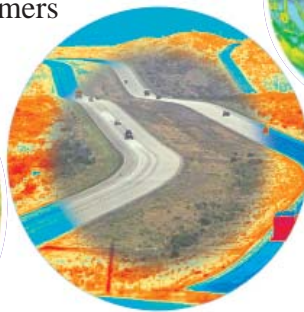
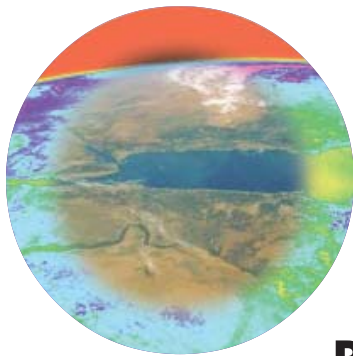
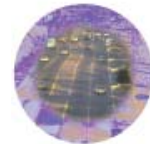




Why Is Soil Important?

One of the most important natural resources is soil. It covers much of the earth's surface. Most life on earth depends upon the soil for food. Plants are rooted in the soil and get nutrients (nourishing substances) from it. Animals also get nutrients from eating the plants that grow in the soil. Soil is home to many organisms such as seeds, spores, insects, and worms. We build sidewalks, roadways, and homes on the soil. Soils also help filter out pollutants that could contaminate our drinking water. There are many different kinds of soil. It forms very slowly and is destroyed easily. That's why it's important that you and farmers help take care of it.



Plants Keep It in Place

At Home

Have you ever looked at the yard of a newly built home after a hard rain? Since there is no grass in the yard, gullies or small trenches form. This is called erosion. Erosion is the wearing away of soil by wind and water. When erosion occurs, the topsoil layer is washed or blown away. In the United States, erosion has caused us to lose 6.43 billion tons of soil per year. This would be the equivalent of 320 million dump trucks. If you were to park these trucks end to end, they would extend to the moon and three quar-

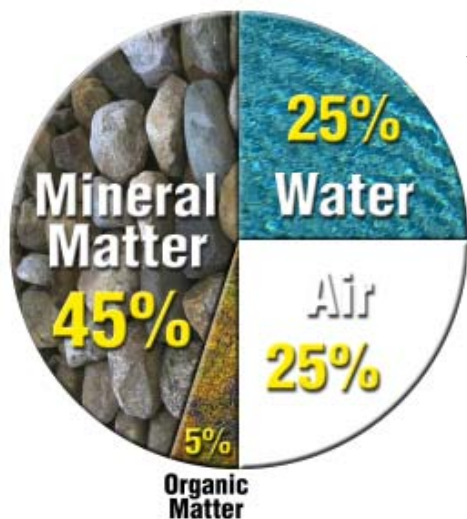


ters of the way back. In Illinois, the majority of our soil loss is caused by water erosion. The best way to prevent wind and water erosion is to protect the soil with healthy vegetation.

On the Farm

Even dead plants help prevent soil erosion. In the past farmers plowed their fields after harvest to mix the plant stems and leaves with the soil. This is called tilling. Today many farmers leave the stems on the ground to help keep the soil in place. This is called no-till farming. Illinois has more no-till acres than any other state. That makes us #1!

Soil Parts



About one-half of soil is made up of pores full of air and water. Roots need oxygen from the air, and they need water since plants are made of mostly water. The other one-half of soil is minerals and organic (humus) matter. Some of the nutrients in the humus and minerals dissolve in the water so plants can absorb them.

A Slice of Soil

Soil is one of our most important natural resources on the earth's surface. Many living things depend on it for food. People do too. Not all soil is good enough for plants to grow. Complete this activity to learn just how little soil we have to grow food.

An apple and paring knife are needed for this activity:

1. Cut an apple into four equal parts. Three parts represent the oceans of the world. The fourth part represents the land area.
2. Cut the land section in half lengthwise. Now you have two $\frac{1}{8}$ pieces. One section represents land such as deserts, swamps, antarctic, arctic, and mountain regions. The other $\frac{1}{8}$ section represents land where man can live and may or may not be able to grow food.
3. Slice this $\frac{1}{8}$ section crosswise into four equal parts. Three of these $\frac{1}{32}$ sections represent the areas of the world that are too rocky, too wet, too hot, or where soils are too poor to grow food. Plus, we can't grow food on some land because cities and other man-made structures are built on it.
4. Carefully peel the last $\frac{1}{32}$ section. The peel on this small piece represents the amount of soil on which we have to grow food. This amount of soil will never get any bigger.



With so little soil and so many people on the earth, how are we able to grow enough food to feed everybody? Read on to find out!

How is Soil Formed?

Soil is formed from rocks and minerals very slowly breaking down and organic matter slowly accumulating as humus.

Materials:

- 2 different kinds of rocks
- Paper bag

1. Using two different kinds of rocks, rub the two pieces together over a paper bag.
2. What happens when you rub the rocks together?
3. What do you notice about different types of rocks?
4. Where would you find rocks being worn away in nature?

Soil Sammy



Materials Needed:

- Knee-High Stocking
- Grass Seeds
- Potting Soil
- Baby Food Jar
- Water
- Jiggle Eyes
- Fabric

1. Using knee-high hose, place some grass seeds in the toe where you want it to grow. The toe of the hose is the head of Soil Sammy and the grass looks like hair when it grows.
2. Pack a handful of soil in the end of the hose on top of the seeds. Make sure the ball of soil is slightly bigger than the opening of the baby food jar.
3. Tie a knot in the hose under the ball of soil.
4. Completely wet the head of Soil Sammy. Place the top of the hose (which is the bottom of Soil Sammy) in a baby food jar filled with water making sure the head is above the mouth of the jar. The end of the hose will absorb the water to feed the grass seeds, which will germinate through the hose. (You may have to cut a few small holes in the hose to help.)
5. Now you can decorate! Suggestions are a round piece of fabric to fit over the mouth of the jar for a shirt. You can add buttons to the shirt or jiggle eyes on the face and cut out felt for a mouth.
6. Water as needed and be sure to cut the grass “hair” and style as desired.

Will the grass hair grow better or faster with fertilizers? Try it and find out. Add different fertilizers to the soil and water and see which grows best.

Add to the Water:

Store-bought liquid fertilizer
Soda Pop (It has phosphorus.)
Apple juice (It has citric acid.)
Lemon scented liquid soap (It has citric acid.)
Ammonia (It has nitrogen.)

Add to the Soil:

Store-bought fertilizer stick
Coffee grounds (The caffeine has nitrogen.)
Baking Soda (It has nitrogen.)
Epson Salt (It has magnesium sulfate.)
Cream of Tarter (It has potassium.)

Farmers have to be careful and not add too much fertilizer. They go to special classes and use math problems to figure out the right amount. You shouldn't use too much fertilizer either, but you can experiment with different amounts.

Farmers Keep the Soil Healthy

Farmers must take good care of the soil so that they can continue to grow food. Farmers must check the soil to make sure it has the right nutrients and in the right amounts. If they don't have the right amounts, farmers need to adjust them to grow healthy crops. They may grow plants like soybeans to add the nutrient nitrogen to the soil or they may use fertilizers to add nitrogen, plus other nutrients.



Fertilizers Help Plants Grow

You need to eat the right kinds of food to grow big and strong. Milk gives you calcium, oranges give you vitamin C, and hamburgers give you protein. What can you do if you are not getting enough nutrients from the food you eat? You can take vitamins!

Fertilizers are like vitamins for plants. They add to the soil the different nutrients plants need to grow stronger and healthier. Most plants need 16 nutrients and minerals to grow, but there are three particular nutrients they need the most: Nitrogen, Phosphorus, and Potassium. Farmers typically add one or more of these as a fertilizer to grow a healthy food crop for us.

Nitrogen – Nitrogen is found in the air and soil. Many crops use nitrogen so fast that farmers and gardeners have to add some more to the ground. One way farmers add nitrogen to the soil is to plant different crops, at different times, in the same field. A farmer will grow corn in the field one year and plant soybeans in that field the next year. Growing corn takes nitrogen out of the soil, but growing soybeans put nitrogen back into the soil.

Phosphorus – Phosphorus helps plants store and use energy from the sun to make food for themselves. This process is called photosynthesis. Plants need large amounts of phosphorus as they begin to grow and when the weather turns cold. Phosphorus is made from rock phosphate. Rock phosphate cannot be absorbed by plants, so it is processed to a form that farmers can apply to plants.

Potassium – Potassium makes cotton from cotton plants stronger, fruit stay fresher longer, and grass greener. Potassium helps plants survive droughts, diseases, and very hot and cold temperatures. It also helps plants produce starches, controls root growth, and open and close pores for water. Potassium is found in the soil but only a small amount is available to plants. That's why farmers add potassium fertilizer to soil.



Earth's Water Supply

To understand how much of the earth's water supply is available for our use, try this activity:

1. Fill a one-gallon container (such as an ice cream bucket) with water.
2. Pour a half-cup of water out of the one-gallon container and into a clear bowl. The water in the bowl represents all of the fresh water on earth, which is less than three percent of the total water on earth. Fresh water is found in lakes, rivers, groundwater, ice, and living things. The 15½ cups that are still in the one-gallon container represent salt water. We cannot use salt water.
3. With an eyedropper, drop one drop of water from the half-cup onto a small plate. This one drop represents the freshwater that is available for our use. This water is found in rivers and lakes. The rest of the water in the half-cup is deep groundwater, bound up as soil moisture, biomass water, or water in the atmosphere.

Oceans	97.3%
Ice	2.19%
Groundwater	0.5%
Soil Moisture	0.005%
Atmosphere	0.001%
Inland Lakes	0.018%
Rivers	0.000096%

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