

# Curriculum Enrichment Program

All in-person excursions have a 20-student maximum and include bus transportation, boat transportation (if applicable), experimental materials, and BIOS educator. Virtual lessons are conducted over Ocean Academy's Zoom platform.

## Plankton | Ocean Food Chains

2.5-hour excursion or 45-minute virtual lesson

Students will learn about the roles and importance of phytoplankton and zooplankton in marine food chains. They will participate in a plankton tow aboard the R/V *Stommel* and learn the process of net deployment and retrieval. Collected samples will be brought back to the laboratory for examination under microscopes, with various species identified using local ID manuals.

Proficiency Scales    P6 Biology / Food Chains  
 M1 Biology / Habitats and Environment / Food Chains  
 M3 Biology / Food Webs and Keys

## Marine Debris | Plastic Pollution

3.5-hour excursion or 45-minute virtual lesson

Students will learn about the negative impacts that marine debris can have on the environment. They will participate in two aspects of a marine debris clean up: categorizing larger identifiable debris utilizing the Marine Debris tracker application, and sampling quadrats for microplastics at Cooper's Island Nature Reserve. This field excursion offers laboratory-based extensions for further data collection.

Proficiency Scales    P6 Biology / Caring for the Environment  
 M1 Biology / Caring for the Environment

## The Water Cycle | States of Matter

2.5-hour excursion or 45-minute virtual lesson

Students will review the states of matter and participate in their own water density experiments. Students will learn about the water cycle and build their own precipitation graphs, in addition to looking at all factors that influence our day-to-day weather. Classes will have the option of taking home a weather station for one month for use in their classroom.

Proficiency Scales    P4 Chemistry / Properties of Matter  
 P5 Inquiry / Make Observations and Measurements  
 P5 Chemistry / Changing States of Matter (evaporation and condensation)

## Ocean Sounds | The Science of Sound

2.5-hour workshop or 45-minute virtual lesson

Students will explore how sound travels through different mediums and learn about factors that affect pitch. They will conduct their own laboratory experiments on vibration, explore how marine life use sound to communicate, and learn how scientists use sound to study the ocean.

Proficiency Scales    P4 Physics / How Sound is Made and Measured  
 M2 Physics / The Properties of Sound

**Force | The Science of Ocean Pressure** 2.5-hour workshop or 45-minute virtual lesson

Students will learn about the impact of pressure on marine animals and divers. Students will explore how pressure varies with the ocean's depth and conduct their own pressure experiments in the laboratory.

Proficiency Scales P3 Physics / Forces and Friction  
M3 Physics / Pressure and Density

**Circuits | Diagrams and Conductors** 2.5-hour workshop

Students will investigate how some materials are better conductors than others and why plastics are used to cover wires and switches. Students will make observations and measurements of circuits and predict the effects of making changes to the length and thickness of wire and changing resistance.

Proficiency Scales P6 Physics / Circuit Diagrams and Electrical Conductors  
M3 Physics / Current in a Circuit

**Engineering | Robotics** 4-hour workshop with a 1-hour lunch break

Students will explore aspects of computer, mechanical and electrical engineering with three hands-on workshops.

Proficiency Scales P6 Physics / Circuit Diagrams and Electrical Conductors  
P6 Inquiry / Obtain and Present Evidence  
P6 ICT / Programming  
M3 Physics / Current in a Circuit  
M3 Inquiry / Make Observations and Measurements to Collect Evidence  
M3 / Programming

**Climate Change Workshop** 2.5-hour workshop

Scientists at BIOS are actively researching changes in our Earth's climate. This introductory lecture will focus on exploring climate change research from ocean circulation patterns to physiological effects in organisms. This workshop can be extended for field work opportunities.

Proficiency Scales M1 Biology / Caring for the Environment | Renewable and Non-Renewable Resources

**Identification Keys** 2.5-hour workshop or 45-minute virtual lesson

Students will use identification keys to classify fish and zooplankton found in the ocean around Bermuda. They will participate in a plankton tow aboard the R/V Stommel, examine the sample under microscopes in the laboratory and use an identification key to determine what type of plankton they have collected. Students will create their own identification key for animals found on Bermuda's rocky shore.

Proficiency Scales P4 Biology / Identification Keys



# BIOS

[www.bios.edu/education/bermuda-teacher-programs-resources/](http://www.bios.edu/education/bermuda-teacher-programs-resources/)

[www.bios.edu/education/curriculum-enrichment-program](http://www.bios.edu/education/curriculum-enrichment-program)

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