

### Materials

- Plant markers
- Popsicle sticks
- Clear duct tape
- Garden journals and pencils
- Magnifying glasses

### Preparation

- Identify growing cool-season crops to be featured in this lesson (ex. snap peas, lettuce, turnips). Review corresponding plant family names. Mark plant stations if necessary.
- Gather pre-made plant markers (see: Planning and Mapping 3) for featured plants. If you haven't already done so, use clear duct tape to attach popsicle sticks to the bottom end of each.

## PROCEDURE

### Part 1: Identify Crops and Search for Evidence of Pests and Disease

- As a class, gather in the garden. "By now, all of our cool-season crops have been planted in the garden and are on their way to reaching maturity. Along the way, these plants will undergo many changes in size and appearance." Instruct students to get their garden journals and pencils ready for plant observation. Have magnifying glasses on hand. Save plant markers for later.
- Lead the group to the first plant station and evenly arrange students around the garden bed. "Do you recognize this plant?" If necessary, give the group a few hints. Once students have correctly identified the plant, have them kneel down for a closer look. "This plant is in its early stages of growth. The mature plant will look different from the one we see now." Instruct students to draw a rough sketch of the featured plant (and its name) in their garden journals. Encourage students to label any plant parts that they are familiar with.
- "If all goes well, these plants will supply us with food to eat. However, a successful harvest is never guaranteed. There is always the risk that our plants might be severely damaged by pests or disease during their life cycle. Do you see any evidence of pests or disease on this plant?" Have students examine the entire plant for evidence of pests or disease. "Do you notice any holes in the leaves? Mold? Weak-looking plants? Yellowing of the leaves?"
- If there is evidence or pest of disease, distribute magnifying glass so that students may take a closer look. Have students record any findings in their garden journals. Encourage additional sketches, written observations, etc. Lead the group to the following plant stations and repeat the process outlined above. After the final plant station is complete, return to the first station.

### Part 2: Install Plant Markers

- "By now, we have identified and examined three different garden crops." Review the names of each. "Each crop comes from a different plant family. Members of each plant family are often prone to similar pests and diseases. By planting a variety of crops from different families, we reduce the possibility that a single pest or disease could wipe out our entire harvest. In addition, we rotate our plant families yearly to reduce the risk of pests or diseases over-wintering in the soil and attacking plants during the following growing season."
- Introduce the plant marker for the first station and select a student volunteer to insert it into the garden soil. Introduce the featured crop's plant family name and have students record it in their journal. Repeat this process for the following plant stations. When finished, gather in a common area for recap and discussion.

### ENGAGE

“As you know by now, a plant begins its life as a seed.” Introduce seed ID cards to the group. “Earlier this year, we planted these seeds in the garden.” Introduce each seed ID card and pass it around for students to examine. Urge students to think of adjectives to describe each. When finished, collect seed cards. Compare and contrast seed appearance. “These seeds come from different plant families, which is why they look different. Today we are going to examine how these seeds have grown since germinating weeks ago.”

### Objectives

- Students will understand the importance of species diversity in the garden
- Students will understand how smart garden planning and crop rotation can help to deter pests and disease

### EXPLAIN

#### Species Diversity in the Garden

Much of the food we purchase from the grocery store is grown on large-scale farms. Many of these farms cover hundreds of acres of land, enabling them to produce huge amounts of food for widespread distribution. This method of food production is known as industrial agriculture. Industrial agriculture emerged in the 20<sup>th</sup> century, as new agricultural technologies made it possible for farmers to cultivate increasingly bigger tracts of land. Under this system, farmers generally cultivate a single crop over a large piece of land. This agricultural practice is referred to as “monoculture”. The major monocultures in the United States are corn, wheat, soybeans, and cotton. In many cases, the same crop is grown on the same piece of land year after year.

While monoculture production is praised by some for its ability to yield a large harvest with minimal need for labor, this method of agricultural production comes with some serious side effects. Naturally, all plants are susceptible to attack from pest or diseases. This is simply a part of farming. However, cultivating a single crop over a large area of land essentially creates an “all-you-can-eat” buffet for hungry pests. Without natural barriers in place, pests and disease can easily spread throughout the entire field, potentially destroying a large portion of the harvest in the process.

By growing a diversity of edible crops in our garden, we reduce the risk of complete crop failure due to pests or disease. Even if one crop suffers, other crops may still produce a harvest. In addition, smart planning and crop rotation practices reduce the need for harmful chemicals. Diverse natural systems keep the garden in check.

### ADDITIONAL CONTENT INTEGRATION *(see previous page)*

Prepare “seed ID” cards in advance. First, cut paper stock into 4X6-inch cards. Label the cards with the corresponding seed names and use glue to firmly attach seeds. Let dry. Introduce seed ID card during the “Engage” part of the lesson. As students identify the featured plants during Part 1, ask if they can remember what the corresponding seed looks like. Display seed ID card once more.

### Additional Materials

- Paper stock
- Scissors
- Spare snap peas, lettuce, and turnip seeds
- Glue and markers.

### EVALUATE

**Journal prompt:** What are the risks of growing a single crop over a large area of land year after year? How can we protect our harvest from year to year without using chemicals?