

Lesson Plan - Our Physical Ocean

Module Summary

This module welcomes students back to Reefs Go Live (RGL) as we explore the world of the ocean and coral reefs and how CCMI's research is helping find hope for their healthy future. Participants engage through the interactive platform by asking questions, taking part in live polls, chatting with the CCMI team, and completing an in-class worksheet (provided). Students are taken on a guided dive alongside an underwater educator, where they explore the basics of physical oceanography, how life underwater differs from life on land, and how these factors drive what species and habitats exist underwater. All education materials are in alignment with the Cayman Islands and United Kingdom Science National Curriculums and the Ocean Literacy Principles.



Friday 22nd March 2024; 10am EST (UTC-5)



Duration: 40-minute broadcast, 1 hour lesson



Years 4,5 & 6

Learning Objectives

- Understand how life underwater differs from life on land, including key processes such as gravity, light, and sound
- Explain how changes in physical ocean properties lead to changes in habitat and species
- Identify how marine species are adapted to the habitat where they live
- Understand how human activity and climate change can influence ocean conditions and marine species

The Cayman Islands and United Kingdom National Science Curriculum

- Recognise that living things can be grouped in a variety of ways (Year 4)
- Construct and interpret a variety of food chains, identifying producers, predators, and prey (Year 4)
- Light: Understand how light and colour differ in water and with depth (Year 6)
- Sound: Recognise that vibrations from sound travel through a medium to the ear (Year 4)
- Adaptation and Inheritance: Identify how animals and plants are adapted to suit their environment in different ways (Year 6)



Ocean Literacy Principles

- Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of Earth
- Ocean Literacy Principle #3: The ocean is a major influence on weather and climate
- Ocean Literacy Principle #4: The ocean makes Earth habitable
- Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems

Description of Live Lesson

This module will take place on a coral reef ecosystem along the coast of Little Cayman in the Cayman Islands, where the CCMI team will guide students through a series of learning objectives. A topside host will communicate in real time with the students who join in as our remote audience/virtual dive buddies and the underwater educator. The hosts will run through basic oceanographic principles and how marine species are adapted to survive in both shallow and deep-water environments. Research into understanding these ecosystems and the threats they face will be shared during the broadcast, highlighting lessons learned from CCMI's projects and explaining why the ocean is so important to human life, all in alignment with the Science National Curriculum of the Cayman Islands and the United Kingdom and the Ocean Literacy Principles. Students can complete the worksheet and supplemental booklet during the live lesson, and they are encouraged to ask questions about the materials to the host or educator at any time during the broadcast. Pre-recorded footage may be used to show key concepts should these observations not be seen naturally during the live lesson.

Live broadcast outline (40 mins)

00:00 - 03:00 Welcome back to Reefs Go Live and CCMI team introductions

03:00 - 08:00 Differences in physical properties on land and underwater

08:00 - 10:00 Questions

10:00 - 20:00 Marine species adaptations

20:00 - 25:00 How human activities influence physical processes, habitats, and species

25:00 - 30:00 Questions

30:00 - 32:30 Deep-ocean exploration and why it is important

32:30 - 35:00 Research into how sound influences fish populations in Cayman

35:00 - 40:00 Live lesson recap and conclude the dive

Necessary Materials

- Internet connection
- Computer/phone
- Projector (optional)
- Speakers/headphones
- Scissors
- Notebook paper
- Pencils/pens
- CCMI worksheets and/or booklet (one copy per student)



Useful additional resources

- www.reefresearch.org/what-we-do/education/teacher-resources/
- www.reefresearch.org/what-we-do/education/reefs-go-live/
- [Deep Sea Exploration: Reef Ecology & Evolution Laboratory - CCMI \(reefresearch.org\)](http://reefresearch.org) (Includes 3-part docuseries)
- [Coral reef facts for kids! - National Geographic Kids \(natgeokids.com\)](http://natgeokids.com)
- [Hope Works Project resources - National Geographic Kids \(natgeokids.com\)](http://natgeokids.com)



“Our Physical Ocean” Key Terms

The CCMI educators may refer to the following key terms throughout the live lesson. Listen carefully to the broadcast to learn some new vocabulary about our coral reef ecosystems!

Adaptation - changes in a living being's shape or behaviour, which improves its ability to survive, these changes are passed on to future generations through the organism's genes

Bioluminescence - chemical reaction that produces light from within an organism's body

Climate change - change in global weather patterns over time, largely due to increased carbon dioxide in the atmosphere as the result of human activities

Coral reef - marine structure composed of a layer of living coral atop coral skeletons, minerals, and organic matter

Ecosystem - a community of living organisms in conjunction with the non-living components of their environment, interacting as a system

Mesophotic - the 'middle-light' zone in the ocean - the area of ocean between brightly lit shallow waters, and deep, dark waters.

Molecule - the smallest individual unit that has all of the properties of the substance. E.g. a water molecule is the smallest unit that is still water, and not just some of the components that make up water.

Photosynthesis - process by which green plants convert carbon dioxide and water into organic chemicals using the energy of light, with oxygen released as a by-product

Photosynthetic symbiotic algae - Algae that live inside a host (e.g. coral) in a relationship where both the host and the algae benefit. The algae provide nutrients to the host through photosynthesis, in return for protection and compounds that are essential for photosynthesis.

Predator - animal that hunts and eats other animals

Species - taxonomic group containing individuals that share common traits/resemble one another, can interbreed, and their offspring are also able to reproduce