

Healthy Soil, Healthy Plants

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Objective of the Lesson: This exercise is designed to introduce students to the importance of maintaining healthy soil for agriculture and human health.

Standards Addressed:

Science

K-3	4-5	6-8
Standard 1 <i>Nature and Application of Science and Technology</i> A-1, A-2, A-3	Standard 1 <i>Nature and Application of Science and Technology</i> A-1, A-2, A-3	Standard 1 <i>Nature and Application of Science and Technology</i> A-1
Standard 5 <i>Earth's Dynamic Systems</i> A-1	Standard 5 <i>Earth's Dynamic Systems</i> A-2	_____
Standard 8 <i>Ecology</i> A-1	_____	_____

Agriscience:

6-8
Exploring Agriscience Careers Standard 4 <i>Plant Science Careers</i> B-2, B-4, B-9
Exploring Agriscience Careers Standard 7 <i>Natural Resource and Environmental Careers</i> B-6

Materials Needed:

For students

- ✧ Empty bottles/cans from household chemicals, motor oil, etc.
- ✧ Fertilizer, manure, etc.
- ✧ Soil test kits (can be purchased from Ward's, 50 tests for \$22.00)
- ✧ Shovel or soil probe
- ✧ Plastic cups
- ✧ Seeds (lima bean seeds are good)
- ✧ Topsoil
- ✧ Water

Teaching Tips:

- ✧ Students will work in groups of 4-6 students.
 - ✧ In this activity students will be examining the health of a large area of soil. To test this area, many small samples throughout the area will be collected and combined.
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Procedure:

Can you put this on the soil?

1. Discuss what makes healthy soil (i.e. soil microorganisms, organic matter, moisture, etc.)
2. Have students identify which materials could be put on the soil without degrading the soil, water or plant health. (Example: fertilizer can be put on the soil but the amount applied should be monitored.)

Taking a soil sample for a soil test.

1. Explain what information a soil test will give.
2. Using the shovel or soil probe, collect 10 samples (4-5 inches deep) from random locations in the area to be tested. Make sure to remove all surface litter and use clean tools. Avoid sampling areas that look like problem spots (these should be sampled separately).
3. Combine all 10 samples in a clean bucket and mix thoroughly.
4. Label, fill and close one soil test bag for each group.
5. Each group should test their soil sample using the soil test kit.

Grow a healthy plant.

1. Give each group a plastic cup and some seeds. Make sure to tell them what kind of seeds they have.
2. Have each group fill their cup with topsoil.
3. Plant the seeds $\frac{1}{4}$ - $\frac{1}{2}$ inches deep in the cup and cover the seeds lightly with topsoil.
4. Water the seeds so the soil is moist.
5. Explain that the seeds will grow into a healthy plant if they supply it with water, sunlight and love.
6. Tell students that once the plant has begun to grow, they can plant it outside. Explain that they should make sure their soil is healthy first, by using the soil test bag we provided.

Discussion

- ✧ Discuss the importance of different types of land use and soil health.
 - ✧ Discuss the different types of soil pollution and why they would affect the ability to grow healthy plants.
 - ✧ Talk about why we need healthy plants.
 - ✧ Have students talk about what they can do to make sure that soil remains healthy.
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Check for understanding:

Possible Questions

1. Why is it important to have healthy soil?
2. Why is it important to take soil from 10 locations in the area you are sampling?
3. If plants are not growing as expected, explain what factors could be responsible.

Suggested Answers

1. Plants need healthy soil to grow which is very important since plants provide food and oxygen for humans.
 2. Because the sample is a small amount of soil that needs to be representative of the larger sampling area.
 3. Groups experiencing trouble growing a healthy plant will need to analyze the amount of fertilizer applied, how often the plant is watered, amount of sunlight, errors in initial soil test, etc.
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Summary of learned material:

Humans rely heavily on soils to grow healthy plants and crops. Maintaining a healthy soil to produce crops for our consumption requires an understanding of how certain factors such as sunlight, water, and fertilizer can affect the plants that are growing in our soils. After completing this activity, students should understand the delicate balance that needs to be maintained to keep soils healthy.

Additional Resources:

General sites:

<http://www.ext.vt.edu/pubs/envirohort/426-711/426-711.html#L1>

<http://interactive.usask.ca/ski/agriculture/soils/soilman/index.html> - a more advanced site

Soil Cultivation Tips:

http://www.fibl.ch/english/publications/training-manual/pdf/Tran_3-3.pdf