Science Learning Packet
Grade 6:
Earth's Changing Climate, Lesson 6

Suggested science learning activities for SPS students during the COVID-19 school closure.

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Due to the COVID-19 closure, teachers were asked to provide packets of home activities. This is not intended to take the place of regular classroom instruction but will help supplement student learning and provide opportunities for student learning while they are absent from school. Assignments are not required or graded. Because of the unprecedented nature of this health crisis and the District's swift closure, some home activities may not be accessible.

If you have difficulty accessing the material or have any questions, please contact your student's teacher.

Grade 6 Science Learning Activity

Earth's Changing Climate Unit Instructional Materials

Lesson 6 (Amplify Lesson 2.6)

AmplifyScience

Earth's Changing Climate

Lesson 6: Investigating Paths of Energy

Investigation Question: Why does an increase in carbon dioxide or methane result in more energy entering and exiting the Earth system?

Unit Investigation Question: Why is the ice on Earth's surface melting?

Lesson 6

During your research as student climatologists, you have gathered evidence to investigate how different gases relate to energy and temperature. You found that an increase in the amount of methane or carbon dioxide in the atmosphere means that more energy is entering than exiting the Earth system. Now you will figure out exactly why this is happening.

Vocabulary you will use in this lesson:

- atmosphere
- carbon dioxide
- change
- claim
- climate
- climate change
- energy
- evidence
- methane
- model
- stability
- temperature

Lesson 6 – Part 1: Investigating Energy Interactions in the Sim

We have discovered a little about the process by which these changes to gases in the atmosphere cause climate change, but our claim that this is what is causing ice to melt will be much stronger if we can provide a more complete description of *how* increases to these gases affect energy and temperature.

To answer this question of WHY an increase in carbon dioxide or methane results in more energy entering than exiting the Earth system, we're going to use the Sim to carefully observe what happens to energy when it interacts with carbon dioxide or methane. We're going to use a feature in the Sim that we haven't used before, the energy tracking function.

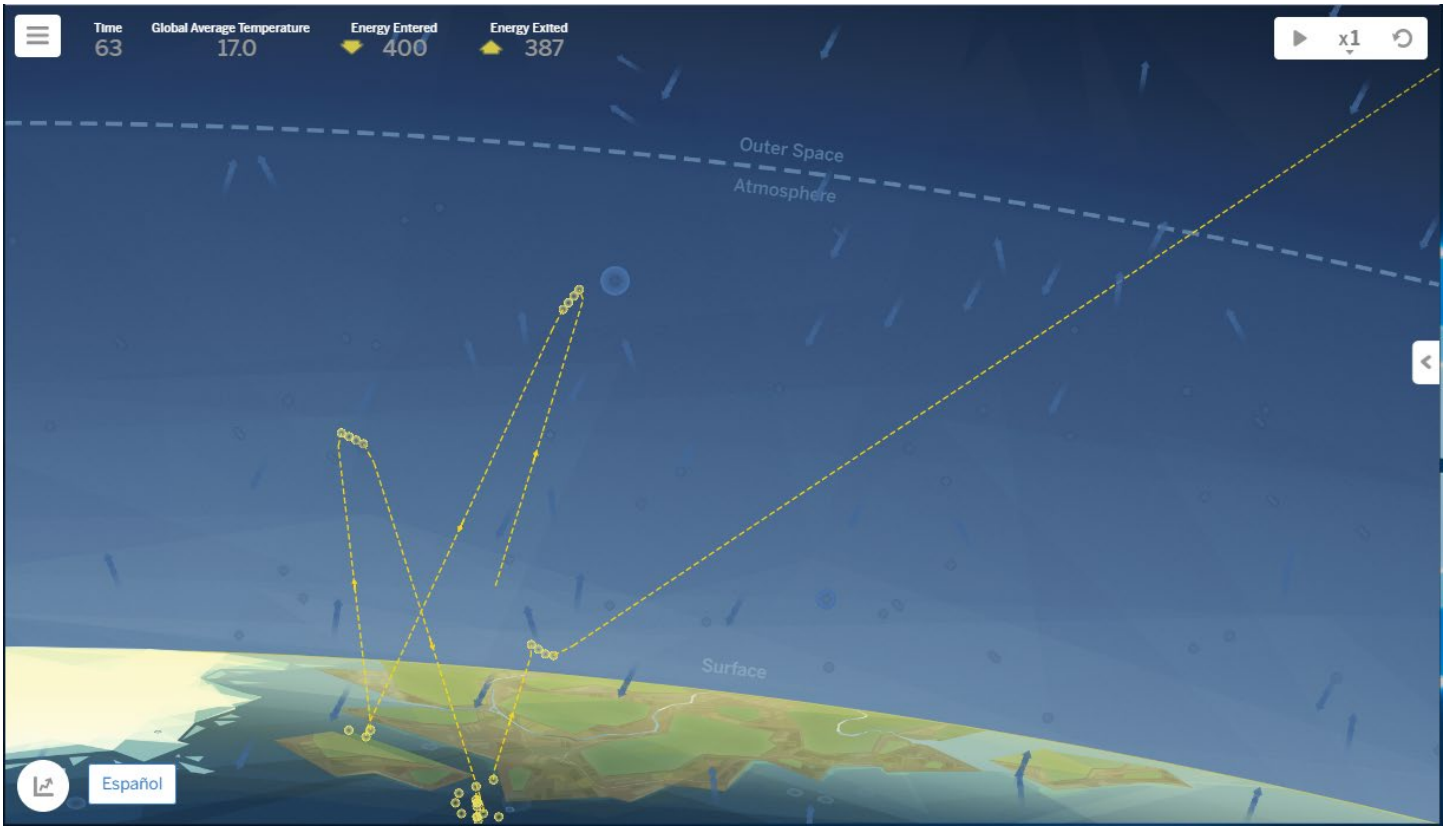
Use the Simulation to investigate this question: *What happens when energy interacts with carbon dioxide or methane in the atmosphere?*

Discuss with a family member or friend and record your initial claim below. Initial Claim:

_____

1. To start, investigate carbon dioxide or methane. Set the gas you are investigating to MAXIMUM and the other gases to ZERO.
2. Press on the eye icon to make the gas you are investigating visible.
3. **Choose an energy arrow that is moving away from Earth**. Press on the arrow to activate the tracking function. The other arrows will fade and this arrow's track will be visible.
4. Press PLAY and observe.
5. If your energy arrow leaves Earth's system, choose a new one. Be patient; it may take a few tries before you capture an interaction!
6. If your energy arrow interacts with a gas, continue observing until that energy arrow leaves the Earth system, then pause. Describe what happened and make a sketch of each interaction.
7. Try to capture at least three interactions.
8. Reset and investigate the other gas (carbon dioxide or methane).

Example energy arrow interaction from the Earth's Changing Climate Sim:



Interaction 1	
Describe what you observed. The energy was absorbed by the carbon dioxide, then sent out again. It came back to Earth, was absorbed again, then sent out again. This happened twice before it went up into outer space.	Make a sketch.

Interaction 2	
Describe what you observed. _____ _____ _____ _____ _____ _____	Make a sketch.
Interaction 3	
Describe what you observed. _____ _____ _____ _____ _____ _____	Make a sketch.
Interaction 4	
Describe what you observed. _____ _____ _____ _____ _____ _____	Make a sketch.

Lesson 6 – Part 2: Summarizing Results from the Sim Investigation

Discuss the results of your investigation with a friend or family member. Was your initial claim accurate? Based on your investigation, how would you answer this question now?

What happens when energy interacts with carbon dioxide and methane in the atmosphere?

Key Concept: Fill-in-the-Blank

_____ gas and _____ gas stop energy from leaving by _____ energy that would have _____ the system.

Lesson 6 – Part 3: New Email from Irene Lee

The head climatologist at World Climate Institute has sent a message asking for your help. Today you will make a model and write an explanation to show how increasing carbon dioxide and methane are affecting Earth's temperature. Your explanation will be used to educate the public on this important topic.

Read the following message, then answer the question.

From: Irene Lee
To: Student Climatologists
Subject: Helping Others Understand Climate Change

World Climate Institute

Thank you for all your hard work on the subject of climate change these last few weeks. Being able to explain why our climate is changing and why Earth's ice is melting is vital.

Today, I'd like you to create a report that explains these climate change ideas to a general audience. Be sure your writing is clear and includes visuals so people who don't know much about this topic will find it meaningful. WCI hopes that if people understand, they will take action and support laws that will help with this serious problem.

Your report is a valuable part of WCI's mission to educate the public so they can better understand this topic. We appreciate your help!

What are some important ideas you'd want to share with people who don't know very much about climate change?

Lesson 6 – Part 4: Writing About Climate Change for the Public

We know that the global average temperature on Earth is increasing and ice is melting. We also know that the amount of carbon dioxide and methane has increased. You may find it useful to refer to your model and use words from the Word Bank as you write your explanation.

Word Bank:

atmosphere	methane	temperature
carbon dioxide	redirect	evidence
energy	surface	

Why does temperature increase when the amount of carbon dioxide or methane in the Earth system increases?