

Common Roots

Microgreens, Restoring Ourselves, Our Soil



Introduction

Winter’s hush across the landscape inspires restorative immune support practices, including eating microgreens, holders of sunshine and deep nutrition. This lesson also scratches the surface of soil, the heart of our continuing food journey through the year. Learn how to be Soil Heroes, even though it’s winter, by composting food waste indoors, sprouting and making microgreen confetti recipes. Older Soil Heroes are encouraged to dig deeper into the soil microbiome, soil-less growing, as well as examine fashion industry practices that exploit rather than restore soil, water, and human resources.

In the Northeast we find the Earth in a restorative mode. New plant life is not emerging and yet there is frozen potential waiting beneath the surface ready to foster growth again in the springtime. We could take our cues from the Earth and focus on restoring and maintaining our health through the short, cold, sometimes dark days. We can focus on hydrating, sleeping, getting out in the crisp fresh air, and eating well. We can grow quiet, like the winter ground. But, through this time, we still need sunshine in order to grow our bodies...and that’s where microgreens come in. They are a little bit of edible sunshine that we can ingest to bolster our health.

What Are Microgreens?

Microgreens are young vegetable greens that we eat before they get very large. And don’t let their size fool you—microgreens are packed full of awesome vitality! You see, some of what a plant needs to get big and strong is “frozen potential” within the seed. And whether the seed grows into a big, mighty stalk or a tiny little sprout, it all begins in the seed. When we eat microgreens, we’re getting a super portion of vitamins and minerals from these tiny young plants! Microgreens are super easy to grow, even inside your house—making them the perfect winter crop and reason to have a microgreen confetti party.

Different Kinds of Microgreens

Microgreens grow from many different kinds of seeds, but there are some that are more popular than others. The most popular varieties of microgreens are:

- Brassicaceae family: Cauliflower, broccoli, cabbage, watercress, radish, and arugula

- Asteraceae family: Lettuce, endive, chicory, and radicchio
- Apiaceae family: Dill, carrot, fennel, and celery
- Amaryllidaceae family: Garlic, onion, and leek
- Amaranthaceae family: Amaranth, quinoa, swiss chard, beet, and spinach

Some microgreens taste grassy; others taste peppery or spicy. Some are sour, some are bitter, and some are neutral. As a whole, the flavor of microgreens is considered to be strong and concentrated. You will be able to taste test any you choose to grow on your winter windowsill and discover a garden full of fresh sunshine flavors.

Microgreen Confetti Party Recipes

There are many ways to include microgreens in your diet. You can substitute them for other greens on a sandwich or a wrap, add a handful to a salad, or even enjoy them blended into smoothies and juiced! Another option is to use them as garnishes. For example, on pizzas, soups, omelets, curries... whatever you like! Here are a few recipes to try out.



Dippin' Greens Party

Ages 4-7

Ingredients:

- 3 different types of microgreens (try cabbage, pea shoots, and sunflower)
- Dressing 1:
 - 2 tablespoons light soy sauce (gluten-free soy variety as needed)
 - ¼ cup avocado or sunflower oil
 - 1 tablespoon sesame oil
 - 1 tablespoon fresh lime juice
 - 1 tablespoon honey
 - 1 tablespoon fresh grated ginger
 - 1 teaspoon water to thin dressing
- Dressing 2:
 - ½ cup plain Greek yogurt
 - 1½ teaspoons fresh lemon juice (or substitute apple cider vinegar)
 - ½ teaspoon dried dill or fresh chopped chives
 - ¼ teaspoon salt, plus more to taste
 - 2 tablespoons water to thin dressing



Tools:

- 2 mason jars
- Plates
- Measuring spoons
- Sharp knife
- Cutting board
- Microplane
- Scissors
- Colander
- Two taste cups for each student

Instructions:

1. To harvest your microgreens, snip with scissors above the soil. Handle gently, as they are very fragile. Rinse with water if needed and drain well in a colander or strainer. If you are buying your microgreens, harvest a variety of flavors and colors to give a real pop of flavor to your salad and maximize the health benefits.
2. Split students into two groups, each with the ingredients for one of the dressings. Have students measure and add ingredients for the dressings into mason jars. What do you see when you first place all the ingredients in the jar? What sinks? What floats? Now shake shake two times. What can you observe about how the ingredients changed? Now shake shake shake shake some more and keep count of how many shakes before you stop and observe again. How many shakes did it take until you saw all the ingredients blend into a creamy dip? There is a fancy word for this process. It is called **emulsifying**.
3. Group 1 can split the two dips into tablespoon individual serving size cups or bowls per student. Each student should have both dressings.
4. Group 2 can split microgreens up so that each student gets a small portion to sample each kind of microgreen.
5. When everyone has settled down in a big circle, you might take five deep breaths. Smell each of the dressings. Appreciate the form and color of the microgreen confetti. Recall how each of the confetti came from a tiny seed, lighter than a feather, yet they have so many good nutrients for our bodies—more than eating the whole plant if the microgreen had matured! Then, let your dippin' greens confetti party begin! You might try each of the microgreens plain, then dip them in the different dressings and quietly compare the yum, silently, like the winter hush that blankets the landscape outside the window.



Eat-the-Rainbow Microgreens Salad

Ages 8-12



Ingredients:

Salad:

- 1 cup of mixed microgreens (e.g., beetroot, radish, basil, parsley, coriander/cilantro, sunflower, red cabbage, kale, broccoli, or pea sprouts)
- 1 handful of rocket/arugula or baby spinach leaves (washed and dried)
- 1 medium cucumber, sliced thinly
- 12 cherry tomatoes
- 1 small carrot, grated

Dressing:

- 2 tablespoons cold-pressed olive oil (ideally organic)
- 1 tablespoon vinegar (apple cider or white) or freshly squeezed lime juice
- 1 teaspoon pure maple syrup or a few drops of liquid stevia (or sweetener of choice)
- 1 teaspoon sesame oil
- 1 teaspoon tamari (organic soy sauce or gluten-free) or salt to taste

Tools:

- Forks
- Plates
- Small mixing bowl
- Grater
- Knife
- Cutting board

Instructions:

1. To harvest your windowsill microgreens, snip with scissors just above the soil. Handle gently, as they are very fragile. Rinse with water if needed and drain well in a colander or strainer. If you are buying instead of growing microgreens, purchase a variety of flavors and colors to give a real pop of flavor to your salad and maximize the health benefits.
2. In a bowl, add grated carrot, then top with rocket or spinach and mixed microgreens. Layer the cucumber and cherry tomatoes around the bowl.
3. Drizzle with dressing and divide amongst students.
4. Together, reflect on the incredible power that microgreens have. In one tiny plant there are as many nutrients as a whole mature plant—and all that power comes from a tiny seed, small as a speck of dust. After reflecting, enjoy your snack!



Sunshine Boost Smoothie

Ages 8 to Elders



Ingredients:

- 1 banana, sliced
- ½ cup frozen mango, chopped
- ¾ cup vanilla Greek yogurt
- ¾ cup orange juice (or to taste)
- 1 ounce broccoli microgreens, or to taste
- 1 cup spinach, stem removed and torn into small pieces

Tools:

- Electric blender (or human-powered blender made from a repurposed wide-mouth gallon water bottle and plenty of muscle)
- Mortar and pestle if using a human-powered blender
- Cups

Instructions:

1. Add ingredients to an electric blender.
2. Mash in mortar and pestle if using a human-powered blender.
3. Blend with the push of a button or shake vigorously, taking turns until mostly smooth.
4. Divide between students' cups.
5. Take five deep breaths, take a moment to appreciate the wonderful sunshine boost you're about to receive, and pause a minute to ponder the tiny seeds that pack so much power. Sip away as you gather up your impressions quietly, as silently as a snowflake falls and blankets the Earth.



Confetti Wellness Snack Ideas

All Ages

Microgreens might be small, but they are “super” in flavor and vitality! If you grow a mixture of microgreens, you can combine colors to create beautiful rainbow healthy snacks!

Microgreens are best eaten raw to enhance a salad, served alone, layered in sandwiches, hidden in dips, dipped in dressing, even juiced in your favorite smoothie. Yet they are also yummy gently sautéed.

Here are a few quick and easy microgreen garnish ideas:

1. Fried egg with pesto on a bed of greens topped with red cabbage microgreens.
2. Lentil or other favorite tacos sprinkled with microgreen confetti.

3. Hummus and pickled onions smothered with confetti.
4. Create your own confetti edibles recipes.

Health and Wellness

Before we get started, our gentle winter wellness reminder is to keep your immune system strong. How? Consider eating garlic and ginger, gargling with salt water every day, drinking lemon water each morning to help you gently detox, and adventuring outdoors. And nibble on some nourishing microgreens!



Ages 4-7

Microgreens are the very first parts of a plant that appear after a tiny feather-light seed is soaked in water. We only eat the stem and leaves of this tiny confetti plant. The microgreen is the plant after it grows for about a week or two, after it has a few leaves but before it starts to really look like the vegetable it is. Even a seed contains so many nutrients and are treasure boxes containing much that a plant needs to grow healthy and strong. Their first sprouts, that we call microgreens, are also treasures for our bodies even though they are feather light, small “baby” plants. Imagine that! A tiny sprout can help our body grow! Seeds and microgreens are amazing. They contain more nutrients than we would receive if we were eating the whole plant. If you don’t wish to eat an entire head of broccoli, eat a serving of microgreens, which is like green confetti, and get even more nutrients! Your meals or snacks can become a confetti celebration of microgreens.



Microgreens have the most nutrients if you eat them when they’re freshly harvested. You can grow them on your windowsill or in a bright room and pick them when you want to eat them. Microgreens only use a small amount of soil and water, making them a wellness warrior and a conservation hero. Either at home or in your classroom, creating a microgreen laboratory can be a simple way to bring more greenery, brightness, and energy into your day during gloomy winter days. Just because most everything green is waiting underground to reemerge in spring doesn’t mean we can’t cultivate a confetti celebration with microgreens!

Many types of microgreens vary in the way they taste. Some of them are a little spicy like radish microgreens, some are sweet like pea microgreens, but all are super seeds packed with vitality! Foods grown in healthy soils are packed with vitality, healing gifts that help our bodies become stronger just like the vitality in lots of the foods we’ve already studied such as apples, squash seeds, honey, and herbs. Some microgreens taste similar to their adult vegetables, and some taste a little different. Try tasting the microgreens of red cabbage, sunflower, or snow pea shoots and then try to guess which one matches which plant! Pea shoots are microgreens as well, but they are just called shoots in this case. You can play our matching game further along in the lesson to test your green knowledge!



Ages 8-12

Does anyone know what a microgreen is? Microgreens are the young plant of a vegetable and some flowers before it grows into the mature plant. They are a great brain food for thinking and studying! When we eat them, we just eat the stem and the first emerging leaves. Just like the seeds, they contain many of the nutrients that the plant needs to grow and thrive. A serving of broccoli microgreens contains up to 40 times more vitamins and minerals than the regular broccoli crown flowers we might be used to eating! These tiny plants are nutritional powerhouses that should be eaten fresh. When we cook vegetables, such as broccoli, some of the nutrients are lost. Microgreens are a great alternative or addition because they taste best fresh and hold amazing amounts of health benefits. The vitality they provide us contains many healing gifts that can help us prevent, or recover quickly from, disease. Microgreens are miniature but mighty wellness warriors.



Microgreens can be an exciting addition to your kitchen windowsill because they are easy to grow. They don't need any fertilizers. They just need the sun from the window, a healthy growing medium, and a misting of water once or twice a day. Adding a bit of green life to your kitchen or classroom windowsill or countertop might refresh you as you wait for the return of spring green during days when the sun shines for many fewer hours. Microgreens are about the size of a four-leaf clover, so you can add them as a garnish to complement plenty of foods while bringing a big boost of vitality to your diet. Try adding broccoli microgreens or red cabbage microgreens to your salad or on top of your avocado toast for an extra burst of flavor. Microgreens can be enjoyed at any time of day and are wonderful nutrient warriors.

Are you feeling a lack of sunshine or adventure? Feeling the winter blues right now? Growing some lively green confetti can refresh us with vitality as we reflect on the power, rhythm, wonder, and promise found in nature. Microgreens can also give our bones the support we need to snowshoe, ice skate, ski, and more.



Teens to Adults

Microgreens are essentially the baby plant of a vegetable before it matures into the adult plant. They are loaded with vitamins and minerals and other health benefits, more often than not being up to 40 times more nutritious than the mature vegetable itself. Now let's get into some of the vitality benefits of specific microgreens since it is such a broad range of foods. Red cabbage microgreens contain high amounts of vitamin C, beta carotene, and antioxidants. It also contains a derivative of an amino acid (methionine) that promotes gastrointestinal health.

Sunflower microgreens are a great source of vitality from complete protein. Imagine that! A complete protein in a two-inch baby plant! A complete protein means it contains an adequate proportion of each of the

nine essential amino acids, which are protein building blocks our bodies need to function properly. They help to build our skeletal, muscular, and neurological systems. Sunflower microgreens also hold vitamins A, B, D, E, and zinc, all of which are necessary for our bodies. Being aware of your health and wellness is especially important in the winter, as our bodies can get run down easily if we lack fresh air, sun, and movement or exercise on a daily basis. In particular, vitamin D is more difficult to obtain in the winter months, since our bodies synthesize it in the sun through our eyes and skin. Many microgreens have high amounts of vitamin D, zinc, and vitamin K, another important wellness combination of nutrients especially needed if you live in the northlands like Vermont.

Pea shoots contain several times as many nutrients as an entire serving of regular peas, which is true for the majority of microgreens and their respective mature plants. Pea shoots are a great source of vitamin C. Vitamin C is a great immunity booster and helps to absorb iron, both of which support activities such as snowshoeing, skiing, or winter hikes! There is a wide variety of microgreens available to try, so find a few that fit your taste palate.



Prenatal

Many types of microgreens contain high amounts of potassium, iron, zinc, magnesium, copper, and antioxidants. Microgreens are very easy to include in your daily diet by adding them to salads, smoothies, and sandwiches or as a pizza or casserole topping. According to the US Food and Drug Administration, raw sprouts should be avoided during pregnancy due to the fact that harmful bacteria can hide in the cracks of the shell, in particular alfalfa. To the right is a photo of bean sprouts. Apparently harmful bacteria can hide between the seed hull and the sprout when germinated in water. Microgreens are completely different since they are essentially baby plants; once you wash them like any other produce, they do not have these same risks of bacteria. It is important to make clear the difference between the terms microgreens and sprouts.



Sunflower microgreens have high amounts of zinc, which is responsible for hormone regulation and aids in cell growth. Mild to moderately low levels of zinc during pregnancy is common. Take in the benefits of sunflower microgreens and avoid alfalfa and mung sprouts. Soaking seeds in water releases a significant increase in nutrient accessibility. It also speeds up the germination process, so microgreens grow faster. Check with your doctor if you want to know more about eating sprouts and microgreens.

Chart for comparing nutrient values:

	Snow Peas (pea shoots)	Broccoli	Red Cabbage
Raw, full-grown vegetable, per cup	7.9 g fiber 2.13 mg iron 36 mcg vitamin K 58 mg vitamin C	81 mg vitamin C 92.5 mcg vitamin K 42.7 mg calcium 288 mg potassium	993.24 IU vitamin A 16.02 mcg folate 50.7 mg vitamin C
Microgreens, per cup	44 g fiber 9.27 mg iron 31.2 mcg vitamin K 3.5 mg vitamin C 654.64 mg phosphorus		significant levels of vitamin C, vitamin E, and beta carotene—more than the mature plant



Elders

Microgreens have been shown to reduce the risk of heart disease and potentially some cancers. They lower levels of LDL cholesterol, which is the kind that we don't want to have in excess. Since microgreens contain high amounts of antioxidants, they can also reduce the risk of Alzheimer's disease. Fenugreek microgreens aid in sugar uptake by cells, which can help our bodies run smoothly and potentially avoid type 2 diabetes. As an addition to winter wellness practices, try growing your own microgreens on your windowsill. They need to be misted once or twice a day and use just a little soil, making them a resource saver. This can be a mindful observation of a living process full of promise and mystery. Before planting your microgreens, soak the seeds in water for several hours, then rinse to prepare the seeds for sprouting. Sprouting time varies with type of seed, temperature, and moisture levels.

Soaking and Sprouting Chart

Seed, Nut or Grain	Soak Time	Sprout Time
Alfalfa	8 hours	2-5 days
Almonds	8-12 hours	12 hours
Barley	6-8 hours	2 days
Broccoli	8 hours	3-6 days
Buckwheat	6 hours	2 days
Chickpeas	12 hours	12 hours
Clover	4-6 hours	4-5 days
Kamut	7 hours	2-3 days
Pumpkin Seeds (hulled)	8 hours	1 day
Quinoa	2 hours	1 day
Watercress	4-6 hours	4-5 days
Sesame seeds	8 hours	1-2 days
Sunflower Seeds (hulled)	2 hours	2-3 days

On a side note, believe it or not our foremothers knew that soaking and rinsing seeds, grains, and nuts could deliver the most nutrients and decrease digestive strain. We know that rainfall and water soaks seeds, thus removing the inhibiting sheath that would otherwise protect a seed from sprouting in dry soil, releasing its nutrients for growth, only for the seed to remain hard, inert, and impenetrable and die off in drought conditions. Soaking seeds allows it to release nutrients for its own germination. Yet the same nutrients become available for our body and as well as ease our digestion of hard seeds, nuts, and grains. Today the wisdom practices of making breads and porridges like our foremothers once did are often forgotten or pushed aside by hurry and a lack of understanding of the value of these nutrients. Check out the accompanying chart for seed soaking recommendations and consider adding a seed

soaking rhythm to your winter wellness habits of exercising, hydrating, breathing some fresh air, soaking up some winter sunshine, and recalling the wisdom of our foremothers as we nibble on microgreens embraced by the restorative quiet of winter.

Cultural and Historical Background



Who Grows Winter Food for Your Community?

Ages 4-7

Who is growing winter food for your community? Find out. In many cultures around the world, it was traditionally our foremothers who grew out the seeds and gathered wild and cultivated plants for food and remedies. They tended the Earth with respect for all the contributing factors that enlivened the soil and supported their natural and human communities. Today more women farmers are joining in this long-standing tradition of bringing nourishment from Earth to table. If you should visit us at Common Roots, you might meet our Farmer Fae on her tractor or busy tending crops in the hoop houses applying her knowledge to sustain our soils and our community and pass down to the next generation crops that have proven to be adaptable and resilient and connect people to diets that promote wellness.



Soil Heroes: Worthy Wisdoms

Ages 8-12

Turtle Island. Ndaakina. Pacha Mamma. Mother Earth. There are many names the original inhabitants have called the ground upon which we stand that we now know as the Americas. The Earth has been revered for ages. Soil has been a sacred element in cultures all over the world. And rightly so. It takes one hundred years to build up 1 inch of soil! The work of glaciers, stone, lichen, moss, water, ice, bacteria, and death and decay of animals, humans, and plants all play a part in creating this foundation of LIFE.



Ancestors as Soil Heroes

Ages 8 to Adult

Many ancestors toiled and harvested to protect the life in soil, and doing so has preserved the ability to grow food that nourishes the whole community. These time-tested wisdoms are worthy of our attention. Who are the descendants of the original soil caretakers in your community? What cultural practices might they be willing to share? Who can you interview to build up your soil hero knowledge?

There is much to be learned by blending ancestral and contemporary wisdom. Agricultural history has compelling stories to tell. Indigenous agricultural wisdoms include the Three Sisters. This method of interplanting builds up the strength of soils and plants through a complex, beneficial symbiotic relationship.

The practice of feeding fish bones replenished nutrients in the soil. Cotton mono-cropping in the southern United States was remedied by George Washington Carver when he applied swamp mulch on depleted soils. Leah Penniman’s work on Soul Fire Farm in Grafton, NY, and her book *Farming While Black* highlight many of the agricultural ancestral gifts that kidnapped slaves brought to bear in American soils. Leah defines the issues facing access to farmland and healing the ancestral wounds of enslavement to soil.

How might you organize Circles of Recovery and Reciprocity that pay homage to soil heroes? Can school gardens include these wisdom carriers as your mentors? Are local community garden plots available to marginalized descendants of soil heroes?

Today, science is scratching the surface, so to speak, while digging deeper. In the invisible layer beneath our feet are the workings of the microbiome and mycelia. Read the bibliography resource article “Restoring Our Soils” by Ron Krupp to scratch at the hidden world of soil. How might the wisdoms of yesterday and today better connect us in our strivings to, in the words of soil hero Wendell Berry, “make the world a better piece of ground”?

Growing Gardens: Seeding Your Future

Luckily, microgreens are some of the easiest sources of nutrients to grow and eat at home! They go from seed to feed in just about 1–2 weeks depending on warmth, light, and moisture levels. They are easy to grow in winter as well as any time of the year.

Types of microgreens:

- Sunflowers
- Peas
- Alfalfa
- Spinach
- Kale
- Cabbage
- Broccoli
- And so much more!



Microgreen Sprouting How-To

We are growing Red Cabbage microgreens. In the winter? Yes, we can!

Winter windowsill microgreen gardening is simple, requires few resources, is easy and fun, and is a great opportunity to become a gardener perhaps for the very first time. As with all seeds, you need to take on some responsibility as you eat a little healthier and maybe discover a passion for food and gardening! By

constructing a blend of colorful and spicy mixes, you might feel like you are eating a splash of sunshine and fresh flavor in the deep of winter.

I often think colors are a fun way to go about growing foods and eating a rainbow. Colors are a wonderful addition to garnished dishes, breakfast meals, and sandwiches. Microgreens can be grown in a few colors. Like any other freshly harvested food, they are a great source of sunshine, and in the winter that's a real treat. Other microgreen varieties can be grown following these directions.

Equipment:

- You will need a growing tray. A 10×20 is the perfect size to start with if you are growing for the whole class or family. Smaller, clear repurposed take-out containers are great for individual confetti gardens and enable you to see the roots of your confetti. Whatever tray you use, you will need a cover to darken the microgreen seeds. Find cardboard or some other sort of lid, or place the small containers in a closed box. Be creative and repurpose something.
- It is essential to have a good growing medium like an organic seed starter mix to cradle the seeds. Seed-starting soil should be a depth of 1 inch.
- You want to be able to keep the seeds moist. You will need a misting bottle full of non-chlorinated water.
- You will need seeds, of course! Try red cabbage, kale, or broccoli microgreen seeds.
- Finally, find a room-temperature windowsill or well-lit room to start your garden.

Step 1:

Moisten soil with water (the soil should feel damp like a sponge, not soggy). Place soil 1 inch deep into the seed tray or container.

Step 2:

Sprinkle roughly 4 teaspoons of cabbage seeds across the 10×20 tray. Or sprinkle just enough seed to cover the soil in other size containers. Press your flat palm or a couple of flat fingers across the seeds in the growing medium so that the seeds are making firm contact with the top of the soil. Take care not to press seeds under the soil.

Cover the tray with something that will keep out light for the first 2 to 3 days. Seeds do not need light to germinate. Keep the tray warm at room temperature.

Step 3:

Peek under the darkening cover each day! Germination should occur within the first 2 to 3 days of seeding the soil. The soil will need to be kept moist but not so wet that a fog condenses on the lid of your windowsill garden. If it seems too wet, lift the lid for an hour or two, then cover again. If the soil seems dry, then mist the seeds with a spray bottle until the surface of the soil is damp.

Step 4:

Remove the lid once you see little shoots coming out of the seeds! What shape and color are they? If you have a clear germinating container, look to see what is happening underneath too. Can you draw what is happening? Write a few confetti party words?

Step 5:

Once the plants have begun to sprout, place them on the windowsill or in any bright naturally lit area. Are the microgreens turning color? What does the little sprouting plant look like now? Draw the changes you see.

You'll need to mist the growing medium every day with water. Be gentle! You don't want to drown them!

Step 6:

Within about 3 to 5 days or so after germination, microgreens can be about an inch and a half tall. Red cabbage microgreen plants will have beautiful open red leaves showing that they are ready to harvest! Most other microgreens are—you guessed it—green!

This is the most exciting part! Cut with a scissor at soil level, or use a sharp knife if you are skillful.

Step 7:

Breathe in, breathe out while gazing at the microgreen confetti. Breathe some gratitude toward the gifts of seed, soil, water, abundance, wellness.

Ready to take a nibble? Observe, smell, nibble. What do you taste? It is important to note that the flavor changes daily, so you might want to harvest a little on day three, four, and five. Microgreens are packed with flavor when they first sprout even though they appear micro. Sprouts taste best when eaten immediately after harvesting. They can also be harvested and refrigerated for about the same amount of time as any other salad greens or fixings.

Microgreen to Mature Plant Matching Game

- Print two copies of the plants and microgreens pictured on the next page.
- Cut out the photo cards on just one copy and save the duplicate as an answer key to check your success in this guessing game. The photo on the left is a correct pairing with the photo directly to the right.
- Mix the cut-up cards and place them face down.
- Turn over two cards at a time and place them beside each other until all the cards have been selected.
- Check your answer key to see how many mature plants matched with the microgreens.
- If you have a match, leave them face up. Turn the other cards face down and try again.





Dirt Made My Lunch

Ages 4-7

The food we eat every day comes from the combined efforts of sun, Earth, water, air, animals, invisibles, soil, farmers, and more. In every bite we are nourished by the energy of all! Yet in the midst of winter in the Northeast, you might wonder how you can eat fresh food full of sunshine power and why it might be a good time to call attention to a silent, frozen world of soil. Let's find out...

“Dirt made my lunch,
Dirt made my lunch.
Thank you, dirt,
Thanks a bunch.
For my salad, my sandwich,
My milk, my munch.
Dirt made my lunch.”

by Steve Van Zandt

What does this poem mean to you? How did dirt make your lunch? Our community farmers grow our food right in the dirt beneath their feet. During the winter months we often eat meals grown locally that were harvested earlier in the year. Some meals are made from foods that have been conserved or preserved since the autumn harvest. Do you eat squashes, carrots, beets, onions, turnips, cabbage, lots of soups, casseroles, and stews? While we can be grateful for these foods that sustain us through the winter, we might enjoy a little fresh pop of sunshine flavor and variety, right? Today we are going to celebrate winter with a microgreen confetti party!



Soil Heroes

Ages 8-12

You can be a soil and water wellness warrior when you grow microgreens. These confetti greens require only a few mistings of water every day and a small amount of soil to get started. Our soils are the key to

healthy and happy plants. While playing outside in the summer or fall, have you ever taken a minute to notice the ground beneath you? Imagine you are digging a hole only a few inches deep in the woods or in your yard. That first layer of soil you are digging is called topsoil. Did you know that it takes the Earth 100 years to create one inch of soil? How? Well that is a long story that time, and rocks, and lichen, and moss, and frost, and dead leaves, and snowfall, and dead animals, and earthworms, and compost, and...actually this might be a story for another time. Because soil is so valuable and takes so long to become ideal for growing healthy food, we can conserve and reduce the soil and water we use. Microgreens are a great way to use less resources yet grow a wealth of wellness confetti!



Waking Up to Microgreens and Restoring Scarcity with Abundance

Ages 8-12

The winter season is long and often sunshine scarce, yet there's plenty of time for establishing new habits, making wellness discoveries, and spreading wellness sunshine.

After waking each morning, remember to drink water, mist your microgreen windowsill garden, and sprinkle some microgreens on avocado toast or eggs. Now that you are cared for, it can be nice to respond to scarcity in your community by restoring abundance just as mothers and fathers who have grown food for our communities have done for generations.

How can you provide the community food shelf with sunshine-rich nourishment? Try sharing microgreen sprouting kits and recipes!

Are you ready?

- Find a supplier for organic microgreen seeds and order some seeds. For starters, we suggest kale, peas, broccoli, sunflower, or red cabbage. Alfalfa and mung beans are not recommended for eating during pregnancy, so the above choices best serve the whole community.
- See the directions for sprouting some of these varieties on Pages 11-13. With permission from Common Roots, you can reproduce the instructions for sprouting.
- Compare the taste of different microgreens. Create a flavor comparison sheet. List microgreen varieties with sections labeled spicy, sweet, earthy, neutral, and other words that might describe the flavors. Taste away.
- Create a chart that notes days between soaking and germination and germination to harvest.
- Determine how to create the packaging and information packets after consulting with your local food shelf staff. Consider enclosing your taste test descriptions, a chart of days from germination to harvest, simple tasty recipes, and our sprouting directions (used with our blessing).
- Deliver microgreen sprouting kits to the food shelf and provide a live demo if appropriate. Why not learn a song to sing and lift spirits as you interact with your neighbors?



Aquaponics = Fish + Hydroponics!

Teens/Adults

Here in Vermont, we have many farmers who grow microgreens or build farm systems that value soil restoration and conservation. Finn & Roots in Bakersfield grows plants and fish by putting a modern twist on an old farming technique by applying “aquaponics.” Aquaponics uses the water and waste leftover from raising fish to fertilize plants. Up in northern Vermont, the winters are cold and bitter, but at Finn & Roots, their “Eco-Ark” is kept at 82 degrees Fahrenheit all year long. The fish live in a large tank on the farm. The water and waste is then used in the Eco-Ark to ensure that salad greens flourish and we have fresh winter side dishes for our meals. This method of farming is unique in the way it uses water and soil and less of it.



What is ROP?

Teens/Adults

At Common Roots, we are conserving, replenishing, and remineralizing to build the vital topsoil needed to grow our strongest greens and other crops. We mulch and compost, plant and till under cover crops, replenish copper, iron, and other vital wellness minerals to the soil, and are committed to the conservation of the Earth. Common Roots farm is ROP certified by the Real Organic Project. ROP values farming practices that go beyond the USDA standards that certify farms as organic. The ROP standards utilize centuries-old farming practices combined with modern science and ecological farming that focus on soil health. This means hydroponics are not included in our ROP farm practices. Hydroponics uses water, not soil, as a growing medium and thus departs from the practice of caretaking and growing soil-based food. The ROP label also includes standards for greenhouse management, the origin of livestock, dairy grazing, animal welfare, and a few other protections. Many small- and medium-size farms are joining this movement of ROP sustainable agriculture. They are united in valuing the wellness and vitality of our Earth and respecting the treatments and time it takes to heal and replenish and protect soils and animals.

Educators Note about Hydroponics

Shall we restrain from raising seeds without soil until younger learners understand a plant’s relationship with the Earth? When is it time for older learners to engage in meaningful plant science experiments and debate the value and ethics of soilless farming?

Some microgreens, like red cabbage, can be grown hydroponically—in other words, just with water and no soil. This technique is debated in the plant world, so let’s dive into why it’s controversial. On the one hand, hydroponic growing techniques can be a solution for barriers to food access (such as if you don’t have access to land), and soil hydroponics can be a solution for growing food close to home. Growing hydroponically can support self-reliance and increase the diversity of nutrients to which people might not otherwise have access. There are questions as to whether hydroponic food contains the same nutrient levels as organic soil-grown food. A taste test can usually provide a sense for the reduced flavor.

This being said, hydroponic growing is not always considered “organic” according to the original intention of the organic labeling laws. This follows a premise that plants have an inherently fundamental relationship with soil unless they are a water plant species. When removing soil as a part of the growing equation, are we truly supporting natural, organic conditions and relationships? By overly utilizing hydroponic food, do we also jeopardize the livelihoods of the farmers who toil tirelessly to protect and restore soil for the benefit of all living creatures, not just human communities? A current movement called ROP, the Real Organic Project, is increasing the commitment to regenerative farming across the United States. Additionally, hydroponically grown food can be less nutrient and flavor dense. What are the benefits for soil and soul when we recondition and restore the Earth that has been collectively depleted?

At what age is it appropriate to introduce these complex issues? If new learners are started off with hydroponics, might they risk losing respect and understanding for the plant-and-soil relationship? Exploring the truth behind these considerations can be a valid journey. We encourage you to research, work directly with plants and soil, and engage conversations and projects that lead you toward wisdom, understanding, and a working relationship that nourishes you, your community, the next seven generations, and the Earth.

No Waste!



Soil Heroes

Ages 4-7

In Farm to School, we typically create recipes for each of us to test. Sometimes we build compost with our food waste – even using the tiniest of microgreens. Today we are going to become super creative soil hero chefs who wish to make a recipe for the Earth. Imagine a compost cake made of delectable layers of repurposed ingredients for an outdoor compost bin. What could we use in Earth’s layer cake recipe? Start with letter A and go all the way to Z. Some of the foods on each list could be waste from food you tasted in our earlier Farm to School lessons, but don’t let that limit you. Make a list for every letter and name every compostable ingredient that you can think of. Celebrate when you finally make your list for ingredients x, y, and z!

Compost Stew: An A to Z Recipe for the Earth by Mary McKenna Siddals is a great introduction for learners ages 4-7 who might need a jumpstart on planning what to put in an outdoor compost bin in the spring. Each letter in the book hints at one ingredient.

Water Protectors

We have learned that growing microgreens conserves water, yet delivers a big care package of nourishment. How else might we enjoy a wonderful outcome while conserving water? Let’s imagine your family is going on a camping trip high in the mountains. You can carry in just a little water. How might your family cook meals, do the dishes, wash up, or water the dog? Can you practice using just one gallon of water and see

what you can accomplish? Apply your adventure insights to water protector habits that could promote more mindfulness at school or home.

You might enjoy reading *The Water Princess* by Susan Verde. It is a contemporary story, so don't be misled by the title. It is not about a life of privilege living in a castle. This gentle story is based on the childhood experiences of Georgie, a young girl living in her small African village. Georgie's family and villagers live without running water. Discover how she goes about gathering the water for her family's needs.



Soil Hero Earthworm Farmers **Ages 8-12**

We have talked about how growing microgreens conserves soil and water resources. Did you know that soil heroes love to make compost? Composting during a snowy cold winter is a challenge. How might we practice being soil heroes all year round? Earthworm farming allows us to compost indoors and use worm waste to improve houseplant growth and our garden soil.

Here's how to farm indoors with worms!

There are many large-scale earthworm condos for sale but here's one option for making a small, low-cost, red wiggler earthworm farm.

You will need:

- A warm, convenient location at room temperature to house your worm farm such as a cupboard under a sink, a closet, somewhere dark.
- A 2-5 gallon plastic bin with a fitted lid. A solid color bin is preferred as it replicates a dark underground environment.
- Enough newspaper (not the glossy pages) and any combination of additional sawdust and/or peat moss to fill the bin 2/3 full. This will become the worm bedding.
- Non-chlorinated water. Half a gallon should be enough.
- A large bowl to soak the newspaper in water
- Red wigglers can be ordered on-line or purchased from your local fish and tackle shop. If temperatures are below freezing most on-line providers won't ship. Perhaps a community worm farmer has enough wigglers to share. Reach out and perhaps you will discover a worm farmer mentor in your neighborhood.
- A water misting bottle
- A hand drill with a 1/4" bit or a nail, preferably with a head of the same diameter, and a hammer

- You will need enough food scraps to cover the top layer of bedding. Scraps should be torn or chopped small. They can include most veggies, but no fruits (that excludes veggies that are really fruits such as tomatoes, cucumbers, etc.). Worms love coffee grinds and tea bag offerings. Rule of thumb is no seeds, no fruit waste, no animal products except crushed eggshells, no oil. Fruits especially breed fruit flies and you are not a fruit fly farmer, right?

How to build your earthworm farm:

1. Make holes 3-4" apart in the bin sides from the bottom edge up to 1/3 of the bin height. Do not drill the underside of the bin or the lid. The holes will allow air and moisture to flow in and out of the worm farm.
2. Tear the newspaper into 1-2" wide strips.
3. Soak the newspaper in a bowl of water.
4. Squeeze the water from the paper so that the paper is moist like a sponge, not dripping. Worms can't swim but need skin and surrounding surfaces to be moist.
5. Mist the sawdust and/or peat moss.
6. Fill the bin 2/3 full of bedding made of shredded newspaper, sawdust and/or peat moss. Mix the bedding materials together.
7. Add the red wigglers and cover with a couple inches of bedding.
8. If the bedding surface seems dry mist with water but do not saturate.
9. Spread enough food scraps to cover the top layer of bedding.
10. Turn the food waste scraps about an inch under the bedding. Close the lid.
11. Place the worm farm under a kitchen sink, in a dark cupboard, in a convenient location for feeding and visiting your wigglers. Wigglers will need to live in a room that is as warm as you like it during the winter months.

Caretaking Tips:

- Check your wigglers daily and feed as often as the food waste has been eaten. Mist as the surface dries out.
- Wigglers love to congregate in the corners so don't forget to look there when you check on them. Surface feeding worms will move away from the light when you lift the lid to feed them. The top feeders will be easy to observe.

- Hooray Soil Heroes! You have chosen to be a worm guardian and farmer. There are AMAZING facts to learn to best care for your growing red wiggler family. Make a journal about all you do and learn as a worm farmer.
- Red wigglers will create an even larger family as they mature in age. Over time you will need to increase the size of your worm farm or divide the population into two farms. There is much to learn about the amazing life of an earthworm. We have guided you to get you going but it is strongly suggested that you dig deeper into this topic to insure the well-being and success of your farm. An experienced guide is needed for more in-depth learning and troubleshooting suggestions. Check out www.unclejimswormfarm.com and other sources.



Indoor Compost Columns Made from Repurposed Soda Bottles

Ages 8-12

Desktop composting is a small, individual system that is fun to observe and only takes up the space of a soda bottle. Check out the complete free guide from Bottle Biology Resource Network at the University of Wisconsin-Madison.

Digging Deeper



Snuggle in a Snow Blanket

Ages 4-7

A fresh snowfall can make life seem especially still and quiet. Do you ever wonder why? Let's find out how.

Find a friend and sit under a blanket and talk. What do you sense when someone outside the blanket speaks? Have the sound levels changed? When snowflakes blanket the landscape, the sound is muffled in the spaces between the snowflakes.

Take spontaneous opportunities to get outdoors during or right after a fresh snowfall. Sit in the wintery snow blanket of rest. Observe the colors and stillness, listen for any sounds...of ice crackling, snow plopping, beech leaves rustling, squirrels scampering. Feel the air as you breathe in and out the winter's hush. What do you think of or feel when breathing in? Breathing out?

If you said you feel happy or grateful, guess what? Feelings of thankfulness and happiness build wellness. Gratitude and happiness are food for our heart, our brain, our whole body and actually help us retain memories as we grow quite old. Who knew? Winter's Hush, we thank you.



Journaling: Outdoor Winter Quiet Is Restorative

Ages 8-12

Could listening to the Earth in winter help us feel restored? We know how much sleep and rest makes us strong and ready for adventure, right? Let's find out if we might feel renewed simply by sitting in the forest or another quiet place in Nature.

Today we are going to sit outdoors and listen to the Winter Earth. We are going to sit or lie still in one spot while we listen, breathe, watch, feel, and imagine. You will hear me call you back to share how listening to the Earth made us feel. It could be refreshed, excited, comfortable, nervous, happy, peaceful, amazed...

Can you build up a restorative practice by adopting a daily or weekly rhythm of listening to the Earth?



Farm to Closet Fashion Movement Restores Soil, Water, and Humans

Teens/Adults

Other than eating microgreens and composting indoors with worms all winter, you might be surprised to learn that the wool sweater or ski jacket in your closet can inspire further questions about soil, water, and waste use and misuse. Regenerative agriculture is seemingly leaving no stone unturned. Even the fashion industry has been called to do their share in soil preservation efforts, such as caring for watersheds, limiting the use of water- and land-based resources, and repurposing fibers, including those that are man-made.

A “fiber shed” describes a rising coalition of eco-fashionistas who caretake their local resources. Knitters, sheep farmers, alpaca farmers, cotton farmers, and others are reexamining the impact that clothing making has on the ecology of local soils and waterways as well as our health. How can animals and plants raised to provide clothing fibers influence the soil, water, and humans creating the textiles? Explore the many ways in the Northeast and across the country that regional fiber shed models are being developed to restore ecosystems and engage in soil restoration, pasture-land management, and carbon sequestration, including bringing to light social justice issues. A good read is *Fibershed: Growing a Movement of Farmers, Fashion Activists, and Makers for a New Textile Economy* by Rebecca Burgess. A worldwide movement is growing, including the Southeastern New England Fibershed and local Vermont alpaca, sheep, and angora farmers. Learn about alpaca farming right here in Vermont and across the Northeast that is setting the stage for healing soils and humans by protecting our skin and soil from toxic fibers. See our bibliography for more resources about the connections between soil, closet, and skin.



RESTORING OUR SOILS by Ron Krupp

Teens/Adults

It may come as a surprise that over 95 percent of “life on land” resides in soil, and that most of the energy for the world beneath our feet is derived from plant carbon. Living roots are the most energy-rich of these carbon sources. Other than the oceans and fossil fuel deposits, soils are the largest reservoirs of carbon on the planet, holding approximately two times the amount in the atmosphere and vegetation combined. The dark color of fertile soil comes from the presence of organic carbon compounds.

Microbes in the vicinity of plant roots and microbes linked to plants via networks of beneficial fungi increase the availability of the minerals and trace elements required to maintain the health and vitality of their plant hosts. Microbial activity also drives the process of aggregation, which enhances soil structural stability, aeration, infiltration, and water-holding capacity. All living things — above and below ground — benefit when the plant-microbe bridge is functioning effectively.

Photosynthesis

Soil restoration begins with photosynthesis. Imagine there was a process that could remove carbon dioxide (CO₂) from the atmosphere, replace it with life-giving oxygen, support a robust soil microbiome, regenerate topsoil, enhance the nutrient density of food, restore water balance to the landscape, and increase the profitability of agriculture. It's called photosynthesis.

In the miracle of photosynthesis, which takes place in the chloroplasts of green leaves, CO₂ from the air and H₂O from the soil are combined to capture light energy and transform it into biochemical energy in the form of simple sugars. These simple sugars are the building blocks of life. Plants transform sugar into a great diversity of other carbon compounds, including starches, proteins, organic acids, cellulose, lignin, waxes, and oils. Fruits, vegetables, nuts, seeds, and grains are packaged sunlight derived from photosynthesis. Significantly, many of the carbon compounds derived from the simple sugars formed during photosynthesis are also essential to the creation of well-structured topsoil. Without photosynthesis there would be no soil. Weathered rock minerals, yes...but no fertile topsoil.

Climate Change and Civil Unrest

Soil restoration is our ally in the fight against global warming. By capturing carbon and reversing desertification caused by severe drought, soil restoration enhances regional cooling and strengthens resilience against droughts and floods. As noted above, restoring soil ameliorates desertification, a factor that can destabilize already volatile regions. Take the unprecedented drought that precipitated civil unrest in Syria before the outbreak of civil war there. The drought was exacerbated by global warming just as the wildfires in the Western U.S. these past summers.

The Rodale Experiment

In a 2014 white paper, the Rodale Institute showed that regenerative organic farming could capture carbon dioxide in quantities exceeding global emissions. I was surprised to read this. The institute compared organic fields with chemical fields and found much more microbiological activity in the organic fields which led to greater carbon sequestration. In a Swiss study comparing biodynamics (BD) with organic, there was even more microbiological activity using BD methods. (The Rodale Institute supports research into organic farming. The Institute was founded in 1947 by entrepreneur J. I. Rodale in Emmaus, Pennsylvania. When J. I. Rodale died in 1971, his son Robert purchased 333 acres and moved the farm to its current site in Kutztown, Pennsylvania.) * For more info on Biodynamics, go to *The Woodchuck's Guide to Gardening* and *The Woodchuck Returns to Gardening* or go online.

Sadly, many of today's farming methods have severely compromised soil microbial communities, significantly reducing the amount of carbon transferred to and stabilized in soil. Over the last 150 years,

many of the world's prime agricultural soils have lost between 30 and 75 percent of their carbon, adding billions of tons of CO₂ to the atmosphere. And over the last 70 years, the level of nutrients in almost every kind of food has diminished.

On the other hand, soil carbon can increase when farmers and gardeners maintain constant ground cover, add compost, increase microbe populations, encourage biological diversity, reduce the use of agricultural chemicals, and avoid tillage. So look no further than the ground beneath your feet for a healthy world.

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