



GOJ/CIDA Environmental Action Programme

NATURAL RECYCLING: DEMONSTRATING COMPOSTING ENVIRONMENTAL STEWARDSHIP IN ACTION

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Ministry of Health & Environment

COMPOSTING: DEMONSTRATING NATURAL RECYCLING

ENVIRONMENTAL STEWARDSHIP IN ACTION



*A Practical Guide to Composting
for Jamaican Institutions*

April 2008

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The Beauty of Compost Heaps. Available at: http://boldweb.com/gw/index.php?option=com_content&task=view&id=15&Itemid=25

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KEY COMPOSTING TERMINOLOGY

Activator—An accelerator that can expedite the natural decomposition process. Its purpose is to increase microbial activity.

Aeration—The process of introducing air into the compost pile. This can be accomplished by turning the pile or using a compost aerator.

Bacteria—A group of one-celled microorganisms that break down organic materials in the first stages of composting.

Compost—Completely decayed organic matter used for conditioning soil. It is dark, odorless and rich in nutrients.

Composting—The art and science of combining unwanted yard waste, food scraps, and other organic materials under controlled conditions so that the original raw ingredients are transformed into a soil conditioner/natural fertilizer.

Humus—A dark, loamy organic material resulting from the decay of plants and animal refuse. Healthy and fertile soil will consist of about 3.5-5% of this soft, sweet-smelling and crumbly organic matter.

Mulch—Any organic material, such as wood chips, grass clippings, compost, straw, or leaves that is spread over the soil surface (around plants) to hold in moisture, help control weeds and eventually release nutrients to the soil.

Vermicomposting—Using redworms to convert food scraps and other organic materials into rich, dark compost.

ABOUT THIS GUIDE

The Guide, *Composting: Demonstrating Natural Recycling*, provides information on the fundamentals of composting and is intended for use by various institutions including government ministries and agencies. Though developed primarily for operations staff, this Guide may also be used by all employees, as it provides practical ways of converting yard, select office, garden and kitchen waste into soil building compost.

By the simple act of putting certain food scraps, yard clippings, fallen leaves, or anything of an organic nature into a compost heap we will be giving back to the earth a present of life. It is the supreme environmental act as it saves "trash" from going to landfill where it will receive very little air to decompose naturally. In a landfill what little matter does decay will be trapped deep within the earth, far too deep to be of much value to the plants on the surface. When this trash is used to build a compost heap, it becomes a valuable commodity, that will enrich and renew the very earth it originally came from.



This Guide is one of the many publications produced as part of the GOJ Environmental Stewardship of Government Operations Project, spearheaded by the Ministry of Health and Environment and funded by the GOJ/CIDA Environmental Action (ENACT) Programme, and like the other publications is intended to build the capacity of GOJ ministries and agencies to better manage aspects of their operations that may impact on the natural environment.

Through this Guide we invite you to explore the environmentally-friendly world of composting.

DEFINING COMPOSTING

Compost is one of Nature's best mulches and soil amendments, and can be used instead of commercial fertilizers. Best of all, compost is inexpensive to make.

Using compost improves soil structure, texture, and aeration and increases the soil's water-holding capacity. Compost loosens clay soils and helps sandy soils retain water. Adding compost to the soil improves soil fertility and stimulates healthy root development in plants. The organic

matter provided in compost provides food for microorganisms, which keeps the soil in a healthy, fertile and balanced condition.



Composting is a simple technique that turns organic materials, such as yard debris and some kinds of food scraps, into a rich soil amendment, which, when applied to lawns and gardens, can condition the soil and replenish nutrients.

Composting is therefore Nature's way of recycling and is a critical step in reducing the volume of garbage sent to landfills for disposal. Composting also provides an alternative means of managing waste. In other words **“Don't throw away materials when you can use them to improve your lawn and garden! Start composting instead”**.

Composting is not a new idea. In the natural world, composting is what happens as leaves pile up on the forest

SOME COMPOSTING QUESTIONS & ANSWERS

Finished 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 (perhaps an eggshell or the shapes of old leaves), the compost is ready to use. It will be the rich brown colour of good soil and smell something like the humus of a forest floor.

Do I need to fertilize if I use compost?

The nutritional value of compost depends on the materials that were used to make it -- one very good reason for putting as much variety into the pile as possible. If you are trying to enrich a severely depleted garden, or growing plants that demand a lot of food, you might want to add some commercially produced organic fertilizer.



Additional Information:

Where can I get additional information?

Some references are listed on page 35 of this Guide. Locally you can get information from Rural Agricultural Development Authority www.radajamaica.com.jm; as well as the Jamaica Environment Trust, www.jamentrust.org.

SOME COMPOSTING QUESTIONS & ANSWERS

Structure/Space:

Do I need a bin to make compost?

No, organic matter will eventually decompose without human help. However a container of some sort will keep your pile neat, protect it from the weather and pests, and make the job of tending it much easier.

Where is the best place to put a compost pile?

Pick a sheltered spot, out of the full sun if possible. Avoid trees and shrubs that may push their roots up into the pile. And give some thought to both convenience and appearance in choosing a location.

Process/Problems:

What if the pile has an odour?

An earthy scent is normal and inoffensive, but a well-built compost shouldn't produce unpleasant odours. If it does, your problem is either too much "green" stuff (ammonia smell) or too little air (rotten-egg smell). First, aerate the pile. If the odour persists, turn and rebuild the pile with more "brown" materials.

Should I wear gloves to handle compost?

If you have not composted pet manures, which contain bacteria harmful to humans, there is no need to wear gloves. Finished compost can be handled just as you would garden soil.

Should I add ground limestone, soil and fertilizer?

No! A perfectly good compost pile can be built out of nothing more than leaves and grass clippings.

DEFINING COMPOSTING

Floor and fields and begin to decay. Eventually the rotting leaves are returned to the soil, where living roots can finish the recycling process by reclaiming the nutrients from the decomposed leaves. Most gardeners have long understood the value of this rich, dark, earthy material (humus) in improving the soil and creating a healthy environment for plants.

THE NATURAL COMPOSTING PROCESS

Leaves/other organic matter → breakdown by organisms → humus → mixing of humus and other soil components with the aid of the organisms → natural soil improvement

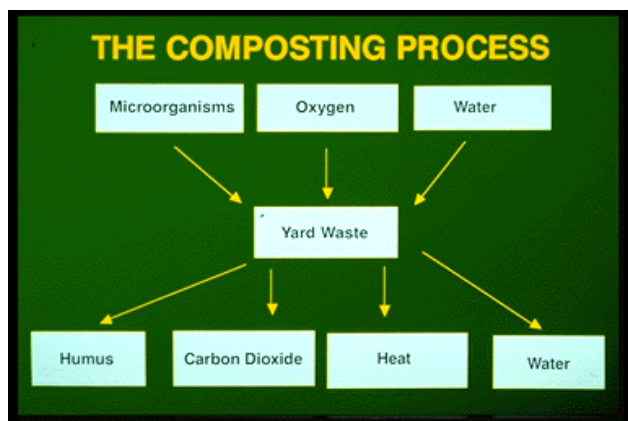
Composting usually involves mixing yard and organic waste in a heap/pile or bin and providing conditions that encourage decomposition. The decomposition process is fueled by millions of microscopic organisms (bacteria & fungi) that live inside the compost heap/pile, continuously devouring and recycling it to produce a rich organic fertilizer and valuable soil amendment called compost or humus.

Today, the use of composting to turn organic wastes into a valuable resource is expanding rapidly in many countries, as landfill space becomes scarce and expensive, and as people become more aware of the impacts they have on the environment.

Composting is a viable option for Jamaica as over 70% of the country's waste stream is biodegradable or organic—consisting primarily of yard waste, paper, and food waste.

THE FUNDAMENTALS OF COMPOSTING

Good composting is a matter of providing the proper environmental conditions for microbial life (e.g. fungi, bacteria). Microbes will slowly make compost out of yard and kitchen wastes under various conditions. However, like people, these living things need air, water, and food. If the pile is maintained to provide for their needs, they will turn the yard and kitchen wastes into compost much more quickly.



The Needs of the Compost Pile

The microbes in the compost pile have three basic needs:

1. Air
2. Water
3. Food

Air

Composting microbes are aerobic - they cannot do their work well unless they are provided with air. Without air, anaerobic (non-air needing) microbes take over the heap/pile, causing slow decomposition, resulting in the pile smelling like putrefying garbage!

USING THE COMPOST PRODUCED

Compost "Tea"

To supply compost nutrients to house/office plants or to spot-fertilize seedlings, Soak an aerated bag (similar to a tea bag) or old pillowcase of compost in a pail of water until the liquid is tea-coloured. Or stir one part compost into three parts water and pour off the "tea." Using this liquid to water plants makes a difference, particularly in the middle of the warm growing season. Of course remove the bags when the compost gets in the soil.



Mulch

Mulching should be done before summer's heat, to conserve moisture. Spread several inches of compost on top of the soil around trees and shrubs, from near the base of the trunk out to the drip line. You can also mulch around vegetables and flowers as soon as the plants are several inches high, to keep roots cool and discourage weeds.

Potting Soil

Office plants, window boxes and hanging baskets will all benefit from a potting soil mixed with sifted compost. Compost alone can be used for growing vegetables in containers, and for starting plants from seed. For indoor use, you may want to sterilize compost in the oven for an hour at 95°C (200°F) - but do not be alarmed by the (temporary) strong smell.

USING THE COMPOST PRODUCED

Finished compost adds nutrients and organic matter to the soil, improving its texture and increasing its ability to hold air and water.

Because it does not burn plant roots, large quantities of compost can be applied to the soil at any time.

The following provides information on ways your finished compost can be used.

Soil Improvement

Plough several centimeters of finished compost into a flower bed or vegetable garden before planting. How much you use will depend on how much you have available. The soil can use it all.

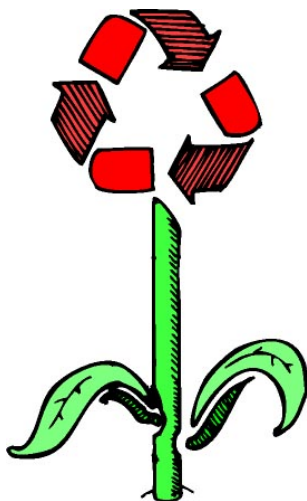
You can also give trees, shrubs, and nursery seedlings a good start by planting them in half-and-half soil and compost. New lawns will develop healthy roots to keep them green, if compost is dug into the soil before the grass seeds are applied.

Top Dressing

Treating lawns with just over a centimetre of compost serves as a very effective feeding or natural fertilizer when the ground dries during the dry season.

Side Dressing

You can also apply compost as a spot fertilizer. Apply it lightly into the top several centimetres of soil around the plant that needs a boost, and water deeply.



THE FUNDAMENTALS OF COMPOSTING

To ensure adequate aeration for the pile and its microbes, it is important to thoroughly break up or mix in any ingredients that might mat down and exclude air, such as wet leaves. The pile can also be turned to get air into it, which means completely breaking it apart with a spade or garden fork and then piling it back together in a more 'fluffed-up' condition.

Water

Ideally, the pile should be as moist as a wrung-out sponge to fit the needs of compost microbes. At this moisture level, there is a thin film of water coating every particle in the pile, making it very easy for microbes to live and disperse themselves throughout the pile. If the pile is drier than this, it won't be a very good microbial habitat, and composting will be slowed significantly. If the pile is a great deal wetter, the sodden ingredients will be so heavy that they will tend to mat down and exclude air from the pile, again slowing the composting process and, perhaps, creating anaerobic odour problems.

If there are a lot of dry components in the pile, such as dry leaves, moisture will need to be added to the pile. Fruit and vegetable wastes generally have plenty of moisture, as do fresh green grass clippings and garden trimmings. Watch out for far-too-soggy piles during wet weather. Also, during dry periods, it may be necessary to water the pile occasionally to maintain proper moisture levels.

THE FUNDAMENTALS OF COMPOSTING

Food

There are two major kinds of food that composting microbes need.

'**Browns**' are dry and dead plant materials such as dry brown weeds, dry leaves, and wood chips or sawdust. These items are a source of energy for the compost microbes. Because they tend to be dry, browns often need to be moistened before they are put into a compost system. Paper is also a good source of energy.

'**Greens**' are fresh (and often green) plant materials such as green weeds from the garden, fruit and vegetable scraps, green leaves, coffee grounds and tea bags, fresh horse manure, etc. Greens are a good source of nitrogen which is a critical protein source for the billions of multiplying microbes.

Approximately equal amounts of browns and greens is the best nutritional balance for the microbes. This mix also helps to control aeration and the amount of water in the pile.

Separating Waste

For successful composting, ministries/agencies will need to begin to separate waste. Organic waste from kitchens, grounds etc. will need to be separated from other wastes and moved to the compost heap.

TROUBLESHOOTING COMPOSTING PROBLEMS

PROBLEMS	CAUSES	SOLUTIONS
Smells like rancid butter, vinegar or rotten eggs	Not enough oxygen, or the pile is too wet or compacted	Mix up the pile so that it gets some aeration and can breathe. Add coarse dry materials like leaves to soak up excess moisture. If the smell is too bad, add dry materials on top and wait until it dries out a bit before you mix the pile.
Odour like ammonia	Not enough carbon	Add brown materials like leaves, organic hurricane rubble (such as fallen trees etc after a hurricane), shredded newspaper, etc
Attracts rodents, flies, or other animals	Inappropriate materials (like meat, oil, bones), or other food-like material (e.g. fruit peelings) is too close to the surface of the pile	Bury kitchen scraps near the center of the pile. Do not add inappropriate materials to compost.
Attracts insects, millipedes, slugs, etc.	This is normal composting, and part of the natural process	Not a problem

TROUBLESHOOTING COMPOSTING PROBLEMS

Making compost is quite easy, but having too much of a certain material or letting the compost get too wet or too dry can cause problems. The Table below provides information on common problems, causes and solutions.

PROBLEMS	CAUSES	SOLUTIONS
Damp and warm only in the middle of the pile	Pile could be too small	If you are only composting in piles, make sure your pile is at least 3 feet high and 3 feet wide.
Nothing is happening. Pile does not seem to be heating up at all	1. Not enough nitrogen 2. Not enough oxygen 3. Not enough moisture 4. Compost is finished.	1. Make sure you have enough nitrogen rich sources like manure, grass clippings or food scraps. 2. Mix up the pile so it can breathe. 3. Mix up the pile and water it with the hose so that there is some moisture in the pile. A completely dry pile doesn't compost.
Matted leaves or grass clippings are not decomposing	Poor aeration, or lack of moisture	Avoid thick layers of just one material. Too much leaves, paper or grass clippings do not break down well. Break up the layers and mix up the pile so that there is a good mix of materials. Shred any big material that is not breaking down well.

SELECTING THE COMPOSTING SITE

Selecting the location for composting often depends on function and aesthetics. In terms of appearances and good relations with clients and neighbours, you probably will not want to place the pile at the entrance of your ministry/agency or on its front lawn. Additionally, any pile of organic matter will eventually rot, but a well-chosen site can speed up the process.

Step 1:

Look for a level, well-drained area. Do not put the pile far away that you can neglect it.

Step 2:

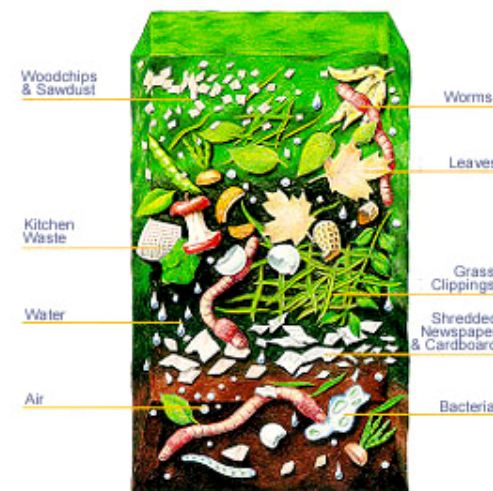
Shelter the pile in a shady spot so it does not dry out too quickly.

Step 3:

Build the pile over soil or lawn rather than concrete or asphalt, to take advantage of the earthworms, beneficial microbes, and other decomposers which will migrate up and down as the weather changes. Uncovered soil also allows for drainage.

Step 4:

Look for a spot that allows you to compost discretely, especially if you have neighboring offices/yards in close proximity. Aim for distance and visual barriers between the pile and the neighbours. Keep the site protected from animals such as dogs, cats and goats.




THE INGREDIENTS FOR A COMPOST HEAP

Like any recipe, the compost heap relies on the right ingredients to make it work. Almost any organic material is suitable for a compost heap/pile.

The heap needs a proper ratio of carbon-rich materials, or "browns," and nitrogen-rich materials, or "greens." Among the brown materials should be dried leaves, and wood chips. Nitrogen materials include fresh or green, such as grass clippings and kitchen scraps.

Mixing certain types of materials or changing the proportions can make a difference in the rate of decomposition. Achieving the best mix is more an art gained through experience than an exact science. **The ideal ratio approaches 1 part browns to 1 part greens.** Judge the amounts roughly by equal weight. Too much carbon will cause the pile to break down too slowly, while too much nitrogen can cause odour.



Leaves represent a large percentage of total yard waste. If they are ground or shredded or mowed over, they will reduce in size making them easier to store until they can be put in the heap. Once smaller, they will decompose faster. Leaves are loaded with minerals brought up from the tree roots and are a natural source of carbon.

Grass clippings break down quickly and contain as much nitrogen as manure. Since fresh grass clippings will clump together, become anaerobic, and start to smell, mix them with plenty of brown material. If you have a lot of grass clippings to compost, spread them on the driveway or other surface to bake in the sun for at least a day.

THE FINISHED PRODUCT—THE COMPOST

Compost is finished when it is a dark, rich colour, crumbles easily, and you are unable to pick out any of the original ingredients. It should also have an earthy smell.

If the compost is too stringy or lumpy, it may need more time. If this is the first time you have tried making compost, keep in mind that the amount of time can really vary. In Jamaica's hot climate it can take anywhere from 1 to 3 months to produce compost. Decomposition depends on a number of things including temperature, the type organic matter you used, site of compost pile, how fine the waste material was chopped, and how often the pile was turned.

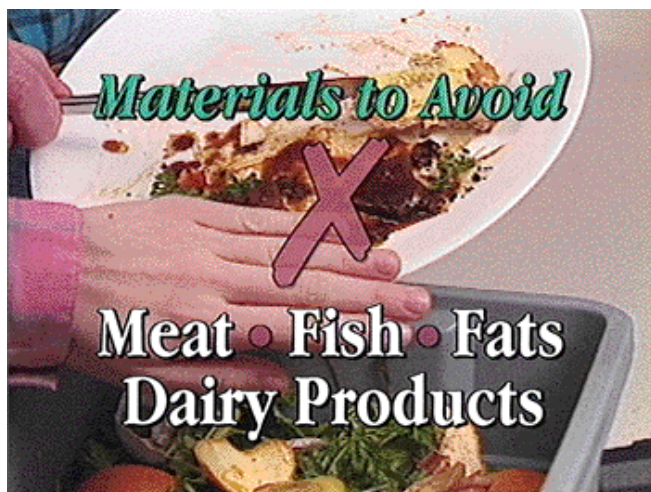


For many outdoor garden applications, it can be fine to use compost that still has a few recognizable bits of leaves or other material - it will finish rotting in the soil. However, if you plan to use compost in seed-starting mixes, the compost should be well-finished because seedling roots may be attacked by decomposer microbes if the roots contact unfinished compost.

BUILDING AND MANAGING THE COMPOST HEAP

KEY POINTS TO REMEMBER

1. Use equal amounts of "greens" and "browns"
2. Mix together a variety of ingredients
3. Shred or chop all ingredients, if possible
4. Build the pile large enough to retain heat
5. Turn or aerate the heap regularly to let in the air
6. Keep the pile as moist as a damp sponge
7. Whenever you add a food scrap layer, make sure you sprinkle it with soil and then cap off with a brown layer to prevent odours and discourage flies.



THE INGREDIENTS FOR A COMPOST HEAP

Once the grass begins to turn pale or straw-like in colour, it can be used without danger of souring. Avoid grass clippings that contain pesticide or herbicide residue, unless a steady rain has washed the residue from the grass blades.

Garden refuse should also be included in the compost heap. All of the spent plants, thinned seedlings, and dead flowers can be included.

Office waste, primarily paper and cardboard can be included in the compost heap. They should however be shredded. Colored paper and glossy paper should be excluded.

Much **Kitchen refuse** including fruit and vegetable peelings such as melon rinds, carrot peelings, ground provision peelings (yam, coco), tea bags, etc. is good for the compost heap. Egg shells are a wonderful addition, but decompose slowly, so they should be crushed. However, some things should be left out of the compost pile.



Not to be Included:

No cooked vegetables, no meat, no dairy products, no peanut butter or salad dressing no diseased plants, and definitely no dog droppings or cat litter. Putting these in the pile can create problems. Meat scraps and the rest will decompose eventually, but will create strong odours and attract pests. **Non-biodegradable materials such as plastics, metals and glass should also be left out of the compost pile.**

THE INGREDIENTS FOR A COMPOST HEAP

Manure is one of the finest materials that can be added to any compost heap. It contains large amounts of both nitrogen and beneficial microbes. Manure for composting can come from bats, sheep, ducks, pigs, goats, cows, pigeons, and any other vegetarian animal. As a rule of thumb, you should avoid manure from carnivores (meat-eating animals), as it can contain dangerous pathogens. Most manures are considered "hot" when fresh, meaning it is so rich in nutrients that it can burn the tender roots of young plants or overheat a compost pile, killing off earthworms and friendly bacteria. If left to age a little, however, these materials are fine to use. Manure should be layered with carbon-rich brown materials such as leaves to keep the pile in balance.

REMEMBER:

All additions to the compost pile will decompose more quickly if they are chopped up a bit before adding to the compost heap.

The list of organic materials which can be added to the compost heap is long. The following table provides a partial list of common materials that can be used for composting.

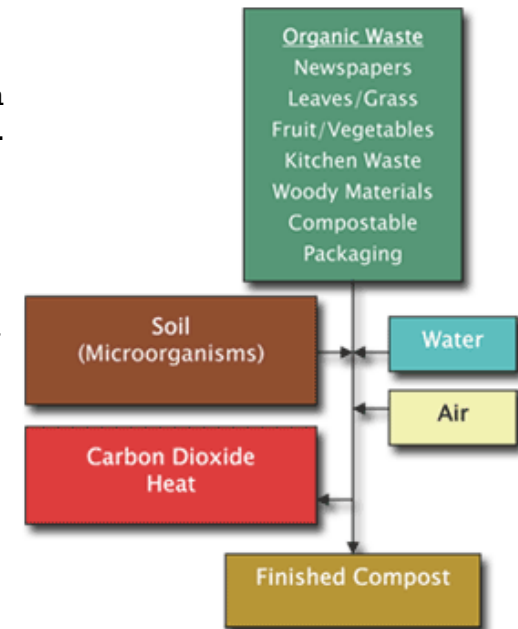
BUILDING AND MANAGING THE COMPOST HEAP

The Composting Timetable

The temperature of the pile should rise steadily, peaking between 50 and 65 degrees Celsius (120 F to 150 F). Twenty-four hours to one week later, when the temperature begins to drop, the compost is ready for turning. Break up any clumps of material, and move the outside parts to the base and centre. If the pile is too dry, this is the time to wet it. Cover the pile again, and wait.

The temperature should peak again in about a week, in a pile made of well-shredded materials. (Remember, the smaller the pieces, the faster the compost.) As soon as it begins to cool, turn the pile once more. In another week or two, the compost should be finished; that is, dark and crumbly, fresh-smelling, with very little of the original material identifiable.

When compost is ready for use, the temperature of the pile won't rise above 43 degrees Celsius (110 F) no matter how often you turn it.



BUILDING AND MANAGING THE COMPOST HEAP

When a compost pile is not heating up, the problem is almost certainly one of three things:

- the pile is too small
- it is too dry
- it needs more "greens" or, a "starter" to give it more nitrogen

Compost Starters

Garden suppliers sell compost starters or "activators," often composed of high-nitrogen fertilizers. In some cases, "inoculants" of dehydrated bacteria are also used as compost activators. There are also several effective organic alternatives: finished compost, or well-composted manure, for example... or you can simply rebuild the compost pile with additional grass clippings or other "green" materials.

Compost Activators

A compost activator contributes either high nitrogen, microorganisms, or both, and provides a quick boost to the decomposition process. You "**jump start**" your compost by adding aged manure, or compost starter.

Step 6:

Add new materials on an ongoing basis to an already established pile. Turn, turn, turn. This introduces air and gets the pile heating up again. Mix older materials with newer materials for faster decomposition. It is also possible to have two heaps—consider starting a new one if the first one is advanced and compost is near in the making.

THE INGREDIENTS FOR A COMPOST HEAP

The chart below lists common materials for composting.

TYPE OF MATERIAL	USE IT?	ADDITIONAL INFORMATION
Algae, seaweed	Yes	Good nutrient source
Ashes from charcoal	No	May contain materials bad for plants
Beverages, kitchen rinse water	Yes	Good to moisten the middle of the pile. Do not over-moisten the pile.
Bird droppings	Careful	May contain weed seeds or disease organisms
Cardboard	Yes	Shred into small pieces if you use it. Wetting it makes it easier to tear. If you have a lot, consider recycling instead.
Cat droppings or cat litter	No	May contain disease organisms. Avoid.
Coffee ground and filters	Yes	Worms love coffee grounds and coffee filters
Dog droppings	No	Avoid
Dryer lint	Yes	Contains moisture
Eggshells	Yes	Break down slowly. Crushing helps
Fish Scraps	No	Can attract rodents and cause the pile to develop offensive odours

THE INGREDIENTS FOR A COMPOST HEAP

TYPE OF MATERIAL	USE IT?	ADDITIONAL INFORMATION
Hair	Yes	Scatter it so that it is not in clumps
Manure (horse, pig, sheep, goat, chicken)	Yes	Great source of nitrogen. Mix with carbon rich materials such as brown leaves so that it breaks down better.
Meat, fat, grease, oil, bones	No	Avoid
Milk, cheese, yoghurt	Careful	Put it deep in the pile so that it does not attract animals
Newspapers and other plain paper	Yes	Shred it so it breaks down easier. Avoid use of coloured paper.
Leaves (green)	Yes	Shredding leaves help them break down easier
Sawdust and wood shavings	Yes	Do not use too much and don't use treated wood
Weeds	Careful	Dry them out before use
Branches and twigs, fruit and vegetable peelings	Yes	Chop up branches and twigs
Yard trimmings treated with chemical pesticides	No	Might kill beneficial composting organisms
Non-biodegradable materials (aluminium foil, plastics, glass, metals, Styrofoam containers)	No	These materials will not break down

BUILDING AND MANAGING THE COMPOST HEAP/PILE

Step 3:

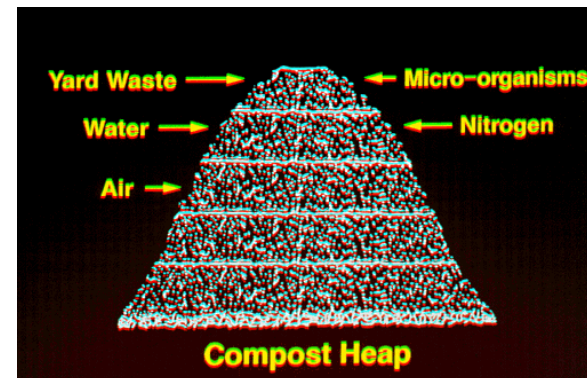
Layer 15 cm (6 inches) of well-watered "browns" and 15 cm of "greens," mixing the two layers together.

Step 4:

Alternate and mix layers of each type of material, adding water as needed, until the pile is at least one meter (3 feet) high. Adding the material in layers simply helps you judge the right proportions of "brown" and "green." But everything should then be thoroughly combined or mixed to compost efficiently. Moisten each layer as you stack the pile.

Step 5:

Cover the pile with a thin layer of soil to protect it from heavy rain and vermin then wait. Turn the pile weekly to thoroughly mix the materials. Turning allows for thorough decomposition and speeds up the composting process. Continue to cover with soil as necessary.



BUILDING AND MANAGING THE COMPOST HEAP/PILE

Step 1:

Gather both "green" and "brown" ingredients, enough to make a compost heap measuring at least 1 cubic metre, that is 3 feet in each direction (high, wide and long). Use equal amounts of "greens" and "browns." It may be useful to consider starting a new heap after the first heap is well underway in the decomposition process.

A smaller pile will not generate or retain enough heat. If you choose the appropriate ingredients to compost, and keep pets and pests out, there's no reason for concern.



A much larger pile is more likely to compact, will shut out air, and is more difficult to work with.

Step 2:

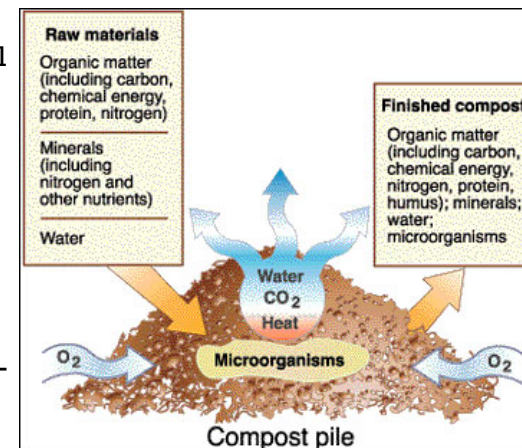
Chop or shred into small pieces as much of the material as possible. Dry materials like leaves can be run through a shredder or under a lawn mower. Shredded materials make a better home for decomposer organisms, with more surface area for them to work on. A shredded pile is also better insulated, has more pockets for air and retains moisture more easily. The finer the pieces -- the faster your compost will be finished.

COMPOSTING METHODS

Composting can be performed by a variety of methods. These include:

1. Placing Materials in Open Piles—Compost Heaps/Piles

Compost piles should be at least 1 cubic yard in size. Note that food scraps must be covered with at least 6 inches of soil to discourage animals and insects from gaining access to the materials.



2. Burying Materials in Pits or Trenches

Materials can be buried in holes or trenches and allowed to decay naturally. This is a useful way of composting food scraps.

3. Enclosing Materials in Drums or Bins (e.g. holding bins, turning bins, and worm bins)

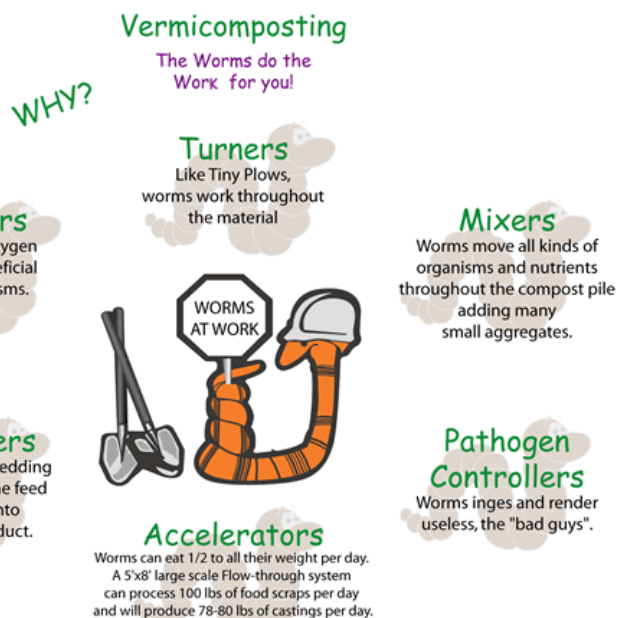
Composting units or bins can be constructed from inexpensive materials with little carpentry or masonry skills. Bins can also be purchased at garden centres and through garden supply catalogues.

GOJ Ministries and Agencies can choose anyone of the methods above.

COMPOSTING METHODS

Worm Composting or Vermicomposting

Worm composting can be accomplished in bins or pits and adapted for indoor or outdoor composting. It can be ideal for small land areas or those with no land space who want to derive some of the benefits of composting and reduce waste. Worm bins are easy to construct and can be adapted to accommodate the food scraps generated within an organization's lunchroom or cafeteria. Indoor methods involve placing red worms (not earthworms or field worms typically found in gardens) in a bin containing shredded newspaper and garden soil. The worms consume their own weight in food each day. Once the worms are established in the bin, they will degrade fruit and vegetable scraps as well as coffee grounds added to the bin.



BUILDING AND MANAGING THE COMPOST HEAP/PILE

Composting involves various activities, ranging from turning the heap occasionally to a major commitment of time and energy. If the heap is properly managed, finished compost can appear in 3-4 weeks.

The speed with which finished compost is produced is determined by whether materials are chopped up, how they are mixed together, amount of moisture and the temperature. The decomposition rate increases with the decrease in size of the composting materials. If you want the pile to decay faster, chop up large fibrous materials. Shredded organic materials heat up rapidly, decompose quickly, and produce a uniform compost. Layering is traditional, but mixing the materials works just as well.

New materials can be added to the heap on an ongoing basis to an already established pile. The temperature of the heap is important - it indicates the activity of the decomposition process. The easiest way to track the temperature inside the pile is by feeling it. If it is warm or hot, everything is fine. If it is the same temperature as the outside air, the microbial activity has slowed down and you need to add more nitrogen (green) materials such as grass clippings, kitchen waste, or manure.

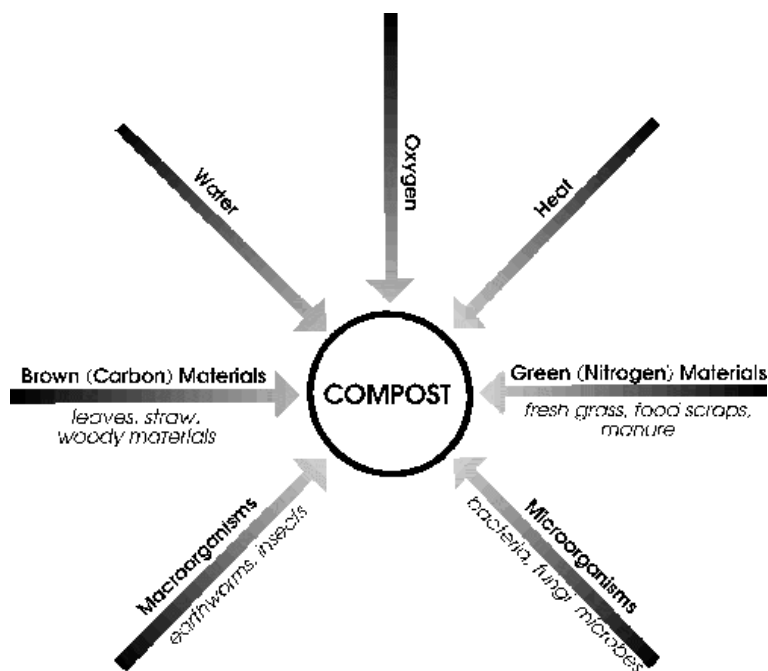
The following provides step-by-step directions for building your compost heap.

Composting...makes everyday Earth Day



THE BENEFITS OF COMPOSTING

- Control or suppression of certain soil-borne plant pathogens
- Supply of significant quantities of organic matter
- Improvement of cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use
- Supply of beneficial micro-organisms to soils and growing media
- Improvement and stabilization of soil pH



Cation exchange capacity is used as a measure of fertility, nutrient retention capacity, and the capacity to protect groundwater from cation contamination (Wikipedia Free Encyclopedia)

THE BENEFITS OF COMPOSTING

As more and more compost is produced and utilized, the benefits of using compost have become more evident and measurable. Because of its many attributes, compost is extremely versatile and beneficial in many applications. Compost has the unique ability to improve the properties of soils and growing media physically (structurally), chemically (nutritionally), and biologically.

To the Soil

Compost does several things to benefit the soil that synthetic fertilizers cannot do. First, it adds organic matter, which improves the way water interacts with the soil. In **sandy soils**, compost acts as a sponge to help retain water in the soil that would otherwise drain down below the reach of plant roots. In this way, it protects plants against drought. In **clay soils**, compost helps to increase the porosity (tiny holes and passageways) of the soil, making it drain more quickly so that the soil does not stay waterlogged or dry out into a brick-like substance.



Compost also inoculates the soil with vast numbers of beneficial microbes (bacteria and fungi) and enhances the habitat that the microbes need to live in. These microbes are able to extract nutrients from the organic part of the soil and eventually pass the nutrients on to plants.

THE BENEFITS OF COMPOSTING

To Plants

Compost can:

- Suppress plant diseases and pests
- Reduce or eliminate the need for chemical fertilizers
- Promote higher yields of agricultural crops

Add Power to Your Flowers...



To the Environment

Compost can:

- Reduce the volume of waste sent to landfills
- Reduce the demand for water
- Reduce the need for fertilizers
- Remove solids, oil, grease, and heavy metals from stormwater runoff
- Capture and destroy 99.6 percent of industrial volatile organic chemicals (VOCs) in contaminated air
- Facilitate reforestation, wetlands restoration, and habitat revitalization efforts by amending contaminated, compacted, and marginal soils

To the Pocket

Using compost can reduce the need for water, fertilizers, and pesticides. It serves as a marketable commodity and is a low-cost alternative to standard landfill cover and artificial soil amendments. Composting also extends municipal landfill life by diverting organic materials from landfills. Composting will also reduce the amount of money ministries and agencies will have to pay for the disposal of their waste.



THE BENEFITS OF COMPOSTING

To Human Health

Compost contains valuable nutrients that could replace and/or supplement use of chemical fertilizers. Use of chemical fertilizers can therefore be cut down to a minimum. Use of chemical fertilizers, particularly when the user does not use appropriate gear has been linked to various types of cancers. It is also well known that chemical fertilizers lead to contamination and pollution of water supplies.

Saves Time

- Compost makes plants grow faster, bigger, and stronger.
- Using compost as a mulch reduces the need for weeding and watering gardens

Convert:

food scraps,
coffee grounds,
tea bags, grass
cuttings, leaves
and other plant
parts plants



Into:

Clean rich soil

General Benefits of Using Compost

- Improvement in the soil structure, porosity, and density, thus creating a better plant root environment
- Increase of moisture infiltration and permeability of heavy soils, thus reducing erosion and runoff
- Improvement of water-holding capacity, thus reducing water loss and leaching in sandy soils
- Supply of a variety of macro and micronutrients