

Materials

- Garden gloves (1 pair per student)
- Hand trowels (1 per student)
- (2) 5-gallon plastic buckets
- 2 sturdy sticks and a roll of twine
- Extra clover seed in a small container

Preparation

- Draw a line down the middle of the garden bed by placing a sturdy stick at either end of the bed and connecting them with a piece of twine. This will help to guide students' work during Part 2.
- Arrange garden gloves in matching pairs and set aside
- Place hand trowels in a plastic bucket and set by clover bed(s)

PROCEDURE

Part 1: Examine Clover

- Arrange students evenly around clover bed(s). "This garden bed is home to a very special type of plant. Do you know what it is?" If students planted clover at the beginning of the growing season, encourage them to think back to earlier garden activities. Offer hints.
- "This plant is called crimson clover, due to its crimson-colored flowers. We do not grow this plant for food; instead, it is grown as a cover crop." Define cover crop and explain benefits of cover cropping. If students have had previous exposure to cover crops, ask these additional questions: "What is the difference between a cover crop and a food crop? Why do we grow cover crops? In what ways do they help our garden?" Discuss as a class.
- Introduce the container of clover seeds. "Clover is a member of the *Fabaceae* plant family. Gardeners refer to these plants and *legumes*. Legumes include popular food crops such as peas, beans, lentils, and peanuts. Are there any other legumes currently growing in the garden?" Pass around clover seeds for students to examine.
- Remove a clover plant from the soil with its root system still intact. "Members of the *Fabaceae*, or legume, family are able to capture nitrogen from the atmosphere and 'fix' it into the soil." Look for small nodes on the plant's roots and point them out to the group. "Within these small nodes, nitrogen from the atmosphere is converted into a form of energy that plants can use." Pass around clover plant for students to examine.

Part 2: Turn Under Clover

- "When we turn clover into the soil and allow it to decompose, valuable nutrients like nitrogen are released back into the soil. The next plants in line will greatly benefit from the available nitrogen." Demonstrate how to use the hand trowel to dig up a shovelful of clover and flip it over, lightly chopping it up at the roots after turning. Repeat. As you work, the plant's green growth should be facing down, and the roots facing up.
- Pass out garden gloves and arrange students evenly around the bed(s). "Each of you is responsible for turning under all of the clover in your small section of the garden bed. Work together with your neighbor to get the job done." Pass out hand trowels and have students get to work. Place any weeds in a plastic bucket.
- As students work, remind them turn the clover so that the roots are facing up. Work together as a group until all of the clover is completely turned under. Collect gloves and hand trowels. Discard of any seedless weeds in the compost pile.

ENGAGE

Prior to this lesson, consult your garden calendar to determine when clover was planted. “Crimson clover is one of the first seeds to go in the ground at the beginning of the growing season. We planted clover seeds on (insert date). That was ___ weeks ago. Let’s find out how much have they grown since planting.” Pass out rulers and select students to measure clover plants from their base to the tip of the plant. Compare results. “Instead of letting the plant continue to grow, we are going to turn it into the soil. This might seem cruel, but it will ultimately benefit future plants.”

Objectives

- Students will understand the difference between cover crops and food crops
- Students will understand how leguminous cover crops such as clover are able to capture nitrogen from the air and incorporate it into the soil, making it available for plants to use
- Students will understand how healthy soil creates healthy plants and healthy plants help to sustain healthy people!

EXPLAIN

Healthy Soil, Healthy Plants, Healthy People

On many large-scale industrial farms, the same crops are planted in the same locations year after year. This system of agricultural production is known as “monoculture”. With no time to rest and rebuild between plantings, the soil is slowly depleted of nutrients and becomes increasingly unproductive. Many farmers have to rely on synthetic fertilizers to supply their plants with the nutrients they need to grow. While fertilizers may provide farmers with a short-term solution for the sake of productivity, they have devastating long-term environmental effects. Over time, chemical fertilizers leech out of the soil and into major waterways, harming plant and animal life.

However, with a little muscle and brainpower, we can build healthy garden soil that is naturally rich in nutrients. Maintaining healthy garden soil requires careful attention and thoughtful planning, but the ultimate benefit is well worth it – great garden soil that can sustain itself over time without any chemical inputs. Achieving the proper balance of nutrients, texture, and pH in the soil is essential in order for plants to thrive. Additionally, practicing smart crop rotation between plant families and food/cover crops helps to improve soil health.

As they grow, plants absorb nutrients from the soil and store them into their tissues. When we eat plants that are grown in naturally healthy soil, we take in the nutrients that are stored in their plant tissues. Healthy garden soil produces healthy plants and healthy plants fill our bodies with the nutrients and energy we need in order to live full, healthy lives. After all, you are what you eat!

ADDITIONAL CONTENT INTEGRATION *(see previous page)*

Collect hand tools and garden gloves. Arrange students evenly around the bed and introduce the large garden tools. Demonstrate how to use the spading fork and shovel to turn under the clover. Pass the spading fork to your right and the shovel to your left, so that each tool makes a complete rotation around the group. Allow students to use each tool for 10 seconds before passing it on the next person in line.

Additional Materials

- Rulers
- Spading forks
- Shovels

EVALUATE

Journal prompt: What is a cover crop? How do cover crops improve soil health?