

Planting: Soil Science

Part 1 of 2

SIXTH GRADE

Knowing how the soil in a garden or farm is composed ensures it is in top condition to grow nutritious food. In this activity, students take on the task of many organic farmers. They conduct a series of observations and tests to determine the health of the soil in the garden and discuss what they can do to improve the quality. Students will amend the soil (if necessary), and in Part 2 they will plant a garden bed.

SUBJECT

SCIENCE

TIME

45 MIN - 1 HR
+
30 - 45 MIN follow up to plant

MATERIALS

Empty Garden Bed (filled with soil but not plants)

Soil Test Information Cards

Ruler for Test 2

Shovels, several to share for Tests 2 and 3

Blank sheet of paper, pencil, and clipboard, 1 per group

pH test kit for Test 4

Watering can or hose

DIRECTIONS

- Identify an empty garden bed ready for planting prior to the activity. Gather students in the outdoor classroom and prompt a discussion about soil health. Has anyone planted in a garden before? How would you describe the soil? (color/texture) Was the soil healthy? How could you tell? What happens when you plant a garden in soil that isn't healthy? Why? (plants don't thrive because they don't get the correct balance of nutrients, they become more susceptible to harmful insects, and poor soil can impact their ability to take in water)
- Briefly explain to the class that you will be planting a crop in the bed, and you'll need to determine if the soil is healthy and what nutrients the class might need to add to make the crop thrive.
- Divide teams into four groups and give each group a Soil Test Information Card, blank sheet of paper, clipboard, and pencil.
- Distribute the ruler and a few shovels for Test 2, a few shovels for Test 3, and the soil meter (or pH strips) for Test 4. Then, without too much intervention, allow students to run the test as listed on the card and record data on their paper.
- Come back together as a class and ask each group to share how they conducted the test and the test results. As a group, decide if anything should be added to the soil prior to planting.
- Contact Barbara Larson at barbara@bckprograms.com if any soil amendments need to be purchased prior to planting.

SOURCE

Adapted from:

- The Spruce | [Four Simple Do-It-Yourself Soil Tests](#)



SQUEEZE IT

Take a large handful of soil into your hand and try to make a very tight ball.

1. If it holds its shape and then crumbles when you give it a poke, it is likely you have “loamy” soil. Loamy soil is really good for growing plants because it holds moisture and nutrients while also providing lots of air pockets for roots to grow.
 2. If it holds together tightly, you likely have clay soil, which means less oxygen and ease for roots to spread out. Add compost to clay soil to loosen up the clay so plants can get oxygen and roots can spread out.
 3. If you cannot make a ball because the soil is too crumbly, your soil is sandy. Sandy soil does not stay moist and usually lacks many nutrients. Add compost to sandy soil to improve the water retention of the soil. Compost helps sandy soil hold water.
 4. Write down the type of soil and your recommendations.
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PERC IT

Dig a hole in the soil about 1 foot deep and fill it with water. Keep track of how long it takes for the water to drain into the soil.

1. If it drains in less than 10 minutes, you have soil that does not hold moisture well, indicating that it probably has a high sand content. Add compost to the soil to improve water retention.
 2. If it doesn't drain after 30 minutes, this shows that you probably have a high clay content. Add compost to the soil to improve water drainage.
 3. If the soil drains between 10 and 30 minutes, you have the ideal drainage rate, and nothing needs to be added to the soil.
 4. Write down the drainage time and your recommendations.
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DIG IT

Dig a deep hole in the garden bed. Sift through the soil from the hole and look for worms.

When you see soil with worms in it, you can be sure there is lots of other good stuff happening. Worms snack on microbes that also benefit plants. Added bonus: Earthworms create air pockets in the soil and keep it light and fluffy, so roots have space to grow.

1. Did you find any worms? If you found at least 10 worms in the soil from the hole you dug, you have found evidence of nutrient-rich soil.
 2. If you didn't find at least 10 worms, dig a little deeper to see if you can find more. If you still don't find more worms, add compost, which is decomposed organic matter, to attract worms. Also, top the garden bed with a few inches of compost to act as a mulch to keep the soil cool and moist.
 3. Write down your findings and recommendations.
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STICK IT

Follow the directions on the pH test kit to test the soil's pH level.

Most plants like to grow in soil that has a neutral pH level. This means it does not have too high or too low of an acid "alkaline" level.

- 1.** The pH is measured on a scale of 0-14. A reading between 0-4 means the soil is acidic and probably not too friendly for plants. Add a limestone product to the soil to increase the pH. This type of amendment can be purchased at garden centers.
 - 2.** If you get a reading between 8-14, this means your soil is alkaline, and you may have challenges getting plants to grow. To decrease the pH of the soil, add sulfur or aluminum sulfate, also available at garden centers. You could also lower the pH of the soil over time by regularly adding compost.
 - 3.** If you get a reading between 5-7, the pH is ideal for plants, and no adjustments are needed.
 - 4.** Write down the soil's pH and your recommendations.
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