



Eco-Schools
Bahamas

OCEANS

Marine & Coast Educators Toolkit



BAHAMAS REEF
ENVIRONMENT
EDUCATIONAL
FOUNDATION

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About BREEF

Summary

The Bahamas is a coastal nation comprised of over 700 islands and cays scattered across 100,000 square miles of crystal blue seas in the Western Atlantic. The ocean is integral in Bahamian life. It is part of the economy, culture, social life and sustainability of the country.

“The environment in which we live influences every aspect of our lives. In The Bahamas, we value our sun, sand and sea and other natural assets.” (Environment Pillar, Vision2040, National Development Plan of The Bahamas)

The Bahamas Reef Environment Educational Foundation (BREEF) has been developing marine conservation resources since it's inception in 1993 and introduced the Eco-Schools Bahamas Programme in 2009.



This toolkit provides a number of resources for educators investigating the Eco-Schools Bahamas Marine & Coast Theme.

Background

Marine and Coast teaches children about coastal and marine habitats, how people are affecting these habitats and what we can do to protect them. Students learn about the adverse effects of climate change on oceans, the sources of marine and coastal litter and its negative effects on marine and coastal flora and fauna. The importance of using the oceans resources responsibly is also communicated to students.



The Marine and Coastal theme:

- Promotes the conservation and sustainable use of ocean, seas and marine resources for the sustainable development of The Bahamas
- Increases awareness of the ecological, economic, social and cultural value of marine and coastal habitats.

Other Eco-Schools around the world have developed nationally-relevant Oceans theme toolkits. Ireland, for example, has produced a Global Citizenship Marine Environment toolkit focused on marine litter and climate change impacts in Ireland (<https://greenschoolsireland.org/themes/global-citizenship-marine-environment/> 2.) The Eco-Schools Bahamas programme presents a unique opportunity for The Bahamas to connect over 59,000 schools in 70 countries to share knowledge and lessons learned through national theme development processes.

Ocean Literacy

"Ocean literacy is an understanding of the ocean's influence on you—and your influence on the ocean." An ocean-literate person understands the essential principles and fundamental concepts about the functioning of the ocean; can communicate about the ocean in a meaningful way; and is able to make informed and responsible decisions regarding the ocean and its resources.[[National Marine Educators Association](#)]

"The ocean is a source of food, energy, minerals, increasingly of medications; It regulates the Earth's climate and hosts the greatest diversity of life and ecosystems, and is a provider of economic, social and aesthetic services to humankind. Knowing and understanding the ocean's influence on us, and our influence on the ocean is crucial to living and acting sustainably. This is the essence of ocean literacy." (Ocean Literacy for All, A toolkit, Published in 2017 by the United Nations Educational Scientific and Cultural Organization)



50-80% of the oxygen production on Earth comes from the ocean. Seagrass beds are especially effective in this process in addition to providing food to marine grazers/herbivores like conch. A healthy marine ecosystem is one in which a delicate balance exists between predators like sharks and grazer. Oceans also play an important role in absorbing much of the heat and carbon dioxide from the atmosphere and has so far negated much of the climate change effects.

Learning Goals

To understand the importance of the ocean in sustaining life on earth the critical role of conserving the Ocean, Marine and Coastal environments and ecosystems to sustain the Bahamian way of life.

Learning Outcomes:

- Define and describe the Ocean.
- Identify and describe the Atlantic Ocean.
- Identify and describe the Marine and Coastal environments of The Bahamas
- Define and describe Marine and Coast
- Define and describe Coral Reefs and Mangrove Creeks
- Identify and describe threats to Marine and Coastal environments of The Bahamas
- To describe the impacts of climate change on the oceans, weather, and marine and coastal ecosystems.
- To create an action plan to combat one of the many threats to ocean, marine and coastal environments of The Bahamas (significant role of small actions)/Citizen Science resources

Requisite Resources:

- BREEF Education Posters:
 - Life on the Bahamian Coral Reef
 - Life in the Bahamian Mangrove Creek
- BREEF Fish and Mangrove Creek Identification Slates
- ESB Marine & Coast Environmental Review/Audit



Vocabulary

- Weather (role of ocean also on climate), hurricane, features of ocean floor,
- CHOPIT, sustainable, resilient, adaptation, mitigation
- Marine pollution/Litter, sources, effects on ecosystems
- Climate change, food web, food chain, photosynthesis, producer, consumer
- Types of Ocean, marine and coastal ecosystems, ocean acidification, tides, currents
- Carbon dioxide, oxygen (role of ocean in storing and producing)
- Coastal management, sustainable fishing, tourism, economy,
- evaporation, condensation, precipitation, rain,



QR code for Booklet Lessons Plans

Lesson Plans

Lesson Plan - General Science/Health Science/Combined Science/Biology

Grade: 7-12

Topic: Marine Conservation (Coral Reefs & Mangrove Wetlands)

Objectives/Learning Outcomes: Students will *design* conservation models for marine organisms and ecosystems based on current environmental threats.

- Identify six threats marine ecosystems
- Research local significance of one threat on Bahamian marine ecosystems (disruption of food chains/webs)
- Recommend strategies or solutions to eliminate or reduce the threat
- Design a model based on the best plan or prototype, solution or strategy
- Test and evaluate chosen option on a microscale, i.e. in lab or classroom setting
- Redesign if necessary

Resource Materials: BREEF Life in the Bahamian Mangrove Creek and Life on the Bahamian Coral Reef posters.

Key Vocabulary Terms: climate change, habitat, overfishing, pollution, invasive species, illegal trade, photosynthesis, producer, consumer, food chain, food web, threats,

Time Frame: 60 minutes

Methods:

Introduction: Teacher poses the following scenario using the posters: Disruption in the food chain, food web, by various threats (CHOPIT)

Development: Teacher's Activities

Introduces students to the topic for the day and facilitate a discussion with students on the definition of Marine Conservation.

Students will be invited to define vocabulary terms in their own words and describe various threats to the marine environment.

Provide clarification of students' definitions and the descriptions as needed. Supplement with brief notes if necessary.

Guide students through the scientific method process in the development of conservation models.

Students' Activities

Students/Groups will conduct a brief web search of a single or multiple threats (ability and grade level dependent)

Note key web-based points to summarize information obtained to define and describe threat(s)

Students take note on the topic, definitions, and descriptions

Students define and describe key concepts/vocabulary terms in their own.

Students will take notes in their notebook or devices.

Students individually or collaboratively design conservation models for marine environments

Lesson Plans

Conclusion: Teacher recaps lessons having students describe their designs and how it will help in the conservation of marine environments/ecosystems and posing appropriate questions to check understanding and application of the lesson.

Evaluation/Learning Evidence:

Completion of individual or group models and oral presentation of solution(s) to environmental threat(s). Student written summary of project.

Follow up/Extension Activities

Students will be encouraged to web-search and read more about the importance of oceans and marine ecosystems to the health of planet earth.



Worksheets

Who Am I? Know Your Mangroves

1. I am found only on land. Who am I? A-buttonwood
2. My fruit is green, ribbed and are in clusters. Who am I? A-white mangrove
3. My leaves are large and yellow-green in colour. Who am I? A-red mangrove
4. My fruits are smooth and flattened. Who am I? A-black mangrove
5. I have arching and branching prop roots. Who am I? A-red mangrove
6. My leaves are opposite, and leathery with rounded tips. Who am I? A-red mangrove
7. I have red-brown fruit in clusters with rounded heads. Who am I? A-buttonwood
8. Sugar glands can be found at base of my leaf stalk. Who am I? A – white mangrove
9. I have white flowers. Who am I? A-black mangrove
10. I have long pencil-like pneumatophores. Who am I? A- black mangrove
11. I have yellow-cream flowers with four pointed petals. Who am I? A red mangrove
12. My fruits are called propagules. Who am I? A-red mangrove
13. I am the first in the water. Who am I? A-red mangrove
14. My leaves are alternate; long and thin. Who am I? A-black mangrove
15. I have very tiny flowers in that are in clusters. Who am I? A - buttonwood



Worksheets

Oceans Marine & Coast Pre and Post Assessment **(Please circle the correct answer)**

Name: _____ [/20]

1. The earth has one big ocean with many features. T F
2. Ocean literacy is an understanding of the ocean's influence on you and your influence on the ocean. T F
3. The ocean and life in the ocean shape the features of Earth. T F
4. The ocean is a major influence of weather and climate T F
5. The ocean makes the Earth habitable. T F
6. The ocean supports a great diversity of life and ecosystems. T F
7. The ocean and humans are inextricably interconnected. T F
8. The ocean is largely unexplored. T F
9. The oceans are a significant source of oxygen for our planet and are instrumental in the capture and storage of carbon dioxide. T F
10. Most ocean pollution begins on land. T F
11. Oceans hold 97% of the planet's water. T F
12. About 95% of The Bahamas is underwater. T F
13. 35% of the coral reefs in the Caribbean region are found here in The Bahamas. T F
14. Andros Island Barrier Reef is the third longest fringing-barrier reef in the world. T F
15. The coastal environment is constantly changing, as sand and rocks are moved around the ocean floor and broken up. Which are the following are important for this process? a) Wind b) Waves c) Tides d) All of these **[2]**
16. Which statement is the most accurate description about how sand is produced? a) Most of the sand in the ocean is produced by the breaking down of plastic b) Most of the sand in the ocean is produced by the erosion and breaking down of rocks c) Most of the sand in the ocean is produced by the breaking down of shells **[2]**
17. What is the biggest cause of marine pollution around the world - approximately 80%? a) Fishing vessels (e.g. Abandoned fishing gear etc.) b) Cruise and cargo ships (e.g. Greenhouse gas emissions, acoustic, and oil pollution) c) Nonpoint source pollution (e.g. Drains and sewers, open dump sites, humans leaving items on the beach, agriculture runoff washed into the sea) **[2]**



Extension Activities

Science - Explain Current state of the Atlantic Ocean and Bahamian Marine and Coastal Environments

Technology - Role of technology in marine and coastal conservation

Engineering - Build, Design

Art - Create, Design, Draw, Illustrate, Paint, Sculpt, Write

Math - Calculate, Count, Estimate, Graph, Group, Measure, Number, Verify, Solve, Tabulate



Interdisciplinary Activities

Grade/Subject	Topics	Objectives
10- 12 Biology	Fishing	Evidence supporting "Conchervation"
Chemistry	Minerals	Mineral content and pH of Saltwater samples
PE	Water Safety, Swimming	Reef, Mangrove Creek snorkel
Geography	Marine Ecosystems	Mapping Coastline (Sandy Beach, Rocky Shore)
Art	Drawing, Painting	Coastal, Mangrove drawings, Seascapes paintings
7-9 Health Science	Nutrition	Sustainability of seafood
5-6 English	Writing	Essays on characteristics of Atlantic Ocean and importance of Bahamian marine environment
3-5 Music	Choral Singing	BREEF TTW Mangrove Song
1-2 Mathematics	Measurement	Legal size of Conch, Grouper and Crawfish



About BREEF

The Bahamas Reef Environment Educational Foundation (BREEF) is a Bahamian non-government, non-profit organization established in 1993 with the mission to promote the conservation of the Bahamian marine environment that sustains our way of life.

To fulfill its vision, BREEF focuses on grass-roots programmes in education, outreach, research and policy, which together impact all Bahamian stakeholders, as well as visitors.



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