

Put Your School Garden to Bed

Your school food garden may welcome back returning students in late summer with a bountiful harvest of tomatoes, zucchini, and other summer vegetables, and you may look forward to a continued harvest of kale, Brussels sprouts, and other cool season crops in the fall. If you are lucky enough to have cold frames, row covers, or some other type of protection, the harvest season may continue into late fall or even the winter months, depending on your climate. But unless you are in a climate mild enough to allow year-round gardening, sooner or later frost and cold temperatures will close the outdoor food garden down for the winter. So early to mid-fall is the time to begin discussing with your student gardeners how they might “put the garden to bed” for the season.

Why is this seasonal chore important? A little care in the fall can reduce the likelihood of insect and disease problems next year, as well as prevent soil erosion, add organic matter to improve soil structure, and reduce the loss of important nutrients in the soil over the winter. It’s also a great opportunity for some interesting lessons in how various insects and fungi have adapted to survive the winter’s cold.

Explore Winter Survival Strategies for Insects and Fungi

During the growing season the garden is alive with all kinds of insects. Some, like pollinating bees and beneficial insects that prey on or parasitize pests, are welcome visitors. The ones that feed on our crops, like flea beetles and tomato hornworms, not so much! But all of them have developed some type of strategy for dealing with winter cold. Some insects, like migrating monarch butterflies, simply depart to spend the winter in warmer climates. But other insects stick around, having developed ways to cope with sub-freezing temperatures. Some, including praying mantids, aphids, and corn rootworms, survive the winter as eggs. Other insects spend the winter either as pupae (tomato hornworms, cabbage loopers), larvae (European corn borer, Japanese beetles), or adults (flea beetles, Mexican bean beetles). Some insects that spend the winter in cold climates are able to tolerate the formation of ice crystals within their bodies, while others produce their own “antifreeze” by forming compounds that keep their body fluids from freezing. Overwintering insect stages may be attached to plant parts, spend the winter in the soil, or plant debris may provide them with some protection.

Many kinds of plant disease-causing fungi have also developed life cycles that ensure their survival in the cold. Fungi may spend the winter on plant debris, in living plant tissue, or in the soil as mycelium (a mass of fungal strands), resting spores, or sclerotia (hardened masses of mycelium).

Help your students explore insect and fungal life histories and overwintering strategies. This will give them not only a fascinating look into the various adaptations these organisms have developed, but will also give clues to ways to reduce future problems with pests and diseases. Clearing out old plant debris deprives many insects and fungi of a place to spend the winter; turning over soil in the fall can expose insects in the soil to cold and predators; and crop rotation can separate susceptible plants from soil-dwelling insects and disease-causing organisms the following growing season.

To find out more about the ways that insects survive winter’s cold, check out information from the Amateur Entomologists’ Society. For information, including life cycles, of common vegetable garden pests, check out *Twenty-five Pests You Don’t Want in Your Garden* from the Pennsylvania IPM Program. For information on how fungi overwinter, check out *Overwintering and/or Oversummering of Pathogens*.

Start with Good Garden Sanitation

While we might marvel at the inventiveness of insect and fungus survival strategies, we don’t want a return of garden problem makers! So it’s important to clean up food garden beds well at the end of the season, removing plant debris (including weeds) that might harbor pests and diseases that could re-emerge the next year. If this plant debris shows obvious signs of insects or disease, it’s better to dispose of it rather than add it to your compost pile. (Taking it to a municipal compost drop-off rather than putting it in the trash is fine. Unlike most home compost piles, materials in these large-scale composting operations usually reach temperatures high enough to kill off pest and disease organisms.)

Cover Bare Soil

Once you've cleared away this year's plant debris, it's time to give your soil a winter blanket. Soil that is left bare over the winter is vulnerable to erosion from wind and water. Rain falling on bare soil can compact it, and rain and snow melt can leach nutrients in the soil out of the reach of plant roots.

One way to counter this scenario is to cover the soil in your garden beds with a thick layer of mulch for the winter. Fallen leaves are generally plentiful (and free) in autumn and work well, especially if they are chopped first to make them less likely to blow in the wind. (An easy way to chop leaves is to run them over with a lawn mower and collect them in the mower's bag.) But other materials will also work, such as dried grass clippings and clean straw.

Grow a Winter Cover Crop

An even better method of winter soil protection is planting a "cover crop." A good cover crop grows fast, blanketing the soil and competing with weeds. Cover crops also grab on to nutrients in the soil, keeping them from leaching away over the winter; then return them when the cover crop is killed and dug in in spring. The decomposing cover crop plants add new nutrient wealth and good "tilth" (soil physical condition) to the soil. Growing cover crops also provides opportunities for lessons on root function, nutrient recycling, and decomposition.

The types of winter cover crops that are suitable for planting in your school garden in late summer and early fall will depend on your region of the country and your gardening schedule. In many areas annual ryegrass (*Lolium multiflorum*) or oats (*Avena sativa*) make good winter cover crops, since they grow quickly and are hardy enough to grow late into the fall. In colder zones (Zone 5 and lower) they are often killed by cold over the winter. The tops of the dead plants can be raked off in spring and added to your compost pile, leaving the roots in the ground to decompose. If you are practicing no-till gardening, the dead plant material can be left on top of the soil to act as mulch; just push it aside to plant.

Winter rye (*Secale cereale*) is another hardy cover crop that can be started as late as mid-fall, so it makes a good choice if a school garden is "occupied" with growing crops until late in the season. Winter rye will survive the cold in most climates to grow again in spring, so it adds lots of organic matter to the soil when the green, growing plants are cut back or mowed and then worked into the soil in spring. Be sure to till growing cover crops in before they go to seed to prevent unwanted self-sowing, and allow 3 weeks for them to decompose before planting the garden to avoid the temporary nitrogen tie-up that occurs as the cover crop decomposes. This wait may delay planting of cool-season crops, so in beds earmarked for spinach, lettuce, and other spring crops, choose a cover crop that winterkills reliably or cover the bare soil with mulch instead.

If you have a no-till garden and a cover crop that survives the winter, things are a little trickier. You can usually kill the cover crop by mowing it, generally after flowering but before it sets seed. Some cover crop species are harder to kill by mowing, and the timing of mowing can be important, so if you plan to use a winter-hardy crop in a no-till garden, do a little homework first to figure out the best choices for your climate and planting schedule.

Southern gardeners who can grow year-round might choose to rotate a cover crop into one section of the garden to improve the soil and give it a rest. To learn about recommended cover crops and planting times for your area, have student gardeners contact the local Cooperative Extension Service or Master Gardeners program.

Consider how you can use the concept of cover cropping to spark investigative learning. Students might explore the effects of different types of cover crops on soil or compare garden plots raised with and without preceding cover crops, for instance.