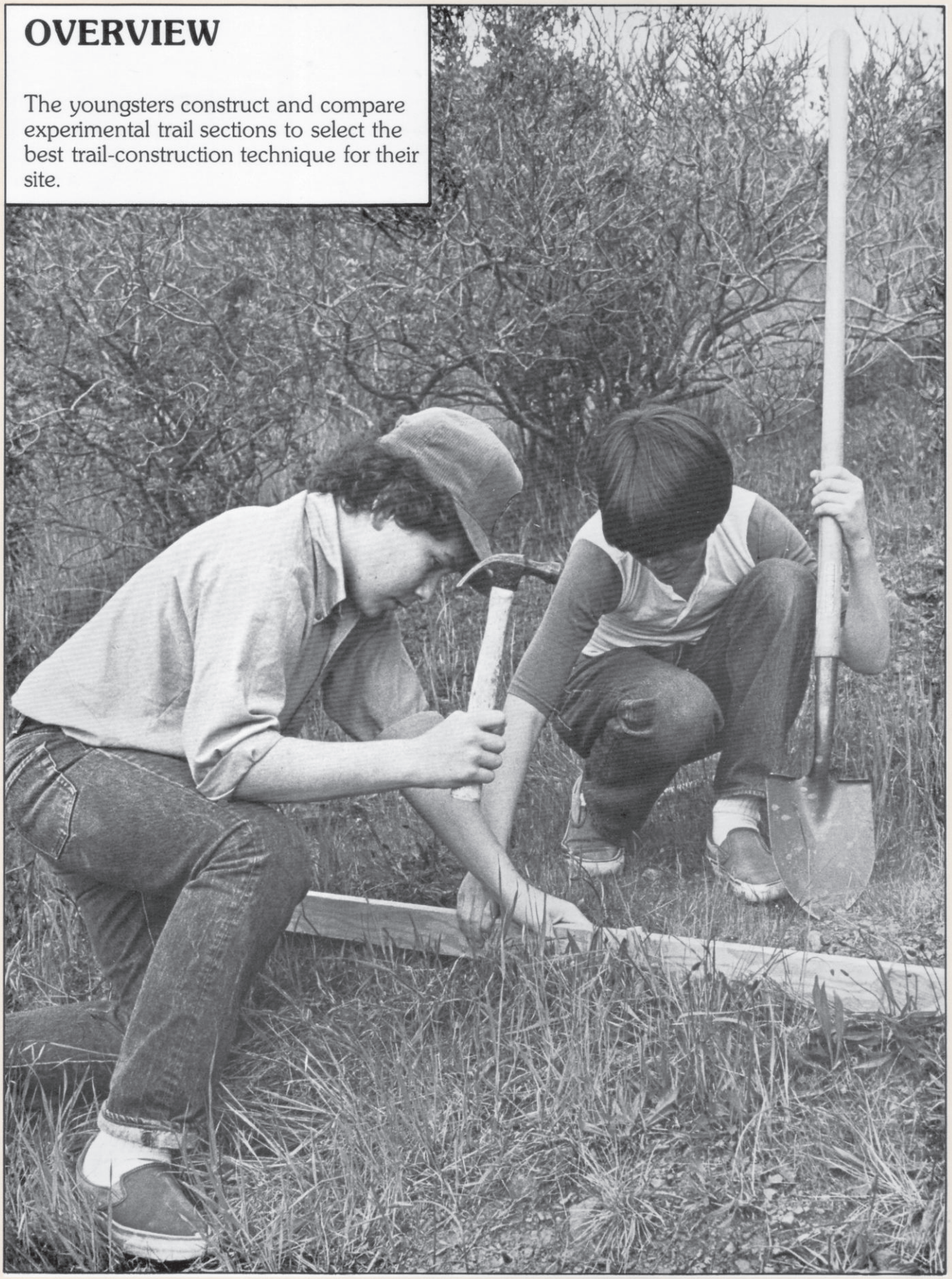
TRAIL CONSTRUCTION

BIO KEY

Trail Construction
Building Techniques
Environmental Impact

OVERVIEW

The youngsters construct and compare experimental trail sections to select the best trail-construction technique for their site.



Published by
Delta Education
Nashua, NH

Developed by
Outdoor Biology Instructional Strategies
Lawrence Hall of Science
University of California
Berkeley, California 94720

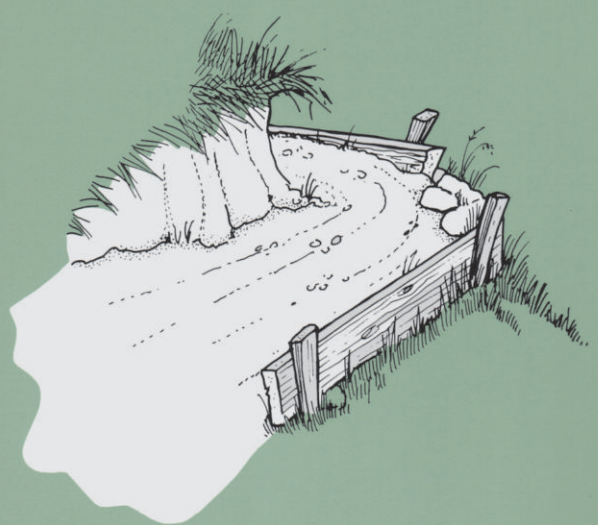
Note: Conduct the other activities in this module before doing *Trail Construction*.

BACKGROUND

The purpose of a trail is to channel foot traffic onto a narrow strip between points in order to reduce environmental damage. The problem in building and maintaining a trail is to provide for human access while minimizing damage to the environment.

Trail Construction allows youngsters to experiment with various trail-building techniques while approaching a specific environmental problem: What is the best way to build a solid, long-lasting trail across a hillside? When the experimental trail sections are completed, the teams use the information gained from the other activities in the Trail Module to evaluate each trail-building technique and its impact on the environment.

CHALLENGE: FIND THE BEST TRAIL-CONSTRUCTION TECHNIQUE FOR YOUR AREA.

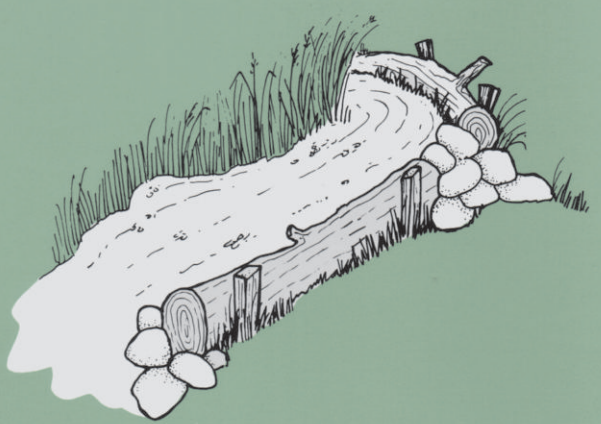


MATERIALS

For each team of three to four:
2 shovels
1 hoe or rake
1 hammer and several nails
6 40- to 50-cm wooden stakes (See the "Preparation" section.)

For the group:
1 meter tape*
2 slope-measuring devices (See the "Measuring Slope" Equipment Card.)
boards, planks, stakes, logs, rocks, and other building materials
graphs and other data from the activities *Cardiac Hill* and *Hold A Hill*
several buckets of water

* Available from Delta Education.



PREPARATION

Group Size. This activity is easiest to conduct with groups of 8 to 16 youngsters. However, larger groups are all right if you have sufficient tools and building materials. We recommend one adult for every twelve youngsters.

Time. Plan on an hour and a half to two hours for this activity. We suggest follow-up visits, spaced several months apart, for assessing the durability and environmental impact of the trail sections.

TRAIL CONSTRUCTION

BIO KEY

Trail Construction
Building Techniques
Environmental Impact

Site. Choose a hillside where you can obtain permission to construct the trail sections. Ideally, the site should be one where a trail is needed or where an existing trail needs to be rebuilt.

Materials. The youngsters may be able to borrow some of the tools from home. If you live near the coast, a bay, or large lake, you may be able to find boards, planks, and other driftwood to use as construction materials. Piles of discarded wood can often be found around construction sites, but ask permission before taking any wood. Stakes can be fashioned from two-by-fours. Prepare about six stakes for each team along with some extras before the day of the activity. Hammers or half-meter lengths of two-by-fours are useful for driving the stakes into the ground.

ACTION

1. Take your group to the area you have chosen for constructing the experimental trail sections. Tell the kids that they will be constructing three- to four-meter trail sections in order to discover the type of construction that is most suitable for trail users and least disruptive to the environment.

2. Divide the group into teams of three or four. Explain that you would like the teams to use different techniques to build their trail sections so that comparisons can be made later.

3. Discuss several different ways to build a trail across a hillside. Encourage the youngsters to think of a variety of construction methods, such as placing retaining walls above and below the trail, and using rock or log borders. See the examples illustrated in this folio.

4. Mention that the teams' trail sections will be evaluated from the standpoint of the "Four E's": *erosion, effort* (to hike), *expense*, and *esthetics*. Erosion will be considered the most important factor. Go over the Four E's with the group:

a. *Erosion:* The slope of the trails should not exceed the maximum slope determined in the activity *Hold A Hill.*
b. *Effort:* The slope of the trails should not exceed the maximum slope determined in the activity *Cardiac Hill.*
c. *Expense:* The cost of materials and labor for building a trail are important. Try to keep the expense to a minimum.
d. *Esthetics:* The trails should look nice and blend into the environment.

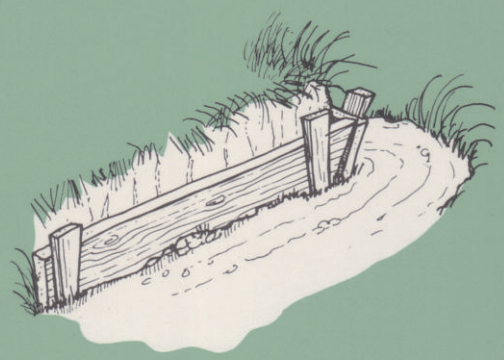
Published by
Delta Education
Nashua, NH

Developed by
Outdoor Biology Instructional Strategies
Lawrence Hall of Science
University of California
Berkeley, California 94720

5. Define site boundaries, and hand out the tools. Show the youngsters the slope-measuring devices and the construction materials, and send the teams off to build.

6. Circulate among the teams, offering encouragement and help when needed.

7. After the trail sections have been constructed, evaluate the results. Encourage each team to inspect the other trails and to evaluate them on the basis of the Four E's. Have buckets of water available for checking out the wash-out potential of a trail. Slope standards can be checked with slope-measuring devices and pulse counts.



TRAILING ON

1. What are the strengths and weaknesses of the trail your team constructed?

2. Were you able to use natural materials (e.g. logs, branches, rocks) in your trail construction? Contrast the use of these available materials to the use of bricks, lumber, nails, and other manufactured materials.

3. If you were to use natural materials, what plants or animals might be affected by your gathering?

4. Do you think a trail through your study area would be an advantage or a disadvantage for the local wildlife? Why?

5. Is there an area where a trail should not be built? Why?

BRANCHING OUT

1. Visit the trail sections every few months to evaluate the durability and environmental impact of the sections.

2. Find some animal trails in your area (e.g. that mice, rabbits, deer, cattle, or sheep use). Are the trails easy to follow? How do the animals deal with "problem spots" on their trails? Would these trails make good trails for people?

3. Design and build a complete trail. Camps, parks, and recreation centers may have a need for some new trails.

4. Find out how government agencies (such as the U.S. Department of Forestry) build trails. They usually operate with a set of guidelines. Get a copy. Compare your discoveries with the techniques used by the professionals.

Cardiac Hill
MEASURING SLOPE

Equipment Card 2

MATERIALS FOR ONE SLOPE-MEASURING DEVICE

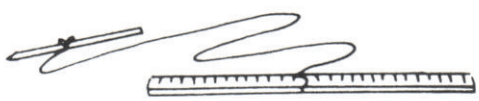
1 meter stick*
1 125-cm length of strong cord*
1 25-cm sharpened stick
1 line level* or level tube consisting of a test tube*, popsicle stick*, and a cork*
household ammonia*
water
tape*

* Available from Delta Education.

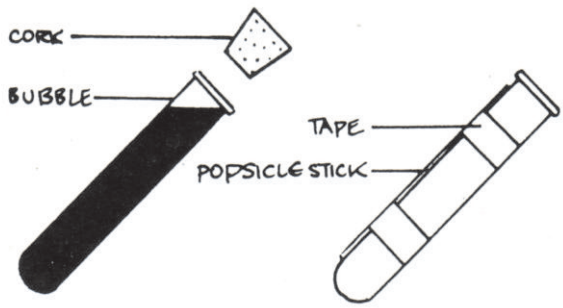
ASSEMBLING THE SLOPE-MEASURING DEVICE

1. Sharpen the 25-cm stick and fasten the cord to it with a knot that enables the cord to slide up and down the stick. This is the "anchor stick."

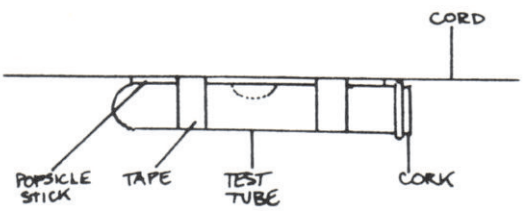
2. Attach the free end of the cord to the meter stick so that the distance between the two sticks is one meter. Make a knot that can slide on the meter stick. (You can use any stick marked off in centimeters if you do not have a meter stick.)



3. Attach a line level to the center of the line between the sticks. Here are instructions for making a level, if you choose to make your own. Fill the test tube almost full of water and add a drop of ammonia to stop algae growth. Cork the tube so that a small bubble remains. Trim off the top of the cork. If your test tube has a flared lip



at the top, tape a popsicle stick to the side of the tube before taping the tube to the center of the cord. Your level should look like this:



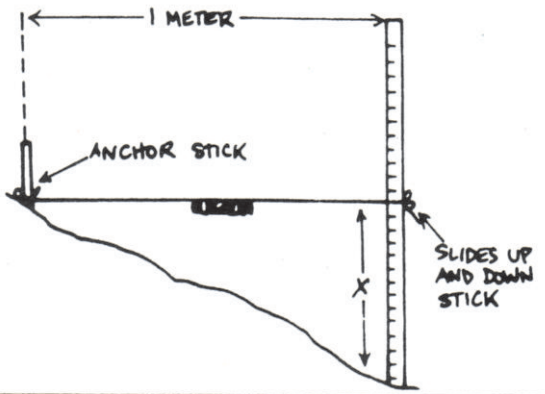
TO USE THE SLOPE-MEASURING DEVICE

1. Place the anchor stick in the ground at the upper part of the slope. Push the string down to ground level.

2. Go down the slope until the string is taut, and rest the meter stick vertically on the ground (zero-end down).

3. Slide the knot on the meter stick up or down until the line level indicates the cord is level.

4. Read the value under the knot on the meter stick. This is the slope in centimeters per meter.



Published by
DELTA EDUCATION