Lesson 3: Coral Reef Resilience
Grades: 3-5
Activity: Coral Reef Rescue Mission
Lesson Objectives

- Understand what a resilient reef looks like.
- Describe why reef resilience is important.
- Design creative solutions to each environmental stressor that Florida’s Coral Reef is impacted by.
Turn and talk to your team. Discuss what some threats are to coral reefs that we learned about in previous lessons.

- **Physical damage**, like boat anchors and people kicking or standing on while snorkeling or SCUBA diving
- **Pollution** that originates on land and flows into the ocean and out to the reef
- **Overfishing**
- **Coral bleaching**
- **Ocean acidification** makes it tough for corals to grow
**Reef Resilience**

*Reef resilience* is a coral reef's ability to maintain key functions in the face of environmental stressors and human pressures by either resisting or recovering from the impacts.

Coral reef resilience is ultimately about coral reef health. For a reef community to be resilient, it must also be able to survive, reproduce, and compete for space and resources.

There are several things that can improve reef resilience, but one of the best ways is to lower human impacts and stressors to the reefs in our area. All stressors need to continually be reduced for long-term reef resilience.

We know the effects that can happen when these threats occur. How do you think coral reefs recover from these impacts and stressors they experience?

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Why do you think it is so important to protect coral reefs, and support reef resilience? (turn and talk to your team)

Healthy reefs can better cope with and recover from major stress events like hurricanes, coral bleaching, and coral disease outbreaks. According to the National Oceanic and Atmospheric Administration (NOAA), coral reefs only cover 1% of the planet, but they are the home to 25% of marine species. Florida’s Coral Reef is home
to over 500 species of fish and 45 species of stony, reef-building corals. The reef provides habitat and food for many of the creatures we catch and eat, like fish and spiny lobster. Over 6 million people live along Florida’s Coral Reef, and the reef protects our coastal communities from flooding during storm events. The reef supports over 71,000 jobs here in South Florida and generates more than $5 billion in local sales and income each year.

Coral reefs are very important to the health of the oceans, which means the health of our Earth and the people and animals that inhabit it. A world without coraToday we are going to take a first hand look at bleached corals and then we are going to go on a coral reef rescue mission with our teams!! reefs would be devastating!
A World Without Corals = Devastating!
Explain to students that we will take a closer look at coral bleaching.

Ask students to explain what coral bleaching is. After listening to their explanations, show them this one-minute video What Is Coral Bleaching? | TIME (https://www.youtube.com/watch?v=fA6mpecyN4)

Coral bleaching occurs when corals become stressed and the algae that live within the corals' tissues leave. The algae, called zooxanthellae, are what give corals their bright colors! Otherwise, coral tissues are translucent. That’s why corals appear white when the bleach - you see through the tissue to the white skeleton. Corals are not dead when they bleach, but they are more susceptible to disease and other stressors that could kill them. There are a lot of things that can cause corals to become stressed. Some of these ways include warming ocean temperatures, poor water quality, and exposure to too much sunlight.
Today we will model how this occurs with our teams.

*Pass out bowls of warm water, coral polyp models, and reflection sheets. Instruct everyone to keep hands off the objects until it is time to begin. Here’s a short video that shows how they work. [https://coralreef.noaa.gov/education/polypmodel.html](https://coralreef.noaa.gov/education/polypmodel.html)

These are special 3D printed models of coral polyps. They are made from material that responds to heat, much like real life coral polyps.

What do you think might happen if we put these models into the warm water?

They might lose their color.

Take 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.

*Collect models and materials.
Coral Reef Rescue Mission
Now that we’ve seen how coral bleaching can occur it’s going to be our job to help prevent this from happening. Florida’s Coral Reef and reefs around the world are so important and we need to do whatever we can to try and protect them.

Every team is going to receive a scenario that explains a stressor that is impacting the health of Florida’s Coral Reef. You and your team are embarking on a coral reef rescue mission. Your mission is to come up with a creative solution to this stressor affecting the reef.

*Pass out scenarios. Give teams a few minutes to review. Circulate and check in with each team to be sure they understand their mission.

You will now use your remaining time to complete your mission.

Be as creative as you can be! The sky’s the limit! Your solution can include an invention, a new procedure or plan to address the problem. You will present your plan at the end of the class time today.

Students will complete their rescue mission sheet. The sheet will include an
explanation of the problem, a space for drawing their invention or new procedure, a write up explaining their plan, and why it’s important to solve this problem for better reef resilience. Circulate and assist students with the process.

At the end of the project completion, give students the opportunity to share their rescue mission and plans with their audience.