

Name _____

Carbon Cycle Webquest

In this activity you will learn about the carbon cycle. The carbon atom is part of several different molecules as it is recycled through the biosphere. Photosynthesis (which removes carbon as carbon dioxide from the atmosphere), respiration (which adds it back) and human activities including the burning of fossil fuels (which releases carbon dioxide) play important roles in the carbon cycle.

Start at this website:

<http://earthobservatory.nasa.gov/Library/CarbonCycle/>

1. What is the 4th most abundant element on earth?

2. Why is carbon such an important element for life?

3. Explain the biogeochemical cycle:

4. The global carbon cycle can be divided into two categories. Complete the table.

geological carbon cycle	takes millions of years
biological/physical carbon cycle	

5. What increased the carbon content of the early Earth?

6. During the geological carbon cycle, how is the carbon returned to the atmosphere?

Click on **Biological/Physical Carbon Cycle: Photosynthesis and Respiration**

7. What two biological processes play an important role in the movement of carbon? _____

8. Look at the figure on this web page. It shows a greatly enlarged section of a leaf. In photosynthesis, carbon starts as a molecule of _____ and then becomes part of a _____ molecule.

9. Use information from the webpage to complete this statement.

The amount of carbon taken up by photosynthesis and released back to the atmosphere by respiration each year is _____ times greater than the amount of carbon that moves through the geological cycle on an annual basis.

10. Photosynthesis and respiration also play an important role in the _____ of carbon.

11. Complete this statement from the webpage.

12. Look at your answers above. List three molecules that contain carbon that are part of the carbon cycle.

A. _____

B. _____

C. _____

Click on **Carbon on the Land and in the Oceans: The modern carbon cycle.**

13. What produces oscillations in atmospheric carbon dioxide concentrations? (These show up as the zig-zag line on the graph.)

14. Over the course of a year, which is greater: the change in atmospheric CO₂ due to photosynthesis and respiration, or the amount of CO₂ introduced to the atmosphere by fossil fuel burning?

15. Look at the graph and complete this statement:
Since 1960, the amount of CO₂ in the atmosphere has increased approximately _____ parts per million.

16. How is carbon stored on land? _____

17. Read the last paragraph on this webpage. What are two differences between the carbon cycle on land and in the ocean?

Click on **The Human Role**

18. What two human activities release carbon dioxide into the atmosphere?

19. What are the main uses for fossil fuels?

20. What is the end result of these activities? Complete this statement from the webpage.

The result is that humans are adding ever-increasing amounts of extra _____ into the atmosphere. Because of this, atmospheric _____ concentrations are higher today than they have been over the last _____ or longer.

21. Look at the diagram of the carbon cycle. The amounts of stored carbon

are shown in black. Where is most of the carbon stored?

22. True or false: Scientists have a complete understanding of the carbon cycle.

Click on : [NASA Missions to Study the Global Carbon Cycle and Climate](#)

23. Look at the image of the global biosphere and complete the statement.

The concentration of phytoplankton pigment is highest near the _____. This means that there are many photosynthetic organisms in these areas. From this we can conclude that the rate of oceanic carbon uptake is _____ (greater or less) in these areas. (Hint: Does photosynthesis remove or add carbon dioxide to the atmosphere?)

24. Read the paragraph that describes The Boreal Ecosystem-Atmosphere Study (BOREAS). What are its primary goals? (list four)

A. _____

B. _____

C. _____

D. _____

Conclusions

Indicate whether each activity **adds** carbon to the atmosphere or **removes** carbon from the atmosphere.

deforestation (cutting down trees) _____

photosynthesis _____

respiration _____

burning fossil fuels _____

volcanic activity _____

formation of biomass (for example, trees) _____

farting _____

planting trees _____