

Groundwater Leaching

Skill: Science, Oral Language

Objectives

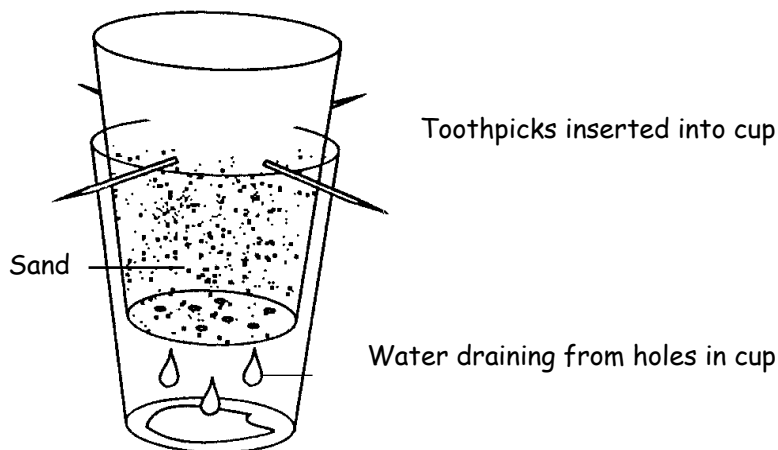
Students will:

- learn about leaching and how soluble materials get into the groundwater.

Procedure

This demonstration uses three mixtures: sand, sand and salt (the more salt the better the reaction), and sand and cornstarch. For each student or group, use two-thirds of a cup of each mixture. Each student or group needs two paper cups.

- Punch several holes in the bottom of one paper cup. Fill the cup 2/3 full with the first mixture (sand only).
- Insert four toothpicks into the sand-filled cup on four sides so the toothpicks extend into the sand about 1/2 inch below the sand line. See illustration No. 1. The toothpicks will support this cup over the second cup, into which liquid leachate will drain from the sand cup. Put the sand cup in place over the other cup.
- Fill the sand cup to the rim with water. Continue adding water to the draining sand until the bottom cup is 1/3 full of leachate.
- Has the water changed? To check, add a few drops of iodine, using the pipette, to the leachate in the second cup. Record any changes. Clean the cups and repeat the process with the other two sand mixtures.



No. 1 Leaching demonstration

Vocabulary

- soluble
- cornstarch
- leachate
- iodine
- pipette
- water-soluble
- chemicals

Materials

- Sand
- Cornstarch
- Water
- Salt
- Toothpick
- Iodine
- Paper cups (2 for each student or group)
- Measuring cup
- Pipette

P.A.S.S.

4th Grade

- Oral 1.2, 2.3
- Science
- Process 1.1, 3.1,3, 4.4, 5.4

5th Grade

- Oral 1.2, 2.3
- Science
- Process 1.1, 3.1,3, 4.4, 5.4
- Physical 1.2
- Life 2.2

6th Grade

- Oral 1.2, 2.3
- Science
- Process 1.1,2, 3.1,5, 4.5, 5.4
- Physical 1.1



Groundwater Leaching

Iodine reaction

Sand only leachate = _____

Sand and salt leachate = _____

Sand and cornstarch leachate = _____

As the water passed through the sand, it dissolved any water-soluble materials with which it came in contact. As the water dripped out the bottom of the sand cup, it carried with it those dissolved materials. The process of picking up and transporting soluble substances is called "leaching."

This demonstration shows that you cannot always tell what is in water by looking at it. (In this demonstration, it included the dissolved chemicals, salt, and cornstarch.) The same holds true for toxic substances that may leach into groundwater. There may not

Discussion and Evaluation

1. What natural activity is represented by pouring water over the mixture?
Precipitation
2. Groundwater can leach minerals out of rocks and leach out other substances that might not have occurred in the ground naturally. What do the salt and cornstarch represent?

These ingredients represent water-soluble substances in the soil. Rocks and soils contain soluble minerals such as iron, calcium, magnesium. Decaying plants and animal matter give up carbon dioxide and nitrogen. Man-made substances, e.g., industrial chemicals, fertilizers, and household products, also contribute to the leachate.

3. Does the material have to be buried or thoroughly mixed with the sand (or ground) to contribute to leachate? How else might materials leach into groundwater?

A material does not have to be completely buried to contribute to leachate. Soluble substances such as highway de-icing salts left in a pile can contribute to leachate. Roadside dumps, over-fertilized fields, and items dumped in a sinkhole can leach into groundwater.

Reprinted with permission of the Virginia Water Resources Research Center from Sandcastle Moats and Petunia Bed Holes, Kathy Sevebeck, Program Director. Illustration by George Wills from Sandcastle Moats and Petunia Bed Holes.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, sex, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational service.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert Whitson, Vice President, Dean and Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared for both internal and external distributions through print and electronic media.

