Testing Soil Moisture

Students Investigate Plant Growing Conditions

Students use moisture meters in the soil to determine which plants need water and which are growing in soil that is moist. Students learn how to read a scientific instrument and how to handle tools safely. Balancing water conservation with plant and human needs provides a rich discussion topic.

GRADES 3-8 | SCIENCE | SURVEY | TOOLS REQUIRED

Introduction

Watering plants is a good opportunity to discuss local climates and how to balance water conservation with plant needs, especially in drought-prone states. Plan for a healthy discussion! Moisture meters are a useful and easy tool to help students evaluate soil moisture. They also provide valuable experience with a scientific instrument with a color and numerically-coded scale.

Materials

- Moisture meters with a scale of 1-10 (one moisture meter per team of two to three students)
- One worksheet copy (provided below) per team
- Watering cans

Instructions

Step 1: Demonstrate Moisture Meter

- Demonstrate how the meter works by pushing its metal probe into a soil location where everyone can see. An indoor plant can be a good starting place. If possible, demonstrate the meter's use in both dry soil and wet soil.
- Safety: Remind students to keep the tip pointing down while they are walking around with it in their hands.
- Safety: Do not use the moisture meter in locations where it is hard to push down (e.g., compacted soil) as the meter might break.
- Safety: Students should walk, not run, with moisture meters.
- Show students where to test the soil under a tree, preferably near the roots.
- Ask students to unpack their understanding of the scale with you.
- Ask students which numbers would indicate that a tree NEEDS to be watered.
- Ask students for reasons to NOT water trees that already have moist or wet soil (tree health and saving water are possible reasons they might share).
- Note: These meters do not work in a bucket of water; contact with soil is essential. They also stop working if they are dropped into a watering can or bucket of water. Let the meter dry out. Often it will work again once it is completely dry, but not always.

Step 2: Pass Out Materials

Pass out a copy of the worksheet and one moisture meter to each team of 2-3 students.

Step 3: Test Soil Moisture Around Plants

Students can test soil moisture under a variety of trees and other plants as well as different sides or distances from a plant.

Team members can decide how to take turns and who waters any trees that are dry.

Reflection

Gather students afterwards. Possible reflection prompts include: "What did you discover? How might this tool help conserve water? How might this tool help trees? If you become an inventor, how might you modify this tool? What are some limitations of this tool?"

Extensions

1. These probes can measure moisture at different depths. Once students get comfortable using them, they can start paying attention to moisture at different depths in the same spot and explore the questions that arise.

2. Students can make predictions based on soil color before they test for moisture.

3. Students can make a drawing of the tool to reinforce their understanding.

4. Try this activity after it rains. What do students predict? To what depth did the rain actually soak the soil?

5. Different species of trees have different water requirements. Students can research the school's trees and their specific water needs.

NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas

- Ecosystems: Interactions, Energy, and Dynamics
- Earth's Systems

Crosscutting Concepts

- Cause and Effect
- Patterns

Science and Engineering Practices

- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Obtaining, Evaluating, and Communicating Information

NATIONAL SCHOOLYARD FOREST SYSTEM

The National Schoolyard Forest System℠ seeks to create schoolyard forests on PreK-12 public school grounds across the country to directly shade and protect students from extreme heat and rising temperatures due to climate change. This initiative was founded by Green Schoolyards America, and launched with California as the first state in partnership with the California Department of Education, the California Department of Forestry and Fire Protection, and Ten Strands.

For more information, visit:
greenschoolyards.org/schoolyard-forest-system

National Schoolyard Forest System℠

green schoolyards america

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PUBLISHER

Moisture Meter Worksheet

Name: _____

Dry, moist, or wet? 1 2 3 4 5 6 7 8 9 10

1. Observe your moisture meter.

   a) Which numbers mean DRY? _____

   b) Which numbers mean MOIST? _____

   c) Which numbers mean WET? _____

2. Measure the soil near five different plants and fill out the table below.

Plant	Moisture Meter Reading	Does the plant need water? Yes / No / Maybe
1.		
2.		
3.		
4.		
5.		

3. How many plants had dry soil? _____

4. How many plants had moist soil? _____

5. How many plants had wet soil? _____

6. Water any dry plants.

OPTIONAL: Place a checkmark when you are done.

a) Find the driest soil you can. ☐

b) Find the wettest soil you can. ☐