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Maintaining a thick, continual mulch of decomposing organic materials is one of the best things you can do for your school garden. Walk around a forested area. Digging into the forest floor you will notice larger leaves on top, and gradually more and more decomposed leaves as you dig deeper until you have reached a dark, springy layer underneath. This process of decomposing leaves and plant matter on the forest floor is producing this soil hummus. When we mulch in a garden we mimic many of the same functions that exist in this forest ecosystem, by protecting the soil underneath, preventing unwanted competition for our vegetables and plants, and building new soil in our garden.

This how-to guide looks at the benefits of mulching, and how to use non-living and living mulches to achieve these different benefits in the school garden. It also looks at possible problems mulch can cause. As an extension, it looks at how mulches can help with season extension and crop storage. Not included in this guide is detail on in-organic mulches such as landscape fabric, black and other colored plastics, rocks and gravel etc. While these mulches certainly have their place in soil warming and weed control, organic mulches have the added benefit of soil building, and are the focus of this guide.

## Why Mulch?

Mulch has many benefits for a school garden, both for the plants and for the humans taking care of them! A low maintenance garden, especially over the summer, is desirable for many schools. Mulch can help with that and much more:

**Weed control:** Prevent weeds from germinating and smother existing weeds.

**Moisture conservation and drought resistance:** Mulches can reduce soil evaporation, and increase the amount of water absorbed by a bed by holding water on the surface until the soil is able to absorb it.

**Soil temperature:** Mulches generally regulate soil temperature keeping it cooler than bare soil. This can help cool season crops in summer heat. Plastic mulches are sometimes used to heat up the soil for heat-loving crops such as sweet potatoes.

**Nutrient content:** mulches add nutrients and organic matter to soils. By “composting in place” sheet mulches add organic matter and humus to the soil.

**Soil PH:** Depending on the mulch you choose, you can make your soil more or less acidic.

**Encourage and protect earthworm activity** by providing a cool damp environment for earthworms that is less susceptible to freezing and has more food for them.

**Encourage and protect soil microbial populations** in similar ways as for earthworms.

**Keeping dirt from splashing on plants,** which can help with disease prevention as many diseases are soil borne and can be transferred by splashing dirt in heavy rains.

**Erosion control:** Mulch helps prevent erosion in heavy rains, from gravity in sloped beds and in the case of wind. Mulch also helps with foot traffic. It can keep feet clean and prevents soil compaction from stray feet!

**Keeps the garden looking good** by presenting a uniform look, which can help with school relations!

**A good use of garden “wastes”** such as grass clippings or some plant debris. By using materials that would usually be a waste product on the school grounds or in your garden, you are creating your own recycling system!

**Establishing new garden beds quickly** with minimal digging by sheet mulching (or lasagna gardening.)



Bridge Street School Garden. Northampton  
(top banner also)

## What to use as mulch

Mulches can be made up of dead and decomposing organic matter, or growing plants.

### “Non-Living” Mulches

The table below lists many of the “dead” organic mulches that can be beneficial for your school garden, and ideas on where to get them. Many things can be used as mulch, but in selecting materials you should follow some guidelines:

Choose mulches that are **safe and non-toxic** as they will be breaking down into their components and turning into the soil that you will be growing your food in!

Make sure that the mulch you choose **will break down in the intended amount of time**. For example, although hypothetically sticks will break down into soil, they would not do it over one winter, and may cause a nuisance in you soil if you include them in your mulch.

Start from your garden and work out! To make the best use of your resources, **do a mulch assessment**. What does your garden generate that you could use as a mulch? What about your school grounds? Your students families? Your community? Your local farms?

**What NOT to use in mulching** is important. Do not use any material from industrial sites that is potentially toxic. Do not put raw, un-composted animal manures such as chicken, horse, cow, rabbit directly onto your garden beds, (although these things may be used with caution in sheet mulching). **Take general caution** when using “found” mulches as they are seen and treated as garbage by many. For example, a city leaf pile may include other things people put in their leaf collection such as dog poop! Leading a school collection whilst educating families on this can be a way to avoid this.



Straw mulch at the Peck School Garden, Holyoke

## “Non-Living” Mulches

Mulch	Depth	Notes/comments	Where to Find
Straw	4-6”	Watch out for hay that has mature seed heads, which will germinate in your garden. Straw is the stalks only of the grass plant.	Farms, garden centers, grow your own. Fairgrounds and other temporary events sometimes use bails - ask if you can have them afterwards!
Grass Clippings	2-3”	Thicker layers of only grass clippings tend to compact and become slimy. Mix with other mulches. Do not use clippings from lawns treated with herbicides.	School grounds. Landscaping companies. School families, DPW.
Bark Mulch or Wood Chips	2-4”	Excellent for use around trees, shrubs, and perennial gardens. When spreading mulch around trees, keep the mulch an inch or two away from the trunk. A couple inches of mulch is adequate.	Saw mills, garden centers, DPW.
Dry Leaves	6”	Best to chop before spreading.	School grounds. Landscaping companies. School families, DPW: Many cities have leaf collection programs, ask about a leaf drop off at your school.
Composted Leaves/Leaf mould	3-4”	Better than dry leaves.	Collect leaves a year in advance and compost.
Newspaper, shredded or in sheets.	2-3”	Wet after application. Applying on a windy day can be tough! Use only black and white inked pages- some colored inks can be poisonous to soil life.	Recycling bins, families etc.
Compost.	3-4”	Great as mulch but can grow weeds- make sure it is from a good source that does not have weed seeds!	Landscape and garden supply, DPW, school cafeteria -make your own (be sure not to put weed seed heads in a small compost).

Mulch	Depth	Notes/comments	Where to Find
Pine Needles and pine bows.	2-4"	Pine needles are good for plants that like alkalinity such as blueberries. Pine bows are a good addition to the top of any mulched garden bed in the winter as they will not compact the bed, but stop other mulch from blowing away.	Landscaping companies, saw mills, school grounds.
Cardboard - Unwaxed.	Make sure sheets overlap.	For sheet mulching applications. Be sure to remove plastics like tape and avoid color ink.	Furniture and appliance stores can have big boxes. Otherwise any cardboard recycling.
Hay	4-6"	Hay with mature seed heads can be used in some applications such as winter mulching, or with fully established plants that will not be affected by some grass growth beneath them.	Farms, garden centers, grow your own.
Other locally available by-products		Check to see what farms, industries or other operations in your area have in excess that they don't want. E.g. grain hulls, cotton, wool, shredded shipping materials etc. Just be sure not to use anything that is potentially toxic or exposed to toxic substances.	



Leaves decomposing and mulching plants on the forest floor

## How to Use Mulch

Mulch is beneficial in established beds around your vegetables, to create new beds, to protect beds and build soil over the winter, and for pathways.

In established beds, you can put mulch around your vegetables, or use to cover soil in between plantings. When applying mulch, make sure to follow these guidelines:

Place your mulch on **soil that is already weeded**. Pull weeds up by their roots and remove if they have seed heads or put in the compost pile if they don't.

**Apply thickly!** Thick enough to keep out sunlight and vigorous weed growth. At least- 4-6"!

Do not apply mulch directly in contact with plant stems or crowns. **Leave an inch or so of space** next to plants to help prevent diseases flourishing from excessive humidity.

In order to create new beds, and to over-winter established beds, use sheet mulching.

### Sheet Mulching



Photo: firesafegardens.com

Sheet mulching is different from the mulching described above as it is not used around garden plants, but as a way to create or build upon garden beds. It is a way of composting in place, although you use less green matter, and would not use food scraps in sheet mulching. Although you can plant perennials and vegetables directly in sheet mulch, for the beginner, I recommend sheet mulching in gardens you will be using the next spring, or at least a few months ahead.

To convert sod or a lawn to a garden without digging beds, use sheet mulch!

1. Mow or scythe the sod as low to the ground as you can.
2. Stake and string out the areas where you want your beds to be.
3. With a fork, make holes all over the bed areas for aeration. Dig up the sod a bit if you like.

4. Lay sheets of cardboard over your bed areas, overlapping the sheets so that there are no spaces anywhere. If you intend to mulch your pathways also with wood-chips, lay cardboard over these areas also.
5. Soak your cardboard with a sprinkler for a couple of hours until wet.
6. Cover with about two feet of mulch. You can layer in manure and some green materials in sheet mulch if you like. Use about a 25:1 brown to green ratio. You will want to make your pile slightly higher in the middle to account for settling.
7. For the final layer use something aesthetically pleasing such as straw or leaves.
8. Leave your beds to break down, or plant directly into them.

### **Create homes for your mulches!**

One of the best strategies for having ample mulches is to make containers in advance that you can fill with mulches when they are free and abundant and then use throughout the year. Whether it is a corner of the garden or school yard you use as a leaf drop off site in the fall, adding a pallet container next to your compost to fill with grass clippings, incorporating mulch collecting into your garden will make your life a lot easier! One strategy could be to build mulch bins near your compost bins, and use these materials alternately in your compost as needed and as mulch in the garden.

### **Chopping up and preparing mulch**

Preparing your mulch is an important step. Most mulches can benefit from being shredded or cut into smaller pieces. Pulling out sticks, taking off tape and staples from cardboard, or shredding leaves is a wise use of time in creating a mulch that will decompose when you would like it to, and create a mat that is less likely to blow away.

### **How much mulch will I need?**

Mulch you buy is measured in cubic feet. As an example, if you have an area 10 feet by 10 feet and you wish to apply 3 inches of mulch, you would need 25 cubic feet. If you know the cubic feet of a bag or container, you can estimate how much mulch you have collected, and how much more scouting about you need to do!



## Possible problems and trouble shooting

Whilst a wonderful tool in your school garden, mulches can have drawbacks like anything else.

**Nitrogen sequestration:** Some heavy materials such as sawdust, ground corn cobs, wood shavings and chips, if mixed directly into the soil and planted into directly can cause nitrogen to be less available to plants. This is because these things are very high in carbon but very low in nitrogen. You can see from the table to the right what a huge difference there is in the C/N ratio in typical garden mulches. When these materials are breaking down, the high carbon causes microbial and invertebrate populations to bloom and therefore these large populations also eat up all of the available nitrogen, which they also need to live. Soil microbes will eat available nutrients before a plant can, and so if there is an imbalance like this in your soil, the nutrients will go to these creatures first.

Some Carbon to Nitrogen Ratios of Common Garden Mulches (adapted from Gaia's Garden- see sources.)	C/N
Finished Compost (average)	16/1
Grass clippings (fresh)	15/1
Hay (legume/grass mix)	25/1
Leaves (dry)	50/1
Chicken Manure	7/1
Newspaper	800/1
Straw (oat)	74/1
Sawdust (hardwood/soft wood av.)	500/1

Think about seeing a pile of wood chips or sawdust that is left to rot. You will not see weeds growing in it for a while as the fungus, bacteria and insects break it down first. To avoid nitrogen sequestration, don't mix these mulches into the soil in your beds, place on top, or use as sheet mulches instead where they will have several months to decompose before you plant into them. You may also be able to compensate for this effect a little by adding a high nitrogen source such as chicken manure.

**Can slow soil warming.** As you are creating a covering to the soil, you will stop early sunlight warmth from reaching the soil. Pull mulch away from perennials and garlic in the spring for faster growth.

Wet mulch can cause **vegetable rot** and possible dampening off (in seedlings, where the plant stem dies at the base and the plant loses its top growth.) Pull about 1" away from plant stems if your mulch is wet.

Mulches can cause rot and **rodent nesting** if up against tree or other woody plants. Keep mulch pulled back away (6-12") from trunks. Avoid "volcano" or high deep mulching of trees and perennials.

If you have damp weather, mulches can have **slugs and snails**. Avoid this by adding dry materials to your mulch.

Mulches are usually **acidic**: add lime or pine needles around plants that prefer neutral or alkaline soil.



## Living Mulches

Instead of placing dead plant material on your beds, you can use growing, live plants to do many of the same functions that dead mulches do. This can be as simple as placing the plants you are already growing close together, so that nothing else can grow there. Plants that can do fine with this include kale, spinach and lettuce. Other plants don't provide enough shade or suffer from being too closely planted together, including beets, tomatoes and cabbages.

Another method is interplanting. In this method you are planting compatible vegetables in close proximity to one another, so that one plant acts as a living mulch to

another. Grow lettuce amongst onions, corn, beets and cabbage. Lettuce is a light feeder so does not compete with the other plants, and benefits from shade as these plants grow taller. Fast growing lettuce and radishes can shade the soil between tomatoes or peppers until they are mature enough to do it themselves.

“Chop and drop” mulches: you do not dig up the plant, but chop off its leaves and use as a mulch in your garden. Common plants used for this purpose include comfrey, clover, grasses and common “weeds” such as nettles.

Cover crops are good for winter mulches. Please see [our cover cropping guide](#) to learn more!

Planting a crop in your pathways can be an ideal way to keep out other weeds and even stop the need to mow between beds! Plant white clover, a low-growing perennial plant in your garden pathways. Cut off the top growth if necessary and add to your garden beds as mulch.

## Season Extension and Crop Storage

Mulches can be used to stop ground freezing, and extend the harvest window of root crops. They can also be piled on top of crops such as cabbages so that they can be retrieved from the garden later than if you left them exposed.



Closely grown beans in the Bowe School garden, Chicopee

Pile straw or leaves on top of your carrot bed and harvest mid winter. Over winter your parsnips and leeks by mulching them and digging them up in the spring! Surround the sides of your cold frames with mulch to keep them warmer and your growing season longer.

## Sources

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[www.aginclassroom.org](http://www.aginclassroom.org)



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Thanks!



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