

Landfill

It is usually dumped into a LANDFILL, a piece of land the town or county has set aside for that purpose. Newer landfills are often called SANITARY LANDFILLS because the garbage is compacted, then covered with dirt or clay, to cut down on health and safety risks to the public.

Many old landfills were built before we had any idea they might cause trouble for groundwater. All sorts of trash, including poisonous household chemicals, were dumped into them. The problem was that nothing kept rainwater from percolating (filtering) down through them

Suppose an old landfill is located where water travels easily through the soil and rock layers. Now suppose some of the trash in the landfill includes water-soluble toxic chemicals. Rainwater dripping down through the landfill might dissolve out some of those chemicals and carry them into the groundwater.

It's like brewing a pot of coffee. Water dripping through the coffee grounds picks up the soluble parts, the flavor and color, of the ground-up coffee beans.

Leachate

When water filtering through a landfill performs a similar trick, the resulting liquid is called LEACHATE. Leachate is the groundwater equivalent of a cup of coffee -- except that no one wants it, and it may continue on into an aquifer used as someone's water supply.

Newer landfills are generally located where the rock layers won't let leachate reach the water table. Liners and drains are installed to catch the infiltrating water.



Demonstration 5: landfills

PURPOSE: To investigate effects of improperly constructed landfills.

MATERIALS:

- stream table or box with garbage bag liner
- sand
- potassium permanganate
- water
- garden watering can or plant mister

PROCEDURE: If you don't have access to a stream table, line a sturdy cardboard box with a plastic garbage bag. Punch a hole in one corner of the box and liner for water to drain through. Tilt the box slightly to encourage drainage toward the hole.

Fill the box with sand. Scoop out a small "landfill" area and fill the hole with potassium permanganate. Cover the "landfill" with sand. Sprinkle water over the entire area. Repeat daily, observing carefully the water that drains from the box.

RESULTS: The water has taken on a purplish color.

CONCLUSION: Liquid wastes and water-soluble materials placed on landfills may leach out of the landfill, particularly if the landfill is an old one. Newer landfills are generally located and constructed so that there is an impermeable layer of materials (clay, concrete or plastic liners) at the bottom to keep as much leachate as possible from leaving the landfill.

QUESTIONS:

1. What sorts of materials are found in real landfills?
2. What could be done to keep water-soluble materials from leaching out of the landfill? Would it help if no water (including rain) ever got into the landfill? What could be done to keep the landfill contents from getting wet?
3. In a real-life setting, where might the leachate end up?
4. What are the similarities between landfills and trash heaps or roadside dumps?