

STUDENT GUIDE

EXPLORE 1 LESSON 8



Part 1: Our Motivation

Record what we were trying to figure out that led to this investigation.



Part 2: Analyzing Data on Human Activity and Climate Change

In the space below, describe the general trends that you observe in each data set.

Name of Data Set:	My Notes:
Greenhouse Gas Concentrations	
Our World in Data	
Global Temperatures	

(continued on next page)



In the space below, describe the general trends that you observe in each data set. (Cont.)

Name of Data Set:	My Notes:
Economic Output	
Emissions Impossible	
GHG From Livestock	

Evaluate the impact of this new data on our working explanation of how cow burps cause climate change. What ideas do you still agree with? What would you revise or add? Use evidence from the data sets above to support your suggestion.

What are limitations of these data? Can they help us determine the causes of climate change?

What do you want to figure out next to help us improve our working explanation?



Part 3: Using a Series of Models of the Greenhouse Effect

Record the strengths and limitations of each computer model.

Computer Model: PhET		
Define the System Shown in the Model	Strengths/Merits of How the Model Shows Matter and Energy Changes	Weaknesses/Limitations of How the Model Shows Matter and Energy Changes

Computer Model: The Concord Consortium		
Define the System Shown in the Model	Strengths/Merits of How the Model Shows Matter and Energy Changes	Weaknesses/Limitations of How the Model Shows Matter and Energy Changes

Computer Model: HHMI BioInteractive		
Define the System Shown in the Model	Strengths/Merits of How the Model Shows Matter and Energy Changes	Weaknesses/Limitations of How the Model Shows Matter and Energy Changes

Prepare an explanation of the mechanism for how Earth's average temperature increases, including the following:

- How greenhouse gases like methane and carbon dioxide influence Earth's average temperature.
- How energy moves into and out of the Earth system, and what this has to do with the Earth's average temperature.
- The specific features from one model you found most useful in helping you understand the mechanism.



Part 4: Sharing Explanations

In the space below, note the similarities and differences in the explanations that your peers share. Be sure to record:

- Which of the models your peers thought had the most merits/strengths.
- How your peers describe the movements of energy and matter into and out of the Earth system.

Similarities	Differences

**Part 5: Revise the Class Working Explanation**

Based on what you figured out about the mechanism of the greenhouse effect, revise our working explanation in the space below.