

NIH SEPA Environmental Health Investigators Garden Soil Quality Kit Summer 2020

This Garden Soil Quality kit is the second in our Environmental Health Investigators summer program. These are instructions on how to test the soil quality of a location where you might want to grow a garden. Once you find the best location, you can transplant your seedlings from the Garden Start kit to their permanent location.

There are several important things plants need to grow. They need light, water, nutrients, which they usually get from soils, and an environment that supports plant growth, which includes temperature and soil pH. Without light, plants will lose their green color and eventually all of their leaves. Without water, plants dry up, losing their leaves and non-woody parts. If plants are not in the correct environment, their seeds may never germinate, or plants may stop growing and never produce flowers or fruit. Plants also need certain nutrients.

Nutrients are the building blocks for organisms. Plants need three main nutrients that support their growth as well as many micronutrients. The main three nutrients are: nitrogen (nitrate), phosphorus (phosphate), and potassium (potash). Micronutrients include: calcium, sulfur, magnesium, iron, copper, chlorine, manganese, magnesium, boron, molybdenum, and zinc. Without the right amounts of nutrients, plants can become sick and show symptoms of nutrient deficiency just like humans.

With this activity, you will learn how to test your plant's soil for a few nutrients, as well as the pH of soil, a key environmental factor that plants need to have at the right value to grow. You will learn to test the levels of pH, nitrogen, phosphorus, and potassium. Follow the directions on this paper (or in your soil test kit) and answer the following questions as best you can!

Materials Included:

- HoldAll Soil Test Kit

Instructions:

1. To test the soil of the place you want to plant your garden, use a scoop or spoon to collect a golf ball-sized amount of soil from about 2-4 inches (5.1-10.2 centimeters) deep. Try not to touch the soil with your skin too much because the oils on your skin can change the results.
2. Spread your soil out on a flat surface such as a paper towel or plate. Remove any rocks or plant material like roots, stems, or leaves and let it dry overnight.
3. Once it is dry, use a tool like a spoon to crush your dry soil into dust and mix it up.

Check out more Environmental Health Investigators activities at <http://www.siuSTEMcenter.org/environmental-health-investigators/> and follow us on Instagram @ehi.siu

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pH Test

1. Remove the cap from the green tube and fill it with your crushed soil to the first line.
2. Carefully add the powder from the green capsule to the tube.
3. Add water to the fourth line. Bottled or distilled water works best.
4. Put the green cap back on the tube and shake well. Let it sit for one minute.
5. Compare the color of the solution to the pH color chart.

Nitrogen, Phosphorus, and Potassium Tests

1. Take your remaining soil sample and add it to a container. Now add 5 parts water, mix well, and let the solution settle for 30 minutes to 24 hours until the solution is fairly clear.
2. Using the pipette, transfer enough liquid to fill the remaining tubes to the fourth line.
3. Add the powder from the capsule of the same color to each tube.
4. Cap and mix each tube. Let them sit for 10 minutes.
5. Compare the color that develops to the plant food chart.

Questions

1. What soil pH does your plant like?
2. How can you change the pH of soil?
3. If your plant's soil has very low nitrogen (N), how much should you add?
4. If your plant's soil has low phosphorus (P), how much should you add?
5. If your plant's soil has medium potassium (K), how much should you add?

Resources

1. Missouri Botanical Gardens Gardening Help: <https://www.missouribotanicalgarden.org/gardens-gardening/your-garden/help-for-the-home-gardener.aspx>
2. University of Illinois Extension Vegetable Garden Guide: <https://web.extension.illinois.edu/vegguide/default.cfm>
3. Illinois Dept. of Natural Resources Kids and Education: <https://www2.illinois.gov/dnr/education/Pages/default.aspx>
4. National Agriculture in the Classroom: <https://agclassroom.org/index.cfm>

Be sure to pick up the next Environmental Health Investigators kit in two weeks, to get information about gardens!

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Environmental Health Investigators We Have Questions for You!

Thanks for participating in our Garden Soil Quality Kit! We would like to know more about your experience and what you are interested in learning. Please take 5 minutes to complete this short, online questionnaire: <https://forms.gle/GRddZv7kos3ym82v7>. It should only take you a couple minutes! Thank you!

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