

## Activity 3: Groundwater

### How does water get underground?

In this activity, you will build a simple model of exposed soil. You will observe how water interacts with soil and how the water and pollution gets underground.

#### Materials Needed

- One small clear cup or jar
- ground coffee
- sugar
- 1 cup of water
- jello mix (half of vial)
- Towel to place under model in case of spills

#### Step 1: Understanding how soil and water relate to each other

Make a hypothesis of what you might observe based on what you learned about the water cycle and the *Make your own Watershed Activity*.

- Where do you think the water will go?
- What do you think will happen?

#### Step 2: Make Your Model!

1. Get your jar of coffee (subsoil) and place it on a flat surface.
2. Gently pour an even layer of sugar (topsoil) on top of the coffee.

Remember that there are multiple layers of soil that break into different soil categories. In our model, the sugar represents the topsoil and the coffee represents the subsoil. You can use the back of this page to learn more about soil horizons.

**Topsoil** is rich in natural matter such as decaying leaves. It is usually looser and not as compacted as subsoil. Topsoil absorbs water easily.

**Subsoil** is located under the topsoil. It is usually more dense and filled with more clay particles than top soil. It is slow to absorb water but holds moisture in for a longer period of time.

#### Step 3: What happens after the rain?

We watched how rainwater travels when it rains in our *Make your own Watershed Activity*. What happens to the water after the rain hits the land and perhaps doesn't run into a nearby stream or river?

This model will mimic what happens in a puddle formed by a rainstorm.

1. Gently and slowly pour water along the side of the jar. If the water pours in too fast, the dry contents in the jar will mix too fast and then you will not be able to see what should happen next in this experiment!
2. Gently set the jar back on a flat surface

Watch what happens after a few seconds!

First, the water soaks into the sugar, much like how it acts with topsoil. You will also see the water start to soak into the subsoil (coffee), but will not soak all the way through because of how dense it is.

#### Step 4: What happens if there is pollution?

1. Sprinkle some koolaid/jello mix over your "soil". This represents pollution in our environment such as pesticides, fertilizers, plastics, and other chemicals.

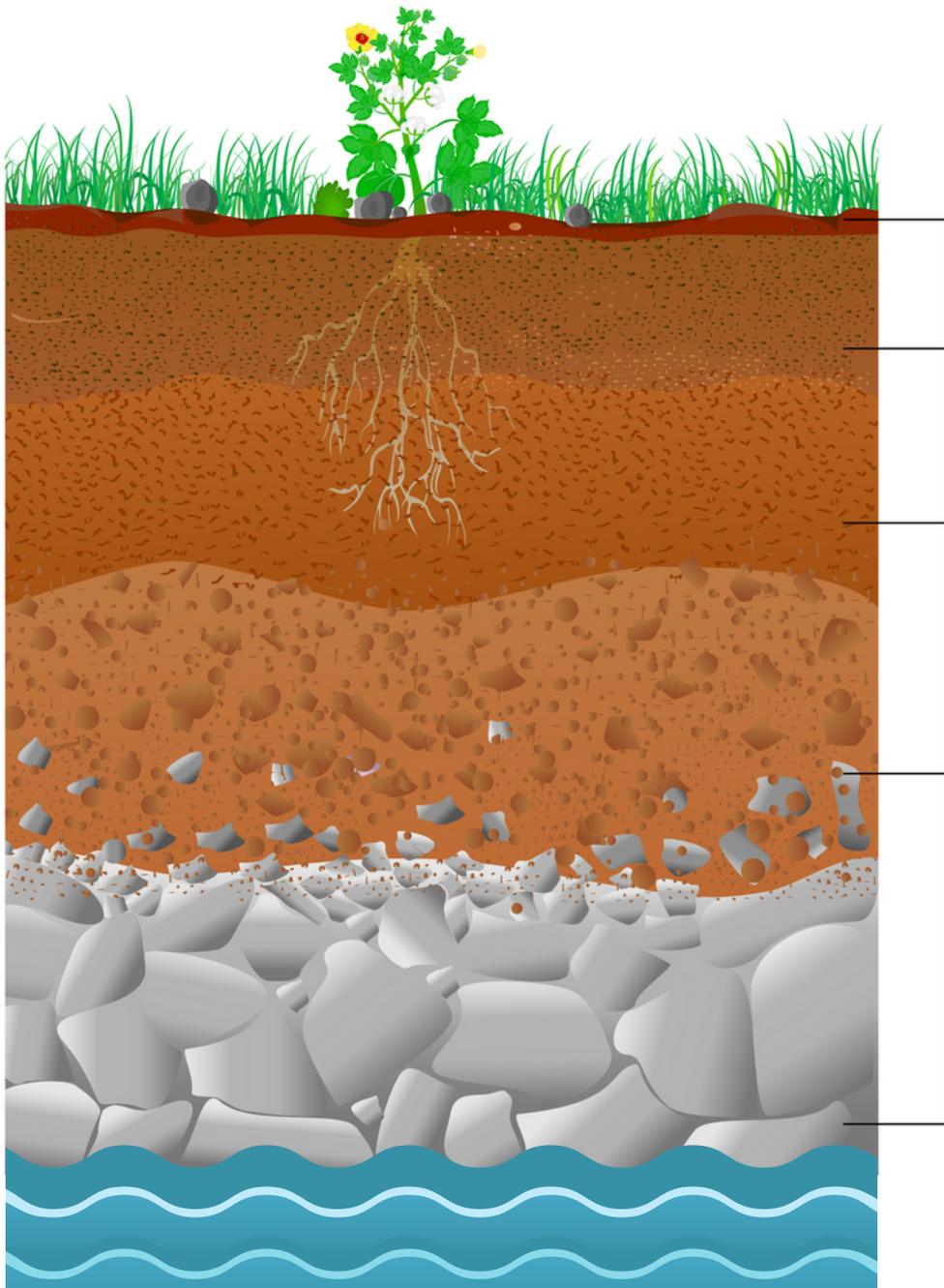
Think about where the pollution went in the *Make your own Watershed Activity* and how water makes its way underground from the Water Cycle Worksheet. Like the water, pollution can make its way underground after a long period of time.

#### Step 5: Erosion in Action

1. Set the jar aside for over for at least 10 minutes.
2. You will see that the subsoil (coffee) mixed with the topsoil (sugar) after a longer period of time. This is now exposed soil that is prone to eroding during the next rainfall.
3. As you clean up your experiment in the sink, imagine this is the next rainfall. The now wet and disturbed soil is not steady and will easily wash away off of the "land". What can humans do to help soil remain on land? Is there a natural way to contain soil on land?

Trees! Trees and plants are nature's "soil cages" keeping soil steady and on land.

# Layers of soil



## Organic Layer

where you find leaves and grass

## Topsoil

(sugar in our activity)  
the darker soil you see when you dig a small hole. It is full of minerals and is a good place for roots to grow.

## Subsoil

(coffee in our activity)  
a mixture of sand, silt (small particles of earth carried by water), and clay. Rich in minerals and other chemicals that leached or moved through the soil layers.

## Parent Material

Very little plant material is found here. Full of bedrock pieces and fragments. It is called parent material because this is the Earth's deposit where soil begins to develop.

## Bedrock

A large rock deposit that is not soil and is usually not exposed.

## What is erosion?

Erosion is a process where natural forces like water, wind, ice, and gravity wear away rocks and soil. It is a geological process, and part of the rock cycle. Erosion occurs at the Earth's surface, and has no effect on the Earth's mantle and core.