An Taisce
The National Trust for Ireland

Benton
Ecological
Systems &
Technology

Composting at Home

Biodiversity Week
May 19, 2022

Why Bother with Composting?



- Reduce waste & save money
- Save energy & cut greenhouse gases
- Reduce the negative environmental impacts associated with landfilling or burning green waste
- Produce a wonderful soil amendment to enhance the health, structure and fertility of soils around your home
- Conserve our precious bogs and peatlands to protect biodiversity and the abundance of life they support

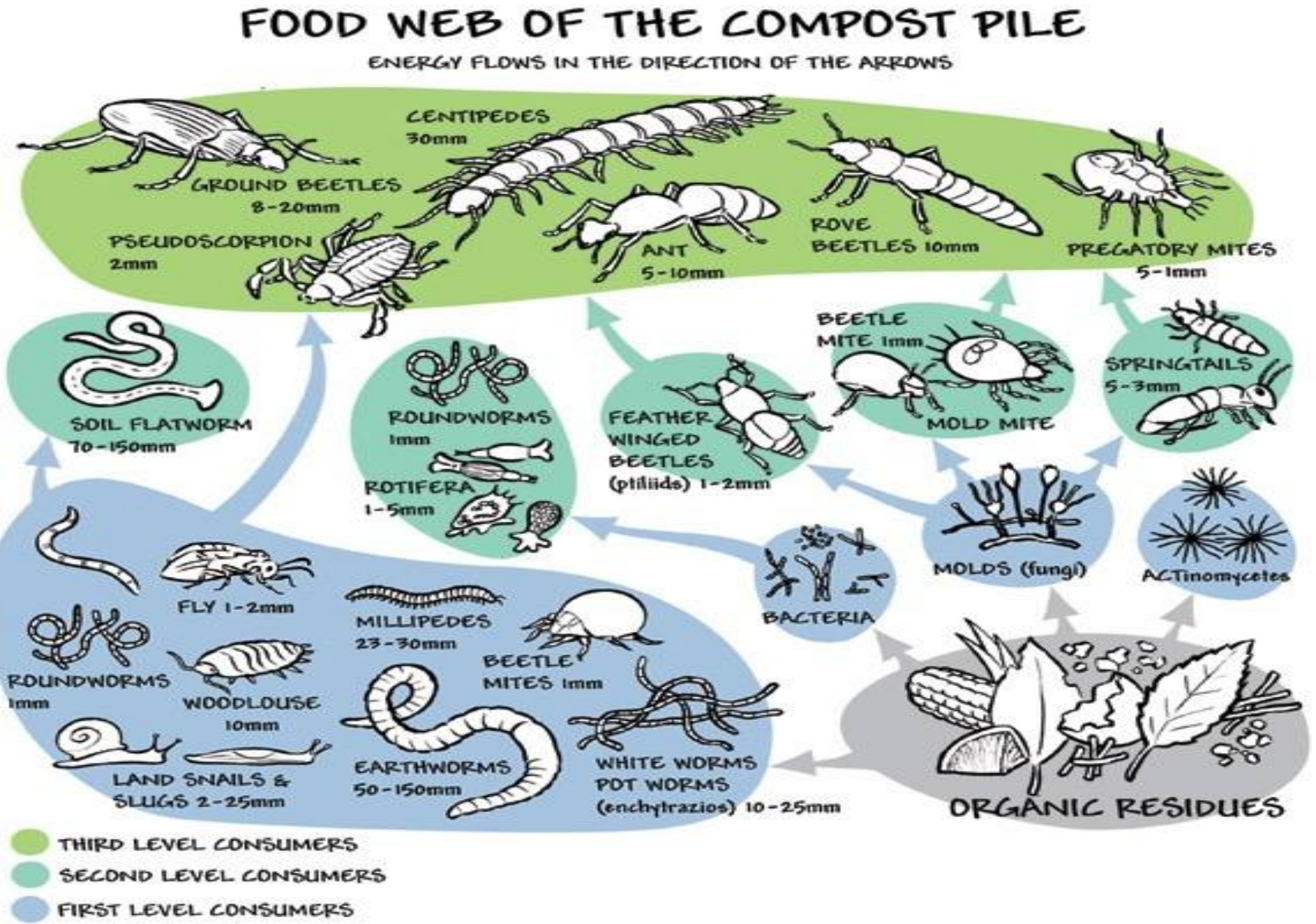
Learning Objectives

- Understanding the biology & essentials of composting.
- Describing the difference between a holding and turning system for garden & landscape materials.
- Understanding the types of holding systems available and how to operate them.
- Understanding the types of turning systems available and how to operate them.
- Describing what mulch is, how to make it and how to use it.
- Understanding how to set up and use a wormery.
- Understand how to use compost around your home.

Defining Composting & Compost

Composting, in its most simple form, is the farming of aerobic microbes to promote the decay of biodegradable materials into a stable, humus like substance called **compost.**

Biology of Composting



Essentials of Composting

Composting is a process that involves many different organisms and, like all life forms, these organisms need air and water to survive and thrive. The five essential conditions for successful composting are:



Green & Brown Materials



Green materials contain Nitrogen, essential for creation of protein and microbe reproduction.

Green & Brown Materials



Brown materials contain Carbon, essential in providing energy to the microbes for growth.

Green & Brown Materials



An ideal mix for home composting contains both green and brown materials.

Composting Materials

Yes:

- Grass cuttings
- Leaves
- Annual weeds
- Flowers
- Vegetable plants
- Old house plants
- Bush & tree trimmings
- Hay & straw
- Vegetative food scraps
- Rinsed seaweed

Yes:

- Cattle manure
- Vegetarian pet poop (rabbit, gerbil, guinea pig, etc.)
- Shredded paper products
- Paper napkins & towels
- Sawdust & wood shavings
- Pine needles & cones

No:

- Diseased plants
- Perennial weeds
- Weeds with seeds
- Carnivore pet poop
- Cat litter
- Animal derived food scraps, such as meat, bones, skins, egg shells
- Dairy products
- Grease & cooking oil
- Ashes from BBQ, fireplace or stove

Examples of Green Materials



Grass clippings



Old Flowers



Vegetative food scraps



Annual weeds



Vegetarian Pet Poop

Examples of Brown Materials



Leaves ↑ and pine needles ↓

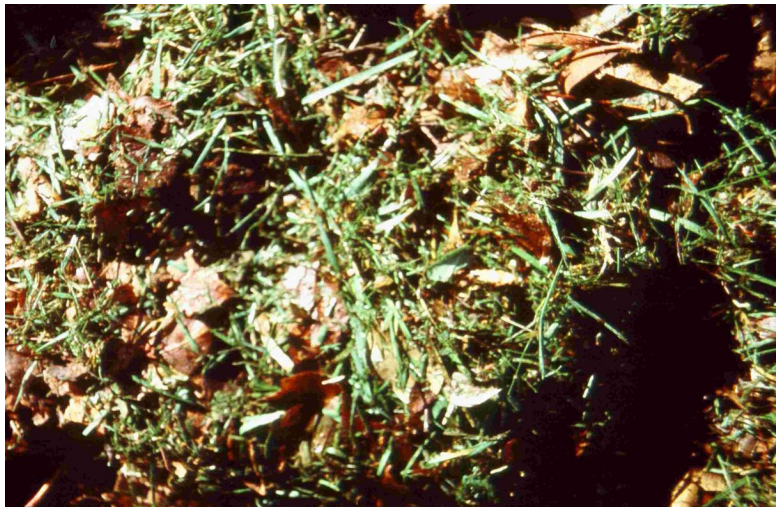


Husks ↑ & shredded paper ↓





Well Balanced Materials



Autumn lawn clippings





Bedded cattle manure



Bush or tree trimmings above & old vegetable or garden plants to left

Blending Materials for Composting

For well balanced, healthy compost you need the right blend of BROWN and GREEN materials

Composting Sweet Spot
These materials will compost well on their own.



WELL BALANCED

WELL BALANCED



BROWN

GREEN



Slow Compost
Brown materials on their own will compost slowly. To speed up, mix with green materials.

Sick Compost
Green materials do not compost well on their own. They need to be mixed with brown materials.

VERY BROWN

VERY GREEN

Straw/Hay



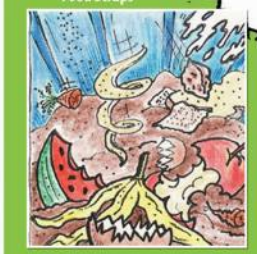
Hedge/Bush Trimmings



Old Plants



Food Scraps



Paper/Wood Chips/Saw Dust



Autumn Leaves



Weeds (excluding noxious weeds)



Grass Cuttings



Animal Manures



VERY DRY

DRY

WELL BALANCED MOISTURE CONTENT

WET

VERY WET

For more information please visit STOPFoodWaste.ie

Surface Area

- Composting bacteria work from the surface of materials inward.
- The smaller the particles, the faster they will decay
- It's like a block of ice in the sun. Kept whole and it will take all day to melt. Breaking up the block into smaller pieces and it will melt in an hour or two.

Shredding Increases Surface Area





Materials can be chopped by hand or cut up with pruning shears. Small chippers can also be used.

Shredding Increases Surface Area



Lawn mowers can also be used to chop up materials.

Moisture



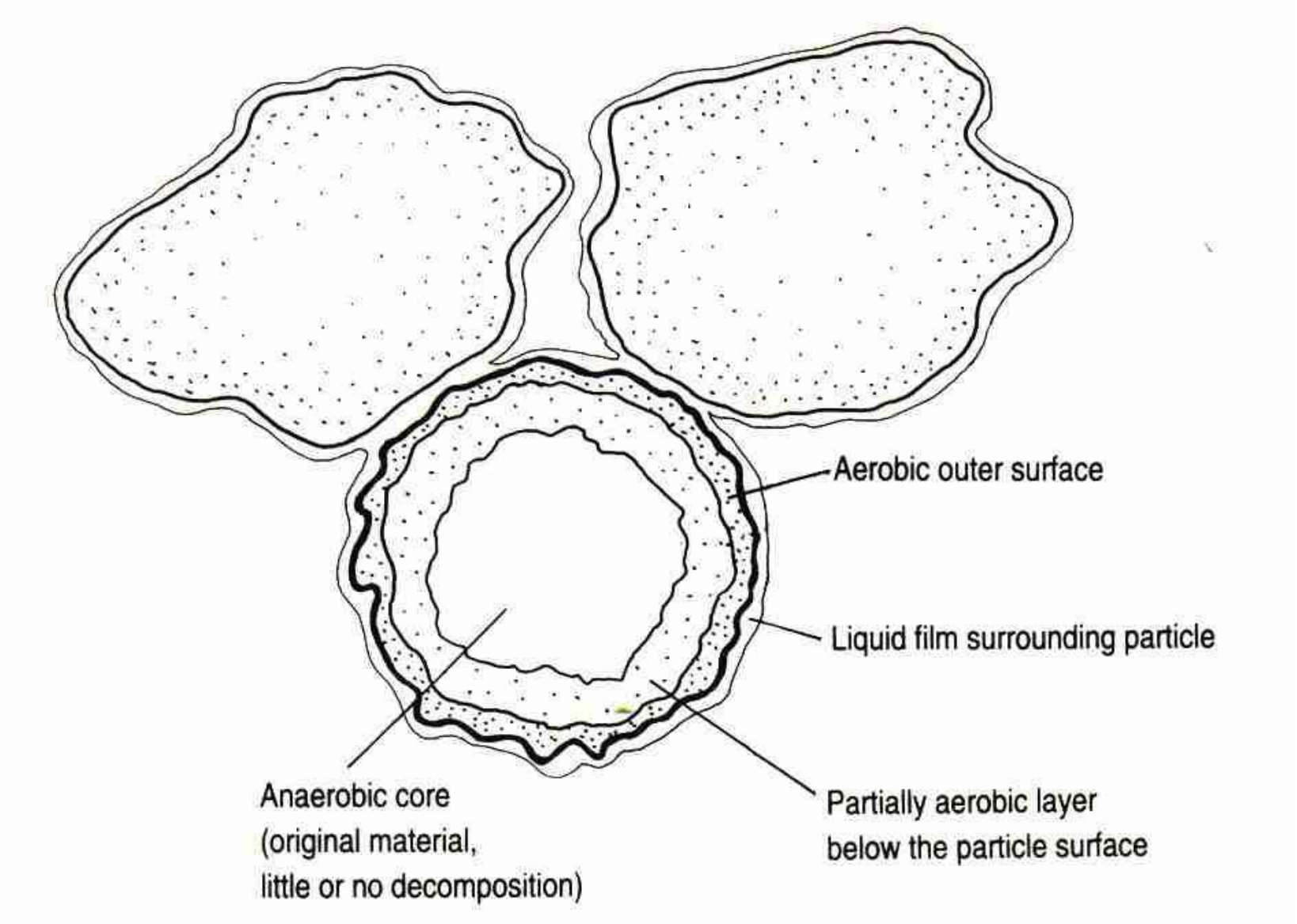
Materials should be as wet as a wrung out sponge.
Moisture should be added when the pile is made so the surface of materials are wet and look sheeny.

Moisture

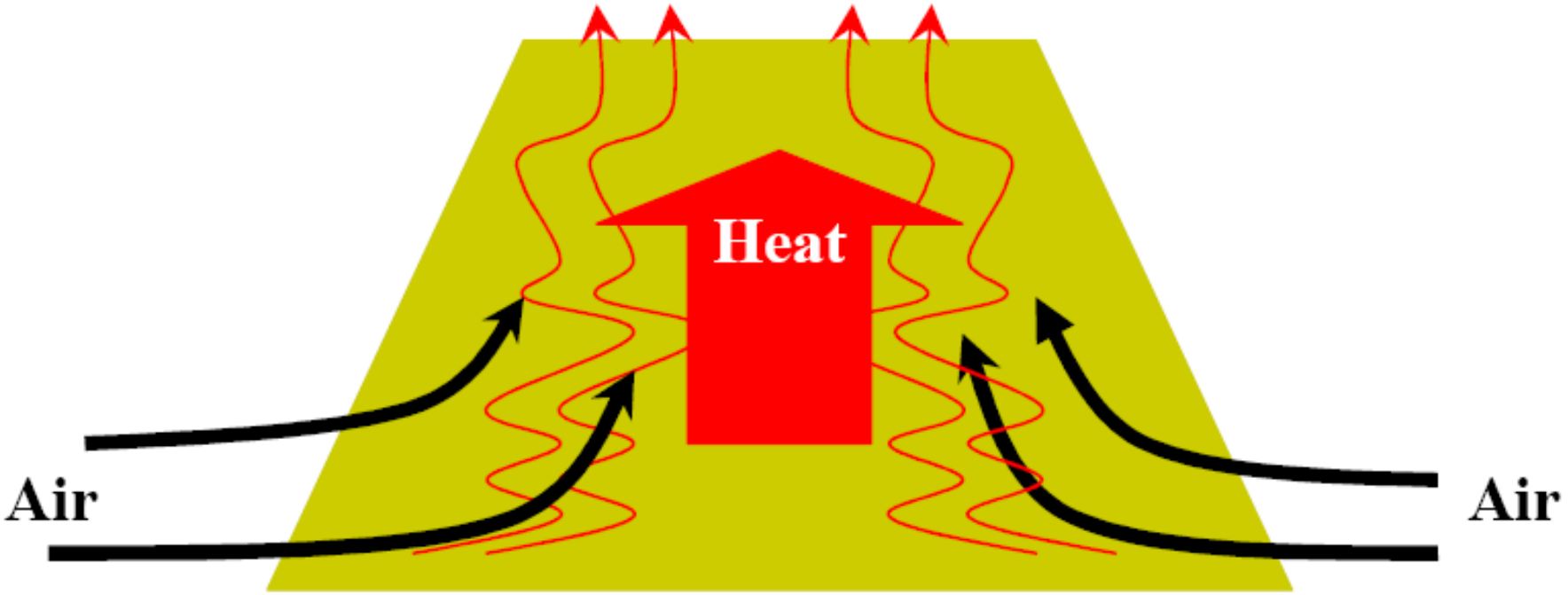


Materials should be as wet as a wrung out sponge.
If the pile is too dry, moisture can be added when the pile is turned

Composting at the Particle Level



Passive Aeration



The "Chimney Effect" pulls air into the composting pile as heat rises if there is enough air space within the pile and it can "breathe."

Passive Aeration



The “Chimney Effect” can be stimulated by raising the compost pile off of the ground; brushy materials, pallets or old pieces of timber can be used.

Turning Also Promotes Aeration



Turning piles using a pitch fork introduces air into the pile and relieves compaction that inhibits passive aeration.

When Is the Compost Finished?

Use your senses!!!



When it looks good: uniform dark colour
When is smells good: earthy soil like aroma
When it feels good: friable and loose

Summary of Essentials

Carbon-Rich Materials

+

Nitrogen-Rich Materials

+

Moisture

+

Oxygen

+

Time

=

Compost

Composting Systems

There are four systems for managing food scraps and/or garden materials at home:

1. Compost Holding Bins, including leaf mould cages
2. Compost Turning Systems
3. Mulching
4. Wormeries

Holding Systems vs Turning Systems

Compost Holding Systems:

- Cold slow composting: 6-24 months
- Continuous system with little to no turning

Compost Turning Systems:

- Hot fast composting: 6-12 weeks
- Batch system with regular turning





Advantages & Disadvantages of Holding Units

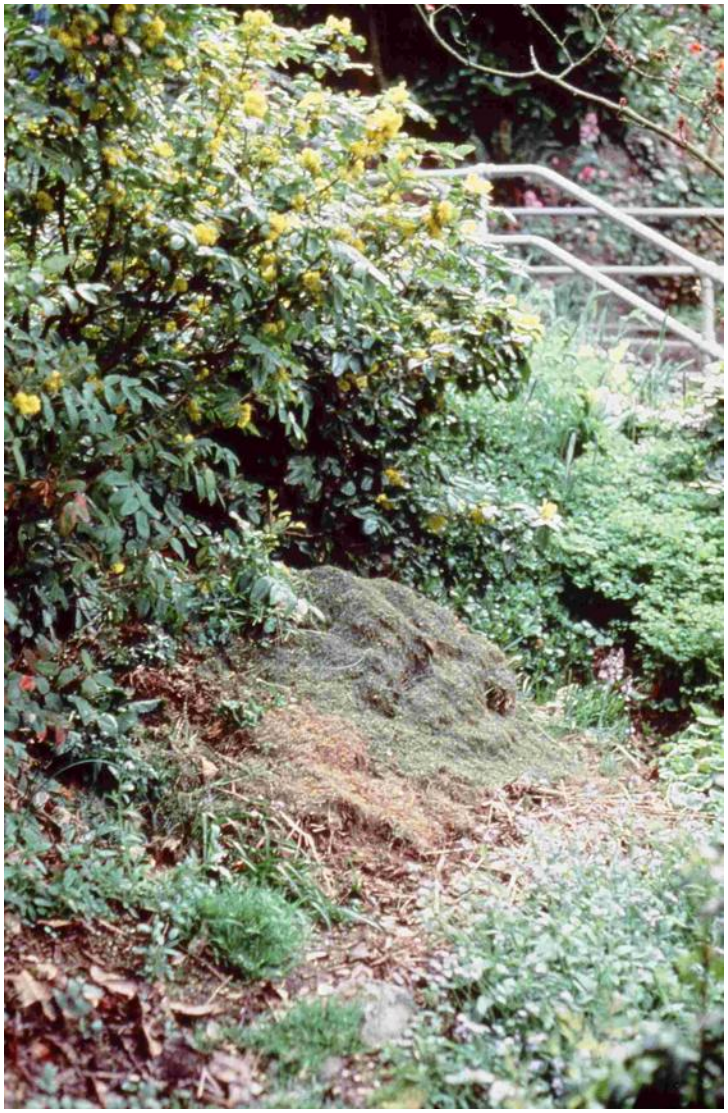
Advantages:

- Simplest method of composting and least labour intensive
- Portable: bins can be moved where they are needed
- Flexible: one pile or bin is ideal for smaller properties, multiple units can be used on larger properties
- Some units, plastic bins, are good at excluding pests and retaining moisture
- Units with lids or covers prevent rain from soaking pile

Disadvantages:

- Slow method of composting: takes 6-24 months
- Open piles can become too wet if uncovered
- Cooler temperatures may not fully destroy weed seeds and plant diseases

Holding Systems



The simplest holding system is just piling it up and letting it rot. Leave it to compost for 1-2 years.

Types of Holding Systems



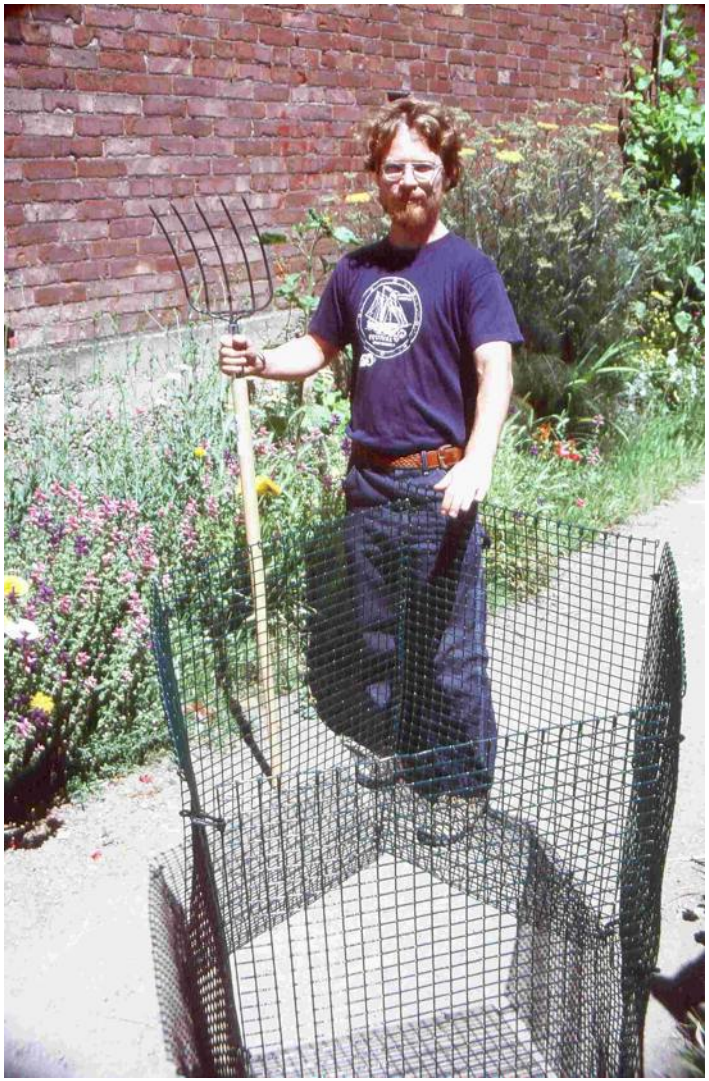
Pallet composter uses materials that are normally thrown away. Simply rope four pallets together to form a composting bin.

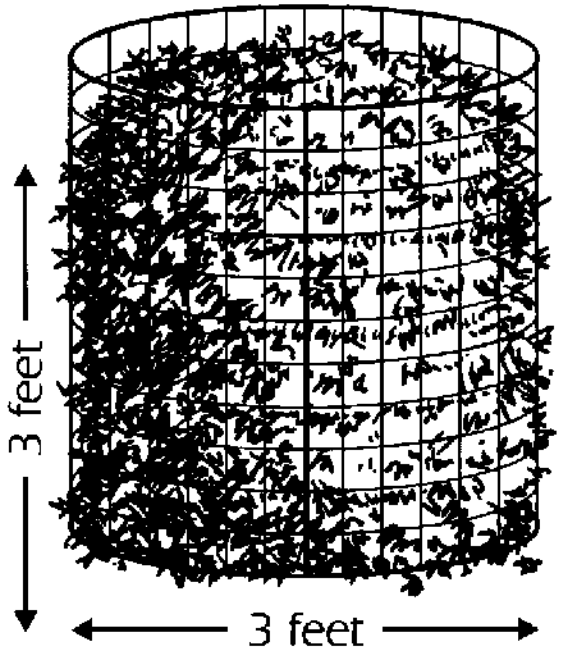
Types of Holding Systems



Wire panels can be clipped together to form a nice holding bin.

Types of Holding Systems





- Thick coated wire lasts longer.
- A variety of fencing material can be used.
- Bins can be circular in shape as well.

Types of Holding Systems



Wooden slats can be stacked on metal rods to make a holding bin as well.

Types of Holding Systems





Types of Holding Systems



A home made wood and wire holding bin is easy to make with hinges and hook & eye fasteners to hold the bin together and allow the bin to be taken apart to turn materials or harvest compost from the bottom.

Types of Holding Systems



There are a variety of commercially available bins made from recycled plastic. Here is a bin called the Soil Saver.

Types of Holding Systems



Here's a type of plastic holding bin that was distributed to residents by many County Councils in Ireland.



Composting Bin Placement



- Place the bin in a shady or partially sunny location on bare soil.
- Choose an area where you can easily add ingredients & get compost out.
- Keep the bin or pile away from the house or the neighbours home just in case there are problems with odours or pests, especially insects.

Steps for Success: Holding Units

- Once the bin is set up, you can add materials as they are generated.
- Simply place materials on the ground in front of the bin or pile.
- Chop or cut stalks into smaller pieces (3-6”) using secateurs, machete or spade.
- If composting grass cuttings, be sure to add other materials.
- Mix and moisten materials using a pitch or spading fork.
- Once thoroughly mixed, place materials onto pile or bin.
- The next time you garden, repeat these steps, but before adding new materials to the pile or bin, use a pitch fork to mix and fluff up existing composting materials.

Composting Food Scraps in Holding Bins

- Food scraps will not compost well on their own in a plastic holding bin. They must be mixed with garden materials, especially "brown" materials such as leaves, straw, hay, bush trimmings, sawdust or shredded paper.

- Composting food scraps with grass cuttings alone will only create a slimy, stinky mess.

- To compost food scraps in a holding bin, it must be at least half full of composting garden materials. Then they can be mixed and buried inside.



How to Compost Using a Holding Bin



Grass is difficult to compost on its own. In the summer, it seems to be the only material available for composting. How do we balance nutrients in the late spring and summer months?

How to Compost Using a Holding Bin



Store leaves from the previous autumn in a holding bin so they are available for composting greens the following season. If leaves are not readily available, then use straw, hay, weeds, paper, prunings… anything to balance the grass clippings and provide air within the pile.

How to Compost Using a Holding Bin



After putting the grass clippings on the pile, add leaves or another "brown" material and mix them together.

Using a Plastic Holding Bin







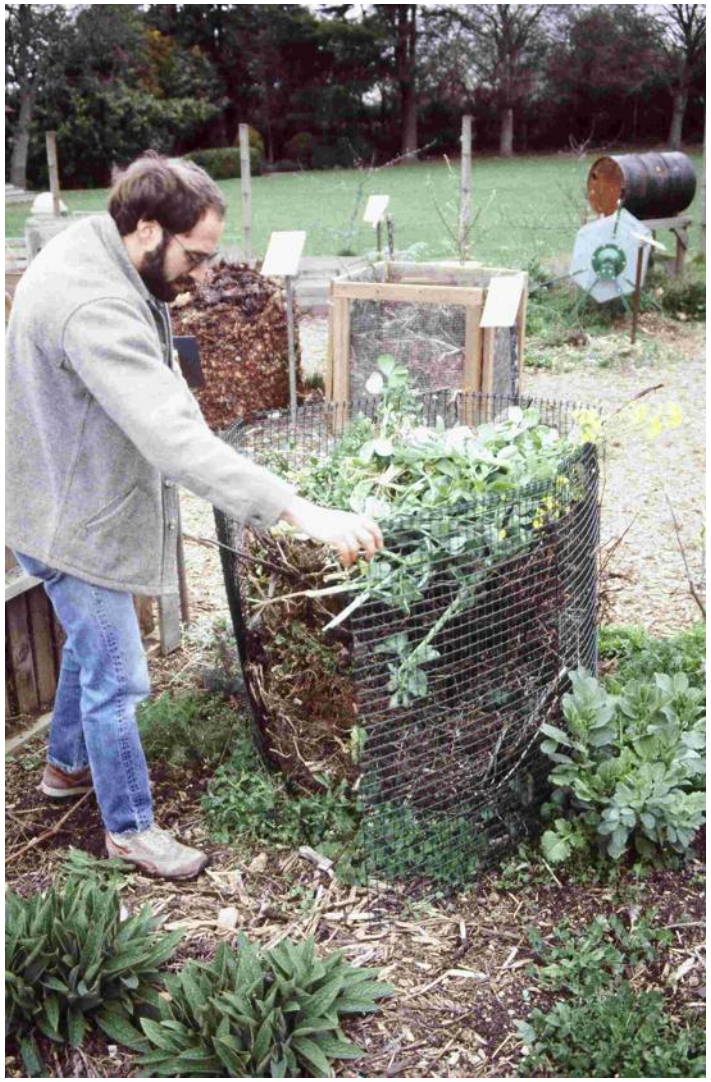
Chopped and moist materials are loaded through the top.
After loading, materials are mixed with materials below.
In 6-12 months, compost can be harvested from door at bottom.

Using Other Holding Bins



If it takes more than 6 months to fill a holding bin, then there may be finished compost at the bottom.

Using Other Holding Bins





To harvest the compost, simply take the bin apart, reassemble it next to the old pile and pitch fork off the undecomposed material into the new bin until you reach the finished compost near the bottom.

Using Other Holding Bins



If it takes 1-4 months to fill the holding bin, then the compost is not likely to be ready.

In this case, another holding bin or two would be needed to handle the extra volume of materials to be composted.

This allows the full bin to compost while another is being filled.

Tips for Faster Composting

You can speed up the composting process using piles or holding bins and make compost in 3-6 months by:

- **Chopping things up:** if garden plants, bush trimmings, & stalks are cut into smaller pieces, composting will happen faster.
- **Mixing & moisten materials before placing them in the bin:** a good mix of green & brown materials keeps the composting creatures happy.
- **Adding moisture when fresh or composting materials are too dry**
- **Turning piles:** infrequent turning every 2-3 months aerates materials for faster composting. Bins can be taken apart and reassembled next to the old pile and the entire pile can be turned. If you don't want to turn the whole pile, you can simply fork up old materials before adding more.

Other Holding Systems: Leaf Mould



Leaves can be placed into a holding bin and allowed to compost for 1-2 years. Be sure the leaves are wet. When it is finished, you will have a slightly acidic leaf mould, ideal for acid loving plants.

Other Holding Systems: Leaf Mould

Tips for making leaf mould:

- Pick a shady location.
- Be sure to keep cages away from ivy, bind weed or briars.
- If placed under a tree, place cardboard or a weed barrier underneath to prevent tree roots from growing up into it.
- Small cages can dry out in summer months so the cage should be at least 1.5m in diameter. 2m-3m is ideal and can store a lot of leaves.
- Collect leaves when they are wet on the ground. This saves mixing and watering leaves before adding to the cage.



Other Holding Systems: Leaf Mould

Tips for making leaf mould:

- Keep the cages open to the environment so rainfall can keep materials moist.
- Fill cages in early autumn and allow them to settle. Top cages up at the end of the autumn leaf season. Don't over fill them.
- Do not add leaves from the following season to older cages.
- Monitor moisture levels in drier summer months and mix water into top layers as necessary.
- After one year, the leaf mould can be used as a mulch.
- After two years, the leaf mould will be ready to use as a compost.
- You can screen it and return undecomposed leaves to new or existing cages.



Types of Turning Systems

Turning systems are characterised by active turning of the composting materials to mix and aerate them which promotes optimal conditions and speeds up the composting process. This can be done by physically turning materials with a pitch fork from one bin to another or it can be accomplished with a system that rolls or rotates to agitate materials inside the composting chamber. There are three types of turning systems:

- Multi-bin systems
- Tumblers
- Spheres







Advantages & Disadvantages of Turning Systems

Advantages:

- Makes high-quality compost quickly: 6-12 weeks
- Multi-bin systems handle larger volumes of materials and therefore are ideal for larger properties or community composting systems
- High temperatures kill plant diseases and destroy weed seeds

Disadvantages:

- More expensive to build or purchase
- Multi-bin system can take up more space
- Requires more time to manage and turn materials

Types of Turning Systems



Wood and wire three bin system where fresh batches are made in bin to left and moved every two weeks to the bins to the right.

Forming Piles for a Turning System



When making a batch, layering helps to proportion materials, but it is important to mix materials thoroughly and add water as necessary when building the pile.

Forming Piles for a Turning System



Another way to form a pile is to mix and water materials in front of the turning system and when it is well mixed and watered, then add them to the turning system.

When Do You Turn Piles?



Given the right material balance and moisture, the composting pile will heat up to 50 to 70°C. Monitor the temperature regularly. When the temperature decreases, the pile is suffocating letting you know that it is time to turn it and get more air inside.

Turning Piles



When turning the pile, try to move the outside of the old pile to the inside of the new pile and vice-a-versa so that all materials are exposed to high temperatures for plant disease, pathogen, fly larvae and weed seed destruction.

Other Turning Systems: Barrels



Another barrel system reusing an old bulk pickle barrel to the left and a commercially available unit in Ireland to the right.



Other Turning Systems: Barrels



The Rolls Royce of barrel systems with stand and hand crank.

Other Turning Systems: Barrels



Homemade barrel system. Be sure to add baffles inside to lift and flop materials within, like a clothes drier.

Other Turning Systems: Sphere



Here is the new kid on the block, the Bio-Orb, an innovative composting sphere that you fill and push around the garden to turn materials inside.