FROST SCIENCE
Field Trip Guide

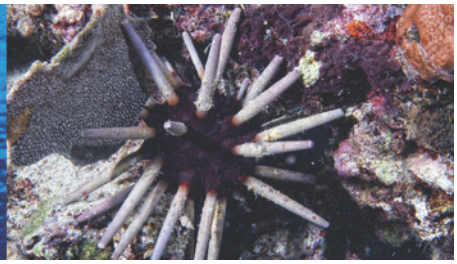
Aquarium
Grades 6-8

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

6th Grade

Big Idea 2 – The Characteristics of Scientific Knowledge

- SC.6.N.2.3 Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests and goals.

7th Grade

Big Idea 17 - Interdependence

- SC.7.L.17.1 Explain and illustrate the roles of and relationships among producers, consumers and decomposers in the process of energy transfer in a food web.
- SC.7.L.17.3 Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.

8th Grade

Big Idea 4 – Science and Society

- SC.8.N.4.1 Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.

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.

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 – 11 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 12 - 18 for post-activity instructions and presentation.

Select Recommended Extensions

Grade 6: The World of Scientists
http://www.cpalms.org/Public/PreviewResourceLesson/Preview/21321
Grade 7: "Wanted: Dead or Delicious" – The Food Chain of the Lionfish
http://www.cpalms.org/Public/PreviewResourceLesson/Preview/127746
Grade 8: Clean Up, Collect Data and Conserve the Environment!
http://www.cpalms.org/Public/PreviewResourceLesson/Preview/53081

Pre-Field Trip Activity: Explanation Game
(A Visual Thinking Routine)

Overview
Students will participate in an activity to prime their curiosity and imagination around a South Florida habitat. In the Explanation Game, students examine two images of two different South Florida habitats. Students make observations and create different hypotheses about the connections and differences between these two habitats.

Objective
Students will make observations to build an explanation and interpretation of how South Florida habitats are both unique and interconnected.

Materials
- Computer, white board and projector
- *Optional: poster paper*
- Sticky notes (provide three different colors, if possible)
- *Aquarium* Grades 6-8 Pre-Field Trip Presentation (pages 7 - 11)

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. Draw a chart on the white board *(or poster paper)* for students to post their ideas
3. Give each student several sticky notes
4. Use the presentation to guide the activity.
5. During the field trip, link student observations back to this activity to encourage a closer look and a more meaningful experience.

Helpful Information
Mangrove Habitat
- Red mangroves 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)

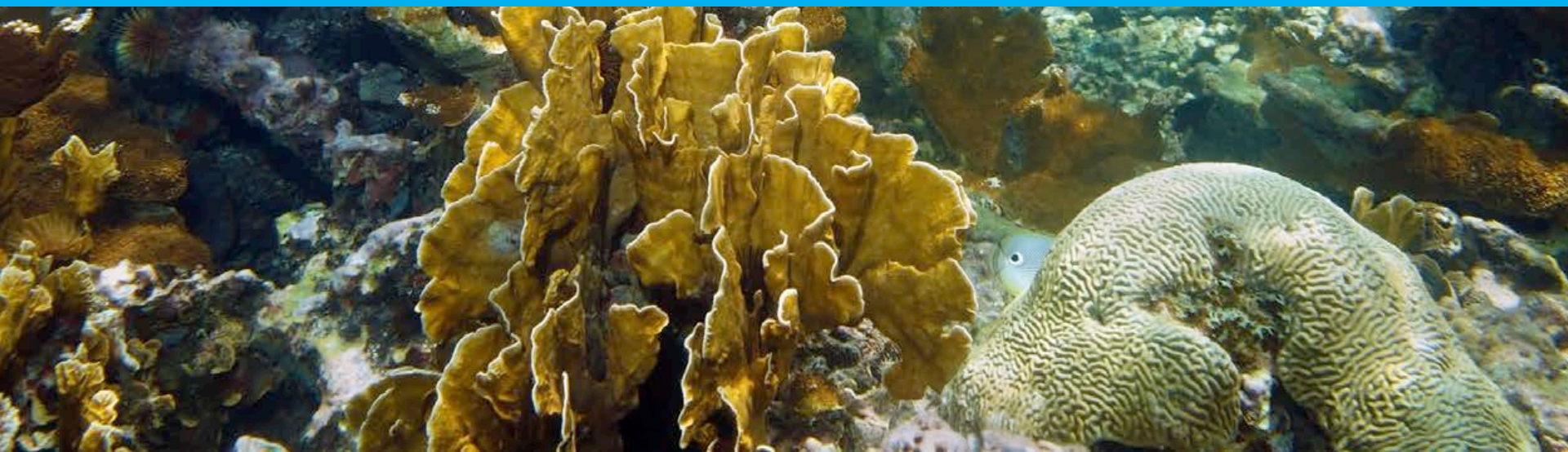
- In this image, there is a school of mangrove snapper (the fish with black bars diagonally through their eyes) and a nurse shark swimming in a habitat provided by the red mangrove's finger-like prop roots. At the bottom of the image, seagrass provides habitat for benthic (bottom-dwelling) organisms. At the top of the image, look for sessile (non-moving) crustaceans, such as barnacles, on the roots toward the water line.

Sawgrass Habitat

- In this image, an alligator basks next to a flock of snowy egrets in a sawgrass marsh in the Florida Everglades.
    - Sawgrass is actually a sedge, which is a type of flowering plant, not a grass. (Saw-sedge!)
    - Sawgrass has tiny teeth that line its sides. The tiny teeth can create a small cut, like a paper cut.
    - Fires play an important role in sawgrass prairies. When fires break out during the dry season, the tops of sawgrasses and all woody vegetation are burned. However, the submerged portion of the sedge survives, allowing it to make a complete recovery.

Frost Science | Aquarium Pre-Field Trip Activity | 6TH - 8TH Grade

THE EXPLANATION GAME



Name It

- Look at the two images and name and describe what you see.
- Record the names and descriptions on sticky notes.
- Place your sticky notes in the *Name It* space on the chart.

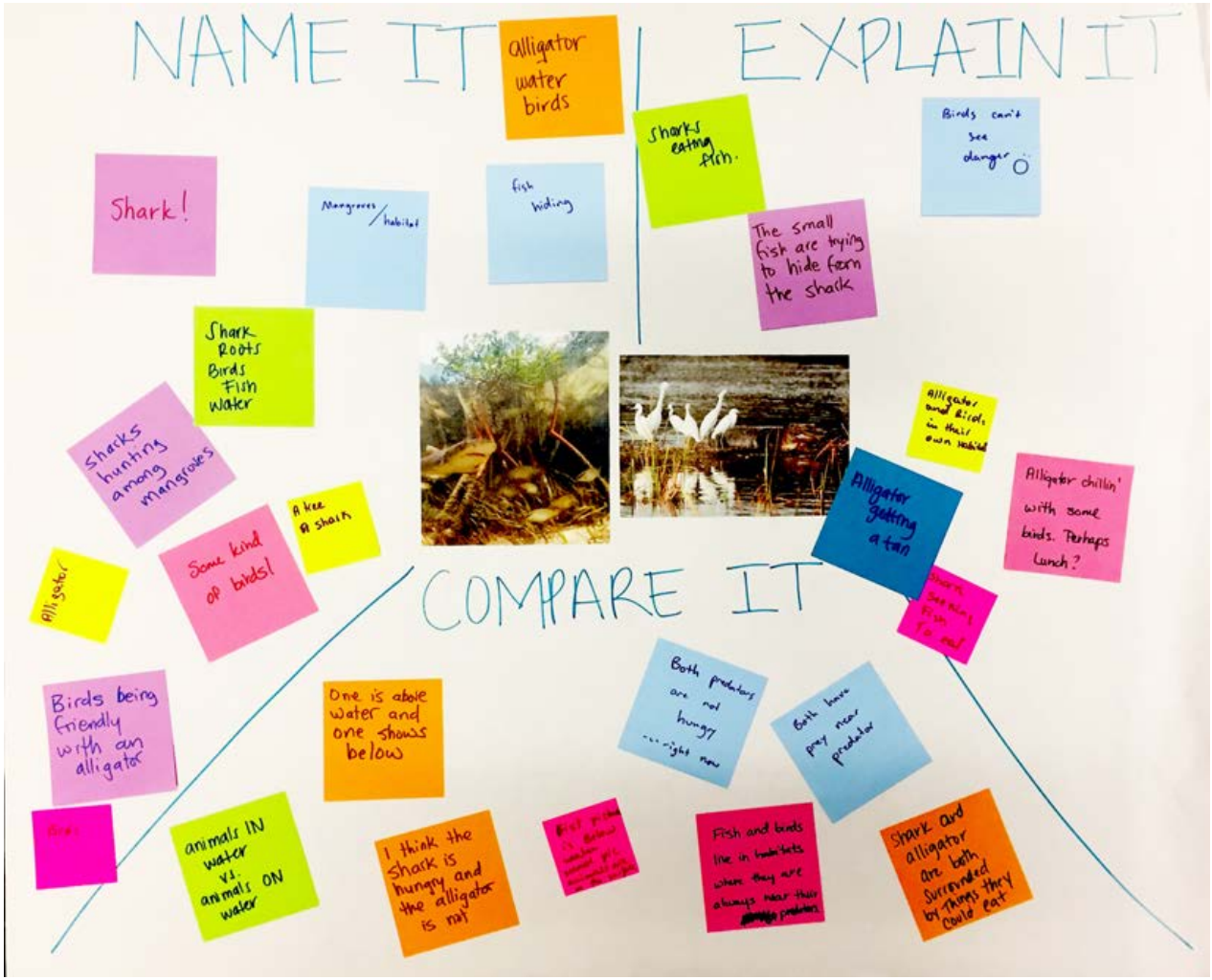
Explain It

- Think of as many ideas as you can to explain what you see in each image.
- Record your explanations on sticky notes.
- Place your sticky notes in the *Explain It* space on the chart.

Compare It

- How do you think the images are related to each other? What makes you say that?
- Record your explanations on sticky notes.
- Place your sticky notes on the *Compare It* space on the chart.

Sample Pre-Field Trip Chart



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Post-Field Trip Activity: Connect-Extend-Challenge
(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 Connect-Extend-Challenge Visual Thinking Routine. This activity helps students make connections between new ideas and prior knowledge. It also encourages students to reflect on ongoing questions, challenges, and difficulties as they reflect on what they can still learn about the subject.

Objective
Students will reflect on their experience at Frost Science and how the knowledge they had about the habitats in the pre-activity has expanded.

Materials
- Classroom chart developed during the Pre-Field Trip activity
- Computer, white board and projector
- *Optional: poster paper*
- Sticky notes (provide three different colors, if possible)
- *Aquarium* Grades 6-8 Post-Field Trip Presentation (pages 13 - 18)

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. Draw a chart on the white board *(or poster paper)* for students to post their ideas.
3. Give each student several sticky notes.
4. Use the presentation to guide the activity.
5. Conclude with a class discussion about the completed activity.

Frost Science | Aquarium Post-Field Trip Activity | 6TH - 8TH Grade

CONNECT – EXTEND – CHALLENGE

How has your knowledge grown?

Now that you have visited the Frost Science *Aquarium*, let's take a look at your pre-field trip chart and think about the new knowledge you have gained.

Connect

- How are the ideas and information presented at the *Aquarium* CONNECTED to what you already knew?
- Record your ideas on sticky notes.
- Place your sticky notes in the *Connect* space on the chart.

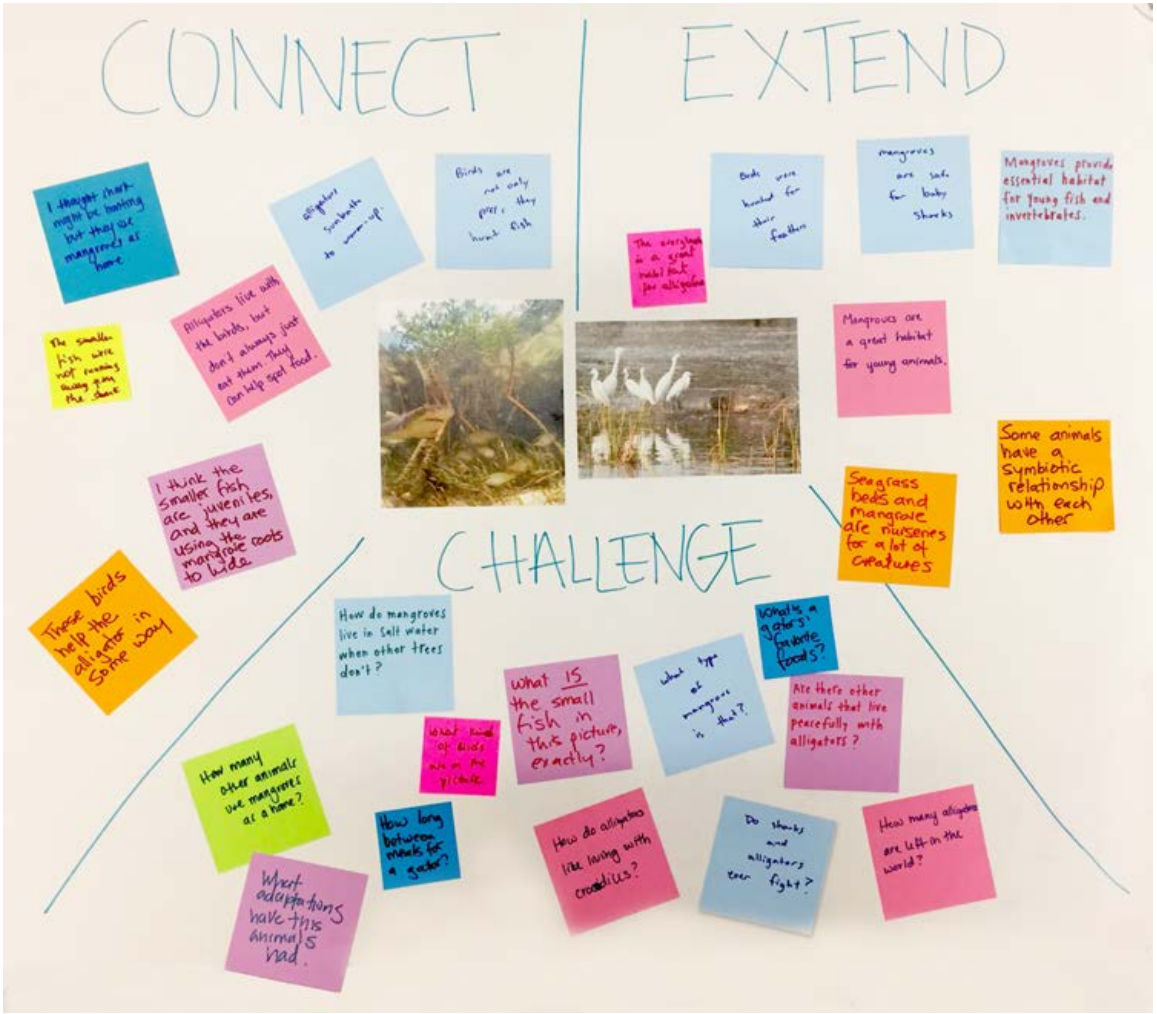
Extend

- What new ideas did you get at the *Aquarium* that EXTENDED or pushed your thinking in new directions?
- Record your ideas on sticky notes.
- Place your sticky notes in the *Extend* space on the chart.

Challenge

- What is still CHALLENGING or confusing for you to get your mind around? What questions do you now have?
- Record your questions on sticky notes.
- Place your sticky notes on the *Challenge* space on the chart.

Sample Post-Field Trip Chart



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AQUARIUM

6TH - 8TH Grade Student Guide

What's That Fish?

Use the dichotomous key at the top to discover what fish species are represented in the box at the bottom.

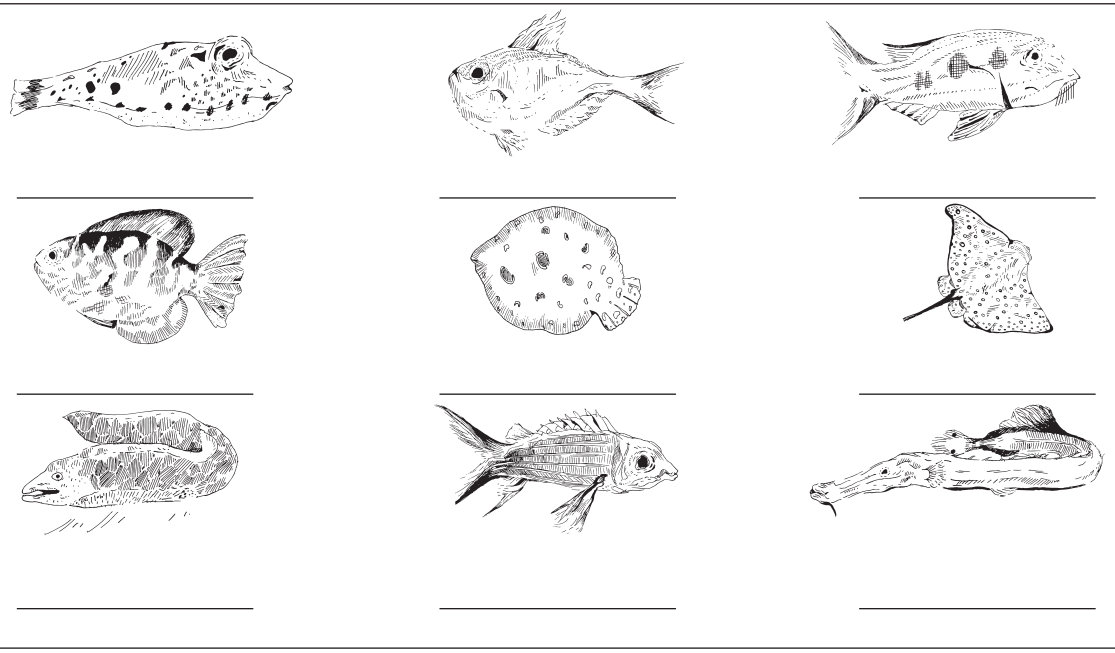
Date: _____

School: _____

Name: _____

What's That Fish

1. If fish shape is long and skinny, go to 3.
2. If fish shape is not long and skinny, go to 5.
3. If fish has protruding fins, it is a **trumpet fish**.
4. If fish has smooth fins, it is a **moray eel**.
5. If fish has both eyes on top of its head, go to 7.
6. If fish has one eye on each side of the head, go to 9.
7. If fish has a long whip-like tail, it is a **spotted eagle ray**.
8. If fish has a short, blunt tail, it is a **peacock flounder**.
9. If fish has spots, go to 11.
10. If fish does not have spots, go to 13.
11. If fish has chin "whiskers," it is a **spotted goat fish**.
12. If fish does not have chin "whiskers," it is a **band-tail puffer**.
13. If fish has stripes, go to 15.
14. If fish does not have stripes, it is a **glassy sweeper**.
15. If fish has a v-shaped tail, it is a **squirrel fish**.
16. If fish has a blunt tail, it is a **glass-eye snapper**.



A

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

What makes this habitat a good fit for this animal (consider biotic and abiotic factors)?

B

In the Dive, identify an animal that uses camouflage to blend into its surroundings and describe the camouflage (bars, stripes, eyespots, coloration, etc.).

C

Using the habitat in "A", draw a food web that includes a producer, consumer, & decomposer.

D

Choose one scientist in the Dive and come up with two questions about their research.

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…

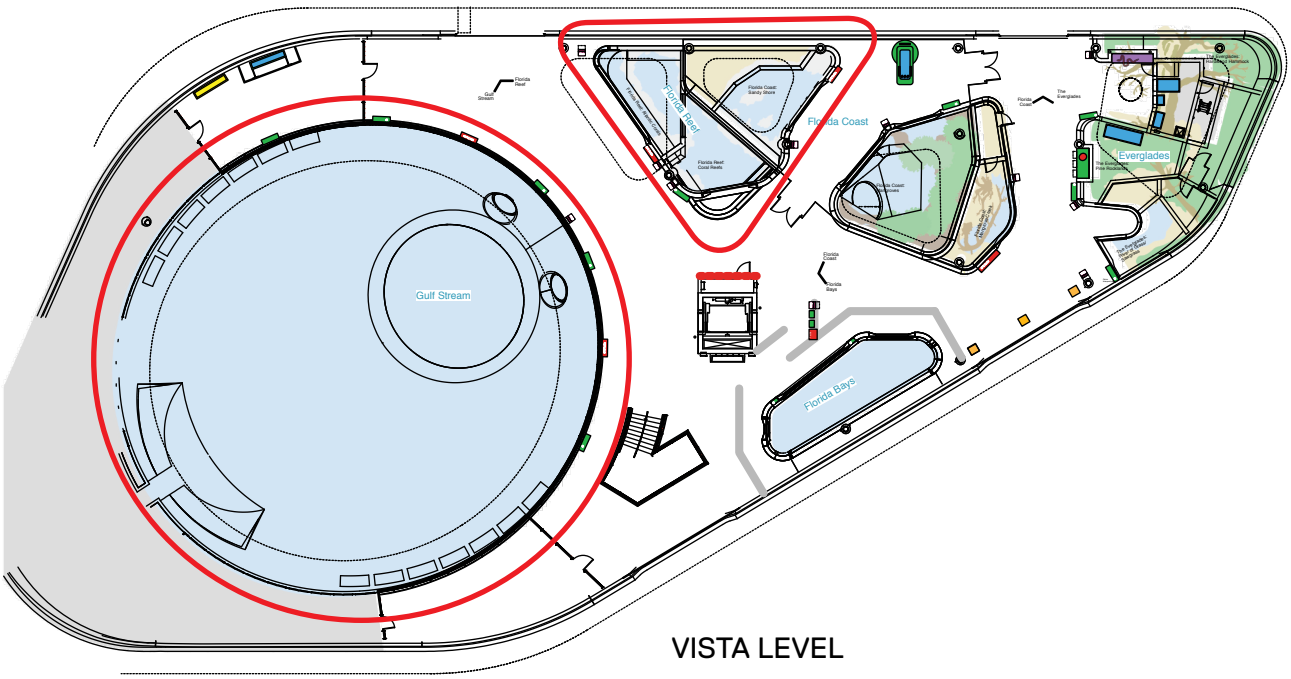
- *Torpedo-shaped body*
- *Forked tail*
- *Shiny body color*

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

Some possible answers include…

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

FROST SCIENCE | Aquarium

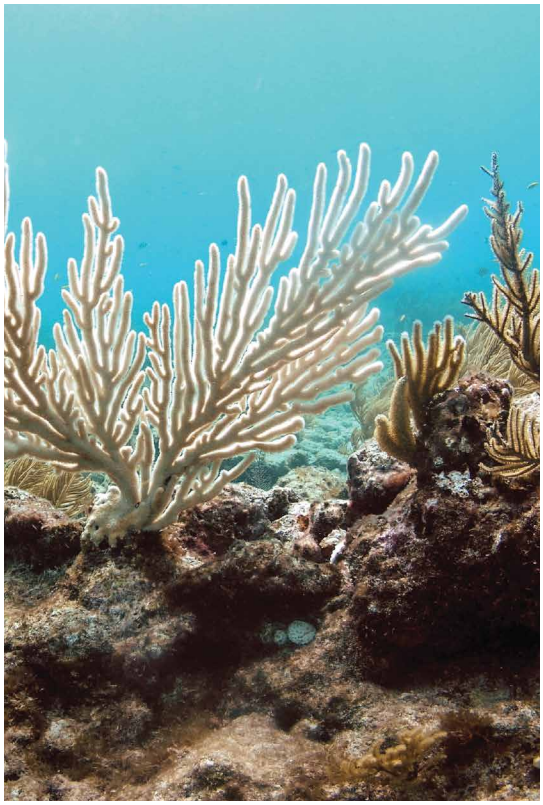


VISTA LEVEL

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.

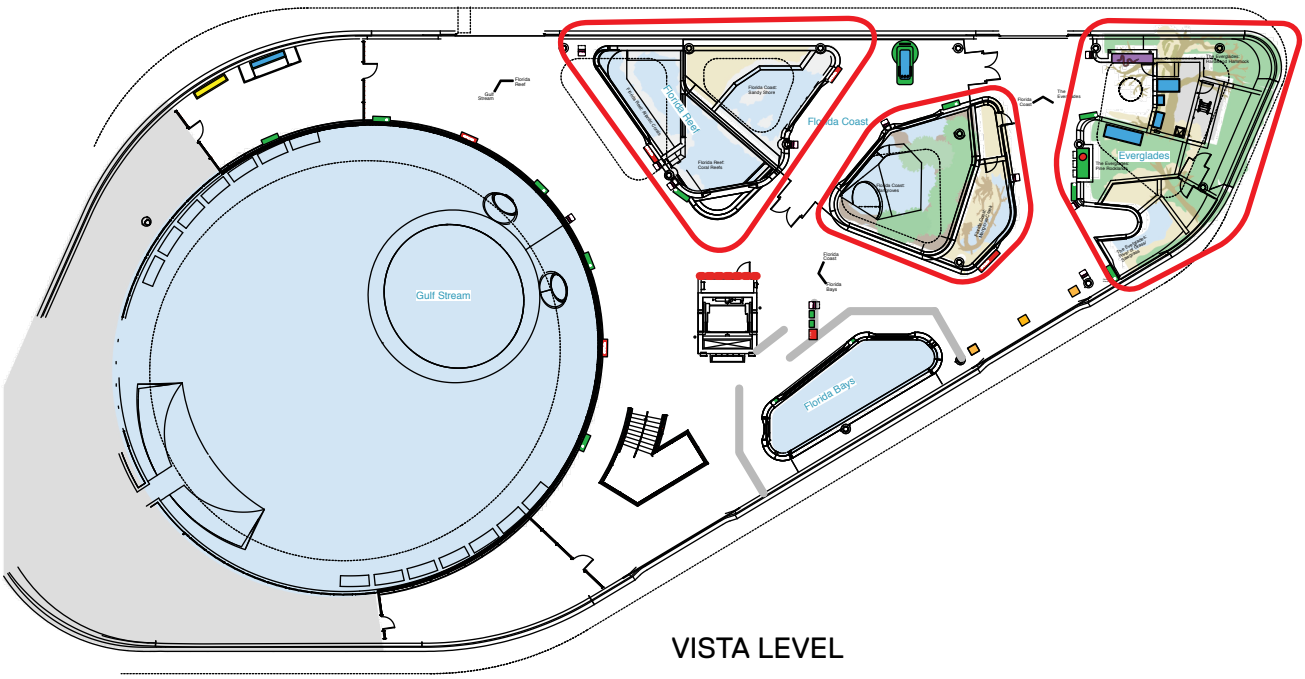
Discuss:

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.*

FROST SCIENCE | Aquarium



VISTA LEVEL

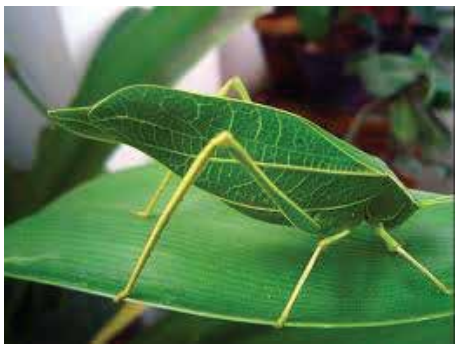
FLOOR PLAN

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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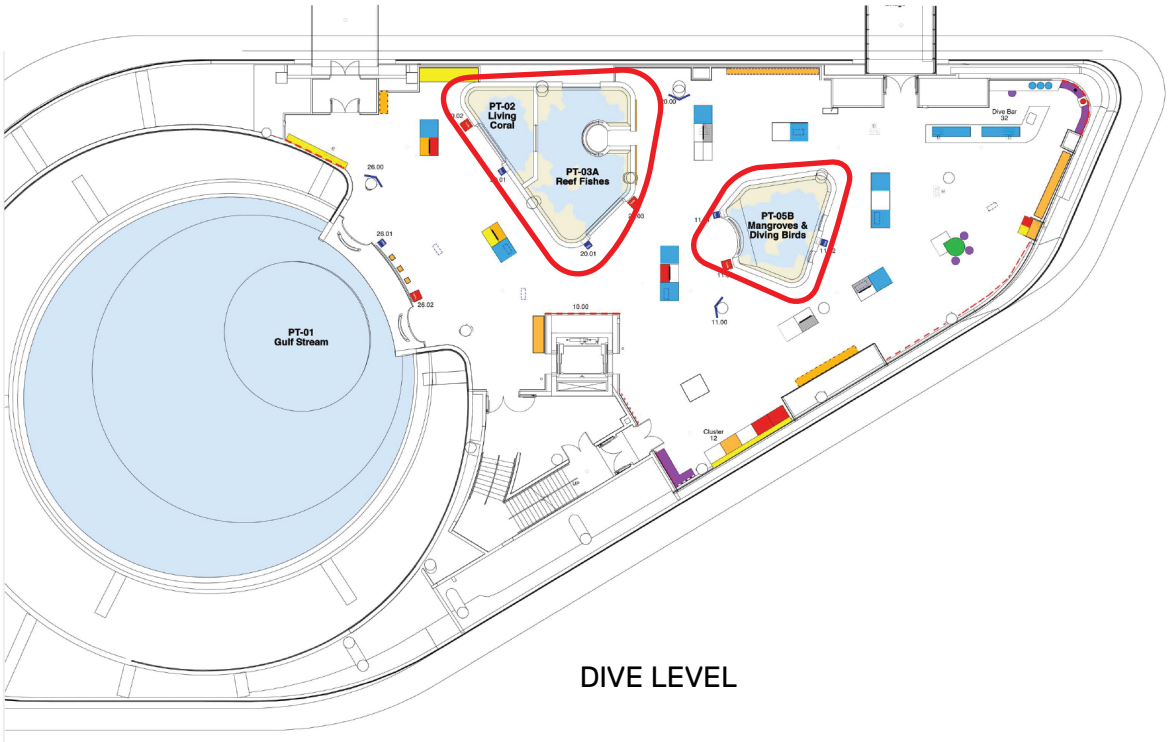

DIVE LEVEL

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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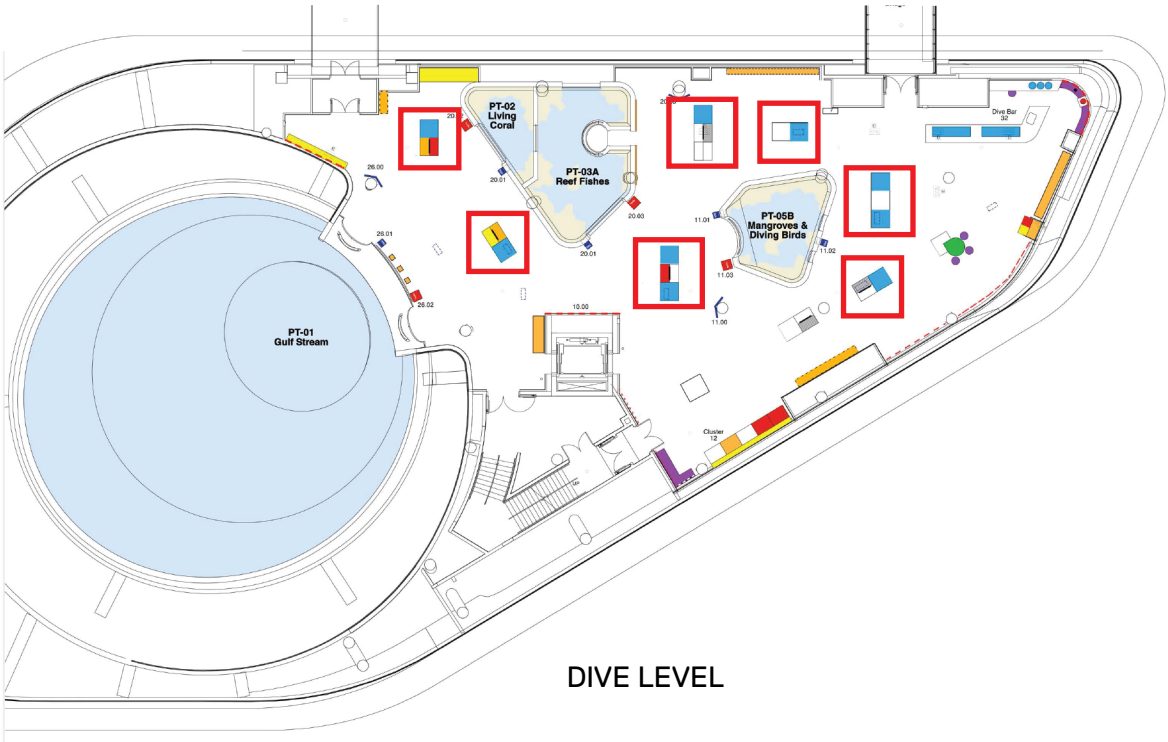

DIVE LEVEL

FLOOR PLAN