

## Materials

- Spinach seed
- Twine and small sticks
- Yardstick
- Transplanter trowels (8)
- Warren hoe
- Watering cans (8)

## Preparation

- Identify planting locations for spinach. Set aside the proper amount of spinach seed.
- Fill watering cans with water and place by beds.

## PROCEDURE

### Part 1: Introduce Activity

- Arrange students evenly around spinach bed. “As temperatures begin to cool, spent warm-season crops are removed from garden beds and placed in the compost pile. In their place, we can plant a variety of cool-season crops that thrive in the colder fall weather.” Introduce a small container of spinach seed and pass it around for students to examine. “Spinach seeds can germinate in temperatures down to 45°F, making them ideal candidates for fall planting. What might happen if planted too deep? Too shallow? Why?” Collect seed.
- To plant these seeds, we will need three groups—one to make furrows, one to plant the seeds in the furrow, and one to water. Divide students into these three groups.

### Part 2: Plant Spinach

- “Spinach is planted in rows spaced 6 inches apart.” Introduce twine and sticks. Firmly insert a small stick into the soil in one corner of the garden bed. Select a student to place another stick at the opposite end of the garden bed. Have two students connect the sticks with twine. Select a student to measure 6” between rows then repeat the process for the second row.
- Arrange the furrow group evenly along the side of the bed where the spinach will be planted. “This group is going to make two long furrows beneath the string we just installed.” Demonstrate how to create a shallow furrow down the row using a trowel. Ask students to create a shallow furrow for the two sections of row in front of themselves, connecting the furrow from student to student.
- Introduce the warren hoe and select a student to run it down the two furrows just created. This will assure that the depth of the furrows is even.
- Arrange the planting group in front of the furrows. “Each of you is responsible for planting seeds in the two sections of row in front of you. Spinach seeds are planted every 2 inches. That is about the length of your thumb.” Demonstrate how to place seeds in the furrow every two inches, leaving them uncovered as you work. Distribute small amounts of seed to each student and instruct them to wait until everyone is ready before planting. Check students’ work as they plant.
- When the group has finished planting, show them how to carefully cover seeds with a light sprinkling of soil (no deeper than ½ inch). After the seeds are covered, show them how to lightly tamp the soil so that the big air pockets in the soil are closed up. When they are finished, students should step back for the next group.
- Ask the watering group to pick up their watering cans and approach the spinach bed. Ask students to wait to water until you give the signal. Students will water the two sections of row in front of themselves. Go!

### Part 3: Review

- Ask students to review the three steps of planting. What were some of the relevant measurements we made? Why are they important?

# Planting Cold Weather Crops

Patterns &  
Preparation

## ENGAGE

Gather in a large area of the garden. “By now, most of our warm-season crops have reached their peak and production is winding down. Which crops have been harvested since the beginning of the school year?” Generate a list. “Which crops remain in the garden?” As a class, tour the garden and identify remaining warm-season crops. “In contrast to warm-season crops, there are certain plants that thrive in cooler temps.” Introduce spinach seeds and crocus corms. “There are many ways to generate new plants. Today, we will be planting seeds which will grow during cool – and cold – months!

## Objectives

- Students will understand the difference between warm-season and cool-season crops
- Students will understand that certain plants, such as spinach and crocus, thrive in cooler temperatures
- Students will understand how to properly plant spinach seeds and crocus corms

## EXPLAIN

### Which plants thrive in cool temperatures?

The cooler temperatures and shorter days are signs that winter is on its way. By now, most of our warm-season crops have completed their life cycles and been removed from the garden. However, some plants actually thrive in cooler temperatures. Hardy garden crops such as collards, kale, and cabbage can produce well into late fall and early winter when warm-season superstars like peppers and tomatoes are long gone. What garden plants have you worked with throughout the summer and fall? Which plants are still around in the garden? Which ones have been removed and sent to the compost pile? Take note of those plants that are still in the garden. Chances are that these standouts are cool-season champions, hardy to colder weather and the occasional frost because of thick, rubbery leaves or other cold-tolerant plant adaptations.

### Overwintering Spinach

Spinach is a cold-weather superstar. It requires temperatures between 45-75°F for germination, making it ideal for fall planting. Spinach produces a harvest well into late fall and early winter and cooler temperatures are said to enhance flavor. Spinach is so cold tolerant that it will even survive the winter and produce one of the earliest crops of the spring! But in order to do so, it needs to be well established. If we were to plant it any later in the season it might just sprout and then die because its roots and stems are not well enough established. Mulching also helps spinach survive especially brutal winters. Just place leaves or straw over the spinach around Thanksgiving time.

## ADDITIONAL CONTENT INTEGRATIONS (see previous page)

Spinach is able to withstand the cold winter temperatures, once germinated, because of its thick leaves. *Introduce students to the term adaptation.* What other plants or animals can you name that have special adaptations to endure harsh winter conditions? What do you do in your family to prepare for and enjoy winter?

### Additional Materials

- Science Journals

## EVALUATE

**Journal prompt:** Can you name three warm-season crops? Think back to the garden tour at the start of the lesson. Can you name three cool-season crops? Hint: Those are the crops growing or being planted in the fall and winter.

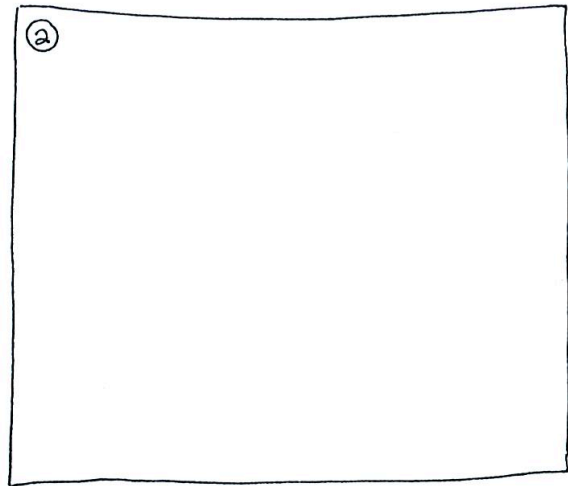
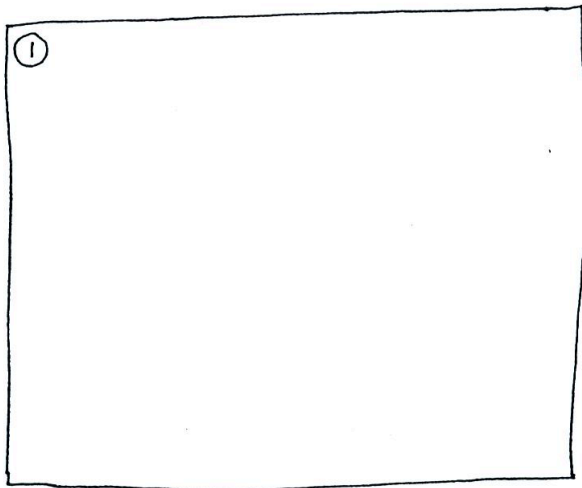
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# Cool-season Crops



Draw two plants you saw overwintering in the garden today:



Define overwintering:

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