

Introduction: This information sheet provides a detailed look at some of the most commonly used waste disposal methods. This supplements a number of the educational exercises, providing you with the required knowledge to run these activities.

Composting:

Organic waste, such as garden and kitchen waste decays to produce a soil improver. This breakdown process is aided by microorganisms, bacteria and fungi. Composting is the oldest and most natural way to recycle organic material, there is evidence the Romans composted. People can compost at home in their gardens, benefitting directly from recycling their own organic waste. Or, there are two large scale composting processes (see below) from which the end product is usually used in agriculture or in landscape gardening.

Open Windrow Composting:

Takes place in an open air facility. Garden waste is shredded then placed in to long triangular shaped rows (called windrows). It is turned every week for 14 weeks until it has transformed in to compost. It is then passed through a trommel (large barrel with small holes in) to remove contaminants.

Positives:

- Diverts organic waste from landfill, subsequently reducing methane emissions (see landfill section for information on methane production, page 4).
- Produces a valuable resource, which improves soil structure and adds nutrients, whilst reducing the reliance on peat for use as a soil improver, (peat bogs trap carbon and provide habitats for a vast array of wildlife, but they are rapidly being destroyed).
- Potentially reduces waste disposal costs.



Negatives:

- Does not allow the composting of all food waste as it does not reach the same temperatures as the in-vessel technique (see below).

In-Vessel Composting:

Takes place initially in an enclosed system. First the waste is shredded then placed in a cell, where it heats to a temperature of 60°C for a number of days, whilst being closely monitored. It is then laid in rows (called windrows) outside to mature, being regularly turned for 6-10 weeks. It is passed through a trommel to remove contaminants.

Positives:

- Diverts organic waste from landfill, thus reducing methane emissions (see landfill section for information on methane production, page 4).
- Produces a valuable resource, which improves soil structure and adds nutrients, whilst reducing the reliance on peat for use as a soil improver (see above for more information).
- Potentially reduces waste disposal costs.
- Allows all organic matter to be processed (including cooked food, meat and dairy products), as it reaches high temperatures for a set period of time, ensuring any potentially harmful organisms are eliminated.

Negatives:

- More costly and uses more energy than the open windrow composting technique.

Anaerobic Digestion:

This is similar to composting in the sense that it uses bacteria and microorganisms to breakdown organic waste. However, this takes place in the absence of oxygen (anaerobically), leading to the production of methane. This is the same process that takes place in a landfill (see landfill section, page 4). This process is tightly controlled and all the gas is captured. The methane obtained can be burnt to produce energy or it can be used as a biofuel.

Positives:

- It is a renewable energy source, reducing our reliance on fossil fuels.
- The remaining waste can be used as a soil improver or fertilizer.
- Reduces biodegradable organic waste going to landfill, thus reducing methane emissions (see landfill section, page 4).
- Potentially reduces waste disposal costs.
- Allows all organic matter to be processed including cooked food, meat and dairy products.

Negatives:

- More costly and uses more energy than the open windrows composting technique.
- Can not usually accept woody material waste as the anaerobes (organisms which live in the absence of oxygen) can not digest it.

Recycling:

Is the process of converting waste materials into something new. They can be recycled in to the same item or something completely different. For example an aluminium drinks can may be turned in to another can or possibly made in to part of an aeroplane.



Positives:

- Recovers materials, making them in to new products.
- Reduces the amount of waste sent to landfill.
- Saves money by avoiding increasing disposal costs (such as landfill taxes) and less money being spent on the extraction of raw materials.
- Reduces the demand for raw materials, the extraction of which often involves mining and forestry which are damaging to the natural environment.
- Requires much less energy compared to making new products. For example, recycling one aluminium can saves enough energy to power a television for three hours¹, when compared to making it from raw materials.
- Some materials (such as glass and aluminium) can be recycled infinitely.

Negatives:

- Despite large energy savings compared to making new products, energy is still required to reprocess the materials. Therefore where possible reducing the amount of waste we produce and reusing items are more sustainable options.

Materials Recovery Facility (MRF):

Where mixed dry recyclables (such as aluminium cans, paper and plastic bottles) are separated. Recycling collected from households often needs to be processed in this way, if all the different recycling material types are collected together in one wheelie bin. The separation is either mechanical, manual or a combination of both. The materials are passed along a conveyor belt and go through various separation techniques, such as strong magnets to separate off steel cans, an inclined belt where round objects such as bottles and cans will roll off but flat items such as newspaper will remain on the belt, or blasts of air will blow off lighter objects such as plastic bottles. Once the different materials have been segregated then the separate material streams are baled.



Positives:

- Allows recycling to be collected co-mingled (all mixed together) from households, therefore minimising the effort required from residents, so encouraging more people to recycle.
- An efficient means to separate recycling.
- Processed materials can be sold for recycling, gaining a revenue. Therefore potentially saving the council tax payer money, as this is a cheaper option compared to landfill, (see landfill section, page 4).

Negatives:

- Uses energy during the process making it less energy efficient compared to getting people to segregate their own recyclables at home, before collection, in to different material types.
- The materials are often of a lower quality compared to source segregated collections, as some contamination is inevitable e.g. glass shards can get amongst other recyclables, such as paper limiting the quality of the final recycled product.

Energy from Waste:

Waste which cannot sensibly be recycled or composted can be used to generate heat and energy. It is burnt in a furnace at temperatures of about 1000°C. The heat generated goes through a boiler which transfers the heat to water, which in turn is converted in to steam. This steam drives turbines which produce electricity.

Gases produced from burning the waste are thoroughly cleaned, with lime being added to neutralize any acid and carbon is added to remove any dioxins and heavy metals. Finally the gases are passed through a fine fabric filter to remove any particles that may be present.

Positives:

- Reduces our reliance on landfill.
- An alternative energy source, reducing our dependency on fossil fuels.
- Heat is generated from the process which can be utilised.
- The remaining bottom ash (which is left after incineration) can be used in the construction industry.

Negatives:

- Emits carbon dioxide, a greenhouse gas. (However this is a better solution than landfill, which emits large amounts of methane, a far more damaging greenhouse gas. See landfill section, page 4).

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Landfill:

Burying all our waste in a big hole in the ground (most likely where quarrying has formerly taken place, e.g. for sand or chalk).

Positives:

- New sites meet strict specifications with liners, which prevent leachate (liquids that run off landfills) from polluting the surrounding area.
- New technology allows some of the gases produced to be captured and utilised e.g. for bio-fuels.



Negatives:

- Emit large amounts of greenhouse gases, in particular methane. (In landfill organic waste, such as food and garden waste, is heavily compacted, causing it to break down anaerobically (in the absence of oxygen), which produces methane. Methane is a greenhouse gas which is 23 times more damaging than carbon dioxide²).
- Landfill sites are rapidly filling up and we are running out of suitable land for potential new sites.
- Waste going to landfill is heavily taxed and this will increase year on year, passing the cost on to the council tax payer. Landfill tax is currently £40 per tonne, as of 1st April 2009).
- Wasting valuable resources that could be used again.
- Materials such as glass and plastic will take a very long time or may never break down in landfill.

Sources

¹ www.recycling-guide.org.uk

² www.defra.gov.uk

Other Points to consider

Every disposal option inevitably has some negative impacts (even if greatly outweighed by the positives). For example, whichever the chosen method, the waste still needs to be transferred to a facility where it can be dealt with, resulting in carbon emissions from transportation.

To ensure we minimise all negative environmental implications associated with dealing with waste, we need to reduce the amount we produce in the first place. This is why we advocate the waste hierarchy. For more details read our 'Waste Hierarchy' information sheet. You can also find much more information on ways to reduce, reuse and recycle on www.surreywaste.info.