

GUAM COMMUNITY COLLEGE
Environmental Biology
Global Climate Change

Title: Global Climate Change

Instructor: Anthony Jay J. Sunga, B.A. MSc, PhD

GCC Contact and Email: anthonyjay.sunga@guamcc.edu

<http://www.pmel.noaa.gov/co2/story/OA+Educational+Tools>

Lesson Description:

This is a two to three lesson plan to cover Global Climate Change as it pertains to the island community, mainly Guam and our neighboring islands. The lesson will focus on environmental issues and concepts as well as scientific principles on Global Climate Change. The main focus of this course deals with tropical ecosystems that are unique to Pacific island regions. This lecture portion of the Environmental Biology will take existing lessons that were previously discussed and integrated into the “bigger picture” of island environments. Students will do hands on activities as well as site visit to enhance the learning experience.

Student Learning Outcomes

Upon successful completion of this lesson, students will be able to:

1. Students will be able to describe key chemical, biological, ecological, and atmospheric processes that affect organisms, with an emphasis on tropical island environments
2. Students will be able to explain the ecological, social, and/or economical implications of climate change, conservation and sustainable use of resources, overpopulation, waste management and recycling, as well as reflect on their personal roles in these issues.
3. Students will demonstrate and integrate knowledge and observations obtained from lectures, labs and field trips in written reports, quizzes and exams.
4. Students will demonstrate their ability to gather and analyze data, present results graphically, interpret results and form conclusions

The material presented in this lesson will be supplemented with chapters 7-10, from the Environmental Biology book on the Tropical Pacific

Chapter	Activity (Topic/Assignments)
11	Climate Change Global Climate, Ocean Acidification Pacific Islands meets Climate Change

Lesson 1:

Presentation on Global Climate Change and what it really means:

1. Both sides of Global Climate change:
 - a. Activity: Students will be divided into two groups to research and a mock trial.
 - i. Support claims of Global Climate change
 - ii. Against claims of Global Climate change
 - b. Students will understand that this issue has debatable points. It will open their minds to being inquisitive.
2. Definitions and concepts to understand:
 - a. Global Climate Change
 - b. Carbon Dioxide cycle
 - c. Carbon footprint
 - d. Sea Surface Temperature
 - e. El Nino

Lesson II:

Presentation on how islands are affected by Global Climate Change

1. Students will be asked to go to their nearest beach and collect beach sand and water.
 - a. Time and date will be recorded.
 - b. Location
 - c. High or low tide
 - d. Conditions of the ocean
2. Ocean Acidification: Why it is important to understand
 - a. pH will be determined from the water samples collected around Guam's beaches

- b. Students will look at the beach sand collected from Guam beaches a
 - i. Star sand presentation will be discussed
 - ii. Importance of pH in the survival of the reef species.
- 3. Carbon dioxide cycle and how it affects our island reef systems.
- 4. They changing of the tides:
 - a. Presentation of when our doorsteps meet the ocean.
 - b. Students will visit sites around Guam that show the ocean reclaiming land.
 - c. Students will build models on the effects of rising sea levels and how island will “shrink”
 - i. Kiribati island and other atolls examples.
- 5. When all our water disappears
 - a. Northern Guam Lens Aquifer (NGLA)
 - b. Students will build a working model of the NGLA and explain how it affects them on an island and their home islands
 - i. Students will visit sites showing the NGLA
 - ii. Lecture on how Global Climate change changes the amount of rainfall and reduces the recharging of the Aquifer.

Lecture from Hawaii conference will be used on the changing rainfall data.

Lesson III: Application of knowledge

- 1. Students will develop lesson plans and activities to teach grade school level kids during our Science symposium visits:
 - a. Schools visited:
 - i. San Vicente Elementary School (1st grade)
 - ii. Wettingale Elementary school (3rd grade)
 - iii. Department of Defense (Guam High School) (10-11th grade)

2. Winter Camp: Marine Biology Sustainability camp for High school students.
 - a. Using technology to understand Global Climate change
 - b. Using technology to gather data
 - c. Building ROVs to study marine ecosystems
 - d. Site visit to Underwater World to test ROV inside aquarium