



LiveWell Kids Garden and Nutrition Program

Lesson 3: Soil Health & Minerals

FIFTH GRADE

OBJECTIVES

By the end of this lesson, students will:

- Realize the role of nutrients in the garden and our bodies.
- Understand what makes a healthy growing medium.
- Understand the benefits of composting and vermiposting (worm composting).
- Understand the components needed for successful compost and partake in building compost.
- Increase ability to make healthy food choices by being aware of nutrients in food and how to get them.
- Become aware of the Nutrition Facts label as a valid source of nutrition information.

SUPPLIES AND SET-UP

- Garden activity – “Making Compost”
 - **YOU PROVIDE** – **Green materials (the equivalent of 1 cup per student)**
i.e: vegetable and fruit scraps, green leaves, green cut grass, coffee grounds.
Green materials will come from either a classroom collection that you initiate, or brought in by you, the volunteer. Some sources for collecting green materials are coffee houses, cafés, smaller grocers, juice bars and neighbors. If using a vendor, please arrange with them at least one day before the lesson.
 - Brown materials for compost
 - 2 Watering cans
 - 1 Hand cultivator tool
 - Follow instructions in the diagram provided along with the supplies for this activity.
- Nutrition activity - “Label Fitness”
 - Laminate: *Nutrition Facts*
 - Laminate: *Label Fitness*
 - Place *Nutrition Facts* laminates where it’s accessible for discussion.
 - Place *Label Fitness* cards where they are accessible to pass out for the game.

PREPARATION

- Refer to the [LiveWell Kids Volunteer Manual](#) on the [LiveWell Kids webpage](#) for details about preparing for the lesson one week prior and the day of. The information can also be found on the inside of the shed door.
- Allow **30 minutes** for set-up and preparation on the day of the lesson.

**INTRODUCTION & MINDFUL BREATHING** (1 Minute)

- Introduce yourself and other volunteers.
- Guide students through a mindful breathing exercise.
- Explain the purpose of this third lesson is to better understand the benefits of composting and the role of minerals in the garden and our bodies.

****Divide the class into 2 groups****

Split the students into two groups. Send one group with the helper/teacher to the nutrition activity. Take the other group to the garden activity. Both activities will run simultaneously for a total of 36 minutes. Switch groups after 10 minutes.

GARDEN: DISCUSSION (18 Minutes)

Soil Health
<p>What is "Soil Health"?ⁱ</p> <p>Soil health is the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. Healthy soil gives us clean air and water, bountiful crops and forests, productive grazing lands, diverse wildlife, and beautiful landscapes. Soil does all this by performing five essential functions:</p> <ul style="list-style-type: none"> • Regulating water Soil helps control where rain, snowmelt, and irrigation water goes. Water flows over the land or into and through the soil. • Sustaining plant and animal life The diversity and productivity of living things depends on soil. • Filtering and buffering potential pollutants The minerals and microbes in soil are responsible for filtering, buffering, degrading, immobilizing, and detoxifying organic and inorganic materials, including industrial and municipal by-products and atmospheric deposits. • Cycling nutrients Carbon, nitrogen, phosphorus, and many other nutrients are stored, transformed, and cycled in the soil.

• Providing physical stability and support
 Soil structure provides a medium for plant roots. Soils also provide support for human structures and protection for archeological treasures.

It's important to care for our soil so it will be able to produce the nutrient-dense food that we want, season after season.

Some of the ways we can care for our soil in the garden is by putting nutrients back into the soil. We can do this by making compost and worm tea to add to our garden beds.

Composting: Definition & Benefits

- What is **composting**? Composting is the process of creating a controlled environment, such as a compost bin, where we can copy nature's process of plant materials breaking down into useful nutrients for growing plantsⁱⁱ.
- Three Benefits of compostingⁱⁱⁱ:
 1. Reduces waste
 2. Beneficial to soil
 3. Saves money

Benefit #1:	Composting Reduces Waste Supplies: <i>Landfill</i>
	<ul style="list-style-type: none"> • Where would plant materials go if they didn't go in compost? <ul style="list-style-type: none"> ○ If students say "trashcan," then ask: Where does the trash from the trashcans go when the trash trucks have taken it away? ○ Answer: When plant materials go in the trashcan and get picked up by the trash trucks, they end up as waste, in a landfill with other trash, instead of becoming useful nutrients for our gardens and yards. • Trash buried in landfills doesn't break down to become compost, but just stays there for many years. (Show <i>Landfill</i> laminate.) <ul style="list-style-type: none"> ○ This smells bad and could cause air, soil and water pollution. • We use our limited natural resources, such as <i>gasoline</i> (for the trash trucks) and <i>land</i> (for the landfills), to transport and process all this trash. This would be greatly reduced if all the plant material went into the compost!
Benefit #2:	Composting Is Beneficial to Soil Supplies: <i>Compost Cycle</i>
	<ul style="list-style-type: none"> ○ Compost contains macroorganisms and microorganisms^{iv}. ○ What is the difference between a macroorganism and a <i>microorganism</i>? <ul style="list-style-type: none"> ○ Macroorganisms are organisms that are large enough to see, such as pill bugs (also called sow bugs or roly pollies), earthworms or centipedes. ○ Microorganisms are organisms that are so tiny, that you need a microscope to see them. ○ Both types of organisms break down organic matter, and often even consume each other, into a usable form of nutrients for plants.

	<ul style="list-style-type: none"> ○ Compost improves the texture of garden soil. ○ By adding compost to our soil, it replenishes nutrients that have been removed from the soil by other plants. ○ The image (on laminate) shows how the nutrient cycle happens when people compost – this is called the compost cycle. ○ It also adds moisture that all living things need to survive, and weighs down the soil, keeping it from blowing away or being rinsed away. Compost is loose and crumbly, which contributes to aerating the soil, vital to supporting the life of soil inhabitants.
Benefit #3:	Composting Saves Money
	<ul style="list-style-type: none"> ● The healthier our soil is, the healthier our plants will be. ● When we make compost, we use it to amend, or <i>improve the health of</i> the soil. <ul style="list-style-type: none"> ○ If we didn't make compost, we would have to buy it from the nursery, or garden center, to amend our soil. <p>By making it ourselves through composting, we can save money.</p>

Ingredients for a Composter	Supplies: <i>"Do the Rot Thing...Compost!"</i>
	<ul style="list-style-type: none"> ● Every school garden in the LiveWell Kids program has composters (show composters.) ● There are four ingredients the compost bin/tumbler needs to recycle organic materials into usable compost: <ul style="list-style-type: none"> ○ Air ○ Water ○ Organic green materials (for 3rd – 5th grades, say: "rich in the element <u>Nitrogen</u>") ○ Organic brown materials (for 3rd – 5th grades, say: "rich in the element <u>Carbon</u>") ● Why are these ingredients necessary? <ul style="list-style-type: none"> ○ There is life in the compost bin, decomposers, the organisms that eat organic matter and all life needs food, air, and water to survive. ○ We are feeding our decomposers – like taking care of pets! ○ Without the decomposers, organic matter would not break down, but would just pile up. ● There is a recipe for making compost, which is 2-parts brown materials to 1-part green materials. <ul style="list-style-type: none"> ○ If we use too many greens, they can rot, making the compost bin slimy and stinky, which attracts pests. ○ If we use too many browns, there won't be enough nitrogen (from green materials) to feed the decomposers and they will die. ○ The compost bin needs a balance of ingredients, just like our bodies need a balanced diet. ● If the compost bin gets out of balance with either too many greens, or too many browns, it's easy to fix!

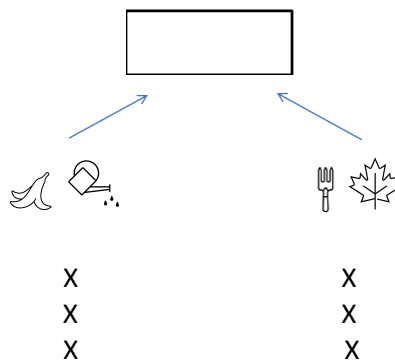
	<ul style="list-style-type: none"> ○ You just add more of the other ingredient (plus water if it's dry) and stir. ○ For example, if you have too many greens, you need to add browns. <p>Similarly, when our diets get out of balance, we need to adjust what we eat.</p>
<p>How to Make Compost</p>	<p>Supplies: <i>"Do the Rot Thing...Compost!"</i></p>
	<ul style="list-style-type: none"> ● In the compost pile, we have scavengers, physical decomposers, such as bugs, as well as chemical decomposers, such as fungi and bacteria. ● Decomposers eat the organic matter that we put in there, including each other!⁴ ● Ask: "Can you name any decomposers that we might see in the compost pile?" <ul style="list-style-type: none"> ○ <i>In the compost pile, you can see: Pillbugs, pincher bugs, worms, centipedes, fungi....</i> ● Decomposers don't all like to eat the same things. ● Some of them are carnivorous, or meat eaters, while others like animal waste. ● Some like dead bugs, while others prefer dry, dead plants. Fungi like to eat fruit and vegetables. ● Ask: "What would our planet look like if we didn't have decomposers?" <p><i>The earth would be covered in dead plants and animals.</i></p> ● Ask: "What are some other benefits to having decomposers in the compost bin?" <ul style="list-style-type: none"> ○ <i>Decomposers also help keep the compost pile warm with their body heat AND aerate, which means to create air spaces, in the compost as they move around.</i> ● Ask: "How do decomposers help plants?" <ul style="list-style-type: none"> ○ <i>They decompose organic materials into smaller parts that plants can use for accessing nutrients.</i> ● Ask: "Does anyone know the difference between a scavenger and a decomposer? Try to guess by thinking about what the word scavenge means." <p><i>Scavengers eat dead plants and animals, breaking them into smaller pieces. This creates more surface area for the decomposers to take over and finish breaking the organic matter down into usable nutrients for plants to use.'</i></p>
<p>Vermiposting</p>	<p>Supplies: <i>Worm Bin</i></p>
	<ul style="list-style-type: none"> ● There is more than one way to add nutrients to soil. ● The school garden has a worm bin. ● Worms live in this structure and are fed fresh produce scraps each week.

	<ul style="list-style-type: none"> Gardeners call their waste “liquid gold!” It’s periodically added to the garden beds for a nutrient boost. <p>Using the worms to make nutrients for the garden is called Vermiposting or Vermicomposting.^{vi}</p>
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GARDEN ACTIVITY

Activity	<p>“Compost Building”</p> <p>Supplies: Green materials, brown materials, 1 stream-spout watering can, 1 sprinkle-spout watering can, 1 hand cultivator tool, 1 weeder tool</p>
	<p><i>Make sure you save HALF the materials for the second group.</i></p> <ul style="list-style-type: none"> The students will form two lines in front of the compost area (one in front of the greens/watering can, and the other in front of the browns/hand cultivator tool.) One student from each line approaches their pile. The student in front of the green pile will go first, putting in one scoop of greens into the composter. The student in front of the browns will then add one scoop of brown material. The student in front of the greens will sprinkle a little water onto the pile. The student in front of the browns will give a stir with the cultivator. Both students will go to the back of the other line. <p><i>**Make sure that you only use HALF the materials with the first group, saving the other half for the second group.</i></p>

Compost Building Activity Diagram



When everyone has completed the composting building, switch with the other group and direct students to the nutrition activity.

NUTRITION: MINERALS WE EAT (10 Minutes)

** Occurs at the same time as Garden Activities

The nutrition section has two parts:

1. Nutrients Discussion (differs by grade)
2. Activity

K-5th	<p>Nutrients</p> <p><i>This section is about getting nutrients – both food and water are nutrients. We need nutrients.</i></p>
Discussion	<ul style="list-style-type: none"> • Just like soil needs nutrients, so do people. • This is especially important for all of you because you are still growing. Your body needs nutrients to grow strong, healthy bones and muscles. • Nutrients also give you the energy to run around the playground, catch a ball, dance and learn in school. • People get nutrients from food and water. <ul style="list-style-type: none"> ○ Nutrients include carbohydrates, protein, fats, fiber, vitamins, minerals, and even water. • It’s important to eat a variety of foods so you can get lots of different nutrients.

	<p>Nutrition Facts Label</p> <p><i>Supplies – (1) Nutrition Facts, (2) Label Fitness</i></p>
Discussion	<ul style="list-style-type: none"> • Ask: How do you decide what to eat? (You’ll likely get a variety of responses: how a food tastes/looks/smells/want to try something new/what friends and family are eating, etc). • Follow up with more questions: <ul style="list-style-type: none"> ○ How do you know what’s in the food that you like to eat? ○ If you’re eating a whole food, like an apple, broccoli or grilled chicken, then you know what you’re putting in your body. But what if you’re eating a granola bar, chips or cereal? ○ How can you find out what’s in your food or drink? • The Nutrition Facts label can help you out! <ul style="list-style-type: none"> ○ Use the laminate, <i>Nutrition Facts</i>, for the remaining discussion. • In the United States, the Nutrition Facts Label is required on all packaged foods.^{vii} <ul style="list-style-type: none"> ○ It is based on updated science and dietary recommendations for Americans. ○ Fresh food that isn’t prepackaged does not need a label (e.g., lettuce, pears, potatoes). • Ask: What information does this label provide? <ul style="list-style-type: none"> ○ It provides information about the food or drink’s contents (ingredients) and nutrients. • Ask: What is the ingredient in a bag of apples? <ul style="list-style-type: none"> ○ Answer: Just apples! Remember, apples are a whole food. • Ask: How about apple pie? What do you think that ingredient list looks like?

	<ul style="list-style-type: none"> ○ Answer: apple pie is a processed food with many more ingredients. You'll likely see butter, sugar, salt, flour and other words you won't even recognize. All of this goes into your body! ● In general, the first 3-5 ingredients make up the largest portion of the food. ● The Nutrition Facts Label also includes other information about the food such as the serving size, fat, sugar, sodium, protein and more. ** ● For now, you can be a nutrition detective at home and at the store by reading the Nutrition Facts label and knowing what's in the food that you are eating! <p style="text-align: center;">** Volunteers: Use your discretion in deciding how much detail to review regarding the Nutrition Facts Label laminate.</p>
<p>Activity</p>	<p><u>Label Fitness</u> ^{viii} You will need the <i>Label Fitness</i> game cards.</p> <p><i>*IMPORTANT! The point of this game is not to scare the students nor to make them feel bad for eating particular foods. Rather, the goal is to familiarize them with the Nutrition Facts label as a source of nutritional information.</i></p> <ul style="list-style-type: none"> ● Game description: Today we're going to play a game that will help us become more familiar with the nutrients and other components of the Nutrition Facts label. ● Ask the students to stand in a horizontal line, leaving enough space between each other so they have ample room to all run/hop/skip forward at the same time. ● Directly across from each student, place a <i>Label Fitness Game Card</i>. ● Explain to the students that you will first call out a specific nutrient or other item (of your choosing) from the Nutrition Facts label. <ul style="list-style-type: none"> ○ May be good options due to typical number: servings per container, total fat, saturated fat, carbohydrates, fiber, sugars, added sugars, protein. ● At your signal, have the students run/hop/skip/crawl to the game card that is directly across from them. ● Once at the game card, direct students to find the nutrient/item you picked out and then do that number of fitness movements (e.g., jumping jacks) that they see next to the item. <ul style="list-style-type: none"> ○ For example, if their card has 5 grams of fat, then they will do 5 jumping jacks. ● Repeat as many rounds as you have time for. ● If you have the entire class or a large group of students, you will need to divide the class by the number of game cards and the kids will take turns by group. ● A fun way to end the game is to shout out "sodium." Some students will see a very large number on their card. They won't have to do 450 jumping jacks, but they'll certainly notice that there is a big number next to sodium.

CLOSING (1 MINUTE)

- Bring students together to close the lesson and thank the students, teacher and other volunteers.
- Point out to them that composting is easy and they can do it at home.
- Take them to see how their garden box is growing before going back to class.
- If time allows, have students draw a Reflection Page and take a few photos to share with BCHD at Mishell.Balzer@bchd.org.
- Thank the students for joining you today and dismiss them.

***Don't forget to report your lesson as delivered with the online form!**

Scan this QR code with your phone for scheduling and reporting lessons as delivered:



From the computer, click the link that was emailed to you by your Lead Volunteer:

[LiveWell Kids Tracking Links 2024-25](#)

Resources

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- ⁱ USDA. "Http://Www.nrcs.usda.gov/Conservation-Basics/Natural-Resource-Concerns/Soils/Soil-Health." *Natural Resources Conservation Service*, 2024, www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soils/soil-health.
- ⁱⁱ Hu, S. (2020, July 20). *Composting 101*. NRDC. <https://www.nrdc.org/stories/composting-101>
- ⁱⁱⁱ US EPA. (2018, October 16). *Composting At Home | US EPA*. US EPA. <https://www.epa.gov/recycle/composting-home>
- ^{iv} *Plant Life Cycles*. (n.d.). Penn State Extension. <https://extension.psu.edu/plant-life-cycles#:~:text=the%20growing%20season,->
- ^v National Geographic Society. (2020, January 8). *Decomposers*. National Geographic Society. <https://www.nationalgeographic.org/encyclopedia/decomposers/>
- ^{vi} *soilcollege*. (n.d.). www.sas.upenn.edu. <https://www.sas.upenn.edu/~jbryson/soilcollege.html#:~:text=Soil%20organisms%20are%20generally%20grouped>
- ^{vii} United States Department of Agriculture, Food and Nutrition Service. *Standards-Based Nutrition Education Grades 5 & 6*. Sept. 2012.
- ^{viii} "Comparing Nutrition Labels Activity for Kids - the Homeschool Scientist." *Thehomeschoolscientist.com*, 13 Jan. 2019, thomeschoolscientist.com/comparing-nutrition-labels-activity-kids/. Accessed 24 Oct. 2023.