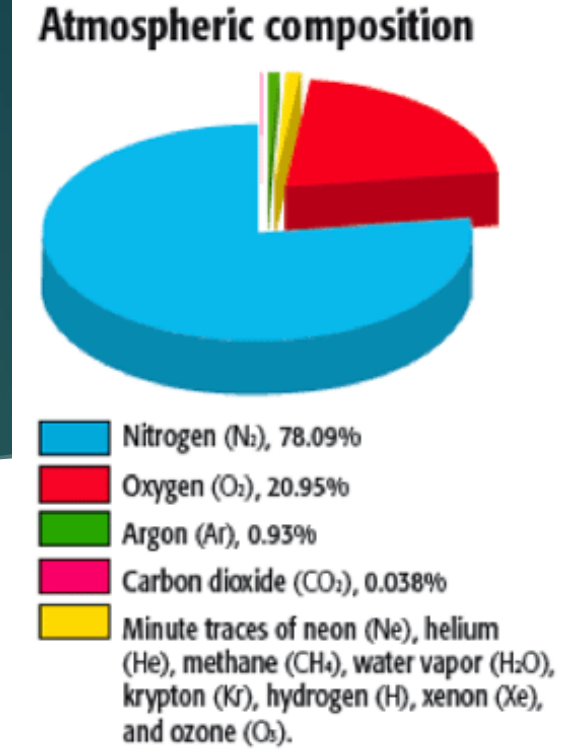
Climate Change

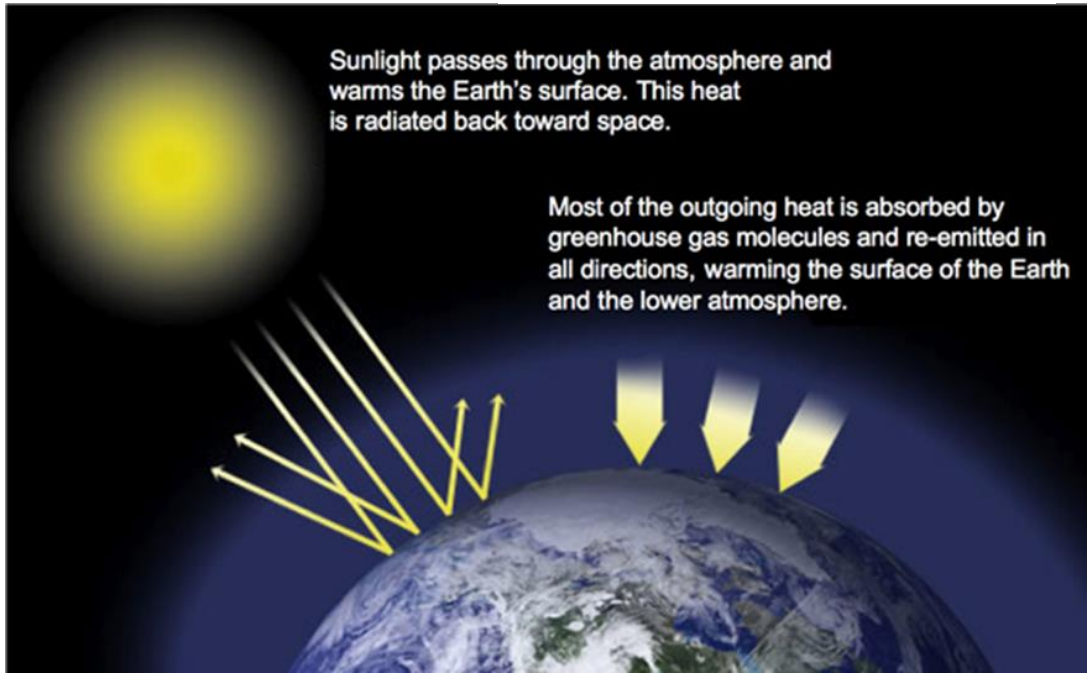
OVERBOOK PROJECT ON THE ENVIRONMENT AND SUSTAINABILITY

This study guide was created by Heather Oswald from Cannon School as part of the 2018 World View Fellows Program:
The OVERBook Project on the Environment and Sustainability
For more information about the program, please visit http://worldview.unc.edu/

Understanding Earth's Atmosphere

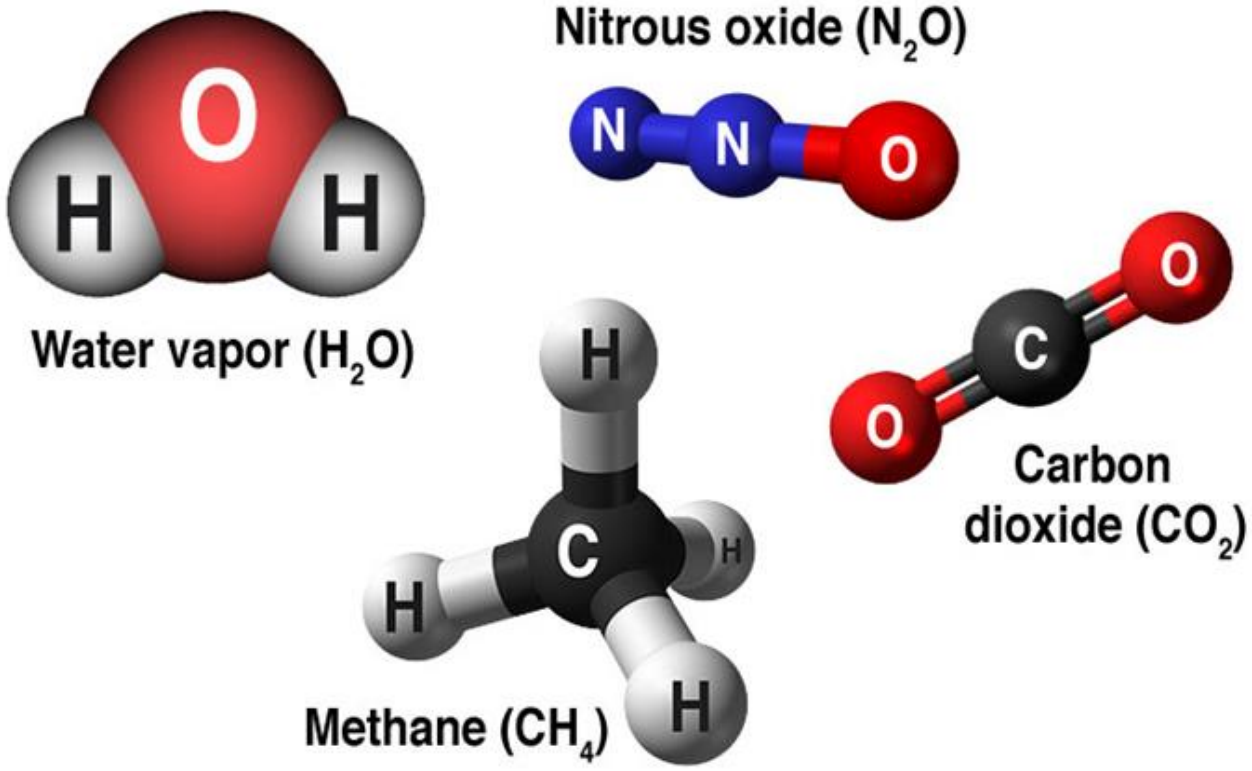


- The atmosphere is a thick blanket of gases that surround and protect Earth. Earth's atmosphere is important to retaining heat from the sun.
  - Without our atmosphere, Earth would be very cold and unable to support life (< 0° C).
  - Without greenhouse gases, solar energy reflected from Earth's surface would escape our atmosphere and return to space.
- With the presence of greenhouse gases, the solar energy is reflected back to Earth's surface, trapping the heat energy in our atmosphere



What is Climate Change?

- Most climate scientists agree the main cause of the current global warming trend is human expansion of the "greenhouse effect“
- Certain gases in the atmosphere block heat from escaping more than others.
- Gases that contribute to the greenhouse effect include:
  - Water vapor
  - Nitrous oxide
  - Methane
  - Carbon dioxide



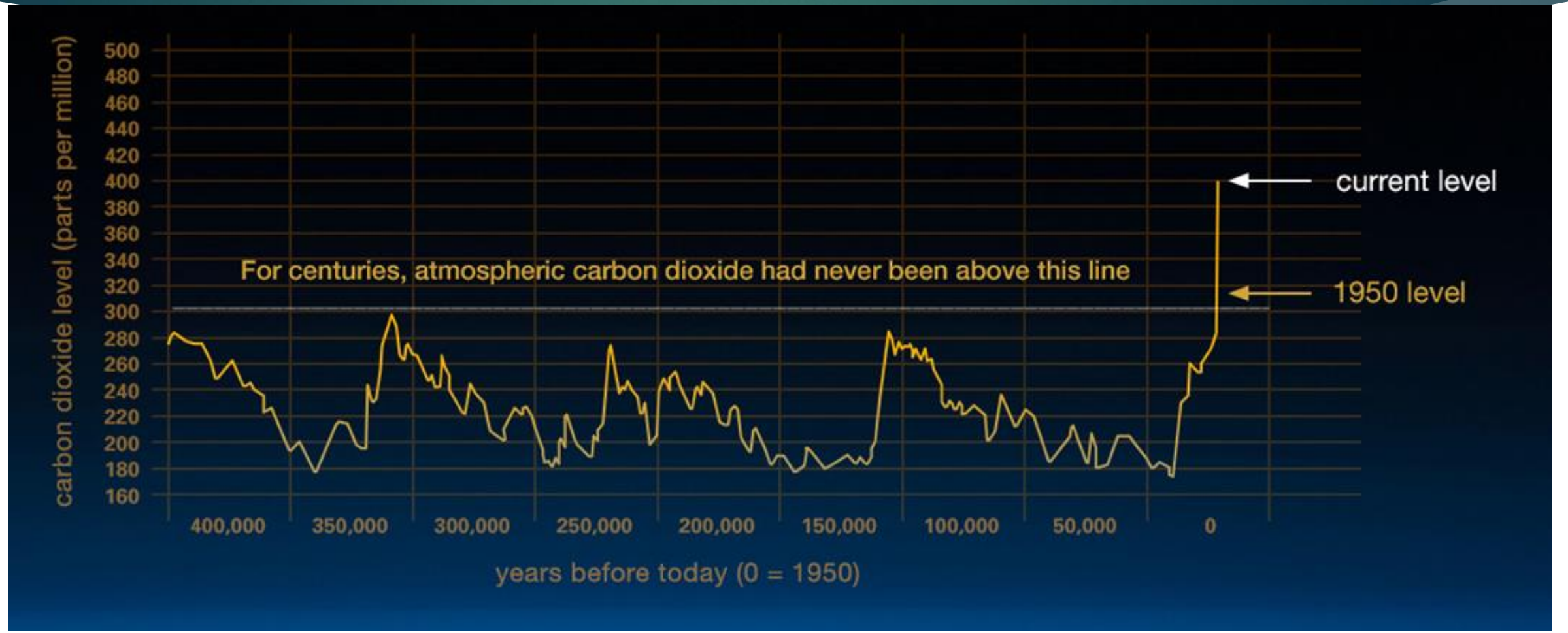
Evidence for Climate Change

- On Earth, human activities are changing the natural greenhouse effect of our atmosphere.
- Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO_2).
- Consequences of changing the natural atmospheric greenhouse:
  - On average, Earth will become warmer. Some regions may welcome warmer temperatures, but others may not.
  - A stronger greenhouse effect will warm the oceans and partially melt glaciers and other ice, increasing sea level.
  - Higher temperatures and shifting climate patterns may alter complex ecosystems, impacting populations of organisms across the globe.

Exploring the Data

Use the Climate Time Machine to visualize changes in these key climate indicators over time.

Evidence for Climate Change



This graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO_2 has increased since the Industrial Revolution. (Credit: Vostok ice core data/J.R. Petit et al.; NOAA Mauna Loa CO2 record.)

Impacts of Climate Change

Taking Action against Climate Change

- Reflect
  - Calculate your Ecological Footprint
    - https://www.footprintcalculator.org/
- Action
  - Journal Reflection
    - Describe an experience where climate change has impacted your life.
    - In what ways can you change your current lifestyle to reduce your ecological footprint and take action in your community to reduce the effects of climate change.
  - Public Service Announcement: PSA Flyers
    - Create a PSA (Public Service Announcement) Flyer to post around their community. (see example)
    - Include a photograph of how climate change has impacted you personally and a fact that you learned about the status of our planet under the pressure of a changing climate.