



Lesson 3: Coral Reef Rescue Mission

Theme: Improving Resilience of Florida's Coral Reef

Grade Levels: K-2

Duration: Two 30- to 45-minute class periods

Students will explore local threats to Florida's Coral Reef and ways to improve coral reef resilience. They will explore the effects of coral bleaching and design posters to tell the community why it is important to protect our coral reefs.

Next Generation Sunshine State Standards:

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| SC.K.N.1.1 | Collaborate with a partner to collect information. |
| SC.K.N.1.2 | Make observations of the natural world and know that they are descriptors collected using the five senses. |
| SC.K.N.1.3 | Keep records as appropriate - such as pictorial records - of investigations conducted. |
| SC.K.N.1.4 | Observe and create a visual representation of an object which includes its major features. |
| SC.K.N.1.5 | Recognize that learning can come from careful observation |
| 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. |

SC.1.N.1.2

Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

SC.1.L.14.1

Make observations of living things and their environment using the five senses.

SC.2.N.1.1

Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

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.

OBJECTIVES

- Understand reef resilience and what a resilient reef looks like.
- Describe why reef resilience is important.
- Identify ways to improve reef resilience.
- Advocate to protect Florida's Coral Reef.

MATERIALS

- Lesson three PowerPoint.
- Coral 3D printed Models (one per team).
- Large bowl (one per team).
- Warm water for bowl.
- Coral reef poster template (one per team).
- Markers or crayons (one set per team).
- Reflection sheet (one per student).



VOCABULARY

CORAL BLEACHING:	when corals are stressed the algae (zooxanthellae/pronounced zoo-zan-thell-ee) that live inside the coral leaves, causing corals to lose their color and appear white
REEF RESILIENCE:	a coral reef's ability to maintain key functions in the face of environmental stressors, storms and human pressures by either resisting or recovering from the impacts
OVERFISHING:	removing fish faster than they can repopulate

Background Information

Coral reefs only cover 1% of the planet, but they are the home to 25% of marine species. In Florida, the five counties that border the reef (Monroe, Miami-Dade, Broward, Palm Beach and Martin) are home to more than 6 million people and host 38 million visitors each year. The reef annually supports 71,000 jobs in those five counties. Florida's Coral Reef protects our coastal communities and beaches from shoreline erosion and provides habitat for the seafood we catch and eat. The reefs are also a key component of tourism in Florida. Pharmaceuticals for pain, inflammation and other ailments have been derived from coral reef organisms and are already on the market.

Lesson Procedure

Coral Reef Resilience

Prior to start of lesson, split teams into groups of four, and have warm water and 3D models of coral polyps ready for each team to use. Use accompanying PowerPoint for visuals.

Talk to your team about coral reef threats that we learned about in previous lessons:

- Damage caused by reef users, such as anchoring boats on the reef or people standing on the reef, or damage caused by major storms and hurricanes.
- Pollution that originates on land and flows into the ocean and out to the reef.
- Overfishing.
- Marine debris.
- Coral bleaching.
- Ocean acidification.

We know what can happen when these threats occur. How do you think coral reefs can heal after they experience these problems?

We have a science phrase called reef resilience. Everyone repeat those words: reef resilience.

Great! You are super scientists!

Reef resilience is a coral reef's ability to resist or recover from the impacts of environmental stressors that we've learned about.

When we get sick, our bodies can fight back and heal. Strong and healthy corals have the same ability. Resilient reefs do a better job of recovering from damage and other challenges.

How can we help Florida's Coral Reef stay strong and healthy?

Have students talk to their teams about their ideas. Walk around and share their ideas.

One of the best ways to help reefs stay strong and resilient is to do a better job of protecting them. (Project the "ways we can help" portion of the PowerPoint slides.)

Why do you think it is so important to protect Florida's Coral Reef? (Talk to your team.)

To put this in simpler terms for the students, explain that corals only cover a tiny portion of our Earth but they have a big impact. Coral reefs provide food, recreation and jobs for millions of people, plus shelter and food for many species of animals. Coral reefs also help protect our coastline.

Ask all of the students to stand. Explain that they represent all the animals that live in the sea. That's a lot of animals.

Take a quarter of your class out of the group. Explain that out of all the marine species, this group calls the coral reefs their home. Even though the coral reefs are only a tiny part of the ocean, all of these animals live there.

What might happen if the coral reefs get sick?

All these animals won't have a place to live. (Students can be seated with their teams.)

Coral reefs are very important to our ocean's health, which means they also are important to the Earth's health and its people and animals.

Today, we are going to take a firsthand look at bleached corals and then we are going to create posters that help the community understand why coral reefs are important!

Coral Bleaching and Poster Design

Students will work in teams of four to explore the effects of coral bleaching and design a poster to tell their community how to protect our coral reefs.

Explain to students that we will take a closer look at coral bleaching. Ask students to explain what coral bleaching is. Show the three-minute video [Why Do Corals Bleach?](#)¹

Coral bleaching occurs when corals become stressed. Usually, this happens when the water is extremely hot or cold, but it can also happen when other threats we have learned about cause problems for the corals.

In lesson one, we learned that corals rely on special algae to provide them with energy. How do you feel when you have not eaten in a while?

You might feel tired, weak and even grumpy!

When this happens, the algae that live with the corals leave. The algae give corals their colors, so without the algae they appear white.

Corals are not dead when they experience bleaching, but they are more likely to get diseases that make it hard for them to survive. Corals can become stressed by rising water temperatures, pollution and runoff, exposure to too much sunlight (almost like when we get a sunburn) and being exposed to air for too long during extremely low tides.

Today, with our teams, we will model how this occurs.

Pass out bowls of warm water, coral polyp models and reflection sheets. Instruct everyone to not touch the objects until it is time to begin. [This short video shows how the models work.](#)²

These are special 3D printed models of coral polyps. Be very gentle with them. Remember the coral polyps are tiny animals that make the coral reef structures. These models are made from material that responds to heat, much like real-life coral polyps.

When water temperatures change and become too warm, it can cause problems for the coral polyps.

What do you think might happen if we put these models into the warm water?
They might lose their color.

Taking turns, each team member may gently flip over the coral polyp and put it into the warm water. Observe the changes in the coral with your team. Record your observations on your reflection sheet.

Students will draw/color before and after pictures of their corals.

Collect models and materials.

Now that we've seen how coral bleaching can occur, it's going to be our job to help our community know we need to protect our coral reefs. Coral reefs are very important, and we need to do everything we can to protect them.

We are going to help show our community we want to protect Florida's Coral Reef.

Pass out the coral reef poster templates and picture cards.

Use your remaining time to design a special poster to show our community we need to protect Florida's Coral Reef.

Be as creative as you like. Use the pictures to inspire your designs. We want to show everyone how special our reef is!

Students will complete their posters. Assist each team throughout the remaining time.

Lesson Wrap-up

At the end of the project, give students the opportunity to share their designs. We would love to see pictures of their work! Email them to Coral@FloridaDEP.gov.

Hyperlink Web Addresses

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¹ [YouTube.com/watch?app=desktop&v=n2hQT8nHtNo&feature=emb_title](https://www.youtube.com/watch?app=desktop&v=n2hQT8nHtNo&feature=emb_title)

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² CoralReef.NOAA.gov/education/polypmodel.html