



8. Where are you starting within the carbon cycle?

“Click to begin your journey”

9. How much of the atmosphere is made of carbon dioxide (CO<sub>2</sub>)?

10. By how much has CO<sub>2</sub> increased in the atmosphere during the past 150 years?

As you work through this game, take some notes about where you go as a carbon atom. Make sure you visit all reservoirs!

How much carbon does the surface ocean absorb from the atmosphere each year?  
\_\_\_\_\_

When carbon enters the deep ocean, how long does it stay there?  
\_\_\_\_\_

True or False:  
When plants die and decay, they bring carbon into soil.

The deep ocean accounts for more than \_\_\_\_\_ % of the Earth's carbon.

True or False:  
Phytoplankton are tiny plants and algae that float in the ocean and take up carbon dioxide as they grow.

True or False:  
Plants both absorb CO<sub>2</sub> from the atmosphere and release it into the atmosphere.

11. Next stop = \_\_\_\_\_  
What did you learn?

12. Next stop = \_\_\_\_\_  
What did you learn?

13. Next stop = \_\_\_\_\_  
What did you learn?

14. Next stop = \_\_\_\_\_  
What did you learn?

15. Next stop = \_\_\_\_\_  
What did you learn?

### Nitrogen Cycle:

Go to: <http://www.elmhurst.edu/~chm/onlcourse/chm110/outlines/nitrogencycle.html> and answer these questions.

16. What are the two conditions under which nitrogen will react with oxygen? (In other words, what is necessary for nitrogen in the air to combine with oxygen?)

17. What are the two compounds that are formed when nitrogen combines with oxygen?

18. How does nitric acid ( $\text{HNO}_3$ ) form?

19. Why is nitric acid ( $\text{HNO}_3$ ) important?

Go to: <http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/N/NitrogenCycle.html> and answer these questions.

20. What percentage of the air we breathe is nitrogen?

21. Even though considerable nitrogen is available in the air, most plants do not use the nitrogen ( $\text{N}_2$ ) found in the air. Why not?

22. In what compounds can plants use nitrogen?

23. How do animals get the nitrogen they need?

24. Atmospheric nitrogen ( $\text{N}_2$ ) is pretty inert. This means that it does not easily break apart. When molecules do not break apart easily, it is difficult to impossible for organisms to use them as a nutrient source. As a result, **nitrogen fixation** is the term used to describe the process of breaking up  $\text{N}_2$ .

a. What is atmospheric fixation?

b. What is industrial fixation? [This is how artificial fertilizers are made.]

c. What is biological fixation? (In your answer, describe the types of plants associated with the symbiotic relationship.)

Go to: <http://www.physicalgeography.net/fundamentals/9s.html> and answer these questions.

25. Draw the nitrogen cycle. (Remember there is another diagram on the previous website that might help you too.) If you're not sure what a term means, look through the reading and links for help.

26. Why is nitrogen needed by plants and animals?

### **Water Cycle:**

Go to: <http://observe.arc.nasa.gov/nasa/earth/hydrocycle/hydro2.html> and answer these questions.

27. What is condensation?

How do clouds form?

28. What is precipitation?

29. What is infiltration?

What factors (characteristics) affect how much infiltration can occur?

30. What is runoff?

31. What is evapotranspiration?

What is transpiration?

32. Take the Hydrologic Cycle Quiz (There's a link at the end of the descriptive pages or you can access it through: <http://observe.arc.nasa.gov/nasa/earth/hydrocycle/hydroquiz.html>)

Go to: <http://www.educ.uvic.ca/faculty/mroth/438/WEATHER/watercycle.html> and use the information provided (and from the previous website) to draw a diagram of the water cycle.

33. Diagram:

### **Soil:**

Go to: <http://library.thinkquest.org/J003195F/soil.htm> and answer these questions.

34. How does soil form?

35. What is weathering?

36. What is the difference between physical weathering and chemical weathering?

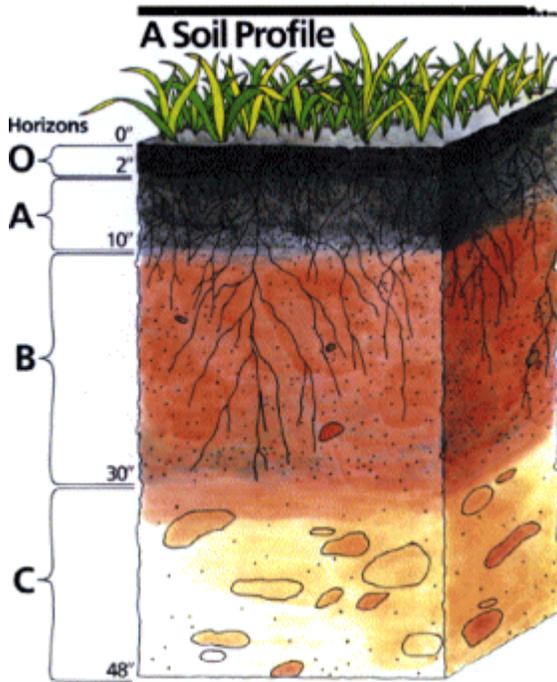
Go to <http://library.thinkquest.org/J003195F/soil1.htm> or click on the link "Soil Composition" on the above website.

37. What is soil? (Or, what is soil made of?)

Go to: <http://www.sccdistrict.com/soilpro.htm> and answer these questions.

38. What characteristics help determine the type of soil found in any location?

39. Diagram the soil profile. Include these layers: O horizon, A horizon, B horizon, C Horizon, and Bedrock. You should provide a few characteristics of each horizon.



O-Horizon:

A-Horizon:

B-Horizon:

C-Horizon:

Bedrock:

40. Why do the O- and A-Horizons have the darkest color?

41. What happens to minerals and nutrients found in the topsoil as water flows through it?

42. What does “leach” mean?