Maryland Department of Agriculture

Soil Activity Book

Discover the Hidden World of the Living Soil

The soil beneath our feet is full of life. Mice, rabbits, moles, earthworms and many types of insects live in the soil. As these creatures burrow and tunnel, they mix the soil, allowing air and water to penetrate beneath the ground's surface. Plant roots reach deep into the soil in search of air, water and nutrients needed for growth.

Millions of microscopic organisms that are too tiny to see also inhabit the soil. Along with earthworms and other soil creatures, they help decompose or break down dead plant and animal tissue. In the process, they help to create plant food and build new soil.

The next time you stand on the soil, think about the millions of living organisms at work beneath your feet. They are part of a cycle that returns valuable nutrients to the soil. Without these unseen creatures, the plants we depend on for food could not grow, and the cycle of life on Earth would be broken.

Can You Identify the Soil Critters?

- Rabbit
- Ants
- Mole
- Fungi
- Earthworms
- Bacteria

Look Inside the Earth

A Soil Profile

If you could look below the Earth's surface, you would see that soil is formed in layers. Soil scientists call these layers horizons. By studying soil horizons scientists can determine the age of the soil, how it was formed and its suitability for farming, construction or environmental projects.

ORGANIC HORIZON

The top layer of the soil consists of dead plants and animals that are decomposing. They create nutrients and organic matter that enrich the soil and provide growing plants with food.

TOPSOIL

Topsoil is the rich, dark soil that farmers and gardeners love. Full of nutrients, topsoil is the most productive layer for growing plants and supporting life. Earthworms, insects, microorganisms and plant roots live here.

This Land is Our Land *Don't Trash It!*

Litter comes in all shapes and sizes. It's not pretty and it's not a nice way to treat our land. Fast food wrappers, water bottles and juice boxes dot many of our ball fields and streets. But you can help! The next time you have a game, bring your drink in a reusable container and ask your teammates to do the same. When snacks are provided, don't leave wrappers or empty bottles on the bench. Bring a trash bag from home and start a team recycling program. At the very least, put litter in the trash can.

SUBSOIL

Just below the topsoil is the subsoil. This layer is rich in minerals but low in nutrients and organic matter which makes it less productive for plant growth. If topsoil is washed or stripped away, plants are forced to find nourishment in the subsoil.

PARENT MATERIAL

This layer contains the rocks and minerals from which the upper soil layers were formed. There is a very small amount of organic matter here. The foundations of large buildings are usually anchored into the parent material because it is so stable.

BEDROCK

Solid rock that lies beneath the soil. This provides a foundation for all of the other layers.

Photo courtesy of USDA Agricultural Research Service

Unscramble the red letters to solve the riddle.

Why do soil scientists dig their work?

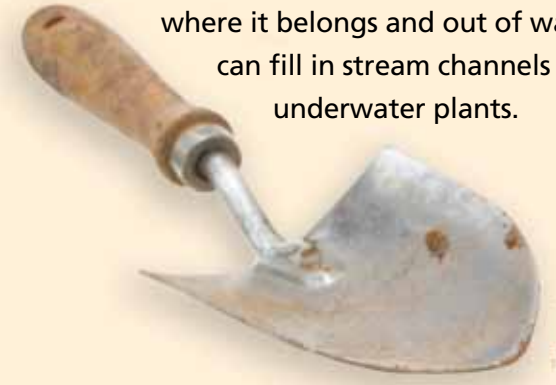
Because it □□□□□.

answer: ROCKS

Why We Need to Save the Soil

Soil is made from eroding rocks, minerals, water, air and decaying plants and animals. Time, climate and location all play a part in how soil is formed. Here in the United States, soil scientists have identified more than 17,000 types of soil based on color, particle size, ability to hold water and other factors. But making soil is slow work. It takes nature hundreds of years to make just one inch of topsoil. Yet topsoil can easily be washed away in just one afternoon during a heavy rainfall.

Farmers work hard to keep topsoil on their crop fields where it belongs and out of waterways where it can fill in stream channels and harm fish and underwater plants.



Match the causes of soil problems in the first column with the solutions in the second column.

Problem	Solution
1. Soil Runoff	a. Plant trees and windbreaks to slow down the force of the wind.
2. Soil Contamination	b. Plant buffers of trees or grasses next to streams to slow down and trap sediment coming off the land.
3. Wind Erosion	c. Use natural or less toxic alternatives to control weed and insect pests.

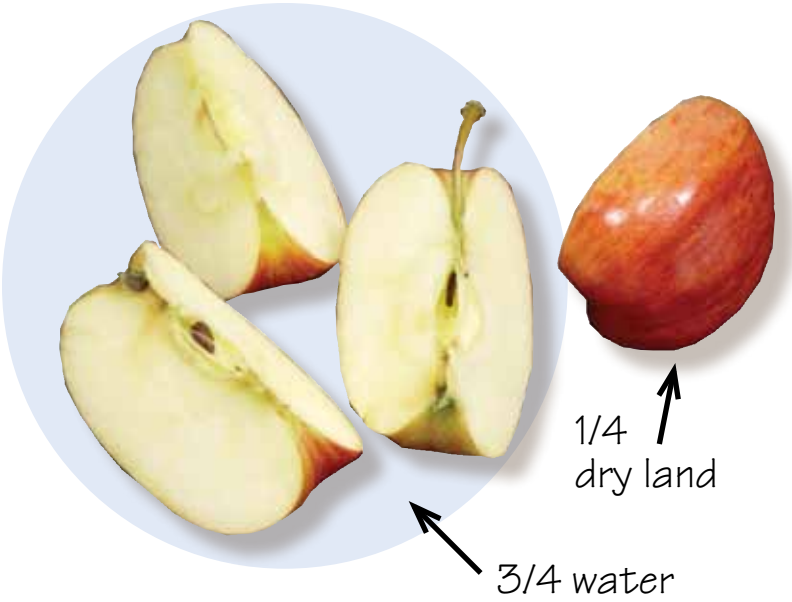
answers: 1. b 2. c 3. a

If the Earth is Our Apple...

Where Do We Plant Our Seeds?

We depend on rain, sunlight and soil to grow food. At first glance, it looks like there is a lot of soil on Earth…but look closer, and you'll see that there's a lot less soil than most of us realize.

Pretend that an apple is the planet Earth, round, beautiful and full of nature's bounty. Cut the apple into four equal parts and set three of these parts aside. They represent water, which covers 3/4 of the Earth's surface.



The remaining apple slice represents dry land. But half of this land is either too hot or too cold to grow food. Cut the apple slice in half again and set aside the portion that cannot support food because of climate.

You are now left with 1/8 of the apple. But nearly half of this soil cannot be used to grow food because this soil is too wet, dry, rocky, poor, or steep. Cut away almost half of the apple again and set the smaller portion aside. A little more than 1/16 of the apple remains.

Now, carefully peel the skin off this one remaining apple slice. The tiny slice of skin represents the soil that we depend on for the world's food supply. Some of this soil has been paved over with highways, parking lots and shopping malls. Agriculture also competes for this soil with our homes, factories, businesses and towns and cities.

Trivia

1. **How much of the Earth is covered in water?**
   ¼ ½ ¾
2. **True or False: Most of the soil on Earth is incapable of growing food.**
3. **The skin of the apple represents the ☐☐☐☐ we depend on for food.**

answers:
1. ¾ 2. True 3. soil

Life on Earth Depends on Clean Water and Productive, Healthy Soil

The Soil Food Web

Don't treat soil like dirt—soil is the stuff that feeds you. Healthy soil supports healthy environments and healthy environments support healthy people. Use the word bank to help answer the questions.

1. Grass, trees and crops are some of the types of plants that grow in the soil. Their roots help hold the ☐☐☐☐ in place.

2. Plants that grow in the soil provide ☐☐☐☐, clothing and shelter for people.

3. Cows, ☐☐☐☐☐☐☐☐ and pigs live on the land and eat grass or crops that grow in the soil.

4. We get many food products from animals, including milk, ☐☐☐☐ and eggs. Chicken nuggets, hamburgers and ice cream come from animal products.

5. Things like wool blankets and ☐☐☐☐☐☐☐ sneakers also come from animals.

Fun Fact: More than 3,000 products are made from corn, including crayons, glue, chewing gum and a cleaner burning fuel for our cars called Ethanol.

What covers all, yet is covered; is bursting with life seldom seen; comes in all the colors of the rainbow; and has been fought on and over for centuries?

answer: soil

Word Bank

answers:
1. soil 2. food 3. chickens 4. meat 5. leather

Hugh Hammond Bennett and the Legacy of the Dust Bowl

Photos courtesy of USDA Natural Resources Conservation Service

"Take care of the land and the land will take care of you."

— Hugh Hammond Bennett

Hugh Hammond Bennett (1881-1960) is known as the father of soil conservation. He led the soil conservation movement in the United States during the Dust Bowl years of the 1930s.

During this time, the Great Plains states endured several years of drought. The lack of rain, combined with poor farming practices, caused soil from over-plowed fields and over-grazed lands to blow away in huge, devastating dust storms. The topsoil was lost, crops were destroyed, farms were ruined and thousands of families were forced to leave their homes.

Bennett went to Congress to ask for help with the crisis. To get the attention of lawmakers, he dramatically threw back the curtains to show the sky, which was darkened by soil that had blown into Washington, D.C. from the nation's heartland more than 2,000 miles away!

Congress unanimously passed laws creating a national soil conservation program. It's the origin of local soil conservation districts that work with farmers and developers to protect and conserve the soil. Bennett was a tireless crusader for soil conservation whose knowledge, passion and showmanship sparked a worldwide conservation movement that exists today.

Sources:

National Association of Conservation Districts
509 Capitol Ct, NE | Washington, DC 20002
202-547-6223 | www.nacdnet.org

USDA Natural Resources Conservation Service
1400 Independence Ave., SW, Room 5105-A
Washington, DC 20250
202-720-7246 | www.nrcs.usda.gov

With additional assistance provided by the Maryland Agricultural Education Foundation and Maryland NRCS.

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Recycled Paper MDA 15.15.16