



Composting and Earthworms

Organic waste as a resource

Key terms

Composting

Soil Conditioner

Fungi

Bacteria

Vermicast

Pesticide

Biodiversity

When food waste goes to landfill, 1 tonne of carbon dioxide equivalent gas is emitted for every tonne of waste. When composted, 0.17 tonnes of carbon dioxide equivalent gas is emitted for every tonne of waste. This is a reduction of 83%.

Composting is the process of decomposing food scraps and plant matter into soil. Removing the portion of food scraps from general waste has two benefits. Firstly it greatly reduces the emissions from landfills and secondly, it creates an excellent resource for conditioning soil.

There are four important components needed in composting; carbon, oxygen, nitrogen and water. Carbon

(humus) is needed because of its ability to retain nutrients and water. Nitrogen is needed for growth of plants, fungi and good bacteria. Oxygen is required for respiration and for the decomposition process. Water is needed in the correct amounts for maintaining the process.

Compost can be used as an alternative to fertiliser. In addition to providing nutrients to plants to help them grow, unlike fertiliser, it is an excellent **soil conditioner**. It helps to keep the **fungi**, good **bacteria** and small animals such as worms, healthy, rather than poisoning them over time. As fertiliser becomes an unsustainable resource because of its

reliance upon unsustainable fossil fuels, composting will become a much more valuable resource, in industry for food production and timber production, and also for gardening. Compost is fairly easy to achieve in the home using food scraps and green waste, and it is also available to purchase at most nurseries.



Did you know:

- Potatoes account for the highest quantity of food thrown away, followed by bread slices and then apples.
- Salad are the most common food thrown away; 45% of salad that is bought gets thrown away.

Compost

To make compost in the backyard, two options are available. The first is a closed composting bin and the second is a compost heap. The types of materials that can be added are kitchen scraps, grass clipping, leaf litter and plant trimmings (best shredded to increase surface area and speed up

composting), weeds, animal manures, paper waste, wood shavings and sawdust. Things to leave out include metal of any kind including bottle tops, broken china, polythene and plastics.

The process of composting should create heat, and the inside of large compost heaps can get up to 75°C. It is

important to mix up the compost so as to create different layers and not have all of the same type of material heaped together. When the composting process is finished, an earthy smell can be detected and the material will no longer be warm. This can take up to a year.

Vermicompost



Vermicompost is the process of composting by using earthworms. The worms will eat their way through the organic material, with their excrement being the end product of the breakdown. This end product is referred to as **vermicast** or worm castings. Vermicompost is a nutrient-rich organic fertiliser and excellent soil conditioner.

Worms can eat about half their body weight in one day, making them an excellent waste disposal solution. A worm farm with an area of one square metre with around

10,000 worms will eat about 10kg of food and garden waste each day.

As the worms deposit their castings they leave a mucous in the product that is not found in plain composting heaps. The mucous allows for a slower release of nutrients, which means they are not washed away by watering.

Vermicompost also contains plant-like hormones that encourage plant growth. Using worm castings will encourage more earthworms to the area due to pheromone

-like compounds. Vermicompost is so nutrient rich that it is usually mixed with other soil or compost when using it in planting. It can also be used as a top layer after planting and plants will thrive on it.

Worms are easy enough to keep in your backyard. It will usually require keeping them in a bin. The bin will require suitable drainage for water and also for better air flow. The worms can be fed all of the materials suitable for composting.

Uses and benefits

Compost works just as well as fertiliser in keeping plants healthy and growing strong. Unlike fertiliser, compost will not be detrimental to the quality of the soil it is applied to, in fact it makes the soil healthier by providing nutrients and micro-organisms.

Composting food scraps and green waste can decrease the amount of material going to

landfill by up to 40% and significantly decrease the amount of greenhouse gas emissions from landfills.

Mulch, the stage before compost, can be used to kill weeds, simply by placing heaped mulch on top of them. It is also a **natural pesticide** for soil. Compost can even be used as a fire deterrent. By collecting fire fuel (organic

litter on forest floors) and composting it, this would speed up the natural decomposing process and the compost could be returned to the site to provide a more moist environment that is resistant to fire.

Composting also allows for greater soil **biodiversity**, which equates to a higher ecosystem health.

Over to you

1. Give a definition of 'composting'. Include a brief description of the process.
2. Name the four compounds essential for composting, including the importance and role of each one.
3. Retrieve the list of everything you threw out in a day from worksheet 1. Of these items, which are suitable for composting? What fraction of the total amount of waste does this account for?
4. Use the internet to find out how earthworms help to break down waste and clean soil.
5. Outline the benefits of using compost and vermicompost to dispose of waste, including solving some of the problems previously mentioned.

"It may be doubted whether there are many other animals which have played so important a part in the history of the world as these lowly, organized creatures [earthworms]"

- Charles Darwin

