

Lesson Planning Tool for Climate Change Work Group

Title of Lesson: Paleoclimatology - Global Climate Change, What does it look like?

Grade Level: High School

Subject: Environmental Science

Source(s) of the lesson: National Center for Case Studies in Teaching Science at the University of Buffalo <http://sciencecases.lib.buffalo.edu/cs/collection/>

This lesson: <http://sciencecases.lib.buffalo.edu/cs/files/paleoclimatology.pdf>

Essential Question(s): How has the Earth's climate changed over time? How do ENSO events (El Nino, La Nina) impact the Earth's climate?

Massachusetts Curriculum Frameworks Science Standards:

HS-LS2-2 Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity, including genetic diversity within a population and species diversity within an ecosystem.

Content Objectives	Practice Objectives	Language Objectives
Use the concept of average to distinguish between weather events, like El Niño and La Niña, and climate.	4. Analyzing and interpreting data	SWBAT - Use descriptive writing to explain how the Earth's climate has changed over time.
Describe some of the data and methods that paleoclimatologists use to reconstruct ancient climates.	5. Using mathematics and computational thinking	SWBAT - Use descriptive writing to explain how ENSO events impact the Earth's climate
Practice finding, graphing, and interpreting data about global climate change.	7. Engaging in argument from evidence	
Construct scientifically reasoned predictions about climate change.	8. Obtaining, evaluating, and communicating information	

Important Vocabulary: Climate change, weather, radiative forcing, el nino, la nina, upwelling, ocean currents, jet stream, methane, nitrous oxide, carbon dioxide, anthropocene

Materials Needed: Please visit the National Center for Case Studies in Teaching Science at the University of Buffalo <http://sciencecases.lib.buffalo.edu/cs/collection/> to access all relevant material for this lesson.

Other Resources: (websites, videos, books, etc.)

Background Information for Teacher: The teacher should be well versed in atmospheric chemistry and understand the concept of radiative forcing and how different greenhouse gases affect the climate differently.

Background Information the Student Needs to Access the Lesson: What prerequisite knowledge should the students have? The student should understand the basic concepts of climate change and how the greenhouse effect works.

Lesson Structure

Lesson Launch (Do Now)	Have students evaluate the following comic strip, and answer the questions, "How has the Earth's climate changed over time?" "Specifically what is different in the past 100 years versus the year 20000 BCE?" https://xkcd.com/1732/
Background Instruction (pre-activity)	Students should read part one of the case study to acquire the necessary background information for the assignment.
Activity	Perform the Case Study
Discussion/ Debrief	Ask students to put into their own words using 3-4 sentences how ENSO events affect the climate and specifically how has the climate changed over time?
Formative Assessment	Collect the answers to the questions of the case study and assess.

Notes:

