

Create your own Aquifer!

Purpose

In this activity, you will build your own aquifer and see how water works in an aquifer system.

Introduction

We know that, when rain falls onto a hard surface, the water gathers in puddles and eventually it evaporates, or if there is enough rain, the water runs off into the storm drains and is discharged to surface water somewhere.

But what happens when water falls onto a garden or lawn?

When precipitation falls onto the ground, some of the water infiltrates the soil. In the soil, plant roots take up some of the water and it eventually makes its way back to the atmosphere through transpiration.

Some of the water in the soil evaporates, but some continues to filter through the soil. This is called groundwater. Groundwater is stored in an aquifer – a layer of geological material like sand, pumice, limestone or fractured rock.

Groundwater and aquifers are the part of the water cycle that happens underneath our feet. This activity simulates an aquifer and allows us to visualise the processes that happen underground and out of sight.

What you need

- Clear plastic container
- Small stones
- Soil
- Grass clippings
- Plastic cup with small holes in the bottom
- Coloured water
- Spray nozzle from a spray bottle
- Coffee filter
- Rubber band

Instructions

1. Place the stones in the plastic container. Arrange the stones so they create a slope towards one side of the container. The end of the slope will become your “lake” or other form of surface water.
2. Next, add a layer of soil to cover the stones. Pack the soil down to help keep it in place.
3. Then, add a layer of grass at the top of the slope to represent your “lawn” or “vegetation”.
4. Hold the cup over the “lawn”. Add the coloured water to the cup to simulate rain. Move the cup around so that it rains over the entire model. Refill the cup as needed and continue the rain until a small lake forms.
5. Watch what happens to the rain as it falls onto the model. Some of the rain falls onto the soil and runs off creating a lake. Some of the rain saturates the soil and begins to fill the aquifer. Some rain remains on the surface.
6. Look at the lake. It is fed directly by rain, through run-off and also by water moving through the aquifer.
7. Stop the rain once the lake is a few centimetres deep. Avoid turning the model into a swamp.
8. Look at the water level. The water level will fluctuate depending on how much water enters or is used from the aquifer.
9. Groundwater is used extensively for drinking water and irrigation. To obtain the water, a bore is drilled deep enough to reach the water. Use the spray nozzle to represent a bore or a well. Cut small strips from the coffee filter. Use these to cover the bottom of the spray nozzle’s tube. Secure the filter with a rubber band. (The filter prevents fine particles from entering the tube and plugging the spray nozzle.) Work the spray nozzle and “pump” water from the aquifer.