



Science Learning Packet

Grade 7:

Matter and Energy in Ecosystems,

Lesson 10

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 7 Science Instructional Materials
Matter & Energy in Ecosystems Unit
Lesson 10 (Amplify Chapter 3, Lesson 3.2)

AmplifyScience



Matter and Energy in Ecosystems

Name _____

School _____

Class Period _____

Teacher _____

Hello Families,

We hope you and your family are well and safe during this time. During this unprecedented out-of-school time, the SPS middle school science team will be offering instructional opportunities for students that align with the district's adopted middle school science instructional materials.

This investigation packet is part of a series of district-aligned lessons for middle school **science developed by AmplifyScience** and adopted by SPS in 2019. While Amplify Science lessons are designed to be done in the classroom with peers, there are some activities that students can complete at home.

In this packet you will find activities to accompany the **lesson videos being aired this week through Seattle's Public television programming on [SPS TV](#) (local channel 26). The videos and packets are also posted to the, [SPS Science webpage](#) under their corresponding grade level.** These lesson videos, developed in collaboration between SPS teachers, Denver Public Schools teachers, and Amplify Science, feature teachers going through the information in the lessons. **The work in this packet is intended to be completed alongside the viewing of the video of the corresponding videos.**

Closed captioning for the videos is available many home languages if this helpful to your family.

- Click CC (bottom right of video)
- Click Setting (the gear next to CC)
- Click Subtitles/CC
- Click Auto-translate
- Choose your language

For students who have access to the internet and the following devices and browsers **may wish to log-in to their AmplifyScience account from home are welcome to do so.** Chrome and Safari are the recommended browsers to use for full functionality of the Amplify digital tools and features.



Sincerely,

Lesson 10 Matter and Energy in Ecosystems

Entry: Gabriela read in the newspaper that the amount of carbon in the atmosphere is increasing and that humans are responsible. She said, "If carbon in the atmosphere is increasing, the total amount of carbon on Earth must also be increasing."

Do you agree or disagree with Gabriela's statement?

Agree Disagree

Explain your answer:

I agree / disagree with Gabriela because



Article Excerpt:

Re-read this section of "*Carbon in the Global Ecosystem*"

"Coal, oil, and gas are called "fossil fuels" for a reason: they are the **carbon-rich matter** left behind by plants and animals that died millions of years ago. These **plants and animals** were buried deep underground before they could decompose, so **decomposers never broke down the dead matter**. Over millions of years, the remains of the plants and animals turned into carbon-rich fossil fuels—coal, oil, and gas. The **carbon that was in the plants and animals when they died is still there**; it's just part of the fossil fuels. When we burn fossil fuels in cars, factories, or power plants, carbon that has been stored in the ground for millions of years is released into the air as carbon dioxide.

Earth is a closed ecosystem. There are many different regional ecosystems on Earth, but they all share one atmosphere and one ocean. **Very little matter escapes from Earth into space, and almost none enters.** Since almost no carbon enters or leaves Earth's system, and carbon isn't being produced or used up, the **amount of carbon in the system does not change. If carbon is increasing in one part of Earth's system, it must be decreasing somewhere else.**

If the amount of carbon changed in one part of a closed ecosystem, what happened to the carbon in the rest of the ecosystem? Find a quote in the text to support your answer.

If you are able to print the game pieces for the Carbon Game, you can play! If not, watch the video and fill out the questions based on what you observe!

The Carbon Game Instructions

Goal: Work with your partner to keep producers, consumers, and decomposers in this ecosystem from running out of carbon for as many rounds as you can.

Materials (team of two players)

- 1 ecosystem game board
- 30 carbon tokens
- 12 Event cards: *natural events that affect the ecosystem*
- 15 Action cards: *ways YOU change the ecosystem*

Before the Game

1. Place six tokens in each region of the ecosystem (air, producers, consumers, decomposers, dead matter).

ANSWER THE QUESTION ON PAGE 77 BEFORE CONTINUING.

2. Shuffle both sets of cards (Action and Event), and place the decks facedown near the board.
3. Each player should draw an Action card and place it faceup in front of both players.

Playing the Game (each round)

1. **Effects:** Follow the Effects of High and Low Carbon instructions for each part of the ecosystem. If more than one effect applies, go in order from the top of the board to the bottom, and then from left to right within each row.
2. **Events:** Draw an Event card and place it faceup next to the board. Follow the instructions on the card. Wait till the beginning of the next round to apply any ecosystem effects.
3. **Action:** Choose one of the faceup Action cards and follow the instructions **OR** discard one of the faceup Action cards. After you follow the instructions or discard, draw a new card, turn it faceup, and wait till the next round to play your new Action card. *This round is now over.*

Winning and Losing

If your ecosystem survives, you win! If any organisms (producers, consumers, or decomposers) run out of carbon, you lose.

Effects of High and Low Carbon

Air (Abiotic Matter)

High carbon (more than 8)

Producers have more carbon from carbon dioxide to perform more photosynthesis.

- Move 1 carbon from air to producers.

Low carbon (fewer than 4)

Producers do not have enough carbon from carbon dioxide to make energy storage molecules.

- Move 1 carbon from producers to dead matter.

Producers

High carbon (more than 8)

Producers provide extra food for consumers.

- Move 1 carbon from producers to consumers.

Low carbon (fewer than 4)

Consumers do not have enough food to survive.

- Move 1 carbon from consumers to dead matter.

Consumers

High carbon (more than 8)

More consumers eat producers and perform cellular respiration.

- Move 1 carbon from producers to consumers.
- Move 1 carbon from consumers to air.

Decomposers

High carbon (more than 8)

More decomposers eat dead matter and perform cellular respiration.

- Move 1 carbon from dead matter to decomposers.
- Move 1 carbon from decomposers to air.

Dead Matter

High carbon (more than 8)

Food supply for decomposers has increased.

- Move 1 carbon from dead matter to decomposers.

Low carbon (fewer than 4)

Decomposers do not have enough carbon from dead matter to survive.

- Move 1 carbon from decomposers to dead matter.

After you complete step #1 in Before the Game, report your carbon numbers.

- The total amount of carbon in the ecosystem is _____.
- The total amount of carbon in biotic matter is _____.
- The total amount of carbon in abiotic matter is _____.

At the end of the game, count again and report your carbon numbers.

- The total amount of carbon in the ecosystem is _____.
- The total amount of carbon in biotic matter is _____.
- The total amount of carbon in abiotic matter is _____.

Based on evidence from the carbon game, if the amount of carbon changed in one part of a closed ecosystem, what happened to the carbon in the rest of the ecosystem?

Reflection:

Think of another science topic you studied earlier. How does that topic connect to what we are learning about carbon and energy in ecosystems? Be creative! Consider how carbon in ecosystems might affect or be affected by molecules, energy, forces, Earth—either its atmosphere or oceans.

Other science topic: _____

Connect the science topic you suggested to something you have been learning in this unit.
