

TTCD Lesson Plan (10): Planting

Unit: Gardening	Grade(s): K-12	Class Size: 1-30	Lesson Duration: 30 minutes	Location:
Topic(s):	Plant life cycle, seeds, planting			
Student Prerequisites:	N/A			
Essential Questions:	What does a plant need in order to thrive?			
Student Objectives:	Students will learn what vegetable plants need in order to grow. Students will gain hands-on experience sowing seeds and/or transplanting seedlings to the garden.			
Standards:	Supports NGS Standards: 3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.			
Local Context:	Ask students what vegetables they like to eat at home. What vegetables have they or their families cooked with before? Choose plant varieties that students are familiar with and some new ones they would like to try.			
Vocabulary:	Transplant: Planting seedlings (young plants) into the ground. We will start these seedlings indoors earlier in the season, when the ground outside is still frozen. Direct Sow: Planting seeds directly into the ground. Fertilizer: A mixture such as manure that can be added to soil to make it more fertile, which helps plants grow! Stem: The main structure of a plant, like a human's bones! It is above ground, and branches, leaves, flowers, or fruits may grow from it. Sow: to plant a seed for growth Germinate: to sprout or begin to grow Seedling: a young plant			
Dena'ina language words:	Added by TTCD or community partners			
Materials:	• Garden design and plan • Gloves for students			

	• Transplants and Seeds • Fertilizer (for transplants) • Outside planting: soil preparation tools which could include digging fork, hoe, broad fork, shovel, trowels, etc. • Inside planting materials: containers with drainage holes, tray to place under containers to catch excess water, potting soil mix • Plant tags and pencils to label rows or pots once planted • Watering can
Instructor Prep:	• Review the garden design and plan. • Organize and lay out the seeds, transplants, and planting materials that students will be using today. • For outside planting, know what will be needed to add to the soil when transplanting outdoors, such as compost, manure, blood meal, bone meal, or other fertilizer. • Make sure to “harden off” seedlings before planting outside.
Introduction:	Question: What do you think a plant needs in order to grow? Recall: what did we learn about last time we talked about soil? Hydroponics? Hook for younger students: As students identify soil, water, air, and sunlight, have one student stand up and pretend to be each element. “Sunlight” might have her hands reaching toward the sky, “Soil” might wiggle like a worm, and “water” could pretend to use a watering can. Hook for older students: Instead of the hand motion activity, designate 4 spots around the room. One represents water, one represents soil, one represents sun, and one represents air. Name a plant students are familiar with (either wild or from the garden) and have them stand up and go to the element they think is most important for that plant to thrive. Ask a student from each spot to explain their reasoning. If there is time, choose 1-2 more plants. Consider including plants with varied needs (alders and fireweed and most “weeds” don’t need particularly rich soil but most garden plants do, cottonwood needs more water than spruce, mosses do well in wet shade while wild roses need lots of sun and do well with somewhat drier soil). Explain that today we are going to start growing our plants for the garden. Cultivating plants is a type of technology that was developed by a number of different cultures, in different ways, and different times in history. The type of planting that the class will do today is one way of using a simple technology to support local food systems. Different plants require different planting methods, including “transplanting” and “direct sowing.” This type of information can usually be found on the seed packet. When you transplant in an outdoor garden, you are planting seedlings (young plants) into the ground. When you direct sow in an outdoor garden, you are planting seeds directly into the ground.

Directions:	Sowing Seeds Indoors: • Soil should be loose and relatively sterile (bagged potting soil, coconut coir fiber, or a mixture with perlite are all good options) • Wet the soil before use. A little water should drip out when you squeeze a handful of it, but you don't want muddy soil. • Fill containers or cell blocks near to the top with soil, gently packing down as you go. Explain that the seed needs loose, airy soil to push its roots into, but not so loose that watering it will pack it down. • Have students read their seed packets before planting. • Plant 2-4 seeds per cell block or hole. Seed depth should be about twice their diameter. Show how large seeds (like squash) are planted deeper than small seeds (like celery). • Water each planted cell block gently until water drips through the bottom • Label each plant with its name and planting date. Sowing Seeds Outdoors: • Demonstrate how to prepare the soil. Remove any large rocks and break up any large soil clumps. Moisten the soil if it is dry. • Demonstrate how to sow different size seeds at the appropriate depth. Show how large seeds (like peas) are planted deeper than small seeds (like carrots). • Lettuce and some other flowering seeds need light to germinate. Show how to scatter seeds on top of the soil and press them in lightly. • Label each plant with its name and planting date. Transplanting Basics: • Demonstrate how to prepare the soil. Dig a small hole that you will put the transplant in. For most plants, plant them so that their whole root is underground, or up to their seed leaves (cotyledons). The soil surface should be even with the soil surrounding the transplant, not mounded. Do not bury the stem unless it is a tomato, which has the ability to produce additional roots on the buried stem. • After removing the transplant from the container, gently break up rootbound roots. • After a transplant is in the ground, tamp down the soil around the plant. Gently "water in" the transplants with a generous amount of water. • Label each plant with its name and planting date. After demonstrating each method, divide the group into smaller groups and get planting!
Wrap Up:	Challenge students to think: How do you know your plant will survive? What will it need in the next week? Month? <i>Evidence of learning:</i> Ask students to explain: Which element do you think is most important right away for the seed to sprout? (probably water) Which element do you think is most important once the seed sprouts and is a seedling? (probably sun, but really all of them) Which

	element do you think is most important for the seed to produce fruit, vegetables, or flowers? (probably soil, but again sun, water, and air are really important at this stage too). Instruct older students to work in pairs or small groups to design the steps of an experiment that would address this question: How could you test which elements are most important to the survival and growth of your plant? Use TTCD notebooks or journals.
Lesson Adaptations:	
Extensions:	• Read The Tiny Seed by Eric Carle, then have students identify the elements plants need in order to grow. • Make a water bottle sprinkler by using a push pin to poke holes in the cap of a plastic water bottle. Instruct students to keep their soil moist, not soaking, and to be gentle as their baby seedlings start to come up! • Share and learn the song Sun, Soil, Water, Air. • For older students: implement the experiment they designed during the check for understanding. 
Reflections:	How did it go? What did students understand most/least? What could change about instruction or lesson plan?
Resources Used:	“Project S.O.W. (Seeds of Wonder): Food Gardening with Justice in Mind” from Cornell University