

# Keeping Soil in Its Place

## *Slip Slidin Away*

### Objectives

Students will be able to demonstrate rain drop splash or splash erosion, and determine its impact on bare soil.

Students will be able to visually identify types of erosion.

### Materials

- Splash Zone Target (these could be made on a transparency, this way they could be washed and used year after year)
- Graph handout
- Soils on the Move handout
- 5 teaspoon of dry soil
- eyedroppers
- water
- rulers
- Erosion Control Practices transparency
- Soil on the Move transparency

### Time

Activity 1: 40 minutes

Activity 2: 20 minutes

Activity 3: 20 minutes

### Getting Started

Gather materials, and make the necessary copies.

### Procedures

#### **Activity 1 - Splash Zone**

1. Divide the class into five groups.
  2. Give each group a Splash Zone Target, eyedropper, and a small container of water.
  3. Instruct student to put enough soil (about a teaspoon of dry soil) in the center of their target to just cover the center circle.
  4. Fill the eyedropper with water
  5. Hold the eyedropper about 12 inches (30 cm) above the soil sample.
  6. Drop 5 drops of water directly onto the soil sample. If a drop misses the soil, continue until 5 drops hit the soil.
  7. Record the number of water “splashes” drops containing soil in each zone.
  8. Complete the graph to show your results.
  9. Discuss questions in Discussion section before moving on to Activity 2.
- \* *You may want to repeat this activity with drops from 1 meter high. Also try the activity with wet soil.*

#### **Activity 2 - Soils on the Move**

1. Introduce students to the types of erosion using the erosion section in the “*Dirt: Secrets in the Soil*” video and the background information.
2. Provide each student with a copy of the “Soils on the Move” handout or make a transparency.
3. Label the handout or transparency. Discuss how each type of erosion differs.

#### **Activity 3 - Methods for Controlling Soil Erosion**

1. Introduce students to the methods for controlling erosion using the erosion section in the “*Dirt: Secrets in the Soil*” video and the background information. You could also duplicate the demonstration using the erosion trays “turkey pans” in the video.



2. Student should complete the Erosion Control Practices activity sheet, or use it as a transparency for discussion.
3. Discuss the various methods and why they are used.
4. Answers: 1) streambank erosion, 2) gully erosion, 3) wind erosion, 4) rill erosion, 5) sheet erosion.

### Discussion

1. What did you observe? How did the soil particles move from the center of the target? (they were picked up and moved with the water)
2. Which zone contained the most number of water drops with soil particles? Why?
3. Which zone contained the least number? Why?
4. What would happen if the drops were larger? (splashes would travel further)
5. How might you prevent splash erosion? (plant vegetation, cover the soil with mulch)
6. How do farmers decide which erosion control methods to use? (it depends on the slope, soil types, and what he or she wants to plant)

### Background

Erosion is a naturally occurring process. Erosion has given us some of our most beautiful landscapes. There are beautiful erosion formations such as the Grand Canyon, Kolob Canyon (Zion National Park) the San Rafael Swell (Emery County) or Bryce Canyon, to name a few. Erosion is the loosening, transportation and relocation of soil particles from one place to another. Erosion occurs primarily due to the action of wind and water. The rate and extent of erosion are determined by soil type and condition, slope of the land, plant cover, land use and climate.

Erosion does not occur only on wilderness landscapes, and the effects are not always positive, especially when you are talking about productive topsoil. Landslides, can bury towns and claim thousands of lives. Streams or rivers loaded with eroded soil can turn sources of clean drinking water into major health hazards.

Water erosion includes raindrop splash, sheet erosion, rill erosion, gully erosion, and slumping or mass erosion. **Raindrop splash** is the most obvious on bare ground during a torrential rainstorm. The raindrops strike the ground and upon impact break soil particles apart, splashing these particles into the air. The impact of raindrops can be lessened by plant cover. Plants break the fall of the raindrops and allow for water infiltration or percolation.

**Sheet erosion** is the washing away of a thin surface layer of soil over a large area of land. Because sheet erosion occurs evenly, it is generally not obvious until most of the topsoil is removed.

**Rill erosion** may be noticeable on sloping bare ground after a rainstorm. Water forms small, well defined channels that carry soil away from the sides and bottom of these channels. The rills of channels erode more soil as they move downslope and increase in size.



When rills become large, the process is called gully erosion. This severe form of soil erosion removes tones of soil from the sidewalls and bottom of the gully.

Streambank (and coastal erosion) erosion is the cutting away of the banks by water. It is generally a slow process which represents the normal situation occurring along most streams. It is most active during floods when the amount and velocity of water are the greatest and when the bank soils are submerged under water and saturated.

To control erosion plant cover is usually the best solution. But to grow our food farmers make *furrows* in the land for *row crops*. A farmer can use a variety of methods to “keep soil in its place.” A farmer may plant his or her crops around the curve of a hill rather than up and down the hill, this is called *contour planting*. Plowing will also be done on the contour. Farmers may also build *terraces*. Terraces are wide ridges that go around a hill to prevent water from rushing down the hill too fast. On steep hillsides, rather than clear the area for cropland, farmers will maintain the area in *forest and grass*. Water always runs down hill, farmers do not plow in these low areas where water collects, instead they maintain these low ditch areas as *grassed waterways*.

Soils susceptible to wind erosion should be kept covered with some kind of vegetation. If this cannot be done year-round, a *windbreak* of trees and shrubs may be planted. Windbreaks are rows of trees planted to slow down the wind and prevent soils from blowing in the wind.

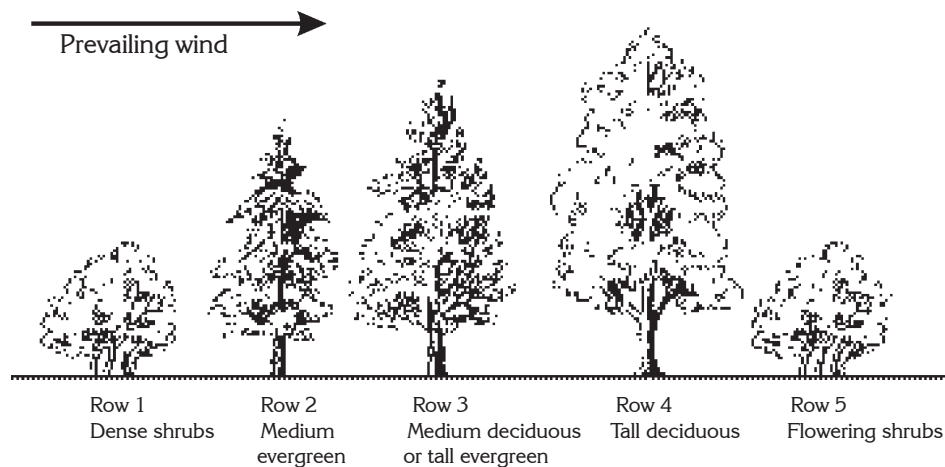
**Vocabulary**

mulch: a covering placed on bare soil to keep it from eroding, loose leaves, straw, bark chips etc.

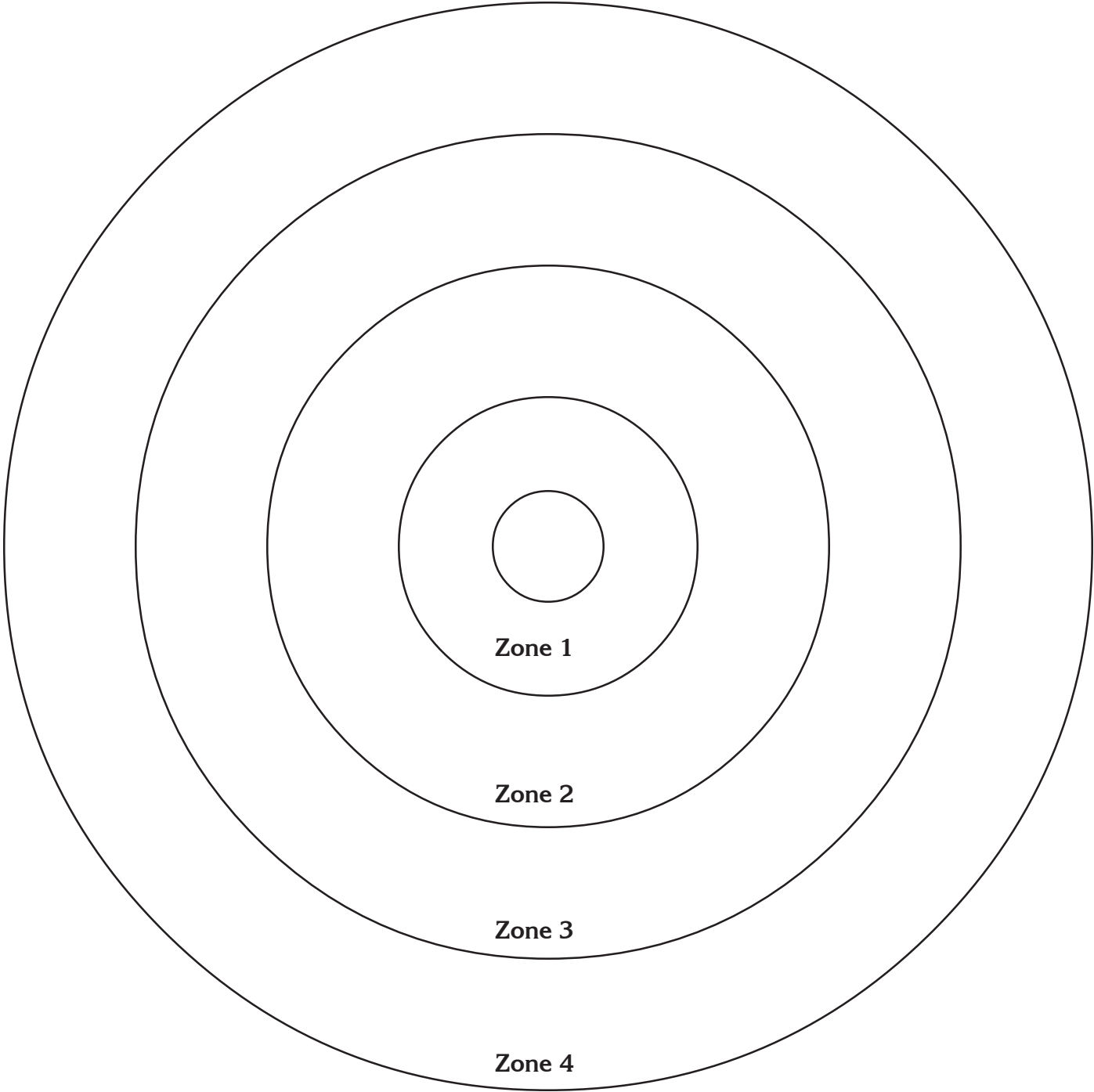
furrows: small ditches (2-6 inches deep) between the rows of plants used to convey water.

row crops: plants planted in a row to facilitate harvesting and watering.

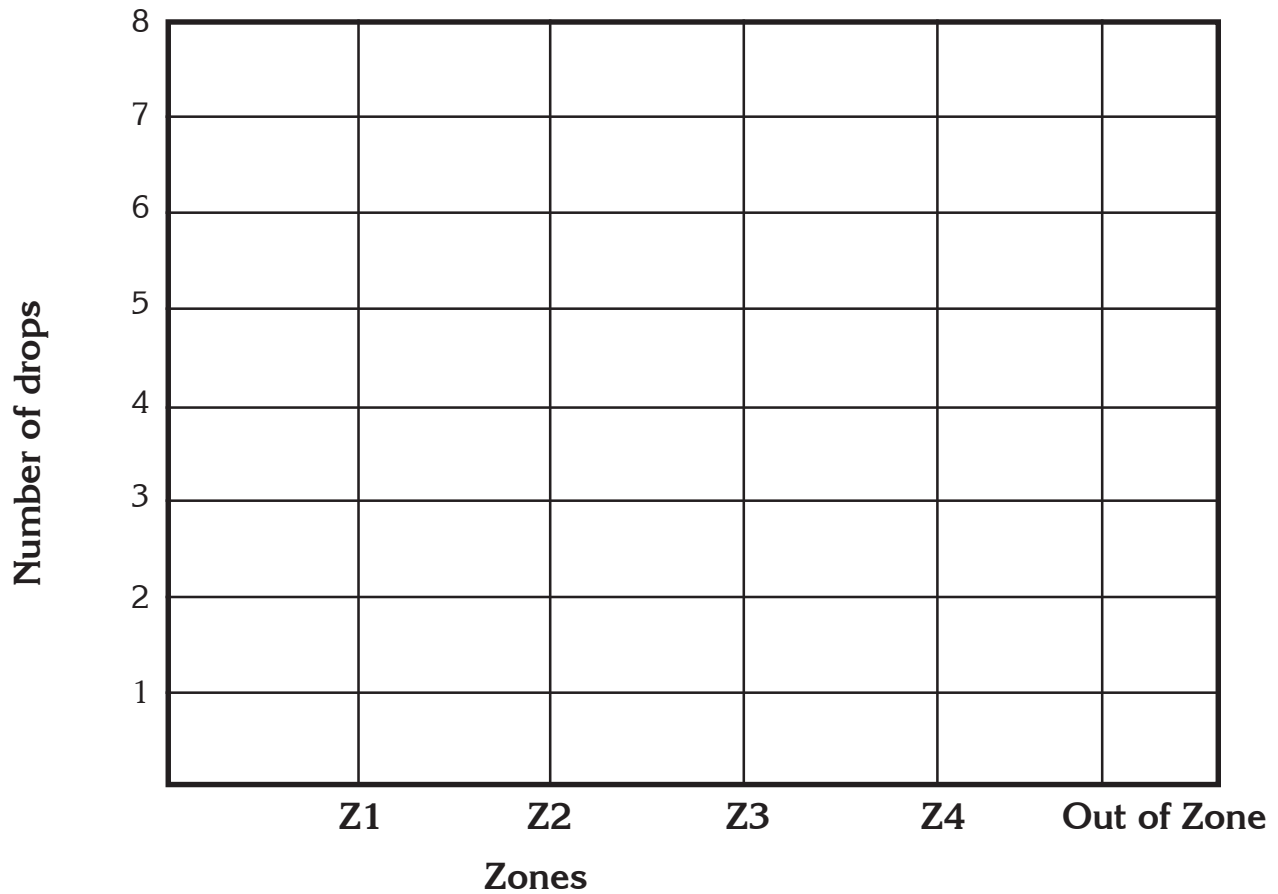
**Windbreak**



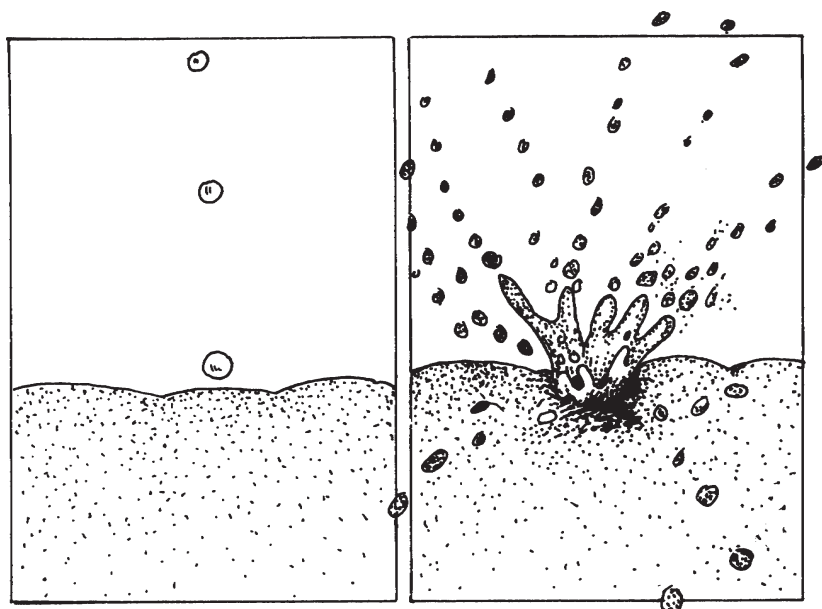
# Splash Zone Target



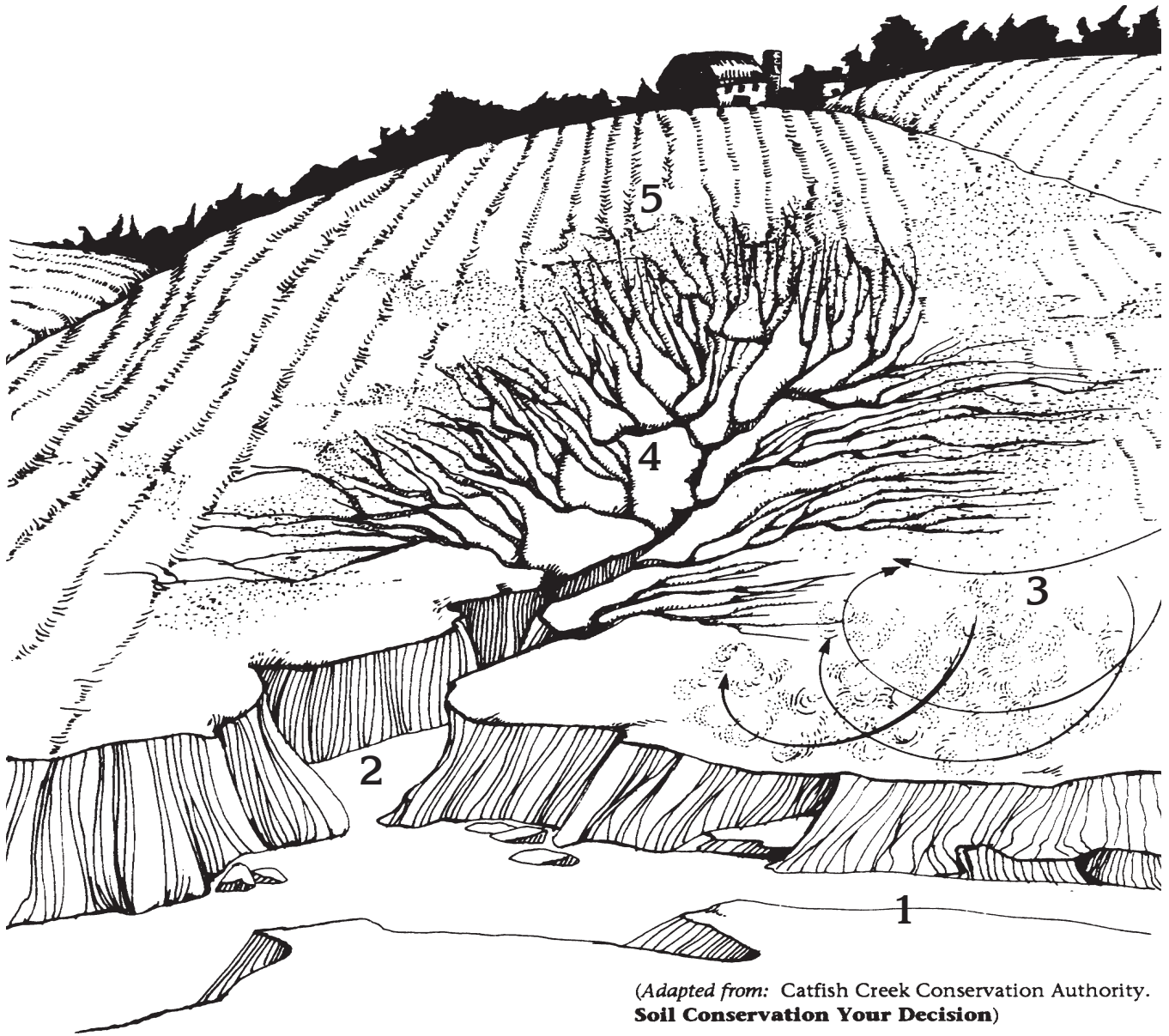
# Splash Zone Graph



## Raindrop splash



# Soils on the Move



Identify which area is:

\_\_\_ wind erosion

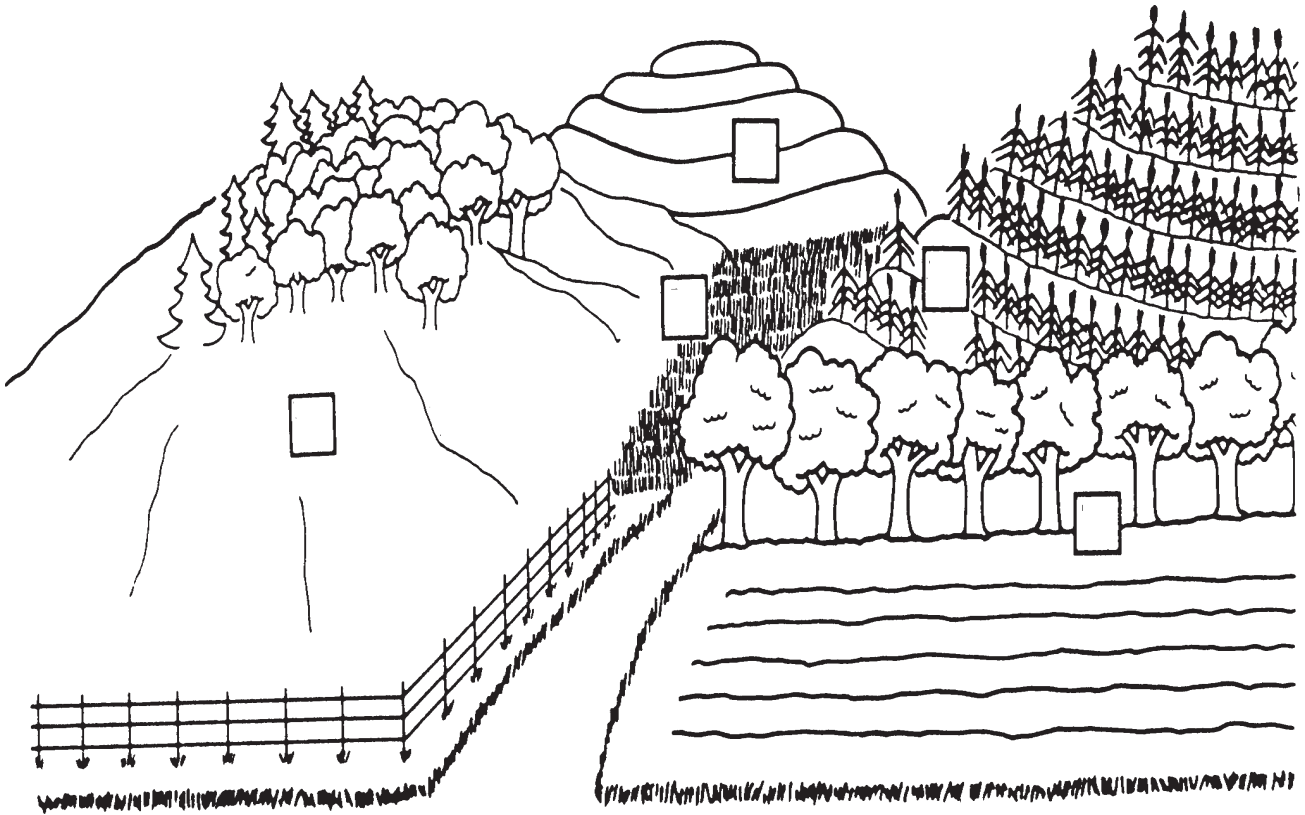
\_\_\_ gully erosion

\_\_\_ rill erosion

\_\_\_ streambank erosion

\_\_\_ sheet erosion

# Erosion Control Practices



Farmers use several methods to conserve soil. Match the number of practices below in the correct box in the picture.

1. **Contour Planting:** plant crops around the curve of a hill rather than up and down the hill.
2. **Terraces:** wide ridges that go around a hill to prevent water from rushing down the hill too fast.
3. **Forest and Grass Areas:** keep steep hillsides in trees or grass rather than clear for cropland.
4. **Grassed Waterways:** plant grass and don't plow low areas in a field where water usually runs.
5. **Windbreak:** rows of trees planted to slow down the wind and prevent soils from blowing.