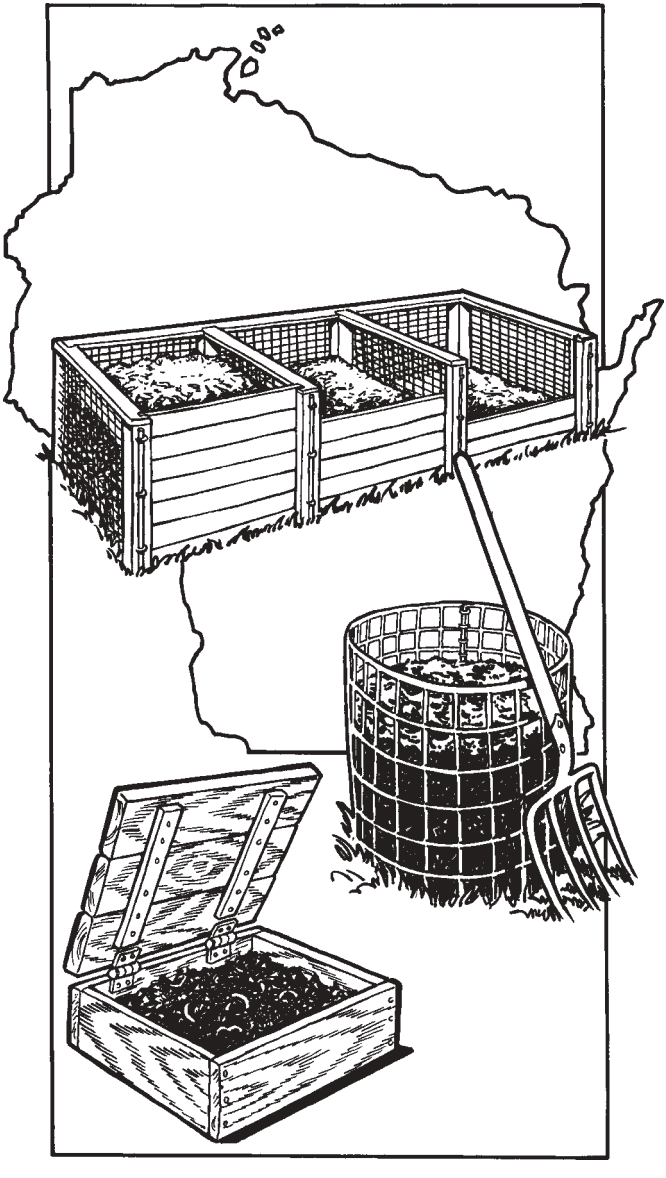
HOME COMPOSTING

The Complete Composter



Wisconsin Department of
Natural Resources

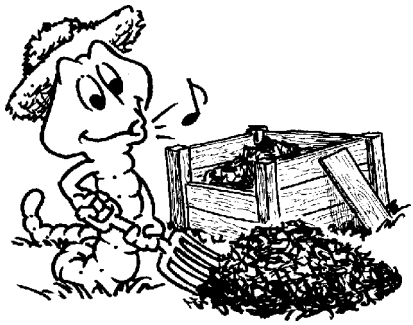
PUB-WA-182 2005

Wisconsin's Recycling Law

Each year over 300,000 tons of yard materials no longer go to landfills or incinerators in Wisconsin. Valuable space and resources have been saved since 1993 when the state banned leaves, grass clippings, garden debris, and twigs, brush and branches (6" in diameter or smaller) from going to these disposal sites.

Although many communities provide collection for yard materials; the most economical way to handle these materials is to compost them at home. Home composting saves money on soil amendments and improves your yard and gardens. Municipalities save too with reduced collection costs.

(Note: stumps, roots or shrubs with intact root ball can still be landfilled or sent to incinerators which burn solid waste to recover energy.)

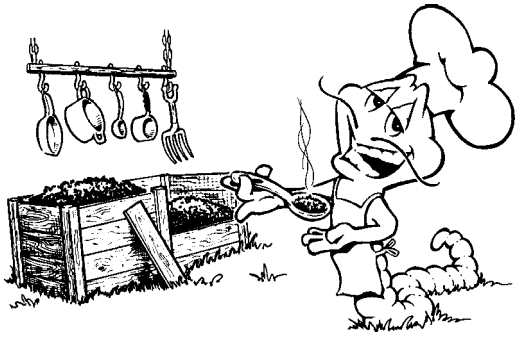


A Burning Issue

Burning leaves and brush is declining. People recognize the value of these materials for mulch or compost. They also realize that burning pollutes the air, creates fire hazards and can be a health risk and nuisance to neighbors. State air quality and fire control rules restrict backyard burning and many communities prohibit it entirely.

In This Brochure...

You will find information about different composting methods as well as the types of materials recommended for home composting. If you have questions about your current home composting or you are interested in composting additional materials, this brochure is for you.



Hot Composting

A “hot” compost pile breaks down yard materials rapidly. You build a “hot” pile all at once (in a batch). The microbes on the yard materials multiply and are the workhorses of the compost pile. Give the microbes a mix of carbon and nitrogen foods, water and oxygen and they will multiply and heat your pile. The pile may reach 140˚ F or more, but to avoid loss of nitrogen (and associated ammonia odor) and optimize the decomposition rate, you generally don't want it hotter.

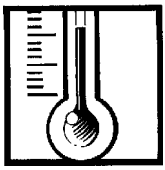
Hot compost piles require periodic “turning” to mix materials, allow oxygen to circulate, and keep temperatures from getting too high. In spring through fall, turn materials every 1 to 2 weeks if using an enclosed bin, or every 2 to 3 weeks if using a pile or open top bin. Add water as needed to keep the materials slightly moist. Materials will become inactive if they are too dry. Overly wet materials will not allow air circulation, and will produce undesirable odors, along with chemicals that aren't good for your plants. A ”hot” pile can make finished compost in 2-6 months.

Hot composting is ideal for a household that has lots of yard materials, has limited space for a compost pile, wants a finished product in a short amount of time, *and* is willing to actively work the material. Food scraps *can be* buried 8-10 inches into the center of the material or covered with a layer of dried leaves, hay or other carbon. Many communities regulate composting food scraps. *Always* check with your local community before composting your food scraps.

Cool Composting

"Cool" composting is the laid back way to recycle your yard materials. A "cool" pile is built a little at a time or all at once but with little turning. Always put a layer of carbon (i.e. leaves or hay) on the top to control odors.

A "cool" compost pile remains cool because: 1) it contains little or no green materials, 2) moisture isn't added, so sometimes, the materials may dry out, and 3) it isn't turned, so low oxygen is available, and excess moisture isn't driven off very fast. All of these conditions result in slow composting. You may turn it now and then or let it sit. It may be necessary to occasionally turn the materials, if odors develop due to green materials being added or the materials becoming too moist. Finished compost can take 1 – 2 years.



In a "cool" compost pile, grass clippings and other nitrogen materials should be mixed with other bulky materials like leaves or straw. Be careful what you add to a "cool" pile. Do not add diseased plants, or any portion of invasive plants or their seeds, as high enough temperatures may not be reached to destroy the disease or viable parts of plants and their seeds.

Food scraps *can be added to enclosed bins and must be* buried 8-10 inches into the center of the material or covered with a layer of dried leaves, hay or other carbon. Many communities regulate composting food scraps. *Always* check with your local community before composting your food scraps.

Cool composting is ideal for a household that needs to manage material, has enough space to allow material to sit for 1-2 years, and wants to put minimum work into managing their yard materials.

Food Scrap Composting

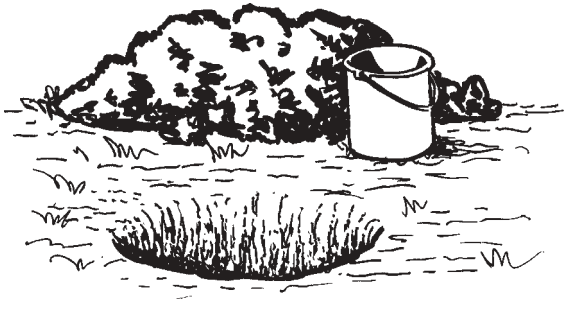
Food scraps may be composted in three ways: incorporation into the soil, composting and worm bins.

In many communities there are public health ordinances which regulate food waste composting. *Always* check with your local community before attempting to compost your food scraps.

Soil incorporation

Soil incorporation is the simplest method of composting food scraps. Dig a hole or trench, chop the food scraps and mix them into the soil, and then cover them with at least 8" of additional soil.

DO NOT bury foods such as meat, bones, dairy products, or oils. They will attract animals and other pests.



Hot or Cool Composting

Food scraps should only be added to enclosed bins using the hot or cool method. They must be buried into a compost pile (8-10 inches) or put on an enclosed pile and covered with 8-10 inches of carbon materials (leaves or straw, etc.) Add only uncooked vegetable scraps, never scraps containing oils, meats, bones, or dairy products. Keep the pile enclosed in a bin to help keep out animals.

What food scraps can I compost?

YES: fruits and vegetables, such as apples (peels and core), cabbage, carrots, celery, coffee grounds (and filters), eggshells, grapefruit, lettuce, onion peels, orange peels, pears, pineapple, melon rinds, potatoes, pumpkin shells, squash, tea leaves, tomatoes, turnip leaves, etc.

NO: dairy and meat products, including butter, bones, cheese, chicken, fish scraps, lard, mayonnaise, meat scraps, milk, sour cream, and yogurt. Do not compost foods containing oils or fats such as peanut butter, salad dressing, margarine, and vegetable oil.

Piles, Pits, Bins and Barrels

No matter what composting method you use (hot vs. cold, or pile vs. open bin vs. enclosed bin) decomposition will occur faster if the materials are reduced in size down to about 1/2 inch. It's important that all the materials are not reduced too small, as this will inhibit air circulation, and very frequent turning will be required to keep the microbes supplied with oxygen.

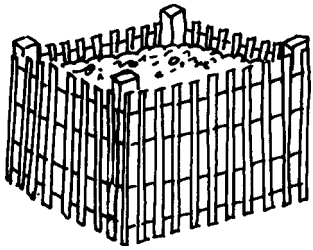
Too much moisture or green material (grass clippings) may cause odor problems. To minimize odors, mix in some leaves or bulky organic material and turn the pile more frequently to let air inside.

"The Pile"

The pile is not a structure, however many people use this composting method. Pile leaves and grass into a corner of the yard and nature does its work.

The pile can be used for either a cool or hot composting. DO NOT ADD FOOD SCRAPS to this open pile!

Snow fence bin

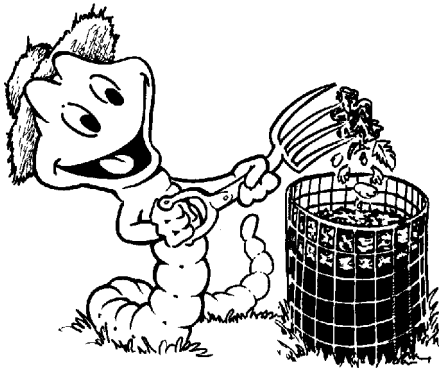


Bins made with prefabricated snow fencing are popular because they are simple to make and easy to move and store. To build this bin, buy the appropriate length of prefabricated fencing (a 64 cubic foot bin would be 16' long and 4' high), and fasten two-by-fours to the corners to form a stable square bin. A bin 4' x 4' x 4' (64 cubic feet) may keep the compost pile active during the winter months.

A snow fence bin can be used for either a cool or hot composting.

Woven wire bin

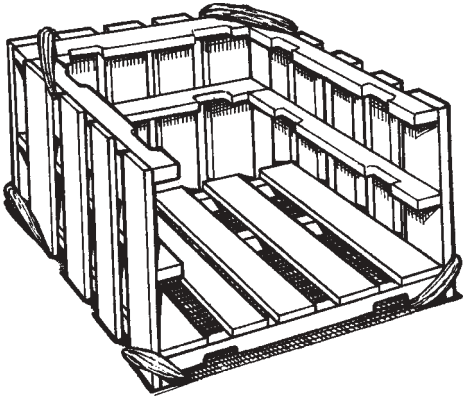
This simple, economical bin requires only a length of woven wire fencing and a few minutes of time to construct. Multiply the diameter of the compost heap by 3.2 to get the length of



fencing to buy. Fasten the ends with wire or three or four small chain snaps (available at hardware stores) to make a circle. To turn the material in the bin, simply open the bin up, move it, and turn the material back into the bin at its new location. To make the bin more stable, attach the sides to posts. To keep the compost from freezing during the winter months, use a piece of woven wire with a 4' height and approximately 16' long and overlap ends by only about 9" to make a 4½' diameter bin with a volume of about 64 cubic feet.

A woven wire bin can be either a cool or hot composting structure.

Wooden pallet bin



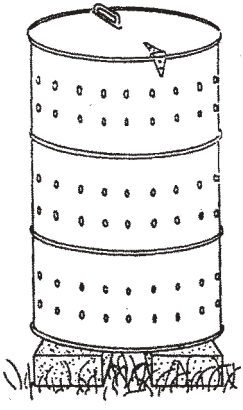
Old wooden pallets are an inexpensive, readily available building material. Pallets can easily be wired together to form a bin. In areas where the soil is a heavy clay, consider using a pallet to form the bottom of the bin and keep materials up off the ground for better drainage. Construct bins with removable fronts or sides so that yard materials can be easily turned with a pitchfork. Wire mesh can be substituted for wooden sides to increase air flow. Covered bins allow protection from heavy rains.

A wooden pallet bin can be either a cool or hot composting structure.

To make the structure more attractive consider painting the bin with an outdoor latex paint or plant climbing plants around the outside of the bin.

Barrel/drum composter

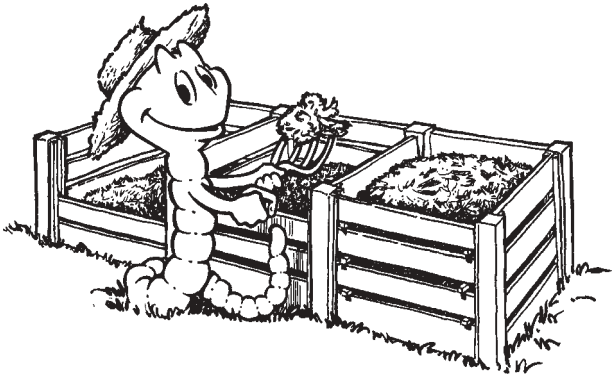
A barrel or drum composter generates compost in a relatively short period of time and provides an easy mechanism for turning. This method requires a barrel of at least 55 gallons with a secure lid. Be sure it was not used to store toxic chemicals.



Drill 6-9 rows of 1/2 inch holes the length of the barrel to allow for air circulation and drainage of excess moisture. Place barrel upright on blocks to prevent excessive rusting. To make a rotating barrel go to www.uwex.edu/ces/shwec for Barrel Composter.

Fill 3/4 full with material. Every few days, turn the rotating barrel or place the plain drum on its side and roll it around the yard to mix and let air into the compost. The compost should be ready in two to four months.

This is an easy system for city dwellers where there is a small amount of material. This rolling barrel design is one of the easiest to construct at home. Because of the small size of the structure, yard materials in the drum will usually freeze during a Wisconsin winter.



Three-chambered bin

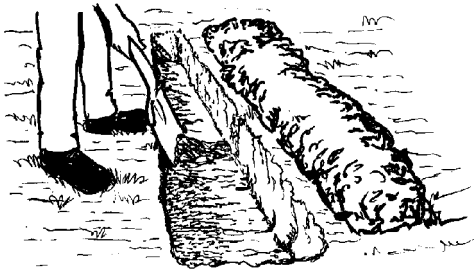
This efficient and durable composter yields quick results. It works like an assembly line with three batches of compost in different stages of decomposition. Material is started in the first bin and allowed to decompose for 3-5 weeks. Then it is turned into the middle bin for another 4-7 weeks. The material in the middle bin is turned into the third and last bin as finished or nearly finished compost. New material is started in the first bin each time it is emptied.

This structure should be made from rot-resistant wood such as cedar, arsenic free treated wood, plastic lumber, or metal posts and wire mesh or hardware cloth. Each bin should be approximately 3-5 feet wide by 3-5 feet high. Removable slats in the front and between bins offers complete access to the contents for turning. Another design option is making the fronts removable doors rather than wooden slats. Plastic or hardware cloth can be used to make tops for shedding heavy rain or snow.

Commercial Compost Bins

There are many manufactured compost bins on the market made of recycled plastic, metal or wood. Check out your local garden center, home supply stores, or the internet. Many local communities have annual compost bin sales through their recycling program, UW Extension or other programs.

"The Pit and Trench"



Pit and trench composting is useful for gardeners and is frequently done right in their garden or next to their garden plot. This is an easy compost method requiring no turning.

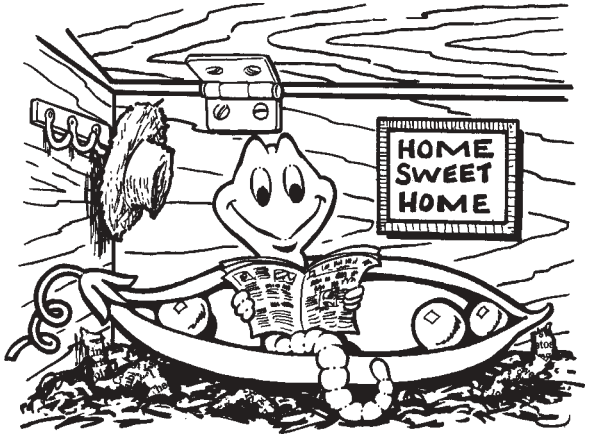
Dig a pit about 2-4 feet deep. Add yard materials, including garden debris (no seeds or diseased plants), throughout the summer. At the end of the summer, when the garden is done, cover the pit with 1-3 inches of soil. Next spring plant the garden as usual locating the pit in a different part of the garden. Before covering with soil, food scraps can be added.

The trench is a variation of the pit. Dig a trench 18 inches deep. The trench can be located in a garden or next to a garden. Fill the trench with leaves, grass, and garden debris throughout the summer. At the end of the summer, when the garden is done, cover the trench with 1-3 inches of soil. Do not add food scraps until you are ready to cover the trench.

Worm Bins

Using worm bins (vermicomposting) is a fun and easy way to compost food scraps. Worm bins utilize redworms (not earthworms) to eat food scraps and turn them into worm castings — a useful garden fertilizer.

Worm bins are commonly made from simple wood boxes with lids or plastic tubs. Put worms in the box with shredded, moistened newsprint, corrugated cardboard or shredded office paper. A good rule of thumb for sizing the box is to build one square foot of surface for every pound of food waste generated per week and no more than 12-18 inches high. (Redworms are surface feeders). One of the easiest boxes to build is called the 1-2-3 box — sides are 1 foot high, the box is 2 feet deep from front to back, and 3 feet wide from side to side (6 square feet surface area), with aeration holes in the bottom and a simple covering of black plastic over the top. A box this size will handle about 6 pounds of food scraps per week.



Drill air holes in the bottom of the wooden or plastic box and keep the lid ajar to keep the box dark, slightly moist, and ventilated. The worms will not leave the box as long as it is kept relatively moist and there is enough food available. Don't add more food than worms can eat or you will have odor problems. Optimal temperature for worm bins is between 50˚-75˚ F. Do not let the temperature drop below this level or the worms will die! Some people keep their worm bins in the basement. Others prefer a spot under the kitchen sink.

Worm bins are usually kept in the house to assure the worms don't get too cold or hot.

Redworms may be purchased at bait shops, other stores which sell fishing supplies or off the internet. Be sure to purchase redworms and not earthworms or other worm varieties. They consume their own weight in food each day! (Other types of worms eat less.) Redworms are only about 2 to 4 inches long when full grown, and are not native to Wisconsin.

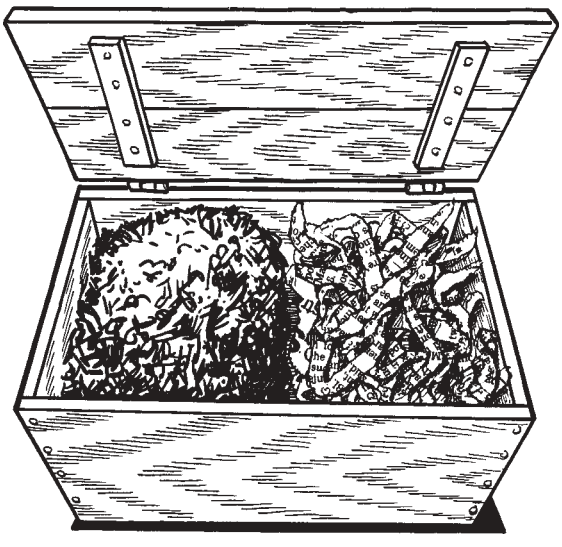
Making a worm home

Once the worm bin is built, shred newspaper (not the colored sections) or office paper into 1 1/2 inch-wide-strips until you have about 10 pounds of shredded newspaper. Add a small amount of sand to provide grit for the worm's gizzard. Add about 4 gallons of water to the paper to make the worm environment about 75 percent moisture. The worms will eat the bedding material and sand as well as your food scraps.

Feeding your worms

Once you add the redworms to their new home, you can start feeding them your food scraps! They will eat lettuce leaves, apple cores, potato peels, watermelon rinds, coffee grounds—the list is long. Avoid dairy and meat products, oils, and oily foods because these foods can cause odors and attract animals and insects. Also don't add citrus and bananas, as they may have fruit fly eggs on their skins.

Add food scraps to the worm bin by digging a hole in the bedding at one corner of the bin and burying the scraps in the bedding. The next day, bury the scraps at the alternate corner of the bin and move down the sides of the bin alternating sides every day. Some people simply add food scraps to the top of the bedding. This method works, but it can cause odors. If your bin gets ripe, simply add more bedding material to the bin. Add some fresh bedding at least every two months.



Harvesting your compost

As the worms eat their way through the materials in your bin, the contents of the bin darken and begin to smell moist and earthy. This is the vermicompost (worm compost), your finished product. Vermicompost is full of nutrients necessary to promote strong, healthy plant growth.

There are a couple of easy ways to harvest your vermicompost. One way is to carefully move the finished compost to one side of the bin, and fill the empty side with fresh, moist bedding material. Give the worms 4 or 5 weeks to move over to the new bedding materials, and then remove the finished vermicompost.

Another method is to put a can filled with food scraps into the finished compost. Punch holes in the sides and the bottom of the can large enough for the worms to enter. In 4 or 5 weeks the can should be filled with worms. The finished compost can be removed from the bin without the worms. Remember to refill the bin with fresh, moist bedding material.

Using worm compost

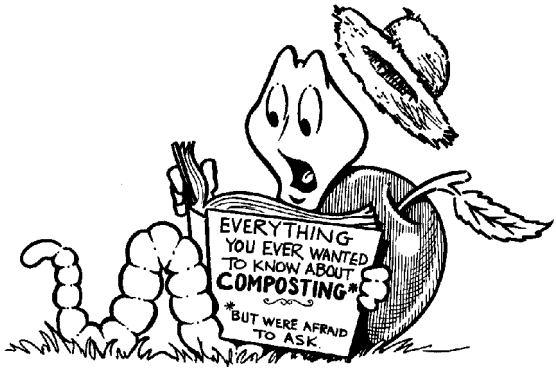
Worm compost (vermicompost) is a rich soil enhancer. It contains many nutrients needed to grow strong, healthy plants both in your house and in your garden. Some of the ways it can be used:

- Mix with peat moss, garden loam, vermiculite or sand to make potting soil.
- Sprinkled on your houseplants soil as a top dressing.
- Spread 1 inch thick on the surface of your garden or dig it into soil.
- Added by the handful when you transplant vegetables and other plants in your garden.

Commonly-asked Questions

What is compost?

Compost is a soil-like material rich in stabilized carbon produced from the breakdown of organic materials (materials that contain carbon). Most compost is considered a soil conditioner (or soil amendment), not a fertilizer, because compost usually doesn't contain very high levels of macro-nutrients (nitrogen, phosphorus, and potassium - or N, P, K). However, compost may provide low levels of macro and trace nutrients essential to plant growth. The primary benefit of compost is that it increases soil organic matter. This improves soil water holding capacity and soil physical properties,



and allows for greater plant root penetration. It also increases soil biodiversity (number and type of microbes and other small creatures in the soil), which helps plants obtain nutrients from soil, and maintains a balance among organisms to help prevent outbreaks of disease causing organisms. Aerobic composting (meaning composting with air, or oxygen) produces the best quality compost for agricultural and silvacultural use (including lawns and gardens). Compost should not contain toxic substances at concentrations that would negatively impact the health of human or plants.

What is composting?

Composting is the process that uses microorganisms, carbon and nitrogen food, moisture and oxygen to convert plant materials such as grass clippings, leaves, and other organic materials to compost, a more usable organic soil amendment.

What is mulch?

The term "mulch" is used differently by different people. Perhaps most often, mulch refers to materials that are placed on the ground surface, around plantings or trees, to prevent weeds from emerging and to help retain soil moisture. Leaves or grass clippings can be used around vegetable plants, and wood bark or

chips can be used around woody stemmed and forest type plants. (Before bringing wood mulch onto your property, learn more to make sure it won't be a source of disease or insects.) However, the term mulch, or mulching, may also describe any organic material (processed or not) that is mixed into the soil.

What is mulching?

Mulching is using unprocessed yard materials as a soil cover around plants, shrubs, and trees to enhance moisture retention and suppress weed growth. Yard materials mulch includes grass clippings, leaves, wood chips, pine needles and bark. Don't use grass treated with herbicides for mulch. You can also mulch grass clippings right on the lawn with a mower to add free nitrogen fertilizer.

What are yard materials?

Yard materials are leaves, grass clippings, yard and garden debris, and brush no greater than 6 inches in diameter. Included as yard materials are raw garden vegetable plants, tree seeds, pine needles, weeds, flowering plants, seeds, small woody materials, and pine cones.

When should I start my composting?

Start your pile any time in spring, summer or fall. Be sure to save several bags of leaves in fall so you have carbon to use in July when you have lots of grass and garden debris.

Do compost piles freeze in winter?

Home compost piles usually freeze during Wisconsin winters, but will restart on their own when they thaw in spring. Approximately 64 cubic feet of materials is needed to prevent freezing, and this amount of material may remain somewhat active, meaning decomposition may continue to occur, but at a greatly reduced rate. A much larger amount of mate-

rial, probably too much for a home composter to manage, or an insulated bin, would be needed to maintain a hot composting pile through winter.

How does composting fight plant diseases?

Compost can fight some plant diseases either through competition of micro-organisms or from chemicals produced in the compost.

Why are pet wastes not acceptable to use in compost?

Pet wastes from cats, dogs, meat eating animals and birds contain pathogens (disease organisms) which can be transmitted to humans. These pathogens are destroyed by high heat, but home composting may not be sufficiently mixed, and all materials may not reach the necessary temperatures. Manure from plant eating animals can be composted safely but should be done only in a hot pile.

Can I add pine needles to my compost?

Pine needles are high in acid and resin, which can make them difficult to compost. These make a good mulch for acid loving plants such as lilies of the valley, blueberries, raspberries, blackberries, roses and conifers. The best use of pine needles is to leave them under the pine tree where they fall. Pine needles condition the soil and protect the shallow root system of their parent tree.

No more than 10 percent of a mixed yard material pile should be pine needles. Some gardeners compost pine needles with leaves or another carbon source separately for their acid loving plants.

Can I add oak leaves to my compost?

Oak leaves compost well, but a little slower. Although they are acidic, the compost process is a great neutralizer. Once oak leaves are composted, the finished compost will have a pH close to neutral. To help oak leaves break down faster in a compost pile, consider using your lawn mower to chop them into finer pieces before adding them to your pile. This will expose more surface area to the microorganisms and speed up the compost process.

Can I use agriculture lime on my compost pile?

Lime is not recommended as it can harm microorganisms, cause ammonia odors and slow the composting process.

Can I add toxic weeds or plants to my compost pile?

Many of the native plants and weeds in Wisconsin that produce toxins (black walnut or butternut leaves, nightshade, monkshood, etc.) can be added to your compost pile. Compost these in small amounts only. However, black walnut or butternut leaves should *not* be used as mulch (without prior composting). To identify a specific plant and see if it is toxic, check with the local library or the local county extension agent before adding it to your compost pile or using it as mulch.

Where should I put my Compost Pile?

Here are some guidelines on where to locate your compost pile:

- Within reach of water with a garden hose.
- In a convenient area near garden or house.
- Protected from direct winds.
- In a spot with good drainage.
- Three feet away from buildings to eliminate heat and moisture damage from the composting process.
- Away from neighbors' windows.

What if I don't have enough materials to start a compost pile?

Sometimes you will end up with too much of one type of material, and not enough of another. Here are some suggestions for balancing out your compost pile:

Not Enough Grass: You will need to add another nitrogen source to your compost. Add a 2-inch layer of livestock manure, or 1 cup of 10-10-10 fertilizer per 25 square feet of top surface area with a 3 foot depth.

Not Enough Leaves: Grass is a high source of nitrogen and is small in size and easily compacts. Grass *must* be mixed with some bulking material such as wood, leaves, plant stalks or chips to provide a carbon source and allow air to circulate through the pile. Composting grass without a bulking material can create a strong ammonia smell.

Does a composting require a license or approval?

Usually compost piles are fine as long as they are maintained in a nuisance free manner. However, check with your local municipality to see if there are any backyard composting rules. Your local community may have additional requirements or limitations on backyard composting of food scraps. Composting of only

yard materials, vegetable wastes and manure, if less than 50 cubic yards in size at one time, does not require an approval or license from the DNR.

Will the compost pile smell bad?

It shouldn't. A properly-tended pile won't create unpleasant odors. Turning the pile to add oxygen or adding a bulking carbon source should end an odor problem quickly. Finished compost has a pleasant earthy, greenhouse smell.

Will the compost pile attract animals?

You might see animals around your compost pile if you are composting food scraps improperly. Food scraps should be buried 8- 10 inches into the center of an enclosed compost pile. DO NOT throw food scraps on top of your compost pile at any time! Animals will come around if you supply them with an easy food source.

What happens to pesticides when they are composted?

Pesticides include herbicides (weed killers), fungicides (fungus killers) and insecticides (insect killers). *Most* pesticides which are *currently available* to homeowners are degradable organophosphates. The active ingredients in most pesticides usually break down in 6-8 weeks.

Grass clippings or weeds treated with pesticides can be safely mixed into a compost pile or mulched back onto your lawn.

WARNING: Uncomposted grass and weeds treated with pesticides should not be used as a garden mulch. Pesticide treated yard materials don't know the difference between plants and insects you want to keep and weeds and bugs you want to kill.

References

This brochure is designed to answer some of the common questions people have about composting and yard management. If you are interested in more information on the topics discussed in this brochure, check with your local library for the following publications:

www.uwex.edu/ces/shwec. UW-Extension SHWEC – Composting information, bin plans and resources and vermicomposting

Compost Indoors!: Worms do the Work. Applehof, Mary. Organic Gardening (pp. 58-63), January, 1992.

Worms Eat My Garbage, 2nd edition. Applehof, Mary.,Flowerfield Press, l997.

Backyard Composting Brown, Deborah & Carl Rosen. Minnesota Extension Service, University of Minnesota, Agriculture, 1990.

Let It Rot!: The Gardeners Guide to Composting. Stu Campbell, Storoey Books, 1990.

The Rodale Book of Composting: Easy Methods for Every Gardener, Debra Marin, et. al. 1992.

Backyard Composting: Your Complete Guide To Recycling Yard Clippings. Harmonious Technologies. Ojai, CA, 1992.

UW Extension

A3383 - Mulches for Home Harrison, H.C

A3384 - Specialized Gardening Techniques Harrison, H.C, 1991

A1989 - The Vegetable Garden. Harrison, H.C., 1992

Other Resources:

For more information on composting or DNR yard waste regulations, contact your municipal recycling staff, a County Extension Agent, or a DNR recycling specialist.

Other yard waste management brochures available from DNR are:

PUB-WA-072, *Home Composting: Reap A Heap of Benefits*

PUB-WA-073 2004, *Yard Care: Do Your Share!*

Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707
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Illustrations: Joal Morris

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