



Guide to Composting

Worm Farming

Bokashi



Composting
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Introduction



What is compost?

Compost is a mixture of decayed organic material and is used as fertiliser.

Generally, the ingredients used to make compost come from our gardens and kitchens (food scraps) although organic material is anything that was once living.

As the organic material breaks down, it changes and becomes what is known as humus. During the process, soil micro-organisms, worms and insects convert the organics into a soil-like material which can then be used in the garden.

What is composting?

Composting is a process which mimics nature by recycling organic material.

Composting is like baking a cake. It needs the right combination of ingredients and sufficient time for everything to “cook” – e.g. break down completely – before the compost is ready. (Note that materials that are only partly composted can harm plant life).

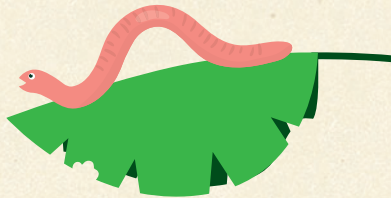
The benefits

- Compost produces a valuable humus that returns organic matter to the soil.
- It reduces the harmful effects of organic waste in landfill (e.g. water pollution, emissions of the potent greenhouse gas methane, and bad smells).
- It reduces the need for chemical fertilisers in your garden.
- It reduces rubbish collection costs.
- Producing your own compost saves money.
- It reduces the space needed for landfills.

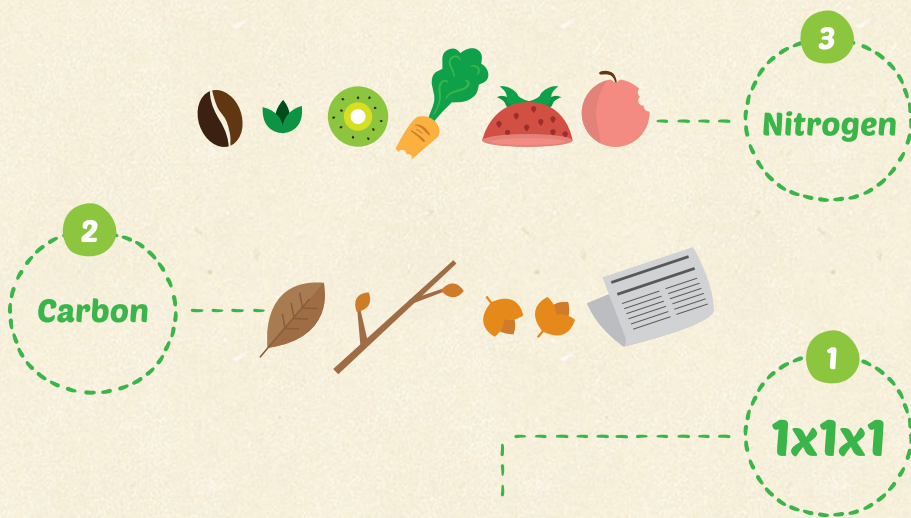
Compost results from the eventual decomposition or break down of the ingredients. It can take anywhere between two and 18 months before compost is ready to use, depending on the method used, what gets put into the bin, the time of year and how often the material is turned.

There are a number of ways to compost, however the focus here is on three methods which are most common and effective — using compost heaps and/or bins, worm farms and bokashi.

Composting



Getting started • Keeping it going • The final touches • What not to compost • Common composting problems • Invasive weeds • Composting invasive weeds • Types of compost bins



Getting started

Choose a site with care. Ideally, it should be warm and sheltered. Consider neighbours by siting the heap or bin away from any areas that are too close and could cause offence.



2 To work properly, your compost heap should be **at least 1m high x 1m wide x 1m deep**.

3 Start with a layer of coarsely chopped **twiggy, woody** material on bare soil or grass.

4 Add alternate layers of green matter (**nitrogen rich**) and brown matter (**carbon rich**), preferably in layers no more than 5-10cm deep – see list on page 5.

Limit all materials, including grass clippings, to thin layers.

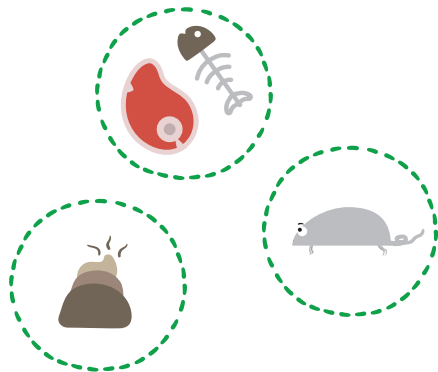
If you can't be bothered layering, just make sure there is a mixture of green and brown matter.

Avoid

Avoid cat/dog/human faeces, meat, fish, bones, oil and invasive weeds. Smaller pieces make quicker compost – for quick compost, fibrous materials should be no bigger than the thickness of your finger (2cm).

The heap should have a cover, e.g. plastic lid, underfelt or tarpaulin.

If rodents are a problem, they can be kept out by cutting out a piece of chicken wire larger than the bin base. Place it underneath the bin on the soil and fold the edges 10cm up the sides of the bin.



When adding food scraps, it's especially useful to add an equal quantity of brown material on top such as dry leaves to reduce odours and speed up decomposition.

Keeping it going

Compost activators or accelerators can be added to the compost to hasten the natural break-down process.

They usually contain a natural nitrogen or bacterial enzyme and can be bought at most garden centres. Sprinkling on lime and untreated wood ash can help balance pH & reduce smells. The heap should be as moist as a wrung out sponge. Add water if needed.

Avoid excessive moisture by keeping the heap covered.

To work properly, your compost heap needs to reach temperatures between 30 and 60°C. From time to time, check that it is heating up in the centre; it should feel warm.

Compost needs air – turn and mix it up to aerate and speed up decomposition.

The final touches

Once an open heap is 1 metre in height, you should finish it by turning it with a pitchfork and mixing it up every week or two.

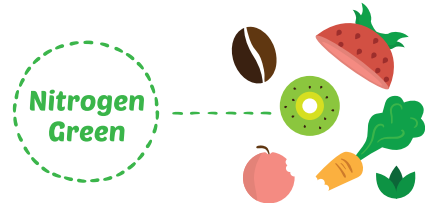
Either use a new bin for the new heap, or use your original bin and just keep the old heap covered with underfelt, tarpaulin or something similar.

Compost is ready when it becomes a sweet, dark, crumbly material and you cannot distinguish the original materials in it.

If compost is well maintained and turned often it can be ready in as little as 6-8 weeks. If it is never turned,

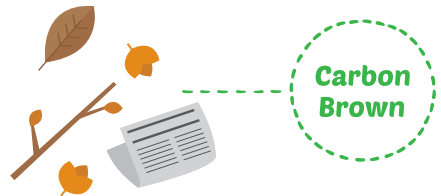
it will be ready in 12-18 months. When it's ready, put it onto the soil or dig it into your garden. You can also use it for pot plants and for potting up seedlings.

Don't forget to wash your hands when you've finished composting and gardening!



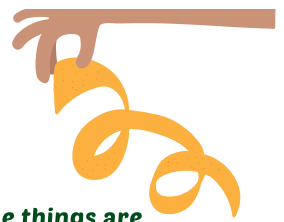
Green – Nitrogen rich, wet

- Food scraps
- Manure
- Fresh grass clippings
- Weeds without seeds
- Vegetable scraps
- Seaweed
- Compostable teabags
- Tea leaves and bags
- Coffee grounds



Brown – Carbon rich, dry

- Torn newspaper/cardboard
- Egg cartons
- Tree prunings
- Dry leaves
- Bark, untreated sawdust
- Wood ash
- Twigs and sticks
- Crushed shells



What not to compost

Although in theory anything organic can be composted, some things are best avoided when composting at home.



Cat and dog faeces
Can cause disease



Large amounts of pine needles or gum leaves
Allopathic — create environment hostile to compost creatures



Meat, fish, oil, bones, fat
Can attract rats



Woody materials in pieces larger than the diameter of your finger
Too slow to break down



Non-organics e.g. tin, glass, plastics
Won't break down



Diseased plants (e.g. with blight)
Disease may spread



Invasive weeds, e.g. kikuyu, wandering willie, jasmine
Could spread in or beyond your garden – however they can be composted after treatment (see page 7)



Bamboo, flax and cabbage tree leaves
Not ideal in home composting systems (bury in the ground, or take green waste to Transfer Station for disposal)

Common composting problems

Problem	Cause	Solution
Smelly, slimy heap	Not enough air/too wet/too much nitrogen	Turn heap. Add brown material (e.g. dry leaves)
Materials are not decomposing	Heap too small. Not enough heat due to lack of green materials or water. Materials in heap are too large	Increase size of heap. Add green materials and water. Break materials down into small pieces
Pests attracted to heap e.g. flies, cockroaches, rats, mice	Wrong food added/bin not rodent proof	Don't use meat/bones/ fish. Bury food scraps in centre of heap. Rodent proof your bin
Fruit flies (vinegar flies)	Heap is too acidic	Sprinkle lime on heap
Ants	Heap is too dry	Add water and lime
Other "mini-beasts"		E.g. beetles, worms and other insects are essential. Appreciate the work they do!

Invasive weeds

It can be difficult for people to accept that well-loved plants like honeysuckle and Mexican daisy are deemed to be pests, but it is essential to control them. Plants like ginger, jasmine and privet can cause serious harm to our native environment and others can threaten the livelihoods of producers of commercial crops.

To find out more and to identify invasive weeds, visit:

www.doc.govt.nz

www.weedbusters.org.nz

www.arc.govt.nz

Composting invasive weeds

It is possible to compost invasive weeds, however it is essential that they first go through a “pre-compost” process in order to ensure that they die.

- 1 Put the weeds in a large plastic bag with a handful of soil and water.
- 2 Tie the top and leave for at least two months, until there are no green shoots or other signs of life.
- 3 Add them to your compost heap as a green.

If you leave them for long enough, they will turn into soil.

There is also another way to handle noxious weeds:

- 1 Put them into a closed bin and cover them with water (or submerge them in a sack).
Leave for 2-3 months by which time the water will turn a green/brown colour but it can be used as fertiliser for your plants.
- 2
- 3 Empty the solids into your compost bin.

Types of compost bins

Before you choose a compost bin you should consider what you will be putting in it. Larger, open bins are better for people with large amounts of garden waste. Smaller, enclosed bins are more suitable for households with large quantities of food waste as they provide a barrier to rodents. You may find you need both!

Choosing a bin

There are a number of points to consider before you buy a bin so that you get one appropriate for your needs. These are:

- The number of people in your home
- The size of your garden
- The capacity of the bin, taking the above into consideration
- Your ability to turn compost with a garden fork



- The design of the bin (e.g. whether different parts need to be lifted)
- materials used in the making the bin

If it's hard on your back, consider alternatives e.g. rotational composters.

Buying a bin

There is a range of commercial compost bins which vary in size and complexity. With regard to size, a medium-sized compost bin (240 litres) should cope with all the kitchen waste and garden waste of 2-4 people.

Worm bins are especially suitable for households with limited outdoor space and are designed to process kitchen waste, not garden waste — see Worm Farming page 10.

Bins are usually available from hardware and garden stores, and range in price from \$40 to \$220. Generally speaking, bins that require less turning are more expensive.

While larger bins are obviously more suitable for larger households, bins may not vary significantly in performance. The most important thing is knowing how to manage your bin so that you make good compost.

Make your own compost bin

If you are making your own bin, you can use a wide range of material, including chicken wire, wood, plywood, bricks, concrete blocks, etc. It must be on the soil and no smaller than 1m high x 1m wide x 1m deep.

For large amounts of garden waste, units can be made from wood, bricks or concrete blocks. Ready access from the front is necessary.

Stacking bins have the advantage of being moveable and can be extended to cope with large amounts of waste. Black polythene or sacks may be used for lining, warmth and moisture control. Wrapping netting around a wooden frame. Line these with newspaper or cardboard to retain heat.

Check for designs in books at the Waitomo District Library in books on composting such as *The Suburban/Urban Composter* by Mark Cullen.

Some designs can also be found at:
www.backyardgardener.com/compost
www.pinterest.nz/
www.compostcollective.org.nz/





Worm Farming

- What is worm farming • Types of worm bins**
• Getting started • Keeping it going • The diet • Harvesting your worm casts • Common worm farming problems





What is worm farming?

Compost can also be produced using worms. This is known as worm farming. It is also called 'vermiculture' or vermi-composting.

Usually tiger worms are used for worm farming in NZ, though red worms can also be used. Worm farming uses the same principles as composting, but it does not generate heat, making it

cold composting. Value is added to the materials when they are eaten and excreted by the worms. This produces what is called vermicast and worm tea which have high levels of nitrogen, phosphorous and potassium (NPK) compared to ordinary soil. This makes them valuable for your plants' leaf growth, root and stem strength and flower and fruit set.

The benefits

Same benefits as page 2.



Casts and worm-tea are fantastic for plants (always dilute the worm-tea to the colour of weak tea – usually about 1:10).



Kids enjoy them.



If you have mostly kitchen waste and live in a home with little or no outdoor space, a worm farm is a good option.

Types of worm bins

There are different types of worm bins but most have a number of layers.

Note that it is easier to harvest worm casts from bins which have more shallow layers. Bins generally have two to three layers; some bins can have extra layers added to increase capacity. When buying a bin, ask the retailer whether there is any back up if you need advice.

- A tray/layer/stacker system allows for easy removal of worm casts
- Bins with taps allow the worm tea to be extracted easily
- Some bins stand on legs which can be easier to proof against pests (legs can stand in bowls of water if need be)
- When buying a bin, ask the retailer for advice on the product.

- Sizes vary and costs vary between \$20 and \$200
- Worms and food scraps are added to the top working tray which generally has a vented lid
- More levels can be added once the first working tray has filled with worm casts
- A three-tray system allows for easy removal of worm casts with minimal loss of worms

Getting started



1

Choose a site which is sheltered from sun, wind and rain. Carports or sheltered porches are ideal.

2

Use a layer of bedding first – e.g. hay/coconut fibre/shredded cardboard/paper.

Bedding should be damp and porous. Add worms — 1000 (250g) is fine; 2000 is even better. Try asking on local community pages if anyone in your neighbourhood has an abundance of worms. They can also be purchased online from NZ retailers at around \$50 per 1000 worms.

3

Food can then be added. You can cover food scraps with damp newspaper or cardboard to limit flies and odour.

Worms can eat their own weight each day but don't overfeed at the start (e.g. for 250g of worms, give about 200g of food).

4

Worms need air but not light (worms are photophobic).

Keeping it going

Worms need a moist environment. Check that their surroundings are damp, add water if needed.

Add dry leaves or torn up paper products if it is too wet — the working area should be as damp as a wrung out sponge.

Add food scraps regularly.

Smaller pieces (not larger than 2cm) will be eaten more quickly and prevent odours.

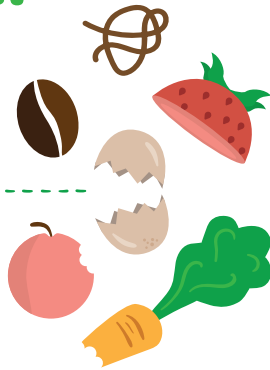
Worms cannot tolerate very hot or cold conditions (10-30°C is ok).

Small flies or white worms/bugs indicate the worm farm has become too acidic and you should add a sprinkling of lime to neutralise pH. Worms are omnivores and will eat almost anything, but some things are best avoided.

If worms are overfed, uneaten food will rot.



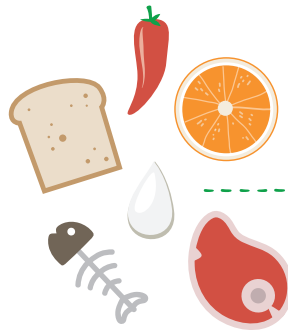
The diet



Most fruit and vege scraps, coffee grounds and tea leaves, aged horse manure

Dirty paper, crushed eggshells

Vacuum cleaner dust and hair



Spicy food, chilli, onion, garlic, meat and milk products

Flour products

Cooked food

Garden waste

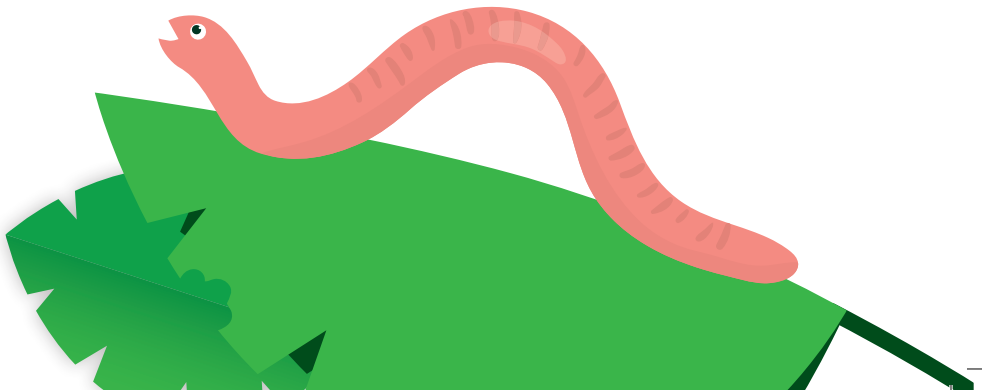
Shiny paper

Citrus/very acidic food

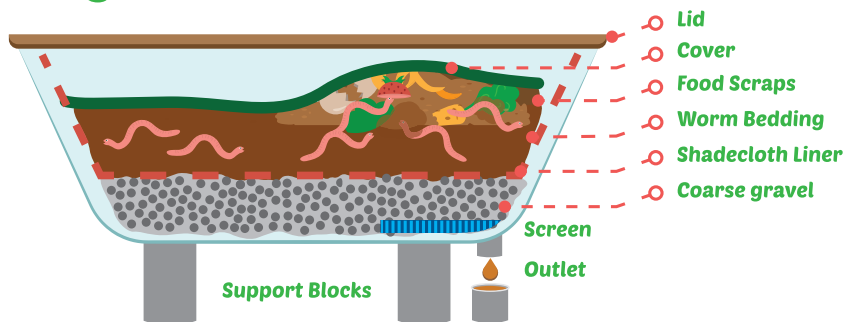
Harvesting your worm casts

After a few months or when a layer is full, you should harvest the casts. Remove the top layer and take off the bottom layer. This bottom layer contains the casts. It is ready when few worms can be seen. After the bottom tray is emptied, any worms and unprocessed

material can be placed into the next full layer. The emptied tray then becomes the top layer. Add bedding (paper/straw/manure) to the top layer and then add more food scraps. The worms will migrate slowly to the food layer.



Make your own worm farm using recycled materials



You can also easily make a worm bin out of large buckets, polystyrene trays or an old bath. A bath worm farm will ultimately digest about 1-2 litres of mixed organic waste a day.

To remove the casts, once the worm farm is full (after nine to 18 months), place a plastic sheet or large container

next to the bath, and using a garden fork remove the top half of the worms' bedding. This is undigested food and is where the majority of worms will be. Place this to one side. Remove all casts. Replace the contents that were put aside and commence the feeding, forking, watering process when required.

Common worm farming problems

Problem	Cause	Solution
Rotting food, food not eaten	Too much for population/ wrong food/pieces of food are too big for the worms	Feed less, break into small pieces
Fruit/ vinegar flies around farm or small white bugs and worms	Too acidic	Cover food with damp paper. Add lime to increase pH
Worms climbing up sides. Worms very fat & pale	Too wet	Add paper products and dry leaves, gently fork holes in the working layer
Ants	Too dry or acidic	Add water/lime. If your worm farm is on legs, place each leg in a container of water to stop such pests from getting in
No worm tea	Not enough water	Add water

Bokashi

What is Bokashi • Benefits • Getting started



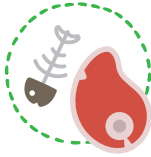
What is Bokashi?

Bokashi was developed in Japan and literally means 'fermented organic matter'. In NZ, bokashi kits can be purchased from www.zingbokashi.co.nz.

A fermented wheat-bran mixture called Compost-Zing is used in a bucket system where food is pickled. The final product has a slight sweet/sour smell.

The benefits

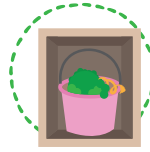
Same benefits as page 2.



The benefit of this system is that you can add products such as meat and fish, which are discouraged in the usual compost due to vermin & odours.



It produces a compost product within 2-4 weeks after being buried, compared to 3 or more months in a compost pile.



No space is required as fermentation takes place in the bucket, which makes it ideal for small houses, apartments and schools.



Buckets can be kept indoors as the smell is inoffensive.



It keeps food waste out of the landfill and it is good for your plants, adding beneficial vitamins to the soil.

Getting started

Sprinkle a layer of Compost-Zing in the base of your bucket (1 tablespoon).

Add a layer of food and remember to break it into small pieces. Once you have a layer of about 3cm, add another handful of Compost-Zing. More may be used in summer than winter.

Push layer down gently to remove any air, as this is an anaerobic process (a potato masher is ideal).

It is best to minimise opening the bucket to avoid excess air.

Close the bucket lid tightly. This can be easily removed again by pressing down on the centre of the lid.

Drain any liquid that forms at the bottom of the bucket every 3-4 days. Dilute as required.

When the bucket is full, close the lid and keep in a warm place for about 10-14 days. When the food waste smells like pickles, it is ready to be buried in the garden. Plants can be put directly into the soil after 10 days.

**Waitomo District Council
would like to**

**Thank
You**

**for your efforts in helping to
reduce waste sent to landfill**

**For more information please visit
www.waitomo.govt.nz**

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District Council

