Unit 4 Resources
for the Science of Climate Change

Recommended for course participants

If you don't have the time to read this unit's materials, watch 12 ½ minutes of this video:
Why is the Earth Warming and What Can We Do about it? The Causes and "Solutions" Start at 5'22" and go until 18:00"
Wilmette Institute Climate Conversations with Christine Muller, part 3, May 12, 2020
https://www.youtube.com/watch?v=KbA3Q9n0M3o

Video on Greenhouse Effect (6:52): Professor Scott Denning of Colorado State University explains how greenhouse gases in Earth's atmosphere warm our planet. (Credit: Changing Climates project at Colorado State University.)
This talk is excellent and provides a deeper understanding of the greenhouse effect.
Link to video

Resource Library

There are numerous resources in this course. Consider them as a library available to you at any time without obligation to look into any "book".

Earth: The Operator's Manual
The first two chapters of this video documentary are relevant for this unit 3.
Fast forward the beginning and start the documentary at about 7'25. Watch up to about 28'15." The video is longer, but you can just stop there. The 2nd half of this film will be the topic of Unit 5.
https://www.youtube.com/watch?v=2RyvpsIx47E

What is climate change? - The Climate Question, BBC World Service. This podcast explains the basics of climate change in 15 minutes.
https://www.youtube.com/watch?v=SLEenW2UiUw

NASA Climate Change Vital Signs
Excellent website to explore
https://science.nasa.gov/climate-change/

Up-dated graphs:

Keeling curve: https://keelingcurve.ucsd.edu

NOAA carbon concentrations: https://gml.noaa.gov/ccgg/trends/monthly.html
Intergovernmental Panel on Climate Change (IPCC): 6th Assessment Report

Synthesis Report of the Sixth Assessment Report March 20, 2023
Summary for Policy Makers
https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf

Working Group I Report for its 6th Assessment Report: 2021: The Physical Science Basis
The Working Group I contribution to the Sixth Assessment Report is the most up-to-date physical understanding of the climate system and climate change, bringing together the latest advances in climate science, and combining multiple lines of evidence from paleoclimate, observations, process understanding, and global and regional climate simulations.

Link to the AR6 WG I Report website: https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/

Link to the Summary for Policy Makers: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

Link to Headline Statement: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Headline_Statements.pdf

Let's Talk Climate Solutions Part I: The Science of Climate Change
Webinar Series with Professor Stephen Porder from Brown University, March 2023
https://professional.brown.edu/science-climate-change

The different videos provide excellent information about different aspects of climate science in an accessible way:
What is Climate?
What Controls Climate?
Is Climate Changing?
Why is Climate Changing?
Climate Models & Attribution
What Does the Future Hold?

What We Know - the Reality, Risk, and Response to Climate Change.
What We Know - the Reality, Risk, and Response to Climate Change (8 dense pages)
This report by the American Association for the Advancement of Science (AAAS) provides a helpful overview of climate science.

Climate change widespread, rapid, and intensifying
Press Release by the Intergovernmental Panel on Climate Change (IPCC), 9 August 2021 regarding the report from their Working Group 1 for the 6th Assessment Report. You can find links to this IPCC Report in the Resources file below.

US National Climate Assessments, United States government interagency reports
This link contains an archive of the U.S. National Climate Assessments. These were retrieved, mostly, from USGCRP websites in April, 2025. Known gaps were filled with downloads from other federal websites.

Greenhouse gas levels in atmosphere reach new record
Press Release by the World Meteorological Organization, 20 Nov. 2018

The warming effect of long-lived greenhouse gases on our planet has increased by 41% since 1990. Globally averaged concentrations of carbon dioxide (CO_2) reached 405.5 parts per million (ppm) in 2017. “The last time the Earth experienced a comparable concentration of CO_2 was 3-5 million years ago, when the temperature was 2-3°C warmer and sea level was 10-20 meters higher than now.”

Climate Change in a Nutshell: The Gathering Storm by climatologist Dr. James Hansen, 18 December 2018
http://www.columbia.edu/~jeh1/mailings/2018/20181206_Nutshell.pdf

Dr. James Hansen wrote this scientific statement in support of the Juliana versus the Government court case (see pages 1-3). Pages 4 – 52 provide a deep overview of climate science, highly recommended to the serious student of climate change.

Books:

Global Warming – A Very Short Introduction by Mark Maslin. This book is small in size, but rich in content. Readers who enjoy getting the essential information in a concise format will highly appreciate this book. (148 pages)

The Long Thaw - How Humans Are Changing the Next 100.000 Years of Earth's Climate by Prof. David Archer (176 pages). This excellent book explains the reasons why our carbon emissions have such a long-term effect on the climate. You don't need to be a scientist to understand that book.