

Microgreens Classroom Toolkit

Minneapolis Public Schools Harvest of the Month

Minneapolis Public Schools' **Farm to School** program brings fresh, local produce from farmers to our schools. The **Harvest of the Month** initiative helps our students build connections to local, healthy food while promoting Farm to School items that are offered in our cafeterias. Students will have the opportunity to try the Harvest of the Month items in a variety of ways! Depending on the season, Harvest of the Month items might be served on our lunch menus, offered to participating FFVP sites, or featured in other creative ways to encourage students to explore local, fresh produce.



This toolkit highlights **Greens** as a spring Harvest of the Month item and includes materials to grow your own microgreens in your classroom! Microgreens are fun to grow, tasty to eat, and nutritious. This kit includes a brief lesson plan and supplemental information that you can use to customize the activity to fit your classroom and students.

This toolkit was adapted from the University of Minnesota Extension Anoka County 4-H at Home Microgreens kit. UMN Extension Center for Youth Development is a community partner collaborating with MPS on the Harvest of the Month pilot project.

For questions or support during your growing journey contact: **Ashley Nitzkorski**, Registered Dietitian, MPS Culinary & Wellness Services.

Share your growing experience with MPS! Post your photos on social media and tag #MPStruefood to show your adventures. Please email any photos of students with media releases to ashley.nitzkorski@mpls.k12.mn.us



Kit Supplies

- Two 10"x10" growing trays without drainage holes
- Eight 5"x5" inserts with drainage holes
- Potting soil
- Seeds – eight different varieties
- Plant tags
- Spray bottle for watering
- Cardboard box (save & repurpose cardboard to black out your seeds!)
- [Access to MPS Microgreens Google Drive folder](#) including this information guide, growing instructions, and supporting materials

What are microgreens?

A microgreen is the new, tender shoot of a vegetable plant. It's what happens if you let a sprouted seed go a little bit further into growing, but don't let it completely mature. Microgreens are vegetable greens harvested when they are seedlings just after the cotyledon leaves have developed. They range in size from 1 to 3 inches, including the stem and leaves.



The term "microgreen" isn't specific to any one plant. Common microgreens include sunflowers, radish, pea, mustard, parsley, beet leaves, celery, and wheatgrass.

The story of one class's journey to learn about microgreens and grow them in their classroom:
<https://www.naeyc.org/resources/pubs/tyc/apr2018/project-based-learning-microgreens>

Terms to understand

Cotyledon leaves

A cotyledon, or seed leaf, is a leaf that is stored in a seed. When the seed sprouts, the cotyledons are the first leaves that the plant has. Monocot plants have only one cotyledon, and other plants have two. Cotyledon leaves are packed full of nutrients that the plant needs to develop!



Germination

Germination is the process in which a plant emerges from a seed and begins to grow. Seeds germinate with ideal conditions for that specific seed. The soil depth, amount of water, and temperature are all critical conditions that must be met for the process of germination to be initiated. Typically, the soil conditions must be moist and warm.

- Seed germination video for young learners:
<https://youtu.be/TE6xptjgNR0>
- For older learners, pay attention to the *germination rate* of each of the seed varieties. The germination rate is the number seeds germinated as per total number of seeds planted from day of germination. Good seed varieties have high rates of germination.





Why grow and eat microgreens?

Nutritious: Microgreens have been called a SUPERFOOD! They can have up to 40 times¹ the nutritional value of full-grown plants.

- People in the US eat about half the recommended amount of fruits and vegetables.² Growing microgreens at home can help provide more essential nutrients into your diet.
- Vitamins are 4-6 times more concentrated than in mature plants.³ Microgreens are a good source of vitamins E, C, & K.
- Compared to mature plants, lettuce microgreens have more calcium, magnesium, iron, zinc, selenium, molybdenum, and manganese⁴-- all important minerals particularly for children's growing bodies.
- Phytonutrients and antioxidants are found in all leafy greens. Adding a small handful of microgreens to your plate may significantly increase the nutrient profile.

Fast growing: In less than two weeks you can grow fresh, and delicious food.

Accessible: Growing microgreens requires very little space and resources, making them relatively inexpensive and easy to produce.

Fun and beautiful: Microgreens have vivid colors and are exciting to watch grow. Growing your own food is satisfying.

What's the difference between microgreens and sprouts?

- Sprouts are eaten at the 1st visible growing stage (sprouting). Microgreens at the 2nd (the first true leaf development).
- Sprouts have no color (etiolated). Microgreens are, well, very green!
- Sprouts have no leaves. Microgreens do.
- Sprouts are fat. Microgreens are thin and leggy.
- Sprouts are crunchy and have a mild taste. Microgreens can be spicy, zesty, peppery and hot!



Cornell Cooperative Extension, Monroe County, July 26, 2019

<http://monroe.cce.cornell.edu/agriculture/seasonal-produce-highlights/sprouts-and-microgreens>

¹ Warner, J. (2012, 8 31). Tiny Microgreens Packed With Nutrients. Retrieved from Nourish by WebMD: <https://www.webmd.com/diet/news/20120831/tiny-microgreens-packed-nutrients#1>

² Stewart, H. & Hyman, J. (2019, June 3). Americans still can meet fruit and vegetable dietary guidelines for \$2.10-\$2.60 per day. Amber Waves Magazine. Economic Research Service, USDA.

³ Barclay, E. (2012, 8 30). Retrieved from NPR: <https://www.npr.org/sections/thesalt/2012/08/29/160274163/introducing-microgreens-younger-and-maybe-more-nutritious-vegetables>

⁴ Pinto E, Almeida AA, Aguiar AA, Ferreira I. [Comparison between the mineral profile and nitrate concentration of microgreens and mature lettuces](#). *J Food Compos Anal.* 2015;37:38–43. doi:10.1016/j.jfca.2014.06.018



What kinds of plants work well for microgreens?

Many edible plant species can be used to grow microgreens. Special microgreen seeds are not required, but experts in the microgreen world do recommend them. Feel free to use seeds you'd normally use for a fully mature plant. With microgreens, you simply harvest when the plants are very young when they are packed with nutrients!

Microgreens typically taste like a more intense version of their full-sized vegetable forms. When in doubt, just pick a microgreen variety of a vegetable or herb that you already enjoy eating! With their concentrated flavors, a little goes a long way with your taste buds.

Here are a few popular microgreens you could grow: *Arugula, Basil, Beet Greens Cabbage, Carrots, Celery, Dill, Endive, Fennel, Kale, Kohlrabi, Lettuce (any), Mizuna, Mustard, Spinach, Watercress, Wheatgrass and much more!*

Whatever you chose, be sure to read the instructions for germination on the seed packet. Some do better when soaked ahead of time. Some prefer different growing mediums or amounts of light. Experiment with different varieties and growing styles to learn what works best for your environment.

How to Grow Microgreens

It's time to start growing! There are many kinds of microgreens, and each has its own requirements and its own needs to successfully grow.

Most microgreens are grown in a similar process:

1. Prepare a container that drains for growing
2. Select & sow your seeds
3. Cover and add weight blackout (see note below)
4. Uncover and expose to light
5. Harvest your microgreens



The most important guidance when growing microgreens is to read the directions carefully. Please refer to the [growing instructions](#) document. The seed varieties in your kit were chosen because of their diversity in flavor, appearance, and familiarity. We also integrated some of the MPS Fab Five (kale, kohlrabi, legumes, radish, and squash) which are five crops that grow well in MN, are served in our school cafeterias, and provide endless learning opportunities for students!

Most microgreens grow stronger if they face harsh conditions while germinating. Cover your sowed seeds and add some weight for a few days. Remove the cover and weight once the seeds have sprouted. You can **repurpose the cardboard box that your toolkit supplies came in as a blackout material**. Then place no more than 5 pounds on top for added resistance.

We recommend watching this short video by @DonnyGreens to help you visualize the process of growing your microgreens: <https://www.youtube.com/watch?v=q3cnjSBCWzk>



Harvesting your microgreens

The first leaves you'll see are seed leaves. They don't look anything like the actual leaves of the plant. The best time to harvest microgreens is when they've developed the first set of true leaves, which is generally about 10 days to two weeks after planting.

To harvest, simply snip the microgreens just above the soil level with clean scissors.

Unlike mesclun or baby greens, you won't be able to get additional harvests from one planting of microgreens. Because the plants haven't had much time to develop—and you're snipping off everything except the very bottom of the stem—the plant has no way to generate new growth.

After you harvest your microgreens, you can re-use the soil that's left over up to three times before you'll need to compost the soil or add extra nutrients to it.

Tasting your microgreens

Microgreens can be incorporated into many recipes and dishes, but we suggest first tasting them on their own with your students. Compare and contrast the varieties in your kit, then brainstorm how they could be used in other ways.

- Describe the texture. How does it feel in your mouth?
- Does it taste like the full-grown version? (Each kit includes at least one familiar variety!)
- The kids in this video talk about the various flavors in microgreens and how to taste them: <https://youtu.be/nXzOllS5bEY?t=117>

Here are some ideas for how microgreens can add a boost of flavor to everyday meals:

- Top your burger, taco, pizza, or sandwich
- Garnish soups, salads, or stir fries
- Blend into smoothies or juices
- Fold into omelets just before serving



Keep Exploring!

As you experiment with growing microgreens in your classroom, use what you learn to improve your process. Experiment with different seed varieties and test your growing techniques until you find your best process. Keep a class journal to jot down what and when you plant and what you learn.

There is so much to explore about growing microgreens. These other state Extension programs have great microgreen resources if you want to do more research.

PenState Extension: <https://extension.psu.edu/a-step-by-step-guide-for-growing-microgreens-at-home>

Iowa State University: <https://hortnews.extension.iastate.edu/2019/03/grow-your-own-microgreens>

Oregon State University: <https://foodhero.org/microgreens>

Reflection

- How did you eat your microgreens?
- Have you ever grown your own food before?
- How did you feel after growing and eating your own produce?
- What advice would you give to another 4-H'er?
- What was your favorite microgreen?
- How was this experience for you?
- What went well?
- What problems did you have?
- What would you change in the next planting?



Take it further

- Watch and journal how the plants grow in the container.
- Try a blind taste test! Can you identify the plant through taste, touch and smell only?
- Experiment with different growing mediums- hydroponic, coconut mats, vermiculite.
- Explore germination- choose different seed varieties and track which has the best germination rate.
- Research the nutritional benefits of each variety. What nutrients are you looking for in your own diet that microgreens could help with?
- Teach someone else to grow their own microgreens!

Frequently Asked Questions

Q- What should I grow first?

A- You can start growing one variety or all eight. It's up to you! Each envelope of seeds contains enough for one of your 5"x5" growing tray inserts. Starting with a smaller planting helps you understand the plants and how to best grow them. Seeds are sown closely so planting full trays produces a lot of microgreens!

Options:

1. Grow one variety at a time. To keep it simple, just start with one variety. You don't have to try many different seed types at the same time. Start with just one 5"x5" tray and one variety of seeds to get a sense of the process.
2. Use the 10"x10" tray with four 5"x5" inserts inside to grow multiple varieties at once. With this method, you would have to cut your cardboard in 5"x5" squares to cover each variety individually. The varieties require different amount of blackout times. For example, the radish will be ready to uncover before the carrots.

Q- What else can I grow my microgreens in?

A- You can grow microgreens in anything! You can use an old food takeout container or plastic food container. Just be sure to poke some holes in the bottom and put it on a plate or cookie sheet for watering from below. If you just want to grow a small amount of a variety of seeds, it may be easier to use a small container.



Q- Can I reuse the soil?

A- It's best to start out with fresh soil every time, but you may reuse the soil a second or third time. Reusing soil more than that is not recommended as the plants remove the nutrients from the soil when they grow. Add your used soil to your compost pile.



Q- What kind of soil are we using?

A- We are using a potting soil mix that contains coconut coir. Microgreens grow best in a seed starter soil which has a finer grain. A good experiment might be to compare your plants grown in different soil types—seed starter soil, potting soil, peat moss mix, etc.

Q- Can I grow these seeds in another medium besides soil?

A- That depends on the seed. Check the growing instructions for the seeds we have provided. There are many microgreen seed varieties that can be grown hydroponically. If you're interested in hydroponic growing, contact Divine Islam, MPS School Garden

The original version of this guide was developed in conjunction with a 4-H at Home kit for self-directed learning for youth and their families, K-one year post high school.

Developed by Anna Gilbertson, Extension Educator, Minnesota 4-H Youth Development, Anoka County annag@umn.edu, December 2020.