



CORAL
REEF ALLIANCE



WYLAND FOUNDATION

Wyland Foundation thanks the Coral Reef Alliance for these custom-created lessons* for teachers to use in the Wyland National Art and Classroom Mural Challenge

* Adaptable for most grades

Coral Reef Lesson Plans

Teach students about some of the planet's most valuable ecosystems.

Lesson 1: What is a Coral Reef?



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Objective

This lesson will serve as a general introduction to coral reefs. Students will learn what a coral reef is, how it looks, what it is made from, and how it forms. They will also discover the many benefits coral reefs provide and why saving them is important for marine animals and human communities.

Purpose

To get students familiar with coral reefs, which are some of the world's most valuable ocean ecosystems.

About Coral Reefs

Coral reefs are underwater structures made up of tiny animals called **coral polyps**, which live in colonies and stick to a hard surface. Together, these components create a bright and colorful **ecosystem** that provides food and shelter for many marine species.

Reefs are made up of a variety shapes, sizes, and colors—which is one reason why so many people love them! The coral's bright colors come from a symbiotic algae called **zooxanthellae**, which live inside the coral tissue of a **hard coral** and provide its source of food through the energy that they produce via photosynthesis.

Although they cover less than 0.1% of the earth's surface, **coral reefs** are the most **biodiverse** marine **ecosystems** in the world.



Photo Credit: Teresa Wood

Coral reefs support roughly a quarter of all ocean animals. They also provide food and income to 275 million people and many of the organisms found on reefs are used to advance modern medicine. Not to mention, many **coral reefs** keep our shorelines safe by acting as a barrier during storm surges and floods.

These incredible benefits are what make **coral reefs** such an important component of our oceans, and our planet.

Teacher Resources

- [Coral 101 Guide](#)
- [FAQ About Coral Reefs](#)
- [Why Are Oceans Important?](#)
- [Hard Corals Vs. Soft Corals](#)

Lesson Time

We recommend at least 30 to 60 minutes for this lesson.

Vocabulary

Biodiversity, Ecosystem, Polyps, Zooxanthellae, Calcium Carbonate Invertebrate, Coral Reef, Barrier Reef, Hard Coral, Soft Coral

Discussion Questions

After a brief demonstration on what a coral reef is and how it forms, the teacher can engage in the following discussion questions with students.

- What have you learned about coral reefs? Tell me something new that you know now.
- Have you ever seen a coral reef? If so, what did it look like and what animals did you see near it?
- What colors do you think are on a coral reef? Do you know why coral reefs are so colorful?
- Why are coral reefs important for a healthy ocean and for ocean animals?
- Why do you think coral reefs are important for humans?
- Why do you think we should protect the ocean's coral reefs?
- What are some things you'd like to know about coral reefs that we haven't discussed yet?

Hands-on Activity

Explore the shapes and colors of a coral reef with this hands-on art activity. Work with students to create a mixed media art project that shows off the beauty of the underwater world.

Materials:

Sponges, paint, colored paper, colored pencils or markers, scissors, glue

Steps:

1. Each student cuts a sponge into the shape of a coral. The teacher should demonstrate different types of corals and potential shapes.
2. The teacher will then collect each sponge and add it to one big pile for the students to pick from.
3. Then students will create their own version of an ocean floor by stamping different sponges with paint on colored paper.
4. Students can add to their creation by using other materials (like colored pencils, cut-up paper pieces, etc.) to add more corals, animals, etc.



Lesson 2: How to Keep Coral Reefs Healthy



Lesson 2: How to Keep Coral Reefs Healthy

Objective

This lesson will serve as a general introduction to direct coral reef threats. We will focus on the two major stressors: water pollution and overfishing.

Purpose

For students to understand what threatens coral reefs, how we can keep them healthy, and why healthy reefs are important for both the ocean and human communities.

About Coral Reef Threats

Coral reefs are some of the most threatened ecosystems on the planet. If we don't take action now, it is predicted that nearly all reefs will be threatened by 2050. The two biggest local threats to coral reefs are **overfishing** and **water pollution**.

More than half of the world's coral reefs are impacted by **overfishing**. When too many fish are removed from the ecosystem, there aren't enough **herbivorous fish** to feed on **algae**. Eventually, the **algae** can take over and smother a coral reef. In response, **conservationists** are working with local communities and governments to expand Marine Protected Areas, establish and increase compliance of **sustainable fishing** regulations, and build awareness about the impacts of **overfishing**.



Photo Credit: Kellon Spencer

Water pollution from sewage and **runoff** is also a major direct threat to coral reefs. When **wastewater** enters the marine environment, it brings with it chemicals and bacteria that are harmful to coral reefs and humans. The extra nutrients can spur the growth of **algae**, which can quickly take over a reef. It also blocks out the necessary sunlight that corals need to survive. In response, **conservationists** are advocating for sustainable **wastewater** infrastructure, restoring and reforesting watersheds, monitoring water quality, and educating local communities.

Teacher Resources

- [Direct Reef Threats Guide](#)
- [Runoff in Maui, Hawai'i](#)
- [Working with Local Fishers and Scientists](#)
- [Healthy Fisheries](#)
- [Clean Water](#)

Lesson Time

We recommend at least 30 to 60 minutes for this lesson.

Vocabulary

Conservationist, Human Impact, Water Pollution, Wastewater, Sediment, Runoff, Overfishing, Algae, Herbivorous Fish, Sustainable Fishing

Discussion Questions

After a brief demonstration on what threatens a coral reef, the teacher can engage in the following discussion questions with students.

- What have you learned about coral reef threats? Tell me something new that you know now.
- What causes overfishing and why is it harmful to coral reefs?
- Do you think overfishing is harmful to humans too? Tell me why or why not.
- What are some ways that we can promote sustainable fishing? Is there a way we can feed people, but still protect fish?
- What causes water pollution and why do you think it is harmful to coral reefs?
- What are other risks from water pollution?
- How can we minimize water pollution? Can you think of ways that you could be part of the change?
- Why do you think it is important to reduce overfishing and water pollution?

Hands-on Activity

Learn how runoff pollutes the ocean with a 3D model demonstration.

Materials:

Metal paint tray, spray bottle, and substances to represent pollutants (ex: frosting, dirt, shaving cream, etc.)

Steps:

1. Prep your materials before demonstrating. Add clean water to the metal paint tray and fill the spray bottle with water. The paint tray should be set at an angle so water goes to the bottom of one side of the tray.
2. Introduce the demonstration to students. One side of the tray represents the ocean and other represents land.
3. Stick your chosen "land pollutants" to the dry side of your metal tray.
4. Then spray the pollutants with water and show students how they drip into the clean water. This should demonstrate what happens when stormwater hits land pollutants and there is runoff into the ocean.



Lesson 3: Climate Change and its Impact on Coral Reefs



Lesson 3: Climate Change and its Impact on Coral Reefs

Objective

This lesson will teach students about climate change and its impact on coral reefs. Students will focus on why climate change happens and what we can do to slow it down.

Purpose

To help students understand the biggest global threat to coral reefs (and our planet): climate change. Students should feel inspired to take action and help advocate for climate solutions.

About Coral Bleaching

Climate change is impacting our planet's people, animals, and ecosystems. This includes coral reefs, which suffer from **coral bleaching** events in response to stress from the warming ocean waters.

When hard corals are stressed, they expel their colorful symbiotic **zooxanthellae**—tiny algae that provide energy and live in the coral's tissues. This leaves the coral animal with little food and very weak. When **zooxanthellae** are expelled, the coral colony's white skeleton is visible through the transparent tissue of the coral animal. This is why the event is called "bleaching."

If corals stay in a "bleached state" for too long, they can get sick and die. It's currently projected that by 2050, 90% of globe's coral reefs will experience **coral bleaching** annually.



The good news is that research shows coral reefs can actually adapt to **climate change**. But in order for adaptation to happen, we need to slow down **carbon emissions** and keep coral reefs healthy by reducing local threats.

As coral reef experts focus on effective ways to reduce local stressors and keep reefs healthy, it's important that governments, corporations, and individuals also do their part to reduce carbon emissions and slow down the rate of our planet's changing climate.

Teacher Resources

- [Global Reef Threats Guide](#)
- [Climate Change Threatens Coral Reefs](#)
- [Climate Change Impacts Next Generation](#)
- [How to Reduce Your Carbon Footprint](#)

Lesson Time

We recommend at least 30 to 60 minutes for this lesson.

Vocabulary

Climate Change, Greenhouse Effect, Carbon Emissions, Fossil Fuels, Nonrenewable Energy, Renewable Energy, Sustainability, Advocate, Coral Bleaching, Zooxanthellae

Discussion Questions

After a brief demonstration on climate change and coral bleaching, the teacher can engage in the following discussion questions with students.

- What do you know about climate change?
- In what ways are we already seeing climate change and how is it impacting people, animals, and wild places?
- How does climate change impact coral reefs?
- What happens to a coral reef when it bleaches? Why is this dangerous for coral reefs?
- How can we slow down climate change?
- What are some actions you can take in your personal life to slow down climate change?
- What are some ways you can share information about climate change and its impact on our oceans with the people in your life?

Hands-on Activity

Make an action plan to help combat climate change. Together in small groups, students will create real steps that can be taken to slow down climate change and help save coral reefs.

Materials

Big pads of paper, markers

Steps

1. Divide the class into small groups
2. Give each group 10 to 15 minutes to brainstorm different ways they can help combat the climate crisis. Write the ideas on a pad of paper.
3. Each group then presents a few of their top ideas to the rest of class and the teacher takes notes and starts creating one big action plan for the whole class.
4. After the lesson ends, the teacher types up the action plan and prints off copies for the students. Students can then share the plan with their friends and families to help promote change.









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Clean Water and Healthy Oceans"*



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