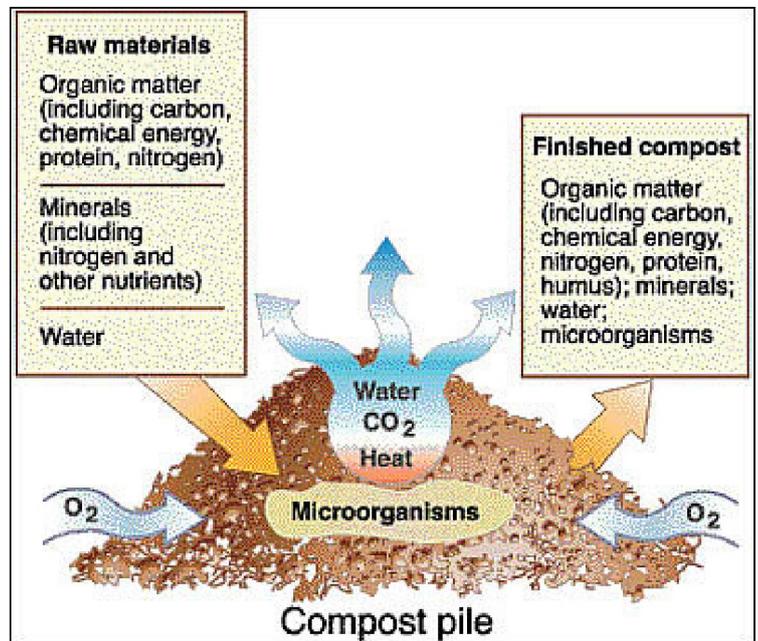


## The Composting Process

The organisms that make compost need food (carbon and nitrogen), air, and water. When provided with a favorable balance, they will produce compost quickly. Other organism factors affecting the speed of composting include surface area/particle size, volume, and temperature.

Organic material provides food for organisms in the form of carbon and nitrogen. Bacteria use carbon for energy and protein to grow and reproduce. Carbon and nitrogen levels vary with each organic material. Carbon-rich materials tend to be dry and brown such as leaves, straw, and wood chips. Nitrogen materials tend to be wet and green such as fresh grass clippings and food waste.



## The Ingredients

A C:N ratio ranging between 25:1 and 30:1 is the optimum combination for rapid decomposition. If ratio is more than 30:1 carbon, heat production drops and decomposition slows. You may have noticed that a pile of leaves or wood chips will sit for a year or more without much apparent decay. When there is too much nitrogen, your pile will likely release the excess as smelly ammonia gas. That said, the C:N ratio does not need to be exact. Values in table below are calculated on a dry-weight basis. Blending materials to achieve a satisfactory C:N ratio is part of the art of composting.

MATERIAL	C:N RATIO	MATERIAL	C:N RATIO
Woody Vege stalks	50-100:1	Manure, horse and cow	20-25:1
Fruit waste	35:1	Paper	170-200:1
Grass clippings	12-25:1	Sawdust	200-500:1
Hay, green	25:1	Seaweed	19:1
Leaves, deciduous	21-28:1	Straw	40-100:2
Leaves, pine	60-100:1	Vegetable waste/Weeds	12-25:1
Leaves, other	30-80:1	Wood chips	500-700:1

- **Nitrogen– Green**, newly cut – 1 pile of fine (eg fresh lawn clippings), one pile of coarse (eg freshly chopped up weed/tree stalks)



- **Carbon– Brown**, dry - one pile of fine (eg old sawdust out the chookhouse), one pile of carbon (Bail of Straw)
- **Activators**– molasses (diluted), kelp (diluted), liquid worm castings (diluted to the colour of weak tea), (mix up in a couple of watering cans and have ready to go on nitrogen layers), sour milk, old compost, herbs (comfrey, yarrow, stinging nettles) Try 1 kg of rock phosphate, 1 lts of molasses, and 1 lts of kelp powder .
- **Minerals** - Rockdust– to increase the mineralisation of your soil at least 1 kg.
- **Water**– have a hose ready to water in the carbon layers or watering can with water and molasus in it.

## Where to get the mineral stuff from

Other than perhaps buying some organic straw most of your bulk carbon and nitrogen sources should be free and recycled organic 'waste'. WA's soils and thus most things grown in our soils are trace element deficient. This means that compost made from them is also low in minerals and trace elements. To address this you need to add the organic rock dust, rock phosphate, kelp and other remineralising amendments.

They are common farm based fertilizers and stock feed supplements or organic gardening soil amendments. The cheapest place is to purchase them through stockfeed stores like City Livestock on Gnangara Rd, Green Life Soils. You might also find them closer at Absolutely Organic and other small organic shops and nurseries.

## The Factors Controlling Compost

**Air** - Proper aeration is a key environmental factor. Many microorganisms, including aerobic bacteria, need oxygen. They need oxygen to produce energy, grow quickly, and consume more materials. Aeration involves the replacement of oxygen deficient air in a compost pile with fresh air containing oxygen. Natural aeration occurs when air warmed by the composting process rises through the pile, bringing in fresh air from the surroundings. Air flow can be negatively affected if large quantities of finely sized materials such as pine needles, grass clippings, or sawdust are used, or if materials become water saturated.

The easiest way to aerate a pile is to regularly turn it with a pitchfork or shovel. Turning will fluff up the pile and increase its porosity. To aid turning make compost pile out in wire wrapped in a circle, or light welded mesh.

**Moisture** - Decomposer organisms need water to live. Microbial activity occurs most rapidly in thin water films on the surface of organic materials. A general rule of thumb is to wet and mix materials so they are about as moist as a wrung-out sponge.

Material should feel damp to the touch, with just a drop or two of liquid expelled when squeezed in your hand. If a compost pile is too dry, it should be watered as the pile is being turned or with a trickling hose.

**Temperature** - Temperature is another important factor in the composting process and is related to proper air and moisture levels. As the microorganisms work to decompose the compost, they give off heat which in turn increases pile temperatures. Temperatures between around 55°C indicate rapid decomposition, and kill off pathogenic bacteria and fungi like Ecoli, but to temperatures greater than 70°C reduce the activity of most organisms. Lower temperatures signal a slowing in the composting process.

Aim for temperature of 55°C- 70°C for at least 3 days in all parts of the compost: Compost must be turned to achieve adequate temperature throughout pile. Turn compost every time compost approaches 65°C to maintain adequate air throughout pile. Compost thermometers are available from many garden supply companies.

Another method for monitoring temperature is to stick your fist into the pile if the interior of the pile feels uncomfortably warm or hot during the first few weeks of composting, you'll know everything is fine. If the



temperature inside the pile is the same as the outside, that is an indication that the composting process is slow. You can increase activity by adding nitrogen rich material and turning the pile.

**Volume** - In order to become self insulating and retain heat, piles should ideally be about 3m<sup>3</sup>. The larger size retains heat and moisture, but is not too large that the material will become unwieldy for turning. Smaller compost piles will still decompose material, but they may not heat up as well, and decomposition is likely to take longer. The more “surface area” available, the easier it is for microorganisms to work, because activity occurs at the interface of particle surfaces and air. Don't “powder” materials, because they will compact and impede air movement in the pile.

## Wire Cage Thermal Composting

- Make the compost in a circular wire cage, use welded wire fence, 6 mt length. Mesh size is 50 mm x 75 mm and ideally about 1 mt height, if available get the 'heavy duty' wire. To turn pile, undo wire, relocate within a fork throw, rejoin wire.
- A tarp to cover the compost usually about 5 mts x 5 mts.
- Compost materials. Principal: 'A diversity of materials ensures a diversity of microbes' What we would like to have is a large diversity of materials, so some of everything you can find.
- Create a base of coarse carbon to allow under ventilation, then stack as per 4 brown, 3 green, 2 nitrogen, using a wheel barrow to portion it. Having coarse brown material allows air in so avoid too much paper, grass clipping and other fine carbon that will mat down and form “paper mache”.
- Layering via the 4 brown (carbon)-3 green (carbon and nitrogen) -2 Nitrogen ratios with a wheel barrow allows good control and with coarse material allows good oxygen flow. This is why these compost piles should only need to be turned every 10 days, about 5 times and it should be done. Over the course of the pile keep an eye on the moisture levels- it must be kept moist to allow the pile to ‘cook’ properly.
- As the centre of the pile is the hottest part ,ensure that when turning, the cooler outer edges of the pile gets turned in to the centre to ensure the correct temperature for killing weed seeds and possible pathogens
- Turn compost when it approaches 68 to 70 °C or to hot to keep hand in middle.
- Compost cooked 14-20 days, keep turning, done once composition is fine, earthy brown and cool.
- Finished compost can be kept for 3-6 months in a dark, moist environment. The bugs hibernate and can be reenergized. However as with everything the sooner the better.

## Chop And Drop Pruning "Lazy Compost"

Natures way of recycling organic matter is to let the leaf and plant matter fall on the ground, pile up and reach a depth and concentration such that it holds moisture and supports bugs and biology which intern break down the organic matter into humus and thus soil.

A quick and simple way of recycling your plant waste/pruning's is via insitu cold composting, basically chop and drop, you grow plants that produce lots of growth (organic matter) and you prune it heavily letting the plant matter drop around the plant on the soil. This is slow and ineffective at making usable compost but simple and quick to get done and in the long run the soil building effects are similar.

## What to Cold Compost In

There are many techniques for making compost piles to speed up the cool composting process and allow you to compost food waste more safely.



Pile or Heap - If you have all the ingredients but no wire, you can make a heap/pile. A hole or Trench - Dig a hole and bury compost. A bin above or buried in the soil - Purpose build bins can keep pests out and allow lots of storage then composting once full. Having more than one allows you to leave the full bin to compost over 3-4 months.

Bays - Compost bays are popular, 3 bays allows you to run two lots of compost on the outer bays and use inner bay to 'turn' the compost in between. Bays are also good and neat way to accumulate/store ingredients for a big Hot compost batch.

Here is a part of the great EarthCarers Compost Flyer look the rest of their info sheets online.

# COMPOST



*There are many ways to make successful compost. You can use bins, tumblers or covered heaps. These instructions focus on bin systems. Earth Carers favorite tip is to monitor your compost system - get intimate with it!*

Compost bins can be purchased from gardening stores. Some Councils offer composting bins at a discounted rate.

Don't panic! the finished product will not look homogenous like commercial compost. Each item will compost at a different rate, some chunks in your compost is fine - your garden won't mind!

## Getting Started

1. Choose a site that is shady in summer and has good drainage. Bury the bin 10cm into the soil. Tip: Cover base with a layer of mouse mesh.
2. Add a layer of small twigs, egg cartons dry leaves and/or torn up newspaper. This acts to aerate the compost.
3. Add activators such as animal manures, compost from an old heap, blood and bone and/or rich soil.
4. Add water.
5. Add a variety of materials in thin brown and green layers adding water and activators occasionally. Continue to add these items over time until your bin is full.
6. To aerate your compost and to speed up the process, turn your compost with a compost mate or pitch fork every couple of weeks or more if necessary.
7. Monitor the compost to make sure it is still active, not too dry or wet or attracting pests - see over for troubleshooting.

