FROST SCIENCE

K-2 Exhibit Educator Guide

Welcome to Frost Science! Use this to guide your learners through an engaging and thought-provoking experience at the museum. Start on Level 4 and have fun exploring our exhibits as you work your way down to Level 1 (stairs are recommended). If you follow this guide and spend 30 minutes in each exhibition, your field trip will be 3 hours.

This guide contains:

- Scripted overviews of each exhibit
- Age-appropriate questions to prompt your students with when exploring
- Scripted interactions for intentional and dedicated student learning

Stay curious, keep exploring, and remember, it's our world, let's explore it!

Look for this icon to see the best route through the museum.

Begin your field trip by taking the stairs or elevators to Level 4.

River of Grass

Use this guide to spend **20-30 minutes** in *River of Grass*.

Teacher Overview

Welcome to the *River of Grass*! Located on Level 4, this exhibition provides immersive, sensory-rich activities relating to the Florida Everglades ecosystem. This exhibition is split into two areas: an outdoor hands-on area about hydrology, and an indoor virtual Everglades experience where children can interact with digital wildlife.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *River of Grass*! Here we will explore what makes the Florida Everglades so special. To start, we will take some time to play in the outdoor area, where you can experiment with water, before adventuring into the inside of the exhibit to see the Everglades come to life!"

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: Which animals live in the water? Which animals live on land? Which animals live both in the water and on land?

Grade 1: Why do plants and animals need water to survive?

Grade 2: How do plants and animals interact with water in their environment?

"Explore this exhibit to discover more! You have 10-minutes to explore and investigate!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.

Grade 1

SC.1.L.17.1 Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

SC.1.L.14.1 Make observations of living things and their environment using the five senses.

Grade 2

SC.2.L.17.1 Compare and contrast the basic needs that all living things, including humans, have for survival.

Optional Exhibit Interactive Highlight

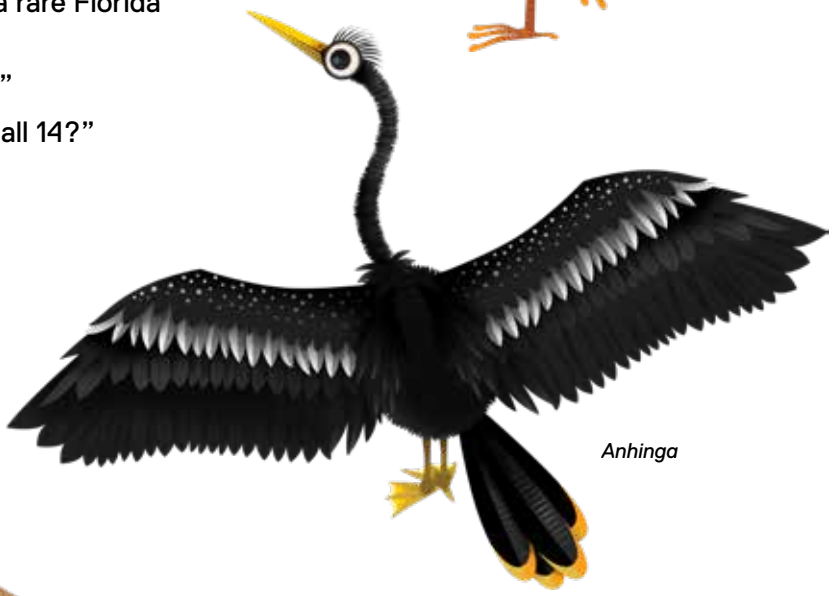
Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the River of Grass interactive virtual environment (5-8 minutes).

"We can see the Everglades come to life as we explore the virtual environment! As you play, you can interact with the animals and the environment in different ways!"

Ask the following guided questions while students are interacting with the exhibit:

- "As the sun rises, move a log and watch the water flow change. What do the minnows do?"
- "Part the grass to spot hidden animals and nests."
- "As it gets dark, use flashlights to uncover hidden animals. If you are quiet, you might even be able to see a rare Florida panther."
- "What happens when you step on the flowers?"
- "How many animals can you see? Did you spot all 14?"
- "Do you see the otter?"
- "Do you see the white-tailed deer?"
- "Do you see the Florida panther?"
- "Do you see the pig frog?"
- "Do you see the alligator?"
- "Do you see the barred owl?"
- "Do you see the anhinga?"
- "Do you see the mosquito?"
- "Do you see the gar fish?"
- "Do you see the wood stork?"
- "Do you see the great egret?"
- "Do you see the wood duck?"
- "Do you see the roseate spoonbill?"
- "Do you see the softshell turtle?"

Wood stork



Anhinga

Florida panther

Wood duck

Softshell turtle

Walk outside of *River of Grass* to explore *The Vista.*

The Vista

Use this guide to spend **20-30 minutes** in *The Vista*.

Teacher Overview

Welcome to *The Vista*! Located on Level 4, this exhibition places you at the top of our three-level aquarium. Here you will discover key South Florida ecosystems, including the Gulf Stream, the Florida Coast and the Everglades. Along the way, you will encounter the diverse wildlife that calls these ecosystems home.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *The Vista*! Today we will get up close and personal with key South Florida ecosystems that provide local animals and plants with all the things they need to survive! To start, we will look at the Gulf Stream Aquarium to try and see amazing animals like sharks, rays, and sea turtles! Next, we will explore the aviary to learn more about key coastal habitats, including mangrove nurseries and sandy shorelines. Then, we will learn more about the Everglades as we encounter some of the marsh ecosystem's most iconic predators, alligators and crocodiles! Finally, if there's time, we will learn to safely touch the stingrays in the Florida Bay Exhibit."

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: How are the animals and plants you see alike or different?

Grade 1: What do plants and animals need to survive?

Grade 2: How do plants and animals interact with their environment?

"Explore this exhibit to discover more! You have 10-minutes to explore and investigate!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.

Grade 1

SC.1.L.17.1 Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

SC.1.L.14.1 Make observations of living things and their environment using the five senses.

Grade 2

SC.2.L.17.1 Compare and contrast the basic needs that all living things, including humans, have for survival.

SC.2.L.17.2 Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.

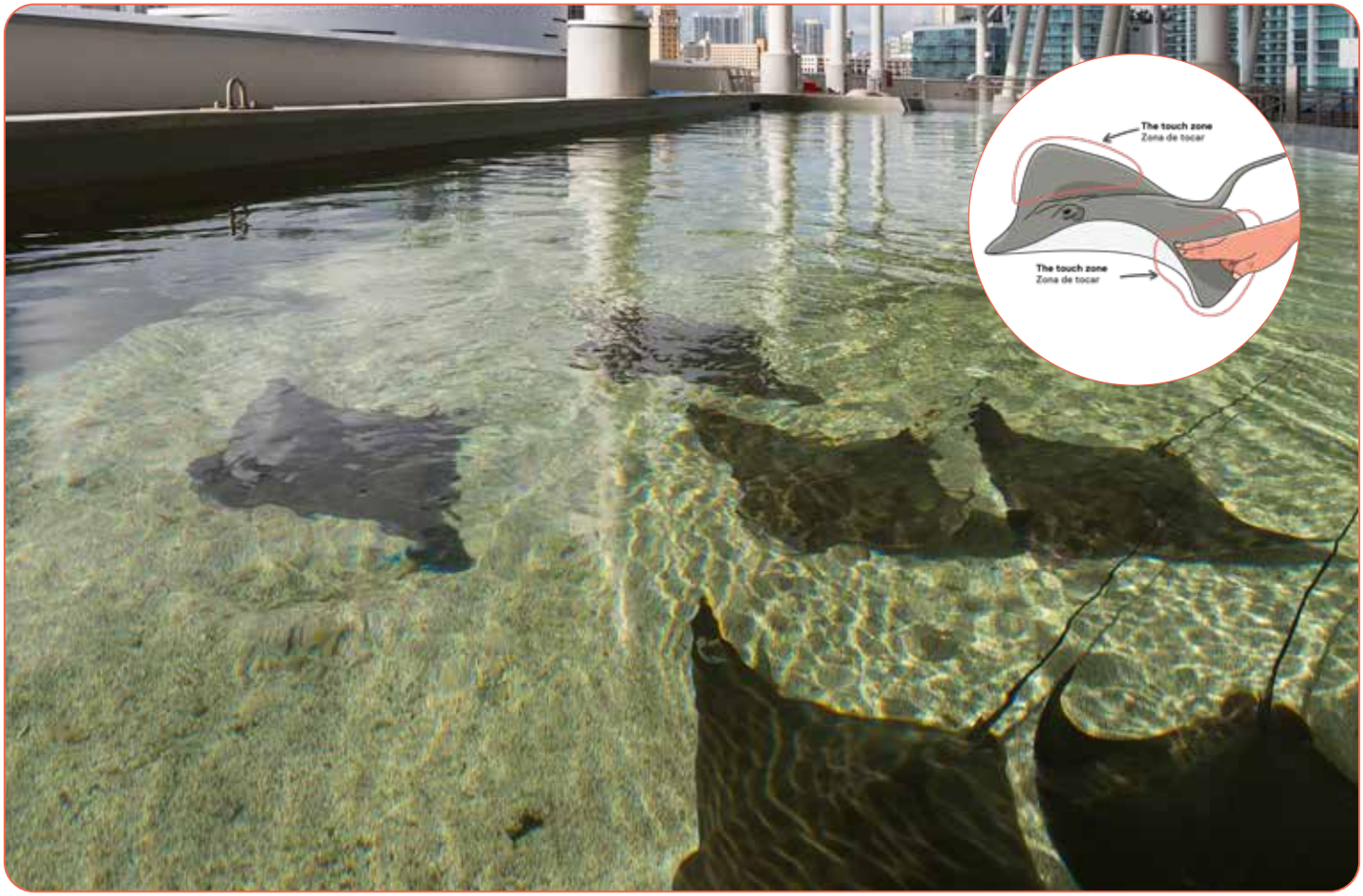
Optional Exhibit Interactive Highlight

Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the Florida Bay Exhibit - Sting Ray Touch (5-8 minutes).

"Welcome to the Frost Science Stingray Touch! We will now touch the stingrays in this exhibit, but you must follow the rules to stay safe!"

"Using only one hand, place two fingers in the water with enough space for the rays to swim underneath. Wait for the stingrays to come to you! When a stingray swims by, only touch the top part of the ray by gliding your two fingers gently on the top part of the ray. Make sure not to splash around or lean too far over the touch exhibit. Wait for the stingrays to come closer to the edge of the aquarium instead of leaning over it."

"As you watch and touch the stingrays, think about how they look and act. How are stingrays the same or different from the other animals you saw today?"



Across from *The Vista* you will find *The Dig.*

The Dig

Use this guide to spend **20-30 minutes** in *The Dig.*

Teacher Overview

Welcome to *The Dig*! *The Dig* is located on Level 4 of Frost Science. In this exhibit, students will learn about fossils, how they are formed, what they can tell us about ecological history, and what it is like to be a paleontologist. If students are lucky, they can even see Frost Science's paleontologists working in the fossil preparation lab!

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *The Dig*! Who loves dinosaurs? Does anyone want to be a paleontologist when they grow up?" *Accept responses.* "While Florida has a lot of shark teeth and ancient manatee fossils, Florida doesn't have any dinosaur fossils. Because of this, Frost Science has the only paleontology research program in all South Florida!"

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: What is the biggest fossil and the smallest fossil you can find?

Grade 1: Where were the fossils in *The Dig* found?

Grade 2: What do fossils look like up close?

"Explore this exhibit to discover more! You have 10-minutes to explore and investigate!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.N.1.5 Recognize that learning can come from careful observation.

Grade 1

SC.1.E.6.1 Recognize that water, rocks, soil, and living organisms are found on Earth's surface.

SC.1.N.1.1 Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

Grade 2

SC.2.E.6.1 Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.

Optional Exhibit Interactive Highlight

Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the Prep the Fossil interactive (5-8 minutes).

"Paleontologists spend a lot of time preparing, or prepping, fossils. What do you think it means to prep a fossil? Look in the fossil preparation lab for a hint!"

Direct students to look at the fossil preparation lab. Frost Science's paleontologists may be working in the lab preparing fossils. Point out any fossils that are currently being prepared. These fossils may be encased in rock or plaster.

"Right! When paleontologists prep fossils, they have to get rid of the rock! This can take a long time."

Point out the Prep the Fossil interactive in *The Dig*.

"It takes a lot of work to prep fossils! Try it yourself!"

Let students try the Prep the Fossil interactive. Students should be instructed to take turns so everyone gets a chance to engage with the interactive.

"Wow! That was a lot of work. Why do you think paleontologists prepare fossils?" *Accept responses.* "It's not always easy to prep fossils. Paleontologists don't always see all the fossils they are prepping. Some fossils can be under other fossils or covered by dirt or rock! Lots of fossils can also break during prep. As you look around *The Dig,* think about how much work it takes to prep tiny fossils and big fossils."

Walk down the stairs by the sting ray touch to enter *The Dive.*

Aquarium: The Dive

Use this guide to spend **20-30 minutes** in *The Dive.*

Teacher Overview

Welcome to *The Dive*! Located on Level 3, *The Dive* allows you to explore different habitats within our ocean. Here, you can see sharks in the Gulf Stream Aquarium, invasive lionfish, a goliath grouper, and seahorses. Florida's Coral Reef takes center stage in our ReeFLorida exhibit, which contains interactives focused on conserving this ecosystem.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *The Dive*! Here we will explore Florida marine habitats and the animals that live in them. In this exhibit, you can find sharks, octopus, seahorses, barracudas, and more. Don't forget to visit the ReeFLorida interactives to discover how you can help protect Florida's Coral Reef. It is the only barrier reef in the US outside of Hawaii!"

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: How are the animals you see alike and different?

Grade 1: In what ways do the animals in the aquarium use their habitat?

Grade 2: What do animals need to be happy and healthy?

"You have 10-minutes to investigate and play!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.L.14.3 Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.

Grade 1

SC.1.L.14.1 Make observations of living things and their environment using the five sense.

Grade 2

SC.2.L.17.2 Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.

Optional Exhibit Interactive Highlight

Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the Overfishing interactive (5-8 minutes).

"People all around the world rely on the ocean for food. What do you like to eat that comes from the ocean?" *Accept responses.* "A lot of us love seafood, but do you think we can take too many fish from the ocean?" *Accept responses.* "When we take too many fish from the ocean, we are overfishing. When we overfish, there are less fish in the ocean and some species of fish can even go extinct."

"In this interactive, you get to fish. Your goal is to fish as sustainably as possible and try to not overfish."

Optional guiding questions:

- "You have the choice to fish with nets or lines. Which do you think will be better for fishing without overfishing?"
- "There are dolphins, turtles, and sharks in the game. Is it bad to fish them? Why?"
- "Why do you think we have laws that keep people from fishing certain animals? How does it help these animals?"
- "Why is it important to stop overfishing?"

Use the bridge in *The Dive* to enter *Feathers to the Stars.*

Feathers to the Stars

Use this guide to spend **20-30 minutes** in *Feathers to the Stars.*

Teacher Overview

Welcome to *Feathers to the Stars*, located on Level 3. In this exhibit, students will learn all about flight, from flying dinosaurs to the future of space travel.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *Feathers to the Stars*! This exhibit is all about flying – from flying birds to flying spaceships. While lots of things can fly, making things fly is actually really hard! Have any of you ever flown before? How were you able to fly?"

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: What do birds do with their wings to fly?

Grade 1: How are rockets able to fly into space?

Grade 2: How are airplanes and birds the same?

"You have 10-minutes to fly around and investigate!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.P.12.1 Investigate that things move in different ways, such as fast, slow, etc.

SC.K.E.5.1 Explore the Law of Gravity by investigating how objects are pulled toward the ground unless something holds them up.

Grade 1

SC.1.E.5.2 Explore the Law of Gravity by demonstrating that Earth's gravity pulls any object on or near Earth toward it even though nothing is touching the object.

Grade 2

SC.2.P.13.3 Recognize that objects are pulled toward the ground unless something holds them up.

SC.2.P.13.4 Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object.

Optional Exhibit Interactive Highlight

Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the paper airplanes (5-8 minutes).

"Have any of you made a paper airplane before?" *Accept responses.* "What did your paper airplane look like?" *Accept responses.* "Let's all take a minute to make a paper airplane! Once we're done making our paper airplanes, we're going to see how far they fly!"

Guide students to the paper airplane table and give each student a piece of paper. Help students make paper airplanes as needed and encourage students to get creative. As students create their airplanes, make sure the bottom or base of their airplane has enough paper to catch the gears of the launcher.

"Now that we've made our paper airplanes, let's see how far they fly!"

Direct students to make a single-file line along the side of the airplane table. All students should be able to see the airplanes as they fly down the table.

One at a time, show each student's airplane and ask students to look at the general shape of the plane and wings before helping each student load their paper airplane into the airplane launcher. Once each student launches their airplane, they should move to the end of the table and the line should shift down the table and towards the launcher. Encourage students to cheer each other on – this is not a competition of which plane can fly the furthest.

"Now that everyone has had a chance to fly their airplane, is there anything you would do differently next time? How might changing your airplane change how it flies?" *Accept responses.* "As you continue to explore *Feathers to the Stars*, think about how shape of a bird, plane, or rocket changes how it flies."

Leave *Feathers to the Stars* using the glass automatic doors and walk to the other side of the building. Walk down the stairs to explore *meLab* on Level 2.

meLab

Use this guide to spend **20-30 minutes** in *meLab.*

Teacher Overview

Welcome to *meLab*! *meLab* is located on Level 2 and Level 3 of Frost Science. On Level 2, students explore *meLab: The Journey*, where they can learn what being healthy means to them and experiment with lifestyle choices to live healthier, happier lives. On Level 3, students can explore *meLab: The Discovery,* where they can learn how scientists and doctors know what it means to be healthy.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Right now, we're going to spend some time exploring *meLab: The Journey!* On this level of *meLab*, you can learn more about how healthy choices can help your body do what it needs to do."

"Some healthy choices are fun. What kind of healthy choices do you like doing?"

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: What is one thing you can do to keep your body healthy?

Grade 1: How does running around and moving keep you healthy?

Grade 2: Why is it important to eat lots of different kinds of food?

"Explore this exhibit to discover more! You have 10-minutes to explore and investigate!"

10-minute free exploration

Supporting Standards

Kinder

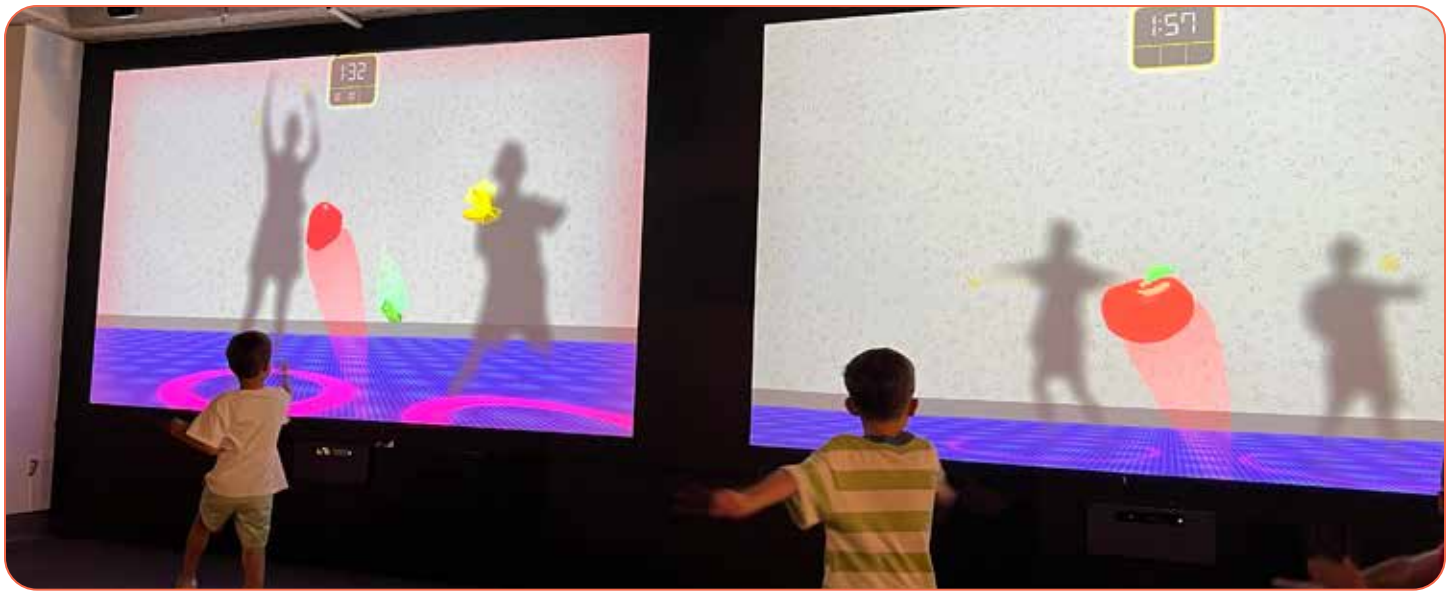
SC.K.L.14.1 Recognize the five senses and related body parts.

Grade 1

SC.1.L.17.1 Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

Grade 2

SC.2.L.17.1 Compare and contrast the basic needs that all living things, including humans, have for survival.



Optional Exhibit Interactive Highlight

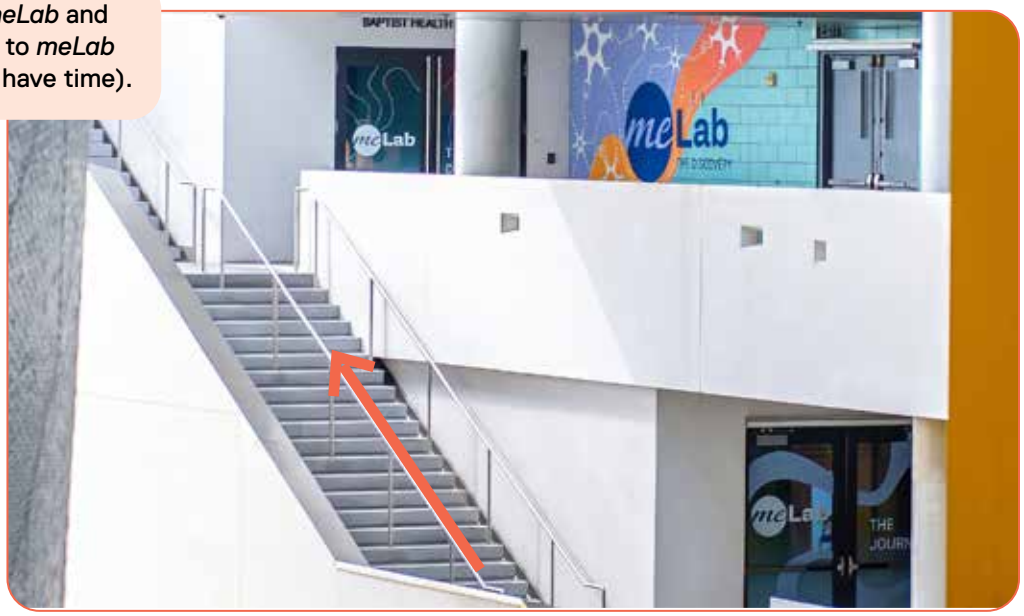
Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the Crush the Calories interactive (5-8 minutes).

"What do we need to do to have a healthy body?" *Accept responses.* "Right! We need to eat food, drink water, and move! Food is really important because it has calories and calories give us energy! We use this energy to live, run, jump, and play. All food has calories, but it's important that we eat lots of different kinds of food to stay healthy. What are your favorite foods?" *Accept responses.* "These foods all have a different number of calories! That doesn't make them good or bad, just different. You may have noticed the big screen on the wall. This is a game called Crush the Calories. In this game, your job is to catch as many fruits and vegetables as you can!"

Let students play the Crush the Calories game. Each station can have up to four students playing at once. Groups should switch out after each game so that all students have a chance to play.

"Awesome job catching all the fruits and vegetables! As you look around the rest of the *meLab,* look for other things that help give us healthy bodies."

Walk outside of *meLab* and walk up the stairs to *meLab* on Level 3 (if you have time).



Walk down the stairs to Level 1 to explore *Power of Science*, located behind the yellow elevators, in the Ocean Gallery.

Power of Science

Use this guide to spend **20-30 minutes** in *Power of Science*.

Teacher Overview

Welcome to *Power of Science*! *Power of Science* is located on Level 1 of Frost Science. In this exhibit you will discover innovative technologies and groundbreaking discoveries across four scientific frontiers.

Exhibit Introduction (3 minutes)

Share this introduction and the thought-provoking question outside the exhibit before walking in, or in the exhibit before allowing for free exploration.

"Welcome to *Power of Science*! This exhibit will teach us about how scientific discoveries and new technologies in different fields of science have improved our understanding of life on Earth and beyond! We will visit each of the four scientific frontiers: 'our oceans', 'our bodies', 'our environment', and 'our universe' to learn what kinds of groundbreaking research scientists are doing right now."

Thought-provoking Question (2 minutes)

"I have a question I would like you to think about while having fun in the exhibit..."

Kinder: How do scientists explore objects in space?

Grade 1: How do scientists observe nature?

Grade 2: How can we prepare for extreme weather?

"Explore this exhibit to discover more! You have 10-minutes to explore and investigate!"

10-minute free exploration

Supporting Standards

Kinder

SC.K.E.5.5 Observe that things can be big and things can be small as seen from Earth.

SC.K.E.5.6 Observe that some objects are far away and some are nearby as seen from Earth.

Grade 1

SC.1.E.6.1 Recognize that water, rocks, soil, and living organisms are found on Earth's surface.

Grade 2

SC.2.E.7.5 State the importance of preparing for severe weather, lightening, and other weather related events.

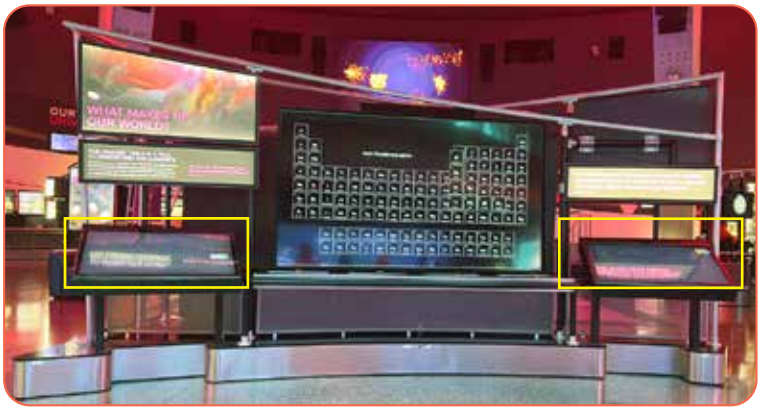
Optional Exhibit Interactive Highlight

Want some dedicated and intentional student learning in this exhibit? Follow the script below to engage with the Create a Shoreline interactive(5-8 minutes).

"Today we are going to create a shoreline that protects our beaches from storm surge. Storm surge is what happens when hurricanes and other storms push water up onto land. To protect our beaches, we can add two different types of barriers: natural barriers or manmade barriers. Natural barriers are created by things like coral reefs and mangroves, which are small trees that live in or near the ocean. You may have seen corals or mangroves near our beaches here in Miami. Manmade barriers can look different in different places. There is actually a seawall right outside the museum! Seawalls like this can be seen all over downtown. Let's give it a try!"

Optional guiding questions:

- "Do you think it is better to use one type of barrier or both kinds of barriers at the same time? Why?"
- "What happens to your money after each storm? Why?"
- "What happens to the people in your neighborhood if you don't build a complete barrier?"
- "Can a seawall protect a whole city by itself?"



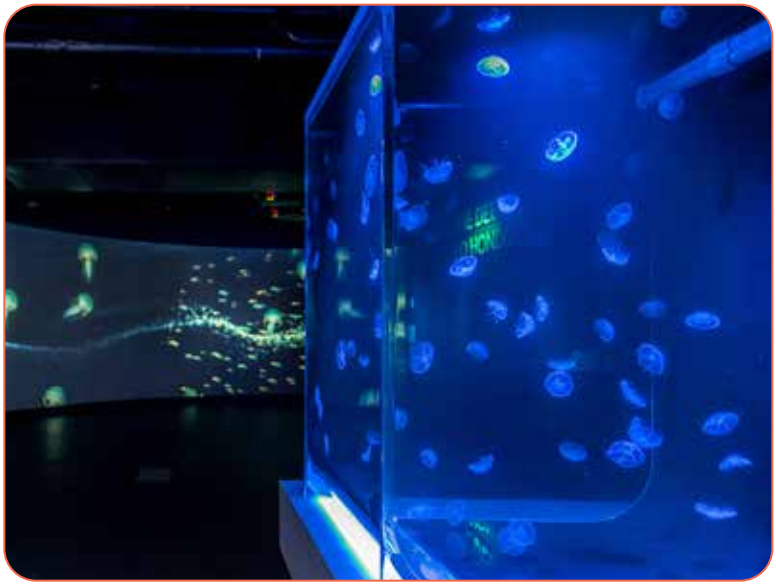
Try this!

Ag (silver) + Cl (Chlorine)

Li (Lithium) + O (Oxygen)

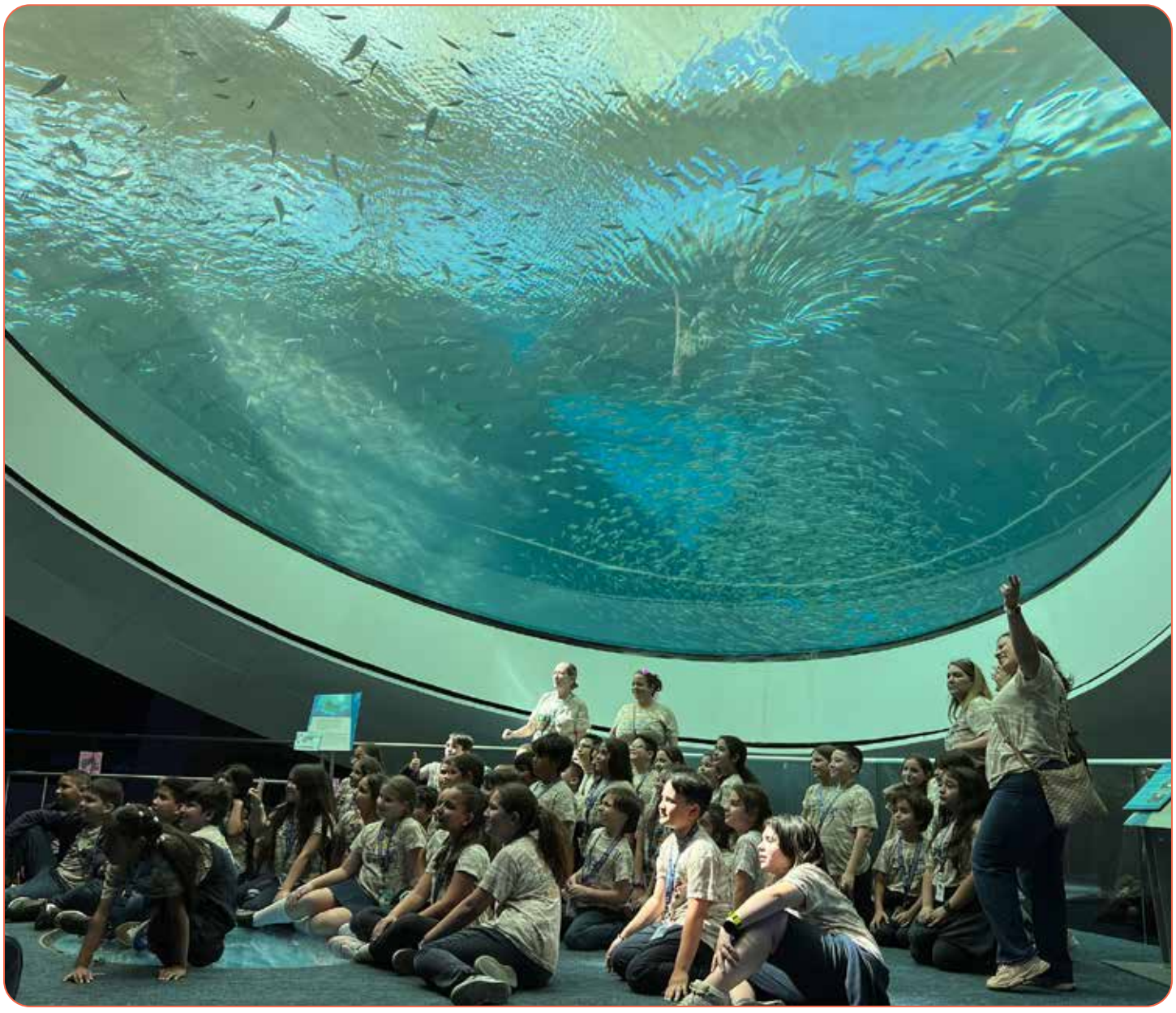
Na (Sodium) + Cl (Chlorine)

Walk up the ramp or the stairs to view the Oculus and stand underneath the Gulf Stream Aquarium. Then, take a look at our jellies in *The Deep*.

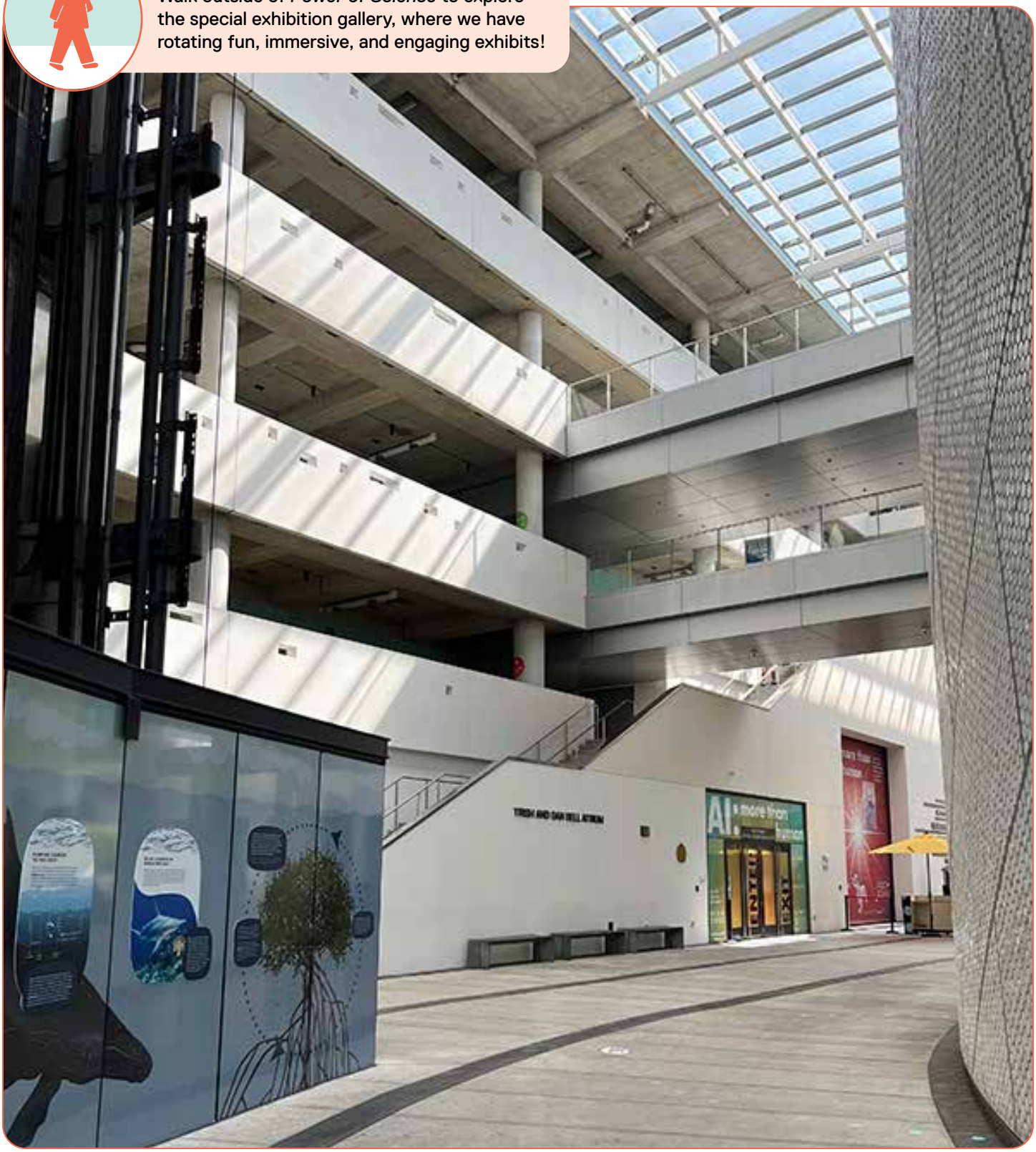


The Oculus and The Deep

The Deep, the aquarium on Level 2, features jellies and a unique view of the Gulf Stream Aquarium via the Oculus.



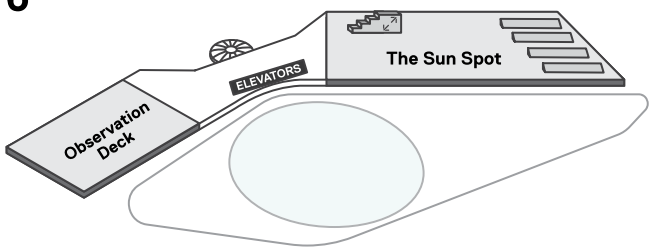
Walk outside of *Power of Science* to explore the special exhibition gallery, where we have rotating fun, immersive, and engaging exhibits!



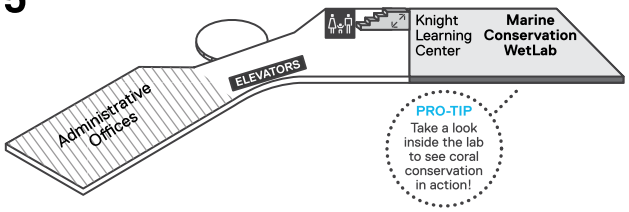
Congrats! You explored, investigated and discovered all the exhibits at Frost Science. We hope you and your students had a great time with us!

Museum Floorplan

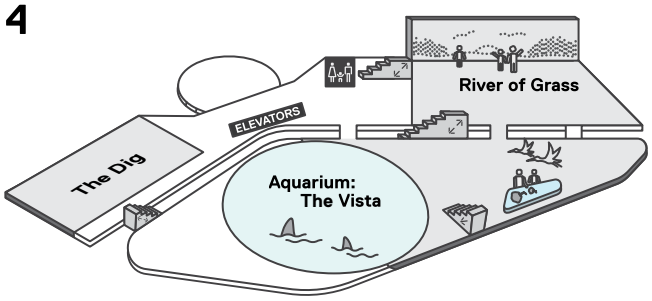
LEVEL 6
(ROOF)



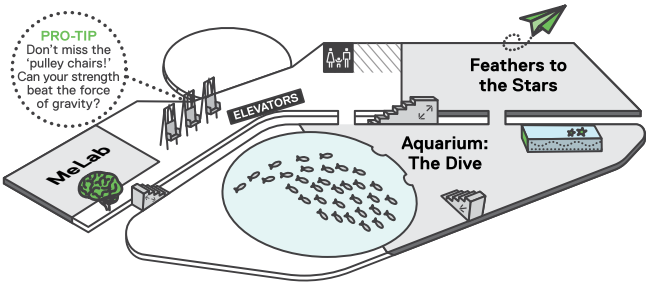
LEVEL 5



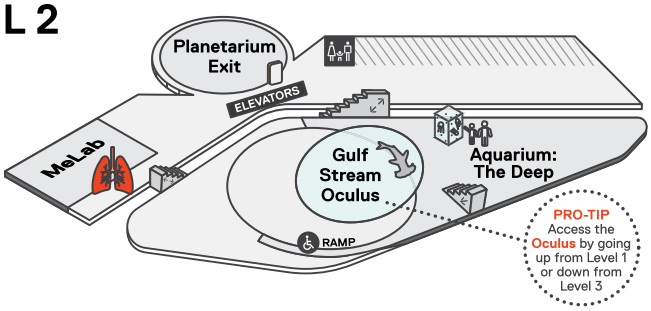
LEVEL 4



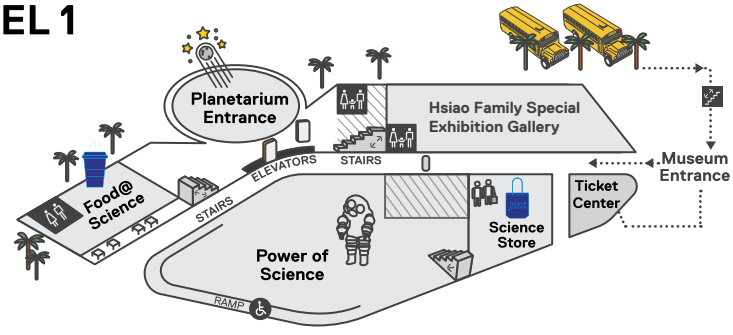
LEVEL 3



LEVEL 2



LEVEL 1



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.