



LiveWell Kids Garden and Nutrition Program

Lesson 3: Soil Health & Minerals

SECOND GRADE

OBJECTIVES

By the end of this lesson, students will:

- Realize the role of nutrients in the garden and our bodies. (K-5)
- Understand what makes a healthy growing medium. (K-5)
- Understand the benefits of composting and vermiposting (worm composting). (K-5)
- Increase ability to make healthy food choices by being aware of nutrients in food and how to get them. (K-5)

SUPPLIES AND SET-UP

- Garden activity - “Making Worm Tea”
 - Laminate: *Worm Bin*
 - Trowel
 - Weeder tool
 - Stream-spout watering can (this is the watering can without a sprinkle-top)
 - Sprinkle-top watering can
 - Castings from the worm bin
- Set laminate, trowel, weeder tool and stream-spout watering can (fill $\frac{3}{4}$ of the way with water) on the lid of the worm bin. Fill the sprinkle-top watering can and put it next to your garden bed.

- Nutrition activity - “Sodium Relay”
 - Two collapsible bins
 - Sodium Relay Packet which includes:
 - ✓ Two Sets of *Sodium Relay Flashcards* (blue-dot set and yellow-dot set)
 - ✓ Laminate: *Sodium Relay Answer Key*
 - ✓ Laminates, card labels: *High Sodium, Low Sodium*
- Set bins on the ground with a card label in front of each one.
- Place the flashcard sets on the ground across from the bins where students will line up in 2 lines behind them.
- Place answer key where it is accessible for checking answers after relay.

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 20 minutes. Switch groups after 10 minutes.

GARDEN: DISCUSSION (10 Minutes)**Soil Health**

What is “Soil Health”?ⁱ

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:

- **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 plantsⁱ.
- 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"> • Everything that we put in the trash ends up in a place called a <i>landfill</i>. <ul style="list-style-type: none"> ○ In landfills, the trash is buried in the ground for many years and is of no use to anyone; it’s just taking up space. ○ Imagine what it would look like and smell like if all your trash from home was buried in the backyard! • When we compost, we put less waste into landfills. Just like reusing and recycling, we can think of composting as nature’s recycling.
Benefit #2:	Composting Is Beneficial to Soil Supplies: <i>Compost Cycle</i>
	<ul style="list-style-type: none"> • Compost contains nutrients that are vital to a healthy soil, just like nutrients are vital to your body. • What are nutrients? <ul style="list-style-type: none"> ○ A <i>nutrient</i> is a substance found in food that provides the nourishment we need to grow and thrive.^{iv} • How do the nutrients get into the soil? <ul style="list-style-type: none"> ○ Scavengers and decomposers break down organic matter into smaller and smaller pieces until it’s in a useable form for plants to access the nutrients.^v • Compost is an example of the nutrient cycle at work. <ul style="list-style-type: none"> ○ The nutrient cycle is the natural process of nutrients being recycled from dead matter to living matter in a constant loop.^{vi} ○ The image (on laminate) shows how the nutrient cycle happens when people compost – this is called the compost cycle.^{vii}
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 ○ Organic brown materials • Why are these ingredients necessary? <ul style="list-style-type: none"> ○ There is life in the compost bin: organisms that eat organic matter, and all life needs food, air, and water to survive. ○ We are feeding them – like taking care of pets! ○ Without them, organic matter would not break down, but would just pile up.
How to Make Compost	Supplies: <i>“Do the Rot Thing...Compost!”</i>
	<ul style="list-style-type: none"> • Ask: Who can give an example of <i>green</i> materials? <ul style="list-style-type: none"> ○ <i>Green materials are the fresh plants and plant parts that get put in the compost. Here are some examples: fresh cut grass, vegetable scraps, fruit scraps, coffee grounds, manure and green leaves.</i> • Ask: Who can give an example of <i>brown</i> materials? <ul style="list-style-type: none"> ○ <i>Brown materials are the dried, brown plants and other non-green things that are put in the compost. Here are some even examples: dried grass, brown leaves, dead flowers and plants, paper and eggshells.</i> • <i>On the laminate, point out the F.B.I.</i> <ul style="list-style-type: none"> ○ FBI stands for Fungus, Bacteria and Invertebrates; these are the organisms responsible for eating everything in the composter. ○ These are the decomposers and scavengers. Scavengers are bigger organisms that break down organic matter for the decomposers. Examples include worms, millipedes and pillbugs (also called sowbugs and roly-pollies), pincher bugs and centipedes.
Vermiposting	Supplies: <i>Worm Bin</i>
	<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. • 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.^{viii}</p>

GARDEN ACTIVITY

Activity	<p>“Making Worm Tea”</p> <p><i>Supplies: “Worm Bin” laminate, Worm bin, watering can with a STREAM spout (NOT a sprinkle-spout), filled with water, weeder tool.</i></p>
	<ul style="list-style-type: none"> • Bring the students to the worm bin and explain that it houses worms that eat our produce scraps, using the laminate to illustrate. • The waste that the worms excrete is rich in minerals that are enriching for the soil. • We take that ‘worm waste’ and add it to the garden soil; like adding vitamins. • Lift the lid on the top layer so they can see where the food is added. The worms come up through the holes in the floor of the tray and eat. • Then lift that top tray off (with the lid on) and place it on the soil. • The next tray has worm castings (worm waste). Let them see this layer. • Take a trowel and scoop about 1 teaspoon of the castings and put it in the watering can. • Use the weeder tool to stir well. • Have the group go with you to your garden bed so they can watch you drizzle it on the soil, between all the plants.

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

	<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. • For younger students, the following imagery may help clarify the concept: <ul style="list-style-type: none"> ○ Think of a carrot that you built out of Legos. Each Lego piece is a different nutrient. Different nutrients, or Lego pieces, do different things that our bodies need. Nutrients can be vitamins, such as vitamin A, which is found in carrots and spinach for example. So, your Lego carrots and spinach would have lots of vitamin A Lego pieces. Nutrients can also be minerals, such as potassium, which is in bananas and potatoes. Carbohydrates, fats, proteins, and water are other examples of nutrients. Keep in mind that foods can have

	<p>a bunch of different nutrients in them. Therefore, your Lego carrot not only has vitamin A Lego pieces, but it also has vitamin K, vitamin C, potassium, fiber, calcium and iron Legos too. That’s a lot of good-for-you nutrients – or Legos!</p> <ul style="list-style-type: none"> • It’s important to eat a variety of foods so you can get lots of different nutrients.
	<p>Minerals</p> <p>Supplies: (1) Two paper trays, (2) Sodium Relay Packet which includes (A) Two Sets of <i>Sodium Relay Flashcards</i> (1 blue-dot set and 1 yellow-dot set); (B) <i>Sodium Relay Answer Key</i>; (C) <i>High Sodium</i>; (D) <i>Low Sodium</i></p>
Discussion	<p>Minerals are nutrients that our bodies need to keep us healthy.^{xiv} Minerals help us grow, have good eyesight, fight illness and form bones, muscles, skin and organs. Our bodies can’t make minerals on their own. Minerals are found in soil and are absorbed by plants or eaten by animals that consume the plants. When we eat these plants (or animals that have previously absorbed the minerals by eating plants), the minerals are passed along to us. This means we get minerals through food. Minerals are found in foods like cereals, bread, meat, fish, milk, dairy, nuts, fruit and vegetables.^{xv} Some minerals that you may have heard of include: Calcium helps build bones and teeth. Found in milk, yogurt, kale and broccoli.^{xvi} Iron helps carry oxygen around the body.^{xvii} Found in beans, eggs, leafy green vegetables, whole grains, chicken and beef. Potassium is needed for kidney and heart function and to keep muscles and the nervous system working well.^{xviii} Found in bananas, tomatoes, dried apricots, spinach and nuts. Fluoride helps prevent cavities.^{xix} Added to toothpaste and water. Sodium regulates muscle contractions, nerve function, blood pressure and the balance of fluids in the body.^{xx} Most of the sodium we eat comes from packaged and prepared foods, including food from restaurants (e.g., deli meats, pizza, burritos and tacos, soups, chips). Foods may not taste salty, but they can still be high in sodium. Pickles and some chips <i>taste</i> salty and are likely high in sodium. However, packaged cookies, cereals and pizza may not taste salty, but may have a lot of sodium. Our bodies need sodium, but in small amounts – a little less than 1 teaspoon of table salt each day.^{xxi} The best way to make sure you get enough minerals is to eat a variety of fresh, whole foods, such as colorful fruits and vegetables. Minerals are also in whole grain breads and cereals, lean chicken, fish and meat as well as eggs, beans, nuts and low-fat dairy products. This is a good reason to eat more fresh, whole foods!</p>

	**Note: The above is NOT a full list of minerals, their benefits nor their food sources.
Activity	<p>Sodium Relay</p> <p>You will need the <i>Sodium Relay</i> Packet and 2 paper trays.</p> <p>Game description: Today we're going to learn more about the mineral sodium by playing a game called Sodium Relay.</p> <p>Activity Set Up:</p> <p>Find an area with open space to move around.</p> <p>Set up two paper trays with <i>High Sodium</i> and <i>Low Sodium</i> laminates placed in front.</p> <p>Have in hand two sets of <i>Sodium Relay</i> flashcards (blue-dot and yellow-dot cards.)</p> <p>Volunteer will be a few feet in front of the students with the High Sodium/ Low Sodium trays close by.</p> <p>Have students sit down in two lines.</p> <p>Volunteer will place a deck of cards in front of each team.</p> <p>One team gets blue-dot cards, and the other team gets yellow-dot cards.</p> <p>Students are divided into two teams and line up accordingly.</p> <p>Explain that when students get to the front of the line, they will look at their card and decide whether the featured food is high or low in sodium.</p> <p>If high, they will run to the tray labeled <i>High Sodium</i> and put the card in there.</p> <p>If low sodium, then they will run to the <i>Low Sodium</i> tray and place their card inside there.</p> <p>Teams are racing against one another, so they will be running at the same time. After their turn, the student will go to the back of the line and the next person in line will take a card and run to a tray.</p> <p>After every student has had a turn and all cards are used, count the number of correctly placed cards to determine the winning team.</p> <p>See <i>Sodium Relay Answer Key</i> as needed.</p> <p>If any cards are placed in the incorrect tray, review the correct answer with students.</p>

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

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}^a MedlinePlus. (2021, July 23). *Definitions of Health Terms: Nutrition*:

MedlinePlus. <https://medlineplus.gov/definitions/nutritiondefinitions.html>

^v *Decomposers and Scavengers - NatureWorks*. (n.d.). Nhpbs.org. <https://nhpbs.org/natureworks/nwep11.htm>

^{vi} *Nutrient Cycling - an overview | ScienceDirect Topics*. (2015). Sciencedirect.com. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/nutrient-cycling>

^{vii} *The Compost Cycle | StopWaste - Home, Work, School*. (2022). Stopwaste.org. <https://www.stopwaste.org/at-home/home-and-community-gardening/the-compost-cycle>

^{viii} *soilcollege*. (n.d.). www.sas.upenn.edu.

<https://www.sas.upenn.edu/~jbryson/soilcollege.html#:~:text=Soil%20ganisms%20are%20generally%20grouped>