

**RELAX!  
HERE'S A LESSON  
WORTH TEACHING.**

## SoilSeparation

Appropriate for All Ages



## RESOURCES AVAILABLE TO TEACHERS

Other teaching aides are also available including:

- Videos
- Posters
- PowerPoint Presentations
- Visual Aids
- Full Curriculum for Teachers
- Activities

Visit our website to order your support materials today. The time you invest in our cause will come back to you many times over as you see the eyes of both young and old audiences respond to the information you share.

[www.nutrientsforlife.org](http://www.nutrientsforlife.org)

## YOUR VOICE OUR RESOURCES

Nutrients for Life is a nonprofit organization that provides information and resources to educators and individuals like you, to help inform the public about the vital role that fertilizer plays in feeding the world. The information we have compiled is science-based and user-friendly. It has been successfully implemented by educators across the country. Through a grassroots effort, we can spread the word about soil health to students of all ages and to adult organizations that are always looking for programs. Our story is not only important, but it is interesting and serves a vital role in educating consumers and decision-makers in the future.

**IF YOU  
DON'T TELL  
YOUR STORY,  
WHO WILL?**

**Your story matters.  
Soil science matters.**



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# PROCEDURE



Prepare bottles at least one day before making observations.

Step 1: Fill each bottle about 1/3 to 2/3 full of soil. Place potting soil, local soil and sand in separate bottles. (A funnel or a paper cone may make it easier to get the soil in the bottles).

Step 2 : Add water to near the top of each bottle. Place caps on the bottles, shake the contents well, and place the bottles in a location where they will not be disturbed. Prepare at least one day before making observations.

*\*Be careful when transporting the bottles to try and not disturb the solutions that have already separated.*

- Show the class the bottles of potting soil, local soil, and sand that were previously prepared with water and allowed to settle.
- Explain how they were prepared.
- Ask students to gather around the bottles and make observations about the different soils.
- Students will observe that the different soils separate differently. At this point, students will not know what is found in each layer.
- Ask the students if they can identify the organic material in the water bottles. Soils contain both organic and inorganic material. Where do they see the organic material? Organic material is less dense than inorganic material and floats to the surface of the water.
- Ask the students what about the difference in the color of the water in each bottle. What could cause the differences? The cloudiness in the water comes from inorganic particles called clay that are so small they can remain suspended in



the water. Most of the nutrients in the soil is found in the organic mater and the clay.

- Ask students if all soils support the growth of plants equally well. Most students will recognize that since soils differ in their amounts of organic material and clay, they will vary in their ability to support plant growth. It is important to understand the differences in soil to make educated decisions.

## Summary Thoughts

- The potting soil will show a thick layer of dark material on the bottom, a thick layer of cloudy water, and a thinner layer of organic material on the top.
- Local soils may differ, but a typical soil will show layering similar to potting soil, though there may be less organic material floating on the surface.
- Most of the sand will form a very thick layer on the bottom of the container. There will be a thick layer of clear water and a very thin layer of material on the surface.



# OVERVIEW

Soil is made up of different particles that are categorized into three groups – sand, silt, and clay. Sand has the largest particles and clay has the smallest particles. Most soils are a combination of the three groups. The relative percentages of sand, silt, and clay are what give soil its texture. In this activity students are asked to observe three different soil types (potting soil, local soil and sand) that have been mixed with water and allowed to settle. In the demonstration students will be able to see the different types of particles that make up the soil.

# MAJOR CONCEPTS

- The potting soil will show a thick layer of dark material on the bottom, a thick layer of cloudy water, and a thinner layer of organic material on the top.
- Local soils may differ, but a typical soil will show layering similar to potting soil, though there may be less organic material floating on the surface.
- Most of the sand will form a very thick layer on the bottom of the container. There will be a thick layer of clear water and a very thin layer of material on the surface.

## Soil Separation Lesson

Here is a quick, but effective lesson that you can use at a moments notice.

*Visual aids: 3 clear plastic bottles, (such as recycled bottles or 5.5 oz cups); potting soil, local soil and sand*

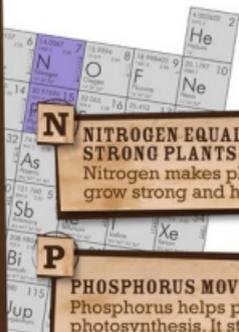
This lesson is found in NFLF's curriculum, *Nourishing the Planet in the 21st Century*.

When going to the classroom, bring a copy of the curriculum and accompanying poster to gift to the teacher.

All NFLF resources are free.

# NUTRIENTS FOR LIFE

Humans and plants need many of the same nutrients to grow big and strong. Humans need a variety of proteins, carbohydrates, minerals, and vitamins to stay healthy. Besides the primary nutrients NPK, plants need small amounts of secondary nutrients, such as calcium and sulfur, and micronutrients, like iron and zinc.



**N**  
**NITROGEN EQUALS STRONG PLANTS**  
 Nitrogen makes plants grow strong and healthy.

**P**  
**PHOSPHORUS MOVES ENERGY**  
 Phosphorus helps plants with photosynthesis. It stores and moves energy around the plant.

**K**  
**WATER IS POTASSIUM'S FRIEND**  
 Potassium helps plants control and use water efficiently.



NUTRIENTS COME FROM THE SOIL THAT HELP THE PLANT GROW AND PRODUCE FOOD



NUTRIENTS COME FROM FOOD GROWN IN THE SOIL

**K**  
**POTASSIUM HELPS THE HEART**  
 Humans need potassium, like plants do. Potassium helps control muscles and the rhythm of the heart.

**Fe**  
**IRON HELPS MOVE OXYGEN**  
 Iron helps the body make hemoglobin that moves oxygen and hemoglobin through the blood. This is similar to phosphorus moving energy around the plant.

**Ca**  
**CALCIUM EQUALS STRONG BONES**  
 Calcium helps humans have strong bones, like nitrogen helps plants have strong stalks.

