

### Materials

- Newspaper strips and pot makers, plus extra newspaper for lining desks
- Pre-moistened potting soil mix, stored in a 5-gallon plastic bucket
- 3-4 smaller containers
- Seedling flats and hand sprayer
- Amaranth and marigold seeds
- Small containers of vermiculite for dusting
- Tape and permanent markers for labeling

### Preparation

- Arrange desks into small groups and cover desks with whole sheets of newspaper.
- Pre-moisten potting soil with a bit of water and divide soil mix into smaller containers (1 per group). Set aside.

## PROCEDURE

### Part 1: Make Newspaper Pots

- Instead of using verbal directions to communicate instructions, silently mime the pot making procedure. Have students pay close attention as you slowly wrap the newspaper around the upper neck of the pot maker, fold the edges under, and press down firmly onto the base to finish your newspaper pot.
- After you have finished, select a student volunteer to silently demonstrate the procedure for the rest of the class. As students once again observe each step of the process, encourage them to think of ways to put each step into words. Once the student finishes making their pot, direct the group's attention to the board.
- As a class, generate a list of instructions on how to make a newspaper pot. When the class is satisfied with their list, split students up into groups, pass out newspaper strips, and distribute pot makers. As individual students finish their pots, have them help their classmates or make one more pot. Collect the pot makers.

### Part 2: Plant Seeds

- Using a finished newspaper pot, demonstrate how to fill the newspaper pot with potting soil. Explain:
  1. Hold your pot over the bucket
  2. Make a mountain! (Sprinkle a big handful of soil into your pot until it forms a large mound on top)
  3. Give it a haircut! (Cut the extra soil off so it is level with the top edge of the pot)
  4. A little more for good luck! (A little extra on top)
  5. Tuck it in! (Gently pat down on top so that soil is totally level with the top of the pot)
- Record the steps on the board, then distribute small containers of potting soil to student groups. Once all students have finished filling their pots with the correct amount of soil, demonstrate how to plant the seeds.
- "Use your 'powerful pinky of planting' to poke a very tiny hole in the soil. For these seeds, the hole should be no deeper than your fingernail." Check students' work. Then, assign each small group either amaranth or marigold seeds, depending on your garden's unique planting scheme.
- Distribute seeds and instruct student to place two seeds into the small hole in the soil surface. When all students are finished planting, instruct them to lightly cover the seed with soil and gently "tuck it in".
- Collect finished pots and place them in separate seed flats labeled "amaranth" or "marigold". Finally, use a hand sprayer to water the seeds in, then place the flats in a warm, sunny, and draft-free area of the classroom.

### ENGAGE

“Warm-season ornamentals such as amaranth and marigold require warmer temperatures in order to germinate and grow. While outside temperatures might still be too cold for planting these seeds directly into the ground, we can get a head start on the growing season by starting seeds indoors. The classroom environment will provide our growing seedlings with a suitable home until outside temperatures are warm enough for transplanting. Today, you will learn how to successfully start plants from seed and care for them over time.”

### Objectives

- Students will understand basic seed starting methods and seedling needs for survival, including regular watering, maintaining consistent temperatures for germination and growth, and monitoring for pests and disease
- Students will understand how dusting the soil with vermiculite after planting helps to prevent certain soil-borne diseases

### EXPLAIN

#### Preventing Soil-Borne Diseases

Without the proper care and attention, tender seedlings may succumb to certain soil-borne diseases. Of these diseases, the ever-pesky “damping off” causes great distress to novice and expert gardeners alike. “Damping off” is a fatal disease caused by several species of soil-borne fungi that thrive in unfavorable soil conditions. Fungal pathogens attack the plant at the roots or crown, causing it to rot and die. Seeds can become infected with the disease immediately after germination (pre-emergence damping off) or after they have broken through the soil surface (post-emergence damping off). Pre and post-emergence symptoms include: suspiciously low germination rates, poor plant vigor, seedling discoloration, yellowing of foliage, and healthy-looking seedlings that suddenly wither and collapse.

We can prevent soil-borne diseases like damping off by putting a layer of vermiculite on the surface of the soil after the seed has been planted. The vermiculite acts like a thick blanket over the soil, discouraging the growth of fungal pathogens on the soil surface. In addition to applying vermiculite after planting, it is extremely important to maintain total control over the growing environment throughout the early stages of seedling growth. Seedlings require consistent levels of light and moisture. Many soil pathogens thrive in excessively moist soil, therefore be careful not to over-water. Maintaining adequate airflow is also essential. Air should move freely around the plants throughout the entire day; this helps to strengthen seedlings and allows excess moisture to evaporate. If needed, place a fan near the seedling trays to ensure proper airflow, but do aim the fan directly at the plants.

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

Prepare “Seed ID” cards. 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. During the lesson, pass around the ID cards to introduce the day’s seeds. When students have finished examining seeds, have them generate a list of adjectives on the board.

#### Additional Materials

- Paper stock
- Scissors and glue
- Spare amaranth and marigold seeds
- Markers

### EVALUATE

**Journal prompt:** Check your seedling daily to track its growth. In your journal, record when the first shoot is visible. Then, record when the plant’s seed leaves (cotyledons) emerge and when the plant’s first set of true leaves develops.