

THE N.C. SCHOLAR OF GLOBAL DISTINCTION PROGRAM



WORLD VIEW



Latin America

BIO 111

General Biology 1

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This course introduces the principles and concepts of biology. Emphasis is placed on basic biological chemistry, cell structure and function, metabolism and energy transformation, genetics, evolution, classification, and other related topics. Upon completion, students should be able to demonstrate understanding of life at the molecular and cellular levels.

Description of module:

Global Ocean Acidification Module – introduces students to the impact of ocean acidification on the world. This module follows a chapter on water and its importance to life on Earth. This lecture also covers the “evil twin” to global warming – ocean acidification and the pH scale. The module begins by explaining ocean acidification and its causes. It then explains the impacts of ocean acidification on the environment, aquatic life, the economy and on humans. All of this is followed by research-based discussions on specific impacts in Latin America and a journal investigating what will happen if we do not take action to reduce ocean acidification. Meanwhile, an in class laboratory experiment will give students a visual lesson as to what a decreased pH can do to a living organism’s shell.

Student Global Learning Outcomes::

- Demonstrate knowledge of basic biological principles as they apply to broader concepts in Latin America.
- Demonstrate the ability to write critically about essential questions in Biology that impact Latin America.

Activity 1: Ocean Acidification Discussion Forum

Select a specific area in Latin America and describe the impacts or results of ocean acidification in that area. Latin America includes all the Portuguese- and Spanish-speaking nations located to the south of the United States. Some examples are Brazil, Mexico, Peru, Columbia, Argentina, Venezuela, Cuba, Chile and Costa Rica. The impact you choose to explain may be economic, species extinction rates, specific species impact, effect on humans etc... You should reply to at least two of your classmates with a thoughtful discussion regarding their topic of choice.

Objectives:

Identify the importance of pH homeostasis on living organisms’ aquatic environment. Be able to discuss impacts of ocean acidification in Latin America on a college level. Identify distinct characteristics of ocean acidification including causes and results in a Latin America area.

Activity 2: Ocean Acidification Journal

Watch the three videos in this Module – include the Zoom talk of actual research being performed by scientists at UNC at Chapel Hill. List three of the most important items mentioned in the two videos in your own words. Next, look into research being performed now or recently regarding how this problem is affecting areas in Latin America

– and what we can do to reverse the problem. Be sure to answer the question – what is the research telling us we should do to slow ocean acidification?

Objectives:

Discuss ocean acidification research with regards to Latin America and disseminate actions that may slow the process. Demonstrate knowledge of ocean acidification and its impacts on a specific region in Latin America.

Assessment for writing activities (will be in the form of a rubric):

The writing should have a clearly articulated main idea or thesis and this thesis should be strongly supported by reliable and relevant evidence and reasoning. The sentences should be grammatically correct with clear meaning. Compelling evidence should be chosen from reliable sources with correct citations.

Activity 3: Visualize the Impacts of Ocean Acidification

In the lab, we will have two containers with fresh seawater. One container will be made slightly more acidic. In each container, we will place a few thin seashells and be able to visualize the impacts of ocean acidification on the shell structure. The shells will be measured for weight twice weekly for 16 weeks to measure the rate of degradation.

Objectives:

Demonstrate an understanding of the principles of scientific inquiry. Relate scientific findings to the real world, specifically Latin America.

Assessment:

Review of formal lab report – includes utilization of the writing rubric. There will also be questions in the lab report specifically regarding ocean acidification and Latin America.

Follow-up for all assignments:

An in class discussion regarding ocean acidification in Latin America and how there are similarities in the United States.

Resources and References

Link to a LibGuide created for these assignments:

https://researchguides.piedmontcc.edu/OceanAcidification_LatinAmerica

Coral Reef Research – John Bruno – UNC Chapel Hill

https://www.dropbox.com/s/skhhtc7kd3rmjux/Coral_reefs.mp4?dl=0

TED Talk - How Pollution is Changing the Oceans' Chemistry

https://www.ted.com/talks/triona_mcgrath_how_pollution_is_changing_the_ocean_s_chemistry

Brazilian Ocean Acidification Network

https://broa.furg.br/images/doc/LAOCA_taller_BrOA_BRAZIL.pdf

You Tube - Acid Test - The Global Challenge of Ocean Acidification

<https://www.youtube.com/watch?v=5cqCvcX7buo>

Conservation of Brazilian coral reefs in the Southwest Atlantic Ocean: a change of approach

https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-560X2017000200001

Effects of Protection and Sediment Stress on Coral Reefs in Saint Lucia

<https://journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0146855.g001>

The Future of Reef Ecosystems in the Gulf of Mexico: Insights From Coupled Climate Model Simulations and Ancient Hot-House Reefs

<https://www.frontiersin.org/articles/10.3389/fmars.2019.00691/full>

Natural ocean acidification at Papagayo upwelling system (north Pacific Costa Rica): implications for reef development

<https://bg.copernicus.org/articles/15/2349/2018/bg-15-2349-2018.pdf>

The Tropical Atlantic Observing System

<https://www.frontiersin.org/articles/10.3389/fmars.2019.00206/full>

What is Ocean Acidification?

<https://oceanservice.noaa.gov/facts/acidification.html>

Latin America Countries

<https://www.worldatlas.com/articles/which-countries-make-up-latin-america.html>

What is Scientific Literature?

<https://researchguides.piedmontcc.edu/c.php?g=1038930&p=7534179>