

# All Washed Up

## Summary

This lesson identifies groundwater as one of the locations that hold water as it passes through the water cycle. Students create a model that effectively filters water as it passes through the ground water system.

## Time Frame

2 class periods of 30 minutes each

## Group Size

Small Groups

## Life Skills

Thinking & Reasoning, Communication, Social & Civic Responsibility

## Materials

For each student group:

- Medium size flower pot or a cut-down waxed carton with holes punched in the bottom

- 1 Coffee filter or paper towel

- Water (stored in a two-liter pop bottle with a lid)

- 2 shallow trays or pie tins

- 1 cup dirt

- 1 cup sand

- 1 cup gravel

## Background for Teachers

Have you ever wondered how water is cleaned before it reaches the surface? Making a simple water filtration system will answer many questions about the process.

Part of the water cycle occurs in locations where water passes after falling to earth as precipitation. Water that has fallen into the ground and is not evaporated is called ground water. It filters through the spaces or pores in the rock and soil of the Earth's crust. Water moves downward until it reaches rocks that it cannot permeate. When this happens, the water begins to fill up the pores and spaces in the rocks. This water is stored or passes through the ground until it can find a way to the surface. Often this water is filled with things that are not safe for humans. Nature has designed ways to purify, or clean the water as it travels.

In this investigation, however, remind students that no matter how great a job they think they have done cleaning the water, it should NOT be tasted. The investigation will give them a good idea how ground water is filtered, but it is still not a real water treatment plant, and just a few drops of "bad" water can make them sick.

This investigation can be messy with all the dirt and water, so it might be wise to do it outside.

## Student Prior Knowledge

Students should be able to identify that water is collected in the ground as it passes through the water cycle.

## Intended Learning Outcomes

Observe simple objects and report observations.  
Make simple predictions and inferences based upon observations.  
Conduct a simple investigation when given directions.  
Use observations to construct a reasonable explanation.  
Pose questions about objects, events, and processes.  
Use available reference sources to obtain information.

### Instructional Procedures

Step 1. Distribute materials. Review the water cycle and evaporation. Ask:

What happens to water that does not evaporate but goes into the ground?

Do you think it gets dirty?

How does it get clean?

Have groups decide possible answers to these questions. Tell students that they will be investigating to see what happens to water that must pass through materials similar to the path that ground water would travel through the earth.

Step 2. As each step of this investigation is done, discuss what each part represents in nature. Have each group place the filter or piece of paper towel in the bottom of the pot or carton. Then fill the bottom of the pot with gravel or small stones about 2 inches (5cm) deep. Pour sand into the container until it is about three-quarters full.

Step 3. Next have them pour about 1 cup of dirt into the soda bottle and fill it most of the way with water. Screw the lid on and shake up to make some really dirty water. Have students discuss what might make water in the water cycle this dirty. (This will be the time to discuss the path of water through the earth and its journey back to the surface.)

Step 4. Have them pour some of the muddy water from the bottle into one of their shallow containers and observe what the water looks like without any kind of change being done to it. This will be their "control" or test container to compare to the filtered water. Then have them place their filter system (the pot or wax carton) into the other shallow container and pour some muddy water into the top of it.

Step 5. As the water trickles through all the layers, have groups discuss together what is happening. Have them watch as the water filters through. Compare it to the first container. Is there a difference? Have them state two observations from the investigation so far. If there is little change, is there anything they could do to the water they have filtered to get better results?

Step 6. Ask them if they repeat the process more than once, what are their predictions about the water? Will it be cleaner? Why? Have them repeat this procedure several times until the water comes through fairly clear. Continue to compare the two pans after each run through. Do they think that the water is "clean" enough?

Step 7. Gather the class back together. Discuss the investigation and answer any questions. Pose the following questions:

Does the location of water as it passes through the water cycle affect its quality?

What is important in ground water to help clean it up?

If ground water eventually ends up in our rivers and lakes, is it important for it to be cleaned or filtered?

Does nature have ways of cleaning water?

Why would this be important for our water supply?

What conclusions can they make about the importance of water passing through the earth as ground water and its relationship to the water supply in their community?

Step 8. Have students investigate if there are any environments in nature that use this process to clean water as it travels through the water cycle. (This would be an excellent way to tie the water cycle into the wetlands and their environmental importance.) Provide research and hands-on materials in a center that allows students to investigate ground water and its travels. (Stormwater would be a

part of this area and allow for more investigations.)

### Extensions

Identifying groundwater as a location that holds water as it passes through the water cycle is a great introduction to educating students about the importance of stormwater education. Utilize all of the materials and videos provided by the Stormdrain Coalition in Salt Lake Country. This will help students become more energy conscious about the conservation of water.

### Assessment Plan

Have students write an article, editorial, or cartoon and create a classroom newspaper called the "GroundWater Gazette." Each type of contribution must contain three facts about the process water goes through to be filtered as it travels through the ground. Information could also be written about the importance of stormwater conservation.

Compile into a flyer that can be shared with other fourth grade classes, or other grade levels.

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