

Unit 4 Handout 12

Lesson 10: Exploring Climate Change Graphs

Purpose: Analyze a graph of data related to climate change.

NGSS Practices: Analyzing and interpreting data.
Obtaining, evaluating, and communicating information.

Credit: Thanks to Mrs. Utynek for designing this sheet for the activity!

Background Vocabulary. Use your Weather and Climate textbook and/or online resources to match the following definitions to the correct vocabulary term.

Term	Definition
_____ 1. Weather	a. The state of the atmosphere at a specific time and place.
_____ 2. Climate	b. A greenhouse gas, which can be produced by burning fossil fuels.
_____ 3. Greenhouse Gases	c. The amount of CO ₂ emitted by a person or group due to the consumption of fossil fuels.
_____ 4. Fossil Fuels	d. Weather conditions that are characteristic of a region over a long period of time.
_____ 5. Climate Change	e. Gases in the earth's atmosphere, which absorb heat energy and prevent it from escaping.
_____ 6. Global Warming	f. The gradual increase in the overall temperature of earth's atmosphere.
_____ 7. Carbon Dioxide	g. A natural substance formed in the geology past from the remains of living things (e.g. coal).
_____ 9. Carbon Footprint	h. A change in global or regional climate patterns.

Comments, Questions, Concerns? (Cookies!). As you watch a short video on climate change, write down your thoughts, questions, and reactions. We can share these questions and find answers using our resources.

Data Exploration. Your group has been assigned a graph. Complete the table below using the graph as your source of information.

Graph Letter: _____	Graph Title:
Variables (x and y axis): What are the variables shown on the graph?	
Possible vocabulary/ definitions: What keywords are on the graph that we should know?	
Summary sentence(s) of the connection between the variables: What story does the graph tell?	
Impact on Earth: How might our planet be affected by changes in the shown variable(s)?	

Comments, Questions, Concerns? (Cookies!). As you listen to others share their graphs, write down your thoughts, questions, and reactions. We can share these questions and find answers using our resources.

Visualizing Change. Here are two resources from NASA that visualize how our planet has changed. There are also predictive models which visualize how change may occur in the future.

<http://climate.nasa.gov/interactives/climate-time-machine>

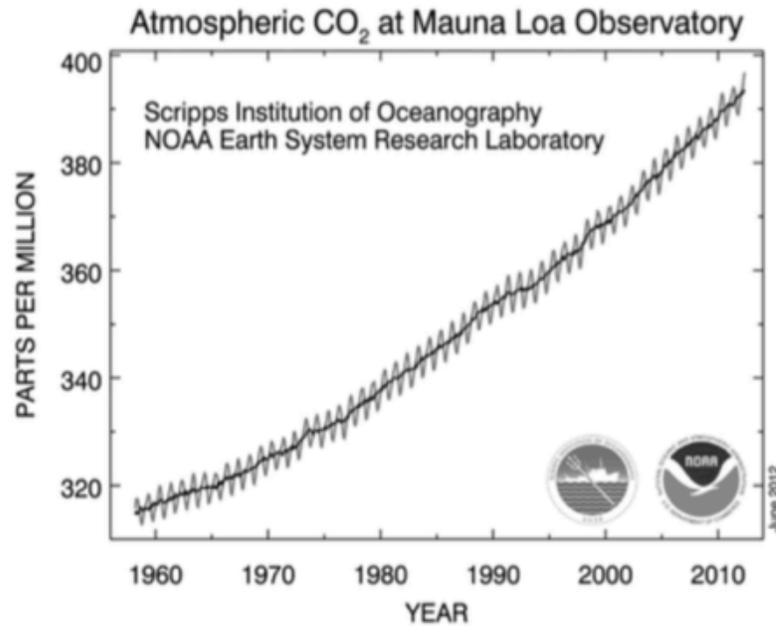
http://climate.nasa.gov/climate_resource_center/earthminute

Data Exploration Part 2 - Carbon Dioxide Concentrations. Complete the following table using the graph shown below.

10.2a CARBON DIOXIDE CONCENTRATION AT MAUNA LOA OBSERVATORY, 1960–2010

Introduction The data on carbon dioxide concentration in the graph below was collected over a 50-year period at the Mauna Loa Observatory in Hawaii. This observatory, located on the side of the Mauna Loa volcano on the Big Island of Hawaii, is one of many run by the National Oceanographic and Atmospheric Administration (NOAA). The Mauna Loa record is considered by scientists to be a precise and reliable indicator of carbon dioxide (CO₂) in the middle layer of the troposphere.

Graph A



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SOURCE: U.S. Global Change Research Program (www.globalchange.gov)

Graph A	Atmosphere CO ₂ at Mauna Loa Observatory
Variables (x and y axis): What are the variables shown on the graph?	
Summary sentence(s) of the connection between the variables: What story does the graph tell?	

Visualizing Carbon Emissions. Here's a great visual on what the concentration of carbon dioxide looks like in our atmosphere. The narration is thorough and describes what is being shown.

<https://www.youtube.com/watch?v=x1SgmFa0r04>

Reducing Your Carbon Footprint. The increased emission of carbon dioxide gas in our atmosphere is driving climate change. The Industrial Revolution led to the quickly increasing amount of carbon dioxide gas emitted into the atmosphere. Humans have the ability to slow this process by changing some of our habits. For example, in the video we watched, we learned we can reduce our carbon footprint by recycling more and turning off electronics when we're not using them.

We should ask: what is our contribution of carbon dioxide to the atmosphere? What is our carbon footprint? There are a number of free, online tools you can use to calculate your carbon footprint. Use the one linked below (or find one of your choice) and answer the following questions.

<http://www.carbonindependent.org> (based in the UK, but it's simple to use)

Question	Response
1. What is your carbon footprint? (How much carbon dioxide do you release each year?)	
2. Are you above, below, or about average as compared to others' carbon footprints?	
3. What is your biggest source carbon emission?	
4. What can you do to reduce your carbon footprint?	