FROST SCIENCE
Field Trip Guide

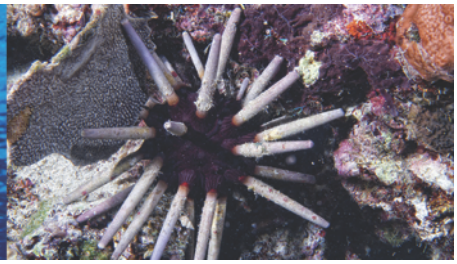
Aquarium
Grades 3-5

Contents

Questions? Ready to book your field trip? | Please visit: www.frostscience.org/fieldtrips

Elkhorn coral create a home for many underwater species

Hammerhead sharks have an unusual head shape that helps them catch prey



Blunt spikes give the pencil urchin its name

Overview

Students will discover the crucial ecosystems of South Florida through face-to-face encounters with working scientists and dynamic live animals. Students will learn about local coastal habitats, the plants and animals that reside in them, and the ecological connections to Miami's urban landscape. Though interactions with stories from working scientists, students will learn about the process by which researchers ask and answer questions.

Educational Standards

3rd Grade

Big Idea 1 - The Practice of Science

- SC.3.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

Big Idea 15 – Diversity and Evolution of Living Organisms

- SC.3.L.15.1 Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live birth and those which lay eggs) according to their physical characteristics and behaviors.

4th Grade

Big Idea 17 - Interdependence

- SC.4.L.17.4 Recognize ways plants and animals, including humans, can impact the environment.

5th Grade

Big Idea 14 – Organization and Development of Living Organisms

- SC.5.L.14.2 Compare and contrast the function or organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support – some with internals skeletons others with exoskeletons – while some plants have stems for support.

Background Information

We're all connected.
People, plants, animals and habitats are all part of a dynamic natural community.

From Gulf Stream sharks to the tiny organisms within coral, the *Aquarium* offers a trip through the beautiful watery worlds of South Florida. The exhibition is comprised of three levels:

- On the Vista, students will discover the surface of South Florida ecosystems, including the Gulf Stream, coral reefs, mangroves, beaches and the Everglades.
- In the Dive, students will take lessons from the Vista and apply them to global habitats, as they descend into underwater worlds and the science behind them, through scientist interactions and immersive exhibits.
- In the Deep, students will explore the mysterious depths of the Gulf Stream, examining the connectivity of the ocean currents, as well as the animals that depend upon them, like jellyfish.

Aquarium Key Questions

- Why are coastal habitats important?
    - What sorts of animals use those habitats?
- What can you do to support and protect coastal habitats?
- What are some research questions scientists might try to answer?
- What is one question you have about ocean science?

Pre-Activity

See pages 5 - 13 for pre-activity instructions and presentation.

Field Trip Experience

All Museum field trips are a three-hour experience, offered Monday through Friday, beginning at 9:30 a.m. or 10:00 a.m. Each field trip includes three experiences of the teacher's choice and time for lunch. Upon arrival, the teacher will be provided with a specific schedule for his/her visit based on the three chosen experiences. Additional information regarding field trip logistics is provided in the field trip package that each teacher will receive upon booking a field trip.

During the field trip, students will encounter a variety of experiences. To enhance these learning opportunities, facilitator cards are provided at arrival for all teachers and chaperones who would like to use them (please see pages 21 - 24 for a sample). The facilitator cards include prompting questions, additional content, and exhibition location maps which show where in the exhibit one can find content related to that card. Additionally, a student guide that corresponds to the exhibition prompting questions are available in this document on pages 19 - 20. Please print a student guide for each student in advance of your arrival to the museum, and bring pencils; student guides and pencils will not be provided by Frost Science.

Post-Activity

See pages 14 - 18 for post-activity instructions and presentation.

Select Recommended Extensions

Grade 3: What Am I? Classifying Living Things
http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46369
Grade 4: Ocean In A Bottle
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/29165
Grade 5: Sell This Habitat
http://www.cpalms.org/Public/PreviewResourceLesson/Preview/47810

Pre-Field Trip Activity: Zoom In
(A Visual Thinking Routine)

Overview
Students will participate in an activity to prime their curiosity and imagination around a South Florida habitat. In Zoom In, students examine an image, piece by piece, until the complete image is revealed. Students will make observations and create different hypotheses along the way to modify their thinking as they gain new information about the habitat the image is showcasing.

Objective
Students will make observations to build an explanation and interpretation of why mangroves are important to humans and animals alike.

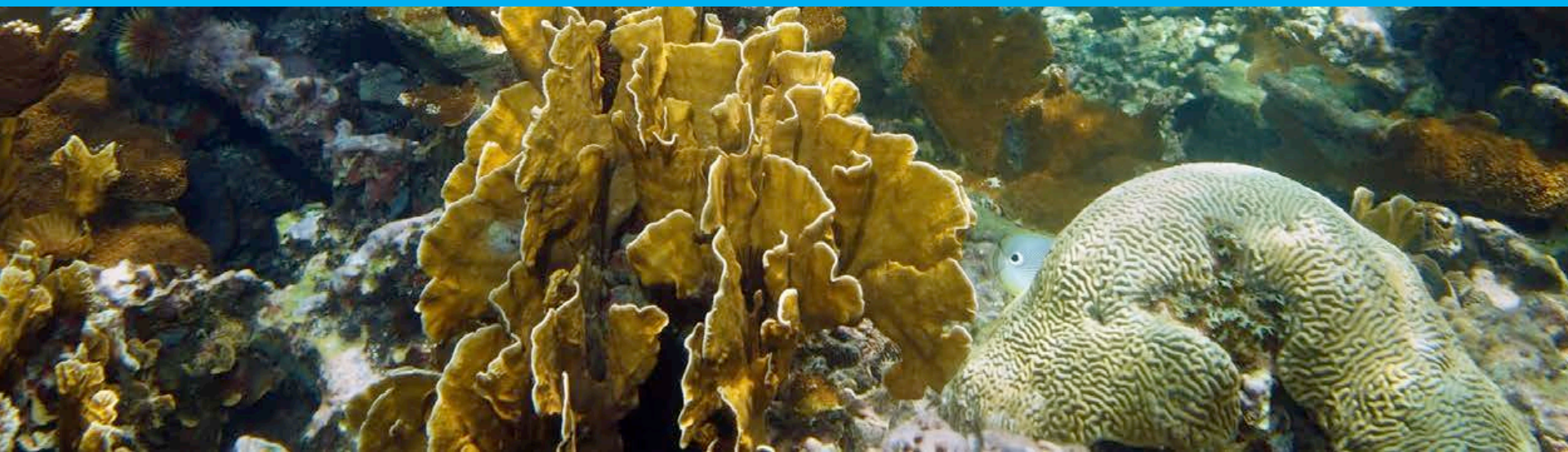
Materials
- Computer, white board and projector
- *Aquarium* Grades 3-5 Pre-Field Trip Presentation (pages 6 - 13)

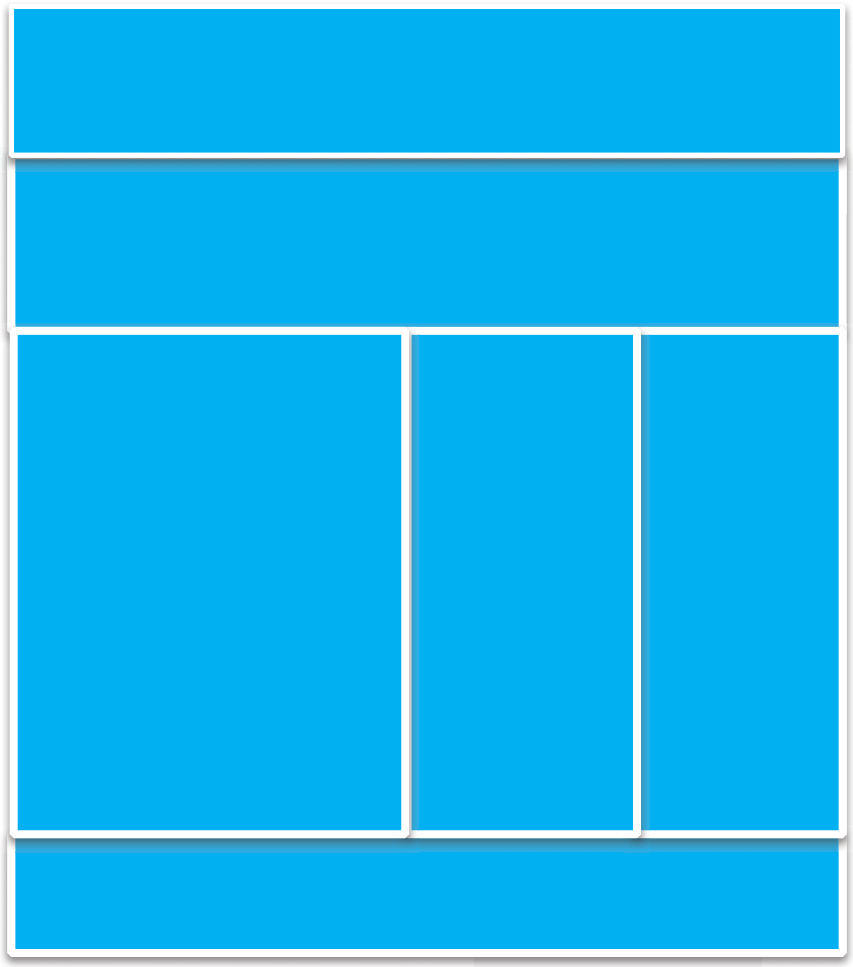
Activity Steps
1. Test the presentation on your computer: open the document, go to "View" on the menu bar, then click the full screen option ("Enter Full Screen" or "Full Screen Mode").
2. Use the presentation to guide the activity.
3. Use the Visual Thinking Routine "What Makes You Say That" to encourage a robust class discussion.
4. During the field trip, link student observations back to this activity to encourage a closer look and a more meaningful experience.

Helpful Information
- Red mangroves (like the one shown in the image on page 13) provide many ecosystem services. They:
    - Stabilize coasts and provide a storm buffer by reducing wave and wind action
    - provide underwater nursery habitat for many juvenile fish, including commercially important fish species
    - provide terrestrial habitat for crustaceans, birds, and reptiles
    - cycle nutrients through their detritus-based food web (detritus is the decomposing material that serves as the ground surface in mangrove habitats)
- In the image on page 13, there is a school of mangrove snapper (the fish with black bars diagonally through their eyes) and a nurse shark swimming in a habitat provided by the red mangrove's finger-like prop roots. At the bottom of the image, seagrass provides habitat for benthic (bottom-dwelling) organisms. At the top of the image, look for sessile (non-moving) crustaceans, such as barnacles, on the roots toward the water line.
- **What Makes You Say That** is a Visual Thinking Routine that asks students to support their interpretation with evidence.

Frost Science | Aquarium Pre-Field Trip Activity | 3RD - 5TH Grade

ZOOM IN





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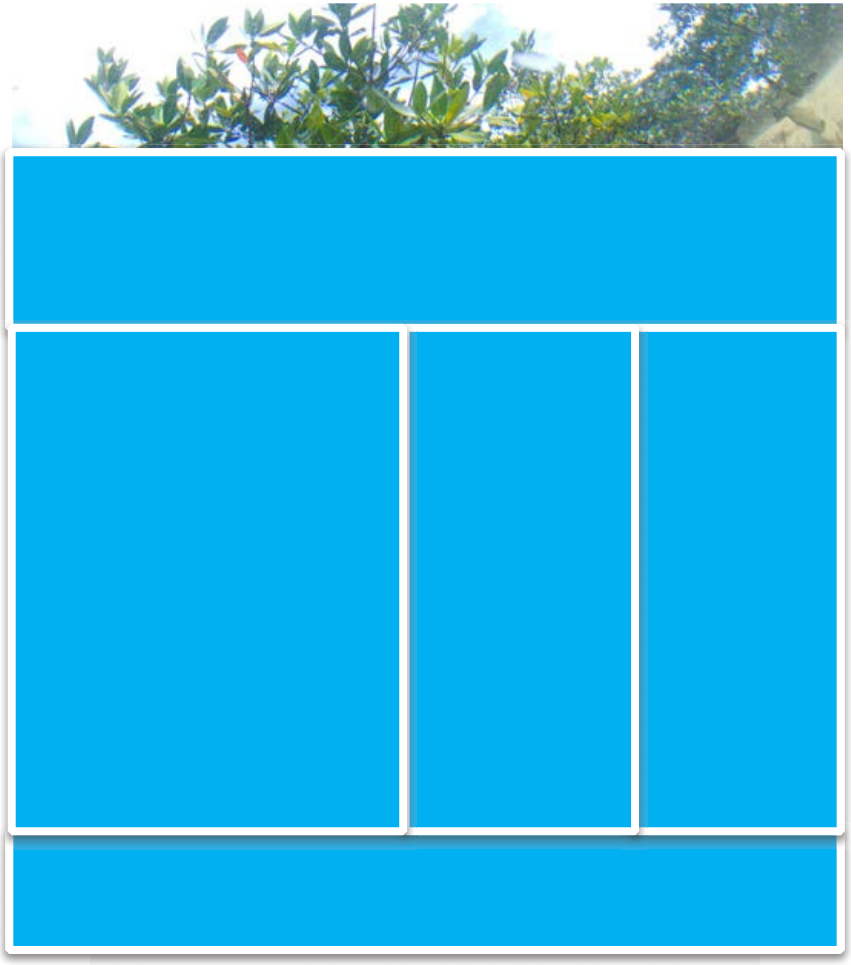
What do you see or notice?
What does this make you think about?



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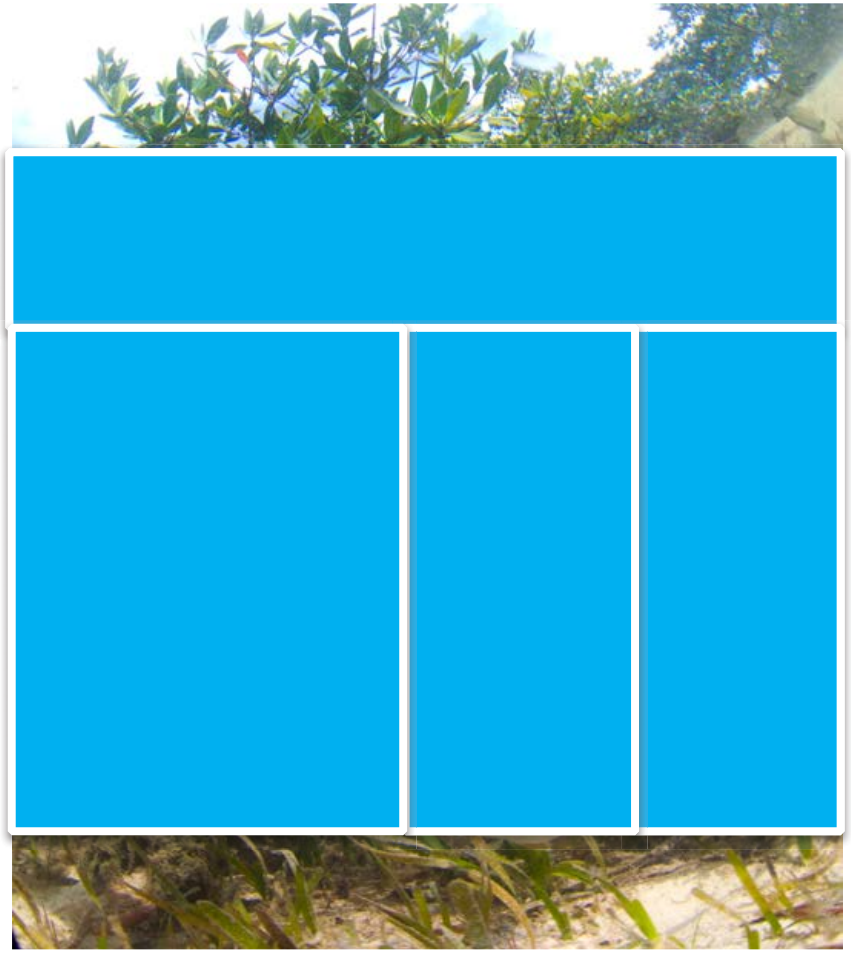
Now, what do you see or notice?
How do you think this is related to the first piece you saw?



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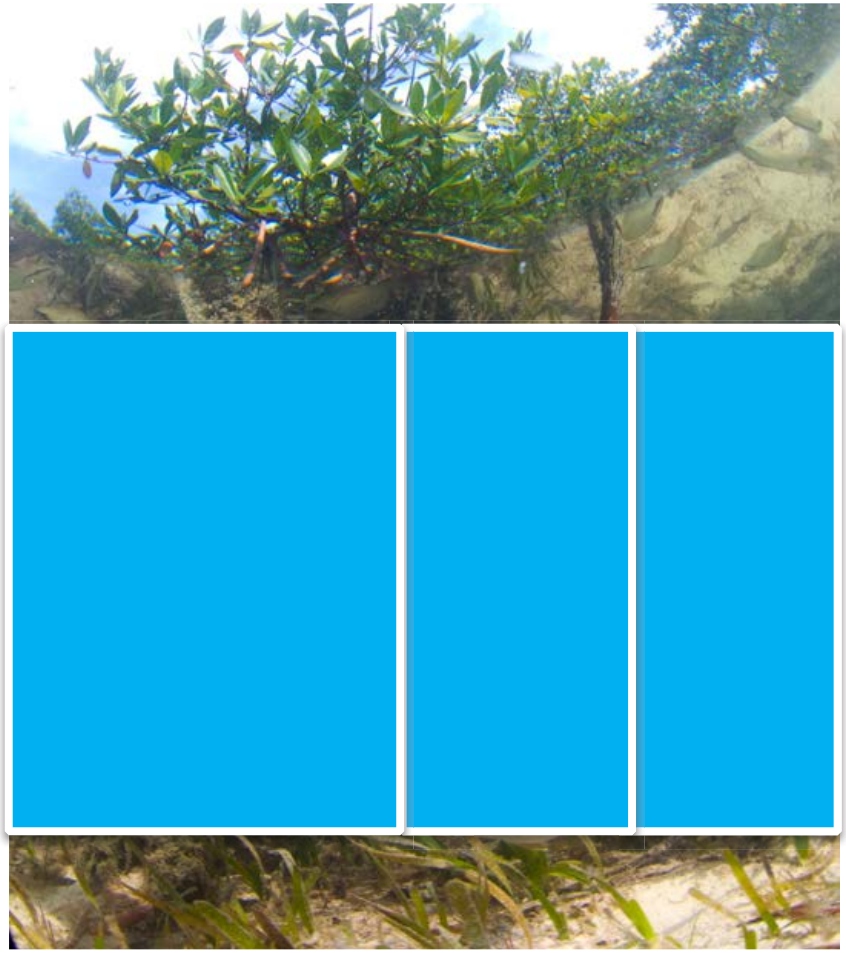
What do you see that is new?
How is the new piece related to the other two?
What do you think you'll see next?



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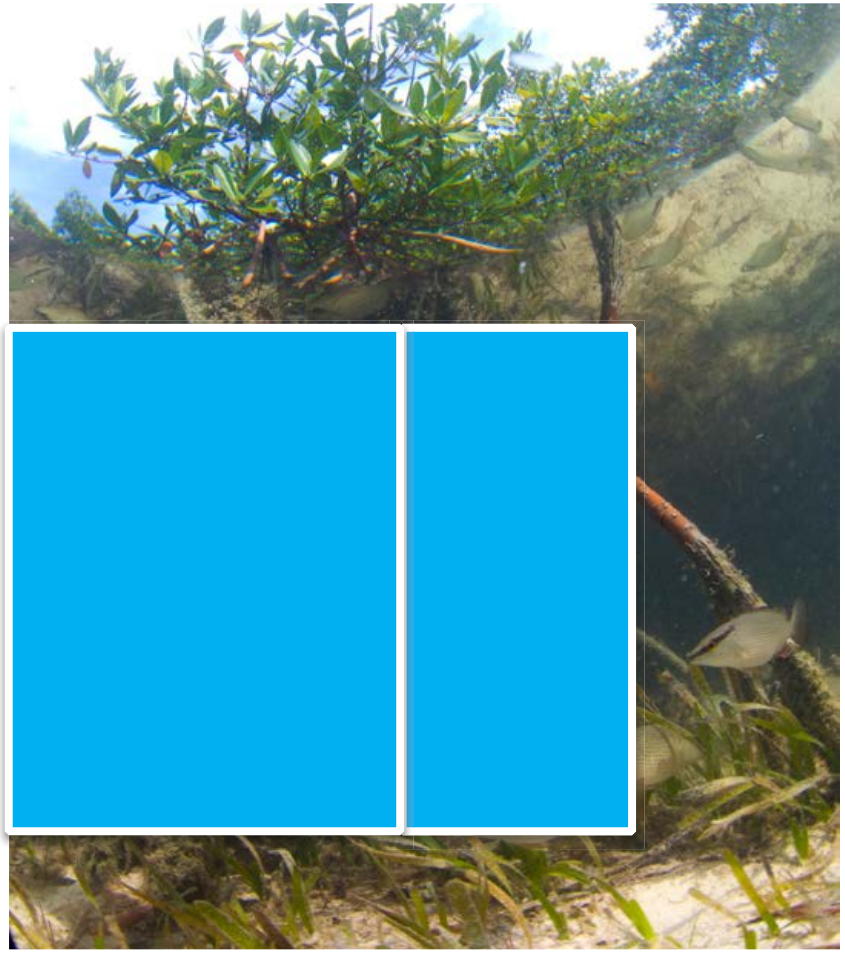
Now, what do you observe or notice?
How does this change your idea about what it is?
What do you think might be in the rest of the image?



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What is different about the image now?
What do you think the last piece will show?

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How can you describe the overall image?
How has seeing the overall image changed your previous thinking?
What questions do you still have about the image?

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Post-Field Trip Activity: Headlines
(A Visual Thinking Routine)

Overview
After the field trip, students will reflect on what they have explored and what they have learned. Students will complete the Headlines Visual Thinking Routine. This activity will help students summarize and capture the core information items they have learned during their field trip. The students can also share and explain their summaries and tentative conclusions as a classroom group for further group learning opportunities.

Objective
Students will reflect on their experience at Frost Science and create a headline capturing the essence of said experience.

Materials
- Computer, white board and projector
- *Aquarium* Grades 3-5 Post-Field Trip Presentation (pages 15 - 18)
- *Optional: Paper, markers, color pencils*

Activity Steps
1. Test the presentation on your computer: open the document, go to "View" on the menu bar, then click the full screen option ("Enter Full Screen" or "Full Screen Mode").
2. Use the presentation to guide the activity.
3. Use the Visual Thinking Routine Think-Pair-Share and have students work together by brainstorming their ideas for headlines, then picking one that they think best describes their experience.
4. *Optional: Have students make a newspaper mock-up using coloring pencils, markers, pictures, etc.*
5. Conclude with a class discussion about the completed activity.

Helpful Information
- Use the provided headline samples, but refrain from giving students concrete examples from the *Aquarium* to allow for their own creativity to shine through.
- **Think-Pair-Share** involves posing a question to students, asking them to take a few minutes of **thinking** time and then turning to a nearby student to **share** their thoughts.
  This routine encourages students to think about something, such as a problem, question or topic, and then articulate their thoughts.

Frost Science | Aquarium Post-Field Trip Activity | 3RD - 5TH Grade

HEADLINES

Your goal is to create a newspaper headline summarizing your experience at the Frost Science Aquarium!

Working with a partner, write a headline about your visit that captures the most important aspect.

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Present your headlines!

Think about these questions:

- How does your headline differ from what you would have said before the field trip?
- If you could write a second headline, what would it be?

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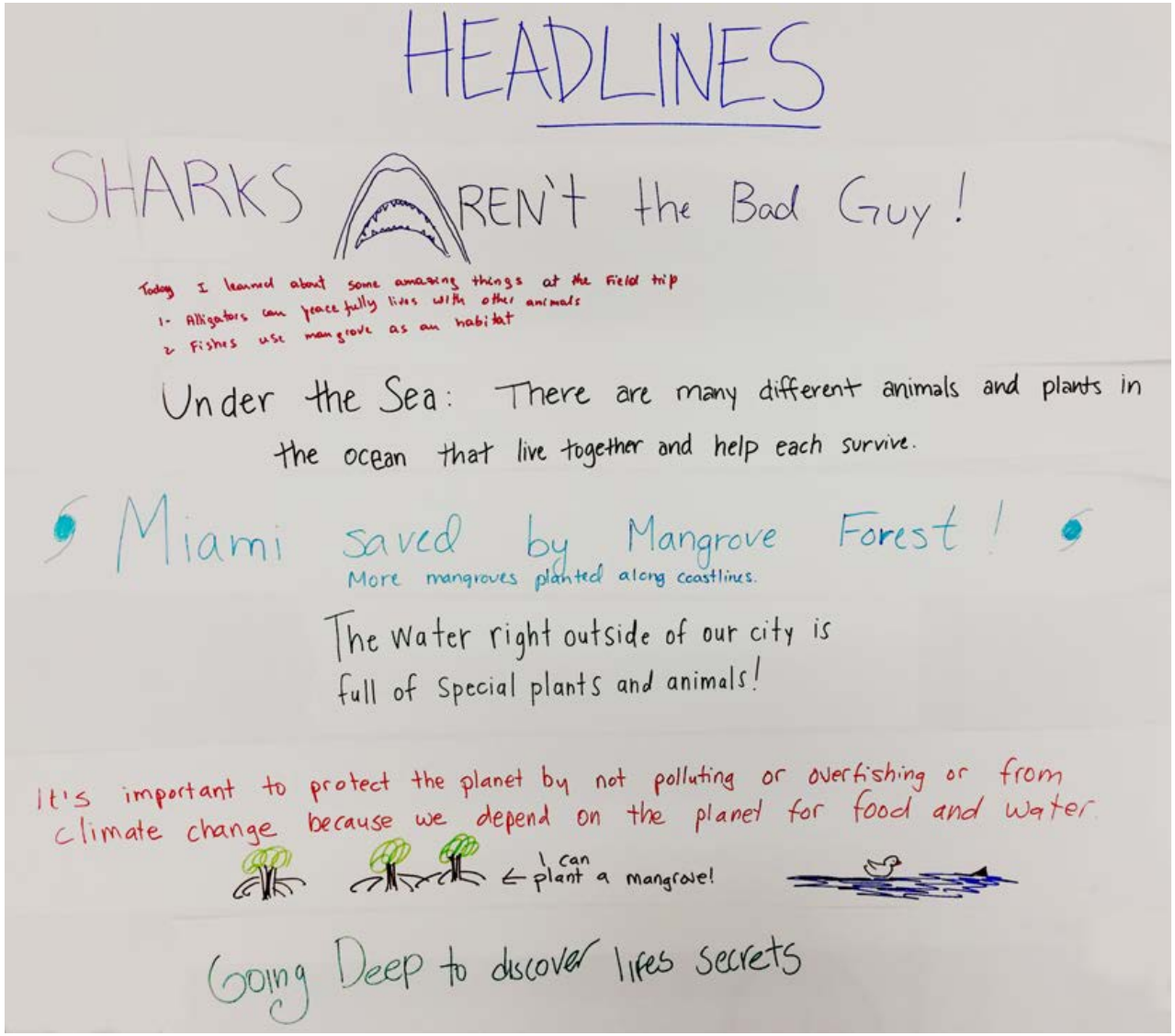
Sample Post-Field Trip Activity



HEADLINES

SHARKS AREN'T the Bad Guy!

Today I learned about some amazing things at the field trip
1- Alligators can peacefully lives with other animals
2 Fishes use mangrove as an habitat

Under the Sea: There are many different animals and plants in the ocean that live together and help each survive.

Miami saved by Mangrove Forest!
More mangroves planted along coastlines.

The water right outside of our city is full of Special plants and animals!

It's important to protect the planet by not polluting or overfishing or from climate change because we depend on the planet for food and water

I can plant a mangrove!

Going Deep to discover lifes secrets

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AQUARIUM

3RD - 5TH Grade
Student Guide

Design-A-Fish!

Use the selection of body types, fin types, and mouth types to design your own fish! Where would your fish live?

Date: _____
School: _____
Name: _____

Body Shapes

Compressed: quick turns, slow swimmer

Oval: fast swimmer

Sphere: too big to be swallowed

Rod: arrow-like; lunge quick, swim fast.

Mouths

Up-pointing: feeds near surface

Terminal: chase, capture, pick

Sub-terminal: Bottom feeder

Elongated: poke, dig, scoop

Caudal Fins (Tail)

Forked: Fast

Lunate: fast, strong,

Truncate: strong, slow

Rounded: slow but short bursts

A

Match the animal to its habitat.

Sand

Open Ocean

Reef

B

What is one animal you see in the Dive that uses camouflage?

Now, draw that animal camouflaged in its habitat.

C

Pick one habitat in the Aquarium and one animal that uses it.

What makes this habitat a good fit for this animal?

D

Choose one scientist in the Dive and identify the question she/he is trying to answer.

CHECK IN

Fish Body Shape

Say:

"Fish come in many different colors, shapes and sizes, depending on their habitat. Let's explore why."

Explore and use the Student Guide

Examine fish body shapes in reef and Gulf Stream habitats.

Discuss:

What characteristics make fish better suited to life in the open ocean?

Some possible answers include…

- *Torpedo-shaped body*
- *Forked tail*
- *Shiny body color*

What characteristics make fish better suited to life on the reef?

Some possible answers include…

- *Flexible pectoral fins*
- *Colorful body colors*
- *Tubular mouth*

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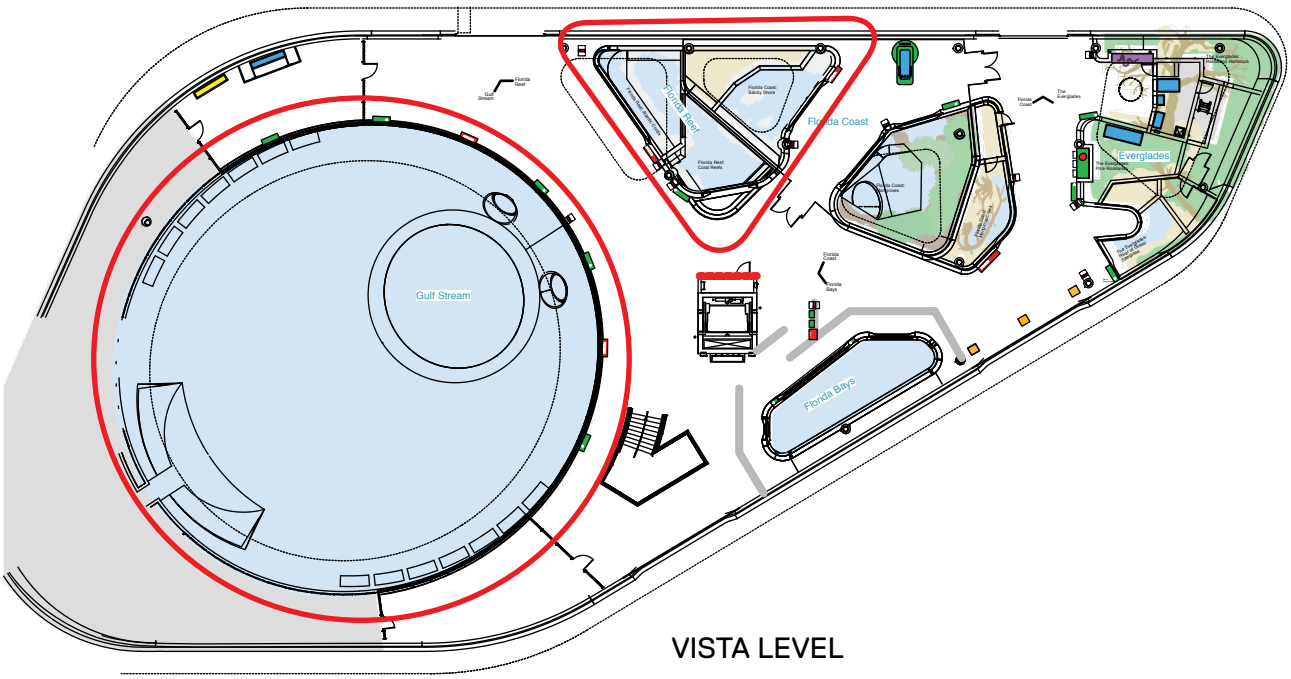
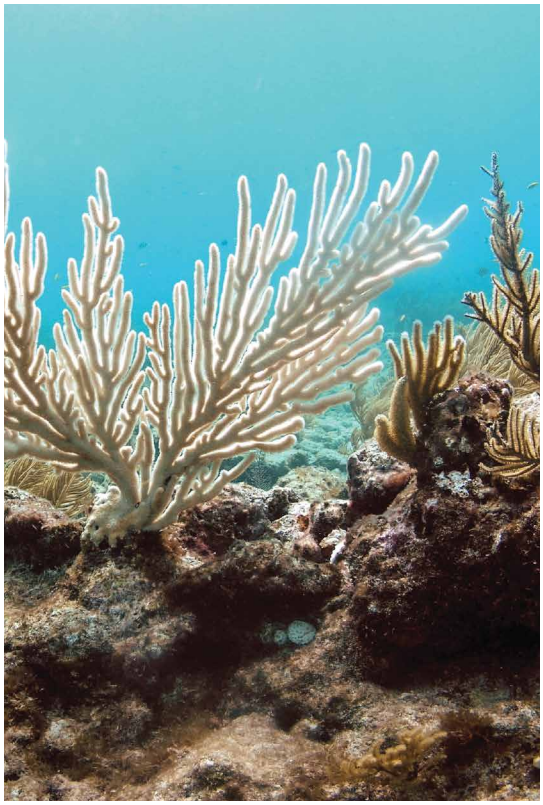


VISTA LEVEL

FLOOR PLAN

CHECK IN

Habitats



Say:

"Although coastal habitats are very different, they all share some basic components."

Explore and use the Student Guide

Discover the features of various coastal habitats, looking for the essential components common to all of them.

Discuss:

What makes a habitat good for an animal?

Some possible answers include…

- *There is plenty of **food** and **water** for the animal.*
- *Animals may use **camouflage** in the habitat.*
- *There is **shelter** with many **hiding places** for the animal.*
- *There is sufficient **space** for the animals to coexist.*

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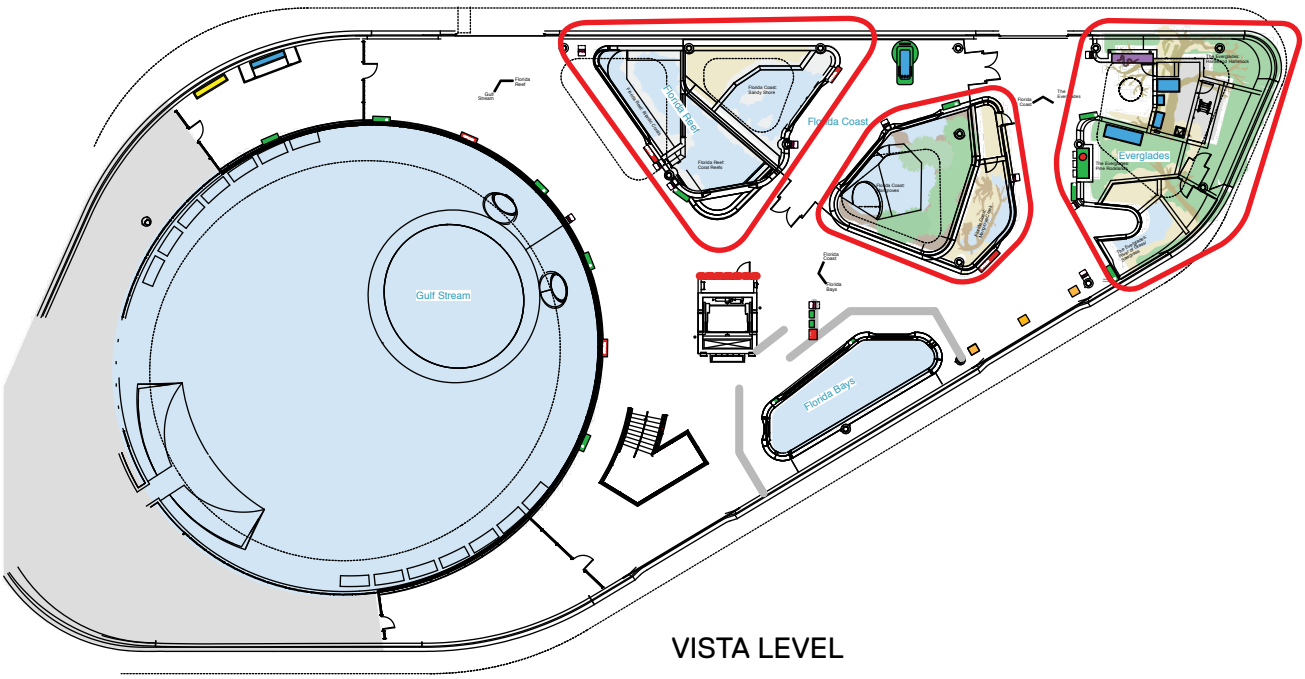


VISTA LEVEL

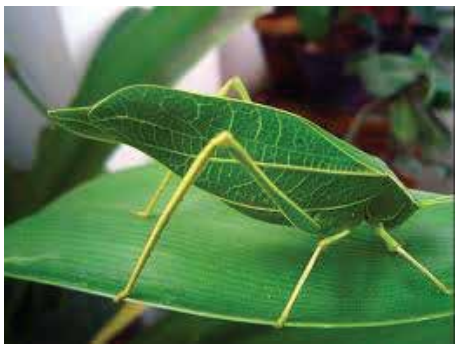
FLOOR PLAN

CHECK IN

Camouflage

Say:

"Many animals use camouflage to help them blend into their surroundings. There are many different types of camouflage, including blending into the background, using patterns, decoration, or distracting other animals. This helps them catch food (predator) and avoid becoming food (prey)."



Explore and use the Student Guide

Explore the Dive level of the Aquarium *to discover animals that camouflage into their marine environments.*

Discuss:

How do different animals blend in with their surroundings?

Some possible answers include…

- *Color*
- *Pattern*
- *Shape*
- *Illumination*
- *Decoration*

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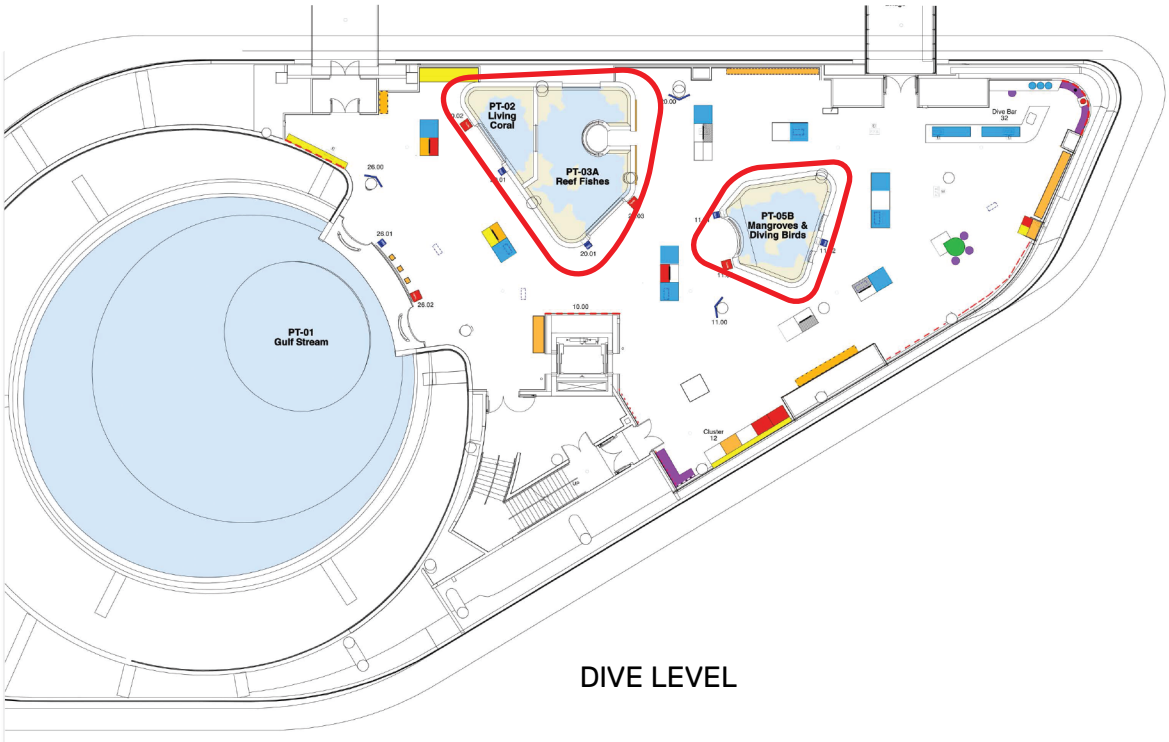

DIVE LEVEL

FLOOR PLAN

CHECK IN

Scientific Process

Say:

"Scientists use the scientific method to help them answer research questions in an organized way."

Explore and use the Student Guide

Explore the Dive level of the Aquarium *to learn more about how the highlighted scientists use the scientific method to answer questions.*

Discuss:

How is the scientific method an open-ended process?

Some possible answers include…

- *It is possible to modify details of the question at any stage of the process.*
- *Answers lead to new questions.*
- *It doesn't have to be used "in order."*
- ***(Great for K-2)** What story was interesting to you and why?*

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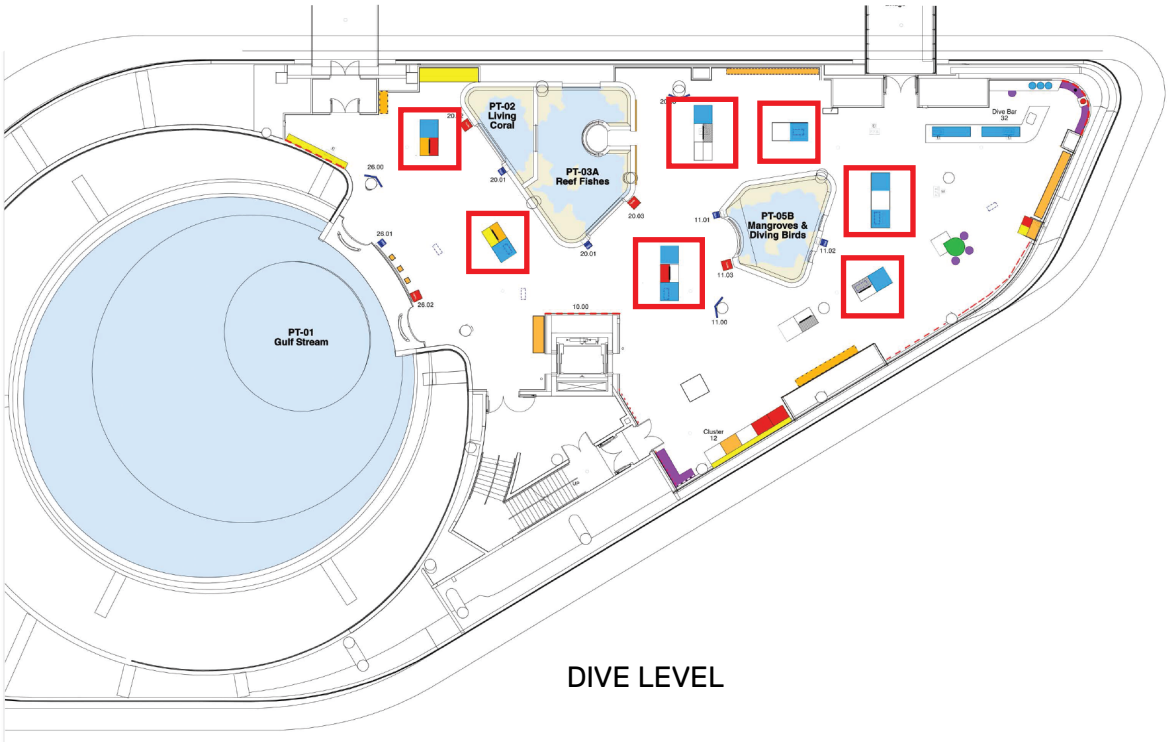

DIVE LEVEL

FLOOR PLAN