Composting

Composting is a natural fit with school garden programs as it provides a responsible way to reuse waste with numerous science and math connections. It's also a way to teach students about the natural cycles of life, death, rebirth, and the recycling of nutrients in the ecosystem. Composting can also help remind students they are part of a bigger picture. What they do matters. By composting they are taking a step to care for our environment and give back to the garden. Just as each microorganism deep within the compost pile individually is small, when all the organisms work together they are able to decompose large amounts of waste and contribute beautiful, rich soil to the garden. Empowering students to work for a healthy cause at a young age can translate to make them more positive and influential leaders in the future.

Decomposition is an important process in our world. As living matter dies, organisms known as decomposers consume it, breaking it into smaller components that are then incorporated into the soil. The end product of the decomposition process is called humus, composed of a complex mix of nutrient rich, biologically stable kinds of organic matter. Humus helps create a beneficial soil structure for plants roots and also provides the nutrients needed for new plant life. Common decomposers include earthworms, insects and smaller microorganisms like bacteria and fungi.

What is Compost?

Compost is also decomposed organic matter, although it is not decomposed to the level of humus and is created in a controlled setting. Gardeners collect organic materials such as leaves, grass clippings, and food scraps and then expose them to conditions that encourage microbial activity. By design, composting speeds up the decomposition process so the materials break down faster than if left to decompose in nature.

If a compost pile is built with the right mix and amount of organic matter, moisture, and air, "hot composting" occurs. The pile gets hot as millions of microbes release heat as they actively decompose the organic matter in the pile. The elevated temperatures in hot composting produce finished compost in one to three months and help to reduce the amount of plant pathogens and weed seeds it contains.

However, many gardeners aren't able to stockpile the raw materials needed to build a "hot" pile all at once. Instead, they add materials to their pile piecemeal as they become available. This results in a "cool" compost pile that doesn't heat up. Decomposing microbes are still at work, but at a slower rate than in a "hot" pile. It may take 6 months to a year to reach its finished state, but you'll still end up with beneficial compost to add to your garden. However cold composting doesn't produce temperatures high enough to kill pathogens and weed seeds, so it's important to exclude diseased plant materials, weed seeds, and the roots of many perennial weeds.

Just like humus, adding compost to the soil helps to create ideal growing conditions for a successful garden. Because of its structure, compost helps to make an excellent environment for plant roots, contributing to good air and water pore space in the soil that's necessary for strong root development. It contains the nutrients plants need for healthy growth in a form that makes them readily available for absorption. Additionally it contains beneficial microorganisms and stabilizes the soil pH (acidity or alkalinity).

Composting also provides numerous environmental benefits. It decreases the amount of waste going to the landfill conserving both space and decreasing costs. Additionally, it prevents the loss of nutrients and decreases greenhouse gas emissions.

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How to Make Compost

For the fastest decomposition to occur, a compost pile should be at least 3 feet tall, wide, and deep and include a combination of “green” or high nitrogen-containing organic materials (e.g, fruit and vegetable scraps, grass clippings) and “brown” or high carbon-containing organic materials (e.g., branches, dry leaves). This will provide the decomposing organisms with the nutrients (carbon and nitrogen) they need in the correct proportion. A good general rule of thumb is to use roughly 2 parts of “brown” material for every 1 part of “green” material by volume. Alternating layers of these materials in the presence of adequate moisture (provided by rain or hand watering so material is as damp as a wrung out sponge), oxygen (incorporated through the turning the pile) and decomposers (add a sprinkling of soil between layers to introduce these microbes) provides the right environment for microbial activity to thrive. You know you have proper conditions and active composting taking place when the temperature in the center of the pile reaches at least 130ºF.

For the best results, locate your pile in a partial shade to full sun location, cut all ingredients into pieces 6 inches or less, and turn the pile regularly to add oxygen. The center of the pile will decompose fastest so you need to keep mixing the materials in the pile to even the rate of decomposition. You can use an aerator, shovel, or pitchfork to help with this task.

Depending on conditions and the size of the pile, decomposition should be complete in 6 to 12 months and ready to use when the mix has a warm brown color, crumbly texture, and a pleasant, earthy odor. Before adding your compost to your garden, use a framed sifter to sort out larger pieces that still need more time to fully decompose.

When composting is done correctly, it should not produce offensive odors. Offensive smells are indicators of an imbalance of materials in the compost. Avoid adding protein-based additions (e.g., meat or animal by-products) that can create problems with rodents, flies, and smells.

Compost Safely

While it’s convenient to place compost bins near the garden, be sure to locate them where runoff from the bins will not drain into areas where edible plants are growing. If this is difficult to do on your site, consider using a completely enclosed, tumbler-type composter.

Keep bins enclosed or bury food wastes in the center of the pile to avoid attracting animals like rats and raccoons to the pile. Don’t add cafeteria waste that could contain meat scraps, dairy products, or other foods of animal origin to your compost bin.

We do not recommend adding any animal manures to your compost pile. While “hot” composting (where temperatures in all parts of the pile reach 130 degrees F or higher) will kill many pathogens, it can’t be relied on to kill all the harmful bacteria that animal manures may harbor. Hot composting is a batch process that requires stockpiling materials and then building a pile with the correct proportion of green and brown materials to fuel rapid decomposition. Instead many gardeners practice add-as-you-go “cold” composting – simply piling materials in any proportion as they accumulate and letting them breakdown slowly with time. These cold piles never reach temperatures that will kill off pathogens. This is also why it’s a good idea not to add any obviously diseased plant material or plants with mature weed seeds to your pile to avoid carrying over problems from season to season.

How to Make a Compost Bin

While you can build a freestanding 3’ to 5’ compost pile, many gardeners prefer to contain their compost piles in bins. While there are many commercially constructed composters available, DIY designs are readily available; bins can be made from a wide range of materials such as wire, wood, concrete blocks and even old trashcans.

Bins can help with sorting the materials during the collection process, and once the piles are created, they can keep the materials contained and provide a neat and tidy appearance. Some bins are even designed to ease the turning of the materials to increase the rate of decomposition. Some compost bin models are enclosed, discouraging visits from unwanted animal pests.

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How to Begin Composting at School

Composting at school can be a very rewarding endeavor. It not only decreases the waste your school produces, it allows students to participate in an activity that benefits their community and environment. The compost produced can be used in your school garden, providing savings on the purchase of fertilizers and other soil amendments. Here are a few key steps to help navigate the process.

- Determine the amount of compostable materials you plan to collect. You can choose a small scale effort where you simply compost materials that are a byproduct of your garden activities, or you can approach it on a larger scale and collect organic waste from snacks and lunches from the cafeteria. You can choose to collect waste every day, once a week, or even just on special occasions or at specific events.
- Research composting techniques. Research the different composting techniques and decide which one is the best fit for your facility and for your needs. Determine if you want to compost using indoor bins, outdoor bins, or a mixture of both.
- Develop a collection process. Set up an efficient process for collecting food waste and for delivering it to your bins. Educate staff and students about each step of the process before beginning the program. Recruit additional volunteers beyond your composting committee to help.
- Incorporate the program into the curriculum. Provide lesson and activity ideas for teachers on how to integrate the new composting efforts into their existing curriculum. If you are not using the composting program as a tool to support your educational efforts, your program will eventually lose the support of educators and administrators.
- Involve the students. Encourage students to take active roles in the monitoring and processing the compost. Most importantly, complete the cycle for the children — use the compost created in gardening projects to make sure they see how their food waste turns into new food resources.
- Build support for composting. Educate students, parents, teachers, staff and administrators about the benefits of composting. Establish a composting committee to explore ways your school could incorporate composting activities.

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