

## Here are some figures on recycling rates.

In 2000 Edinburgh Council recycled less than 5% of its municipal waste, and in 2004 the UK had the third worst recycling rate in Europe, at 18%. The UK is now the eleventh best in Europe at around 40%, though there's still a long way to go to hit Edinburgh's target of 5% to landfill and 70% recycled.

Before dealing with home composting, it might be useful to give you an idea of what the city does with our green and kitchen waste.

Here's what happens to the garden waste in the brown bins:

## This is Braehead run by Forth Resource Management.



They take 70,000 tons a year from our gardens and recycling centres and when the lorries arrive they are weighed and then the material is forked into a giant shredder, which can process 45 tons an hour. After that they are piled up in open "windrows". Here the material starts to decompose and gets very hot. The temperature is monitored and has to remain above 65deg for several days to kill pathogens. This is achieved by turning the heaps several times or adding fresh material if they have cooled down too much.



When they finally cool down they are left to stabilize. The whole process takes 16 weeks. Eventually they are screened at different meshes to give soil improvers, biofuel and topsoil, and these are sold.



Kitchen waste can't be composted in open windrows like this, so the material from the food waste caddies is all taken to an anaerobic digester in Cumbernauld, which can process 100,000 tons of kitchen waste and leftover commercial food wastes every year.

## Energen Gas Plant operated by Shanks/Paragon



Anaerobic decomposition means decomposition in the absence of oxygen. This is exactly what happens to bio degradable materials (i.e. food wastes etc.) in a landfill site; only there it is a very slow process that gives off the gas methane for up to 25 years. In the anaerobic digester the wastes are packed into a sealed container and microbes are added which attack the organic waste. These microbes speed the process up so it takes only 40 days to convert  $\frac{3}{4}$  of the dry solids into biogas, leaving liquids and the remaining solids as nutrient rich fertilizer.

Electricity is generated from the gases and is enough to power 5500 homes for a year, and the solids are used as fertilizer for 1000 hectares of land. Now that it's so easy to put garden waste into brown bins and food waste into the grey caddies to be collected, why should we bother to make compost at all?

My challenge is to try to convince the non-composters among you that it's still very worthwhile to do. So first of all, what is compost, and why should we bother to make it?

To me, compost is one of nature's miracles. It has always amazed me that you can leave a pile of garden rubbish somewhere and even if you do nothing at all to it, provided you leave it long enough in the end it will turn into a lovely dark crumbly soil like substance i.e. compost.

## So, how does this happen?

Amazingly, most of the work of the composting process is done for you by billions of tiny creatures, most of them microscopic- there are said to be more microbes in a teaspoon of healthy soil than there are people on the planet. The most astonishing thing of all is that they will appear by themselves in your compost heap as if by magic, if you've provided the right conditions for them. Later on larger creatures turn up too – worms, beetles, earwigs, woodlice etc. Even slugs are useful because they can chew up the stuff and make it smaller for the really important workers in the system, which are the worms. Of the three distinct categories of earthworm that exist here, the ones that live in the top leaf litter and surface compost are the ones I'm talking about – tiger or brandling worm, small and reddish. Here they are in action in my compost bin.



These organisms do all the work of composting for you, and so we can define compost as what is left when plant materials are broken down by organisms that occur naturally in the soil. When no more breakdown can take place the end result is **Humus**, the stable molecules of humus hold on to the nutrients released by this breakdown. So what's so great about humus?

Humus isn't fully understood, but it is a dark jelly like substance that clings to soil particles forming a sort of irregular jumble with small and large pore spaces, allowing water and air to circulate through the soil. So it improves soil structure, making the soil much easier to work. It also improves all types of soil, from sandy soil to clay, as it allows the sandy soils to retain moisture and clay soils to drain. Because the humus binds onto nutrients in the original compost, it acts as a reservoir releasing the nutrients slowly over time, so they are not washed out by the rain. Thus humus is a tremendously important end product of the composting system.

Even when compost has not fully rotted down to make humus, it can be used as a mulch on top of damp soil to hold in moisture in the summer. It can also be sieved and used as a peat substitute (other peat substitutes being coir and leaf mould), and it's free so it saves you money.

Thus to make compost we need

- **DECOMPOSERS**

i.e. worms, bacteria, fungi, beetles etc. and these are all already in the soil

There are only three other requirements, and these are

- **AIR**

because the microbes require oxygen to work properly,

- **MOISTURE**

because the microbes and the worms need a film of liquid around them to be able to move around easily,

- **THE RIGHT MIX OF MATERIALS**

If you provide these conditions the composting bugs that do the work for you will be kept happy, and if you stick to these principles, you simply cannot go wrong. The **ONLY** thing that matters is having the right mixture of materials with the right amount of air and water. Everything else really is incidental. When people have problems with composting, there are usually easy answers, and they always involve at least one of these three essentials:

- **Not enough or too much air**

- **Not enough or too much water**

- **The materials in the wrong balance.**

The most common problem is that the compost heap is too dry. Heat isn't essential, though the process will work faster if your compost heap, box or bin is in a sunny spot.

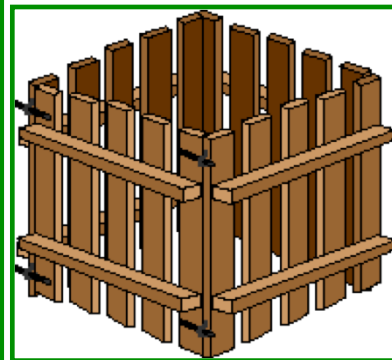
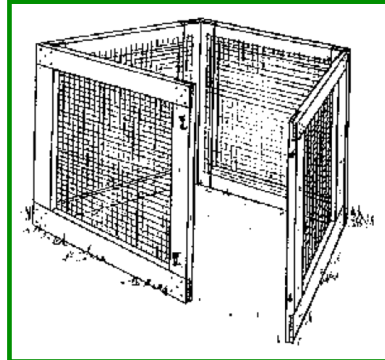
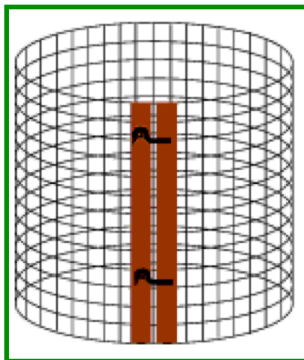
Next, we'll look at what sort of compost heap would suit you best - a box or plastic bin or something else?



Here are some different compost boxes or bins.



Build your own box / bin



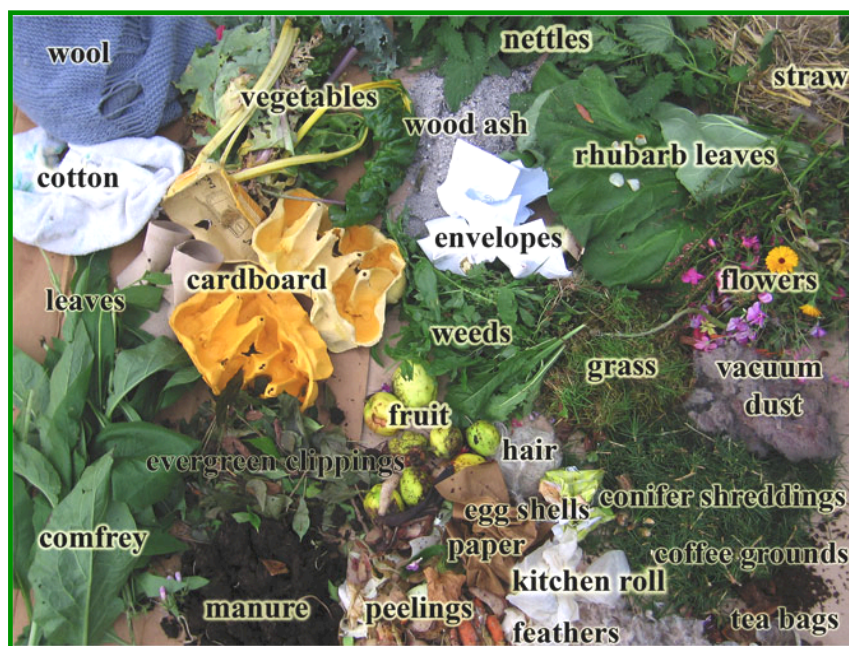
So now you have your bin (open at the bottom of course) and have sited it on soil to allow access to worms and soil dwellers, what do you fill it with?

There's a golden rule here, which is to use **roughly equal greens/browns, preferably mixed**

- **browns** e.g. strawy dead stems, dead leaves, egg boxes, cardboard, crumpled paper are carbon rich, they provide structure and crucially allow air and water movement.
- **greens** e.g. veg peelings, grass, green weeds are nitrogen rich, they rot quickly, they're poorly structured so they prevent air and water movement.

If you pack the materials loosely **air** will be included, and finally the heap should be **damp** and may have to be watered as you pack it. It is then covered to keep in the moisture. An old carpet is good as it lets in some rain and retains moisture.

Some ideas of what to compost are on this photograph. All of these are biodegradeable. Dog and cat faeces, bones, meat and dairy products and anything made of plastic should NOT be put in a domestic compost heap.



Here are a few composting tips based on what I've learnt from my own experience of using a two part system: a New Zealand box for the garden materials and a black plastic bin for the kitchen waste with additional paper/card.

#### Traditional New Zealand Box:



This consists of two approximately three cubic metre wooden boxes together, so that one part can be filled up, covered and left to mature while the other is ongoing. Alternatively the empty part can be used to turn the filled part into, if a speedier process is wanted. Boxes can be made of pallets tied together, and if so it's better to block the holes in the sides with cardboard or similar. It works best if the whole box can be filled up in one go, but it's rare to be able to do this. As it is filled, take note of whether it looks damp enough (water it if dry), whether the materials are in contact with each other and certainly make sure grass is not put in layers greater than about 4 inches. Then cover it.

#### Plastic bin easy method:

I use the bin as an easy care wormery. It's well known that worm compost is the richest compost there is, but the worms need to be looked after and not allowed to get too hot or too cold or too wet. The bin method means that the worms look after themselves but otherwise it's the same principle. For this method to work, worms are absolutely **essential** but they should arrive of their own accord, if the bin is open at the bottom and sited on soil. The other essential is enough paper or card.





## Method:

I have a caddy under the sink that I fill with any greens, peelings etc. as they arise. It can be lined with newspaper to soak up liquids. I also add in cardboard from egg boxes, toilet roll tubes, wrappings round tea, biscuits etc. This is essential to balance the green stuff. I don't do anything else other than to crumple the paper and card first. I then tip it into the plastic bin outside, which has to be conveniently situated or it won't get used. Wear rubber gloves to take off the lid because of the worms.

Whenever the material looks too wet, add in more paper, which could be shredded or crumpled, or card. Beware of shiny card, which will have an unbiodegradable plastic exterior. Beware of shiny card, which



will have an unbiodegradable plastic exterior. Beware also of so called biodegradable caddy liners. If you use these in your caddy, you should empty out the contents into your compost bin and put the liner in your landfill bin. When the compost bin gets full, which could take up to 2 years, the bin has to be lifted off and if possible placed alongside, so that the top

unrotted part can be put straight back in, together with worms which have to be put back too, or at least as many as you can manage to find. (Compost worms only live in the rotting material on top of soil, and will die in ordinary soil). Wear rubber gloves to take off the lid because of the worms in the rim.

## More composting tips

### Leaf mould:

This is a great soil improver and mulch, and can be applied at any time of year without fear of losing nutrients, as it has very few anyway. It can be used in seed and cuttings composts. It can be made in two ways: either pack the wet leaves into a black plastic sack with holes in, tie the sack and leave it a year or two, or construct an open leaf bin with wire mesh. Rotting of the leaves takes place by fungi and requires moisture. Beech and oak leaves take years to rot compared to say ash or lime or sycamore



### Grass:

As it rots so quickly it can be used as a compost

accelerator (in small layers) or as a mulch on or around shrubs, vegetables, hedges etc. Large quantities can be put into a similar bin to leaf mould and layered with paper and card.



### Weeds:

Green unseeding annual weeds can go straight into the compost heap and will rot quickly and act as accelerators. Larger deep-rooted perennial weeds bring up nutrients from below and to throw them away means losing soil benefits. They can be processed by drowning, dessicating or stewing and then adding to the compost heap

## Tumblers, shredders



Tumblers need to be large to be of any use. They also really need to have their contents shredded first. A shredder is tremendously useful around a garden – shredded materials rot far quicker and can also, if dry and twiggy, be used as path material on top of a weed suppressant membrane. Do not buy a noisy or very cheap shredder or you will regret it.

The length of time for garden materials to decompose varies greatly. The following will give you an idea of what to expect.

- Months: Annual weeds, dead flower heads, fruit peel, vegetable trimmings, lawn mowings, newspaper and some card
- 1 - 2 years: herbaceous plant stems, soft prunings, nettle stems, paper, cardboard, shredded woody prunings, most autumn leaves
- 3+ years: holly leaves, many evergreens (even shredded), bulbs, corms, tubers, plant root balls, large twiggy stuff, oak and beech leaves, moss in quantity, egg shells, compost bin of unlayered grass, sawdust and wood shavings, ivy stems.

I will leave you with this quote from Charles Darwin, from a book all about worms that sold even more copies than his *Origin of Species*: *The formation of vegetable mould through the action of worms*, London, 1881

**“It may be doubted whether there are many other animals which have played so large a part in the history of the world than these lowly organised creatures”**

There are many sites online yielding composting information but these you might not come across:

[www.gardenorganic.org.uk/search/node/soil](http://www.gardenorganic.org.uk/search/node/soil)

this one has an excellent downloadable soil information pack with all aspects of soil fertility dealt with including composting

<http://www.bordersorganicgardeners.org/>

Also lots of useful information and help