



K-5 Garden Curriculum

FALL 2017



Kindergarten Fall Garden Lessons

Lessons:

Lesson 1: Sensory Garden Exploration

Lesson 2: Creating Compost

Lesson 3: Compost Critters and Plant Garlic

Lesson 4: Changing Seasons

Learning Objectives:

I explore the garden through my senses.

I learn how to be safe, respectful, and responsible in this outdoor learning space.

I can collect leaves and add them to our compost to help improve soil health.

I can find living things in compost.

I can plant garlic and identify its top and bottom.

I can identify patterns in weather and the changes of the seasons.

Standard(s) Addressed:

K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.



Sensory Garden Exploration

Learning Objective(s):

I explore the garden through my senses.

I learn how to be safe, respectful, and responsible in this outdoor learning space.

Standard(s) Addressed:

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Materials:

- Blue painters tape (1.5-2 inches wide), cut before class
- Paint chips

Vocabulary:

- Senses
- Observe
- Garden

	Lesson Description	Duration
Warm-up & Intro	<ul style="list-style-type: none"> ● Today we are going to be exploring the school garden for the first time! Ask students, “what is a garden?” Pair-share: students share their thoughts with a partner. Have a couple students share their ideas with the whole group. Then ask, “how to gardens help the earth?” Pair-share and then discuss with whole group. ● Introduce garden expectations (Be safe, Be Respectful, Be Responsible). <ul style="list-style-type: none"> ○ Walk in the garden ○ Stay on the pathways ○ Respect all plants and animals ○ Ask an adult before picking or eating anything ○ Care for and use the tools safely ○ * Introduce the Rule of 10: make sure there are ten things before you pick them. ● How do we <i>observe</i> our garden? What senses might we use (hint: all of them!)? ● Introduce stations. Divide into two groups. One will be with the Food Educator, one with the teacher. 	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.

Activity	<p>Station 1: Color Scavenger Hunt:</p> <ul style="list-style-type: none"> ● Students work in small groups of 2-3 ● Each small group of students picks out one paint chip ● Using their sense of sight, students match paint chip colors with different garden objects (ex. purple paint chip can be paired with purple flower, etc.). ● Once they've found their color, they switch it out for another one ● If extra time, ask students how the colors on the paint chips are different from the colors in the garden. <p>Station 2: Aromatherapy Bracelets/ Garden Bling</p> <ul style="list-style-type: none"> ● Students work independently to explore the garden through their sense of smell ● Teacher and any assistants attach pieces of tape around students' wrists, sticky sides out. ● Teach students how to smell herbs by gently rubbing the leaf between their fingers to release its scent. ● Using the Rule of 10 (make sure there are ten things before you pick them), while also being gentle with plants (use two hands to pick) students add herbs, leaves and other found objects to their bracelets. ● If time, have students brainstorm to what foods they might add the herbs. <p>Back Pocket Activity: Weeding</p> <ul style="list-style-type: none"> ● Students can work as whole class ● Have students use their sense of touch to explore the garden by pulling weeds. ● What do the weeds feel like? What descriptive words can you use (eg. fuzzy, smooth, etc.)? What's the difference between the feel of the leaf and the feel of the root? 	~ 20 min. (10 min. at each station)
Taste Test	Students use their sense of taste to explore the garden. Food Educator leads a tasting activity to give students an opportunity to try something growing in the garden.	~ 5 min.
Closure	Gather class together in a large circle. Ask students, "using your senses, what was the most interesting thing you observed in the garden today?". Students first share with a partner, then ask for volunteers to share with the whole group.	~ 5 min.



Creating Compost

<p>Learning Objective(s): I can collect leaves and add them to our compost to help improve soil health.</p>
<p>Standard(s) Addressed: K-ESS3- 3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p>

<p>Materials: <u>Compost Stew</u> by Mary McKenna Siddals Preparation: Pick 10 different leaves from garden before class</p>	<p>Vocabulary: compost rot decompose</p>
---	---

	Lesson Description	Duration
Warm-up & Intro	<p>Today’s lesson is about compost. Pair-share: what do you do when you have leftover, or too much, food for lunch? Discuss: the importance of adding fruit and vegetable scraps to compost so it will reduce waste and help our soil.</p> <p>Read <u>Compost Stew</u> by Mary McKenna Siddals</p> <p>Introduce the two stations. Split into two groups - get in line to walk outside. Teacher leads one station and Food Educator leads other station.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Station 1: Leaf scavenger hunt (Pick 10 leaves before class begins) Students work in groups of 2-3 Give each group a leaf and ask them to find that leaf in the garden. When they find it, ask them to raise their hands and not to pick it. You will check their match and give them a new leaf to find.</p> <p>Station 2: Compost-related garden maintenance.</p> <p>Composting works best when a compost pile consists of a mix of</p>	~ 25 min. (10-12 minutes at each station)

	<p>two colors: brown and green. Browns are materials such as dried leaves, wood chips, or sawdust. Greens are materials such as grass clippings and food waste. The pile is made by layering browns, greens, browns, and greens.</p> <p>Today, we will be looking for browns. Students collect leaves around the garden to add to the compost pile. If there are no leaves, students could weed garden beds and pathways and add them to the compost instead. If weeding, first demonstrate tool safety (how to use trowels responsibly - always keep them below your waist, never swing them around, and return them to the bucket when finished)</p>	
Closure	<p>Gather together in a circle as a whole class.</p> <ol style="list-style-type: none"> 1) Taste test a leafy green if possible. 2) Reflection: why is the compost in our school garden important? 	~ 5 min.



Compost Critters and Plant Garlic

Learning Objective(s):

I can find living things in compost.
I can plant garlic and identify its top and bottom.

Standard(s) Addressed:

K-ESS3- 3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Materials:

Compost critter worksheet (page 44 of Berkeley Unified School District Curriculum)
Dried garlic for planting
Garlic cloves cut in half lengthwise
Magnifying glasses

Vocabulary:

garlic clove
bulb
compost

	Lesson Description	Duration
Warm-up & Intro	<p>Today's lesson is about compost critters. Pair-share: name 2 critters we may discover in our compost.</p> <p>Last week, we talked about adding layers of browns and greens to make a compost pile. We rely on critters to eat and break down those materials to turn them into compost.</p> <p>Introduce the two stations. Split into two groups - get in line to walk outside. Teacher leads one station and Food Educator leads other station.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.

<p>Activity</p>	<p>Station 1: Compost critters (classroom teacher) Ask students to each take a scoop of compost and put it in a bucket. (or spread compost out on a tarp and ask students to explore it with hand trowels or their hands)</p> <p>Use the worksheet to look for and identify critters living in compost.</p> <p>(Adapted from Berkeley Unified School District Curriculum “Compost Critters,” lesson 12, page 43)</p> <p>Station 2: Plant garlic and discuss its parts (Food Educator)</p> <ul style="list-style-type: none"> ● Can anyone identify what kind of plant I’m holding? (garlic) ● Explain the difference between a bulb and a seed ● What do you wear when it gets cold outside in the winter? Garlic has a winter coat too. It is the husky part of the bulb (pass around to feel) ● What are the long stringy parts at the bottom? (roots) <p><i>Give each student half of a garlic clove and a magnifying glass</i></p> <ul style="list-style-type: none"> ● What does it smell like? What does it feel like? ● What do you store your food in if you bring it to school? Garlic has a lunch box too. It stores food inside itself so it can grow all winter (show where it is inside the clove) ● Ask students to use a magnifying glass to look for a small circle inside of the clove. This is a baby plant that will eventually turn into garlic too. ● Plant garlic: explain which end goes down. One clove for every 3 students. Garlic is planted 1-2” deep and spaced 4-6” inches apart. One student digs hole 2” deep, the next student places the garlic clove in the hole and the third student covers up the hole. 	<p>~ 30 min. (15 min. at each station)</p>
<p>Closure</p>	<p>What did you find in the soil that surprised you?</p>	<p>~ 5 min.</p>



Changing Seasons

<p>Learning Objective(s): I can identify patterns in weather and the changes of the seasons.</p>
<p>Standard(s) Addressed: K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time</p>

<p>Materials:</p> <ul style="list-style-type: none"> ● Paper ● Crayons 	<p>Vocabulary: Season</p>
---	--------------------------------------

	Lesson Description	Duration
Warm-up & Intro	<p>Draw symbols of each of the four seasons on the whiteboard (winter: rain, spring: seedlings, summer: sun, fall: changing leaves falling to the ground).</p> <p>Review the Earth’s cycle and the resulting seasons using the four-season symbols. The Earth rotates around the sun, so the amount of sunlight hitting each part of the Earth changes as it moves throughout the year. Different weather is caused by different combinations of sunlight, air, temperature, and moisture in a particular place during a certain time of the year.</p> <p>Ask students:</p> <ol style="list-style-type: none"> 1) What happens to plants in the garden during spring, summer, fall, and winter? 2) Why is it important for gardeners to know what happens in each season? <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.

Activity	<p>Station 1 (classroom teacher): Leaf rubbings: Students collect signs of the season (dead and fallen leaves), put them under paper, color over with crayons.</p> <p>Station 2 (food educator): Students perform seasonal garden maintenance work: adding dead leaves to compost pile, spreading straw and/or mulch.</p>	~ 30 min. (15 min. at each station)
Closure	Students taste-test a fall vegetable or herb.	~ 5 min.

** Adapted from "Changing Seasons" lesson (pg. 29-30) Berkeley Unified School District PK-5 Garden Curriculum*



First Grade Fall Garden Lessons

Lessons:

Lesson 1: Six Plant Parts

Lesson 2: Seed Sort

Lesson 3: Harvest Sunflower Seeds

Lesson 4: Bean Seed Dissection

Learning Objectives:

I can identify the parts of the plant and find examples of different plant parts.

I can compare and contrast different parts of the plant found in the garden.

I can collect sunflower seeds in the fall and save them to plant in the garden in spring.

I can compare seeds by their size, feel, shape, texture and color and whether they are for eating or planting.

I can discuss similarities and differences between seeds.

I can investigate the inside of a seed and identify its parts.

Standard(s) Addressed:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.



Six Plant Parts

Learning Objective(s):

I can identify the parts of the plant and find examples of different plant parts.
I can compare and contrast different parts of the plant found in the garden.

Standard(s) Addressed:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Materials:

Plant from garden (to show parts of plant)
Plant part diagram
Sticky notes with plant part names (one on each)

Vocabulary:

root, stem, leaf, flower, fruit, seed

	Lesson Description	Duration
Warm-up & Intro	<p>Introduce yourself as the Food Educator. Let them know that today's lesson will be about plant parts. Inside the classroom we will act out the parts of a plant, sing a song, talk about expectations in the garden. Then we will go out to the garden for a plant part scavenger hunt and tasting.</p> <p>Show example of plant dug up from garden. Project plant part diagram on whiteboard. Write each plant part name on a different sticky note (root, stem, leaf, flower, fruit, seed) and ask for volunteers to come up and place the sticky note on the plant part diagram.</p> <p>Ask students to stand up and pretend they are a plant.</p> <ol style="list-style-type: none"> 1. Wiggle your toes and say, "Roots!" 2. Move your legs and say, "Stems!" 3. Aim your hands towards the sun and say, "Leaves!" 4. Place your hands around your face and say "Flowers!" 5. Clasp your hands together and say "Fruit!" 6. Wiggle your fingers to the ground like rain or falling seeds and say, "Seeds!" <p>Demonstrate the roots, stems leaves, flowers fruit and seeds chant/song:</p> <p>Everyone sings: Roots, stems, leaves, flowers, fruits and seeds (four times) Teacher: Well, that's six parts, Students: That's six parts</p>	~ 15 min.

	<p>Everyone sings: Six plant parts that plants and people need.</p> <p><i>Sing slow at first, then faster and faster. Students can add in the motions learned from plant part activity above.</i></p> <p>Talk about garden expectations (Be safe, Be Respectful, Be Responsible).</p> <ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Gather in a circle in the garden. Explain that students will be walking around the garden together with a partner as they go on a plant part scavenger hunt. Their job is to find examples of all six plant parts in the garden. Review plants parts. Students will look for the biggest and smallest of each plant part (ex. the biggest leaf and the smallest leaf.) Let them know we will be sharing what we find at the end. Let them know the signal you will use to get everyone's attention, when it is time to gather together again.</p> <p>Assign students a partner for plant part scavenger hunt and remind them to be safe, respectful and responsible in the garden during the scavenger hunt. Students walk around the garden as they compare and contrast the different plant parts they see.</p>	<p>~ 5 min.</p> <p>~ 10 min.</p>
Closure	<p>Gather in circle and ask students to turn to a partner (someone new) and share an example of the most interesting plant part they found in the garden. As a whole group, ask a few students to share examples of different plant parts they found and what was interesting or special about it.</p> <p>Intro to tasting in the garden. Wait for everyone to have their sample, don't yuck my yum, and adventure bites. Garden tasting (chive, sorrel, carrot, or anything else that is ready to eat).</p>	<p>~ 5 min.</p> <p>~ 5 min.</p>

* adapted from "Six Plant Parts" lesson, Berkeley Unified School District Curriculum (pg. 28-30)



Seed Sort

Learning Objective(s):

I can compare seeds by their size, feel, shape, texture and color and whether they are for eating or planting.

I can discuss similarities and differences between seeds.

Standard(s) Addressed:

1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Materials:

A Seed is Sleepy by Dianna Hutts Aston

Mixed seed samples

Egg cartons

Vocabulary:

edible, nonedible

Preparation: Prepare one tray with mixed edible seeds (lentils, corn, wheat, garbanzos, amaranth, and poppy seeds) and one with mixed nonedible seeds.

	Lesson Description	Duration
Warm-up & Intro	<p>Today we will start in the classroom and read <u>A Seed is Sleepy</u>, then go out to the garden and split into two groups. One group will sort seeds (including both edible and nonedible seeds) while the other group acts out the life cycle of a plant. Then we will switch groups so everyone has a chance to do both activities.</p> <p>Explain that some seeds are eaten by people and some are eaten by animals. Other seeds are used for planting only. Seeds that are eaten by people are called <u>edible</u>. All other seeds are called <u>nonedible</u>.</p> <p>Read <u>A Seed is Sleepy</u> by Dianna Hutts Aston</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Station 1: Plant Personification. Students act out the life cycle of a plant. First the teacher reads through the script while students act, then students get together with a partner and practice acting out the life cycle of the plant on their own. They can take turns being the actor and the narrator.</p>	~ 25 min. (12 min. at each station)

	<ul style="list-style-type: none"> - Begin by asking students to curl up into tight ball: You're a seed! - Pretend to be a rain cloud and rain on the little seeds (students) underneath the soil. Tell students to uncurl and kneel. They've sprouted! - Slowly uncurl feet, staying low to the ground. You've grown roots. - Stick up arms like a little sprout-you've sprouted. - Open your hands palms up, and wiggle your fingers-you've grown baby leaves. - Wiggle your toes. You grow lots of little roots (rootlets). - Grow a little taller and spread arms and hands out wider. - You've grown bigger leaves. Tell students that their leaves are soaking up the sun, and making food for the plant. - Stand up (feet together) – Your stem has grown taller. - 'Slurp, slurp'- Your roots drink up water from the ground. - Spread your fingers wide and surround your face- Your flowers are blooming. - Pretend to be a bee or butterfly, and fly around the room pollinating the little flowers (or ask a student to help you). - Interlock your fingers and make a circle over your head-you've produced a juicy ripe fruit – it is a tomato (or other fruit or vegetable). - Tell the students that for some reason, in this garden, this one little fruit or vegetable was forgotten by the garden. You sway back and forth, and suddenly... - 'Splat!'- The tomato (or other vegetable) falls off the stem and breaks on the ground. - Little bugs and insects help the tomato break down, and suddenly, you are left with a tiny seed. <p>Station 2: Seed sort activity Show students the seeds in the trays. Discuss the characteristics of the seeds. Ask:</p> <ul style="list-style-type: none"> - How can the seeds be grouped together? - How are they different? - How are they the same? - Which seeds are edible? Which seeds are nonedible? <p>Students compare and contrast the size, feel, texture, color, and shape of the seeds through careful observation. Students share their observations in pairs.</p>	
Reflection	What surprised you about seeds? What will you tell the people at home about what we did today?	~ 5 min.

* Seed sort activity from "Seeds" lesson, Berkeley Unified School District Curriculum (page 59-61)



Harvest Sunflower Seeds

Learning Objective(s):

I can collect sunflower seeds in the fall and save them to plant in the garden in spring.

Standard(s) Addressed:

1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Materials:

Fruit is a Suitcase for Seeds by Jean Richards
Magnifying glasses
Plant parts diagram
Sunflower seed heads
Trays for seed collection
Paper bags for seed storage/drying
Loppers/shovel

Vocabulary:

harvest
seed saving
six plant parts: root, stem, leaf, flower, fruit, seed

	Lesson Description	Duration
Warm-up & Intro	<p>Today's lesson is about <u>seeds</u>, which are a very important part of the garden. Let students know you will start in the classroom, read a book and sing the plant parts song. Then, you will go out to the garden to observe sunflower plants and harvest sunflower seeds. Show students dried sunflower head.</p> <p>Read <u>A Fruit is a Suitcase for Seeds</u> by Jean Richards</p> <p>Review six plant parts. Ask students to hold up six fingers. Show diagram of plant including roots, stems, leaves, flowers, fruit and seeds.</p> <p>Sing plant parts song: <i>Roots, stems, leaves, flowers, fruits and seeds</i> <i>Roots, stems, leaves, flowers, fruits and seeds</i> <i>That's six parts, six parts</i> <i>Six plant parts that plants and people need.</i></p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.
Activity	Gather in a circle, introduce two stations, dig up sunflower. Ask	~ 25 min.

	<p>students “<i>why are seeds important for farmers?</i>” Students share thoughts with a partner then, discuss importance of seed saving with whole group. Split into two groups. Teacher leads one station and Food Educator leads other station.</p> <p>Station 1: Using magnifying glasses, observe different parts of sunflower – what do you notice? How can you describe each part of the plant? What does it look like? Feel like? Smell like?</p> <p>Station 2: Harvest sunflower seeds</p> <p><u>Background Info:</u> Plants make seeds at the end of their life cycle. After a flowering plant is done growing, blooming, and bearing fruit, it needs a way to ensure that the species will continue; it makes seeds so that a new plant will be able to grow. Farmers can save these new seeds and plant them again the following year. This practice is called “seed saving,” and is a way to ensure that special types of fruits, vegetables, and other plants are preserved.</p> <p>What did gardeners do hundreds of years ago before seeds could be purchased at a store? Gardeners had to save seeds from plants themselves! Sunflowers are a great example of how one seed completes its life cycle, becomes a mature plant, and makes hundreds more seeds to grow the next year. This is how plants make sure that future generations of sunflowers will survive. Gardeners and farmers had to make sure to save seeds from last year’s plants, or it might not be possible for them to grow anything to eat for the next year. Seed saving is a practice that has been used for millennia by farmers and gardeners to store the traits of their best plants for planting in following seasons.</p> <p>Seeds are sometimes on the outside of plants (ex. sunflower), or on the inside of plants (ex. cucumber, grape). Some seeds are edible.</p>	<p><i>(10-12 minutes at each station)</i></p>
<p>Closure</p>	<p>Why is saving seeds important? Ask what would happen if nobody saved seeds for the next year.</p>	<p><i>~ 5 min.</i></p>



Bean Seed Dissection

<p>Learning Objective(s): I can investigate the inside of a seed and identify its parts.</p>
<p>Standard(s) Addressed: 1-LS3-1: Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.</p>

<p>Materials magnifying glasses, plant life cycle picture, parts of a seed diagram, seed samples in plastic bags, soaked lima beans and paper towels cut in half (one for each student)</p>	<p>Vocabulary: Root, stem, leaf, flower, fruit, seed, seed coat Cotyledon, embryo (baby plant), germinate Preparation: Soak lima bean seeds for 48 hours (one for each student)</p>
--	---

	Lesson Description	Duration
Warm-up & Intro	<p>Review six parts of plants and sing plant parts song: <i>Roots, stems, leaves, flowers, fruits and seeds</i> <i>Roots, stems, leaves, flowers, fruits and seeds</i> <i>That's six parts, six parts</i> <i>Six plant parts that plants and people need.</i></p> <p>Ask students: where do seeds come from? Show students examples of different seeds. Students talk with partner to discuss the origin of seeds. Students share thoughts with class during whole group discussion. Show picture of life cycle of plant.</p>	~ 5 min.
Bean seed dissection	<p>Today we will be looking at the inside of a seed. What is inside a seed? Students dissect and examine the anatomy of a bean seed which was soaked for 48 hours.</p> <ol style="list-style-type: none"> 1. Pick up a soaked bean and examine it. 2. <i>What do you think the inside of the seed will look like? Why?</i> 3. Rub the soaked bean between your fingers. The seed coat should rub off. <i>Why do you think the seed coat is important?</i> It protects the seed from water and insects. 4. Now split your seed in two. (There is a slit going down the middle of your seed where it should come apart with a little help.) The two sides are called cotyledon and they are the food for the plant until it grows leaves. 	~20 min.

	<p>5. Observe the inside. (Use a magnifying glass). Describe and/or draw what you see. <i>Were your predictions correct?</i></p> <p>Encourage the use of process skills by asking students to observe size, shape, number of parts, textures, etc.</p> <p>6. Can you find the seed coat, radicle (first root), root hairs, cotyledon, embryo (baby plant)?</p> <p><u>Background information:</u> A seed is a tiny plant wrapped in a very special package. This package has a hard shell that protects the tiny plant. The seed hold food for the new plant to use until it grows leaves and can make its own food. There is a small hole in the shell. This hole lets water go inside the seed. If a seed is kept dry, the tiny plant will not grow. Once water gets inside the seed, the tiny plant gets bigger and pushes its way out of the shell. The seed sprouts.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible)</p>	
Transition to garden	Walk outside to the garden.	~ 5 min.
Garden activity	Together with a partner, students tour the garden and look for seeds.	~ 10 min.
Closure	<p>Circle up and ask students to share first with a person standing next to them and then as a whole group:</p> <ol style="list-style-type: none"> 1) What seeds did you find? 2) Where did you find them in the garden? 	~ 5 min.



Second Grade Fall Garden Lessons

Lessons:

Lesson 1: Dirt Made My Lunch

Lesson 2: Plant Fava Beans and Soil Dissection

Lesson 3: All About Worms

Lesson 4: Water Cycle and Rainwater Catchment

Learning Objectives:

I can compare the taste, feel, look, and smell of different locally grown tomato samples.

I can describe the benefits of cover crops to reduce erosion and increase soil health.

I can plant fava beans in the garden.

I can identify the different parts of a worm.

I can observe worms to compare the diversity of life in different habitats.

I can act out the water cycle.

I can explain the importance of conserving water in the garden.

I can design and build a model for rainwater catchment.

Standard(s) Addressed:

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

2-LS4- 1. Make observations of plants and animals to compare the diversity of life in different habitats.



Dirt Made My Lunch

Learning Objective(s):

I can compare the taste, feel, look, and smell of different locally grown tomato samples.

Standard(s) Addressed:

H1.N4.2 Identify healthy eating patterns that provide energy and help the body grow and develop.

H2.N6.2 Identify how family, school, and community influence food and beverage choices and eating behaviors.

H5.N6.2 Recognize decisionmaking or refusal skills that could help when making food choices.

Materials:

Equipment for the taste test: knife, cutting board, napkins or tasting cups
 Make copies of the “Multi-sensory Taste Test” handout
 Clipboards
 3-4 different varieties of tomatoes for tasting
 Prep: wash tomatoes, assemble taste test materials

Vocabulary:

Different tomato varieties
 Locally grown
 multi-sensory

	Lesson Description	Duration
Warm-up & Intro	<p>Introduce yourself as the Food Educator. Let students know that today we will start in the classroom, learn the “Dirt Made My Lunch” song by the Banana String Slug Band, then we will go out to the garden for a multi-sensory tomato tasting activity.</p> <p>Watch youtube video of Banana String Slug Band singing Dirt Made My Lunch. Then project lyrics and sing together with whole class.</p> <p>Talk about garden expectations (Be safe, Be Respectful, Be Responsible).</p> <ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	~ 10 min.

Transition	Wash hands and walk outside to the garden.	~ 10 min.
Activity	<p>Multi-sensory taste test, tomato tasting: In this tasting activity, students will sample different tomatoes and describe how each tastes, feels, looks and smells. Students will practice comparing several types of one particular food so that they can recognize the differences between the varieties. Students will discuss their preferences and draw conclusions from the taste test.</p> <p>Use tomato tasting worksheet from Growing Healthy Habits Curriculum pg. 55-56.</p> <ol style="list-style-type: none"> 1. Circle up in the garden and introduce multi-sensory tasting activity. Explain to the class that they are going to taste test several varieties of tomatoes. Set the tone for “adventurous eating”. During taste tests students should focus on experiencing new flavors and textures. Encourage everyone to try tastings from the garden. It’s okay if students do not like some of the samples but reactions must be polite. Introduce “don’t yuck my yum”. One way to say you don’t like something is, “it’s not my cup of tea.” 2. Pass out the “Multi-sensory Taste Test” handout and explain the process of the taste test. Students should read each question and record their responses before moving on to the next step in the taste test. 3. Cut the tomatoes and pass out samples of the different varieties, allowing students time to record their observations between tastes. 4. Discuss their conclusions from the taste test. How were the tomatoes different? How were they similar? 5. Review and discuss the fact that vegetables such as tomatoes, come in many types and varieties that have different flavors. Gardening allows us to grow and eat different varieties of vegetables that are not found in the grocery store. <p>If time: together with a partner walk around the garden and look for different fruits or vegetables that you may be able to eat from the garden. Can you find and identify 5 different things growing in the garden that are edible? You have 5</p>	<p>~ 15 min.</p> <p>~ 5 min.</p>

	minutes to tour the garden, then we will gather together as a group and share what we found.	
Closure	<p>Fruits and vegetables are tastiest when eaten during the season in which they naturally grow. Produce can be grown at or near your home and harvested fresh. Eating fruits and vegetables “in-season” might help us find new fruits and vegetables that we like.</p> <p>Reflection:</p> <ol style="list-style-type: none"> 1) Do the same fruits and vegetables always taste the same? 2) What other fruits and vegetables can be harvested and eaten during this time of year, in the fall? 	~ 5 min.
Lesson Extensions and Additional Resources	Apple demonstration	

- *Multi-sensory tasting activity adapted from Growing Healthy Habits curriculum, page 45-47.*



Plant Fava Beans & Soil Dissection

Learning Objective(s):

I can describe the benefits of cover crops to reduce erosion and increase soil health.
I can plant fava beans in the garden.

Standard(s) Addressed:

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Materials:

Tweezers
Magnifying glasses
Trowels
Newspapers
Fava beans (cover crop seed)
Copy of space travelers activity for classroom teacher

Preparation:

prepare garden bed for planting fava beans

Vocabulary:

cover crop
fava beans
erosion

	Lesson Description	Duration
Warm-up & Intro	<p>Sing: Dirt Made my Lunch Song</p> <p>Introduce activities including space travelers soil dissection and planting a cover crop (fava beans). Today students will observe soil composition using different soil samples found in the garden. They will also be planting fava beans in the garden which will help protect the soil through the winter. The fava beans will be ready to harvest in the spring, and will also be mixed back into the soil to help improve soil health. Explain that there will be two stations in the garden (one led by the classroom teacher and the other led by the Food Educator) and that students will have a chance to participate in both stations.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible). And, demonstrate safe tool use.</p> <p>Split class into two groups.</p>	~ 10 min.

Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Station 1 (teacher): Space Travelers Soil Dissection</p> <p>Station 2 (food educator): demonstrate safe tool use, weed a small area of the garden, and plant fava beans. Talk about how planting a cover crop reduces erosion and helps improve soil health.</p>	~ 25 min. (12 minutes at each station)
Closure	What was something interesting that you discovered in the garden today?	~ 5 min.



All About Worms

Learning Objective(s):

I can identify the different parts of a worm.
I can observe worms to compare the diversity of life in different habitats.

Standard(s) Addressed:

2-LS4- 1. Make observations of plants and animals to compare the diversity of life in different habitats.

Materials:

Worm anatomy canvas in office or diagram of worm
Chalk
[Worm worksheet](#)
Paper towels
Marker

Vocabulary:

Crop
Gizzard
Intestine
Castings

	Lesson Description	Duration
Warm-up & Intro	<p>Today we are going to learn all about worms. We are going to start by exploring the anatomy of a worm, then we are going to go outside and participate in “a day in the life of a worm” game and in small groups conduct a worm experiment..</p> <p>Display worm canvas or diagram.</p> <ul style="list-style-type: none"> - Ask students what the mouth does. Explain that the mouth is where the worm takes in food. - Explain that worms don’t have teeth and ask students: How do they chew their food? Explain that worms have a crop where they store their food and mix it around, beginning to break it into smaller pieces. - From the crop, food travels to the gizzard where strong muscles act like teeth breaking the food down. The gizzard also contains small pieces of sand or gravel that help the worm break the food down. - Once the food has been broken down it travels into the intestine, where digestion is completed and the worm gets nutrients and energy from the digested food. - Any food the worm did not digest is excreted as waste and 	~ 5 min.

	<p>ask students: What do we do with this worm “poop”? Explain that worm waste, called “castings” is what makes up compost. It is full of good nutrients that our plants love.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Whole class game: Day in the life of a worm Draw tunnels on the sidewalk with chalk (or just pretend sidewalk is 1 tunnel) Collect leaves and scatter on sidewalk. Explain to students that they will act like worms today! Worms are silent so this is a silent game. When I say bird (and chase students with flapping wings), students must walk to the end of the tunnel (worms hide from their predators) When I say rain, students must come out of the tunnel and take a deep breath (worms need air) When I say sunshine, worms must pretend to take a nap (worms sleep during day) When I say moonlight, worms must collect leaves (worms eat at night)</p> <p>In groups of 2-3:</p> <ol style="list-style-type: none"> 1. Ask students to predict whether or not worms have noses. 2. Ask a handful of students to collect small garden items (leaves, sticks, flowers) for a worm to smell. 3. Set up 3-4 stations (paper towel with 4 quadrants drawn on it) 4. Ask students to place a garden item in each quadrant. In their small station, ask them to observe which leaves the worm likes to smell. Does it wiggle away or stay? Can they smell? 5. Fill out worksheet to collect data. Raise your hand after you observe the worm in all 4 . Food educator will switch your worm out for another, until you have observed three different worms. 	~ 30 min.

Closure	Do you think worms have noses? Explain why - first with your groups, then with the class. Describe how worms have sensors all over their body to smell.	~ 5 min.
Extension	Ask students if they can stretch their arms as long as the longest worm. Call on students to stand in front of the class and measure their arm span (estimate 3 ft each student). Call one by one, adding 3+3 until you reach 22 feet, the length of the longest worm discovered in South Africa!	



Water Cycle and Rainwater Catchment

Learning Objective(s):

- I can act out the water cycle.
- I can explain the importance of conserving water in the garden.
- I can design and build a model for rainwater catchment.

Standard(s) Addressed:

- 2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- 2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Materials:

- Watering Cans
- Small planters
- Pipe Cleaners
- Cheesecloth

Vocabulary:

- water cycle
- rainwater catchment
- water conservation

	Lesson Description	Duration
Warm-up & Intro	<p>Ask students to act out the water cycle:</p> <ol style="list-style-type: none"> 1. Water starts in the clouds and falls to the earth as rain, snow, or hail. 2. Once the water reaches the ground, it is absorbed by the soil. 3. Plants take in water from the soil through their roots. 4. The water is absorbed from the roots and into the stem, leaves, flowers, or fruit. 5. The sun causes water to evaporate back into the air. 6. Clouds form when the air has a lot of water. 7. The clouds hold rain that falls back down onto the soil. <p>Ask students: how can we conserve water in our garden?</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 5 min.
Transition	Split class into two groups and assign partners. Walk outside to the garden.	~ 5 min.

<p>Activity</p>	<p>Station 1 (food educator): Together with a partner design a water catchment model: Using small planters, pipe-cleaners, and cheesecloth, have students design their own rainwater harvesting system. Planter can be the barrel, pipe-cleaners can be tubes to transport the water, and cheesecloth can be a filter.</p> <p>Station 2 (classroom teacher): Watering the plants:</p> <ol style="list-style-type: none"> 1. Help students take turns feeling the dry soil and the wet soil with their fingers throughout the garden before and after watering. 2. Prompt students to pair-share as they describe the soil. <p>Ask:</p> <ol style="list-style-type: none"> 1) Does it feel cool, warm, crumbly, or clumpy? 2) Does the soil look light or dark? Etc. <p>Teach proper watering technique. Have students water the soil instead of the leaves around plants they decide are in need of hydration.</p>	<p><i>~ 30 min. (15 min. at each station)</i></p>
<p>Closure</p>	<p>Act out water cycle again. Taste-test depending on availability.</p>	<p><i>~ 5 min.</i></p>



Third Grade Fall Garden Lessons

Lessons:

- Lesson 1: Plant Life Cycle Garden Search
- Lesson 2: Plant Adaptations
- Lesson 3: Seed Saving and Weed Olympics
- Lesson 4: Create a Compost

Learning Objectives:

- I can observe and document different stages of plant life cycle in the school garden.
- I can help maintain biodiversity by saving seeds from the garden.
- I can identify parts of a plant that help them survive and change over time.
- I can explain how plants adapt to conditions in their environment.
- I can read a seed packet and determine what a seed needs to grow.
- I can identify different weeds in the garden and explain the importance of removing them to prevent competition with the plants we want to grow.
- I can read a seed packet and make predictions about the growth of the seeds.
- I can identify and collect biodegradable materials to form a mini compost pile.
- I can create a compost pile including the four essential elements (browns, greens, water, and air).
- I can observe the role of decomposers in a compost ecosystem.

Standards Addressed:

- 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 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.



Plant Life Cycle Garden Search

Learning Objective(s):

I can observe and document different stages of plant life cycle in the school garden.

Standard(s) Addressed:

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

Materials:

plant life cycle diagram
plant life cycle exploration sheets (one for every two students)
clipboards (1/4 of class)
pencils

Vocabulary:

plant life cycle
stages of plant life cycle include: seed, seedling (young plant), mature plant (adult plant), flowering plant, fruiting plant, dead plant
compost

	Lesson Description	Duration
Warm-up & Intro	<p>Introduce yourself as the Food Educator. Let students know that today's lesson will focus on the life cycle of a plant. Inside the classroom we will act out the life cycle of a plant, then we will go out to the garden and work together with a partner to go on a Plant Life Cycle Garden Search. Together with a partner you will walk around the garden to look for plants in different stages of their life cycle. In the other station</p> <p>Project image of the plant life cycle on document camera. Food Educator describes each stage of the life cycle of the plant while students act them out.</p> <ol style="list-style-type: none"> Seed - Curl up into a tight ball, you are a seed! Everyone repeat after me, when I say "seed", you say "seed!" Seedling (young plant) - Uncurl feet and kneel on ground, stick out your arms, you've sprouted! You are now a young plant, a seedling. Everyone repeat after me, when I say "seedling", you say "seedling!" Mature plant (adult plant) - Open your hands palms up, and wiggle your fingers-you've grown baby leaves. Wiggle your toes. You grow lots of little roots. Grow a little taller and spread arms and hands out wider. You've grown bigger leaves. Tell students that their leaves are soaking up the sun, and making food for the 	<p>~ 5 min.</p> <p>~ 10 min.</p>

	<p>plant. Stand up (feet together) – Your stem has grown taller. ‘Slurp, slurp’- Your roots drink up water from the ground. Everyone repeat after me, when I say “mature plant”, you say “mature plant!” Another way to say this is “adult plant”.</p> <p>4. Plant with flowers - Spread your fingers wide and surround your face- Your flowers are blooming. Everyone repeat after me, when I say “flowering plant”, you say “flowering plant!”</p> <p>5. Plant with fruit (seeds are inside of fruit) - Pretend to be a bee or butterfly, and fly around the room pollinating the little flowers (or ask a student to help you). Ask students to interlock their fingers and make a circle over their heads- now you’ve produced a juicy ripe fruit – it is a tomato (or other fruit or vegetable). Everyone repeat after me, when I say “fruiting plant”, you say “fruiting plant!”</p> <p>6. End of life (dead plant) = compost - Tell students that for some reason this one little fruit or vegetable was forgotten and not harvested. You sway back and forth, and suddenly... ‘splat!’- the tomato (or other vegetable) falls off the stem and breaks on the ground. Little bugs and insects help the tomato break down, and suddenly, you are left with a tiny seed. Everyone repeat after me, when I say “dead plant turns into compost”, you say “dead plant turns into compost!”</p> <p>*and the plant life cycle continues...</p> <p>Introduce garden expectations (Be safe, Be Respectful, Be Responsible).</p> <ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	~ 5 min.
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Plant Life Cycle Garden Search:</p> <p>Together with a partner, pass out one plant life cycle exploration sheet per group (with a clipboard and pencil). Students tour the garden and look for plants in all stages of the life cycle. Look for plants that are growing, flowering (blooming), seeding and dying. Observe and draw 2-3 examples of plants at each life stage, describe what you see.</p>	~ 15 min.
Closure	Whole class gather in a circle. Turn to a partner and describe the plant life cycle in your own words.	~ 5 min.

	<p>Ask students:</p> <ol style="list-style-type: none"> 1) What was the most interesting thing you observed in the garden today and why? 	
<p>Back-up Activity</p>	<p>Seed Dispersal Simon Says: <i>Students act out different means of seed dispersal, then find seeds in the garden and guess how they travel.</i></p> <ol style="list-style-type: none"> 1. Point out something that has gone to seed in the garden. Ask students how those seeds get into the ground to grow. Ask students if all those seeds fell off the plant and started growing in one spot, would they all survive. No! Explain that seeds need to travel so they can find their own space to grow! 2. Play Simon says with students using means of seed dispersal: <ol style="list-style-type: none"> a. Blow away in the wind b. Float on water c. Get eaten and pooped out by an animal d. Stick to an animal's fur 3. After students are familiar with the different ways seeds travel, have them find seeds in the garden and try to identify how they travel. 4. Bring in some seeds if there isn't enough variety in your garden. 	



Plant Adaptations

Learning Objective(s):

I can identify parts of a plant that help them survive and change over time.
I can explain how plants adapt to conditions in their environment.
I can read a seed packet and determine what a seed needs to grow.

Standard(s) Addressed:

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment;
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.

Materials:

Large pieces of paper
Clipboards?
Tape
Dead plant material -- stem, roots, leaves, etc.
Plant starts
Pencils/colored pencils/crayon

Vocabulary:

adapt
adaptation
trait

	Lesson Description	Duration
Warm-up & Intro	<p>Students share and answer questions why they think plants have adapted to their environment through color, roots, leaf shape, and texture. Possible questions and answers:</p> <p>Q: How does a plant stay cool in the bright sun? A: With light colors, especially white flowers.</p> <p>Q: How does a plant absorb as much water as possible? A: With long roots that go deep into the ground.</p> <p>Q: How does a plant retain as much water as possible (avoid evaporation)? A: With needles, which are leaves that have very little surface area.</p> <p>Q: How does a plant store as much water as possible? A: Waxy, fat leaves hold the water.</p> <p>Q: What adaptations might help plants survive in Bellingham?</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	Station 1: Plant fall starts: one group plants fall starts in the garden, noting different traits they have. Do they have large	~ 25 min. (12 minutes at

	<p>leaves? Long roots? What color are they? Demonstrate tool safety and expectations (keep below the waist, never used as a weapon or toy, return to bucket when finished, etc.) before handing out trowels.</p> <p>Station 2: Ultimate Survivor Plant: Working together with a partner, students use dead plants from around the garden while playing the role of an evolutionary “designer”. Students piece together <i>traits</i> that create a plant that is <i>adapted</i> to survive in our garden.</p> <p>Tape all these parts onto a piece of paper, making sure that students are including all six plant parts (roots, stems, leaves, flowers, fruits, seeds).</p> <p>Label all parts and name the new plant.</p> <p>Example: Students may pick a raspberry stem with thorns to keep away predators, large leaves to attract sun, long roots to collect lots of water, etc.</p>	<i>each station)</i>
Closure	Have students present their favorite plant adaptation. If time, taste-test!	~ 5 min.

* Adapted from “Plant Adaptation” lesson from Berkeley Unified School District PK-5 Garden Curriculum, page 147-149.



Seed Saving and Weed Olympics

Learning Objective(s):

I can identify different weeds in the garden and explain the importance of removing them to prevent competition with the plants we want to grow.

I can help maintain biodiversity by saving seeds from the garden.

I can read a seed packet and make predictions about the growth of the seeds.

Standard(s) Addressed:

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.

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.

Materials:

Trowels (half class set)
3-4 buckets to collect weeds
Common Weeds ID sheet
Shelling beans in their pods
optional: example of fruit cut in half showing seeds inside (ex. squash, apple, pepper)
Rainy Day Plan: 15 different seed packets (expired seeds)

Vocabulary:

weed
seed packet

	Lesson Description	Duration
Warm-up & Intro	<p>Introduction: When we go out to the garden today we will split into two groups. One station, with the Food Educator, will play a weed spy game and then compete in weed Olympics. The other station, with the classroom teacher, will practice reading seed packets and discuss what we need to know about seeds to help them grow. Everyone will have a chance to participate in both activities.</p> <p><i>What is a weed?</i> Pair-share then, ask students to share ideas with the whole class. Facilitate whole class discussion to develop understanding. A weed is a plant that is growing where we do not want it, and one that we have not planted.</p> <p><i>Why is it important to remove weeds from the garden?</i> Pair-share then, ask students to share ideas with the whole class.</p>	~ 10 min.

	<p>Facilitate whole class discussion to develop understanding. We remove weeds to prevent them from spreading, before seeds form. We want to give the plants we want the space, water, and nutrients they need without weeds crowding them.</p> <p>Ask students to brainstorm some common weeds they may know. Project “Common Garden Weeds” weed ID sheet on document camera.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Station one (classroom teacher): In groups of 3-4 students will learn about seed saving while working together to harvest shelling beans, or other seeds from the garden.</p> <ul style="list-style-type: none"> - Show students examples of different seeds. Show an example of a fruit cut in half with seeds inside (ex. squash, apple, pepper). Ask students: “where do seeds come from?” - Talk about the importance of seed saving <p>Station two (Food Educator): Weed Spy / Weed Olympics</p> <p><i>Weed Spy</i></p> <p>Walk with students through garden for a “Weed Spy” game. Ask students to silently walk through the garden looking for weeds to pull. When finished spying weeds, ask a few children to show you weeds they spied so that you can check for understanding.</p> <p>Demonstrate safe and responsible tool use: always keep trowel below the waist, never swing it around, and return it to the bucket when finish. Demonstrate proper weeding, removing the roots alone with the plant, shake off the soil, and place the weeds in a bucket. Each student gets their own trowel.</p> <p>As scientists, students gather, record, and communicate information. Students work in teams to locate and pull the weed type assigned to the team. Each team has its own bucket to collect the pulled weeds and a picture and sample of their weed. After the allotted weeding time, the students gather in their teams to count the number of weeds they collected.</p> <p><i>Weed Olympics</i></p>	~ 25 min. (12 min. at each station)

Challenge students to find the tallest weeds, the smallest weeds, the weeds with the biggest roots, the weeds with the most leaves, etc.

Back-up rainy day plan to substitute “Weed Spy” (Read About Seeds)

Students read real seed packets to learn what a seed needs to grow. They will use observation and language skills to decode the words and graphics on the packet and predict how a seed will grow.

Essential Question: What do we need to know about seeds to help them grow?

Show students the seed packets and tell them that each person is going to get one packet. We will use the seed packets to learn about the seeds and the plants that will grow from them. Use one seed packet as an example and explain to the students what information you can find on a seed packet. Point out the front of the seed packet (name of plant, type of plant, picture of plant, and name of seed company) and back of seed packet (tables and planting information). Define terms students may not know, such as “sow”, and “planting depth” (how far underneath the soil we plant the seeds) and assist students in reading any tables on the packet. Give each student their own seed packet to examine.

Questions for students :

- What is the name of your seeds?
- What kind of plant will your seeds grow into?
- What climate is best for your plant?
- What time of year should you plant your seeds?
- How deep do you plant your seeds (planting depth)?
- How far apart should your seeds be planted (seed spacing)?
- How many days will it take for your seed to germinate?
- How many days after the seeds are planted will the food be ready to harvest?

Share with a partner

Students compare their information with a partner to see how the information for their seeds/plants are similar or different.

	<p><i>Make a prediction:</i> If you plant your seeds today, on what day will you see tiny plants above the soil?</p> <p><i>Engage students in discussion, big ideas to address:</i></p> <ol style="list-style-type: none"> 1. Seeds are planted at different times of the year (some plants like warmer weather and some like cooler weather). 2. Each seed has different characteristics (days to germinate/sprout, days until harvest). 3. Each seed has specific needs into order to grow (planting depth, seed spacing, climate). 	
Closure	<p>Gather in a circle as a whole group and reflect:</p> <ol style="list-style-type: none"> 1) What was the most fascinating weed you found in the garden today? 2) What did you learn about what seeds need to grow? 	~ 5 min.
Rainy Day Plan	The reading seed packets activity can be a whole-class indoor activity.	
Extension	Students brainstorm five vegetables they would like to plant in their dream garden then look at planting calendar to see what time of year the seeds (or starts) should be planted.	

* Adapted from *Eat.Think.Grow 3rd Grade Lesson "Read About Seeds"*



Create a Compost

Learning Objective(s):

- I can identify and collect biodegradable materials to form a mini compost pile.
- I can create a compost pile including the four essential elements (browns, greens, water, and air).
- I can observe the role of decomposers in a compost ecosystem.

Standard(s) Addressed:

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Materials:

trowels
scissors
pruners
watering cans
buckets
soft ball (for indoor game)
Decomposition tag (1-2 dark colored arm bands
and 4-5 light colored arm bands)

Vocabulary:

compost
biodegradable
decay
decompose

	Lesson Description	Duration
Warm-up & Intro	<p>Ask participants to name items that get thrown away at school and at home. Write ideas on whiteboard.</p> <p>Explain that some of the trash they have listed, like notebook paper, food scraps, and paper wrapping, is biodegradable matter that can easily decay (break down). Some of what we recycle or throw away, like aluminum cans or plastic bottles, does not decay.</p> <p>Ask students if they use more biodegradable or more non-biodegradable materials. Much of what we throw away could be recycled, such as metals, glass, paper, and some plastics. As you name each recyclable item, cross it off the board.</p> <p>Circle biodegradable items left on the list. Paper can be included here, too. Ask participants how they could recycle biodegradable matter such as food scraps, grass clippings, or leaves.</p> <p>Biodegradable materials can be recycled through composting.</p>	~ 15 min.

Explain that **composting is a natural process of death, decay, and re-birth, and is nature's way of recycling.** Note how little is left when all recyclable and compostable materials are taken off.

Play game with whole class:

To start the game everyone stands (or sits) in a circle. The first part of the game is to give students a taste of the game. Call out a participant's name and something that can be composted: "Sarah, Banana Peel!" Toss the ball to the participant named and then sit down. The participants continue on this fashion, calling out compostable material and tossing the ball to the named participant, until everyone is sitting.

If time, or if it's a rainy day, the next part of the game can be:

Now the tag part can begin (walking only). One participant is placed in the middle of the circle and becomes "it." The person in the middle must tag the person with the ball before the ball is tossed. The person throwing the ball names something that can be composted and then throws it to someone else before being tagged. If the student with the ball doesn't name something before s/he throws the ball, s/he will be tagged, become "it," and will change places with the one in the middle.

Display compost image "The Big Four" on the document camera. Explain that **composting works best when a compost pile contains a proper mix of the BIG FOUR: browns, greens, air, and water.**

- Browns are materials such as dried leaves, wood chips, straw, or sawdust.
- Greens are materials such as grass clippings, weeds (without seeds) from the garden, and food waste (apple cores, carrot tops, cucumber skins).
- The pile is made by alternating equal layers of "green" and "brown" materials.
- If it is kept moist and aerated (mixed up and turned often), the pile becomes a home for beneficial fungus, bacteria, and insects. Over time, these decomposers break down the green and brown materials until you are left with finished compost. This compost can then be spread around the garden to add nutrients to the soil and help the plants grow.

	Review garden expectations (Be safe, Be Respectful, Be Responsible).	
Transition	Ask teacher to assign groups of 3-4 students, and walk outside to the garden.	~ 5 min.
Activity	<p>In groups of 3-4, build small compost piles</p> <p><u>Compost Recipe:</u></p> <ol style="list-style-type: none"> 1. Collect browns (dried leaves, sticks, etc) and rip into small pieces. Chop materials into pieces that are six inches in size or less. 2. Find greens (weeds without seeds, grass clippings, food waste) and rip into small pieces. 3. Layer browns and greens on top of one another in an alternating pattern. Half of each by volume. 4. Add water to your pile, and maintain moisture so that compost is as wet as a wrung-out sponge. 5. Search for decomposers to break down your pile. 6. After piles are complete, students tour garden and look at compost piles created by other groups. Then, place mini compost piles in larger school garden compost. <p>Ask students to collect the brown and green materials in separate piles (an equal amount of each). Assign students to help with each of the various tasks of chopping/tearing, layering greens, and watering.</p> <p>If there is extra time, take turns turning school compost pile or weeding garden.</p>	~ 20 min.
Closure	<p>Gather in a circle</p> <ol style="list-style-type: none"> 1) Turn to a partner and name three items you eat or use that you could compost. Ask volunteers to share some examples with the class. 2) Whole group: How does composting help the earth? 	~ 5 min.
Extension: game to play	<p><u>Decomposition tag:</u></p> <ol style="list-style-type: none"> 1. Introduce the life cycle and the role of decomposers in nature and in composting. 	

	<p>2. Imagine a plant or animal at the end of its life. One participant will play the character “death and decay” to represent the end of a plant or animal’s life, and wears a dark colored armband. If the group is large, you can have two.</p> <p>3. Two to five participants are decomposer characters and wear light colored armbands. All other participants are plants or animals.</p> <p>4. Plant and animal characters “decay” when they are tagged by the death and decay character. When tagged, they freeze in place until one of the decomposers unfreezes them by walking around them three times. The decomposers unfreeze the plants and animals as fast or faster than death and decay freezes them.</p> <p>5. The game has no natural end. You should let participants play long enough to experience the concept, and stop the game well before participants get exhausted or lose interest.</p> <p>6. To summarize, form a circle and review the life cycle and the role of decomposers. Encourage students to talk about how they felt during the game, and what they learned.</p> <p><i>Extra option:</i> To demonstrate that life would stop without the decomposers recycling dead things, you can allow the death and decay character to tag and freeze the decomposer characters along with the plants and animals. The game, and life on earth, ends when everyone is frozen except the death character.</p>	
--	--	--

* Adapted from: Do the Rot Thing: A Teacher’s Guide to Compost Activities
Link: http://www.cvsdmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvsdmd1.pdf



Fourth Grade Fall Garden Lessons

Lessons:

Lesson 1: Weed Identification and Scavenger Hunt

Lesson 2: Plant Cover Crop to Prevent Erosion

Lesson 3: Soil Doctors

Lesson 4: The Power of Mulch

Learning Objectives:

I can identify weeds in the garden.

I can use garden tools safely to help remove weeds from the school garden.

I can contribute to soil health and help prevent erosion by planting cover crop in the garden.

I can observe soil erosion using different soil samples with varying amounts of organic matter.

I can analyze the relationship between the amount of organic matter in soil and the rate of erosion.

I can collect soil samples and label the location on a school map to help evaluate soil health.

I can investigate the school compost pile and evaluate its health.

I can conduct a mulching experiment.

I can improve the health of our school garden soil by spreading mulch.

Standards Addressed:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.



Weed Identification and Scavenger Hunt

Learning Objective(s):

I can identify weeds in the garden.

I can use garden tools safely to help remove weeds from the school garden.

Standard(s) Addressed:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Materials:

Trowels

[Weed ID sheets](#)

Prepare before class: identify up to five weeds in the garden and place numbered stakes next to each one. Create an answer key on the whiteboard or poster board. Write and print descriptions of these different weeds to hand out for scavenger hunt activity which may include height, leaf shape, color, feel, etc.

Vocabulary:

weed

cultivate

noxious or invasive plants

native

non-native

	Lesson Description	Duration
Warm-up & Intro	<p>Introduce yourself as the Food Educator. Let students know that today's lesson will focus on weeds. We will start in the classroom, then go outside to the garden to learn about weed identification, go on a weed scavenger hunt, and help with some weeding in the garden.</p> <p>Ask students, "what is a weed?" Students share with a partner, then share with the whole group:</p> <ul style="list-style-type: none"> ● A weed is a plant that is growing where it is not wanted. ● A weed is a plant growing in an area where people are cultivating specific plants (ex. vegetable gardens, flower gardens). ● In these gardens, weeds compete with cultivated plants for water and nutrients. <p>Are students, "Are weeds good or bad? Ask students to put their thumb up if they think weeds good, and their thumb down if they</p>	~ 5 min.

	<p>think weeds are bad.</p> <ul style="list-style-type: none"> ● Explain that both are true. Some weeds we don't want in our garden (e.g. dandelions) but have other uses (medicinal, etc.). <p>Introduce “noxious weeds”: “In the state of Washington, noxious weeds are non-native plants that have been introduced to Washington from other parts of the world. Because of their aggressive growth and lack of natural enemies in the state, these species can be highly destructive, competitive or difficult to control. These exotic species can reduce crop yields, destroy native plant and animal habitat, damage recreational opportunities, clog waterways, lower land values, create erosion problems and fire hazards, and poison humans and livestock.” Source: http://www.whatcomcounty.us/921/What-Are-Noxious-Weeds</p> <p>Ask students if they can name an example of a noxious weed. Examples include: English Ivy, Himalayan Blackberry, Butterfly Bush, Morning Glory (Field Bindweed), and Scotch Broom. Whatcom County Noxious Weed List 2017 Share with class that weeding is a way to help protect our ecosystem.</p> <p>Introduce outdoor activities:</p> <ul style="list-style-type: none"> ● Station 1: Weed ID and scavenger hunt ● Station 2: Weeding and tool safety <p>Introduce garden expectations (Be safe, Be Respectful, Be Responsible).</p> <ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	<p>~ 5 min.</p>
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Station 1 (classroom teacher): Weed ID and Scavenger Hunt</p> <ul style="list-style-type: none"> ● Before class, identify up to five weeds in the garden with numbered stakes. ● Hand groups of 2-3 students a scavenger hunt which provides <i>descriptions only</i> of different weeds. This can include leaf shape, color, feel, etc. Students must match 	<p>~ 25 min. (12 min. at each station)</p>

	<p>the description of the weeds to the numbered stakes.</p> <ul style="list-style-type: none"> ● Reveal the names of the weeds and the corresponding numbers. <p>Station 2 (food educator): Weeding and Tool Safety</p> <ul style="list-style-type: none"> ● Review tool safety <ul style="list-style-type: none"> ○ Always keep the tool below your waist ○ Never a weapon or toy ○ Clean tools and put away ○ Demonstrate correct weed pulling ● Have students weed identified areas ● If necessary, do a careful comparison of a weed in the garden bed vs. a wanted plant in the garden bed. 	
Closure	Gather whole class together for closure. Taste test available food. If applicable, taste test a weed, like a dandelion leaf! Bitter greens are a great source of vitamins!	~ 5 min.

Lesson Extensions and Additional Resources	<p>Whatcom County Weeds</p> <p>Volunteer opportunity to remove invasive species with Nooksack Salmon Enhancement Association (NSEA) or similar organization.</p>	
Rainy Day Plan	<ul style="list-style-type: none"> ● Plant starts indoors ● What is a native vs. non-native plant? Have students pair-share. ● Soil Poems (this can be used for any rainy day during this 4th grade lesson sequence!) <ul style="list-style-type: none"> ○ Place four bags of different kinds of soil in different corners of the room ○ Have students in 4 groups. Each group visits a bag of soil and observes through touch, smell, etc. Each student writes down a descriptive word/ adjective. ○ Repeat for all four samples. ○ Have students write a poem with the adjectives. ○ Or, have students guess which words correspond to which samples. 	



Plant Cover Crop to Prevent Erosion

Learning Objective(s):

I can contribute to soil health and help prevent erosion by planting cover crop in the garden.
I can observe soil erosion using different soil samples with varying amounts of organic matter.
I can analyze the relationship between the amount of organic matter in soil and the rate of erosion.

Standard(s) Addressed:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Materials:

Pie tins (6 total)
Watering can
cover crop seed (Austrian Field Peas)
Trowels (half class set, ~12)
Buckets (3)
Examples of erosion (images)
Before class: set-up soil erosion activity including preparing different trays of soil

Vocabulary:

erosion
cover crop

	Lesson Description	Duration
Warm-up & Intro	<p>Ask students, “What is erosion?”</p> <ul style="list-style-type: none"> Erosion is the process by which soil and rock is removed from one area of the Earth through natural causes such as wind, water, and ice and transported elsewhere is called erosion. In the broadest sense of the word, erosion means the general wearing down and molding of all landforms on the Earth’s surface. <p>Have students brainstorm: How do humans contribute to erosion?</p> <ul style="list-style-type: none"> Industrial agriculture, allowing overgrazing, deforestation, etc. <p>In the garden people can contribute to soil health and help prevent erosion by planting cover crop. Introduce outdoor activities:</p>	~ 5 min.

	<ul style="list-style-type: none"> ● Station 1: weeding and planting cover crop ● Station 2: Soil erosion demonstration <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Station 1: Weeding and Cover-Cropping</p> <ul style="list-style-type: none"> ● Ask students: what is cover crop? <ul style="list-style-type: none"> ○ “a crop grown for the protection and enrichment of the soil.” ● Explain that cover crop is like a blanket, keeping our soil warm and healthy through the winter. It reinforces soil health with organic matter. ● Have students plant cover crop in empty garden beds. ● If time, having students weed to make more empty beds, then add cover crop there. Remember to go over tool safety and expectations! <p>Station 2: Soil erosion demonstration (adapted from Berkeley Unified Garden Based Learning)</p> <ul style="list-style-type: none"> ● Prepare three trays of soil: one with organic materials (sticks, roots, leaves, dead bugs, and other rotting plants); one with living organisms (worms, roly-polies, and centipedes), and one with various sizes of rocks (pebbles, sand, silt particles). Make sure that each tray has different amounts of organic materials (grasses and roots) so that the erosion experiment demonstrates water drainage and erosion with less and more organic material. ● Split into three groups: each group has one tray to investigate. ● Whole group demonstration: prop each tray (one at a time) up on a slope so that students can observe water absorption and drainage. Demonstrate pouring water continuously and systematically over a tray. Students share with partners their prediction of what they think will happen. Ask students, “which hillside do you think will experience the most severe erosion and why?” ● Select a different student to pour water in the same way over the next trays. Students observe the differences and explain what they observed and why. Students pair-share ideas about why the tray with the most organic matter is not losing soil. Lift the plants to show them the roots that are wound around the soil, holding it in place. 	~ 30 min. (15 min. at each station)

Closure	Gather together as a whole class. Taste test as available something from the garden. Ask students to recap the results of their experiment as a whole group.	~ 5 min.
---------	--	----------

Lesson Extensions and Additional Resources	Bill Nye on Erosion Walk around the school and note places of erosion and/or healthy soil.
--	---

Rainy Day Plan	Soil Erosion Activity <ul style="list-style-type: none"> ● Instead of watering, put trays in rain and see what happens. Natural erosion at its finest!
----------------	---



Soil Doctors

Learning Objective(s):

I can collect soil samples and label the location on a school map to help evaluate soil health.
I can investigate the school compost pile and evaluate its health.

Standard(s) Addressed:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Materials:

Garden maps
Magnifying glasses
Bags for collecting soil samples
School garden map
Science journal or paper to take notes

Vocabulary:

Minerals: Nitrogen, Phosphorus, Potassium
Organic/inorganic
Compost
Decomposer

	Lesson Description	Duration
Warm-up & Intro	<p>Today we are soil doctors and will be collecting soil samples from our school garden to help evaluate soil health and mineral content. Class discussion:</p> <ul style="list-style-type: none"> ● Plants need vitamins, minerals, and nutrients to survive -- just like people! ● Where do we, humans, get our vitamins and minerals? <ul style="list-style-type: none"> ○ The food we eat ● Where do plants get their minerals? <ul style="list-style-type: none"> ○ From the soil ○ They make their own vitamins ● Plants need 13 minerals, and there are three basic and important ones: <ul style="list-style-type: none"> ○ Nitrogen (N) <ul style="list-style-type: none"> ■ Makes a plant green and helps it grow ○ Phosphorus (P) <ul style="list-style-type: none"> ■ For strong root growth ○ Potassium (K) <ul style="list-style-type: none"> ■ Overall strength and disease resistance <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.

Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Station 1 (food educator): Collect Soil Samples</p> <ul style="list-style-type: none"> ● In small groups collect soil samples. ● Mark on garden map where each soil sample came from. ● What does our soil have? What does it need? How can we help provide these things? Pair-share. <p>Station 2 (classroom teacher): Compost Investigators</p> <ul style="list-style-type: none"> ● Put some compost on a tarp and invite students to investigate it. Using magnifying glasses, what can you find in the compost? Look at “Living Things in the Compost” sheet and see if you can identify the different decomposers. ● In small groups investigate the school compost bin and ask students evaluate the health of our compost pile: <ul style="list-style-type: none"> ○ Does it have greens (nitrogen)? ○ Does it have browns (carbon)? ○ What is organic material? Does our compost pile have some? ○ What is inorganic material? Should it be in our compost pile? 	~ 30 min. (15 min. at each station)
Closure	<p>Gather together as a whole group:</p> <ul style="list-style-type: none"> ● Ask students to share the results of their Soil Doctor experiment with the group. Brainstorm ideas to restore and/or maintain soil health. ● Taste test if time/ available 	~ 5 min.

* Adapted from *The Growing Classroom Soil Doctor Lesson* (pg 96)

Lesson Extensions and Additional Resources	<p>Students can continue testing the soil to track progress over time.</p> <p>Brainstorm ways to help improve soil health in school garden.</p>
Rainy Day Plan	<p>Analyze results from examples of different soil samples</p> <p>Students research and develop in-depth soil health plan (eg. compost adds nitrogen; bonemeal adds phosphorus; wood ash adds potassium).</p>



The Power of Mulch

Learning Objective(s):

I can conduct a mulching experiment.
I can improve the health of our school garden soil by spreading mulch.

Standard(s) Addressed:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Materials:

soil thermometers
Mulch (preferable leaf mulch)
Paper and pencils
Shovels/rakes
buckets

Vocabulary:

Hypothesis
Mulch

	Lesson Description	Duration
Warm-up & Intro	<p>Ask students: how have we cared for the soil this fall?</p> <ul style="list-style-type: none"> ○ Erosion prevention; cover crop ○ Weeding ○ Adding nutrients <p>Explain that we are going to prepare our garden for long-term weed management through sheet-mulching!</p> <p>Ask students: What is the purpose of an experiment? What are some experiments we could conduct in the garden? What should we be mindful of when devising experiments in living spaces?</p> <ul style="list-style-type: none"> ○ Pair-share ○ Share a couple of ideas with the whole group. <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 10 min.
Transition	Walk outside to the garden.	~ 5 min.

Activity	<p>Station 1: The Power of Mulch (Berkeley Unified School District Garden Based Curriculum PK-5)</p> <ul style="list-style-type: none"> ● Using soil thermometers, having students measure and record the temperature of soil in the garden. Make sure they include descriptions of their soil sample: Is it in sun? How many weeds? Etc. <p>Ask students:</p> <ul style="list-style-type: none"> ● How does temperature change the soil? (The temperature of the soil will help determine how many weeds are in the garden.) ● How we could change the temperature of the soil enough to kill the weeds, but not enough to hurt it? <p>Mulch Experiment:</p> <ul style="list-style-type: none"> ○ Prepare one garden bed with mulch, one without. ○ Have students name the problem: How can we change the temperature of the soil to kill weeds but have other plants stay healthy? ○ Have students hypothesize about how to solve this problem. ○ Have students conduct an experiment to test their hypothesis (measuring the temperature of mulched v. non-mulched beds). ○ Share results. <p>Station 2: Mulching</p> <ul style="list-style-type: none"> ● Explain that mulching is an easy way to prevent weeds from growing and help protect the soil from the heavy winter rains. Mulch also helps keep soil moist in the summer when the weather is hot. ● Students spread mulch on garden beds (leaf mulch). Students could also spread wood chips on pathways to prevent weeds from growing. ● Review tool safety: <ul style="list-style-type: none"> ○ Always keep the tool below your waist ○ Never a weapon or toy ○ Clean tools and put away ○ Demonstrate correct weed pulling ● Have students collect mulch and spread evenly on bed. 	~ 30 min. (15 min. at each station)
Closure	Gather together as a group and talk about the benefits of mulching. Review the results of the mulch experiment.	~ 5 min.

Lesson Extensions and Additional Resources	Soil Composition Experiment
Rainy Day Plan	Soil Cinquains or Soil Composition Experiment (linked above)



Fifth Grade Fall Garden Lessons

Lessons:

Lesson 1: Living Things in the Compost

Lesson 2: Let's Make Compost!

Lesson 3: Harvest and Spread Compost

Lesson 4: Compost Stewards

Learning Objectives:

I can find and identify living things in a compost pile.

I can describe the importance of decomposers in a compost pile.

I understand the ingredients in a healthy compost, and can build a compost pile.

I can describe what compost is, how it is used, and why it is important.

I can harvest and spread compost on the garden to improve the soil and help plants grow.

I can weed pathways and spread woodchips to block out light and prevent weeds from growing.

I can monitor and maintain the school garden compost.

I can explain the importance of the C:N ratio for creating rich compost.

I can analyze organic material for content, temperature, and weight.

I can gather organic materials to create and/or add to the compost.

Standards Addressed:

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.



Living Things in the Compost

<p>Learning Objective(s): I can find and identify living things in a compost pile. I can describe the importance of decomposers in a compost pile.</p>
<p>Standard(s) Addressed: 5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p>

<p>Materials: Compost critters sheet (Do the Rot Thing) “Living things in the compost” sheet tarp magnifying glasses trowels buckets</p> <p><i>Prep ahead of time:</i> put pile of compost on a tarp to use for station 1 (compost investigation)</p>	<p>Vocabulary: compost decomposer</p>
--	--

	Lesson Description	Duration
<p>Warm-up & Intro</p>	<p>Introduce yourself as the Food Educator. Let students know that today’s garden class will focus on compost. Introduce 5th grade as compost stewards.</p> <p>Ask students, “what is compost?” Turn to a partner to share ideas. Then ask students to share during a whole group discussion.</p> <ul style="list-style-type: none"> • <i>Composting is a way of recycling organic materials such as leaves, dead plants, and food waste. Through a process of decomposition bacteria, earthworms, and other creatures actually eat these materials and break them down into food that plants can eat. The end result is a rich, dark brown, earthy smelling material called compost. This compost can then be returned to the earth to help build healthy soil and ensure more plant growth.</i> <p>Ask students, “what lives in a compost pile?” Project compost critters sheet on document camera (Do the Rot Thing page 19). These are decomposers. Introduce word “decomposer”. Clap out the syllables together with class, “de-com-pos-er”. A decomposer</p>	<p>~ 10 min.</p>

	<p>is a living organism that breaks down organic matter, making nutrients available to plants.</p> <p>Today we will go out to the garden and split into two groups. One group will look for living things in the compost pile while the other group does some weeding and collects organic matter to put in the compost. After 10 minutes we will switch stations so that everyone has a chance to participate in both activities.</p> <p>Introduce garden expectations (Be safe, Be Respectful, Be Responsible).</p> <ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Station 1 (classroom teacher): Ahead of time, Food Educator will put compost on a tarp. In this station students use magnifying glasses and investigate the compost pile. Ask students, “how many different living things can you find in the compost?” Look at “Living Things in the Compost” sheet and try to identify the different decomposers.</p> <p>Station 2 (food educator): Weed an area of the garden and add materials to compost. Do not add invasive weeds to the compost (ex. morning glory, field bindweed, english ivy, herb robert). Also, do not add diseased plants or weeds that have gone to seed. Cut up organic material into small pieces (6” or less) and layer pile with “greens” and “browns”.</p> <p>Talk about and demonstrate tool safety</p> <ul style="list-style-type: none"> ○ Always keep the tool below your waist ○ Never a weapon or toy ○ Clean tools and put away ○ Demonstrate correct weed pulling <p>Background Information: The four essential ingredients of compost are the BIG FOUR: browns, greens, air, and water. “Browns” are dry and woody plant trimmings, such as wood chips, dried leaves, and straw. Browns are rich in carbon. “Greens” are moist vegetable and fruit scraps, green leaves, and fresh manure. Greens are rich in nitrogen. In a</p>	~ 25 min. (12 min. at each station)

	compost pile, you want approximately half brown materials and half green materials by volume. Decomposer organisms need air and water to break down organic matter. Turning and watering your pile provides it with the air and moisture needed for microorganisms. The pile should be as moist as a wrung out sponge. These four ingredients create the perfect environment for the main decomposers: fungi, bacteria, and insects. (Source: Do the Rot Thing)	
Closure	Gather together as a whole group. Ask, “how many different living things did you find in the compost?” Create a list with the whole class to summarize their findings. Taste test something fresh from the garden.	~ 5 min.

* Adapted from: *Do the Rot Thing: A Teacher’s Guide to Compost Activities*

Lesson Extensions and Additional Resources	Composting for Kids video (5:55) https://youtu.be/dRXNo7Ieky8 Make the Most of Compost video (5:19) https://youtu.be/Q5s4n9r-JGU The Dirt on Decomposers video (3:18) https://youtu.be/uB61rfecAsM Decomposers video (3:18) https://youtu.be/Z6V0a_7N1Mw
Rainy Day Plan	Biodegradable & Non-Biodegradable sort https://betterlesson.com/lesson/631755/what-is-composting



Let's Make Compost!

Learning Objective(s):

I understand the ingredients in a healthy compost, and can build a compost pile.
I can describe what compost is, how it is used, and why it is important.

Standard(s) Addressed:

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Materials:

Prep: collect a small bag of finished compost to pass around

[Image of compost layers](#)

[The Big Four image](#)

Basic composting worksheet (page 20, Do the Rot Thing: A Teacher's Guide to Compost Activities)

Image

Buckets

Pitchfork

Loppers

pruners

Watering cans

Flat shovel

“green” and “brown” plant trimmings

* It would be useful to have extra volunteers scheduled on this day to help

Vocabulary:

Compost

Browns

Greens

Biodegradable

Non-Biodegradable

Decay

Decompose

The BIG FOUR: browns, greens, water and air

	Lesson Description	Duration
Warm-up & Intro	<p>Today we will be making a compost pile! Students will be involved in all aspects of building a pile (gathering materials, layering, mixing, watering, and turning).</p> <p>1. Introduce the cycle of life and the concept of decomposition. Explain that by building a compost pile, we build a home for decomposers.</p> <p>2. Biodegradable matter is anything that can decay. Have participants give examples of biodegradable materials that they might throw away at home or at school (banana peel, dried</p>	~ 15 min.

leaves). Keep a list.

3. Pass around a small bag of finished compost. Explain that composting is a way of recycling the materials that the participants have listed. Composting recycles materials such as yard trimmings and food waste through a process of decomposition. Bacteria, earthworms, and other creatures actually eat these materials and break them down into food that plants can eat. The end result is a rich, dark brown, earthy smelling material called compost. This compost can then be returned to the earth to help build a healthy soil and ensure more plant growth.

4. Explain the basics of composting. Composting works best when a compost pile contains a proper mix of the BIG FOUR: browns, greens, air, and water. Ask students to hold up 4 fingers and repeat after you, “browns, greens, water, and air”. Display [image of compost layers](#) on document camera.

- Browns are materials such as dried leaves, wood chips, or sawdust.
- Greens are materials such as grass clippings and food waste.
- The pile is made by alternating equal layers of green and brown materials.
- If it is kept moist and aerated, the pile becomes a home for beneficial fungus, bacteria, and insects (the “FBI”). Over time, these decomposers break down the green and brown materials until you are left with finished compost.

5. Share with the class the three steps to building a pile:
a. Chop materials into pieces that are six inches in size or less.
b. Mix browns and greens (half of each by volume).
c. Maintain moisture by keeping pile as wet as a wrung-out sponge.

6. Include in the pile any materials students may have collected, such as orange peels, apple cores, other vegetable and fruit trimmings, and paper. You can also add plant matter from around the school, like grass clippings and leaves. Avoid diseased plants. You may want to ask participants to bring lunch debris from the day before, although use this in moderation. Do not add dairy or meat products which may attract animals to the pile. Always bury the food waste in the center of the pile.

Review garden expectations (Be safe, Be Respectful, Be Responsible).

	<ul style="list-style-type: none"> - Walk in the garden - Stay on the pathways - Respect all plants and animals - Ask an adult before picking or eating anything - Care for and use the tools safely 	
Transition	Walk outside to the garden.	~ 5 min.
Activity	<p>Gather as a whole class in the garden, discuss tool safety, and demonstrate safe tool use.</p> <ul style="list-style-type: none"> ○ Always keep the tool below your waist ○ Never a weapon or toy ○ Clean tools and put away ○ Demonstrate correct weed pulling <p>Split students into groups of 4-5 to work on different tasks:</p> <ol style="list-style-type: none"> 1. Assign groups of students to help with each of the various tasks including collecting organic matter from the garden by digging out dying plants and weeding garden beds, collecting and sorting the brown and green materials in separate piles (an equal amount of each works well), chopping, layering greens, layering browns, mixing, and watering. 2. Students can chop materials by piling up materials on the ground and using a flat edge shovel to bruise or chop pieces. Clippers can be used to cut up pieces. Ideal size is about six inches long, although any bruising is helpful. These activities should be carefully supervised. 3. Build the compost pile by alternating layers of brown and green material. Add water by using a watering can as you add each layer. The pile should be about as wet as a wrung-out sponge. 4. Stir the layers together with a pitchfork as you build the pile. Keep the pile “fluffed up” to maximize the air in the pile. 5. Always finish the pile with a layer of browns, finished compost, or soil. Don’t put greens on top; this will help prevent fly nesting. 6. Fifth graders plan for the ongoing maintenance throughout the year and eventual harvesting of the compost pile to spread on the garden beds. <p>Background Information: With the help of micro-organisms and insects, we can take our</p>	~ 20 min.

	<p>biodegradable materials and turn them into a rich, dark soil amendment called compost. In this way, valuable nutrients are returned to nature rather than shipped away to a landfill. Composting is an excellent way to demonstrate the cycle of life: life, death, decomposition, and re-birth.</p> <p>The four essential ingredients of compost are the BIG FOUR: browns, greens, air, and water. “Browns” are dry and woody plant trimmings, such as wood chips, dried leaves, and straw. Browns are rich in carbon. “Greens” are moist vegetable and fruit scraps, green leaves, and fresh manure. Greens are rich in nitrogen. In a compost pile, you want approximately half brown materials and half green materials by volume. Decomposer organisms need air and water to break down organic matter. Turning and watering your pile provides it with the air and moisture needed for micro-organisms. The pile should be as moist as a wrung out sponge. These four ingredients create the perfect environment for the main decomposers: fungi, bacteria, and insects. <i>Source: Do the Rot Thing: A Teacher’s Guide to Compost Activities</i></p>	
<p>Closure</p>	<p>Gather together as a whole class to reflect: Ask students:</p> <p>1) What are the BIG FOUR? Turn to a neighbor and see if you can list the BIG FOUR.</p> <ul style="list-style-type: none"> ● <i>Composting works best when a compost pile contains a proper mix of the BIG FOUR: browns, greens, air, and water.</i> <p>2) How is a compost pile part of the cycle of life?</p> <p>Taste-test something fresh from the garden as available.</p>	<p>~ 5 min.</p>

* Adapted from: *Do the Rot Thing: A Teacher’s Guide to Compost Activities* “Activity 7: Building a Compost Pile”



Harvest and Spread Compost

Learning Objective(s):

I can harvest and spread compost on the garden to improve the soil and help plants grow.
I can weed pathways and spread woodchips to block out light and prevent weeds from growing.

Standard(s) Addressed:

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Materials:

Trowels
Buckets
Compost sifter (if available)
Wheelbarrow
Ahead of time: pick up or have delivered a pile of arborists chips or cedar wood chips for students to spread on pathways

Vocabulary:

Compost
Browns
Greens
Biodegradable
Decay
decompose

	Lesson Description	Duration
Warm-up & Intro	<p>The last couple of lessons have focused on composting. Now let's think about some reasons why we compost. Together in small groups ask students, "Can you brainstorm two or three possible reasons why to compost?" Then ask students to share ideas with whole class. Answers may include:</p> <ul style="list-style-type: none"> • By composting at home, we can put less in the landfill. • It's fun. • By returning biodegradable material to the soil, we are caring for the environment. • Adding compost to a garden improves the health of the plants and soil. <p>Today we will harvest finished compost from the compost pile and spread it on the garden beds to improve the soil and help the plants grow. When we go out to the garden we will split into two stations. One station will be harvesting compost and the other will be weeding the pathways and spreading woodchips to help prevent weeds from growing.</p> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	~ 5 min.

Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Demonstrate safe tool use, and show students how to weed the pathways. Students in this station will work together with a partner. Each student will have a trowel, shake off all the dirt on each root and place the weeds in a bucket. Explain that this is how we help keep the garden maintained and accessible as an outdoor classroom.</p> <p>Station 1 (garden educator): Harvest and spread compost on garden beds. Use a compost sifter if available.</p> <p>Station 2 (classroom teacher): Weed pathways and spread wood chips. Explain that spreading wood chips blocks out the light to prevent weeds from growing.</p>	~ 30 min. (15 min. at each station)
Closure	<p>Gather together as a whole class. Students reflect:</p> <ol style="list-style-type: none"> 1) How does composting help the earth? 2) What is one interesting thing you observed about the compost today? <p>Taste test something fresh from the garden.</p>	~ 5 min.

Lesson Extensions and Additional Resources	<p>Spreading the word (students share what they know about composting with these possible projects from Do the Rot Thing: A Teacher's Guide to Composting Activities:</p> <ol style="list-style-type: none"> A. Give a presentation or workshop on composting. B. Develop a pamphlet or brochure on composting. C. Publicize and promote composting. D. Promote or market compost and compost-related products. <p>Students will plan and organize how to communicate their knowledge of composting to others. Students will work together in groups, use community resources, develop materials, write, and present their work. More information about these projects can be found at: http://www.cvsmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvsmd_1.pdf</p>
Rainy Day Plan	Worm bin ecosystem lesson



Compost Stewards

Learning Objective(s):

- I can monitor and maintain the school garden compost.
- I can explain the importance of the C:N ratio for creating rich compost.
- I can analyze organic material for content, temperature, and weight.
- I can gather organic materials to create and/or add to the compost.

Standard(s) Addressed:

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Materials:

Thermometer for taking the temperature of each compost pile
[Carbon and nitrogen in compost image](#)
 Trowels
 Buckets
 Watering cans
 Pitchfork
 shovels

Vocabulary:

compost
 carbon
 nitrogen
 FBI: fungus, bacteria, and invertebrates
 organic and nonorganic materials

	Lesson Description	Duration
Warm-up & Intro	<p>During the last couple of lessons we have been learning about how composting works best when a compost pile contains a proper mix of the BIG FOUR. Raise your hand if you can remember the BIG FOUR. Call on one student at a time to list: browns, greens, air, and water. Explain that generally “browns” are carbon-rich materials and “greens” are nitrogen-rich materials.</p> <p>Introduce Carbon and Nitrogen in Compost: Review the components of a compost pile, the role of fungus, bacteria, and invertebrates (FBI), and clarify the difference between organic and nonorganic materials in breaking down compost layers. Show students the image of carbon and nitrogen in the compost pile and review the brief outline:</p> <ul style="list-style-type: none"> ● Organic materials in the compost will decompose more efficiently if the compost pile is made with the proper balance between carbon-rich and nitrogen-rich materials. Browns (carbon) can be identified as dry ● Greens (nitrogen) can be identified as fresh and moist. 	~ 10 min.

	<p>Carbon and nitrogen provide the necessary environments for microorganisms (FBI) to live. FBI = fungus, bacteria, and insects</p> <ul style="list-style-type: none"> • <i>The balance between these two types of materials is referred to as the carbon:nitrogen ratio and shown as C:N. The ideal C:N ratio is around 25 to 30 parts carbon to one part nitrogen, or 25–30:1.</i> • <i>The correct mix of carbon and nitrogen is needed to create an ideal environment with the right amount of heat and rot to produce compost. This ratio describes the chemical composition of a material and does not mean that you need a volume of brown materials that is thirty times greater than the amount of green matter.</i> <p>Compost troubleshooting: Ask, “what do you think will happen if there is too much carbon or too much nitrogen?”</p> <ul style="list-style-type: none"> • <i>If the C:N ratio is too high (excess carbon), decomposition slows down.</i> • <i>If the C:N ratio is too low (excess nitrogen), you will end up with a stinky pile.</i> <p>Review garden expectations (Be safe, Be Respectful, Be Responsible).</p>	
Transition	Split into two groups and walk outside to the garden.	~ 5 min.
Activity	<p>Station 1: Monitor and maintain compost pile Demonstrate how to take the temperature of a compost pile using a thermometer. Compare temperatures of different piles and explain why you think the differences exist. Examine compost composition and determine if it has the correct balance of carbon and nitrogen. Water and aerate (mix) compost pile to assist with decomposition.</p> <p>Station 2 (classroom teacher): Students weed pathways and spread wood chips or, collect compostable materials in two groups (browns and greens) and add them in layers to the garden compost pile.</p>	~ 25 min. (12 min. at each station)
Closure	Gather together as a whole class. Ask students, “how does maintaining a healthy compost pile reduce the use of fertilizers and other chemicals?”	~ 5 min.

	Taste-test something fresh from the garden.	
--	---	--

** Adapted from the Berkeley Unified School District PK-5 District Curriculum, 5th Grade Lesson 5 “The Carbon:Nitrogen Ratio” pages 232-234.*

Lesson Extensions and Additional Resources	Composting Concepts: Moisture (leaf experiment) from <u>Minnesota School Gardens: A Guide to Gardening and Plant Science</u> , page 126-127 Link: https://minnesota.agclassroom.org/educator/garden/guide.pdf
Rainy Day Plan	“The Power of the Circle” lesson from <u>The Growing Classroom: Garden-Based Science</u> by <u>Roberta Jaffe and Gary Appel</u> , page 181-182.