Denver Urban Gardens School Garden and Nutrition Curriculum

Spring Planting

Lesson

Goals

Students learn about early spring crops and how to transplant seedlings.

Objectives

Students will plant spring crops and transplant seedlings from flats to the garden.

Standards

Science: Life Science

GR.2-S.2-GLE.1
GR.4-S.2-GLE.3

Total Time – 60 minutes

Did you know?

A study done by the Centers for Disease Control and Prevention found that increased amounts of physical fitness translated into higher academic achievement. And working in the garden increases physical activity. So gardening makes you smarter!

Materials

- Soil preparation tools (e.g. spading forks, rakes)
- Measurement tools (rulers, yardsticks or tape measures)
- Sticks (to mark mound locations)
- Trowels
- Spring seeds (peas, spinach, lettuce, beets, radishes, Swiss chard)
- Seedlings ready to be transplanted
- Garden snack
- Journals

Vocabulary

cool season crops/plants seedling

Background for Teachers

The purpose of transplanting is to give the plants more space so they can become productive. It is important to handle the roots as little as possible when transplanting seedlings. Teach students to hold plants at the base of the stem. For younger students, you may want to dig the holes where the plant is to be planted. Use the "Vegetable Planting Guide" (end of lesson) to determine spacing needs. The "Companion Planting Guide" (end of lesson) will assist you in intercropping plants that are beneficial to each other. Seedlings need to be transplanted when they are overcrowded in the flat, have their first true leaves or both. Note: The first leaves to emerge are called cotyledons and are not true leaves. Plants that can handle light frost can be planted as early as April and up to the end of May. Earlier is better for longer living cool season crops.

This lesson is a great follow up to the "Dig In!" lesson:
http://dug.org/storage/school-garden-curriculum/Dig_In.pdf.

Method

Introduction (15 minutes)

1. Discuss with the class: *Now that our garden soil is turned and has been fed with our compost it is ready to start growing cool season plants. Does anyone know what cool season crops are?* (Plants that can handle light frost and cooler soil temperatures, such as peas, lettuce, spinach, root crops, etc.) *We are also ready to give our seedlings a new home. The seedling is like a baby. How do we handle it carefully?* (Squeeze it gently out of the flat; don't touch the roots.) *Visualize the plants when they will be big. What kind of space will our plants need? When the plants are put back in the ground, how will we get the soil to stick to the roots*? (Press the plant firmly into the soil and water it well.)

Activity (35 minutes)

1. Mark the spaces in the bed where transplants and seeds will be planted.

FOR TRANSPLANTS:

2. Have students dig a hole two times the size of the root ball for each plant.

3. Demonstrate how to remove the seedling from the flat, shading the roots from the sun to prevent the roots drying out and handling from the base of the stem gently.

4. Demonstrate how to separate the plants carefully. Think them apart, trying not to break too many roots and keeping as much soil around them as possible.

5. Hand each student a seedling, making sure to hold it by the base of the stem.

6. Help students plant each seedling gently by holding it at the stem, having the roots fall straight down, gently covering the roots with dirt up to the first set of leaves, and pressing the soil firmly around the plant.

7. Water the plants and label them.

FOR SEEDS:

8. Have students dig a row as deep as the seeds need to be planted (see seed packet for instructions).

9. Pour a small handful of seeds into the students' hands, helping them space them appropriately (see seed package), explaining to them the need to place one seed gently in the hole at a time and not to hurry.

10. Have the students gently push the removed soil from the row back onto the seeds, like sealing an envelope. Do not pack the soil down, but simply cover the seeds.

11. Water the seeds and label the row.

TRANSPLANTING SEEDLINGS INTO POTS:

12. Seedlings may be transplanted into slightly larger single pots (4") for a plant sale or for students to take home. To transplant into pots, place potting soil in the bottom of pot just enough for

seedling top to be slightly lower than pot top. Add potting soil on top of seedling and lightly packing it in.

Conclusion (10 minutes)

Discuss or write in journals: *Why is it necessary to transplant seedlings? How did you determine how much space to leave between plants? How will you care for your transplants and seeds?*

Assessment Tools

- Participation
- Journals

Modifications

- Have students write in their journals or discuss why we transplant our seedlings.

Extensions

- Have the class come up with a plan for a plant sale, including which plants to sell, prices and an advertising plan.

Source

Jaffe, Roberta, and Gary Appel. *The Growing Classroom: Garden-based Science*. South Burlington, VT: National Gardening Association, 2007.

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Vegetable Planting Guide

Vegetable	Warm Weather	Cool Weather	Sow Indoors	Sow Direct	Spring Planting		Fall Planting**
					Start Seeds*	Set Out *	
Bush Beans	•			•	3-4 before	1-2 after	12 before
Pole Beans	•			•	3-4 before	1-2 after	12 before
Beets	•			•		2-4 before	8-10 before
Broccoli		•	•		5-8 before	5-8 before	14-17 before
Brussel Sprouts		•	•		5-8 before	4-6 before	17 before
Cabbage		•	•		4-6 before	5 before	13-14 before
Carrots	•	•		•		2-4 before	13 before
Cauliflower		•	•		5-8 before	1-2 before	14 before
Celery	•		•		8-10 before	2-3 before	19 before
Chard	•	•		•		2-4 before	6 before
Corn	•			•	3-4 before	1-2 after	6 before
Cucumber	•			•	2-3 before	1-2 after	11 ½ before
Eggplant	•		•		6-8 before	2-3 after	14 before
Garlic		•		•		6 before	Sept. w/mulch
Kale		•	•			5 bef, 2 aft	6-8 before
Kohlrabi		•	•			5 bef, 2 aft	10 before
Leeks		•	•		8-10 before	5 before	
Lettuce	•	•	•			2-4 b, 2 aft	6-8 before
Onion		•	•			3 bef, 2 aft	8 after spring
Parsley	•	•	•	•	4-6 before	1-2 after	
Peas		•		•		4-6 b, 2-3 a	12 before
Peppers	•		•			1-3 after	
Potatoes	•			•		4-6 before	
Pumpkin	•			•		after frost	
Radish	•	•		•		4-6 before	7 before
Spinach	•	•		•		3-6 before	6-8 before
Squash, Summer	•			•		1-4 after	10 before
Squash, Winter	•		•			2 after	13 before
Tomatoes	•		•			2-4 after	

* Weeks before or after last frost ** Weeks before first frost

Vegetable	Days to Emerge	Days to Harvest	Spacing of Plants (inches)	Depth to Plant Seeds (inches)	Soil Temp. for Germination	Best Air Temp. for Growing
Bush Beans	4-10	50-60	6	1	60-85	60-80
Pole Beans	4-10	60-70	6-8	1	60-85	60-80
Beets	7-10	50-80	2-4	½	60-75	50-75
Broccoli	5-10	80-100	15-18	¼	50-65	60-75
Brussel Sprouts	8-10	100-110	18	¼	65-75	55-70
Cabbage	4-10	80-100	18	¼	50-75	50-75
Carrots	10-17	50-75	2	¼	55-75	45-75
Cauliflower	5-10	60-80	15-18	¼	50-75	60-72
Celery	7-12	90-120	6	¼	50-75	60-75
Chard	7-14	45-55	8	1	40-70	45-70
Corn	3-10	90-110	12-15	1	55-85	50-95
Cucumber	3-8	60	12-24	1	65-85	60-80
Eggplant	5-13	90	18	½	65-85	65-85
Garlic		180-200	4-6	½		
Kale		100-120	15	½	40-70	40-70
Kohlrabi	5-10	50-70	6-9	¼	50-75	40-75
Leeks	7-14	130-160	4-6	½	below 70	60
Lettuce	2-10	60-80	10-12	¼	45-70	55-70
Onion	4-12	85-200	4	¼	50-80	60-85
Parsley	11-27	70-90	4	¼		
Peas	6-15	60-80	4	1	40-75	55-75
Peppers	8-20	80-100	10-12	12	65-85	65-85
Potatoes	10-15	140-160	10-12	6	60-65	60-80
Pumpkin	7-10	110-130	36	1	65-85	50-90
Radish	3-10	25-40	1	¼	40-85	45-75
Spinach	6-14	50-55	4-8	¼	60-70	40-75
Squash, Summer	3-12	50-60	15-24	1	65-85	60-85
Squash, Winter	4-10	80-120	24-36	½ - 1	65-85	60-85
Tomatoes	6-14	80-100	18-24	¼ - ½	65-85	65-85

Vegetable Planting Guide

Additional Comments

Bush Beans: Sensitive to transplanting; pinch extra plants, don't pull them. Pick every 3-7 days.

Pole Beans: Sensitive to transplanting; pinch extra plants, don't pull them. Pick every 3-7 days.

Beets: Thin when young and cook tops as greens.

Broccoli: Keep cool to get stocky plants, but don't go below 40° F. Transplant into beds up to first true leaves. Harvest main head when buds begin to loosen. Side heads will form after first head is cut.

Brussel Sprouts: Keep cool to get stocky plants, but don't get below 40° F. Harvest sprouts when they are 1 ½" wide. Pick lower ones first.

Cabbage: Harvest when head is formed. Keep cool to get stocky but don't go below 40° F.

Carrots: Thin early; harvest any size.

Cauliflower: Tie outer leaves around head to protect from sun. Likes between 57°- 68° F.

Celery: Must go below 60° F at night for seeds to germinate. Requires a lot of nutrients and water.

Chard: Cut leaves close to ground when 8-10" high. Harvest outer leaves first.

Corn: Sensitive to transplanting, pinch extra plants. Plant in blocks, harvest when kernels are milky.

Cucumber: Somewhat sensitive to transplanting; pinch extra plants. Mound soil into hills; plant 3 seeds per hill.

Eggplant: Grows well in hot weather.

Garlic: Harvest when tops start to die.

Kale: Keep cool to get stocky plants, but not below 40° F. Cut outer leaves closer to stem when 10" or longer.

Kohlrabi: Keep cool to get stocky plants, but not below 40° F. Harvest when bulb is 3" in diameter.

Leeks: Keep cool to get stocky plants, but not below 40° F. Plant out when 4" high.

Lettuce: Keep cool to get stocky plants, but not below 40° F. Hard lettuce likes repotting. Plant successively every two weeks. Will go to seed in high temperatures. Harvest outer leaves of leaf lettuce vs. head.

Onion: Harvest when tips start to die back.

Parsley: Soak seeds overnight to speed germination. Cut outer leaves near stem.

Peas: Sensitive to transplanting, pinch extra plants, don't pull them. Harvest frequently.

Peppers: Sensitive to cold, harden off gradually. Green peppers turn red when ripe.

Potatoes: Very tender; cannot tolerate frost. Dig up with digging fork after tops have flowered.

Pumpkin: Sensitive to transplanting; pinch, don't pull plants. Plant in hills, 3-4 plants per hill, 6-8 ft. apart.

Radish: Plant every 10 days. Will get woody when over mature.

Spinach: Keep cool for stocky plants. Plant every 2 weeks. Will go to seed in hot weather.

Squash, Summer: Sensitive to transplanting; pinch extra plants, don't pull them. Harvest frequently.

Squash, Winter: Sensitive to transplanting; pinch extra plants, don't pull. Can store through the winter.

Tomatoes: Prefers warm days and cool nights.

Sources

Adapted from *Organic Gardening and Farming*, February 1972, pp. 32-33, 54, and *The Encyclopedia of Organic Gardening*, Rodale Press, Inc., 1978, pp. 233-235.

Companion Planting Guide

Vegetable	Plant with	Do not plant with
Beans	Potatoes, carrots, cucumbers, cauliflower, cabbage, summer savory, most other vegetables and herbs	Onions, garlic, gladiolus
Beans, Bush	Potatoes, cucumbers, corn, celery, summer savory, sunflowers, strawberries	Onions
Beans, Pole	Corn, summer savory	Onions, beets, kohlrabi, sunflower
Beets	Onions, kohlrabi	Pole beans
Cabbage Family (cabbage, cauliflower, kale, kohlrabi, broccoli)	Aromatic plants, potatoes, celery, dill, chamomile, sage, peppermint, rosemary, beets, onions, thyme, lavender	Strawberries, tomatoes, pole beans
Carrots	Peas, leaf lettuce, chives, onions, leek, rosemary, sage, tomatoes	Dill
Celery	Leek, tomatoes, bush beans, cucumbers, pumpkin, squash	
Corn	Potatoes, peas, beans, cucumbers, squash, pumpkin	
Cucumbers	Beans, corn, peas, radishes, sunflowers	Potatoes, aromatic herbs
Eggplant	Beans	
Leek	Onions, celery, carrots	
Lettuce	Carrots and radishes (lettuce, carrots, and radishes make strong team grown together), strawberries, cucumbers	
Onion/Garlic	Beets, strawberries, tomato, lettuce, summer savory, chamomile, beans (protects against ants)	Peas
Parsley	Tomatoes, asparagus	
Peas	Carrots, turnips, radishes, cucumbers, corn, beans, most vegetables, herbs (adds Nitrogen to soil)	Onions, garlic, gladiolus, potatoes
Potato	Beans, corn, cabbage, horseradish (should be planted at corners of patch), marigold, eggplant (as a lure for Colorado potato beetle)	Pumpkins, squash, cucumber, sunflower, tomato, raspberries
Pumpkin	Corn	Potatoes
Radish	Peas, nasturtium, lettuce, cucumbers	
Soybeans	Grows with anything; helps everything	
Spinach	Strawberries	
Squash	Nasturtium, corn	
Sunflower	Cucumbers	Potatoes
Strawberry	Bush Beans	
Tomatoes	Chives, onion, parsley, asparagus, marigold, nasturtiums, carrots, limas	Kohlrabi, potatoes, fennel, cabbage
Turnip	Peas	

Herbs	Companions and Effects
Basil	Companion to tomatoes; improves growth and flavor; repels mosquitoes and flies; dislikes rue intensely.
Beebalm	Companion to tomatoes; improves growth and flavor.
Borage	Companion to tomatoes, squash, and strawberries; deters tomato worm; improves flavor and growth.
Caraway	Plant here and there; loosens soil.
Catnip	Plant in borders; deters flea beetle.
Chamomile	Companion to cabbages and onions; improves growth and flavor.
Chervil	Radishes; improves growth and flavor.
Chives	Companion to carrots; improves growth and flavor; plant around base of fruit trees to discourage insects climbing trunks.
Dill	Dislikes carrots; improves growth and health of cabbage.
Fennel	Plant away from garden; most plants dislike it.
Garlic	Plant near roses and raspberries; deters Japanese beetle; improves growth and health; plant liberally throughout garden to deter pests.
Horseradish	Plant at corners of potato patch to deter potato bugs.
Hyssop	Companion to cabbage and grapes; deters cabbage moth; keep away from radishes.
Lamb's Quarters	This edible weed should be allowed to grow in moderate amounts in the garden, especially in the corn.
Lemon Balm	Sprinkle throughout garden.
Marigolds	The workhorse of the pest deterrents; plant throughout garden especially with tomatoes; discourages Mexican bean beetles, nematodes, and other insects.
Mint	Companion to cabbage and tomatoes; improves health and flavor; deters white cabbage moth.
Marjoram	Plant here and there in garden; improves flavor.
Nasturtium	Companion to tomatoes and cucumbers.
Petunia	Protects beans; beneficial throughout garden.
Purslane	This edible weed makes good ground cover in the corn.
Pigweed	One of the best weeds for pumping nutrients from the subsoil, it is especially beneficial to potatoes, onions, and corn; keep weeds thinned.
Rosemary	Companion to cabbage, bean, carrots, and sage; deters cabbage moth, bean beetles, and carrot fly.
Rue	Keep it far away from sweet basil; plant near roses and raspberries; deters Japanese beetle.
Sage	Plant with rosemary, cabbage, carrots, beans, and peas; keep away from cucumbers; deters cabbage moth and carrot fly.
Summer Savory	Plant with beans and onions, improves growth and flavor; deters bean beetles.
Tansy	Plant under fruit trees; companion to roses and raspberries; deters flying insects, Japanese beetles, stipend cucumber beetles, squash bugs, and ants.
Tarragon	Good throughout the garden.
Thyme	Plant here and there in the garden; it deters cabbage worm.
Yarrow	Plant along borders and near aromatic herbs; enhances essential oil production.

Sources

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