

Demonstration 4: leaching

PURPOSE: To show how groundwater dissolves soluble materials and carries them through the earth.

MATERIALS:

- sand
- cornstarch
- salt
- lead chloride
- iodine
- toothpicks
- water
- paper cups

PROCEDURE: This demonstration will use three different mixtures: sand, sand + salt (the more salt, the better the reaction and sand + cornstarch. For each student or group taking part, figure 2/3 of a cup of each mixture.

Each student or group will need two paper cups. Punch several holes in the bottom of one 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 that the toothpicks extend into the sand about 1/2 inch below the sand line. The toothpicks will be used to 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. Now 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 to the leachate in the second cup. Record any changes. Then add a few drops of the lead chloride. Observe the results. Record any changes.

Clean the cups and repeat the process with the other two mixtures (sand + salt, sand + cornstarch).

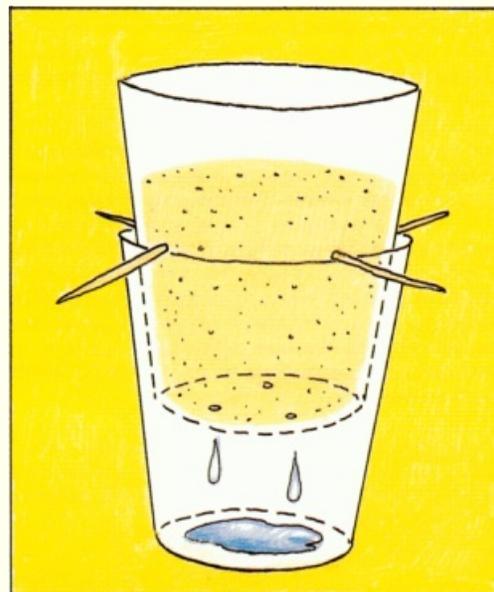
RESULTS:

IODINE REACTION:

sand only leachate = _____
sand + salt leachate = _____
sand + cornstarch leachate = _____

LEAD CHLORIDE REACTION:

sand only leachate = _____
sand + salt leachate = _____
sand + cornstarch leachate = _____



CONCLUSION: As the water passes through the sand, it dissolves any water-soluble materials it comes in contact with. As the water drips out of the bottom of the sand cup, it carries with it those dissolved materials. The process of picking up and transporting soluble substances is called LEACHING.

One point this demonstration makes is that you cannot always tell just from looking at water whether or not there are dissolved chemicals in it (in this demonstration, the dissolved chemicals were the salt and cornstarch). The same holds true for toxic substances that may leach into our groundwater: there may not be any obvious smell or visual clue to their presence.

QUESTIONS:

1. What natural activity is represented by pouring water over the mixtures?
2. Groundwater can leach minerals out of rocks as well as leaching out substances that might not have occurred in the ground naturally. What might the salt and cornstarch represent?
3. Does a material have to be buried or thoroughly mixed with the sand (or ground) to contribute to leachate?