

# ***COMPOSTING NORTH OF 60***

**A GUIDE TO HOME COMPOSTING IN  
THE NORTHWEST TERRITORIES**



# TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>1</b>
What is Composting?.....	1
Why Compost? .....	1
<b>THE COMPOSTING PROCESS .....</b>	<b>3</b>
Factors in Composting .....	3
<b>COMPOST MATERIALS .....</b>	<b>5</b>
Collecting Materials.....	6
<b>COMPOST BINS .....</b>	<b>7</b>
Building Your Own Composter .....	7
<b>GETTING STARTED .....</b>	<b>10</b>
Winter Composting.....	10
<b>USES OF FINISHED COMPOST.....</b>	<b>11</b>
<b>VERMICOMPOSTING .....</b>	<b>13</b>
Starting a Bin .....	13
Feeding the Worms.....	14
Harvesting the Finished Compost.....	14
<b>COMMONLY ASKED QUESTIONS AND ANSWERS .....</b>	<b>16</b>
<b>COMPOSTING TROUBLE SHOOTING.....</b>	<b>18</b>
<b>GLOSSARY.....</b>	<b>19</b>
<b>BIBLIOGRAPHY .....</b>	<b>22</b>

## INTRODUCTION

This booklet was developed to encourage residents of the Northwest Territories (NWT) to begin composting by providing simple steps and guidelines for both backyard and indoor composting. Included in this booklet are the fundamentals of composting, examples of various designs for composting systems and instructions on how to manage and maintain your own unique composting system.

Many people throughout the NWT have already been successfully composting for years. They provide proof that composting may indeed be part of the solution to reducing waste in the NWT. A number of northern gardeners have shared their composting knowledge and experiences with us. Their comments have been recorded and are included in this booklet.

### **What is Composting?**

Composting is a natural aerobic process through which organic materials are broken down into a dark, soil-like material called humus. Most of the work of decomposing organic substances is done biologically by microorganisms such as bacteria and fungi.

Compost contains a good range of major and minor plant nutrients, trace elements essential for healthy plant growth, as well as soil microbes and organic fiber for building healthy soil. Unlike chemical fertilizers, compost has a built-in time release mechanism, which releases nutrients slowly into the soil. Compost also enhances soil structure.



### **Why Compost?**

There are several reasons why composting is gaining increased attention as an environmentally sound way to manage waste in the NWT.

#### **(1) Waste Reduction**

Canadians belong to one of the world's most wasteful societies. Our unending desire for more goods and services has resulted in unbelievable waste.

Garbage in the NWT, as in other parts of Canada, is generally sent to landfill sites or garbage dumps. Increasing amounts of garbage created by a rapidly expanding population is causing dumps in the territories to fill at an alarming rate. Garbage dumps are not only expensive to build and maintain, but are becoming difficult to find.

About 30% of all material disposed of in dumps are biodegradable plant wastes from kitchens and yards. The life span of a landfill site can be extended for a number of years if this material is composted.

## (2) Ecological Benefits

Composting provides an excellent soil conditioner that improves plant, garden and lawn growth.

- Compost acts like a sponge, helping soil retain moisture and nutrients.
- Soils rich in compost experience less erosion and reduced quick runoff.
- Compost helps break down heavy clay soils allowing better root penetration and improving drainage.
- Compost improves moisture retention in sandy soils so water loss and leaching are reduced or eliminated.
- Compost promotes fertility by providing higher quantities of macro and micro nutrition, as well as improving the availability of the nutrition.
- Compost stabilizes and regulates pH at optimum level for nutrient availability.
- Compost eliminates or reduces the need for chemicals, which may pollute ground water.
- There are no toxic or harmful residuals in compost.
- Composting reduces harmful greenhouse gas emissions.
- Compost stimulates plant root development. Overall root environment is improved due to better structure, porosity, and density of the soil.
- Compost adds, stimulates, and diversifies microbial biomass. This helps control or suppress soil-borne plant pathogens.



## (3) Economic Benefits

- By returning nutrients back into the soil, compost reduces the need for expensive chemical fertilizers.
- Compost reduces use of expensive topsoil from the south.
- Compost conserves water as penetration and retention are improved, erosion and runoff are reduced.
- Expensive landfill sites can be used for longer periods. The amount of waste you send to the landfill will be reduced by about 1/3.
- The cost of garbage collection services paid by municipal taxes could decrease as disposal and processing costs are reduced.
- Composting is free and easy, requiring very little if any cost to set up and maintain.



## THE COMPOSTING PROCESS

The composting process is a partial breakdown of organics by microorganisms such as bacteria and fungi. When the process is optimized and goes to completion, the end product is biologically stable, has an earthy odor, breeds few flies, and has less volume and weight than the original material. The heat created by composting destroys pathogenic (harmful) organisms and weed seeds.



### Factors in Composting

There are four main factors influencing the rate at which composting proceeds. These include air, moisture, heat, and the carbon-to-nitrogen (C/N) ratio.

#### (1) Air

The predominant bacteria in composting are aerobic which means they need oxygen. Therefore air is necessary for the organic matter to decompose in an aerobic environment. If there is lack of oxygen in the compost pile it will start to decompose anaerobically and will begin to smell like rotten eggs. **Aerating will eliminate odors and speed up the decomposition process.**

Air can be incorporated into your pile in a couple of different ways:

- Turning your pile with a pitchfork or shovel or by using a special aerating tool. Turning the pile in this way helps mix in new material.
- Poking holes through with a broom handle and loosening with a garden fork.
- Placing an aeration stack in the center of the pile. You can use a piece of pipe or a bundle of brush. This allows air to circulate down into the pile. This method will save you from having to turn the pile.



There is no set rule on how often to turn or aerate your compost. There are many factors that determine the frequency of turning such as the size of the pile, the types and amounts of material being added to the pile, and how fast you want finished compost.

The basic rule of thumb, however, is the more work you put into the compost the faster the compost will work. **Turning the pile every week or two will result in faster composting, provided that all the other factors in composting are maintained.**

#### (2) Moisture

Moisture is needed to maintain composting activity in your pile. The microorganisms that decompose the organic matter need moisture to move around and break down the material. **Your compost pile should be kept about as moist as a well-wrung sponge.** To test the moisture level simply take some compost and squeeze it in your fist, you should get a couple of drops of water coming through your fingers.

If the pile becomes too dry, composting will slow down and eventually stop. Adding moisture to the pile is easy:

- Use a hose or watering can. Turn the pile as you add water to allow for even distribution of the moisture.
- Leave the lid off during rainstorms (providing you have a lid on your composter).

If the pile gets too wet, it may begin to smell like rotten eggs. There are a couple of ways to fix this problem:

- Turn the pile to allow excess moisture to evaporate.
- Add some dry (carbon) materials to soak up the excess moisture.

### (3) Heat

If a compost pile has enough water and oxygen, a good balance of material, and enough volume, temperatures in the pile may reach above 55°C. Heat is the result of the work of the microorganisms that are decomposing the organic material. The higher the temperature, the more work being done. The compost pile should feel warm or hot to touch when you dig into it.

Temperatures of 55°C are desirable because they kill weed seeds and speed up the composting process. The process slows down if optimum heat is not achieved. The chance of killing weed seeds and disease organisms also decreases. The cool ambient air temperatures in the NWT may frustrate attempts to achieve the necessary heat. However, a cooler compost can work just as well but may require more time.

### (4) Carbon/Nitrogen Ratio (C/N)

The C/N ratio significantly influences the rate and degree to which a mixture composts. Microbes use carbon as energy and nitrogen as a food source to produce proteins. **A general rule of thumb is to have roughly equal amounts (by weight – not volume) of browns (carbon) and greens (nitrogen). This is known as the 50/50 rule and will balance the carbon to nitrogen ratio at the proper level.**





## COMPOST MATERIALS

**Carbon sources** are often referred to as “browns” and usually consist of dry materials. Dry leaves, dead plants, and straw are high sources of carbon for the compost mix.

**Nitrogen sources** are usually moist and are referred to as “greens”. Egg shells, coffee grounds and filters, tea bags, raw or cooked fruit and vegetable wastes, and moldy bread or bannock are all kitchen scraps that are moderate sources of nitrogen. Green grass clippings and garden weeds are high sources of nitrogen and should be included.

**Do not compost** meat and bones as they tend to attract animals. Dairy products should be avoided because of their odor. Also avoid fat and oil products because they are difficult to break down and may attract pests. Animal feces such as dog or cat should not be added as these may contain harmful pathogens. Ruminant manure such as cow manure is excellent and will increase the nitrogen. Avoid adding diseased plants and persistent weeds like crab grass and weeds with mature seeds.

The following is a list of some of the different brown and green materials that can be composted. It is not a complete list but will give you some ideas.

<b>Nitrogen sources (greens)</b>	<b>Carbon sources (browns)</b>
<ul style="list-style-type: none"> <li>▪ Grass clippings</li> <li>▪ Grain or pasta products</li> <li>▪ Flower and green plant trimmings</li> <li>▪ Newly fallen leaves</li> <li>▪ Fruit and vegetable peelings</li> <li>▪ Coffee, tea, fruit or vegetable juice</li> <li>▪ Berries</li> <li>▪ Egg shells</li> <li>▪ Oats and oatmeal</li> <li>▪ Tea bags and leaves, coffee grinds</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dried grass clippings and dried leaves</li> <li>▪ Small amounts of wood chips</li> <li>▪ Dryer lint</li> <li>▪ Thin layers of hardwood ash and sawdust</li> <li>▪ Straw</li> <li>▪ Manure from herbivorous animals</li> <li>▪ Fireplace ashes (must be cold or damp)</li> <li>▪ Paper (shredded)</li> <li>▪ Newsprint (non toxic ink)</li> </ul>

### Never Compost:

- Dairy products
- Peanut butter or oil-based products
- Fish, meats, bones, or fats
- Barbecue charcoal or coal ash
- Diseased or insect-infested plants
- Plants or grass clippings that have been treated with chemicals
- Weeds with mature seeds
- Treated wood products
- Pet or human waste



## **Collecting Materials**

The simplest way to collect kitchen scraps is to use some sort of container. Two or four liter plastic ice cream containers work well. The container can be on the counter or under the sink. As you produce material, put it in the container and when it is full it can be taken out and added to the compost pile. A lid will help eliminate odors but is not necessary.

Yard materials can be added to the compost as they are produced provided there are not excessive quantities. If you are getting large volumes of a certain material at one time, such as grass or leaves, store it and add the material a little at a time.

### **Helpful Hints**

- ❖ If you let your grass clippings dry out in the sun, they will become a carbon source and can be used to mix with fresh clippings.
- ❖ Chopping materials up before you put them in the compost pile will help speed up the process. The smaller material has a greater surface area and therefore it will decompose faster.





## COMPOST BINS

A bin is not absolutely necessary for composting. Some gardeners simply throw their compost material into a heap or hole and wait for the results. This method is slower than a managed heap, but the results are the same. A pile in a well-drained area of the yard will work fine.

Bins are recommended because they help you control such factors as moisture of the pile, keep out pests and make your yard look neater. Compost bins may be made or purchased for a reasonable price. The design must allow for easy access to add materials, stir contents, and remove finished compost. A lid will help retain moisture but is not necessary.

The minimum recommended bin size is about 1 meter cubed (3 feet high, 3 feet wide and 3 feet deep) and the maximum dimensions are 5 feet high, by 5 feet wide by any length. This will allow you to build a compost pile that will be large enough to generate heat, but not be too large to handle/turn. Two bins or a two-compartment bin allows you to have one compost pile of material that is finishing while you add fresh material to the other pile.



### **Building Your Own Composter**

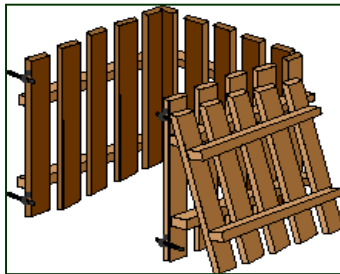
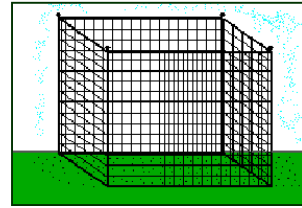
A composter is simply a container and is very easy to build. You can build a unit out of wood, mesh or concrete blocks or you can modify an old barrel or garbage can. To build your own, all it takes is some scrap lumber or other material and a little imagination.

All that has to be done is to build a box:

- It can be three sided, leaving the front open. If you decide to put a front on it, it should be removable so that you can turn the compost easily.
- Make sure there are air gaps/spaces along the sides of the unit to allow air to flow through.
- It is recommended that you leave the unit open to the ground. If you do put a floor in your unit make sure that there are drainage holes in the floor to allow excess moisture to run out. Otherwise the compost will become too wet.
- Do not use pressure treated or other treated lumber to build a composter. The chemicals that are in the wood can leach out and get into your compost. Also your composter should not be painted. If you do paint your composer, use latex based paint and only paint the outside parts of the wood.

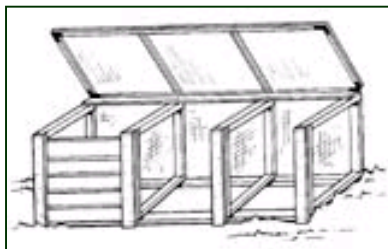
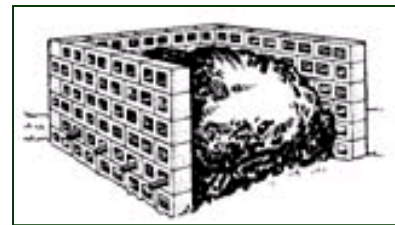
There are several types of compost enclosures. These include:

**Simple enclosure:** Four posts driven into the ground and surrounded by boards or chicken wire.



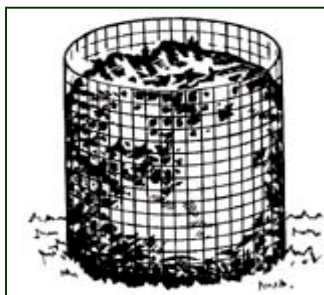
**Single bin:** One of the more popular types of composting bins for small gardens. It is extremely easy to build – no bottom, only three fixed sides and removable boards on front that allow easy access to work the material in the heap. You can also choose to place a wire mesh (1/2 – 3/4 inches) on top of the lowest boards and build the heap on top of the mesh. Finished compost drops through the mesh into the collection area.

**Cinder/concrete block bin:** This is a variation of the single bin box using cinder or concrete blocks. The three-sided structure is built by layering the blocks on edge. This allows air in. Additional air may be allowed into the heap by suspending perforated pipes at intervals between the blocks.



**Multi-bin composter:** Allows for different piles to be in varying stages of decay. This type of bin is used when large quantities of material are available.

**Hay bale/railway tie bin:** Can be used to build a three-walled bin. Hay bales are biodegradable and may last only a few years. Railway ties are more durable. Both retain heat better than enclosures made of other materials.



**Wire mesh container:** A 3 m (118”) length of 1.5 m (59”) high sturdy wire mesh or snow fence with the ends wired together to form a cylinder makes a substantial composter. Build layers of waste in the cylinder in the normal manner. Turning the heap can be accomplished by unhooking the ends, moving the cylinder aside and putting contents back in. Many people just let the heap rot and then use it.

**Barrel/Garbage Can:** To modify a barrel or garbage can into a composter just remove the bottom and drill air holes into the container. Drill air holes large enough to insert something like a broom handle into. This will allow you to aerate the pile by just sticking the broom handle into the holes to form air passages in the compost. Simply lift the barrel/garbage can from around the compost to turn or use.

*“... We dug a trench and filled it full of grass clippings, leaves, kitchen waste and so on, and then just piled soil over it. The soil in these places was enriched over about two years, and most things (even eggshells) seem to have broken down in the soil.”*

- Rosmary Cairns

## GETTING STARTED

The farther north one goes the shorter the period of bacterial activity in the soil. Consequently, it takes longer for organic matter to decompose. It generally takes most compost heaps longer to produce a good product in the north than in southern locations. Northerners can however make the most of the composting season by following these simple steps.

- 1) Place the compost bin/unit on level soil with good drainage, 20 to 30 cm (8 to 12 inches) from fences, decks or buildings. The area should also have at least partial sunlight.
- 2) Make a 10 to 15 cm (4 to 6 inch) bottom layer of course material (dead plant stocks, small branches) for improved airflow and drainage.
- 3) Alternate equal layers (10 to 15 cm) of browns and greens and a 2.5 cm (1 inch) sprinkling of soil in between the layers. Too much soil will make the heap difficult to turn. This layering is repeated in sequence until the heap is 1.2 to 1.5 m (4-5 feet) high.
- 4) Keep the pile slightly damp and cover from rain and pests if necessary.
- 5) When water is added, the top two layers can be stirred together with a garden fork. As materials are added in the future, make sure to contribute equal amounts of green and browns to the mix.
- 6) Turn the pile every couple of weeks with a pitchfork or shovel so it gets lots of air. If the materials are too heavy, just poke holes deep into the pile with a broom handle.

Effectively made compost should heat up do to bacterial action in a couple of days. Hot compost will decompose faster and kill any weed seeds. Heat is maintained by stirring the top two layers every two weeks to ensure aeration, and by adding water when necessary. After about two to three months, the materials at the bottom of the pile should be dark and crumbly and ready to be used as fertilizer.



### Winter Composting

Compost heaps in the NWT stop working when winter sets in. Rather than continue to add fresh materials to your compost pile/bin and over fill it, kitchen wastes may be put into a lined garbage can, left outside to freeze and added the following spring. An early spring start is encouraged by placing a plastic sheet over the heap before winter. The sheet holds in heat from the sun and encourages bacterial growth.

## USES OF FINISHED COMPOST

Finished compost is a free and natural alternative to commercially available, conventional chemicals and fertilizers, and can be used in a number of environmentally friendly ways.

Your compost is ready when it no longer has any traces of greens and browns and is dark brown with an earthy smell. You may find that only the bottom part of your pile is ready while the top is still decomposing. Usually it takes 2-3 months for a pile to compost fully. To speed up the composting process, you can chop or shred materials, add air to your pile more often or add a layer of garden soil. The final product will be approximately a quarter the volume of the original waste material.



Before you use compost you may want to screen it through a wire mesh so that any non-composted items are returned to your pile/bin.

Use	Timing	Method
Perennial flower beds	Spring or fall	Mix 5 cm (2") of compost into the top 15cm (6") of soil.
Vegetable gardens	Spring	Mix 5 cm (2") of compost into the top 15cm (6") of soil.
Annual flower beds	Spring	Mix 10cm (4") of compost into the top 15cm (6") of soil.
Rose bushes	Spring	Mix equal portions of compost to soil. Plant rose bush in mixture.
Trees, shrubs, evergreens	Spring or fall	Mix 2cm (¾") of compost into the top 15cm (6") of soil.
Indoor house plants and container gardening	Spring	Mix a minimum of 4 parts soil (not a potting mixture) to one part compost
Lawns (existing)	Spring	In early spring, cut grass to 1cm (about ½") high. Rake hard and well, remove thatch, then top dress with 2cm (¾") compost.
Lawns (new)	Spring	Mix 10cm (4") of compost into the top 15cm (6") of soil.

## Compost Tea

Compost tea can be used to water your garden and plants or used as a nutritious spray to feed the plants through their leaves. Tea is often used to treat bare spots on the lawn, heal problem plants and trees, or to perk up indoor plants. When sprayed on tomato, pepper, grape, beet, potato, strawberry and bean plants, the harmful effects of downy mildew, botrytis molds, late blight and powdery mildew can be reduced by up to 90%.



To make compost tea, place compost in a burlap bag and put it in a bucket/barrel of water. The mixture should be approximately one part compost to five parts water. Let it steep for ten days to two weeks. Squeeze the burlap bag to extract all the moisture (the tea) and empty the leftover compost on the garden as a mulch or add it back to your compost pile.

*“The soil in many parts of the Northwest Territories is deficient in beneficial microorganisms. A ‘starter’ of one or two pounds of compost from an established compost heap will speed up the process and ensure that beneficial microorganisms are added to your garden along with the compost.”*

**-Dick Kaip**



## VERMICOMPOSTING



Vermicomposting uses worms to compost food materials. The main benefit of vermicomposting in the NWT is that it can be done year round. As well, vermicomposting is ideal for residents in apartments who may not have access to an outdoor area for composting.

The worms used for vermicomposting are called red worms. Red worms like the same temperature range that we do and will eat the same types of food scraps that would normally be put in a backyard composter.



### Starting a Bin

You will need:

- One to two pounds of red worms.
- Shallow plastic utility container. A storage container which is 60 cm x 40 cm x 22 cm (36 L) is a good size to begin with. You can always expand by adding other bins if needed.

It is a good idea to wash out the container and poke holes in the lid for air circulation. If you find that the bin is too moist (the worms will be trying to get out), you may want to drill holes in the bottom for drainage. If you do, you will need to put a tray under the container to catch the extra moisture.

The bins can be stored anywhere so long as they are not subject to freezing or rain. The best temperature range for worms is between 13°C and 25°C.

The worms also need bedding. Bedding can consist of:

- Shredded newspaper or cardboard
- Sawdust
- Leaf compost
- Peat moss

Shredded paper is recommended because it is accessible and inexpensive. Just be sure that the ink on the paper you are using does not contain toxins. The bedding should be soaked in water before adding it to the container. It should be kept about as moist as a well-wrung sponge. Eventually the bedding will be eaten by the worms.





## Feeding the Worms

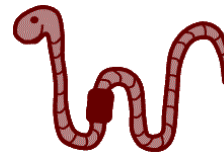
You will need a container to start collecting “food” for the worms. Keep the container in a handy place so you can add the material as you collect it. Any container will do, it should have a lid though and it shouldn’t be any larger than about 2 liters.

The worms don’t have to be fed on any regular schedule, simply add the collected materials when your collection container is full. Begin by adding the food to one corner of the bin. Continue adding food in a systematic pattern until you get to the far corner of the bin. You then start over where you added the food the first time. This will indicate how the worms are doing. If there is still a lot of uneaten food where you first started it means that the worms are a little behind. Simply wait a few days before adding more food.

It is important to note that when you add food to your bin, it must be buried or covered over. This will allow the worms to get at the food and will prevent fruit flies from becoming a problem.

Worm food includes:

- Fruit and vegetable scraps
- Plate scrapings
- Spoiled food
- Tea bags, coffee grounds and filters
- Breads, rice and pastas



Be sure to chop up the material a little bit before adding it to the bin. The smaller the material is, the faster the worms will be able to eat it.

### Do Not Add:

- Meat, fish or bones
- Dairy products
- Greasy, fatty, or oily food
- Egg shells

Just like the backyard composter, these materials will create odors and problems. Worms are not high maintenance pets. If you are going on vacation for a couple of weeks, there is no need to get a worm sitter.



## Harvesting the Finished Compost

The bin will be ready to be harvested in 4 to 6 months. The material will be a rich black soil-like product.



Harvesting:

- Dump the contents of your bin onto some newspapers or a plastic sheet.
- Separate it into a few cone-shaped piles.

- Shine a light on the piles for about 10 minutes, the worms will start to move towards the center of the pile (worms are light sensitive).
- Begin to scrape the finished compost off the sides of the piles.

After doing this a few times, you will end up with a bunch of worms at the bottom of the pile. Put fresh bedding in your bin and reintroduce your worms.

Another option is to move the compost to one side of the bin, and put fresh bedding on the other side. If you put food on the side with fresh bedding for a few weeks, all of the worms will move to that side. You can then remove the finished compost. Continually switch sides of the bin if this method works best for you.



## COMMONLY ASKED QUESTIONS AND ANSWERS

### *Where is the best place to put a composter?*

Pick a sheltered spot, protected from the wind. As much sun as possible will help the compost pile retain as much heat as possible. Avoid trees and shrubs that may push their roots inside the compost pile and remember to consider both convenience and appearance in selecting a location.

### *What shouldn't go into a backyard composter?*

Never include synthetic materials such as plastics. Colored newspapers or magazines should also be avoided. Plant material recently sprayed with a herbicide, fungicide or insecticide should not be added to the composter. Animal and poultry bones, fats, meats, dairy products and other waste carcass parts should not be used as they decompose slowly and attract insect pests.

### *Is it necessary to prepare composting materials?*

Chopping, grinding, pulverizing and shredding will help to increase the surface area for the microorganisms to work on. However, a successful composting process is not entirely based on the size of materials. The materials to be composted should be no more than 5 cm (2") long.

Accumulating compost materials in a container such as an old ice cream bucket or milk carton prior to delivery to the compost container is beneficial. This preparation step enables bacteria and fungi to start breaking down the material and adds additional microorganisms to the compost pile. Peat or sawdust can be used to cover the material to control odors should they persist.

### *Should I wear gloves to handle compost?*

If you haven't composted pet manure, which may contain bacteria harmful to humans, there is no need to wear gloves. Finished compost can be handled just as you would garden soil.

### *What if the compost pile has an odor?*

An earthy smell is normal and non-offensive but a well-built, well-maintained system should not produce unpleasant odors. Covering the compost with a layer of dirt will help minimize any odors.

If the compost smells like ammonia it likely has too much nitrogen. If this happens add something with a high carbon content such as sawdust, shredded newsprint or leaves. If the compost has a rotten egg smell then it is likely too little air. Aerating the pile by turning it will allow additional oxygen to reach the bacteria.

### *Can I add ashes to the compost pile?*

Ashes from untreated wood and paper used in wood stoves can be added in small quantities. Ashes from treated wood, plywood, glossy paper or barbecues should not be added because of the potential of heavy metal contamination.

### *Can I compost in the winter?*

Some bacteria will continue to operate albeit at a slower rate in -20°C weather especially if the composter is protected from the elements. The compost pile will freeze solid in constant -40°C weather. Compostable materials can continue to be added to the composter as long as wet and dry materials are both included. Materials should be covered with peat or dirt as they are added.

### *Should I add activators to the compost pile?*

Activators help to heat the compost pile. Temperatures in the range of 49-71°C are optimum for bacteria growth. If your compost temperature has not risen, especially in the spring and summer months, then the use of an activator should be considered.

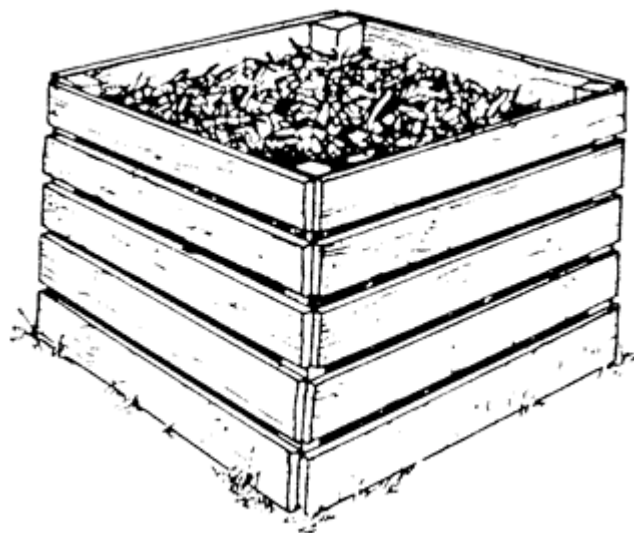
Activators may be organic in nature. Organic activators are high in nitrogen and include fresh grass clippings, vegetable waste, green vegetation, coffee grounds, hair and feathers. Inorganic activators are available from garden supply manufactures and should be used according to the manufacturer's recommendations. Both types of activators will increase bacteria growth in the compost.

### *When is compost "finished" and safe to use?*

When an active compost pile fails to heat up once more, and very little of the original material can be recognized, the compost is ready to use. The compost will be a rich brown color, slightly moist and will smell something like the humus of a forest floor.

## COMPOSTING TROUBLE SHOOTING

<b>Symptoms</b>	<b>Problem</b>	<b>Solution</b>
Compost has bad odor	Not enough air	Turn the pile. Add more dry material.
Pile is dry in the center	Not enough water	Add water while turning pile. Consider another location if the compost is too exposed to the sun.
Compost is damp and warm only in the middle	Pile is too small	Collect and add more material
Compost is damp and sweet smelling but will not heat up	Lack of nitrogen	Mix in a nitrogen source.
Compost is attracting pests	Improper materials have been added	Do not add meat, fish, bones, dairy products or oily or greasy foods. Line bin with ½ inch metal mesh to keep mice out. Put a lid on your unit. Cover kitchen scraps with soil or bury in pile to avoid flies.
Process is too slow	Particles in the pile are too large	Cut waste material into small pieces.
Pile is too wet	Poor drainage, too much rain or lack of air	Move composter to dry location with proper drainage. Add dry leaves. Turn pile and remove lid to allow evaporation.





## GLOSSARY

<b>Aeration</b>	The process of adding air. This can be accomplished by turning the compost pile or poking holes in it with a broom handle.
<b>Aerobic Bacteria</b>	Bacteria that require oxygen to work. These are the good bacteria.
<b>Anaerobic Bacteria</b>	Bacteria that do not require oxygen to work. These can cause unpleasant odours.
<b>Bedding</b>	Material such as newspaper and leaves used as an organic medium for worm composting.
<b>Biodegradable</b>	Able to be broken into simpler chemical compounds by microorganisms. Organic materials are biodegradable.
<b>"Browns"</b>	Organic materials high in carbon.
<b>C/N Ratio</b>	The ratio of the percentage of carbon (C) to that of total nitrogen (N) in organic materials. For example a 2-to-1 ratio means that there is twice as much carbon as nitrogen.
<b>Castings</b>	Manure, i.e., excretion, of earthworms. Earthworm castings are high in nutrients for plants and microorganisms.
<b>Clay Soils</b>	Soils with clay particles and small air pores. Water retention is high creating poor drainage conditions.
<b>Clippings</b>	Blades of grass cut off during mowing.
<b>Compost</b>	A stable humus like material that results from the biological decomposition and stabilization of organic materials under aerobic conditions.
<b>Composting</b>	Biological degradation of organic matter under aerobic conditions to a relatively stable humus-like material called compost.
<b>Composter</b>	A container, usually a bin or a box used for composting.
<b>Compost Tea</b>	Water in which finished compost has been steeped to produce a liquid fertilizer for plants.
<b>Curing</b>	Final stage of composting when the rate of decomposition has slowed to a point where turning or forced aeration is no longer necessary.
<b>Decompose</b>	Decay. Rot. The breaking down of organic materials into smaller particles until the original material is no longer recognizable.

<b>Fertilizer</b>	A substance (natural or man-made) used to enrich the soil and to provide food for plants.
<b>"Greens"</b>	Organic materials high in nitrogen.
<b>Harvesting</b>	Removing compost for use.
<b>Heap</b>	An unenclosed compost pile.
<b>Humus</b>	The end result of successful composting is humus. It is a rich, dark, fine mixture of decomposed organic materials. Humus contains the microorganisms necessary for healthy soil, as well as a ready supply of the macro- and micro-nutrients necessary for healthy plants. Mix it with house plant or garden soil to improve the condition.
<b>Landfill</b>	Pleasant term for a garbage dump which is located in a cavity in the ground so that, when full, it may be covered up and look like part of the land.
<b>Macronutrients</b>	Nutrients that plants require in substantial doses. They include nitrogen, phosphorus, potassium, calcium, sulfur and magnesium.
<b>Mature Compost</b>	The final product of composting; it has undergone decomposition and is in the process of stabilization. It contains readily available forms of plant nutrients.
<b>Micronutrients</b>	Nutrients that plants require in small doses, primarily to enhance the ability to absorb macronutrients. They include iron, manganese, copper, boron, molybdenum, chlorine, cobalt and zinc.
<b>Microorganism</b>	These are microscopic plants and animals. They exist in soil and break down organic matter into basic elements. They include bacteria, fungi, algae, protozoa, yeast, germs, ground pearls, and round worms.
<b>Microorganisms</b>	A living organism so small that it requires magnification before it can be seen. Microorganisms that use heat to break down organic materials in the first stages of composting are called thermobacteria.
<b>Moisture Content</b>	The amount of water in a substance.
<b>Mulch</b>	Covering for soil. Mulch should not generally be mixed into the soil, it is not a fertilizer. There are many types of mulch, including partially decomposed compost, bark, wood chips, hay, nut shells, pine needles, and others. Mulch is used to cover bare ground so that topsoil is not washed away, soil temperature is buffered, and

weeds are reduced due to a lack of light. A good organic mulch will also supply nutrients to the earth as it decomposes.

<b>Organic</b>	Something derived from plant or animal matter. Includes anything that is or was living, made from something living, or excreted from something living.
<b>Pathogen</b>	Any organism capable of producing disease or infection. Often found in waste material, most pathogens are killed by the high temperature of the composting process.
<b>Perennial</b>	A plant that lives for more than two years.
<b>Pesticide</b>	Any substance, organic or inorganic, which is used to destroy or inhibit the action of undesirable plants or insects.
<b>pH</b>	A measure of a substance's alkalinity or acidity.
<b>Red Worm</b>	A variety of earthworm suitable for vermicomposting. The Red Wiggler is a red worm.
<b>Sandy Soils</b>	Soil containing more sand than organic matter. Water retention is low as there are a small number of pore spaces even though individual pores are large.
<b>Screening</b>	To sift out uncomposted matter from humus to create a fine compost.
<b>Soil Conditioner</b>	Something that enriches the physical condition of the soil and increases its organic content.
<b>Trace Elements</b>	Chemicals that plants need in small quantities to grow.
<b>Vermicomposting</b>	Using redworms to compost food scraps, newspapers, and cardboard, yielding nutrient-rich castings.
<b>Worm Bin</b>	A container especially prepared for worms to live in and eat organic garbage. A vermicomposting system.
<b>Yard Waste</b>	Leaves, grass clippings, yard trimmings and other organic debris.

## **BIBLIOGRAPHY**

Canada's Office of Urban Agriculture, City Farmer: Worm Words Glossary for Teachers (1991). [www.cityfarmer.org/wormgloss82.html](http://www.cityfarmer.org/wormgloss82.html)

City of Toronto, Composting (1998-2002).  
[www.city.toronto.on.ca/compost/pubs.htm#basics](http://www.city.toronto.on.ca/compost/pubs.htm#basics)

Johnson, Eric S. How to compost your yard and kitchen wastes at home. Rot Web Text (1996).  
[www.ibiblio.org/ecolandtech/agriculture/feedback/new-links/msg00244.html](http://www.ibiblio.org/ecolandtech/agriculture/feedback/new-links/msg00244.html)

Moran, Neil. Garden Guides: A Growing Resource for Gardeners – Composting (2001).  
[www.gardenguides.com](http://www.gardenguides.com)

New Brunswick Department of Environment, Backyard Magic – The Composting Handbook, Fredericton (1994).

Recycle Organics Together Society (ROTS), The Northern Home Composting Handbook, Whitehorse (1993).

Renewable Resources, Composting – A Recycling Process for the Northwest Territories, Yellowknife (1989).

Territorial Farmers Association, Northwest Territories Agricultural Waste Management Options – Phase 1, Hay River (1995).

The Green Lane™, Environment Canada's Worldwide Web Site. Waste Minimization Fact Sheets: Composting (2001). [www.ns.ec.gc.ca](http://www.ns.ec.gc.ca)

Tynes, Mary J. Compost! Master Composter Home Composting (2001).  
[www.mastercomposter.com](http://www.mastercomposter.com)