# Assignment Summary

For this assignment, you will develop a scientific model on a poster that illustrates the role of photosynthesis and cellular respiration in the carbon cycle. Your model should also show how carbon cycles the Earth’s four spheres. Once you have completed your model, you will write a paper with several paragraphs describing the content of your model in more detail.

Background Information

Earth is composed of four open systems that work together—the atmosphere, the hydrosphere, the biosphere, and the geosphere. The atmosphere refers to all air around you as well as the air that extends from the surface of the Earth into space. The hydrosphere refers to Earth’s water; this includes oceans, lakes, glaciers, rivers, streams, and groundwater. The biosphere refers to all organisms on Earth, whether they live in air, on land, or in water. The geosphere refers to the Earth’s interior, rocks, minerals, landforms, and processes that shape the Earth’s surface.

Carbon is one of the six elements that are common to all living things. It is the basis for all life on Earth. Carbon moves through both living and nonliving parts of an ecosystem in an endless cycle, called the carbon cycle.

Materials

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| --- | --- |
| * Large poster board * Markers, crayons, or colored pencils | * Scissors * Glue or tape |

# Assignment Instructions

**Step 1: Prepare for the project.**

1. Read through the guide before you begin so you know the expectations for this project. Pay particular attention to the instructions for creating a model on your poster board.
2. If there is anything that is not clear to you, be sure to ask your teacher.

**Step 2: Gather materials for the model.**

1. Start with a blank poster board. Be sure to put your name on it.
2. You may either draw the parts of the carbon cycle or print images to construct a model on your poster board. Gather any drawing tools that you will need and/or print out any images you want to use.

**Step 3: Create a model of the carbon cycle.**

1. Create a model of the carbon cycle showing how carbon cycles through an ecosystem.
   1. Show photosynthesis and cellular respiration contributing to the carbon cycle.
   2. Depict the movement of carbon through the atmosphere, hydrosphere, biosphere, and geosphere.
   3. Include the role of fossil fuels and fossil fuel emissions in the carbon cycle. You may have to do additional research to find out where fossil fuels come from and where they are stored.
   4. Represent the diffusion of carbon dioxide in oceans. You may have to do additional research to find out where this carbon dioxide comes from and what happens to it in the ocean.
2. Draw arrows indicating how carbon moves within and between both living and nonliving parts of the environment.
3. Include short phrases on your poster that summarize what occurs at each stage of the carbon cycle.

**Step 4: Create a typewritten paper describing the carbon cycle.**

1. Type several paragraphs describing the full carbon cycle in detail.
   1. Discuss all components of your poster, as outlined in step 3.
   2. Describe the exchange of carbon through carbon-containing compounds between an organism and the environment.
   3. Describe the contributions of photosynthesis and cellular respiration within and among the four spheres. Discuss how carbon enters and leaves each of the four spheres and in what forms.
   4. Discuss the role of carbon storage in organisms.
2. Click “Enter” on your keyboard a few times to leave enough space to answer the following question.
   1. How is a model of the carbon cycle different from the actual cycling of carbon in an ecosystem?
3. Make sure your paragraphs include correct sentence structure, punctuation, grammar, and spelling.
4. Ask your teacher where you should save your work. Your teacher may also have specific guidelines about the file name you should use.

**Step 5: Evaluate your project using this checklist.**

If you can check each box below, you are ready to submit your project.

* Is your name on your poster board?
* Did your poster show the contributions of photosynthesis and cellular respiration to the carbon cycle?
* Did your poster depict the movement of carbon through the atmosphere, hydrosphere, biosphere, and geosphere?
* Did you include the roles of fossil fuels and fossil fuel emissions in the carbon cycle?
* Did you represent the diffusion of carbon dioxide in the ocean?
* Did you draw arrows indicating how carbon moves within and between both living and nonliving parts of the environment?
* Did you include short phrases on your poster to summarize what occurs at each stage of the carbon cycle?
* Did you write several paragraphs describing the full carbon cycle in detail? Did you discuss all components of your poster in this paper?
* Did you describe the exchange of carbon through carbon-containing compounds between the organism and the environment?
* Did you describe the contributions of photosynthesis and cellular respiration within and among the four spheres? Did you discuss how carbon enters and leaves each of the four spheres and in what forms?
* Did you discuss the role of carbon storage in organisms?
* Did you explain how a model of the carbon cycle is different from the actual cycling of carbon in an ecosystem?
* Did you double check for correct sentence structure, punctuation, grammar, and spelling in your paper?

**Step 6: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure that your project is complete. Save your project before submitting it.
2. Turn in your poster board to your teacher. Be sure that your name is on it.
3. Submit your typed paper through the virtual classroom.
4. Congratulations! You have completed your project.