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# Science Learning Packet

## Grade 7:

# Matter & Energy in Ecosystems,

## Lesson 4

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.

## Lesson 1.5 Matter and Energy in Ecosystems

**Chapter 1 Question:** Why didn't the plants and animals in the biodome have enough energy storage molecules?

We know the biodome was shut down because there weren't enough energy storage molecules in the ecosystem. Based on what you have learned so far, what do you think happened in the ecosystem?

**Claim:** There was not enough energy storage molecules in the biodome because \_\_\_\_\_

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Why do you think this? What evidence have you collected throughout this unit so far that makes you think this?

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### Investigating in the Digital Model

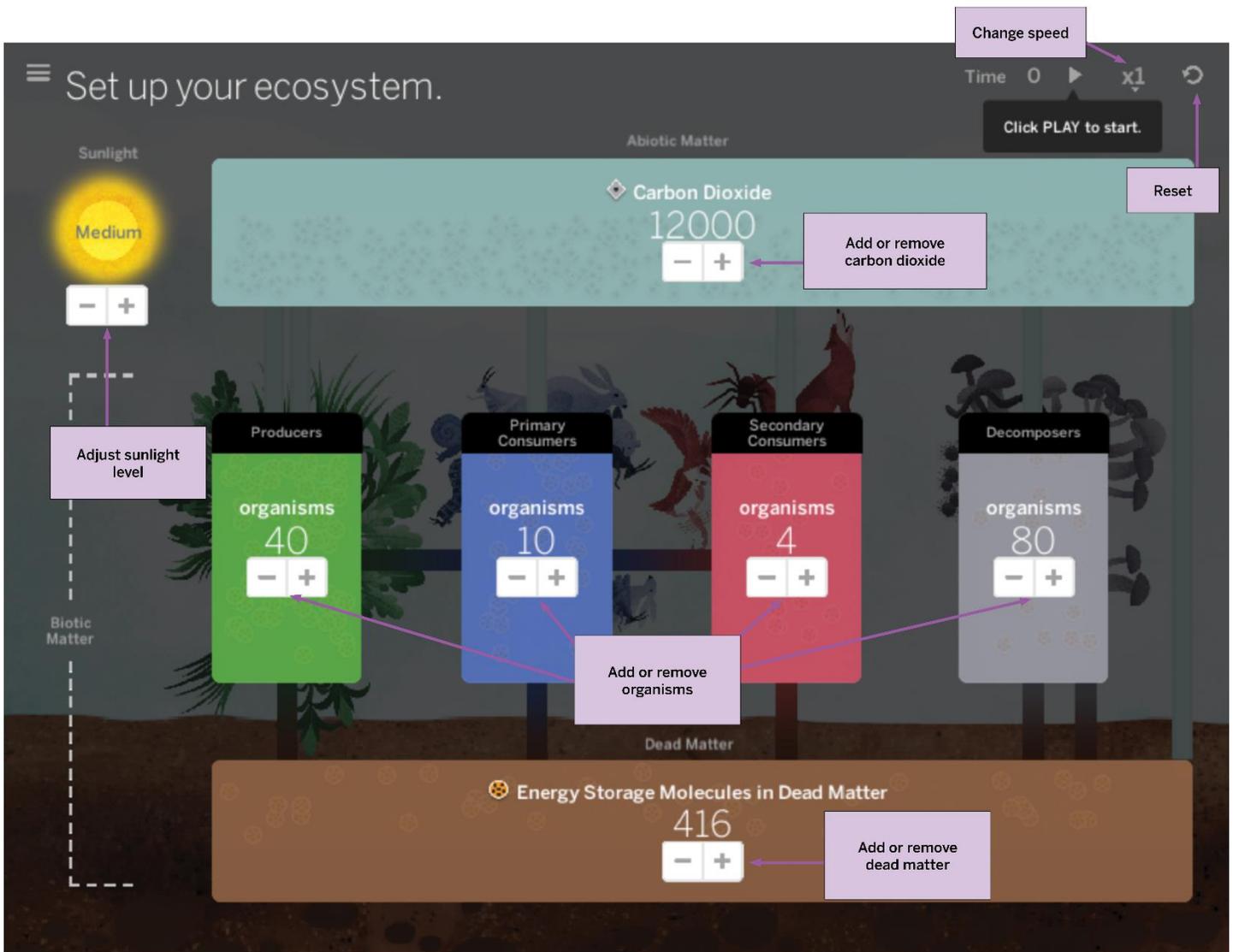
In our last few lessons we have focused on understanding where energy storage molecules come from. Today we are going to focus on understanding how the energy storage molecules decrease.

**Investigation Question:** What factors affect how many energy storage molecules producers are able to make?

We know that energy storage molecules decreased in the biodome. What could have caused a change in the amount of energy storage molecules that producers were making? Use the *Matter and Energy in Ecosystems* Sim to help you find out.

**Mission:** Find at least two ways to **decrease** the amount of energy storage molecules producers can make, without using the kill buttons.

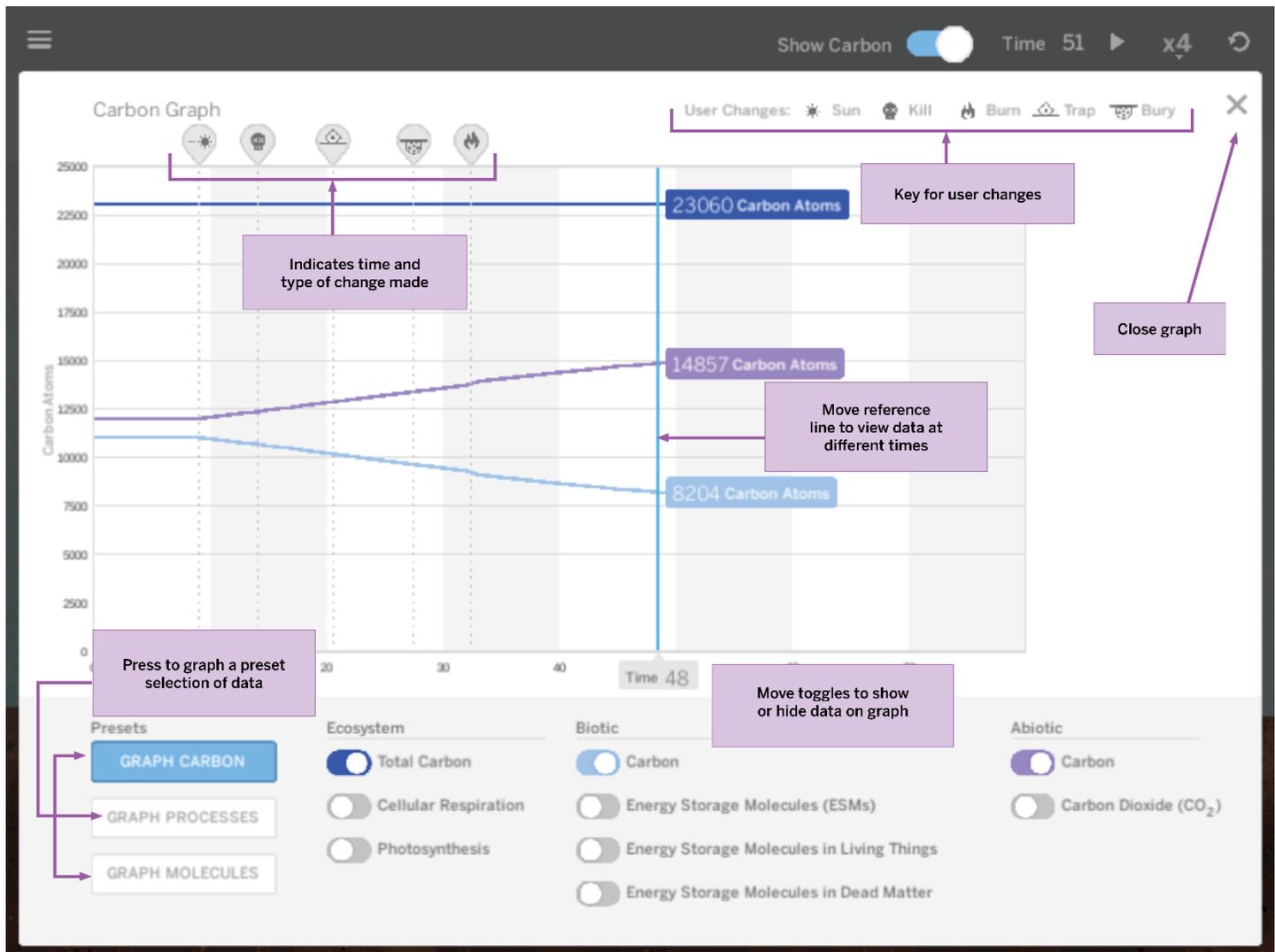
<p><b>Plan 1:</b> One way I will try to decrease the number of energy storage molecules that producers can make is to: (check one)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> increase sunlight.</li><li><input type="checkbox"/> decrease sunlight.</li><li><input type="checkbox"/> burn dead matter.</li><li><input type="checkbox"/> bury dead matter.</li><li><input type="checkbox"/> trap carbon dioxide.</li></ul>	<p><b>Plan 2:</b> Another way I will try to decrease the number of energy storage molecules that producers can make is to: (check one)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> increase sunlight.</li><li><input type="checkbox"/> decrease sunlight.</li><li><input type="checkbox"/> burn dead matter.</li><li><input type="checkbox"/> bury dead matter.</li><li><input type="checkbox"/> trap carbon dioxide.</li></ul>
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## Instructions

1. Open the Matter and Energy in Ecosystems Simulation.
2. Without changing any of the starting values, press PLAY. Run the Sim for at least 20-time units.
3. **Make only one change to the ecosystem at a time!** Do not use the kill buttons.
4. Observe the ecosystem for an additional 50-time units. Look for evidence that your mission is complete.
  - a. *(Hint: Look at the graphs of energy storage molecules and photosynthesis- see next page for help analyzing the graphs)*
6. If your change does not decrease the energy storage molecules in living things, reset the Sim and try changing something else after 20-time units.
  - a. *(Hint: Make a BIG change in the ecosystem so it is easier to see the effects.)*
7. Remember, **find two ways to decrease energy storage molecules:**

## Using the Graphs:



- There are three preset options—for carbon, processes, and molecules at the bottom of the screen. When you press one of the presets, colored line graphs appear.
  - The graphs give information about three categories, Ecosystem, Biotic, and Abiotic. **You can turn the graph lines on or off, using the “toggle” buttons to the left of their names.**
- To scroll forward or backward through time, you can drag the blue vertical line on the graph. The label(s) to the right of this line show the **value and units for each graph**, and the values change as you move the blue line!
- What you changed will appear at the **top of the graph** and reflect changes that were made in the Sim (such as pressing the Kill buttons). The key for these change icons is located at the top right-hand corner of the screen!

Draw or describe what you did to accomplish this:

Way 1	Way 2

Why did these changes affect the number of energy storage molecules that were in the ecosystem?

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**Before Next Time**

For a challenge, test out how you can **increase** the number of energy storage molecules in an ecosystem.