

MATERIALS

- Whole garlic bulbs (about five)
- Harvest basket
- Yardsticks
- Popsicle sticks or small twigs to mark planting spots
- Hand trowels (enough for half the class)
- 2 garden rakes
- 4 spades
- 4 5-gallon plastic buckets

PREPARATION

- Identify a location to collect fall leaves.
- Identify the garlic planting location.
- Set the hand trowels and the garlic bulbs in the harvest basket at the Garlic Station.
- Set the rakes, spades, and buckets at the Leaf Station.

PROCEDURE

Step 1: Introduce Garlic Planting Station

- “A bulb of garlic consists of individual cloves. New garlic plants grow from the cloves.” Show a bulb of garlic to the class and demonstrate how to break up the bulb into individual cloves. Pass cloves around for students to examine.
- “Each clove has two ends, the flat base and the pointed tip. The clove will grow roots from the flat base and send up a shoot from the pointed tip. Which end should point toward the sky when we plant?”
- Collect garlic cloves and arrange students around the garden bed.
- “Garlic must be planted in a row, with plants spaced 6” apart.” (If more than one row is necessary, space the rows 12” apart.)
- Beginning 3” from the corner of the bed, mark the first planting spot with a small stick. Use the yardstick to identify the next planting spot. Mark this spot with another stick. Select a few student volunteers to continue measuring/markings until the row is complete. Select a few other volunteers to break apart the garlic cloves.
- Beginning at the first marker, demonstrate how to dig a hole 2” deep, piling the soil next to the hole. Insert a clove of garlic into the hole, pointed end up, then return the soil to the hole and pat down gently.

Step 2: Introduce Leaf Collection Station

- Demonstrate how to mulch the carrot and garlic beds with a blanket of fall leaves: 1) Rake some leaves into a pile. 2) Place them in a bucket. 3) Chop the leaves in the bucket with a spade until they are about one inch square. 4) Dump the chopped leaves on the carrots, brushing the carrot greens with your hands so that the leaves settle on the ground. “We will be covering the carrot and the garlic beds with a 6” layer of mulch. We will start with the carrot bed and then move to the garlic bed once all the garlic has been planted.”
- “At this station there are three roles: the rakers, the choppers, and the movers. There will be two rakers, four choppers, and six (or so) movers. The rakers rake the leaves into a pile and the choppers chop the leaves in the buckets. The movers fill the buckets with the leaves from the pile and then dump the chopped leaves on the bed.”

Step 3: Rotate Through Stations

- Separate the class into two groups and explain that students will rotate stations after about 7 minutes.
- Before sending students to the stations, identify who will assume each role at the Leaf Collection Station.
- Upon completion of the activity, have students return the tools, brushed of any dirt, to their proper locations.

Plant Dormancy

Patterns & Preparation

ENGAGE

Show students a picture of a volcano, a bat, and a deciduous tree. Break students into groups of 4 and ask them to discuss what the three have in common. Come back together as a class and call on a student from each group to report their guess. Then, write the *dormant* on a board and explain that each of these go dormant. Define plant dormancy for the class as a period in a plant's life when growth and development stops.

OBJECTIVES

- Students will be able to explain the effect of seasonal change on overwintering garden plants
- Students will be able to explain the role of dormancy in plant survival over the winter
- Students will be able to define two new garden terms: *overwinter* and *dormant*

EXPLAIN

How do plants survive the winter?

Given the chilly forecast, it might not make sense to plant any additional garden crops. Yet, garlic can be planted in the late fall and *overwinter* in the garden. Once planted, garlic will make roots, but will go *dormant* shortly thereafter. Garlic temporarily stops growing in order to conserve energy over the winter. Even as the garden sits under a blanket of snow, garlic bulbs can still survive. A nice thick layer of leaf mulch helps to keep the beds warm and weed-free. Come spring, little green garlic shoots will emerge from the soil and the plant will come back to life.

As for the carrots, their green tops will die back as the temperatures drop, but their orange roots will stay alive under the soil. Without any green leaves to soak up the sun, the carrots do not have as much energy available to them. This would be a problem if the carrots were still in the process of growing, but the little carrots have already sensed the approaching winter and they have begun to slow down and use less energy. This is called "going dormant" and can be compared to the way an animal might hibernate.

Why do trees drop their leaves?

The leaves of a tree are small energy factories. But it also takes a lot of energy to keep these factories running. So, when winter comes, trees drop their leaves to conserve energy. Dormancy and abscission (the dropping of leaves) is triggered by the shortening days and the diminishing intensity of the sun. Another benefit of abscission is that it keeps the tree from drying out in the winter winds.

ADDITIONAL CONTENT INTEGRATION *(see previous page)*

Step 1: Introduce students to a new garden term: *overwinter*. Define this as the process of keeping a plant alive in the garden over the winter. Use garlic and carrots as examples, then have students record the definition in their garden journals.

Step 2: Explain that mulch helps insulate the plants and soil over the winter to keep the plants from suffering frost damage while dormant. *What should we use for mulch? Leaves!* Engage students in a discussion of why the trees are dropping their leaves.

ADDITIONAL MATERIALS

- Max/Min thermometer
- Sunrise and Sunset times
- Sun Position Pole
- Flip chart and markers
- Garden journals

EVALUATE

Exit Slip: Why do plants stop growing over the winter?