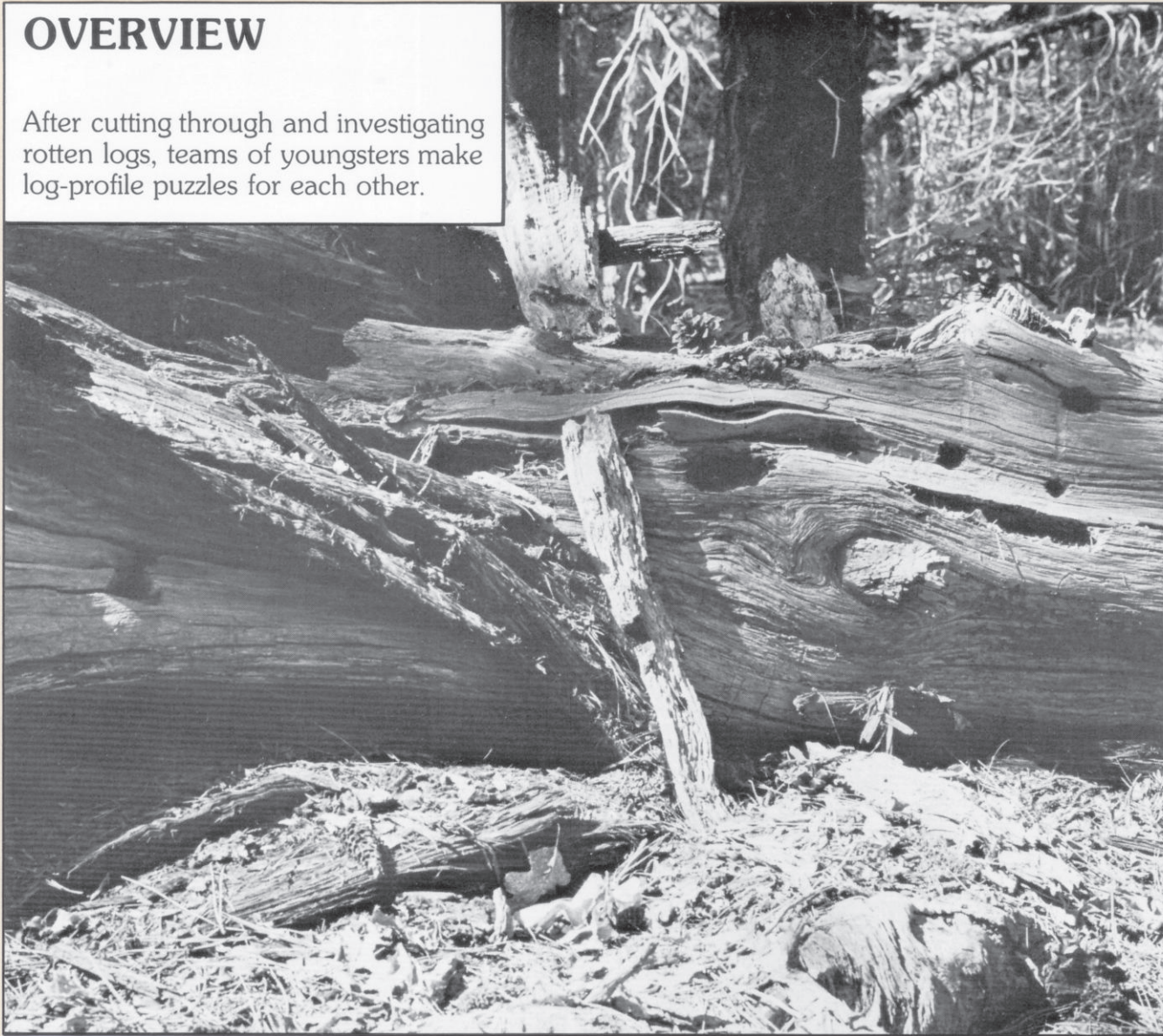


OVERVIEW

After cutting through and investigating rotten logs, teams of youngsters make log-profile puzzles for each other.



BACKGROUND



Have you ever walked through the woods and found yourself stepping over long humps? If you had stopped to push away some of the leaves and twigs covering these mounds, you might have discovered a tree—or what was once a tree.

Over time, a fallen tree serves as a source of nutrients and shelter for millions of organisms. Most of these organisms are microscopic bacteria. Larger organisms

that inhabit the log include fungi, mosses, and small critters such as bristletails, wood lice, millipedes, ants, termites, and beetles. Through the feeding action of the fungi, bacteria, and other organisms, the log is broken down into smaller parts called *humus*. The breakdown of plant and animal matter into smaller parts is called **decay** or **decomposition**. Given enough time and the proper environmental conditions, the log will completely decompose and its materials will be returned to the environment where they can be used again by plants to make food. The process of plants and

LOGS TO SOIL

BIO
KEY

Rotten Logs
Decomposition
Log-Profile Game

animals reusing raw materials and nutrients is called **natural recycling**. Natural recycling prevents the depletion of the raw materials that are essential for plants to manufacture food.

CHALLENGE: INVESTIGATE THE PROFILE OF A ROTTEN LOG.

MATERIALS



For each team of three or four:

- 1 bow saw or crosscut hand saw
- 1 large bag*
- 1 trowel*
- 1 egg carton for storing samples
- hand lenses* or bug boxes*
- 1 marking pen*
- 1 meter tape* or ruler*
- 1 large envelope* (8.5" × 11")
- 4 small index cards* cut into thirds
- 12 paper clips*
- white glue*
- pencils
- 1 Action Card

For the group:

- 1 piece of flagging* for each rotten log
(See the "Preparation" section.)
- 1 sheet of Action Cards*
- extra egg cartons

* Available from Delta Education.

PREPARATION



Group Size. This activity is suitable for both small and large groups if the site contains enough rotten logs.

Time. Plan on forty-five to sixty minutes for this activity.

Site. Any site (yard, woodland, or moist field) with soft pulpy rotten logs is suitable for this activity. The logs should not be newly fallen trees. (These trees can be used in the activity *Sawing Away*.) Look for lumps on the ground; they should be identifiable as logs once the ground litter is removed. You should be able to tear the log apart with your hands. If necessary, obtain permission to cut the rotten logs. Find and flag one log for each team and one for your demonstration.

Materials

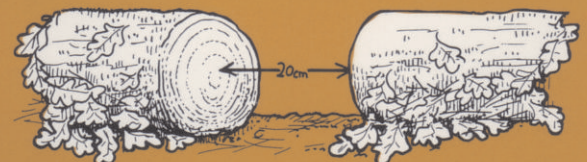
1. Put a trowel, an egg carton, a marking pen, a hand lens or bug box, and a meter tape or ruler into a large bag for each team.
2. Duplicate one Action Card for each team.
3. Cut four index cards into thirds for each team. Place these twelve cards along with twelve paper clips into a large envelope for each team.

Safety. Give the youngsters these rules about saw safety:

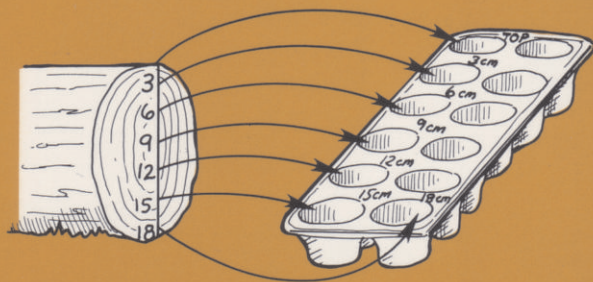
1. When using a saw, keep your fingers (and thumbs!) away from the saw blade. Never run with a saw. When carrying a saw, always keep the teeth of the saw pointing toward the ground.
2. When you are not using the saws, pile them out of people's way.

Sampling Technique. Practice the following technique before meeting with your group.

1. Clear away the litter and soil around the log to expose the whole circumference.



2. With the saw, make two parallel cuts about 20 to 25 centimeters apart straight down through the log.
3. Remove the slice of “wood” from between the two cuts and move it aside. You may have to dig the slice out with a trowel. You now have two exposed vertical profiles of the rotten log for study.
4. Measure the profile of the log from top to bottom with the meter tape. Then remove a small chunk of log material from the profile every 3 cm, starting with the forest litter on top of the log and continuing down to the ground. If you can't obtain a sample with your fingers, use the trowel. Store the samples in profile-order in an egg carton. Use a marking pen to label the egg carton compartments, that is, “Top,” “3 cm,” “6 cm,” and so on.



ACTION

1. Stand on one of the log-lumps at the site, and ask the youngsters what it is. If they can't figure it out, reveal that the lump is a fallen tree. Ask the youngsters how the fallen tree is different from a tree that is still standing.
2. Show the youngsters the log you chose for the demonstration. Have them help you remove the litter and then dig down to the bottom of the log with their hands. Go over the saw-safety rules. Then show the kids how to make two parallel cuts in the log. Remove the section of log between the cuts, and show the youngsters the vertical profiles

remaining on the log. Show them how to take samples from the log profile, and how to store and label the samples in an egg carton. (See the “Preparation” section.)

3. Divide the group into teams of three or four.
4. Give each team an Action Card. Tell the teams that they will each saw through a log and collect profile samples. While they work, the youngsters should answer the questions on the Action Card.

Logs to Soil Action Card



Logging Observations

1. Which part of the log is **decomposing** or rotting fastest? How can you tell?
2. Where in the log do you find the most moisture?
3. What kinds of plants and animals can you find living in or on your log? Are some animals found in certain parts of the log?
4. What might have caused your tree to fall? How long do you think it has been down? How old do you think it was when it fell?

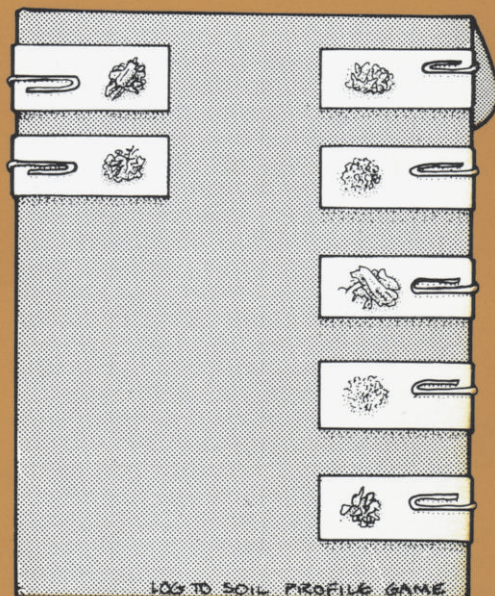
5. Give each team a saw and a bag of equipment. Assign each team to a flagged log, and let them begin. In some cases, the youngsters will have difficulty in making a clear vertical profile, but tell them to do the best they can. Have the youngsters take samples every 3 cm, and to label the egg carton compartments with a marking pen as they place the samples in the egg carton.
6. If a team finishes early, encourage the kids to make a second profile on a different portion of the log, or to sample another log. Provide another egg carton for this purpose.
7. Call the teams together and ask them to discuss their answers to the Action-Card questions. Encourage the youngsters to show their samples as evidence for their answers. (Note: The samples must be saved for the log-profile-puzzle game.)
8. All the logs should be “reassembled” at the end of the activity—complete with

litter on top. Challenge the teams to make the logs look as if the youngsters were never there.

The Log-Profile-Puzzle Game

1. Give each team a container of white glue and an envelope containing twelve cards and twelve paper clips. Have the teams lightly mark a log-profile-level (that is, "Top," "3 cm," "6 cm," and so on) in pencil on the back of each card.

2. Taking the cards in order (top to bottom), have the teams glue small pieces of the log samples from their egg cartons onto the front side of the cards. The piece from the top sample should be glued to the front of the card labeled "Top"; the 3-cm sample is glued to the card labeled "3 cm"; and so on. When they are finished, have the teams clip the cards, sample-side up, around the envelope in random order.



3. After the teams have finished preparing their puzzles, have them exchange envelopes. Challenge the teams to arrange the sample cards in the proper profile order (that is, the same order as the samples appear in the egg cartons from which they came) without peeking at the backs of the cards. When the teams think they have solved their log-profile puzzles, you or the team that set up the puzzle should check their profile order. Give teams that goof another chance.

PUZZLING IT OUT



1. What difficulties did you have in putting the samples into the proper order? What clues did you look for?
2. What similarities and differences did you find in the samples from different logs?
3. What evidence is there that the fallen tree is beneficial to the plants and animals in the environment?

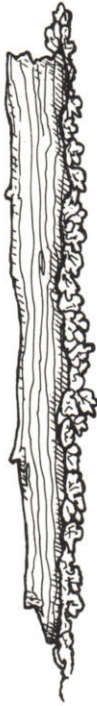
BRANCHING OUT



1. Try growing vegetables or other plants in materials from a rotten log. Find a rotten log that you can crumble up with your hands. Fill several milk cartons with crumbled material from a rotten log. Fill several other milk cartons with garden soil or potting soil. Label the cartons so you can tell them apart. Punch drain holes near the bottoms of the cartons. Plant vegetable (radish, bean, tomato) or other plant seeds in the cartons; water and care for them according to the instructions on the seed packets. Compare the growth of the plants in the two types of cartons over time.
2. Repeat the experiment above, but this time plant several cartons with a 50/50 mixture of rotten log material and garden soil.



Logs to Soil Action Card



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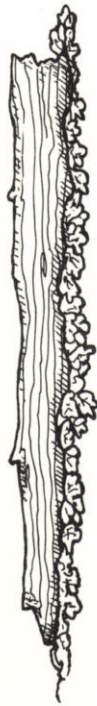
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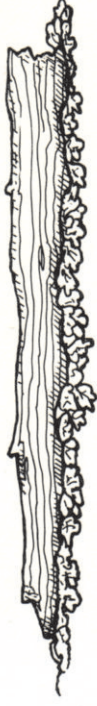
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