

CO₂ and our climate

Eunice Newton Foote & her groundbreaking discovery

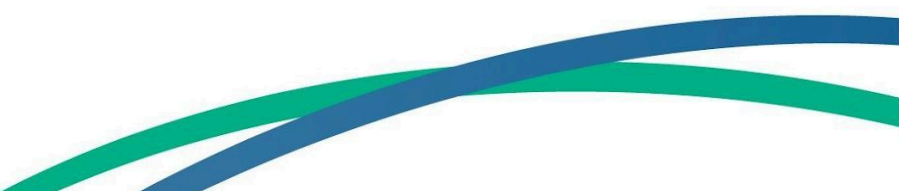
Key questions: What is CO₂, and how does it affect the climate? How does CO₂ compare to air as a greenhouse gas? How does CO₂ in the atmosphere interact with infrared light (heat)?

Brainstorm: If you wanted to figure out how well CO₂ holds onto heat compared to regular air, how would you design an experiment to test it?

Intro: Who was [Eunice Newton Foote](#)? Describe her experiment.

Experiment: Your teacher will lead you through a demonstration of Eunice Newton Foote's groundbreaking experiment. Write the procedures below as your teacher performs them.

Hypothesis: What do you think will happen when both bottles are exposed to light? Which bottle do you expect to heat up faster? Why? Why might the composition of the gas make a difference?



Data Table: Temperature of CO₂ vs. air

Minute	CO ₂ bottle temperature (in °C)	Air bottle temperature (in °C)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Analysis

1. Graph your data below or by using a computer program as instructed by your teacher.
2. Open the [Molecules and Light PhET simulation](#) and only focus on CO₂. How can you relate what you learned in this experiment to what you see in the simulation regarding CO₂?

Discussion and Conclusion - Your teacher will lead you through a discussion and conclusion based on the prompts below.

1. Did your evidence support or refute your hypothesis?
 - a. If you were right, try to explain what causes the differences in temperature and how it can relate to the climate.
 - b. If the results did not follow your hypothesis, then where did your hypothesis go wrong? Or, were there errors in the experiment that could be improved on in the next run?
 2. What do you think would happen if we removed all of the CO₂ in the atmosphere? Would our climate remain the same?
 3. Try to predict, using evidence from your experiment and the simulation, what will happen as more carbon dioxide gets added to the atmosphere.
 4. When sunlight hits the ground, it turns into invisible heat called infrared radiation. How do greenhouse gases like CO₂ 'catch' this heat and scatter it back toward us, and what does that mean for our global climate?
 5. Have you heard about the increase of CO₂ in the atmosphere? If so, where do you think the excess CO₂ is coming from? If not, can you predict where you think excess CO₂ is coming from?
- 