Why Compost?

The Law

Yard waste is the second largest recoverable item in the waste stream (second only to paper). Recognizing the value and potential of compost, the Michigan Legislature enacted a law requiring the diversion of yard clippings from landfills in 1990. Public Act 264 of 1990 amended the Solid Waste Management Act (now referred to as the Natural Resources and Environmental Protection Act) to prohibit the disposal of yard clippings at landfills or incinerators. This act became effective March 1993 for municipalities and March 1995 for other generators of yard clippings.

Rural residents and others who do not have curbside pickup of yard waste must compost their clippings. Many urban communities offer special yard waste collections or residents may contract with their waste haulers to pick up yard waste.

The Economics

The average person throws away 4.4 pounds of trash per day. Of this, 14 percent consists of grass clippings, leaves, garden debris and other organic yard wastes, 8 percent consists of food waste and 39 percent is paper (EPA's Characterization of Municipal Solid Waste in the U.S., 1996 update). This means that 61 percent or 2.7 pounds of the trash thrown away each day by one person may be composted.

Many Michigan residents have subscription-based trash service, meaning they choose their own local waste hauler. Many waste haulers offer carts of various sizes for trash. Composting may decrease the overall amount of trash produced so a household requires a smaller cart, which costs less and therefore saves the resident money.

The Environment

Decomposed yard waste can play an important part in improving soils. Soils may contain up to 25 percent organic matter, but organic matter continually decomposes, so it is necessary to replenish it. By composting, home gardeners can replenish the organic content of their soil. Organic matter plays a role in plant health and makes soil more productive.

The Composting Process

Composting is the process in which microorganisms (bacteria and fungi) decompose organic matter (yard waste) to yield carbon dioxide gas (CO_2), heat, water and a stable, soil-like product called humus (or compost).

In nature, dead organic matter decomposes slowly through the activity of microorganisms and other decomposers (e.g., worms, beetles, ants, etc.). The rate at which organic matter decomposes depends on the type and size of materials, and the amount of air and moisture. In a controlled environment, the composting process can be hastened and the valuable end product (humus) may be harvested.

The overall objective in managing the composting process is to create and maintain an optimal environment for specific decomposing organisms (see Figure 1). Hot composting methods

The Composting Process

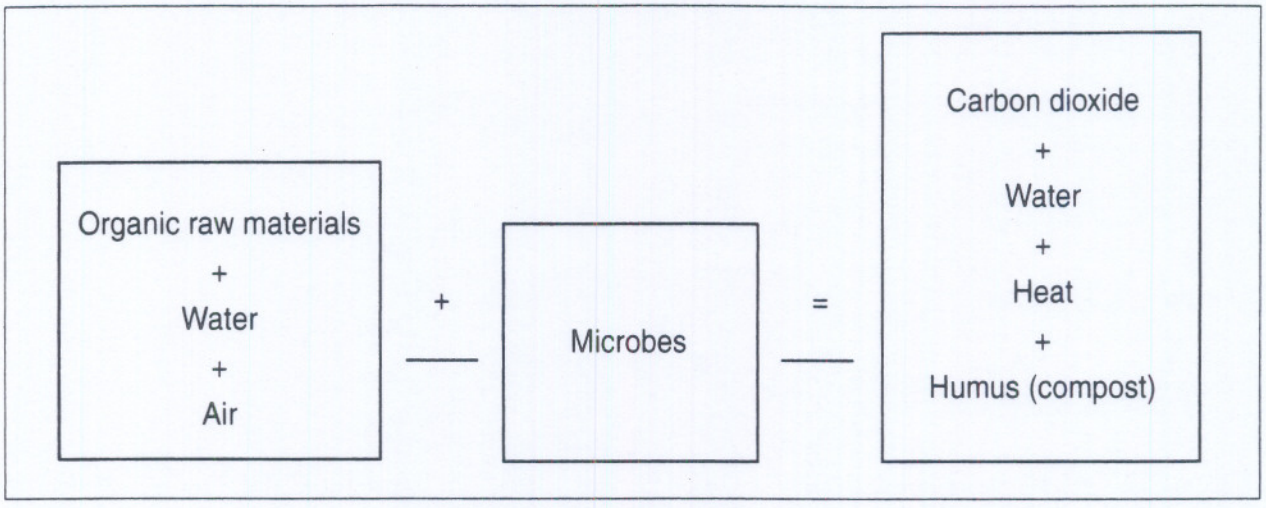


Figure 1 — The composting process.

produce compost at a significantly higher rate than cold (natural) composting processes by controlling raw materials, water and air during the decomposition process. Managing the process maximizes microbial (bacterial) activity. Bacteria do the bulk of the decomposition.

Materials

Anything organic or once alive will compost. Whether a specific organic material should be composted depends on whether you are able and willing to control the potential nuisances, expend the necessary effort and/or have enough materials. For example, a commercial composting toilet is available, but composting human waste is not for everyone.

Carbon and Nitrogen

Of the many elements within a typical compost pile, carbon and nitrogen are the most important. Carbon provides both an energy source and the building material for cells (bacteria). Nitrogen is crucial for cell growth and function.

In general, materials that are brown and dry (leaves, sawdust, etc.) are high in carbon, thus considered carbon sources. Those that are green and/or moist (grass clippings, coffee grounds, etc.) tend to be high in nitrogen, or nitrogen sources.

The ideal carbon to nitrogen (C:N) ratio is generally considered to be 30:1, or 30 parts carbon for each part of nitrogen by **weight**. At lower ratios, nitrogen will be supplied in excess and will be lost as ammonia gas, causing undesirable odors. Higher ratios will not provide sufficient nitrogen for optimal growth of the microbial populations, so the compost will remain relatively cool and degradation will proceed at a slow rate (as in cold composting).

Following is a table listing the typical C:N ratios (by weight) for some common materials:

Materials high in carbon	**C:N**
Autumn leaves	30-80:1
Straw	40-100:1
Wood chips or sawdust	100-500:1
Bark	100-130:1
Mixed paper	150-200:1
Newspaper or corrugated cardboard	560:1

Materials high in nitrogen

Vegetable scraps	15-20:1
Coffee grounds	20:1
Grass clippings	15-25:1
Manure	5-25:1

For the backyard composter, the 30:1 C:N ratio by weight is more easily estimated by a 2:1 or 3:1 ratio of C:N by **volume** — e.g., three bags of leaves per one bag of grass clippings. Note that the C:N ratio is a guideline and may need to be adjusted according to the available materials.

The following table lists common composted materials and tells whether they are considered carbon or nitrogen sources.

Material	Comments
Coffee grounds	Good N source.
Corncobs and stalks	Best when ground or used as a mulch texturizer; high in C.
Eggshells	Calcium and N source. May attract pests if not buried.
Fruit wastes	Banana peels are rich in K. Fruit wastes may attract pests if not buried.
Grass clippings	Use only herbicide-free clippings; high in N; decompose rapidly and help heat up compost pile; smelly unless blended with C-rich materials.
Hair (animal and human)	Good N source but slow to break down; avoid dyed human hair.
Hay	Bulky, high in C; alfalfa highest in N.
Leaves	Leaf mold (decomposed leaves) an excellent soil texturizer; contain growth inhibitors if not first composted; shred before adding to pile.
Manure	From high to low N: pigeon, chicken, duck, horse, rabbit, pig, cow, sheep.
Weeds	Cut before seeds set or use in hot compost pile; purslane is high in N.
Wheat straw, oat straw	High in C; slow to break down.
Wood ash	K and P but no N; use sparingly (strongly alkaline); don't use ashes from fires started with charcoal or painted wood.
Stable bedding, sweepings	Better nutrient balance than manure alone.
Vegetable waste	Pea pods very high in N.

N= nitrogen C= carbon K= potassium P= phosphorus

Materials to Avoid

The following table lists materials that should be avoided when composting.

Material	Comments
Dog or cat feces	May contain disease-causing parasites transferable to humans.
Glossy colored paper	May contain toxic inks.
Coal or charcoal ashes	Contain sulfur oxides and other compounds toxic to the soil.
Plants recently treated with pesticides or long-lived chemicals such as arsenic	May add toxic substances to the pile and finished compost.
Lime	No need to add to pile because pH naturally fluctuates. Ending pH is usually around 7.2 to 7.4.

Materials requiring extra care when composting

The following table lists materials that may be composted as long as composters are aware of the potential problems associated with composting these materials.

Meat or animal products, including dairy foods	May attract pests, create odor.
Oils or foods cooked with oil	May attract pests.
Diseased plants	May spread disease to other plants where compost is applied.
Invasive weeds and seeds	Buttercup, morning glory and quackgrass may overrun compost area. Be aware that some weed seeds may survive the compost process, including burdock and mallow.

To avoid attracting pests, bury materials in the compost pile.

To destroy disease pathogens and weed seeds, the pile must maintain 130 degrees F for three consecutive days. Anytime diseased plants or weed seeds are composted, caution should be exercised in using the compost. It is unwise to apply the compost to the same species of plants that were composted. It would be better to uti-

lize that compost around other plants that aren't susceptible to the same diseases.

Additives

Additives may be inoculants or activators. Inoculants are microorganisms; activators are nitrogen sources.

Commercial inoculants need not be purchased because there are cheaper ways to add microorganism to the compost pile. Try using a shovelful of compost or garden soil, or spoiled milk or yogurt.

Commercial additives are not generally necessary for composting, as long as a 2 to 3:1 ratio of carbon to nitrogen has been provided. If lack of nitrogen becomes a problem during the composting process, beer, calcium nitrate, fishmeal, dried blood or urea may be used to boost nitrogen levels.

Fertilizer need not be applied during the composting process. If the area where the compost is to be applied also needs fertilizer (based on a soil test), the fertilizer may be applied with the compost.

Particle Size

In general, small-sized materials compost faster because they are easier for bacteria and other organisms to digest. On the other hand, particles that are too small and compact inhibit air circulation through the pile, and reduced air flow decreases the rate of microbial activity. A particle size of approximately one inch is desired for hot composting. Materials may be processed through a chipper/shredder to reduce particle size.

Nutrients and pH

Adequate phosphorus, potassium and trace minerals (calcium, iron, boron, copper, etc.) are essential to microbial metabolism. Normally these nutrients are present in ample concentration in the composted source materials.

A pH between 5.5 and 8.5 is optimal for compost microorganisms. Materials with a low pH are considered acidic; those with a high pH are considered basic. A pH of 7 is neutral. Under normal conditions, the pH will naturally drop and then rise during the composting process.

Oxygen

Another essential ingredient for successful composting is oxygen. There are two methods of decomposition based on oxygen content: aerobic and anaerobic.

- **Aerobic decomposition** occurs as microorganisms use oxygen to transform carbon into energy, producing carbon dioxide in the process. Oxygen concentrations greater than 5 percent are considered optimal for maintaining aerobic decomposition. This is the preferred method of decomposition in the backyard (hot composting) situation.
- **Anaerobic decomposition** occurs when oxygen is lacking. Without oxygen, microorganisms convert organic matter into carbon dioxide gas, methane gas, various alcohols and volatile fatty acids (VFAs), ammonia and hydrogen sulfide gas, most of which produce noxious odors. This method produces compost but much more slowly and with more odor than aerobic processes.

During the initial stage of composting, the oxygen (O_2) concentration in the pile is similar to the O_2 composition of air. As biological activity progresses, the O_2 concentration falls and carbon dioxide (CO_2) concentration increases. If the average O_2 concentration in the pile falls too low, anaerobic conditions may develop. To maintain aerobic conditions, especially during hot composting, it is helpful to turn or mix the pile periodically (every 3 to 4 days).

Moisture

Moisture content of 40 to 60 percent is generally considered ideal for composting. You can estimate the ideal moisture content using the "squeeze test". The compost mixture should feel damp to the touch and, when squeezed, contain about as much moisture as a wrung-out sponge. Water may need to be added during the composting process, especially in the winter.

Microbial decomposition occurs most rapidly in the thin liquid films found on the surfaces of the organic particles. With too little moisture (less than 30 percent) or too much (greater than 65 percent), bacterial activity slows down, slowing decomposition. High-moisture conditions can also create odors and nutrient loss.

Microbiology of Composting

A compost pile is home to a complex food web consisting of everything from microscopic bacteria to centipedes. It is important to understand the roles of the various organisms to know how to better manage the composting process.

The major groups of microorganisms active during composting are bacteria, actinomycetes and fungi. Each group requires certain amounts of nutrients and functions only at specific temperature and pH ranges. In the hot composting process, bacteria provide the bulk of the decomposition. In the cold composting process, other organisms contribute more to the process.

Bacteria

Bacteria are microscopic organisms that are very simple and can exist in a variety of forms and environmental conditions. They are the most numerous group of microorganisms active during composting and are considered the fastest decomposers.

Bacteria are the smallest living organisms and the most numerous in compost. They are single-celled and structured in rod, sphere or spiral shapes. Many have the ability to move under their own power. They make up 80 to 90 percent of the billions of microorganisms typically found in a gram of compost. They are the most nutritionally diverse group of compost organisms, using a broad range of enzymes to chemically break down a variety of organic materials.

In the hot composting process, three types of bacteria provide the bulk of the decomposition.

- **Psychrophilic bacteria** are active between 0 and 55 degrees F, working best at the warmer temperatures (near 55 degrees F). As they consume organic matter, the pile temperature rises and the second level of bacteria becomes active.
- **Mesophilic bacteria** are active from 50 to 120 degrees F (10 to 50 degrees C). They are the most abundant of the microbes and do the majority of the decomposition. They consume the most easily degradable materials first. The heat they produce causes the compost temperature to rise rapidly. The mesophilic bacteria again take over for the final phase of "curing" or maturation of the remaining organic matter after the supply of the high-energy compound decreases and the temperature gradually decreases. The numbers and types of mesophilic microbes that recolonize compost as it matures depend on the spores and organisms that are already present in the compost and the immediate environment. In general, the longer the curing or maturation phase, the more diverse the microbial community it supports.

- **Thermophilic bacteria** are active from 110 degrees to 160 degrees F (45 to 70 degrees C). The fastest organic matter breakdown occurs during this stage. Higher temperatures accelerate the breakdown of proteins, fats and complex carbohydrates, the major structural molecules in plants. During this higher temperature stage, many disease-causing organisms and weed seeds are also destroyed. If the temperatures exceed 160 degrees F (70 degrees C), microbial activity will rapidly decrease (this rarely occurs in a backyard situation).

Because the bacteria produce heat, it is possible to compost throughout the winter months. The most limiting factor tends to be lack of water, not cold air temperatures.

Actinomycetes

Actinomycetes are similar in structure to fungi but technically classified as bacteria. Primarily aerobic, they are more numerous during the curing phase, after easily degraded compounds are gone and when moisture is low.

Actinomycetes produce the characteristic "earthy" smell of soil and play an important role in degrading complex organic compounds found in woody stems, bark or newspaper. They form long, threadlike, branched filaments that look like spider webs stretching through compost. These filaments can appear during the thermophilic phase, but most are commonly seen toward the end of the composting process, in the outer edges of the pile. Sometimes they appear as circular colonies that gradually expand in diameter.

Fungi (molds)

Fungi include molds and yeasts. They are larger than bacteria and can attack organic residues that are too dry, acidic or low in nitrogen for bacterial decomposition.

In compost, fungi are important because they break down tough debris such as woody substances and other decay-resistant materials better than other microorganisms. Fungal species are numerous during both mesophilic and thermophilic phases of composting. They grow primarily in aerobic environments, both as unseen filaments and as gray or white fuzzy colonies on the compost surface.

Other Organisms

Many other organisms are active in the compost pile, including protozoa, rotifers, nematodes, mites, springtails, centipedes, earthworms, slugs, snails, millipedes, sowbugs, beetles, ants, flies, spiders, pseudoscorpions and earwigs.

Temperature Stages

Heat is produced when bacteria break down organic material. The heat production depends on the size of the pile, its moisture content, aeration and C:N ratio. Additionally, the indoor or outdoor temperature affects compost temperatures.

You can chart the health and progress of your hot compost system by taking periodic temperature measurements, though for most backyard composters, it is not necessary to have accurate (or any) temperature readings.

The typical stages of a hot compost pile are shown below:

- **Stage 1 — Day 1** — During initial mixing, the materials are at the same temperature as the air.
- **Stage 2 — Days 3 to 5** — A well mixed pile will heat up to between 100 and 140 degrees F. Decomposition occurs most rapidly during this stage (the thermophilic stage) of composting. This stage is also important for destroying sensitive pathogens (disease-causing organisms), fly larvae and weed seeds. In outdoor systems, compost invertebrates survive this stage by moving to the periphery of the pile or becoming dormant.
- **Stage 3 — Day 6 to Day ?** — Once the bacteria have broken down a majority of the organic matter (usually in the core of the pile), the pile cools. At this point, turning the pile usually will result in a new temperature peak (Stage 2) because of the replenished oxygen supply and the exposure of undecomposed organic matter. Stages 2 and 3 are repeated (if the pile is turned and kept moist) until the bacteria have broken down most of the organic matter. This stage can last several weeks or several months, depending on how often the pile is turned.
- **Stage 4** — After most of the organic matter is decomposed, the compost temperature drops and is not restored by turning or mixing. At this point, the compost is "cured" by other organisms. Though the compost temperature is close to ambient during the curing phase, chemical reactions continue to occur that make the remaining organic matter more stable and suitable for use with plants. This stage can last up to a year.

Composting Methods

Hot Composting

A hot composting system must be large enough to insulate the pile and hold moisture, yet small enough to allow good air circulation. In general, a pile 3 feet wide by 3 feet long and 3 feet high is considered the optimum size.

The shape of the pile also helps to control its moisture content. In humid regions, outdoor compost systems may need to be sheltered from precipitation. In arid regions, piles should be constructed with a concave top to catch precipitation and any other added water.

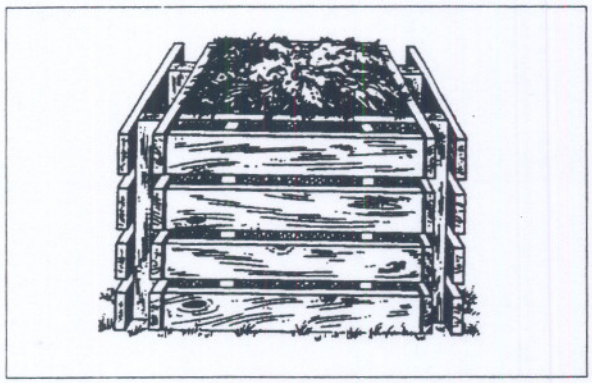
Generic composting recipe:

- Mix 2 to 3 parts brown (carbon) to 1 part green (nitrogen).
- Add a shovel full of compost or soil.
- Add water until materials are as moist as a wrung-out sponge.
- Mix for aeration.

Composting Methods

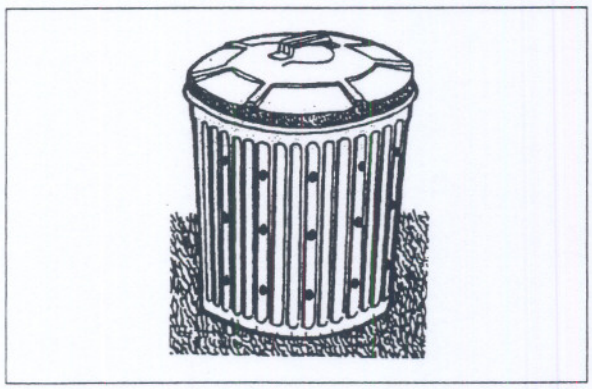
Bin selection

There are many types of compost bins to choose from. Bins may be purchased through catalogs or at local garden centers or created with materials found around the home. Following are some examples of bins that can be made at home.



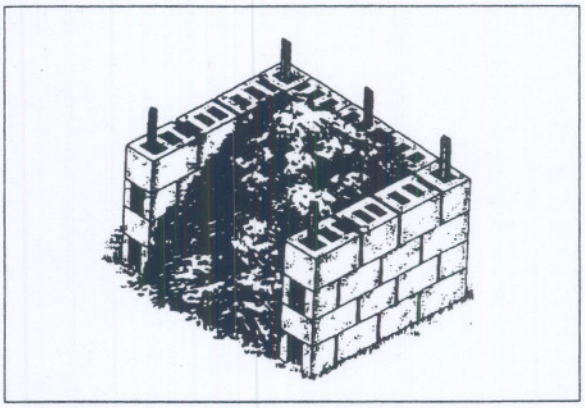
Pallet bin

Simply use three or four wooden pallets. Pallets may be just leaned together or fastened together with wire.



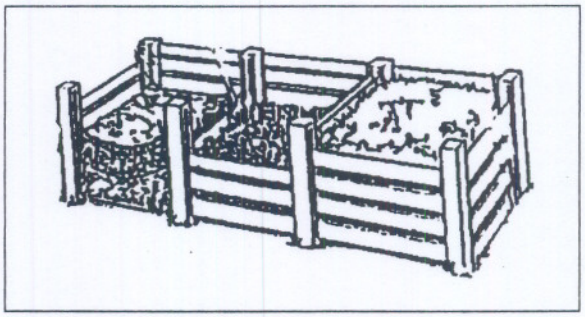
Garbage can bin

An old metal or plastic garbage can can be used. Drill holes in the sides and bottom for air circulation and drainage. Lid is optional.



Cinder block bin

Cinder blocks may be stacked three to four high to make the walls of this bin. Posts may be placed vertically through the blocks for stability.



Three-bin unit

This unit is three bins in one. It is useful for people with a continual supply of compost materials. The materials are initially added and mixed in bin 1. After time, the materials are transferred to bin 2 and more materials may be started in bin 1. Then materials in bins 1 and 2 are moved over one space ad more materials can be added to bin 1. Finished compost is harvested from bin 3.

Troubleshooting

Composting is by no means an exact science — if you can smell your compost pile, something is wrong. Below are some of the most common problems (with solutions) encountered when composting.

Problem	Cause	Solution
Ammonia smell	Too much nitrogen	Add brown (carbon) materials
Bad or rotten smell	Not enough air	Turn pile
	Pile too wet	Add more materials, cover bin when raining
Pile does not heat up	Lack of nitrogen	Add green (nitrogen) materials
Pile damp and warm only in the middle	Pile too small	Add more materials

One final note on hot composting

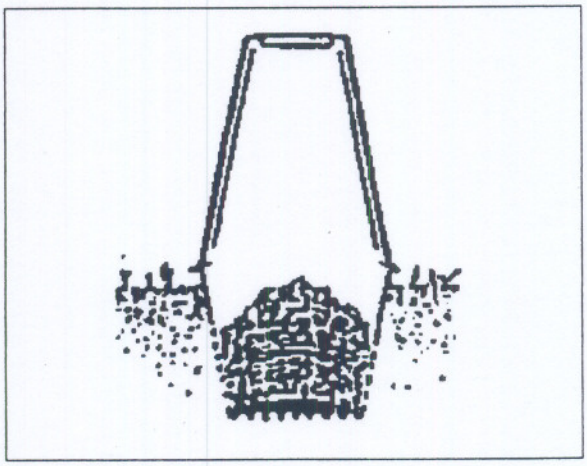
It is easy to switch on and off between hot and cold composting. A pile can easily be transformed from cold composting to hot composting by aerating the pile, checking for correct moisture (moist as a wrung-out sponge) and adding green (nitrogen) materials. Many people compost only during the summer. Their pile can sit "idle" all winter and with a little maintenance become a hot compost pile.

Cold Composting

Cold (or passive) composting is a method to reduce and recycle organic debris through natural decomposition with minimal management or labor. Cold composting tends to suit those with minimal materials, time or need to harvest finished compost. Methods include grass cycling, mulching, sheet composting and pit composting. There is no size limitation for cold composting.

Methods

Cone composter (variation of pit composting)



This system is good for composting pet waste. A top cone that stays above ground is attached to a basket buried beneath the ground. The materials are added through a hole in the top of the cone. The waste is composted naturally and humus never collected (because of transferable pathogens). This allows for nature to do its thing without having to dodge piles outside.

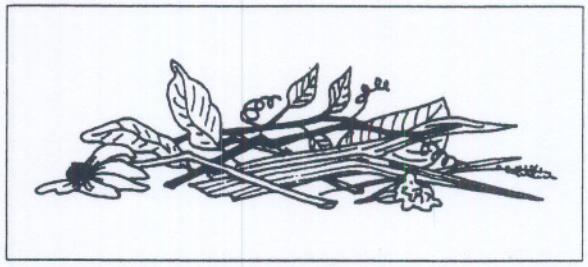
Composting Methods

The cone has a sealed top so that smells are trapped inside. Soil may be added to help alleviate strong odors. This is a variation of the pit composting method whereby materials are simply buried outside.

Sheet composting

This system is the most used by homeowners, most of whom are unaware that it is a form of composting. Waste is simply spread over an area (typically a garden) and mixed into the soil (by pitchfork or rototiller). Decomposition takes place naturally. This type of composting is normally done in the fall, and then the area is planted the following spring.

Pile method

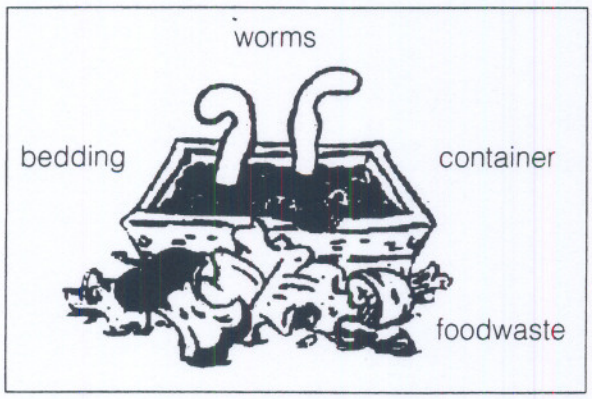


In this method, materials (especially brush) are tossed in a pile. Decomposition is slow and may take a couple of years. Homeowners with large areas of land most commonly use this method.

Grass cycling

Grass cycling is the practice of leaving grass clippings on the lawn after mowing. Grass is approximately 85 percent water, so it decomposes quickly. Clippings provide moisture and nutrients to the soil. One standard-sized trash bag of clippings contains about 1/4 pound of nitrogen. Because clippings contain so much water, they do not contribute to thatch buildup.

Worm Composting



Worm composting can be done indoors or out. Indoor worm composting systems can not handle large volumes of materials. Because so little space is required, it can be done in small areas such as an apartment. Outdoor worm composting systems are typically designed to handle large volumes of materials.

Inside or outside, worm composting has four key ingredients: container, worms, bedding and food.

1) The Container

Buy or build a container. An old dresser drawer, trunk or barrel works fine outside. Most people use a plastic tote for indoor composting. Wood containers are absorbent and good insulators for worms. Plastic containers are useful, but compost tends to stay quite wet.

The container should be between 8 and 12 inches deep and provide 1 square foot of surface area for every pound of food waste per week

(e.g. 6 pounds of waste requires a bin 2 feet by 3 feet or two bins 1 foot by 3 feet).

For an outdoor bin, drill eight to 12 holes between 1/4 and 1/2 inch in size (depending on the size of the container) in the bottom for aeration and drainage. A plastic bin may need more drainage; if contents get too wet, drill more holes. Raise the bin on bricks or wooden blocks for air circulation. Place a tray underneath to capture excess liquid, which can be used as liquid plant fertilizer.

Cover the bin to conserve moisture and provide darkness for the worms. Indoors, place a sheet of dark plastic or burlap sacking on top of the bedding, or cover with an aerated lid. Outdoors, use a solid lid to keep out unwanted scavengers and rain.

Worm bins can be located in the basement, shed or garage, on a balcony or on the kitchen counter. They need to be kept out of hot sun, heavy rain and cold. Temperatures should always be between 55 and 70 degrees F.

2) The Worms

Redworms are best for composting because they thrive on organic materials such as food scraps. Officially known as *Eisenia foetida* and *Lumbricus rubellus*, they are commonly known as red wiggler, brandling or manure worms.

Worms may be purchased from a worm farmer or bait shop, taken from a friend's bin or gathered from an aged manure pile. For an indoor bin, small holes may be drilled around the top of the container. Larger holes should be drilled on the sides near the bottom and covered with vents or connected with PVC pipe.

For 1 pound per day of food waste (an average amount), 2 pounds of worms (roughly 2,000) will be needed. If fewer worms are used to start with, reduce the amount of food waste accordingly until the population increases.

3) The Bedding

Suitable bedding materials include shredded newspaper and cardboard, shredded fall leaves, chopped-up straw, seaweed, sawdust, dried grass clippings, peat moss, compost and aged manure. Vary bedding in the bin to provide more nutrients for the worms and to create a richer compost. Soil should be added to provide the necessary grit for the worms' digestion. For indoor bins, add 1 cup; for outdoor bins, use about one shovel full.

Fill the bin with a mixture of damp bedding so that the overall moisture level is like that of a wrung-out sponge. Check the bin weekly for proper dampness — be sure not to let the bedding dry out. Lift the bedding gently to create air spaces. This helps control odors and allows freer movement by the worms.

4) The Food

Worms will eat food scraps such as fruit and vegetable peels, pulverized eggshells, tea bags and coffee grounds. To avoid potential rodent problems, do not compost meats, dairy products, oily foods or grains. Other organic materials, such as leaves, may also be composted.

Bury the food waste by pulling aside some of the bedding, dumping the waste, and then covering it up with the bedding again. Bury successive loads in different sections in the bin to ensure that worms are not overloaded with food. Once all the sections are filled, wait until one is empty before adding more material. Indoor bins can easily be divided into six sections.

Troubleshooting

Problem	Causes	Solutions
Worms are dying	Too dry	Add water until bedding is damp
	Extreme temperatures	Move bin so temperature is between 55 and 70 degrees F
	All food and bedding eaten	Harvest casings, add fresh bedding and food
Bin smells bad	Overfeeding	Stop adding food and fluff up bedding
Molds	May happen spontaneously	Brush mold off affected surface
	Moldy food was added	Remove moldy food and bedding

Harvesting Compost

After 2 1/2 months, little or no original bedding should be visible in the bin and the contents will be brown and earthy-looking worm castings. It is now time to remove some of the finished compost.

The easiest method is to simply move the finished compost over to one side of the bin and place new bedding and food in the space created. The worms will gradually move over and the finished compost can be skimmed off as needed.

If you want to use all of the compost at once, dump the entire contents of the bin onto a large plastic sheet and separate the worms manually. Most children love to help! Divide the pile into several small piles, then place a bright light over them. The worms will move to the center of each pile to avoid the light. Simply skim off the compost until all you have is a pile of wiggly worms. Watch out for the tiny, lemon-shaped worm cocoons, which can contain up to 20 baby worms. Mix a little of the finished compost in with the new bedding of the next bin.

Use the finished compost as soil conditioner for houseplants, gardens or lawns.

Quick Indoor Bin

Need: 10 gallon Sterilite Tote*
7/8-inch wood drill bit
2 14-inch sections of 7/8-inch PVC pipe
1 cup of soil
newspaper
redworms

Use the tip of the drill bit to drill 20 to 30 small (3/8-inch) holes in the lid of the tote. Also, drill five small (3/8-inch) holes throughout the PVC pipe. Drill two 7/8-inch holes on each of the long sides of the bin. These holes should be 2 inches from the bottom of the bin and spaced about 9 inches apart. Insert the PVC pipe through these holes.

Fill the bin with newspaper shredded into 1-inch strips. Add enough water to make the newspaper as moist as a wrung-out sponge. Add 1 cup of soil. Add redworms.

* The deep Sterilite® containers are better for worms than the shallow Rubbermaid® containers.

Uses of Compost

Cured compost is a versatile material that can be added freely at any time of year without fear of burning plants or polluting water. For garden use, compost should have aged long enough so that the decomposition process has stabilized. According to the Rodale Institute, unfinished compost slows the growth of certain plants, though others, such as corn and squash, seem to thrive on partly finished compost. Half-finished or fibrous compost can be applied in the fall; additional decomposition will take place in the soil in the winter and early spring.

For general soil enrichment, the best time to apply compost is a month or so before planting. If compost is used close to planting time, it should be finely shredded and worked into the soil. The Rodale Institute suggests using compost as follows:

Vegetables and flowers: Work 1/2-inch to 3 inches of well finished compost into the top 1 to 2 inches of soil in the garden each year. Compost may also be added to trenches and furrows when you plant and placed in the holes of transplanted seedlings. If you make it a point to add compost whenever you plant, your soil will gradually become better.

Compost may also be applied as mulch or side-dressing during the growing season, either by itself or mixed with equal parts of soil. Top-dressing (or side-dressing) is a strategic approach if your compost supply is limited. Place about 1 inch of compost on the soil, away from the stem of the plant. Spread outward to the drip line of the plant. Then scratch into the soil so as not to disturb the plant roots. For shallow-rooted plants such as azaleas and annuals, just leave the compost on the surface of the ground and let rain and earthworms do the work of pulling the material into the soil.

Garden soil that has been well mulched and amended usually needs only 1/2 inch of compost to maintain its quality.

Garden renovation: Because soil becomes depleted of its nutrients over time, a total overhaul of the soil is needed from time to time. For an overhaul, remove plants and bulbs, setting them aside in the shade with soil around their roots. Weed the garden bed and mix a 4-inch layer of compost or peat into the soil. Water the bed, let the compost and soil settle, and then replant.

New or renovated lawns: Spread compost in 2-to-3 inch layers when establishing new seedlings or when rejuvenating the lawn in the spring. To renovate a patchy lawn, dig up the bare spots about 2 inches deep, work in plenty of finished compost, rake well, soak the patch and sow the seeds.

Lawn maintenance: Compost may be liberally broadcast over the lawn at any time, adding organic matter to the soil. The compost feeds the lawn and helps promote strong root growth.

To use compost in maintaining an existing lawn, top-dress with 1/2 inch of compost every year. Fall is the best time, though early spring is usually workable. To get compost into the soil, aerate the lawn and then spread the compost over the soil. Earthworms will carry the material down into the soil.

Potting mixtures: Mix fine, screened compost with sand, peat moss or other amendments to create a custom potting mix. It is not reccommended to heat compost because heating suppresses disease-fighting microorganisms. Compost can also be mixed with potting soil in a 50/50 mixture. Compost will contribute microbes and a source of nutrients, which will help support the plants.

Uses of Compost

Sowing seeds indoors: Put your compost through a 1/2-inch sieve and roll it with a rolling pin to make it fine. Then mix the compost with equal amounts of sand and soil.

Compost tea: Make a nutrient-rich plant "drink" by soaking a cloth bag full of compost in a watering can or pail for several days. Dilute the resulting solution to a weak-tea color; reuse the compost "tea bag" a few times; then apply the remaining solids in the garden. The compost tea will help perk up your plants!

Information for this chapter was adapted from the Michigan Master Composter Manual, used with permission.