

MATERIALS

- *For tomato irrigation:* clean 5-gallon plastic bucket with lid, filter screen, hose fittings, water supply line, drip line, sleeves (or string)
- 6-foot tall steel rebar rods, ½" diameter (3 rods per row of tomatoes), post pounder
- Large pile of mulch (saved fall leaves, straw, grass clippings), buckets for transporting mulch (1 per student group), garden gloves (1 pair per student)

PREPARATION

- Identify a location for the irrigation bucket stand. Stand should be placed at least 3 feet off the ground.
- Construct a stand for the irrigation bucket (see attached instructions)
- Drill a hole in the bottom of the plastic bucket. Size of the hole should match up with the size of selected hose fittings.
- Roll up drip line and place by bucket stand

PROCEDURE

Part 1: Install Tomato Irrigation

- Arrange students evenly around tomato bed(s) and introduce the day's garden activities. "Like all plants, tomatoes require sun, soil, water, and air in order to survive. The first part of this lesson will focus on one of those needs – water. Tomato plants require a steady supply of water in order to produce high quality fruit."
- Define *irrigation* and explain the benefits of using irrigation systems. Define *drip irrigation* and explain how it works. Introduce drip irrigation materials. As a class, move to the bucket stand. Display the bucket and explain how to connect hose fittings on either size of the pre-drilled hole. Select two students to connect fittings. Select a student to connect the water supply line to the rubber stopper on outside end of the hose fitting.
- Introduce drip line. Identify drip openings and explain how the drip line delivers water to plants. Select a student to connect drip line to the water supply line. Explain how to properly run the drip line along the length of the tomato beds. "Drip line must lay flat across the soil surface and be free of any folds or creases. As you lay drip line, make sure that it is in direct contact with the soil. Drip openings should be facing up."
- Arrange students along the length of the tomato bed(s), so that 3–5 students are in charge of one row. Have students work together to stretch drip line along their row of tomatoes. "Stretch drip line along the soil surface in front of you, then pass it on to your neighbor. Check the line for any folds or creases." When all groups are finished, demonstrate how to close the end of the drip line. Select a student to fold and close each end of drip line. Fill bucket with water to test drip system. "Can you spot any water coming out of the drip line? Where?"

Part 2: Install Stakes and Mulch

- Reconvene as a group around one tomato bed. "A steady water supply will help to sustain growth and fruit production. As plants begin to produce fruit, they will require some additional support." Demonstrate how to install rebar stakes. Push stakes into the soil until secure, then select a few students to hammer stakes in. Repeat the process until all rows are complete.
- As a group, move the mulch pile. Define *mulch* and explain benefits of mulching tomatoes. Distribute garden gloves. Divide students into groups. Each group fills up one bucket with mulch. As a class, move to tomato bed(s). First, demonstrate how to properly mulch beds, leaving enough space around tomato plants. Then, assign each group a section of tomato bed to mulch. Remind groups to check drip line before applying mulch – it should be flat against the soil surface. Check students' work. When finished, collect gloves and materials.

Install Tomato Irrigation

Food & Technology

ENGAGE

Connect garden hose to water source and place by tomato bed(s). As a class, gather around tomato bed(s). “What happens to water as temperatures begin to warm?” Discuss as a class then define *evaporation* – the vaporization of a liquid. Turn on hose and begin to water tomato beds from overhead. “On hot days, only a small portion of this water will actually be captured and used by the plants. The rest will evaporate before it even reaches the soil surface. Thankfully, there are ways to conserve water during hot summer weather.” Introduce *irrigation*.

OBJECTIVES

- Students will be able to define *evaporation*, *irrigation*, and *mulch*
- Students will understand how drip irrigation and mulching helps to conserve water
- Students understand how to properly install drip irrigation line, install trellis stakes, and mulch garden beds

EXPLAIN

Conserving Water in the Garden

The arrival of warmer weather means increased growth and fruit production for warm-season crops such as tomatoes, peppers, and summer squash. These plants are especially thirsty during hot summer months when fruit production reaches its peak. In many climates, summer rainfall can be infrequent just as plants need it most. During dry summer months, many large-scale farms rely on overhead sprinklers to supply their fields with water. This artificial application of water to the soil is known as *irrigation*. Unfortunately, overhead irrigation can be inefficient at times, as warmer temperatures cause much of the water to evaporate before it even reaches the soil!

During this lesson, we focus on special water-saving method of irrigation known as *drip irrigation*. Drip irrigation delivers a slow and steady supply of water to the plants, minimizing evaporation while saving time and energy for the gardener. Although some drip irrigation systems use pumps to transport water, our DIY drip irrigation system relies upon the power of gravity to feed our plants. First, an elevated bucket is filled with water. Gravity exerts enough downward pressure on the water to transport it to tomato plants via a network of drip lines. The drip lines emit a slow trickle of water through a series of holes, which are placed directly next to a plant’s root zone. The benefits of using a drip irrigation system are twofold: we conserve precious water resources and free up the plant’s energy to do other things . . . like produce sweet, succulent fruit for us to enjoy! *Mulch*, or a covering of material over the soil surface, provides the added benefits of moisture retention, weed suppression, and temperature regulation. Organic mulch such as leaves, straw, or grass is best, as it also improves soil fertility over time.

ADDITIONAL CONTENT INTEGRATION *(see previous page)*

Construct bucket stand as a class. **In the classroom:** Review instructions and make a list of materials. Procure necessary materials, then select a small group of students to measure and mark wood for cutting (an adult may cut wood to appropriate length). Construct stand in the classroom. Select proper drill bit and supervise bucket drilling. **In the garden:** Dig holes and install stand, hammering until secure. Fill in remaining space with soil press down firmly.

ADDITIONAL MATERIALS

- Bucket stand instructions
- *Classroom:* measuring tape, hand saw, drill/drill bits, screws
- *Garden:* steel rebar, post hole digger, rubber hammer

EVALUATE

Journal prompt: What is irrigation? How does drip irrigation help to conserve water?