre-K through 12th grade. Enhanced field trips are available throughout the academic year, subject to availability. At least one chaperone must remain with the group at all times.

*Please check with your reservation representative if you are interested in adding both an enhanced field trip and Frost Planetarium show.

Pre-K

Sea Life Sorting

Students will sort, classify and compare shells in this ocean and coastal-themed experience that celebrates the biodiversity of life on Earth. Hands-on activities will teach students how to observe, investigate, and categorize our diverse mollusk shell collection of rare finds and Florida favorites. Students will learn to recognize the similarities and differences in shapes, colors and sizes, and match sea creatures needs with their environments and habitats.



Grades K-2

Crocogators

Young biologists will sink their teeth into the world of some of the oldest animals on Earth: crocodiles, alligators, caimans, and gharials! Students will go on a journey that follows the evolution of these remarkable reptiles while exploring their unique adaptations through engaging activities, including a special viewing of both crocodile and alligator skulls from our museum's collection. Students will complete their day by comparing the physical features of alligators and crocodiles and making a take-home face mask of their favorite reptile.

Night and Day

Students will blast off into outer space to explore the key components of our planet, including our star, the sun, and our natural satellite, the moon. A facilitator will guide students in discovering the key roles the sun and moon play in the repeating patterns that make day and night. Students will then explore how the positions and rotations of the planet help to create the four seasons. Students will put together a planetary orbital model with a special focus on the positioning between the sun, moon and earth to uncover how these celestial bodies create solar and lunar eclipses.

Wind Tunnel Design

Students will apply their engineering skills to make machines go higher, further and faster. Using a variety of materials—including everyday objects—they'll be encouraged to create their own flying contraptions and to test them out in our own vertical wind tunnel. Their designs will go through different challenges, all encouraging design readjustments and trial and error—an important part of the engineering process.

Grades 3-5

Junior Paleontologist Lab

Discover what our planet looked like millions of years before humans walked the Earth. Students will spend time learning about fossils and what they can tell us about Earth's history with a chance to view Frost Science's fossil collection up close. Students will also step into the role of junior paleontologist by participating in a mini-dig, where they will uncover what is like to make a new discovery from mapping out their site to identifying their findings.

Building the Future

Students will let their creativity flow as they become the next generation of problem solvers by exploring the fundamentals of engineering. This hands-on introduction to the engineering design process will encourage creative thinking, team work and perseverance while students tackle a bridge-building challenge. Teams will plan, build and test their designs to respond to weight and length demands, and then modify their designs to create the ultimate bridge.

Fingerprints of Light

Students will have the opportunity to jump into an astrophysicist's shoes as they study how light's properties and behavior are applied to astronomy and human space exploration. Students will use tools like color filters, diffraction gratings, and colorful spectrum gas tubes to note how gases emit light and have their own unique light pattern or "fingerprint." Finally, students will analyze the light spectrums of different planets to determine which one to explore.

Motion of the Ocean

Students will learn about ocean currents, the constantly moving, interconnected energy system powered by forces that play a key role on our planet. Drawing inspiration from a real-life serendipitous experiment with rubber ducky drifters, students will engage with a hands-on simulation model to observe how wind and landmasses affect movement for surface currents and plot data of paths taken as they monitor a drifter. They will then be introduced to how new technology can further aid science research by checking in on ocean drifters' tracks as part of the Global Ocean Observing System and applying their new knowledge to predict future drifter tracks.

Grades 6 - 8

Earth Formations

Students will investigate the geophysical phenomenon of tectonic plates and how they have continuously changed the surface of our planet, from Pangea to Modern Earth. Using various props and puzzles, they will learn how to interpret tectonic movement with maps, collect scientific data, and make predictions about the future of Earth's topography. As they uncover the different layers of the earth, they will also have the opportunity to observe and categorize striking pieces of the museum's rock and mineral collection, and use tools to view them up-close to identify patterns within the rock cycle and how weathering and erosion play a part in their formation.

Fluorescing Fish

Students will light up with curiosity as they explore the science of luminescence. Students will start by exploring light's properties and luminescence in the natural world. They will then examine how fluorescence, a form of luminescence, is used as a scientific tool through an experiment where genetically modified fluorescent fish are used to better understand genetics. This real-world biology application is an illuminating introduction to Punnett Squares.

Squid Dissection

Students will dive into a slimy (and sometimes smelly!) dissection that investigates the biology of one of the earth's most highly developed invertebrates: squid. Students will examine and identify the unique features and adaptations these mollusks have developed over time to help them survive. They'll also analyze the squid's role in the marine food web along with the characteristics they share with their mollusk relatives. Don't worry, the smell comes off with a little soap and water—but the memory lasts forever!



Grades 9 - 12

Forensic Science

From matching fingerprints to analyzing ink samples using chromatography, students will step into the roles of forensic scientists. Students will learn the importance of careful observations while working through different stations as they analyze different types of evidence. Students will use the same tools as the experts as they use the evidence given to draw conclusions like real forensic scientists. Afterwards, they will present their findings and have a conversation about the next steps that would be taken in a real lab.



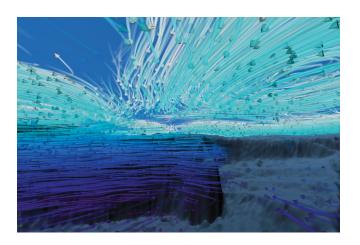
Water Quality Testing

Students will dive into water chemistry by analyzing the temperature, acidity, salinity, and nutrient balance from various water sources – including our own aquarium. As they gather results, students will make inferences on what they mean for an aquatic system, especially for aquatic creatures to live and thrive. As they conclude their lesson, they will review real-life studies that are responding to the changing climate and pollution, including research at Frost Science that is focused on increasing the heat tolerance of corals as ocean temperatures rise.

Frost Planetarium Shows

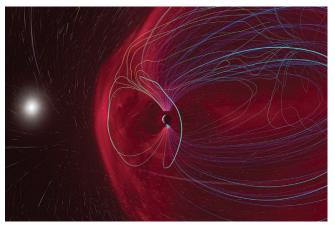
A Frost Planetarium show allows students to explore the world and universe through a state-of-the-art experience in an awe-inspiring venue. For more information about current shows, please visit frostscience.org/planetarium.

Please note that shows are filled on a first-come, first-served basis. Check with your reservation representative if you are interested in adding a planetarium show. Shows are subject to change.



Dynamic Earth

Narrated by Liam Neeson, you'll ride along on swirling ocean currents, fly into roiling volcanoes and dive into the heart of a hurricane as you explore the inner workings of the Earth's climate system.



Worlds Beyond Earth

Narrated by Academy Award-winner Lupita Nyong'o, take a journey and discover the story of the surprisingly dynamic nature of the worlds that share our solar system and the unique conditions that make life on Earth possible.



Living Worlds

In Living Worlds, see how a deeper understanding of Earth might help us locate other living worlds, light years away. Narrator Daveed Diggs takes you on an exploration of the co-evolution of life and our planet, revealing the ways in which life has transformed Earth's surface and atmosphere over billions of years.

Frost Science in the Community

The museum is on the move! During our outreach programs, we'll come to you and bring the museum with us. Our science-focused hands-on activities and demos are aligned to Florida NGSSS, promote project-based learning, and engage students in K – 12th grade in STEM. Check out our outreach offerings and contact outreach@frostscience.org if interested.





Outreach

The Phillip and Patricia Frost Museum of Science is on the go! Outreach with Frost Science brings hands-on learning directly to schools and communities. Each experience inspires the audience to investigate our world and universe through the lens of science.

Frost Science Outreach Programs include:

- STEM-focused, NGSSS-aligned curriculum (standards available upon request, per grade)
- All hands-on activities and supplies needed for each program
- Two specially trained science educators to bring your outreach experience to life



Hands-On Activities

- ◆ \$250 for one 30-minute session I \$175 for each additional 30-minute session
- 25 participants maximum per 30-minute session

Catapult Engineering Challenge

Take flight into engineering design as your students build and test their own catapults. Students will use materials like K'Nex, cardboard, and rubber bands to build a catapult, then test their device for distance and accuracy. Along the way, they'll discover the principles of engineering design and physics.

Museum on the Move

Bring the collections of Frost Science to you! In this hands-on activity, your students will sort rocks, seashells, and skeletons of animals from South Florida and beyond to learn about variation and adaptation. Students will spend time learning how to identify iconic elements of Florida's natural history, so they can continue learning in their own backyard.

Circuitry Challenge

Learning about electrical conduction is a snap in this hands-on circuit exploration. Students will discover the basics of energy and electricity as they use problem solving skills to build circuits that glow, buzz, and even move. Just be careful not to short circuit!

Geology Rocks

Dig into geology as your students learn to sort and identify rocks and minerals from the Frost Science collection. Then students will be able to conduct experiments to study magnetism and luster. Finally, they'll take on the role of backyard geologists as they learn about limestone and South Florida's unique history.



Shows and Demonstrations

√ \$300 for one 30-minute show I Additional shows may be added for \$250 each

Power of Plasma

Join us for an out of this world exploration into the fourth state of matter. After playing a game to understand solids, liquids and gases, students will learn about the most common state of matter in the universe, plasma! Explore the role of magnetism and electricity in our universe through experiments conducted with our plasma globe. Then discover spectroscopy to take exploration to the stars and beyond.

The Chill Zone: Liquid Nitrogen

Explore physical reactions by freezing everyday objects with liquid nitrogen. Watch as balloons, flowers and other objects undergo a physical change when exposed to extremely cold temperatures (-321°F to be exact). Make sure to stay for our grand finale as we create a simulated cloud (thunder and all!).



Night Sky Telescope Viewing

\$1,000 for two hours for up to two telescopes

Enhance a special evening event under the stars with a night sky telescope viewing*! Bring the far away beauty of celestial objects up close and experience the night sky as never before. Participants will have the opportunity to view celestial objects** in the night sky as well as learn about telescopes and astronomy.

*Night sky telescope viewings are weather permitting. No refunds or cancellations will be provided for inclement weather or poor visibility. However, if there is an appropriate location and power supply, we will provide a supplemental weather-appropriate activity when possible.

**Celestial objects in the night sky will vary depending on the time of year and event location.

Portable Planetarium

Starting at \$1,000 for two hours of programming

Explore the cosmos as you step inside the Frost Science Portable Planetarium. Participants take a guided journey through the night sky and discover educational facts about our solar system and other key celestial objects that they can find when they look up at the stars. Limited to 30 students per presentation (35-person total capacity, including teachers and presenters). The indoor-only, inflatable dome can be used in auditoriums, gymnasiums, cafeterias, media centers and libraries with an uncompromised space of 20' x 20' x 20'.





Early Childhood Programming

Early Childhood Hands-On Science (ECHOS)

ECHOS is a hands-on, interactive early childhood science curriculum that is:

- research-based
- designed for small groups of preschool children
- aligned with preschool science standards
- scripted to facilitate guided inquiry
- a foundation for critical thinking

The overall goal of ECHOS model is to increase teachers' ability to introduce basic science concepts to preschool children through the use of a guided inquiry-based curriculum. Interested in using ECHOS curriculum in your classroom? Contact echosinfo@frostscience.org or visit frostscience.org/echos.

Little Atoms: Pre-K Learning with Frost Science

This outreach program is specifically geared toward early childhood science learning. This program delivers hands-on activities to daycares, libraries, and schools. Each experience is specifically designed for early learners, ages 3 to 5, to engage the senses while promoting exploration and discovery. Themes include:

- Building Blocks: Sort, stack and play with basic building blocks which helps develop a child's spatial awareness.
- Junior Docs: Practice listening and looking while investigating the body through role-play by becoming a doctor.
- Let's Rock: Investigate various types of rocks and examine the science behind the hardness of rocks.
- Music Makers: Stimulate senses through sight, sound, and touch and engineer musical instruments of all kind out of everyday objects and materials.
- Spinning Spirals: Whirling, twirling, spinning spiral patterns will be explored as we examine the science behind the shape of a hurricane.
- Young Minds Yoga: Be introduced to movement that will help strengthen the body and mind.

For more information please email outreach@frostscience.org or visit frostscience.org/outreach.

Educator Resources

Supporting Field Trip Materials

We know educators are incredibly busy. To help you prepare for your field trip—as well as reinforce the lessons learned at the museum back in your classroom—we've created standards-based pre- and post-visit materials for grades Pre-K - 8 that align with each of our exhibitions. These resources include activities to use before and after your visit, and provide insight into what you can expect during a Frost Science field trip.

Standards-aligned curriculum materials can be downloaded free of charge from frostscience.org/fieldtrips.

South Florida Educators Membership

Certified K-12 teachers of accredited public and private schools located in Miami-Dade County, Broward County, Palm Beach County, and Monroe County can purchase a Frost Science Educator Membership for just \$25. Educator memberships are valid for admission for one adult cardholder year-round, plus guest privileges for select programming and exhibition previews.

Need inspiration for an upcoming Frost Science field trip? A free educator membership helps you plan an unforgettable experience for your students.



- FREE museum general admission + one FREE Frost Planetarium show per visit for one adult cardholder
- Discounts on parking with every visit (based on availability)
- Invitations and guest privileges for select programming and exhibitions previews

To register for a Frost Science Educator Membership, please visit the Membership Priority Window at the onsite Frost Science Ticket Center during regular operating hours with your current school educator I.D. Verification is valid for one full year.

Cost for a Frost Science Educator Membership is \$25/year. Proof of current school year employment is required. School websites, health insurance cards, or a class syllabus are NOT acceptable proofs.

Active educator members with a current Educator Membership can convert their Educator Membership to a family membership level of their choice with a \$25 credit towards the purchase of the higher membership level. For more information, please email membership@frostscience.org or call 305-434-9600.

Field Trip FAQs

For more information regarding field trips, please review our virtual program FAQ and in-person field trip FAQ at frostscience.org/fieldtrips.



^{*}Does not include the ASTC Passport or discount to camps, educational programs or additional tickets.

Frost Science Exhibitions



Aquarium

A masterpiece of living science, the three-level Aquarium (Vista, Dive, Deep) carries you from the surface to the depths of South Florida's crucial aquatic ecosystems and beyond.

Royal Caribbean Vista Level 4

A massive outdoor deck, the Vista level puts you at the surface of key South Florida ecosystems. In the 500,000-gallon Gulf Stream Aquarium, scalloped hammerhead sharks cruise the waters, while rehabilitated green herons navigate the spaces of the Mary M. and Sash A. Spencer Aviary. Red mangroves and a 22-foot gumbo limbo hold court just beyond the Florida Bay Touch Experience, where you can meet and touch gentle stingrays that thrive in our state's shallow backwaters.

Dive Level Level 3

Throughout the Dive level, nearly 30 aquariums and interactive vessels offer an intimate view into the subtropical sea, where colorful damselfish dart through corals and predators search for their bait through mangrove forest shadows. At the Dive Bar, students will get an up-close encounter with some of our favorite marine invertebrates and learn about their unique features.

Deep Level Level 2

With a revealing look at the mysterious and vast depths of the Gulf Stream, the lowest level of the aquarium is where drifters such as jellies reside. A one-of-a-kind 31-foot-wide oculus lens forms the bottom of the Gulf Stream Aquarium and gives you a direct view of the scalloped hammerhead sharks swimming overhead.





Power of Science

Ocean Gallery, Supported by the University of Miami

Step into the shoes of researchers, explorers and innovators unlocking everything from the mysteries of the universe to those inside our bodies. In this new permanent exhibition at Frost Science, you'll dive into groundbreaking research and discoveries from the University of Miami and beyond. As you journey across four scientific frontiers, Our Oceans, Our Environment, Our Bodies and Our Universe, you'll encounter rare specimens, state-of-the-art scientific instruments and cutting-edge exhibits, including an interactive floor. As you learn about the Power of Science, these interactive exhibits and games will challenge you to think like a scientist and explore real-world solutions to issues such as major storms and threats to coral reefs.



Feathers to the Stars

The Batchelor Foundation Gallery, Supported by Christine Allen

Discover the amazing story of how ancient evolution gave birth to animal flight and how humans used imagination and engineering to get airborne and travel to outer space. Students will come face-to-face with a 30-foot dinosaur, the *Yutyrannus huali*, while exploring interactive stations with handrails that reveal the secrets of birds' biomechanics. They'll meet the daredevil inventors who pioneered human aviation by risking their lives to figure out the aerodynamic principles of thrust, drag, weight and lift before building and launching their own air rockets in an exploration of the physical laws that guide rockets through the Earth's atmosphere.

MeLaß

Baptist Health South Florida Galleries

MeLa β guides students through the amazing ways the body and mind work together and how daily choices contribute to their health. In this exhibition, they'll get to challenge their brain with problem-solving tasks, stop a 'virtual virus' and more. Their partner in MeLa β is β eta, a digital character they'll build as they answer questions in each learning zone. The more questions they answer, the more they'll customize β eta, and learn about themselves.





River of Grass

William R. Kenan, Jr. Charitable Trust Gallery

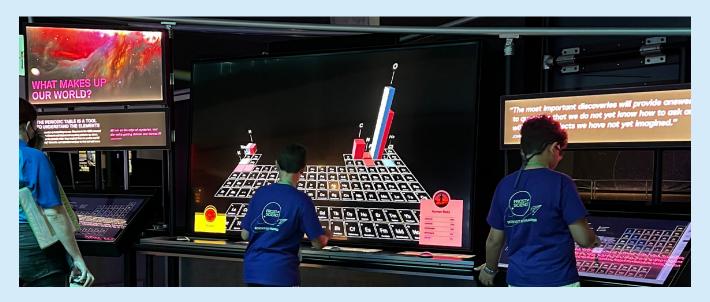
The wet, wild and mysterious River of Grass provides young explorers with an interactive way to learn more about the Everglades through two related spaces. In the outdoor area, children see, feel and experiment with the physics of water, introducing them to the concepts that keep the 300-mile Everglades and all its creatures alive. Inside, children venture into an interactive virtual environment where animal characters come to life during a "day in the life" of the Everglades. They'll chase otters, spot a panther using a flashlight, and by the end of the journey, learn that life in the Everglades is rich and worth protecting. This exhibition is specially designed for children 3-6 years of age.



The Sun Spot

Florida Power & Light Company Solar Terrace

Experience the power of the sun as a renewable source of energy through several interactive solar-powered activities. Begin by feeling the power it takes to energize everyday objects with an outdoor bike or hand crank. Then, discover the science and engineering behind solar panels and explore the dynamic nature of the sun while safely viewing it with a Sunspotter. Students are also invited to get into the engineering mindset as they investigate why we need different types of renewable energies and explore why innovation in batteries may be the solution to the future of clean energy.





Special Exhibition

Frost Science also has spaces dedicated to nationally touring temporary exhibitions. This ensures a regular rotation of topics and experiences for you and your students to explore.

Ultimate Dinosaurs: Meet a New Breed of Beast

October 8, 2022 - April 23, 2023 I Hsiao Family Special Exhibition Gallery

Step into the shoes of a paleontologist and uncover some of the most significant dinosaur discoveries from the Southern Hemisphere over the last two decades in *Ultimate Dinosaurs: Meet a New Breed of Beast*, a hands-on, interactive special exhibition. Featuring a new breed of dinosaurs that evolved in isolation in South America, Africa, and Madagascar, this exhibition showcases rarely seen specimens that are brought to life like never before with cutting-edge technology. Guests will encounter 13 dinosaur casts, in addition to authentic dinosaur fossils, and touchable fossilized dinosaur specimens. *Ultimate Dinosaurs* tells the story of the break-up of the supercontinent Pangaea into the continents that we know today and the ways that continental drift affected the evolution of dinosaurs during the Mesozoic Era, 250-65 million years ago. As Pangaea divided first into Laurasia in the north and Gondwana in the south, and later into the many continents we know today, dinosaurs were passengers on these drifting land masses. Guests will discover that an amazing diversity of species evolved because of this phenomenon. In addition to seeing specimens, learning more about the adaptations that made them unique and using augmented reality technology to make them come to life, guests can expect hands-on activities that will help them explore physical characteristics like crests and frills, stride patterns, and more.

Ultimate Dinosaurs: Meet a New Breed of Beast is presented by the Science Museum of Minnesota. The exhibition was created and produced by The Royal Ontario Museum, Toronto.

To see all current exhibitions, please visit frostscience.org/exhibition.

Museum Floor Plan



∯\$ ELEVATORS

∯ RESTROOM

AN FAMILY RESTROOM

TH CAFÉ

NON-PUBLIC AREA



For the safety of our animals and divers, please, no flash photography.



Food, drinks, gum and smoking are not allowed in museum galleries and exhibitions.

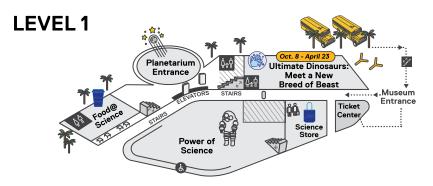


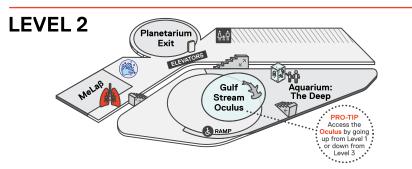
All galleries and exhibitions are wheelchair accessible.

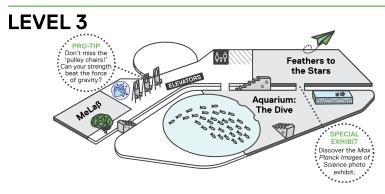


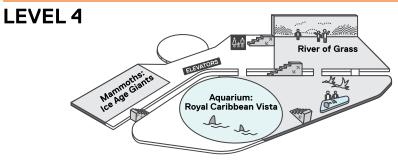


Frost Science is a smoke-free facility. No smoking or vaping on property.









LEVEL 5

