



2018 Teacher Pack

Dive 1: Lesson Plan - The Complex World of Coral Reefs

Module Summary

This module is an introduction exploration dive to the world of coral reefs and the Reefs Go Live format. Students are introduced to the Reefs Go Live team and are shown how the interactive format works. They are taken on a dive where they will explore the diversity of organisms that each play an important role a coral reef ecosystem. Students will be given an in-class activity to assist with the discovery of many different corals, sponges, algae, fishes, and invertebrates. The dive includes a visual demonstration on sponge pumping.

Year 4, 5, 6

Learning Objectives

- List some of the organisms that make up the coral reef ecosystem
- Define a coral: animal, plant, and rock
- Explain what a sponge is and why are they important
- Summarize why coral reefs are important to humans
- Organize an activity to help coral reefs in the future

Science National Curriculum Alignment

- Observe similarities and differences among animals and among plants (Year 4).
- Find out about other animals, including how they grow, feed, move and use their senses (Year 4).
- Investigate a local habitat, including the relationship between the animals and plants found there, and develop skills in classifying animals and plants by observing external features (Year 4).
- Investigate the conditions necessary for the growth of familiar plants including light, heat, and water. *For example, place plants in different environments, varying the light, water, and temperature, and observe the results* (Year 5).
- Understand that some waste materials can be recycled and that this can be of benefit to the environment. *For example, discuss the recycling of bottles, cans and paper* (Year 6).

Description of the live dive

The dive takes place on a pristine coral reef rich with marine life. The underwater educator communicates with the lesson host on the boat and with the engaged remote classes that were live at the time. The educator takes the students through a series of fun facts and learning objectives regarding our complex coral reefs, all in alignment with the Science National Curriculum of the Cayman Islands. Students will have an in-class activity to complete during the lesson. Pre-recorded footage and images are used to show the diversity and complexity of the coral reef, adding to these processes that were discovered naturally during the broadcast. The dive includes a visual demonstration on sponge pumping.



Live broadcast outline (45 mins)

00:00 - 03:00	CCMI host welcomes students and outlines the lesson
03:00 - 05:00	CCMI host introduces the educator and the in-class activity
05:00 - 10:00	Educator describes competition on the reef
00:00 - 15:00	Educator explores the coral reef pointing out different organisms
15:00 - 20:00	Questions
20:00 - 25:00	Educator explains the importance of coral reefs to humans
25:00 - 30:00	Educator demonstrates sponge pumping techniques
30:00 - 35:00	Educator explains threats to coral reefs and hopes for the future
35:00 - 40:00	Questions
40:00 - 45:00	CCMI host on the boat recaps the live dive and concludes the lesson

Materials

Internet connection, laptop, projector, speakers, paper, pencils/pens, CCMI activity sheet, and CCMI fun fact sheet.

Useful resources

- www.reefresearch.org/reefs-go-live
- www.projectaware.org
- www.doe.ky
- www.education.gov.ky/education/curriculum
- www.oceanservice.noaa.gov/kids/



Fun Fact Sheet - The Complex World of Coral Reefs

1. Coral reefs are important because they protect our coastlines from storm damage, provide habitat for many commercially important fishes, and are estimated to generate \$375 billion USD in economic and environmental services worldwide annually (Costanza et al. 1997).
2. The average depth below the water's surface in the Caribbean Sea is about 2,200 m (Spaulding et al. 2001).
3. Coral reefs only make up less than 1% of the ocean floor, but they are home to 25% of all marine species (Worm et al. 2006).
4. Today's coral reefs are between 5,000 and 10,000 years old, but ancestors of these reefs formed almost 250 million years ago (Knowlton and Jackson 2008).
5. Coral reefs are the largest living organism in the world. The largest reef system is the Great Barrier Reef in Australia, which is just over 4,000 km long and can be seen from outer space (Belfield 2002).
6. Corals are an animal, a plant, and a rock all in one (Nothdurft 2009).
7. Coral reefs act as the world's carbonic sink, trapping carbon. Excessive carbon dioxide (CO₂) is being emitted into our atmosphere, and as the atmosphere becomes supersaturated excess carbon is forced into our oceans resulting in ocean acidification. However, coral reefs are taking up this excess carbon in their nutrient cycle and helping to clean our oceans (Anthony et al. 2011).
8. It is estimated that over one billion people worldwide rely on coral reefs for food, income, and eco-tourism opportunities (WWF 2017).
9. Ninety-five per cent of nutrients that corals need to survive is obtained from the zooxanthellae living inside the coral polyps, undergoing photosynthesis. The other 5% comes from the coral polyps using their tentacles to reach out and grab food that floats by in the water column (Cheal et al. 2010).
10. Coral reefs are important to the development of new medicines linked to the treatment of cancer, Alzheimer's, bacterial infections, and other diseases (Reaka-Kudla 1997).
11. It is estimated that we have lost approximately half of the world's coral reefs over the last 30 years, and we could potentially lose more than 90% by the year 2050 if we don't take drastic measures (Gates 2016).
12. Coral reefs are the connecting ecosystem between nursery grounds (such as seagrass beds or mangrove forests) and the open sea. This is where most developing fishes spend a portion to the majority of their lives reaching sexual maturity before some apex predators move to open ocean (NOAA 2015).
13. Recently scientists have discovered deep sea "cold coral reefs" off the coast of Norway and deep in the Mediterranean Sea (Goodbody- Gringley et al. 2014).

In Class Activity Sheet - The Complex World of Coral Reefs

Our CCMI scientist needs your help! Raise your hand if you see one of these reef creatures throughout our live lesson. Can you identify it? If you can, label it in the correctly numbered box. If you cannot identify it, describe it out loud to your teacher during the broadcast so that he/she can help you identify it!

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.

