



Classroom Series

Potassium in Soil Lab

Code 5970



Lesson Plans are provided to help organize an existing curriculum, allowing the teacher to spend more time on hands-on activities that meet key classroom learning objectives and improve student achievement. The Lesson Plans will aid the teacher in integrating LaMotte test kits and equipment into classroom activities that meet National Science Education Standards.



LaMotte Company
PO Box 329 • Chestertown • MD • 21620

www.lamotte.com

Concept/Topic

Introduction to soil potassium and demonstration of a simple test procedure.

Time Requirement

one class/lab period

Subject Area(s)

Environmental Science, Biology, Earth Science

General Goals:

1. The students will gain a basic understanding of soil potassium.

Specific Objectives:

- 1 Students will be able to list sources of potassium in soil.
- 2 Students will be able to explain how potassium is removed from the soil and used by plants.
- 3 Students will be able list the symptoms of insufficient or excess potassium.
- 4 Students will be able to follow instructions and work together as a team.
- 5 Students will be able to make observations.
- 6 Students will be able to collect and analyze data, and draw a conclusion.

Materials, Required

Order Code	Description
5970	Classroom Studies, Potassium in Soil Lab
2-2146	Safety Goggles
2-2234	Gloves
	Timer/clock

Materials, Optional

Order Code	Description
	Soil Samples
5425	Topsoil Tour
5913	Nitty Gritty Soil Science Kit
5679	Garden Guide Kit

Anticipatory Set (Lead-In):

Plants need air, light, water and nutrients to grow. Some of the nutrients used by plants are found in the upper layers of the Earth's soil. Potassium is an important nutrient.

Most of the potassium in soil becomes available to plants very slowly. Weathering by wind and rain breaks rocks down into a form of potassium that is usable to plants. Wood ashes and seaweed yield small amounts of potassium.

Potassium dissolves in the water in the soil and then plants absorb it through their roots. The potassium solution travels up from the roots and through the stem. When the potassium gets to the leaves, the plant uses it to take energy from sunlight and make food for the plant in a process called photosynthesis.

Potassium is necessary for a healthy root system and new cell growth. Since new cells form at root tips and buds, potassium is important for root crops such as beets, potatoes, carrots, and radishes, and bud crops such as asparagus, broccoli, and cauliflower.

When plants don't get enough potassium, they won't grow properly. Their roots won't be correctly formed and their stems and stalks will be weak. Plants may be so weak that they will fall over as they grow. Plants with a potassium deficiency can be recognized by leaves that curl at the ends and look burnt and ragged around the edges.

Preparation:

Read the manual to become familiar with the text and test procedures. Prepare and package a set of items for each of the 5 teams. Decide how to divide the students into 5 teams. Make a copy of the Student Procedures for each team.

Step-By-Step Procedures:

1. Divide students into 5 groups.
2. Present the Introduction lecture material.
3. Pass out a set of bagged items to each team.
4. Have members of each team decide on duties of each member. For example, instruction reader, reagent adder, mixer, timekeeper, result recorder etc.
5. 5. Read instructions aloud, one step at time, as students perform the Testing Soil for Potassium procedure.
6. Discuss students' results.

Plan for Independent Practice:

Have students review additional information on soil on websites included in the Resources section. Have students read and become familiar with Student Procedures.

Closure (Reflect Anticipatory Set):

Plants that have enough potassium will be have sturdy stems, be more resistant to disease and better able to survive freezing weather or droughts. High levels of potassium are found in most soils but very little of it is in a form that is available for plants to use right away. With many crops, potassium can be returned to the soil for future use by plowing under waste leaves and stems after the harvest.

Assessment Based on Objectives:

Have students:

- list examples of root crops and bud crops that would be affected by the amount of potassium in the soil.
- explain how potassium travels through the plant from the roots and is turned into food by photosynthesis.
- describe the visible symptoms of a plant that is potassium deficient.

Adaptations (For Students With Learning Disabilities):

- Provide written and verbal instructions for test procedures.
- Provide a copy of lecture material.
- Give students a copy of the Student Procedures ahead of time so they may become familiar with the instructions.

Extensions (For Gifted Students):

- Have students draw a diagram of photosynthesis.
- Have students follow suggestions in the manual for Additional Experiments.
- Have students use terms in the Glossary to create a potassium in soil crossword puzzle.

Possible Connections To Other Subjects:

- Social studies - land use and urbanization

Resources:

NASA Soil Science
Education
<http://ltpwww.gsfc.nasa.gov/globe/Sci4kids>

Standard Methods for the
Examination of Water and
Waste Water
www.standardmethods.org
Details of test methodology

LaMotte Company
www.lamotte.com
Review and order
additional equipment

National Gardening
Association
www.ars.usda.gov/is/kids/soil/soilintro.htm

National Science Content Standards Addressed

A Science as Inquiry

All students should develop:

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

C Life Science

All students should develop understanding of:

- Population and ecosystems
-
-
-

D Earth and Space Science

All students should develop understanding of:

- Structure of the Earth system

E Science and Technology

All students should develop:

- Abilities of technological design

Resources

National Resource Council (NRC). 1996. *National Science Education Standards*. Washington, D.C.: National Academy Press.