Nature's Water Filters

Background

Soil filters particles out of water passing through it. Various kinds of soil have different abilities to filter pollutants out of water. Soil that is fine, like fine sand, will be able to trap more sizes of pollutants than loosely formed soil made of large particles.

If the flow of water is slowed down, it is more likely to enter the ground's surface and pass through the soil. The slower the water passes through the soil profile, the more particles can be filtered out. The rate at which water passes through the soil is called the "percolation rate." As runoff and pollutants carried by water percolate through the soil, these particles are trapped within the soil. Many of the minerals in soil chemically bind to the introduced pollutants, and here they are stored or even "eaten" by bacteria, resulting in cleaner ground and surface water.

Preparation for the experiment

1. Punch a lot of small holes in the bottom of each plastic milk jug (one jug for each sample being collected). Cut off the top of each jug.
2. Collect soil samples: sand; clay; gravel; humus-rich organic soil found in the top few inches of the forest floor or garden, made of decomposed plants and animals
3. Fill each plastic bottle half-full with soil. Label each with the soil type.

Procedure

1. Place the soil-filled jug over an aluminum tray and pour a glass of water over the soil.
2. Collect the drainage in the aluminum tray. Use a funnel to transfer the drainage to a second glass container.

u Which soil filtered the water best?

u Why do you think some soils filtered better than others?

Answer:

A sample with fine particles that fit close together, and one with a tangle of roots throughout, should be better filters (capture more) than a loose sample with large particles and lots of pore spaces.

(over)

Grade Levels:
Demonstration K-3
Group Experiment 4-6

Science SOLs: 2.7, 3.7

Materials Needed:
- **bags or containers for collecting soil**
- **1/2 gallon samples of several soil types (sand, clay gravel, loam, humus)**
- **a nail**
- **large funnel**
- **several aluminum pans**
- **scissors**
- **water**
- **a one gallon plastic milk jug or plastic bottle for each soil sample collected**
- **two glass containers for each soil sample collected**
- **recording sheet (see back pg.)**

Vocabulary Words:
clay
erosion
humus
loam
nonpoint source pollution
percolation rate
sand
silt
soil horizon

3. Record your findings in the chart below:

	Water Clarity Rate Results			
	Soil Type	2nd Pour	3rd Pour	4th Pour
Sample I				
Sample 2				
Sample 3				
Sample 4				

NOTE: Rate water clarity from 1-5, where 1=cloudy and 5=clear

4. Pour the dirty water over each of the soil samples again. Record your findings. Does the water eventually become clear?

Picture This — Clean Water

Research ways that contractors, road builders, and home owners can prevent nonpoint source pollution. You'll find some of the answers in the book, *Watershed Connections*. Write your ideas down.

_____

_____

_____

_____

_____

Gutters and Downspouts — A Drawing Activity

Draw a picture of a house and yard. There are many things you can do to help take care of soil and water. Look at your drawing and answer these questions:

1. Does the house have gutters along the edge of the roof?

Gutters and downspouts help prevent soil erosion. If you didn't draw them on your building, add them now.

2. Draw some grass, flowers, and shrubs next to your house where the downspouts empty onto the ground. The plants will make the house pretty. They will also act like big sponges and help to keep soil from washing away when it rains.

3. Is there a sidewalk in your picture? What is it made of? Sidewalks made of stones, gravel, or bricks (uneven surfaces with air holes) let rain soak into the ground.

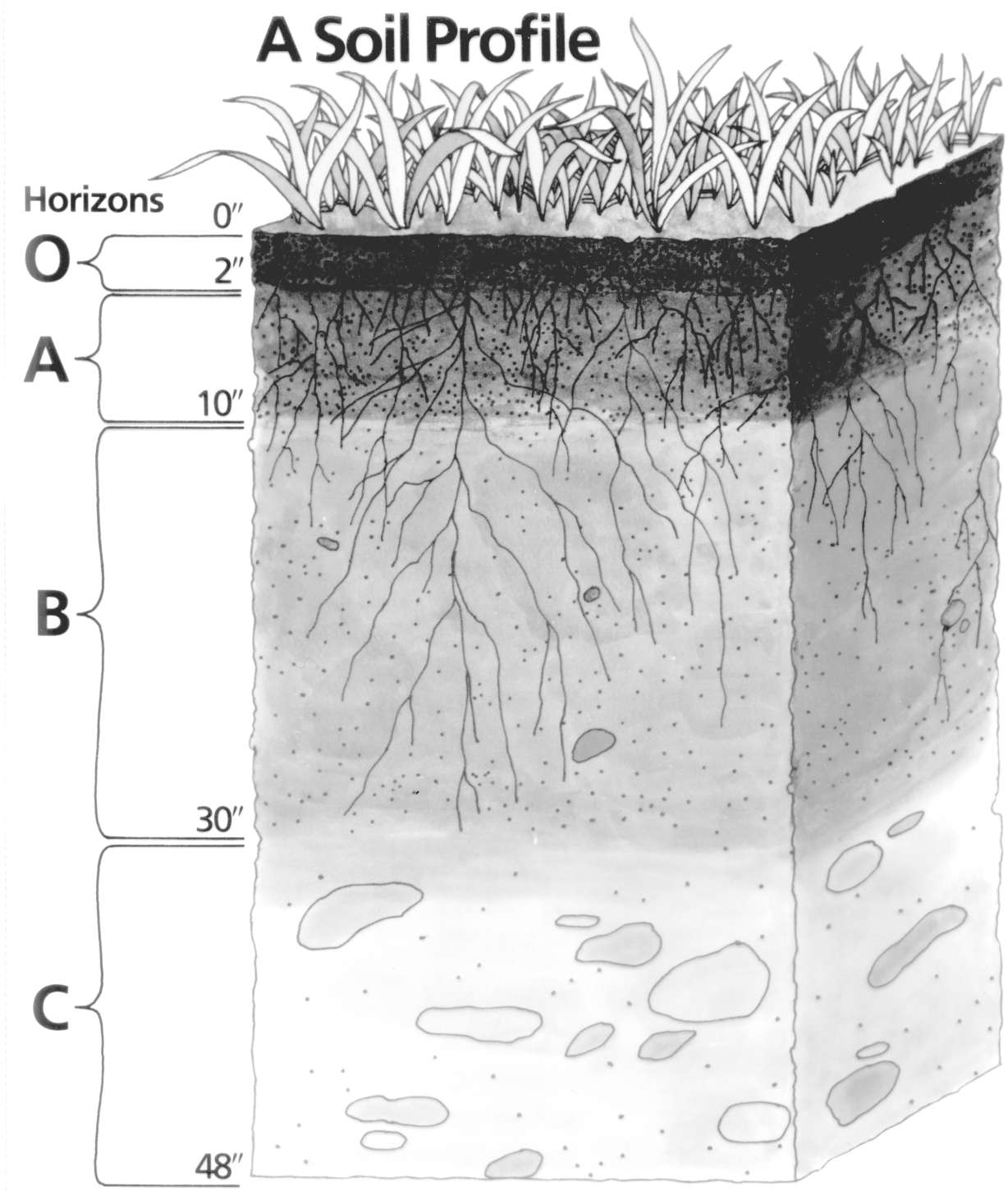
4. Is there a pet in your picture? Cleaning up after pets is important if you live in the city or suburbs. When it rains, animal waste washes from sidewalks into street storm drains. It could end up in your neighborhood creek or stream. If you were a fish, would you want that dumped in your living room? Be a pooper-scooper. Clean up after your pet.

Grade Levels: 1-6

Science SOLs: 1.8, 2.7, 6.11

Materials Needed:
- drawing paper
- markers or crayons
- Watershed Connections activity book

Vocabulary Words:
erosion
nonpoint source pollution



Source: USDA Natural Resources Conservation Service.