

### MATERIALS

- Garden map, yardsticks
- 8 tomato seedlings
- 8 hand trowels
- 8 small watering cans
- Compost tea and a measuring cup
- 5 gallon bucket, paint strainer

### PREPARATION

- Make sure seedlings have been hardened off.
- If compost tea is not available for the final watering, use a mixture of fish emulsion and liquid seaweed. Revita (composted chicken manure) can be used instead of compost.

## PROCEDURE

### Part 1: Demonstrate Transplanting Procedure

- As a class, gather in the garden. Introduce the seedlings: *Our seedlings have gone through the hardening off process and are ready for transplanting.* Hold up the garden map and identify the planting location. Select a student to lead the group to the tomato bed.
- At the tomato bed, use a yardstick to identify the location for planting the first seedling. Tomato seedlings are planted on the imaginary center line extending down the length of the bed. (Consult your bed layout diagram if planting another crop.) The first seedling on that center line should be planted 9" from the short edge of the bed. (9" is half the tomato's normal 18" spacing. Plant spacing is based on the diameter of a mature plant's root system.) Stick a trowel into the ground at this spot. Then, select a student volunteer to continue measuring down the line, sticking a trowel into the ground every 18". If measured properly, you will have 8 trowels in your 12' bed, and the final trowel will be 9" away from the other short edge of the bed.
- Pour unfiltered compost tea through a paint strainer into another 5 gallon bucket. Choose a student volunteer to water all the seedlings: *Seedlings need to be watered thoroughly both before and after transplanting. We are going to water the seedlings with compost tea to help them power through the shock of transplanting.* (If no compost tea is available, just use water.)
- Dig a hole where the first trowel was placed. It should be a little deeper than the pot and an inch or so wider. After digging the hole, return the trowel to the trowel bucket.
- Hold up the seedling and demonstrate how to gently tear off the rim of the newspaper pot, so that no newspaper will be exposed to the air once the seedling is planted. *Exposed newspaper wicks moisture from the roots and dries them out.* Leave the rest of the newspaper pot intact.
- Put a small handful of compost into the bottom of the hole and place the seedling on top of the compost. The surface of the seedling's soil should be flush with the surface of the soil around it. Add or remove soil as needed. Once the seedling is positioned properly within the hole, fill in the rest of the hole. Use your hands (not a trowel) to firm the soil around the seedling. This will close any pockets of air around the seedling's roots.
- Finally, measure about two cups of compost tea into a small watering can. Water the seedling well. *Watering closes up any remaining pockets of air that could dry out the seedling's roots.*

### Part 2: Student Transplanting

- Divide students into groups of three and direct each group to a properly spaced trowel. Assign transplanting tasks to each person in a group: One will dig the hole; one will place the compost and seedling into the hole and bury it; the other will water it in with compost tea. While the digger is digging, the transplanter should tear the rim off the newspaper pot and the waterer should fill his or her watering can. After the holes have been dug, collect the trowels. They can become a hazard to the plants.

# Transplanting: Needs of Plants and the Limits of Production

## Food & Technology

### ENGAGE

Seedlings are like baby plants, just learning how to survive in the world. Raise your hand if you have a little sibling or you know a friend or family member who is younger than you. Who can tell me one way that adults, older siblings or friends can help a small child. When they are young, children require gentle care. Just like baby people need a bit of extra care and attention, seedlings (baby plants) also need gentle, loving care as they enter the garden for the first time.

### OBJECTIVES

- Students will be able to successfully transplant seedlings
- SWBAT explain how fertilizers help reduce transplant shock
- SWBAT list factors that impact how much food we will get from a plant.

### EXPLAIN

#### How do we help seedlings deal with transplant shock?

While the hardening off process helps plants to better cope with ever-changing outdoor conditions, newly transplanted seedlings still go through a brief period of stress as they adjust to their permanent homes. This is known as “transplant shock”. As caring gardeners, we help the plants through this trying time with a big drink of compost tea. The extra nutrients help the seedlings power through the initial shock of transplanting and firmly establish themselves in their new environment.

#### A Quick Lesson in Economics: You get what you give

We give seedlings many things: an early beginning inside; transition time outside; adequate space; a boost of nutrients during transplanting; healthy, aerated soil; plenty of water; and the right amount of sun. In return, our plants produce food for us. As good gardeners, we try to find the perfect balance between what we give and what the plants give. If we don't give tomato seedlings enough space, or if we don't give them the amount of time they need to grow, they won't produce, as many tomatoes per plant later in the season, and the tomatoes it does produce will likely be smaller. At the same time, it is possible to give the tomato seedlings more than they need. You could give them more space by planting fewer seedlings, but then you wouldn't get as many tomatoes at the end of the season (because at a certain point more space no longer equals more tomatoes per plant; it just means more weeding in between each plant). By trial and error, gardeners and farmers try to find the perfect balance between what we give the plants and what we get from the plants.

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

Have students look at the tomato seedling and guess how many could fit into the bed if we packed them together. In a 12'x3' bed, you could fit 576 seedlings. Why do we only plant 8? What are the limiting factors?

**Extension:** Based on the tomato's root size, we could plant about twice as many tomatoes in this garden bed, but if we did that every year, we would be taking more nutrients from the soil than we can put back with our compost.

### ADDITIONAL MATERIALS

- No additional materials needed.

### EVALUATE

**Journal prompt:** If we regularly used fertilizer on our plants, we could grow more plants per bed. Why would a farmer choose not to use fertilizer regularly?