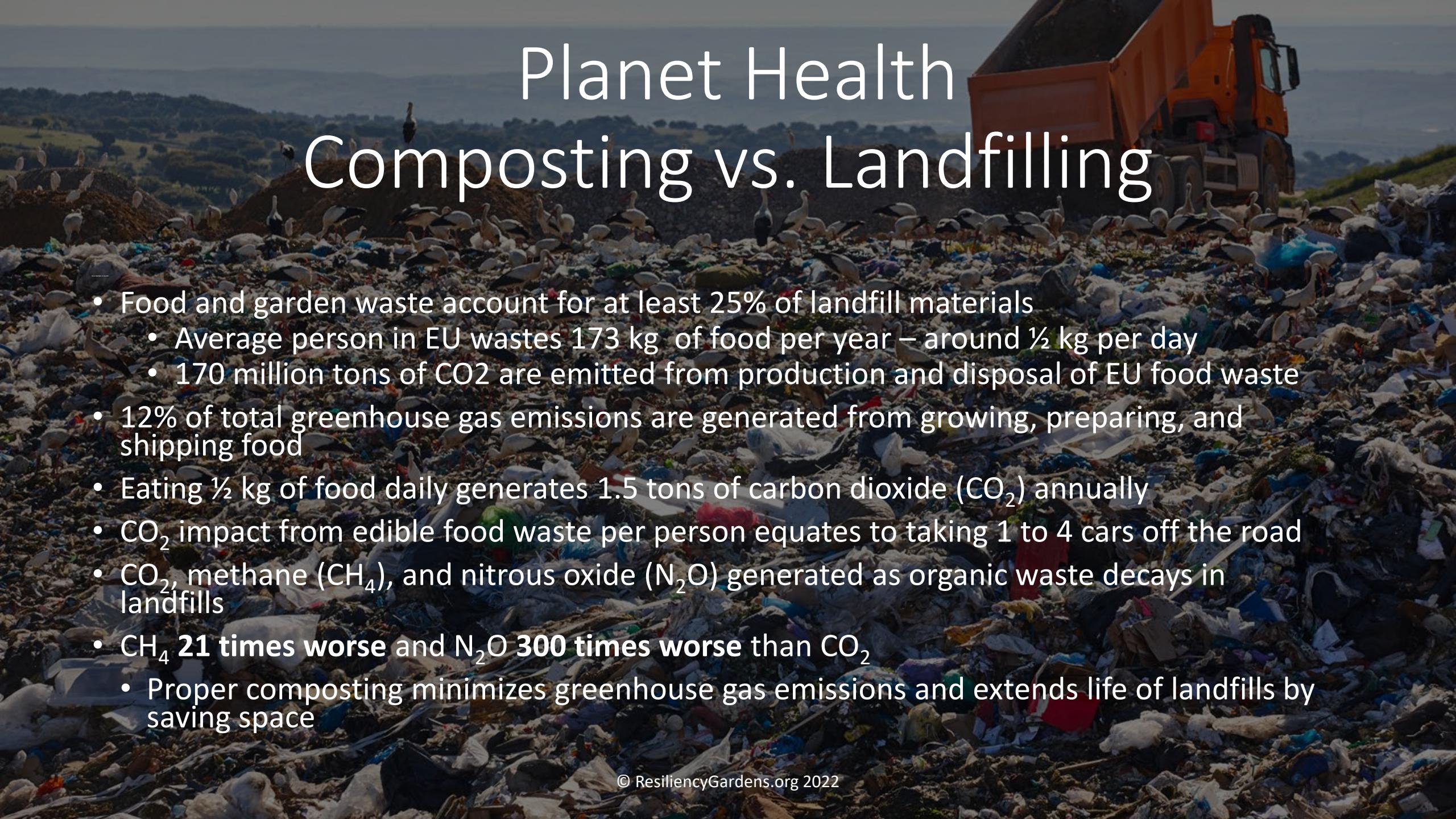


The background features abstract, glowing green organic shapes resembling veins or stylized flames against a solid black background. A thick white diagonal line runs from the bottom-left corner towards the top-right.

# Resiliency Gardens

Vermi-composting  
for Planet and  
Plant Health

June Lavelle  
[ResiliencyGardens.org](http://ResiliencyGardens.org)



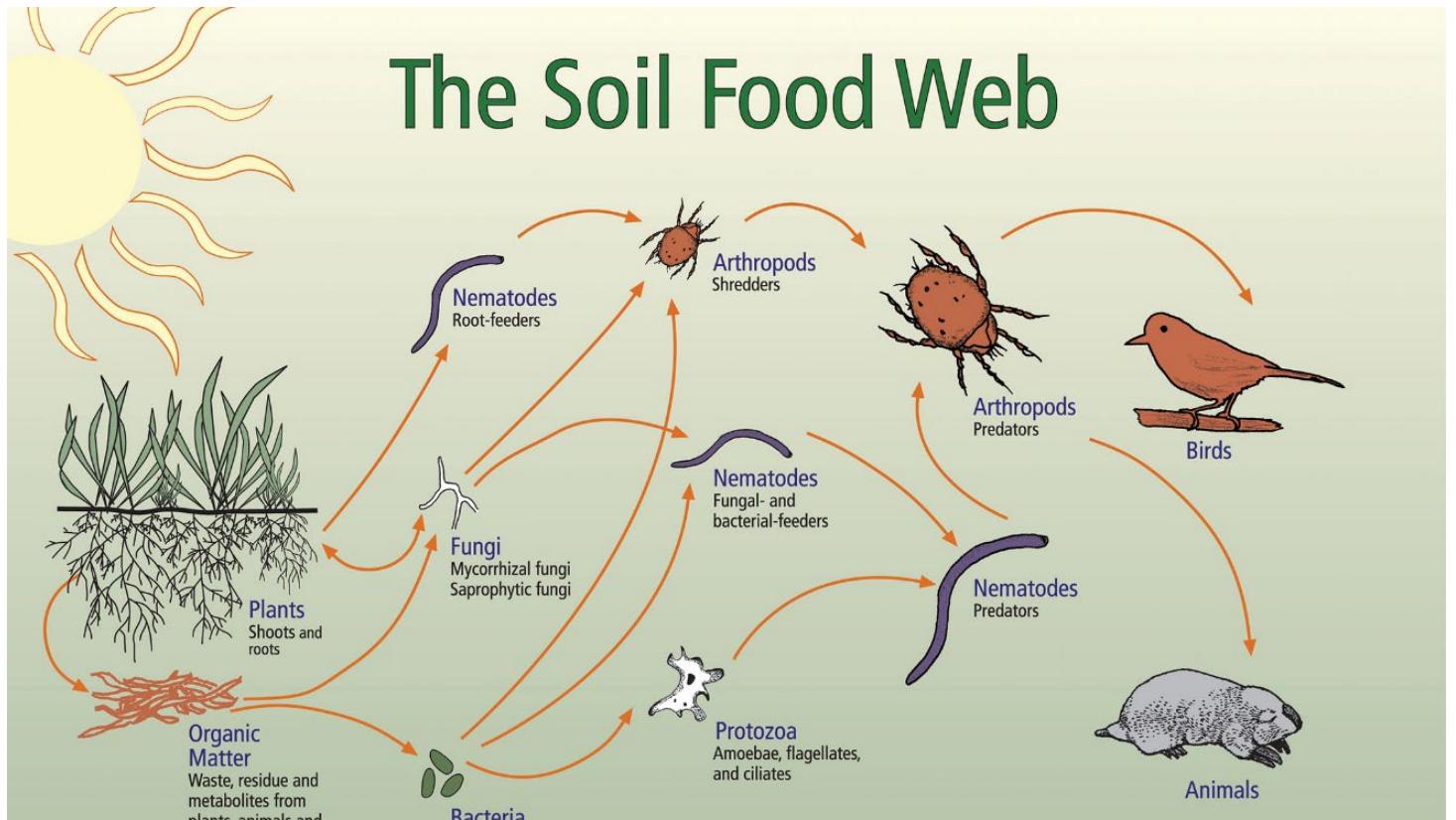
# Planet Health Composting vs. Landfilling

- Food and garden waste account for at least 25% of landfill materials
  - Average person in EU wastes 173 kg of food per year – around  $\frac{1}{2}$  kg per day
  - 170 million tons of CO<sub>2</sub> are emitted from production and disposal of EU food waste
- 12% of total greenhouse gas emissions are generated from growing, preparing, and shipping food
- Eating  $\frac{1}{2}$  kg of food daily generates 1.5 tons of carbon dioxide (CO<sub>2</sub>) annually
- CO<sub>2</sub> impact from edible food waste per person equates to taking 1 to 4 cars off the road
- CO<sub>2</sub>, methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) generated as organic waste decays in landfills
- CH<sub>4</sub> **21 times worse** and N<sub>2</sub>O **300 times worse** than CO<sub>2</sub>
  - Proper composting minimizes greenhouse gas emissions and extends life of landfills by saving space

# Plant Health

---

The food web is the community of organisms living in the soil that all plants depend on for their nutrition



A close-up, top-down view of a garden bed. A person's hand is visible, reaching towards the center of the bed. The bed is filled with dark soil and several leafy green plants, likely lettuce or radishes, showing their green leaves and some purple stems. The plants are arranged in a somewhat dense, overlapping pattern.

# Common Methods for Composting at Home

- Anaerobic (“passive”) composting
- Aerobic (“active ”) composting
- Vermicomposting

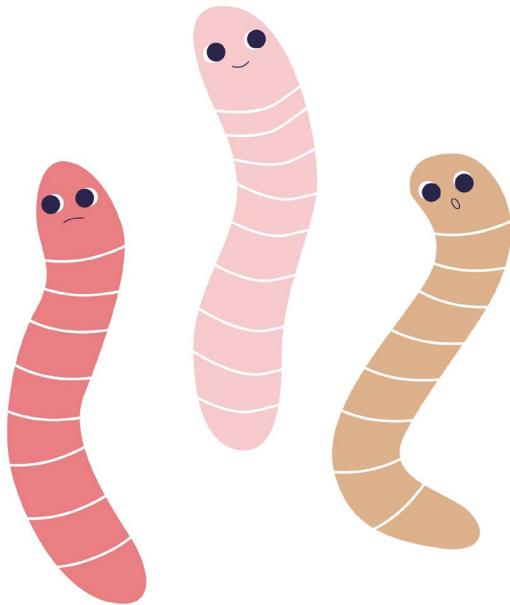


# Vermicomposting

---

- Uses certain species of earthworms to eat organic matter and pass it through their digestive systems, producing castings, or “worm poop”
- Produces a very fine, granular compost that is very good for use in a potting mix
- Worm “tea” can be made from worm compost and sprayed on plant leaves to build a plant’s immunity to disease and to help resist insects.

# 7,000 known species of earthworms



## Types of Commercially Available Worms:

1. Composting Worms
2. Garden Aeration Worms
3. Fishing Worms

### Best worms for composting:

- Red Wiggler: *Eisenia Fetida*
- European Nightcrawler: *Eisenia Hortensis*
- African Nightcrawler: *Eudrilus Eugeniae*

### Best worms for garden aeration:

Alabama Jumper: *Amyntas Gracilis*

### Best worms for fishing:

- Canadian Nightcrawler: *Lumbricus Terrestris*

# Red Worms

(*Eisenia foetidae*)

- 
- Live in the top 12 inches of soil
  - Feed on organic decaying matter
  - *Can* eat their body weight in food every day
  - Generate 75% of body weight in worm poop (castings) each day
  - Lay one cocoon every week or so
  - Each cocoon produces 3 to 4 baby worms
  - Begin breeding at 4 to 6 weeks of age
  - Can double their population every 90 days
  - Live up to 2 years
  - Do not survive cold winters outside of a compost pile



# Vermicomposting

## Advantages

- Easy to do year-round
- Requires less space - great for folks with no/small yard
- **SEVEN** times richer in nutrients than regular compost
- No turning, no odor, & little watering – worms do the work
- Very fine compost - no screening needed

## Benefits

- More nutrient availability
- No leaching
- No pollution
- Improves soil properties
- Provides employment and money
- Improves quality of fruits and vegetables
- Saves electricity and water used for in-sink garbage disposals
- Fun and educational

### Nutrient Value:

6600 ppm organic nitrogen  
1300 ppm phosphorus  
1,000 ppm potassium



## Make a worm bin

- A worm bin is a good conversation starter
- It's something different; hopefully soon to be the norm
- An ant farm was never this productive and handlers will not be bitten
- It can offer a sense of pride, satisfaction and accomplishment
- You can reduce your environmental footprint in an easy and productive way

# What do I need to vermicompost?

---

- A container to hold the worms with enough space for worms to reproduce
- Ventilation
- Bedding
- Starter soil
- Red worms
- Food
- Moisture & temperature control





## Types of containers/bins

Popular worm bin containers include plastic storage containers, plastic buckets, restaurant bus boy bins, and kitty litter containers.

Commercial multi-tiered worm bins are also widely available on the market



# Making a DIY Worm Bin

## Step 1

Acquire all materials and create a small workplace out doors.

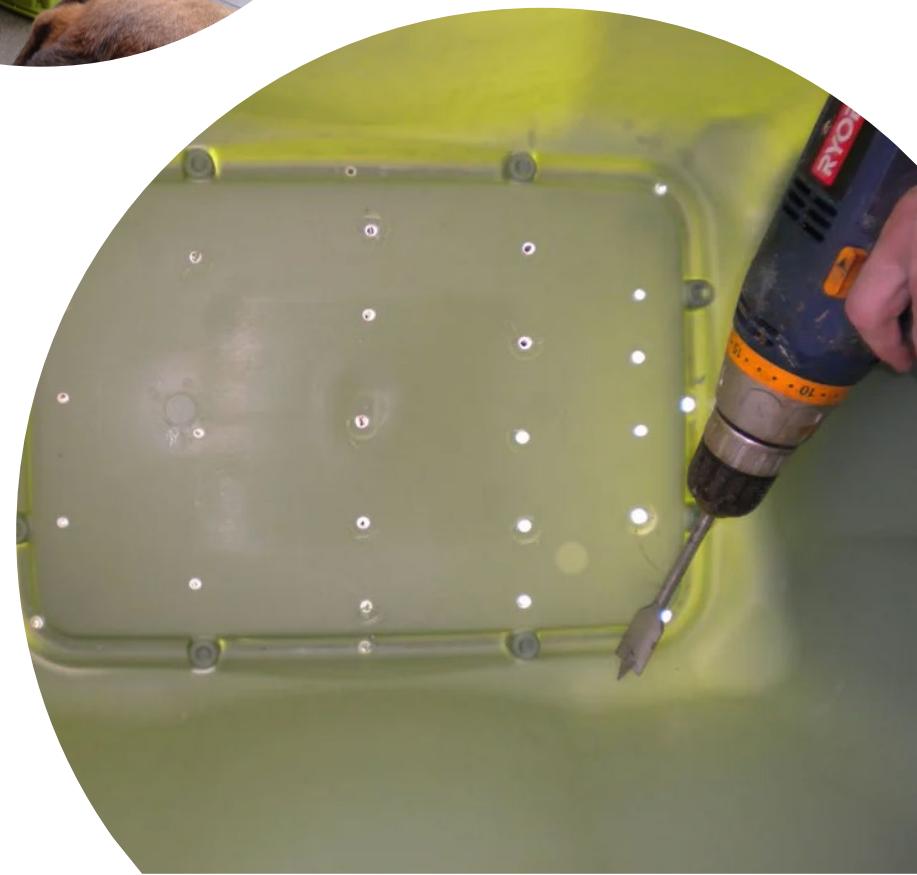
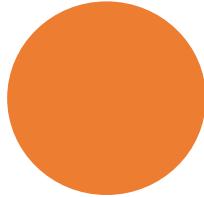
### Materials List:

- Two 60-liter plastic bins, one with lid.
- One tray (to place under stacked bins as liquid catchment)  
\*Third bin or lid can be substituted for tray
- Drill and 4mm hole bit
- Two bricks, boards or empty food containers (to separate stacked bins)
- Approximately 4 cups of dried leaves or mulch from yard
- Few sheets of newspaper (no colored ink)
- Approximately 4 cups of soil
- $\frac{1}{2}$  kg red wigglers (*Eisenia foetida*)

# Making a Worm Bin

## Step 2

Drill about 20-30 evenly spaced 4cm holes in the bottom of one bin to provide drainage. This will be the “inside” bin where the worms will live.



# Making a Worm Bin

## Step 3

Drill about 30 small holes in the top of one of the lids. This will fit onto the “inside” bin.

Also, drill ventilation holes about  $2\frac{1}{2}$  cm apart on each side of the second bin near the top edge. This will be the “outside” bin.



# Making a worm bin

## Step 4

---

Put spacers such as small blocks of wood, bricks, or empty plastic food containers at the bottom of the “outside” bin to support the inside bin.

---



# Making a Worm Bin

## Step 5

---

- Prepare bedding for the worms by shredding newspaper into 2.5 to 3 cm strips.
- Worms need bedding that is moist but not soggy – moisture of wrung out sponge.
- Cover the bottom of the bin with 8-10 cm of moist newspaper, fluffed up. If you have any old leaves or leaf litter, that can be added also.



# Making a Worm Bin

## Step 6

---

- Throw in a couple handfuls of dirt for "grit" to help the worms digest their food. Add some manure, if it's available.
- Add your worms to the bedding.
- Put a layer of damp brown corrugated cardboard over the worms.



# Making a Worm Bin

## Step 7

- 
- Place your bin almost anywhere
  - Indoors, Outdoors
  - Dark, Warm (5-26° C) , Moist, Ventilated
  - For example, in the laundry room, kitchen, garage, or outside on the balcony during warmer months



# Taking care of your WORMS

- Worms may need a day or two to acclimate to their new surroundings
- Feed your worms slowly at first. Begin with a small amount of food; when it's gone; add more.
- Worms eat half their weight per day. Cut or tear large scraps into small pieces
- If worms try to crawl out, the conditions need to be adjusted.
- When bedding is used up, harvest your bin

Worms Love	Worms Hate
<ul style="list-style-type: none"><li>• Breads &amp; Grains</li><li>• Cereal</li><li>• Coffee grounds &amp; filters</li><li>• Fruit rinds &amp; peels</li><li>• Tea bags</li><li>• Vegetables</li><li>• Cardboard</li><li>• squash and melon rinds</li><li>• cucumber peels</li><li>• eggshells (dry and crush before adding to bin)</li></ul>	<ul style="list-style-type: none"><li>• Dairy Products</li><li>• Fats</li><li>• Meat</li><li>• Fish</li><li>• Citrus</li><li>• Animal wastes</li><li>• Greasy, oily foods</li><li>• Pickles, salty or vinegary materials</li><li>• Avocado pits and shells, peach pits</li></ul>

# Taking care of your worms

---

- There must be ventilation holes and proper drainage in the composting container. Worms can drown in standing water.
- Worms thrive at 15°-25°C, but can survive at 5°-30°C.
- Worms never sleep; they just eat, defecate and reproduce.
- Worms lay eggs in a cocoon where they are fertilized and produce an average of three baby worms each. With favorable conditions, their population can double in 90 days.
- Do not use too much fresh manure or soil in the worm bin.
- Do not turn or tumble worms like in traditional composting. Use wet hands to handle worms.



# Taking care of your worms “Leachate”

---

**Leachate** – The liquid run off (or seepage) that settles in or below the vermicompost or worm castings. Check for accumulated leachate in your vermi-composter frequently (when you feed, or weekly).

The leachate should be drained regularly and if you are getting more than 60-120 ml of liquid in a week, the composter is probably too wet!





## Harvesting the worm castings: Method #1

- Move the compost to one side of the box and add fresh bedding and food to the other side.
- Then only bury food on the new side.
- In six weeks, the worms will have migrated to the new bedding, and you can harvest the finished compost and replace it with new bedding.

# Harvesting the worm castings: Method #2

- Dump the contents of the bin onto a tarp. Pick out any large pieces that aren't broken down and place them in a small bucket.
- Separate the castings into several small cones and leave in the sun for half an hour. The worms will migrate down into each mound.
- Starting at the top, scrape the castings into a second bucket, peeling off a few cm of the mound at a time. When you start encountering lots of worms, stop. Let the sun drive them further down into the mound.
- After 15 minutes, go back and scrape more castings into the bucket, a few cm at a time.
- When you get down to the last few cm, you'll find most of the worms. Carefully scoop them up and place them in your bin with new bedding.





# When is compost finished?

---

Compost is mature when...

- The color is dark brown
- It is crumbly, loose, and humus-like
- It has an earthy smell
- It contains no readily recognizable feedstock

# Using finished compost Soil Amendment

---

- Compost improves soil health when mixed in the top 10 to 15 cm (work in no more than a 5 cm layer of compost)
- Will improve water and nutrient retention of sandy soils
- Will loosen compacted clay soils and make them more friable



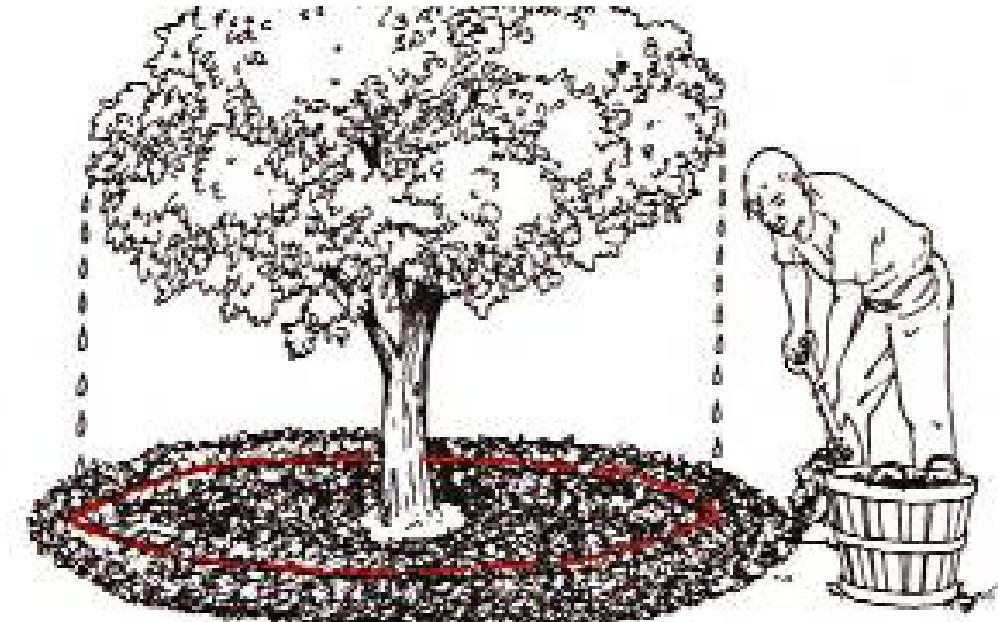
# Using finished compost Surface mulch

---

Mulch provides

- Protection from temperature extremes
- Slows moisture loss from soil
- Provides some slow-release nutrients





## Using finished compost Around trees/shrubs

- Maximum 7 cm depth
- Start 7-10 cm from trunk
- Extend out to dripline

# Using finished compost Potting mix

---

Compost must be very mature to avoid injury to new plants

---

Sift compost used for growing vegetable seedlings through a 5-6 mm mesh to ensure that it is finely textured.



## Homemade Potting Soil Recipe

- 2 parts coconut coir or peat
- 1 part finished, sifted compost
- 1 part perlite

# Using vermi-compost Worm Compost Tea

**Worm Compost Tea** – The end result of suspending worm castings in highly oxygenated water (brewing).



# Benefits of Worm Compost Tea

---

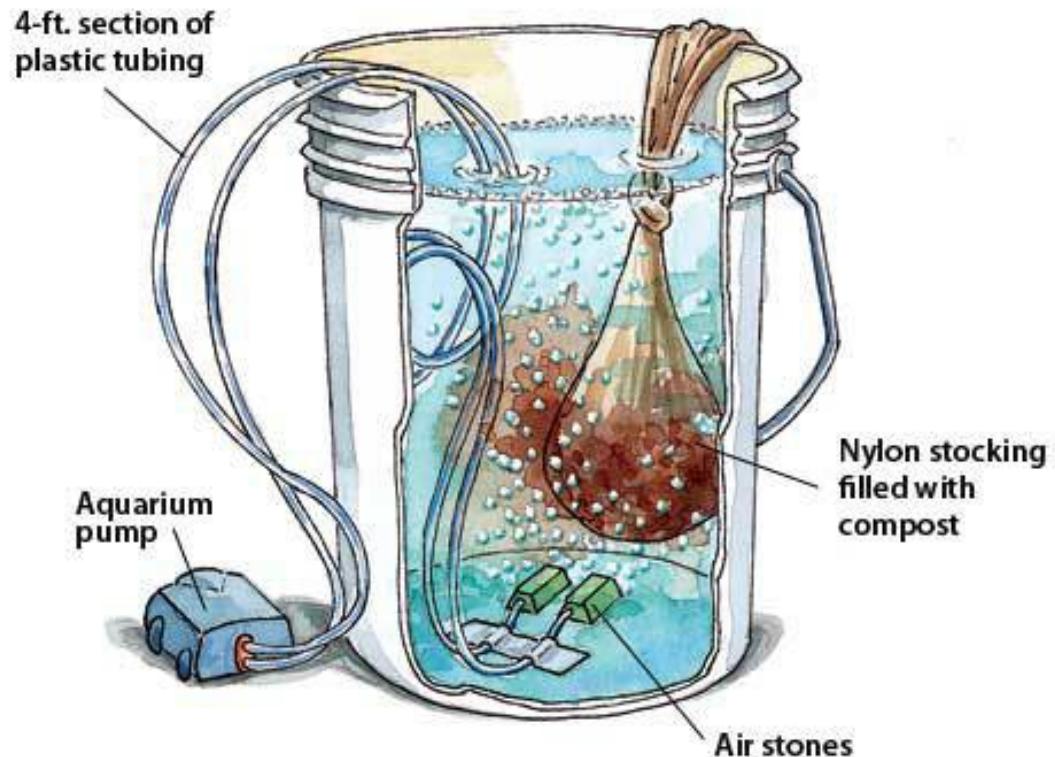
- Nutrient application
- Protects plants from foliar and root diseases
- Decomposes harmful chemicals
- Inoculation of soil food web
- Transforms compacted soil into healthy soil
- Reduces water usage



# How to make Worm Compost Tea

---

- Fill a 20 liter bucket  $\frac{3}{4}$  full of water and let sit for 24 hours to remove the chlorine
- Choose a handful of well-aged vermi-compost
- Tie the vermi-compost in a nylon stocking and lower it into the bucket of de-chlorinated water
- Add nutrients (optional) like sugar, molasses, or corn syrup
- Aerate with an aquarium bubbler for 24 hours



# How to use Worm Compost Tea

---

- **Spray the tea on leaves.** Spraying the leaves helps to lower the incidence of nasty diseases like powdery mildew.
- **Feed the soil.** A good drenching right after seedlings have been transplanted will help fight soil-borne diseases.





# Why should you compost?

It's environmentally responsible

- Keeps biodegradable waste out of landfills and sewage plants
- Alternative to burning
- Gives you a vibrant garden without chemical fertilizers or pesticides
- Saves money; makes money



Thank you for composting! Together we can help improve our soils, the quality of our food, and help save our planet.

---