Colorado State University Extension

ST[EMpower]

# The Dirt on Dirt, Part 4
## How can soil clean water?


## Soil Science Careers

Soil scientists study the upper few meters of the Earth's crust in terms of its physical and chemical properties; distribution, genesis and morphology, and biological components. They need a strong background in the physical and biological sciences and mathematics.

Soil scientists work for federal and state governments, universities, and the private sector. The job of a soil scientist includes collection of soil data, consultation, investigation, evaluation, interpretation, planning or inspection relating to soil science. This career includes many different assignments and involves making recommendations about many resource areas.

Soil Scientists do these jobs:

- Wetland specialist
- Watershed technician
- Hydrologist with Board of Health
- Environmental technician
- State soil and water quality specialist
- Soil Conservationist
- County Agricultural Agent
- Landscaping business
- Farming
- On-site evaluation
- Crop consultant
- Soil scientist, mapping and interpretation, U.S. Department of Agriculture
- Research technician
- Conservation planner
- District marketing manager for an agricultural firm
- County conservationist
- Crop production specialist
- Research scientist

From: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054277

## ACTIVITY

**Background**: Soil is made from **organic** and **inorganic** matter. Our activity this month is focused on the **inorganic** part of soil.

The water on our planet is very old and is constantly recycled. Soil is the perfect filter to remove impurities from water. For the soil experiment this month, we are going to test how different soils can purify and filter water. Clean water is vital for life.

Water seeps through the pores between soil particles. Remember that soil is made up of three different sizes (sand, silt, and clay) that are tightly packed, but are all different shapes. Sandy soil (the largest particles) has the ability to hold large amounts of water due to the presence of many pore spaces. That soil is **permeable**. Clay particles (the smallest) means that soil is not very permeable, and resists water seeping through it. (For more activities on sand, silt, and clay, see the November 2014 STEM insert in your monthly 4-H newsletter.)

The initial water content of the soil is also important. In general, water seeps into drier soils more quickly than wet soils. The length of time and the amount of precipitation can affect how fast soil can absorb the water. If rain or snowmelt is faster than it can seep through the pores (such as in a downpour), then the water pools at the surface, and may run downhill to the nearest stream channel. That is why we have flood warnings when there is a heavy rainfall over a short period of time, rather than the same about of precipitation, but over the entire day.

**Materials**: 3 oz. paper cups, 5 oz. paper cups, 1 small nail, Kool Aid, food color, sand, shovel, plastic or metal spoon, sharpie marker, 3 plastic baggies, pitcher, water

- While you can repeat this experiment many times, these directions are for 3 **treatments,** and the sand sample will act as the **control**.
- Gather the plastic baggies, sharpie, and shovel. Collect 3 samples of dirt from your yard at different levels. The first sample will be the top soil, the next sample will be 5 or 6 inches lower, and the last sample will be about 12 inches down from the top layer. Be sure to label each of your layers on the plastic baggie top soil, 6" and 12". You only will need enough to fill your 5 oz. cup about half full.
- In the larger (5 oz.) paper cups, poke 5 holes in the bottom of the cup.
- Place each larger (5 oz.) paper cup into one of the smaller 3 oz. cups. The larger cup will be sitting on top of the smaller cup with lots of space between the two.
- Label each 5 oz. cup with the depth you collected your soil sample (top soil, 6" and 12" and sand). With the spoon, fill the 5 oz. cup about halfway with the soil sample that matches the label.
- Mix the Kool aid in the pitcher following the directions.
- Fill each of the 5 oz. cups (with the soil) with the Kool Aid. Allow the Kool Aid to drain to the bottom smaller 3 oz. cup.
- What happened? Which soil was the best Kool Aid filter? Do you think that if you dug deeper, your soil sample would be a better filter? What would happen if you took the water from your three different soils, and then poured it into a sand filter?
- Predict what will happen if you repeat this experiment using other flavors of Kool Aid, food color, or other liquids.

## POWER WORDS

**control**: in a science experiment, a sample with no changes applied to it
**inorganic**: not consisting of or deriving from living matter
**organic**: of, relating to, or derived from living matter
**permeable**: allowing liquids or gases to pass through it
**treatment**: in a science experiment, the sample that has changes applied to it

Activity modified from: http://www.soils4teachers.org/lessons-and-activities#General5