Composting:

- **Why Compost?**

Reduces waste**:**
The largest component of landfilled municipal solid waste is food scraps, accounting for approximately 22% of municipal discards in the landfill. Organic matter in the landfill decomposes without access to oxygen. When food breaks down without oxygen, it produces greenhouse gases contributing to global warming.

Increases soil structure and nutrient content:
Adding compost to soil improves its structure and texture, making it more ideal for plant growth by adding organic matter. The parts of food you toss contain important vitamins and minerals that, when returned to soil, get recycled back into the ecosystem and taken up by the next round of crops grown on the land.

Improves soil retention and increases soil generation:
With higher percentages of organic matter, soil is better able to retain water, nutrients, and air – benefiting the entire ecosystem by creating an optimal environment for plants, and by reducing runoff and erosion.

Remediates contaminated soil:
Composted soil has been shown to remediate soil contaminated with metals and organic contaminants.

- **Compost Recipe**
    1. Greens (Energy Materials) – 1 Part
       Green compost ingredients are those with higher nitrogen content such as grass clippings, kitchen scraps, and garden trimmings. These materials rot quickly and are full of the compounds needed for fast microbial growth. They are usually quite wet and heavy and can get stinky fast unless you balance them out with enough brown material.

    2. Browns (Bulking Agents) 2-3 Parts
       Brown compost ingredients are those with higher carbon content such as paper, shredded woody material, and straw. Browns are dry and bulky, creating space for air to reach the greens. They do not decay rapidly without greens because they do not hold enough moisture.

    3. Air
       Packing layers of green and brown materials into a compost bin is not going to make compost alone. Air needs to be introduced through turning the compost with a fork, an aeration tool, or a rolling composter. As the microbes work to break down the materials, the compost heap will become warm. The heat in the middle of the pile can reach up to 150 degrees F. Turning the compost once a week should be plenty, but to speed up the process, mix the compost every few days to introduce more air and move materials from the edges to the middle.

- **Composting systems:**

All sorts of composting units are available commercially. Some are simply “digesters,” such as a cone covering a collecting basket in a pit. Others, with solid bases, have doors or chutes to let you harvest the compost from the bottom and put it to use. Your own system may be as simple as a circle of chicken wire, or a bottomless barrel with air holes in its sides. Just lift it away from the pile, set it up again nearby, and put the newer layers back in, leaving behind the finished

Pens

One of the simplest structures is a circle of snow fencing or wire mesh supported by posts or stakes. At turning time, you unwrap and remove the fencing, set it up in a new location nearby, and fork the compost back into the pen. This requires a little more space and some lifting effort ,and it leaves the compost in full view ;but it is inexpensive, strong enough, and very easy to construct.

Bins

Bins are sturdier and more discreet than pens. They may require a little more skill to build but are still inexpensive. The four sides can be made of almost anything: wire screen stretched on wooden frames or old pallets standing on end. Three walls are normally fixed permanently together, but may be hinged, hooked or tied. One design has three walls of concrete blocks, stacked without mortar, and a fourth wall of removable boards. To turn the pile, the front of the bin is removed and the compost forked out onto the ground. Then the pile is rebuilt in the bin. You do need the extra ground space in front of the bin for turning, but you don’t have to lift the compost over a wall to get it back in. One variation calls for the bin to be set over a pit, to provide extra insulation. Although this encourages the presence of helpful earthworms ,it does mean reaching down below ground level to turn the compost.

Drums

A rotating barrel composter can be made from a large drum with aeration holes punched in it, and fins inside to lift and mix the compost materials. A hinged loading door in the side allows wastes to be added gradually. Some are rolled on the ground to mix the contents; others are mounted horizontally on stands with crank attachments. Various commercial models are available. If bacteria is introduced with a good amount of garden soil and the barrel is turned every few days, compost can be made in a few weeks this way with little physical effort.

Composting Boxes

Perhaps the best small-scale system for the relatively energetic composter is a design known as the New Zealand box. A bottomless wooden box with ventilation spaces between the wall boards, its face is easily removable to facilitate turning. Since the compost rests directly on the ground, a lid is normally added to prevent nutrients leaching from the pile during heavy rains. A New Zealand box or something similar can be made at home with a minimum of skill. It can be moved to a new location fairly easily, if required, and it keeps the compost neatly out of sight. A popular variation has two or three compartments in a row: compost is turned from one box into another; the emptied box then accumulates the makings for another batch. It is ideal for people who use kitchen and yard wastes as they accumulate and can’t save up enough materials to make a really big pile

- **Compost Care**
  Temperature: The process will slow down when the pile falls below 90. Add water during dry spells.

  Moisture: Moisture is also necessary to give the microbes the best possible conditions to break down the material. After adding the materials, water the compost pile and mix it well. It should be damp but not soggy. In dry months you may have to add water, and in wet months you may have to protect the compost from rain.

  Oxygen: Turning compost for aeration. This is a super easy way to speed things up. We mentioned above that your microbes need to breathe easy in order to be productive. If your compost has compacted down too much, it might be suffocating your microbes and in turn, slowing them down. If you've put your compost in a bin, turn it using a small pitchfork, called a compost fork.

- **Organisms**
  If you are composting for the first time, you may be surprised by the size and complexity of the community of small organisms that take up residence in your compost pile. These organisms, which include many insects, bugs, slugs, bacteria, and fungi, form what is called a "food web." In the food web, each organism has a job to do in turning your organic waste into dark, crumbly finished compost.

  The food web decomposition process is divided into three levels:

  Level One (primary consumers) is comprised of the organisms that shred organic matter and the microscopic organisms that eat the shredded organic residues.

  Level Two (secondary consumers) is comprised of the organisms that eat level one organisms.

  Level Three (tertiary consumers) is comprised of the organisms that eat level two organisms.

  Your microbes like to be warm, so make sure that your bin isn't too big for the waste you produce. Compost that is compact will stay warmer, and produce more efficient microbes. Overly compressed compost won't have enough room for air, and if your microbes can't breathe they won't work for you. Turn your compost regularly (every two weeks is recommended) to keep plenty of air in your compost, and your microbes breathing easy.

- **Worms**
  You'll want the kind of worms that are sold for fishing bait, such as red wigglers or brandling worms, not ordinary field worms from someone's garden. Redworms normally live in barnyard manure piles, and feed on fresh organic material. Field worms are better at digesting things that are already well decomposed and aren't likely to survive in a worm bin on a diet of kitchen scraps. Your valuable little redworms will live quietly in their dark box and multiply rapidly. Just

bury your leftovers in their bedding after each meal. It is unlikely that you will have too much waste to compost: redworms will eat their own weight in kitchen scraps and bedding each day. For each cubic foot of worm bin, plan on using 200 grams (approximately half a pound) of red wigglers (about 500, depending on their size).

Food
Coffee grounds, vegetables and fruit are the recommended food for worms. A varied diet is important. Avoid bones, dairy products, meats, garlic and potato peelings. What doesn't cause odors or attract insects will simply take a very long time to break down. Eggshells are essential to keep the bedding from becoming too acidic for the worms. Dry them well, crush them, and sprinkle the tiny pieces over the top of the bedding.

Covered Bin
Your worms can live in a plastic bin or wooden box, with plenty of airholes punched in the sides and top. Line the worm bin with nylon net to keep the small ones in. Holes in the bottom are needed for drainage, so you'll want a tray under the bin. Bedding Loam or black topsoil, available from garden centers, makes a particularly good bedding material. Bedding can also be shredded newspapers, soaked to soften the edges (the worms will eat this too, so avoid colored inks and glossy paper) or a mixture of sawdust, peat, shredded leaves, and soil.
Fill the bin with about 30 cm (1 foot) of bedding, about as damp as a wrung-out sponge, not soggy and not dry. With a lid on the bin and regular feeding of the worms, maintaining the correct moisture level shouldn't be difficult
Temperature
Redworms will survive in temperatures from 5o C to 32o C (40o F to 90o F) but prefer it at or above room temperature. If you keep the worm bin outside in good weather, be ready to bring it in promptly when the temperature drops.

Harvesting the Castings Removing the worm-compost couldn't be easier. You will notice that redworms hate the light. They'll wriggle down into their bedding whenever you take the lid off the bin. Every few months, when the castings outweigh the bedding that remains, place the opened bin under a very bright light and give the worms ten minutes to get well away from the surface. Then the coast is clear for scraping away the worm castings from the top layer. When you start to see the worms again, keep the light on them and give them another ten minutes to go deeper still. And remove the next layer of compost. Keep going in this way until the harvest is done. Then fill up the bin with fresh bedding and start again.

- **Tea**
  Compost tea is a liquid produced by extracting beneficial microorganisms (microbes)—bacteria, fungi, protozoa, nematodes, and micro arthropods—from compost using a brewing process. A true compost tea contains all of the organisms that were present in the compost before brewing. The brewed water extract should also have soluble nutrients from the compost.

  Benefits of Compost Tea

Compost tea is a good overall plant health booster (a little like vitamins for people), and healthy plants are better able to resist pests and diseases.

Good tea improves soil health and soil structure. A healthy soil is less likely to leach nutrients down beyond plant root zones. If soil is nutrient-rich, the need for fertilizer is minimized.

Compost tea improves the water retention capacity of soil, which reduces the need for frequent watering.

Plant root growth is stimulated by compost tea applications. Deeper roots retain moisture better and help to reduce runoff.

When sprayed onto plants, compost tea adds beneficial microbes to foliage. By occupying leaf surfaces, these organisms prevent potential disease organisms from gaining a foothold.

How to Make Compost Tea

Fill a clean 5-gallon bucket with 4 gallons of chlorine-free water; rainwater is ideal, well water is good.

Aerate the water with an aquarium pump, preferably double outlet, connected with plastic tubing to 2 air stones set in the water.

Add about 1 cup of compost per gallon of water to the bucket. It is a good idea to put the compost in a pillow case or stocking to reduce or eliminate the need to filter the tea later, especially if you plan to apply it with a sprayer.

If adding loose compost, put it in the bucket before adding water. If the compost is contained, squeeze the bag a couple of times after adding it to the water to help water infiltration.

Add 2 tablespoons of natural sugarcane, unsulphured molasses, maple syrup or fruit juice to encourage bacterial growth. Bacterially-dominated teas accelerate nitrogen fixation in the soil and can assist in insect resistance and suppression of some diseases. They are best for vegetables and annuals.

For a fungally-dominated tea, add a similar amount of kelp, fulvic or humic acid or rock phosphate. Fungally-dominated teas also accelerate decomposition in the soil, especially of tougher, woodier materials and have been shown to aid the fight against powdery and downy mildew. They are favored for perrenials, shrubs and trees.

Brew for 24-36 hours, looking for the aforementioned sweet, earthy smell and bubble-covered surface. Keep it out of the sunlight to avoid UV damage to the microbial population. Keep it as close to room temperature as possible for best results.

Apply the tea within 4 hours of completing the process — before the thriving microbial population exhausts the oxygen in the mixture. It can be applied unfiltered directly as a soil

drench at the rate of 5 gallons per acre, or, if filtered, as a foliar spray at 10 gallons per acre. It can be diluted up to 4 or 5 times the original volume while maintaining the benefits.
Best to apply it early in the morning or in the evening as UV rays kill microbes
Disassemble the brewing kit and clean it to remove the brewing film with a 5% baking soda or 3% hydrogen peroxide solution.