



Utah Core Objectives

Sixth Grade Science

1. Use Science Process & Thinking Skills

- Observe simple objects, patterns, and events, and report observations.
- Sort and sequence data according to criteria given.
- Given the appropriate instrument, measure length, temperature, volume, and mass in metric units as specified.
- Compare things, processes, and events.
- Use classification systems.
- Plan and conduct simple experiments.
- Formulate simple research questions.
- Predict results of investigations based on prior data.
- Use data to construct a reasonable conclusion.

2. Manifest Scientific Attitudes and Interests

- Demonstrate a sense of curiosity about nature.
- Pose science questions about objects, events, and processes.
- Maintain an open and questioning mind toward new ideas and alternative points of view.
- Seek and weigh evidence before drawing conclusions.
- Accept and use scientific evidence to help resolve ecological problems.

Objective/Materials — next page

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RICH SOIL; POOR SOIL DEMONSTRATION

How does water move through different types of soil?

Why should we preserve wetlands?

Note

This demonstration is a “follow-on” experiment to the Composting lesson, especially for students who have a 90-minute science period.

Prior to the demonstration

Conduct lesson on “The Secret Life in a Composter.”

Set up the soil demonstration apparatus (see p. 2) at 4 lab stations. Provide a cup of water if there is no sink nearby.

Instructions

Opening remarks.

Customize your introduction for the group.

“Now we’re going to do an experiment to see how water runs through different types of soil samples.

Explain organic and inorganic.

Organic—soil made from living things. Compost is an organic soil. Soil in wetlands is an organic soil.

Inorganic— soil made from non-living things like rock or sand. In Utah we have lots of inorganic soil because there is so much rocky or sandy soil here.

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RICH SOIL; POOR SOIL

- Continued -

Objectives

Students will:

- Develop hypotheses about the outcomes of two different soil experiments
- Explain why wetlands hold water
- State two reasons wetlands should be preserved
- Identify two ways governments protect wetlands
- Explain how soil erosion happens
- State two reasons soil quality near rivers and streams must be protected
- Identify two ways governments protect river and stream beds

Materials Needed:

- Soil Erosion demonstration — 6 per class. prep found at <http://soils.usda.gov/education/resources/lessons/experiments/erosion/>
- Soil Quality demonstration — 3 pairs per class. prep found at <http://soils.usda.gov/education/resources/lessons/experiments/SOM/>
- Powerpoint "Wetlands Pictures" on memory stick hard drive or DVD

Additional—next page

Time

- 45 minutes

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Walk through the demonstration procedures, holding an apparatus..

“I have set up some water drip apparatus and filled each with different types of soil. In a few minutes each lab group will go to one of the lab stations. You are to determine if your soil sample is organic or inorganic.

Then ONE of you will fill the cup with water and pour it into the drip funnel. All of you will WATCH the water drip through the soil.

How long does it take for the water to get to the cup?

What happens to the soil?

What about the run-off—is it cloudy or clear?

The idea is to OBSERVE how water runs through different types of soil.

So what is the VARIABLE in this experiment?

A: Different types of soil.

Assign lab groups to each apparatus ONE-AT-A-TIME to manage class transition.

Signal the experiment to begin.

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Additional Materials Needed

- Scales, if weighing samples
- 1 bucket compost samples (or any soil from a forest floor)
- 1 bucket poor soil samples (sandy or clay soil or any soil from a desert area),

To make Soil Quality Experiment

- 36 38.8 oz. or 1 liter plastic bottles — 6 per lab group
- plastic bottle caps
- 2 large needle
- Pliers
- A lighter
- Box cutters

RICH SOIL; POOR SOIL

- Continued -

During the experiment, circulate asking these questions:

- Is your soil organic or inorganic?
- How fast does it take for the water to run through?
- Did the soil get saturated and the water stay on top of the soil or did the soil “float?”
- Was the run-off clear or cloudy?
- Would you drink that water?

After 10 minutes or so have the groups rotate so they can see the next soil sample. Ask:

Is this sample the same or different from yours?

Is it organic or inorganic?

What do you notice that’s different?

After 3 minutes repeat the rotations, so groups have a time at each station.

When all the water is in the cup, have the groups return to their desks.

Debrief the experiment with the same questions. Make these learning points:

- Organic soil - the compost sample—absorbs water, can float on top of the water.
- Run-off is clear, not cloudy. (although it may be colored)
- Looks like it would be okay to drink.
- Wetlands are places with highly organic soil, habitat for animals.
- Important to preserve wetlands
- What are some examples of wetlands that you know of.

- Inorganic soil gets saturated with water and then the run-off comes off the top bringing particles with it.
- Run-off is cloudy, you won’t want to bring it.
- Run-off likely to cause erosion.

Compare results with those shown at <http://soils.usda.gov/education/resources/lessons/experiments/SOM/> and show students other resources on the website.

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RICH SOIL; POOR SOIL

- Continued -

Show the power-point presentation “Wetlands Pictures.”

Slide 1: Here is a beautiful wetlands in Crested Butte Colorado.

Slide 2: But let’s look closer. What’s that over there?

A: Bus depot. What kinds of pollutants drip out of parked buses?

A: Validate: Motor oil, gasoline, antifreeze.

So when the rain and snow comes down, where does all that go?

A: Into the stream. And animals and people drink from that stream. This is part of a big watershed. My guess is that this bus depot was allowed to be built there before there were zoning regulations protecting wetlands. Now we have zoning laws protecting wetlands and I doubt this bus depot would be allowed .

Slide 3. This is Richardson Flats in Park City. It’s a wetlands at the intersection of Rte 40 and Rte 248. The sign says duck crossing. But what else do you see?

A: A place where the organic vegetation has been removed. Perhaps for a parking lot. This action is taking away from the wildlife habitat, taking away from the health of the wetlands.

Slide 4: Here’s the duck. This poor little duck will have less place to live and feed and have babies.

Slide 5: Here’s the side of a highway not too far away from Richardson flat. You’ll notice native grass growing here and some green stuff behind it.

Slide 6: Here’s a closeup. Notice on the right side the grass is growing nicely, but on the left side this inorganic soil has hardly any grass and a big ugly weed.

So what is this green stuff? Can anyone guess?

A: Not moss, not grass but plastic netting. Distribute sample. It’s so important to keep run-off from taking soil away that plastic netting is put on the side of highways to aid the process of re-vegetation and prevent erosion.

Slide 7: Here’s what can it looks like if erosion happens. So it’s VERY important to protect wetlands and re-vegetate to prevent erosion.

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