



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Lesson Plans for Teachers

www.tceq.state.tx.us/assistance/education.html

Underground Pollution

Grade level:

- Fourth grade.

Sample TEKS for 4th grade:

Science:

- 4.1
- 4.2B, C, E
- 4.3B, C, D
- 4.4A

Social Studies:

- 4.7A, B
- 4.8A, D

Objective:

Learn about groundwater by constructing an aquifer model.

Focus:

There are two main sources of water, groundwater and surface water. Ninety five per cent of those fresh water resources in U.S. come from groundwater.

Materials:

- two kilogram pea size gravel
- 800 grams top soil or potting soil
- 800 grams sand
- 2 liters tap water
- 70 grams sugar
- blue food coloring
- clear plastic tray
- watering can
- spray pump
- paper coffee filter
- rubber band
- metric ruler

Procedure:

Build a 6-centimeter layer of gravel on the bottom of the tray to represent the aquifer. Slope the gravel so there is an empty space at the lower edge of the tray to represent the lake. Place a loose layer of soil over the gravel. Add a few drops of food coloring to the water in the watering can

and sprinkle the colored water on the soil. Children observe what happens with precipitation. The colored water should infiltrate the soil and begin to fill the space between the stones on the bottom of the tray. The groundwater will also move laterally to fill the lake area. Continue adding precipitation until the water table is three or four centimeters high as measured by a ruler held by the tray. Demonstrate the impact of human activity on the aquifer. Place a coffee filter over the open end of spray pump and secure with the rubber band. Explain the device represented well with a screen. Push the spray pump through the soil and into the gravel. Let one of the children operate the pump which will draw from the aquifer and to the surface. Continue pumping to lower the water table and the lake level. Precipitation can return to the previous levels. Discuss the effect of drought and rainfall, show the effect of groundwater contamination. Colored sugar demonstrates nonpoint source pollution. Mix 30 drops of food coloring per 80 grams of sugar. Spread the sugar over the surface of a plate and allow it to dry for one to two hours. Spread 40 grams of sugar over the sand. Sprinkle warm water on the sugar. Water moves through the sand and it will dissolve the sugar and the color will mix with the water; the polluted water will move into the aquifer and the lake.

Social studies extension:

Identify areas of Texas where there are aquifers and study the relationship to settlement patterns.

Submitted by: Hooshang Amiri, Texas Southern University TES Course, 1997.