

# Earth Systems II - Unit 9 Study Guide

es2u9 (Climate Change - what is the evidence?)

Web resources:

<http://climate.nasa.gov/>

<http://www.environment.yale.edu/climate/>

<http://www.climate.umn.edu>

**Big Questions:** Are humans so powerful that we can affect large-scale things like climate? If so, are humans powerful enough to change course?

## Study Objectives

1. Describe Earth's climate system and explain the variety of factors influencing global climate.
  - a. Make a Venn diagram comparing and contrasting weather vs climate
  - b. Diagram the layers of the atmosphere along with each layer's characteristics or importance
  - c. Diagram the "green house effect" as it relates to inputs and outputs of solar radiation
  - d. List and describe the variety of factors that can influence climate change
2. Describe several modern methods of climate research.
  - a. What is a proxy indicator?
  - b. How can we learn about past climates?
  - c. How can we learn about the present climate?
3. Summarize current consequences and potential future impacts of global climate change.
  - a. List and describe current consequences of climate change
  - b. List and describe potential future impacts of climate change
4. Evaluate the scientific, political, and economic debates concerning climate change.
  - a. Science:
  - b. Political:
  - c. Economic:
5. Characterize human influences on the atmosphere and global climate and human responses.
  - a. What is meant by the term "anthropogenic"?
  - b. Describe the top two greenhouse gas contributors in the US and specific ways we can reduce these emissions

## Vocabulary

climate change   greenhouse gases   greenhouse effect   El Nino   La Nina   proxy   anthropogenic   carbon tax  
cap and trade   carbon sink   feedback   permafrost   forcing agent   weather   climate   albedo   cryosphere

## Assignments

- **Read: "Understanding and Responding to Climate Change" National Academies**
- **Notebook 10pts**
  - Cmap - "Inconvenient Truth"/ Video Guide - "What's up with the Weather?"
  - Notes on Study Objectives (2-column format with facts on right and ques/questions/commentary on left)
  - Understanding El Nino and La Nina (536, 537)
  - Activity: "Has our local climate been warming? Examining Cloquet's Climate History"
  - Activity: "Population Peril - Polar bears decline in the Canadian Arctic"
  - Activity: "Water World - using GIS to predict consequences of sea level rise"
  - **Extra Credit:** "Peat bogs harbor carbon time bomb" (Moodle)
- Lab: "Dendrochronology - finding evidence in tree rings" 10pts
- Knowledge Quiz 15pts (Moodle)
- Test 20pts

*"People tend to focus on the here and now. The problem is that, once global warming is something that most people can feel in the course of their daily lives, it will be too late to prevent much larger, potentially catastrophic changes."*

**Elizabeth Kolbert**