



Science Learning Packet

Grade 6:

Earth's Changing Climate, Lesson 5

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 5 (Amplify Lessons 2.3, 2.5)

AmplifyScience



Earth's Changing Climate

Lesson 5: Learning More About Past Climate Changes

Investigation Question: How do carbon dioxide and methane affect energy entering or exiting the Earth system?

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



Lesson 5

Climate change is not a new thing. There is evidence that this has happened before in Earth's history. In this Lesson you will use evidence from the text about warming during the Eocene in order to model the Earth system during this current warming climate.

Vocabulary you will use in this lesson:

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

Lesson 5 – Part 1: Effects of Energy Absorbed by Earth’s Surface

Earth’s current climate is changing, but there have been other times in Earth’s history when the climate changed. During some of these times in the past, more energy entered than exited the Earth system.

Explain how this affected energy absorbed by the surface and temperature by making choices that complete the statement below.

If more energy enters than exits the Earth system, energy absorbed by the surface would (circle one)

- a. increase,
- b. decrease,
- c. remain stable,

causing global average temperature to (circle one)

- a. increase.
- b. decrease.
- c. remain stable

Lesson 5 – Part 2: Second Read of "Past Climate Changes on Earth"

Let’s reread part of this article to help better understand why increased carbon dioxide or methane can cause temperatures to increase.

Reread the introduction and the section, "Alligators in the Arctic: The Eocene Period." As you read, highlight any information that helps answer the question, *How do carbon dioxide and methane affect energy entering or exiting the Earth system?* After you read, use your annotations to help you answer the two questions.



Triceratops and other dinosaurs may have gone extinct because of a change in climate.

Past Climate Changes on Earth

Evidence shows that Earth is getting warmer— the global climate is changing right now. Did you know that Earth’s climate has also changed in the past? During some periods in Earth’s 4.6 billion-year history, Earth has been much warmer than it is now. During other periods, Earth has been much cooler. In every case, climate changes on Earth have to do with the amount of energy that enters Earth’s system compared to the amount of energy that exits.

Energy is always entering the Earth system as light from the sun. This energy is absorbed by Earth’s surface and warms the air near the surface. At the same time, energy is always exiting the Earth system,

passing through the atmosphere and going out into space. When the energy entering and exiting are in balance, global average temperatures will stay the same. Average temperature keeps its stability as long as the amount of energy entering the system is equal to the amount of energy exiting the system. If either one changes, whether it’s the energy entering or the energy exiting, the temperature changes too. In the past, when more energy entered than exited, the climate warmed. When less energy entered than exited, the climate cooled. Scientists study past climate changes to find out what might happen as Earth’s climate changes, both now and in the future.

Alligators in the Arctic: The Eocene Period

About 56 million years ago, Earth's temperature rose suddenly. Earth got so warm that water in places that were normally very cold or even frozen, such as places near the Arctic Circle, became warm. During the Eocene Period, landscapes near the poles looked like swamps in Florida do today. Earth had no ice caps, and the water in the Arctic Ocean was warm enough for a pleasant swim. In fact, scientists have found fossils showing that alligators, which are warm-water organisms, lived in the Arctic during the Eocene Period. The global average temperature was about 16°C (28.8°F) warmer than it is today.



During the Eocene Period, even the Arctic was warm enough to be a comfortable home for organisms that need warm conditions.

1. When more energy enters than exits the Earth system, what happens to temperatures on Earth?

2. Do carbon dioxide and methane affect energy **entering** or **exiting** the Earth system?
