Lesson Plan - Exploring the unknown ocean: Underwater mountains of Cayman

Module Summary

This module takes students on a journey with Expedition Hope to Pickle Bank and 12-Mile Bank seamounts. They will discover why these ecosystems are so important and about the research techniques used by the CCMI scientists during the expedition. 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). All educational material aligns with Cayman Islands and United Kingdom Science National Curriculums and Ocean Literacy Principles.

Friday 21st March 2025; 10 am EST (UTC-5)

Duration: 40-minute broadcast, 1 hour lesson

Years 4,5 & 6

Learning Objectives

- Understand how plants and animals are adapted to deep-water environments
- Understand the importance of Pickle Bank and 12-Mile Bank in the context of climate change in the Cayman Islands
- Explain the importance of Expedition Hope

The Cayman Islands and United Kingdom National Science Curriculum

- Identify scientific evidence that has been used to support or refute ideas or arguments (Years 4,5 & 6)
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (Years 5 & 6)
- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals (Year 6)
- Give reasons for classifying plants and animals based on specific characteristics (Year 6)
- Recognise that environments can change and that this can sometimes pose dangers to living things (Year 4)

Ocean Literacy Principles

- Ocean Literacy Principle #1: Earth has one big ocean with many features
- Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of the Earth
- Ocean Literacy Principle #3: The ocean is a major influence on weather and climate
- Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems
- Ocean Literacy Principle #6: The ocean and humans are inextricably interconnected
- Ocean Literacy Principle #7: The ocean is largely unexplored

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.

Through the broadcast, participants will develop an understanding of what seamounts are and why they are important to the wider ocean. Participants will be guided through the aspects of the expedition including what research was done at the seamounts during the project and what scientists learned from the information collected. The hosts will explain how seamounts play an important role as a refuge for rare species and how they can enhance biodiversity of inshore reefs due to connectivity between areas of the ocean. Additionally, students will gain insight into CCMI's ongoing research initiatives to discover more about the ocean around the Cayman Islands.

By the end of the broadcast, students will better understand research expeditions and understand actions they can each take to protect the ocean, preserving marine biodiversity for future generations.

This lesson is 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 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, CCMI team introductions
03:00 – 05:00 Introduction to seamounts
05:00 – 10:00 The formation and biodiversity of seamounts
10:00 – 11:00 Introduction to Expedition Hope
11:00 – 16:00 Mini documentary
16:00 – 18:00 More detail on the seamount project
18:00 – 20:00 Importance of seamounts
20:00 – 25:00 Methods and materials
25:00 – 30:00 Results
30:00 – 35:00 Questions
35:00 – 37:00 Conclusion
37:00 – 40:00 Summary and goodbye

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) (Includes 3-part docuseries)
- Coral reef facts for kids! - National Geographic Kids (natgeokids.com)

“Exploring the unknown ocean: Underwater mountains of Cayman” 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 seamounts and ecological terms in the ocean!

Benthic - bottom of the ocean or the bottom of any other large body of water

Biodiversity - all the different living organisms within a given area

Ecosystem - community of living organisms interacting with their physical environment within a specific area, forming a complex network

Endemic - native to and only found in a limited geographic region

Mesophotic - the middle light zone of the ocean, between shallow and deep waters from 30 - 150 m

Seamount - underwater mountain formed by volcanic activity; rises from the ocean floor but does not reach the water’s surface

Upwelling – the process in which deep, cold, nutrient-rich water rises toward the surface