FACTivity

Time Needed

- One class period

Materials (for each student or group of students)

Note: Using the play dough and the scale are optional in this FACTivity.

- Ruler (inches or centimeters)
- Plastic knife
- 5 ounces of play dough (Play-Doh™ or homemade play dough)
- Letter scale (ounces) (may be shared by all groups)
- Log sheet on page 30

The question you will answer in this FACTivity is: How do forest termites contribute to the carbon cycle?

Background Information

Carbon is an element found in all of Earth's living things. All living things need carbon to survive. For example, about 18.5 percent of your body is made up of carbon. Carbon is also found in nonliving things such as rocks, animal shells, oceans, and the atmosphere. Earth has a limited amount of carbon. Because of this, carbon must be cycled and reused. To see how the carbon cycle works, review figure 3 on page 14.

Trees are living things, and therefore contain carbon. When trees are alive, they also contain water. Water is taken up by tree roots and transported throughout the tree. Scientists at the University of Nebraska estimated that 27.5 percent of an average living tree's weight is made up of moisture. (Compare this with your own body, which contains up to 60 percent water!) After a tree dies, it gradually dries out. Scientists estimate that about 50 percent of a tree's dry weight is carbon.

Methods

1. Create groups of 2-4 students.
2. Your team will construct a play dough log. Your log should be either: 10 centimeters (cm) long and 4 cm in diameter, or 4 inches (in.) long and 1.5 in. in diameter. Make sure that your log is the same diameter across its entire length.
3. Your play dough log represents a part of a tree that has recently fallen in a forest. As a scientist, you have cut your log to its current length in order to conduct this experiment. Weigh your log using the scale and record its weight on your log sheet. This number is your log's wet weight. (Note: If you do not have access to a scale, use the following weights: 10 cm long = 5 ounces; 4 in. long = 5 ounces.)
4. Now, calculate your log's dry weight. To do this, subtract 27.5 percent from 100 percent. Multiply the value you just found by your log's wet weight to find its dry weight. Record the dry weight on your log sheet.

   100 percent – 27.5 percent = _____ percent

   _____ percent x wet weight of log = Dry weight of log
5. Multiply your log's dry weight by 50 percent to find how much of your log's weight is made of carbon. Record the carbon weight on your log sheet.

   Dry weight of log x 50 percent = _____
6. As a scientist, you want to measure how much of your log's carbon will be eaten by termites over the next 5 years. Pretend that you have left your log in the forest for 5 years, and have just returned to figure out how much of the log's carbon has been eaten by termites.
7. In this study, the scientists found that up to 20 percent of each log was eaten by termites within 5 years. You discover that 20 percent of your log has been eaten by termites. How many centimeters or inches are equal to 20 percent? Calculate the length of 20 percent of your log by multiplying the original length of your log by 20 percent.

   Original log length x 20 percent = _____
8. In the previous calculation, you figured out the amount of your log that has been eaten by termites. Measure that amount with the ruler and use the plastic knife to cut off 20 percent of your log's length. The amount lost represents the amount of your log eaten by termites.

9. Now you must calculate the amount of the log's carbon that has been eaten by termites. First, multiply your log's dry original dry weight by 20 percent. This value is the dry weight of the portion of the log eaten by termites.

   Original dry weight of log x 20 percent = _____

10. Multiply the dry weight of the part of the log eaten by termites by 50 percent. This number is the weight of carbon that was eaten by termites.

    Dry weight of part of log eaten by termites x 50 percent = _____

11. Record these numbers on your log sheet. Compare these amounts. Note how much carbon was eaten by termites. This carbon is no longer in your log.

12. Think about what you learned about in this article, as well as about what you know about all living organisms. Some amount of carbon has been transformed, moving from a once-living tree to termites. The carbon will then be transferred from the termites to other places in the environment. Examine the carbon cycle illustration on page 14. Your teacher will lead a class discussion about where the carbon eaten by termites might go. At the conclusion of your discussion, answer the question posed at the beginning of the FACTivity.

LOG SHEET

Item measured (unit of measurement)	
Log wet weight (ounces)	
Log dry weight (ounces)	
Amount of carbon in original log (ounces)	
Length of log after 5 years (centimeters or inches)	
Dry weight of eaten log (ounces)	
Weight of carbon eaten by termites (ounces)	