

# Compost & Recycling Ambassador Program

Spring 2026 Session – Week 5

CITY OF  
LONGBEACH





**Week 5**

# **At-Home Composting Methods and Soil Science**



# Today's Agenda

March 19, 2026



1. Icebreaker and Assignment Review
2. Backyard Composting and its Science
3. Vermicomposting and its Science
4. Bin Monitoring
5. Field Trip to LB Community Compost!

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**Take 3 minutes each to answer the following:**

- 1. “Eat This First” Section and Kitchen Pail Set-up**
  - Were you able to set up your “eat this first” section?
  - What type of container do you use to separate your food scraps?
  - How have either worked so far in your household?
- 2. If you could give one reason why someone should use their green bin, what would it be?**

# Assignment #4: Kitchen pail/Eat this first section

A previous CRA's eat this first sections!



Cath's kitchen pail in action!



Derek's kitchen pail in action!



Maggie's kitchen pail in action!



Brandon's kitchen pail in action!



# A quick reminder on program requirements

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# Weekly Giveaway





Explore your bins as a team:

## Backyard Compost Bins

- Maintain your bins
- Take notes of the current status of the bin

## Worm Bins



- Maintain your worm friends!
- Take notes of the current status of the bin

***\*Make sure to fill out the monitoring sheet***

# Intro to Bin Monitoring

## Backyard and Vermicomposting Group Activity

<b>Group 1: Backyard Bin (Soil Saver)</b>	<b>Group 2: Backyard Bin (Earth Machine)</b>	<b>Group 3: Backyard bin (Tumbler)</b>	<b>Group 4: Worm bin (Can-o-Worms)</b>	<b>Group 5: Worm bin (Can-o-Worms)</b>
Benjamin	Edward	Kathryn "Taffy"	Griffin	Lori
Erin	Paul	Jenny	Tristan	Grace
Joel	Teodora	Francy	Wendy	Owen
Lynn	Anna	Sanghak	Vanessa	Kerry
			Elena	Yesenia

# Break Time

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Let's take a 5-minute break!

Feel free to use the restroom,  
go for a walk, or grab a drink  
and snacks!





**We will go over two composting methods:**

## **Backyard Composting**

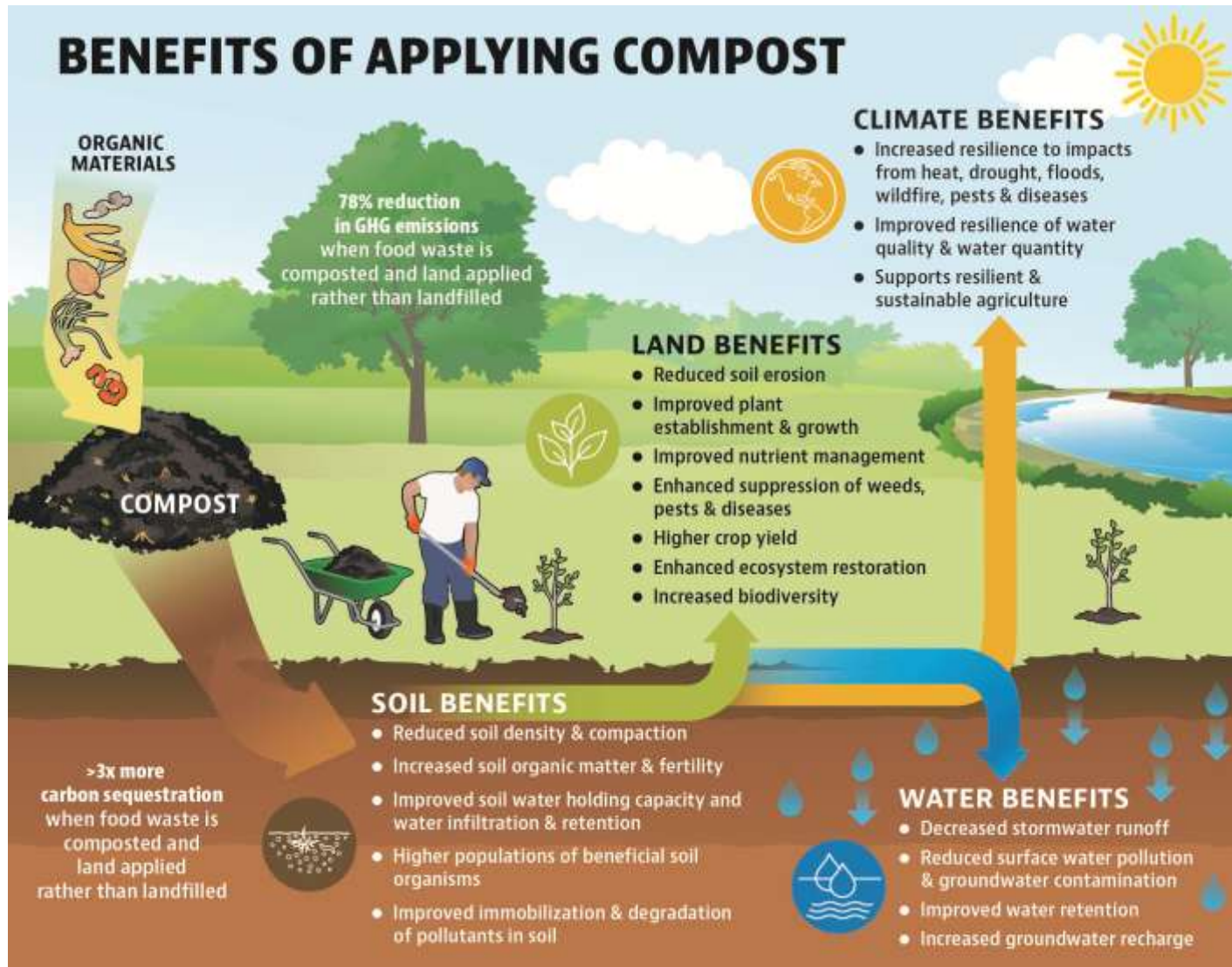
Typically, this process involves placing yard trimmings and food scraps in open piles or enclosing it in compost bins.

## **Vermicomposting**

Otherwise known as worm composting, this commonly uses red wigglers (*Eisenia fetida*) along with other micro-organisms to convert food scraps into worm castings (compost).

# At-Home Composting Methods

Why is it important to understand the benefits of compost?



# Composting Terms to Know

## Organic Material

- Not USDA organic
- Anything that was once alive and carbon-based

## Decompose/Decomposition

- All organic material will eventually break down
- Work of the Fungi Bacteria and Invertebrates

## Compostable

- Not to be confused with “compostable” plastics

## Biodegradable

- Not to be confused with “biodegradable” plastics and other products



# Composting Terms to Know

## What is Composting?

**Composting** is the sped-up natural decomposition process of organic material into a nutrient-rich soil amendment

- **Organic material** is feedstock for composting
- Fungi, bacteria, and invertebrates feed on organic material
- FBI use **carbon** and **nitrogen** to multiply

**Compost** is the final product which is a dark, crumbly, earthy-smelling soil amendment

- ✓ Rich in N-P-K





# Backyard Composting and its Science

# Backyard Composting and Its Science

## Things to consider before committing

**Space** – One cubic yard

**Location** – Ideally placed on soil away from walls

**Time and Effort** – Requires more time maintaining

**Equipment** – Requires use of some tools

**Your personal goal(s) with composting** –

1. Is your goal to reduce waste from going into landfills?
2. Is it to locally manage your food scraps, yard trimmings, or both?
3. Is it to create compost for your plants or garden?



# Activity #5: Compost Bin Samples

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Take a closer look at the backyard and vermicompost bin samples

We are placing two different compost samples at your desk.

## Directions

Please explore the samples and see if:

1. you spot any familiar insects or critters!
2. notice the differences between the two finished compost samples?

# Backyard Composting and Its Science

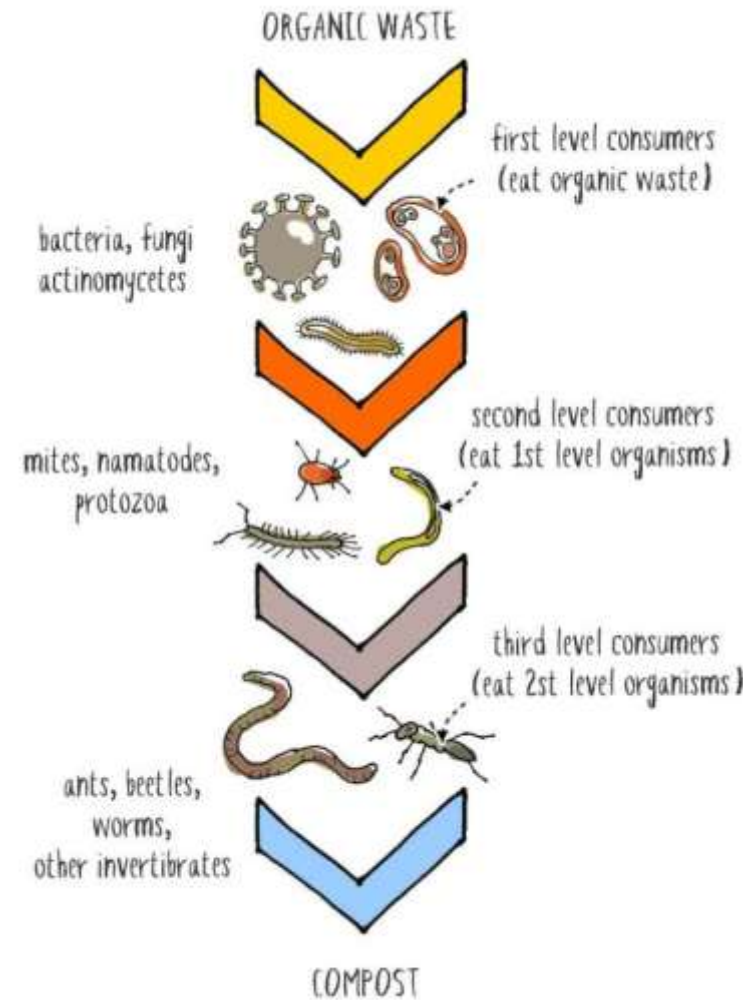
## The Compost Bin “Food Web”

**1) First level consumers:**  
Fungi, Bacteria, and actinomycetes



**2) Second level consumers:**  
Protozoa, Nematodes or Roundworms, Rotifers, Springtails, Mites, Beetles, and Black Soldier Fly Larva

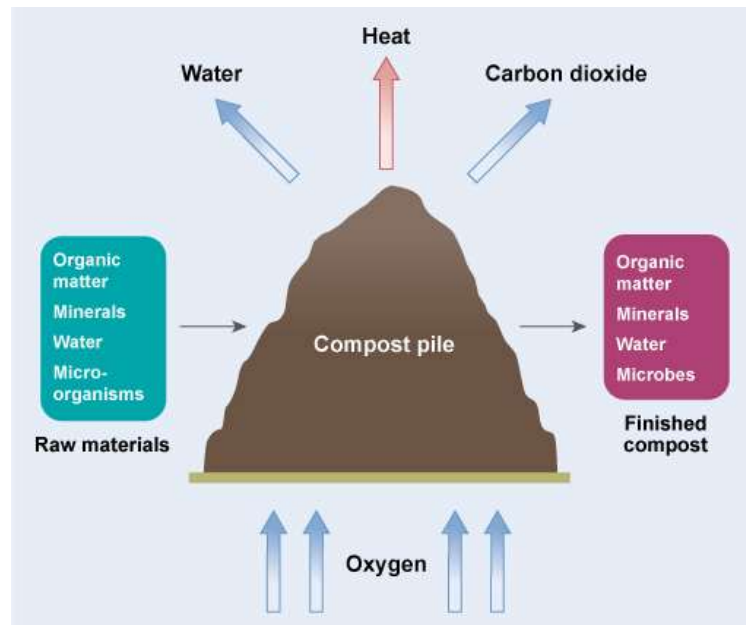
**3) Third level consumers:**  
Invertebrates like Ground Beetles, Centipedes, Millipedes, and Ants



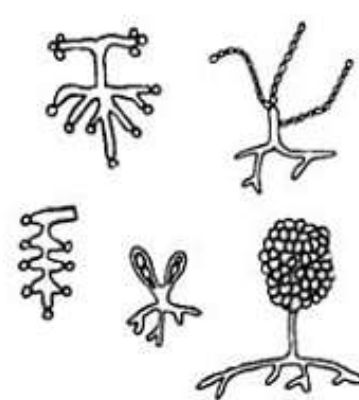
# Backyard Composting and Its Science

## The Compost Bin "Food Web"

- 1) **Aerobes** require oxygen to live
- 2) **Anaerobes** DO NOT require oxygen to live, in fact, oxygen is **toxic** to them

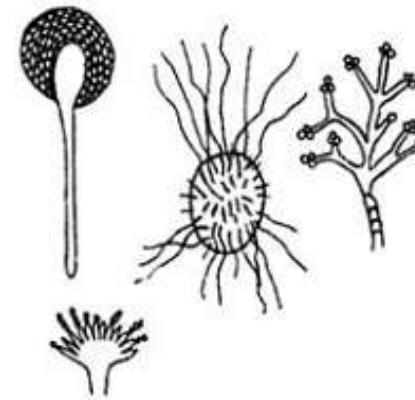


### COMPOST MICROORGANISMS MAGNIFIED 1,000 TIMES



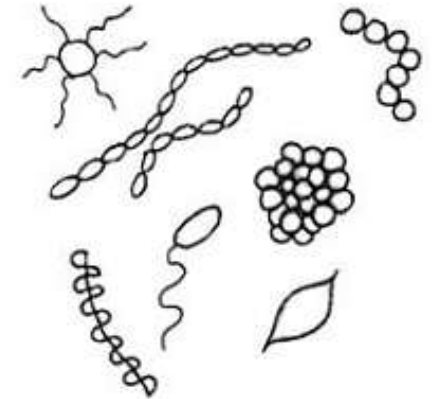
**Actinomycetes**

100 thousand - 100 million  
per gram of compost



**Fungi**

10 thousand - 1 million  
per gram of compost

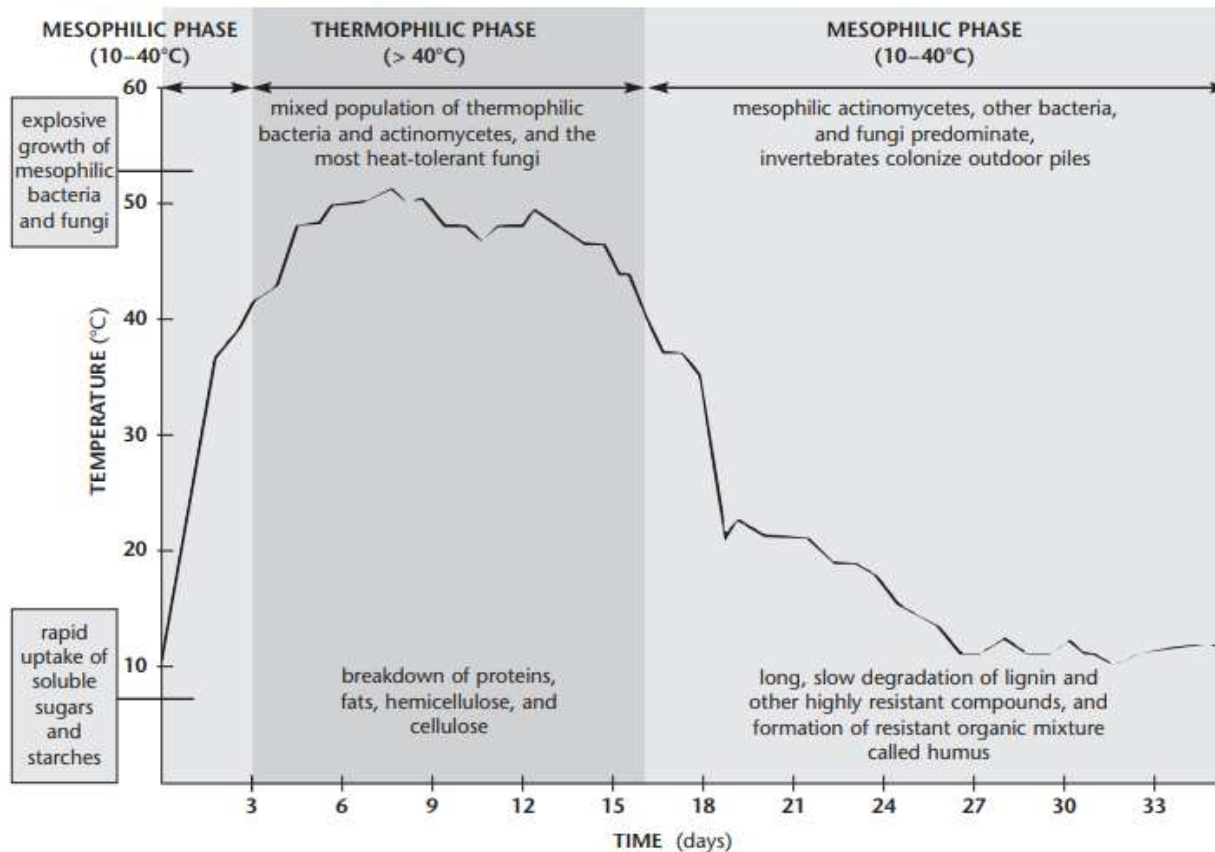


**Bacteria**

100 million - 1 billion  
per gram of compost

## Stages of Backyard Composting and Microbes

Figure 1-1. The Three Phases of Thermophilic Composting.



### Passive or Cold

- Low maintenance
- Little attention to watering, aerating, or optimizing conditions
- Slower (could take up to a year)

### Active or Hot

- Needs more maintenance
- Pile needs regular turning
- Volume reaches about 1 cubic yard
- Adequate moisture maintained
- Faster (3-5 months)
- Pathogens reduced

# Backyard Composting and Its Science

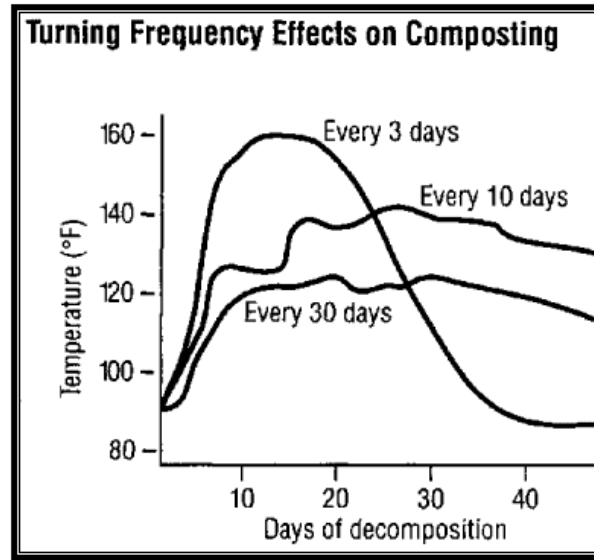
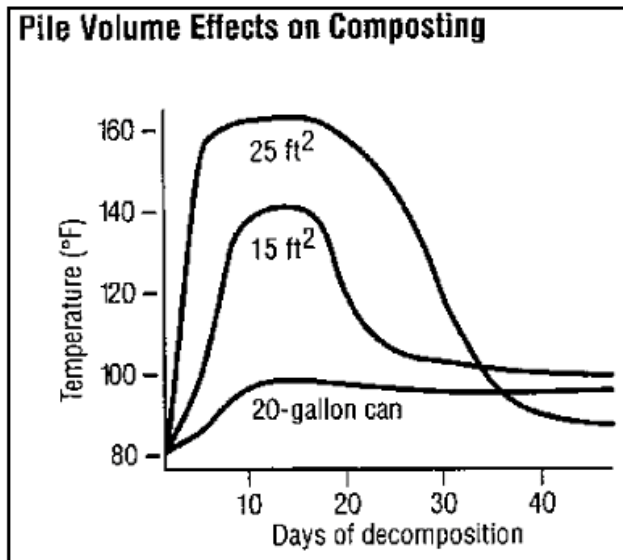


What goes into your backyard bin?

## 4 Key Ingredients

1. **Browns** – Carbon-rich material
  2. **Greens** – Nitrogen-rich material
  3. **Water** - Controlled moisture level
  4. **Oxygen** – aerating your pile
- 3 Parts Browns**

**1 Part Greens**



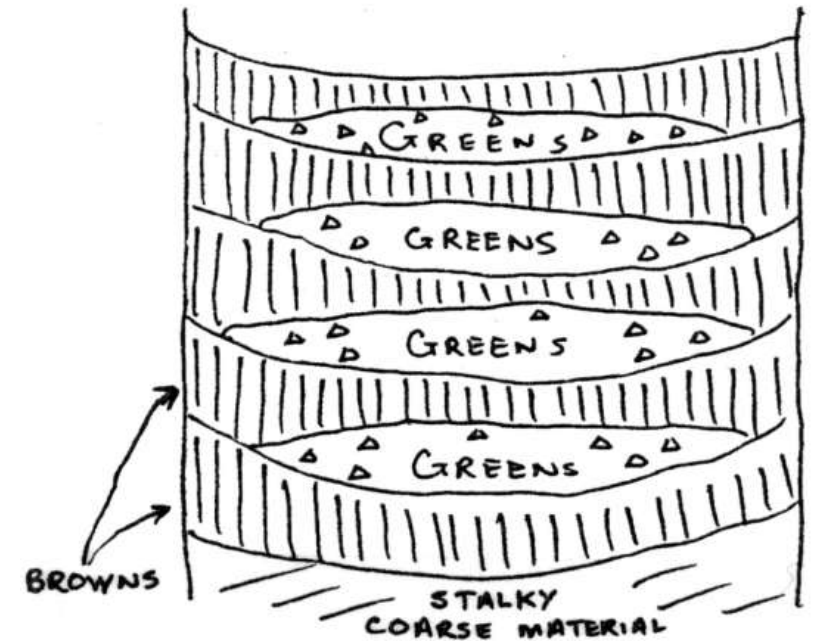
# Backyard Composting and Its Science

## Starting your Pile: Lasagna Layering Method

1. Add twigs at the bottom to promote airflow
2. Add 4-6 inches of browns to absorb excess liquid
3. Add a layer of greens following 3:1 ratio
4. Add a layer of browns 2x thicker than the greens layer
5. Never leave any green material exposed
6. Add **water** and aerate your pile for 5 to 10 minutes

🔄 **Repeat** 🔄

7. The pile will start heating up as the bin gets full and the volume increases



Source: Cornell Composting

# Backyard Composting and Its Science

What goes into your backyard bin?

## 3 PARTS BROWNS: 1 PART GREENS

### BROWNS (CARBONS):

- Dry leaves/ grass
- Wood chips/ sawdust
- Straw
- Shredded paper
- Small twigs
- Tree bark
- Nutshells
- Eggshells

### GREENS (NITROGENS):

- Grass and plant trimmings
- Fruit and vegetable scraps
- Flowers
- Fresh leaves
- Coffee grounds and filters
- Tea leaves/tea bags (natural fiber, no staples)\*\*



\*\*Most brands of tea bags have plastic in them. Read label carefully to ensure the entire item (bag, string, tag) is plastic-free. The best option is to use loose leaf tea.

# Backyard Composting and Its Science

## What cannot go into your backyard bin?

### DO NOT COMPOST:

- ⊗ Meat scraps and bones
- ⊗ Dairy products
- ⊗ Processed foods
- ⊗ Oil and grease
- ⊗ Diseased vegetation
- ⊗ Plants that have been treated with herbicides
- ⊗ Palm fronds and large wood pieces
- ⊗ Weed seeds
- ⊗ Charcoal or ashes from treated wood
- ⊗ Manure from carnivores (meat-eating animals)
- ⊗ Plastics or synthetic fibers
- ⊗ "Compostable" or "Biodegradable" plastic



# Backyard Composting and Its Science

## The importance of airflow and moisture

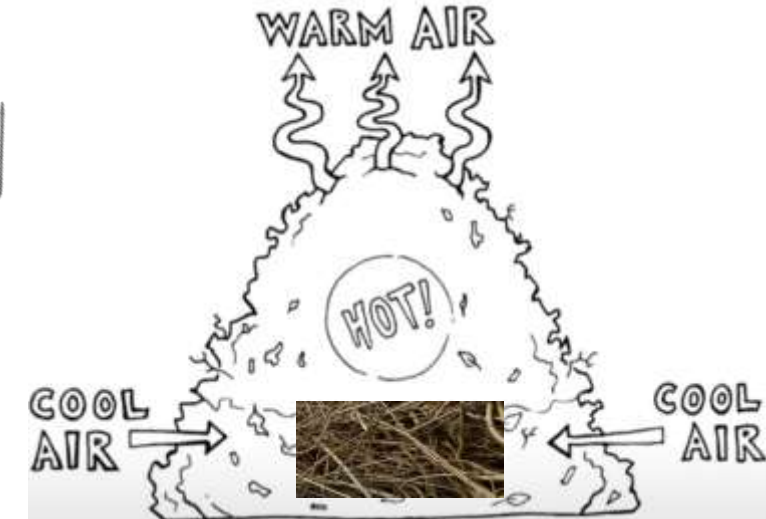
**Warm air** rises through the pile and draws in **cool air** from the bottom and sides

## What does aerating your pile do?

- ✓ Bin systems receives fresh air
- ✓ Releases trapped heat and moisture
- ✓ Breaks up clumps and redistributes air channels

## Moisture level should be like a wrung-out sponge

- If it's too dry, microbial activity will slow or cease
- If too wet, it can create a bad smell



### THE "HAND SQUEEZE" MOISTURE TEST



Take handfuls from different places in your compost pile and give them a squeeze! At the ideal moisture level, a few drops of water should appear between your knuckles and it should feel like a wrung-out sponge.

# Backyard Composting and Its Science

## Tips to avoid bad odors

- ✓ Turn the pile more often
- ✓ Don't add moisture
- ✓ Add more carbon (**BROWNS**)

## Tips to increase temperature

- ✓ Turn the pile more frequently
- ✓ Add more material so the pile is larger
- ✓ Add more nitrogen (**GREENS**)



# Backyard Composting and Its Science

## Tips to avoid unwanted critters

- ✓ Secure all sides of the bin
- ✓ Cover all food scraps with brown material
- ✓ Do not add meat, dairy, oily or cooked food
- ✓ Keep your bin away from a fixed wall or fence

## Things to look out for when monitoring

- ✓ Ensure bin has the right ratio of **greens/browns**
- ✓ Check the temperature with a compost thermometer
  - Heat indicates there is ongoing decomposition
  - Take note of **heating/cooling** cycles
- ✓ Check moisture levels and add water if necessary
- ✓ Repeat turning until temperature stops rising



## Pop Quiz



**What are the four (4) essential ingredients of backyard compost?**



**A. Browns (C), Greens (N),  
Water, Time**

**B. Browns (C), Greens (N),  
Water, Oxygen**

**C. Food, Garden Trimmings,  
Worms, Air**

**D. None of the above**

## Pop Quiz



**What are the four (4) essential ingredients of backyard compost?**



**A. Browns (C), Greens (N),  
Water, Time**

**B. Browns (C), Greens (N),  
Water, Oxygen**

**C. Food, Garden Trimmings,  
Worms, Air**

**D. None of the above**



## Harvesting and Using Backyard Compost

# Harvesting and Using Backyard Compost

## When is compost finished?

**If turned:** 6 - 8 weeks

**Not turned:** 6 - 8 months

## What can speed it up?

- ✓ Size of your feedstock
- ✓ Carbon and Nitrogen content
- ✓ Moisture levels
- ✓ Volume and Insulation



# Harvesting and Using Backyard Compost

## Curing is Often Overlooked!

- Mesophilic microorganisms take over the pile
- The pile must be kept at about 50% moisture
- Cure the pile for 3 – 4 weeks
- You do NOT need to turn the pile or add new material during the curing phase!

## Why Cure?

- ✓ Ensures a neutral compost pH
- ✓ Balance out the carbon and nitrogen content
- ✓ Makes compost optimal for plant growth



# Harvesting and Using Backyard Compost

## Harvesting time can vary based on need

- ✓ Compost that will be used as a **top dressing or mulch** can be applied after the least amount of time
- ✓ Compost that will be used for **growing plants in containers** must be thoroughly composted



The Spruce / Steven Merkel



Source: Carbon Gold

# Harvesting and Using Backyard Compost

## Signs of 'Unfinished' Compost

- ✘ Food/yard debris content is still recognizable
- ✘ The pile is still warm
- ✘ The pile smells like ammonia
- ✘ Many large lumps in pile



# Harvesting and Using Backyard Compost

## How to Identify 'Finished' Compost

- ✓ The pile has shrunk significantly
- ✓ Materials are broken down & unrecognizable
- ✓ The pile is no longer generating a significant amount of heat
- ✓ Smells earthy (no ammonia)
- ✓ Dark crumbly appearance
- ✓ After curing



**Don't forget to sift!**

# Harvesting and Using Backyard Compost

## Sifting Finished Compost

**Once curing phase is finished,** sift and apply

**Sift** using a ½" screen to separate any clumps/ unfinished material



# Harvesting and Using Backyard Compost

## 4 Ways to Use Your Backyard Compost

### 1. Top-Dress Your Lawn

- Sprinkle lightly over lawn
- Water well

### 2. Potting Mix

- 2 parts sifted compost; 1 part potting soil mix

### 3. Soil Amendment

- Mix in small amounts of compost into top 1-2 inches of soil

### 4. Garden Bed

- Mix 3-4 inches thoroughly into soil before planting

### 5. Shrubs & trees

- 1-2 in at the base and cover with mulch



TOP-DRESS LAWNS



PREPARE GARDEN BEDS



POTTING MIX



AMENDING SOIL

# Backyard Composting and Its Science

Questions?



# Break Time

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Let's take a 5-minute break!

Feel free to use the restroom,  
go for a walk, or grab a drink  
and snacks!





# Vermicomposting (with worms) and its Science

# Vermicomposting and its Science

## What is Vermi (worm) composting?

**Vermicomposting (worm composting)** is a process involving the use of worms and raising them under controlled conditions

**Vermicompost** is a mixture of partially decomposed organic waste, bedding, worm castings, worms, worm cocoons, and other organisms

- **Worm Castings** is another word for worm manure or “poop”

Red Wiggler Worms

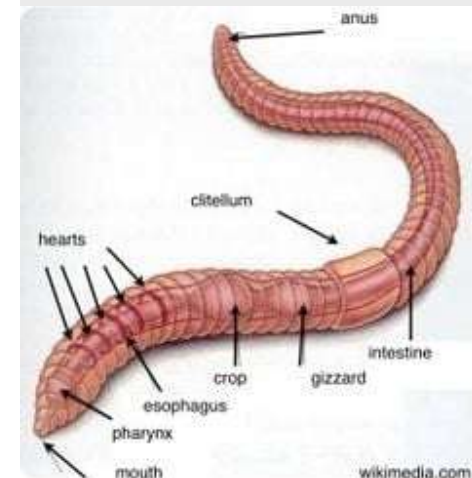
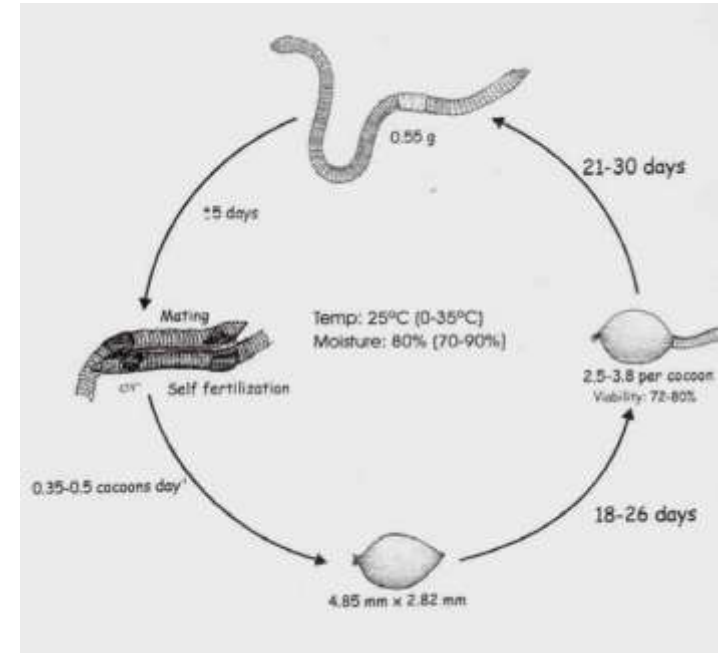


# Vermicomposting and its Science

## Why red wigglers?

Earthworms found in backyards are not suitable, they cannot process waste in confined spaces

- ✓ More than **7,000** earthworm species inhabit the earth, only a **few worm species** are used for vermicomposting
- ✓ **Red wigglers are voracious eaters** and will eat a wide range of organic materials
- ✓ **They reproduce well in captivity** and can produce over four cocoons per week, each containing three babies
- ✓ **They can tolerate human handling** and a wide range of temperatures, moisture levels, and pH levels
- ✓ In good conditions, they can **double every 2 months**
  - 3 - 4 weeks** from cocoon to the emergence
  - 3 - 5 weeks** from emergence to maturity



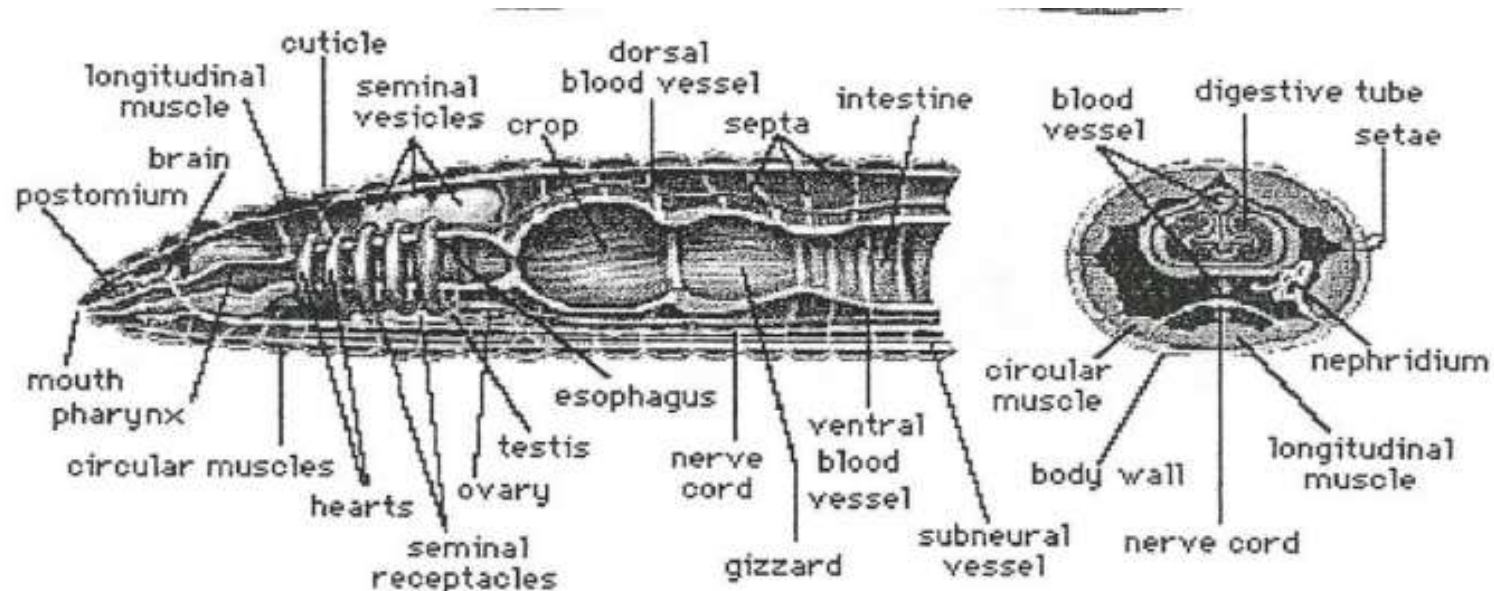
# Vermicomposting and its Science

## Red Wiggler Worm Anatomy

**Digestive System:** Like birds, worms have no teeth and rely on their crop and gizzard to grind foods.

**Reproduction:** Earthworms are hermaphrodites, meaning each has both male and female reproductive organs.

**Lifespan:** Earthworm longevity is species dependent.

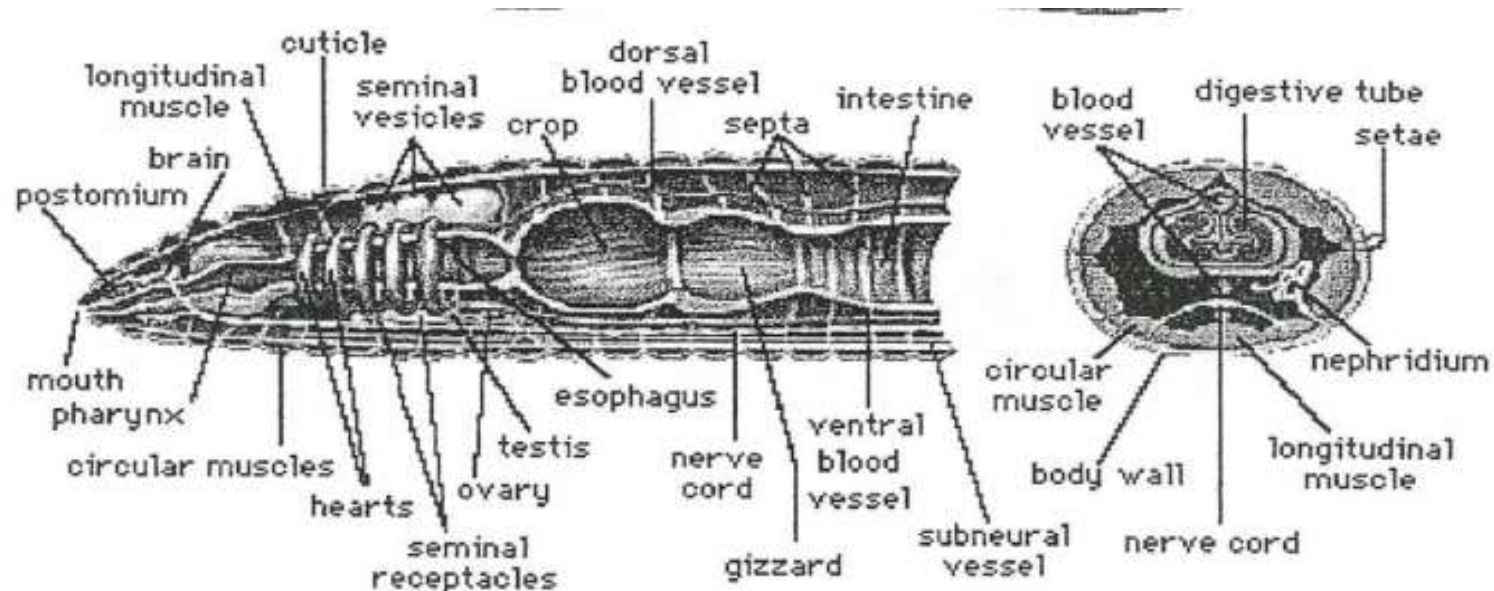


# Vermicomposting and its Science

## Red Wiggler Worm Anatomy

**Coelomic Fluid:** Worms have **no** bones or cartilage.

**Blood Vessels and Hearts:** There are **three** principal blood vessels in a worm's body, and they have **five** "pseudo-hearts"



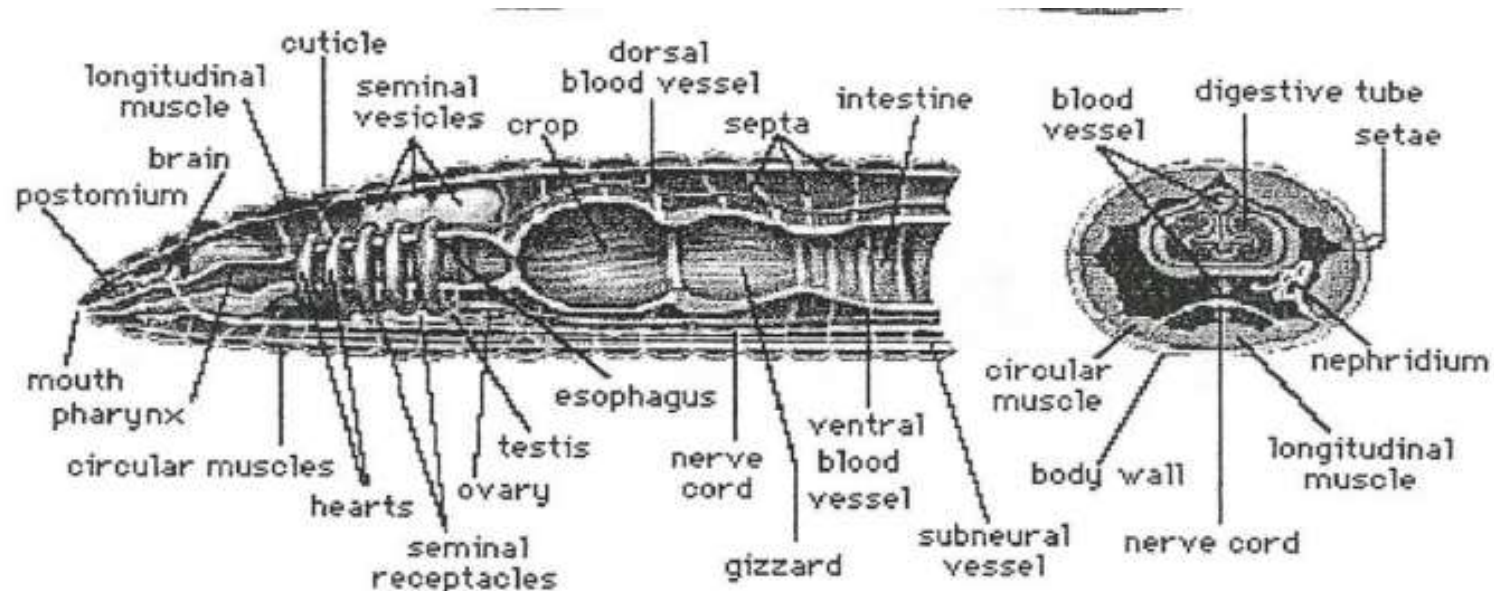
# Vermicomposting and its Science

## Red Wiggler Worm Anatomy

**Skin:** A worm's skin is like an external lung

**Sensory Organs:** Worms do not have eyes but do have light-sensitive organs in several places on the surface of their bodies.

**Setae and Locomotion:** Setae are a worm's "legs."



# Vermicomposting and its Science

## The Worm Bin Ecosystem

Your worm bin will have an entire ecosystem of organisms that help break down the food in the bin.

Red wigglers



Potworms



Worm Cocoons



Springtails



Mites

# Vermicomposting and its Science

## Things to consider before choosing this system

**Space** – Much smaller scale than backyard composting

### Location

- ✓ Indoor or outdoor in a shaded/dry area
- ✓ Flat surface
- ✓ Easy to access

### Equipment

- ✓ Container
- ✓ Red worms
- ✓ Bedding
  - Shredded paper/coco coir and water

### Feedstock

- ✓ Veggie and fruit scraps only, **NO YARD WASTE**



# Vermicomposting and its Science

## DO Vermicompost:



## DO NOT Vermicompost:



Dairy products



Meat products



Coffee grounds and filters



Tea bags (fibrous, no staples)



Grass or plant trimmings



Oily products



Eggshells



Onions/Garlic/  
Acidic Foods

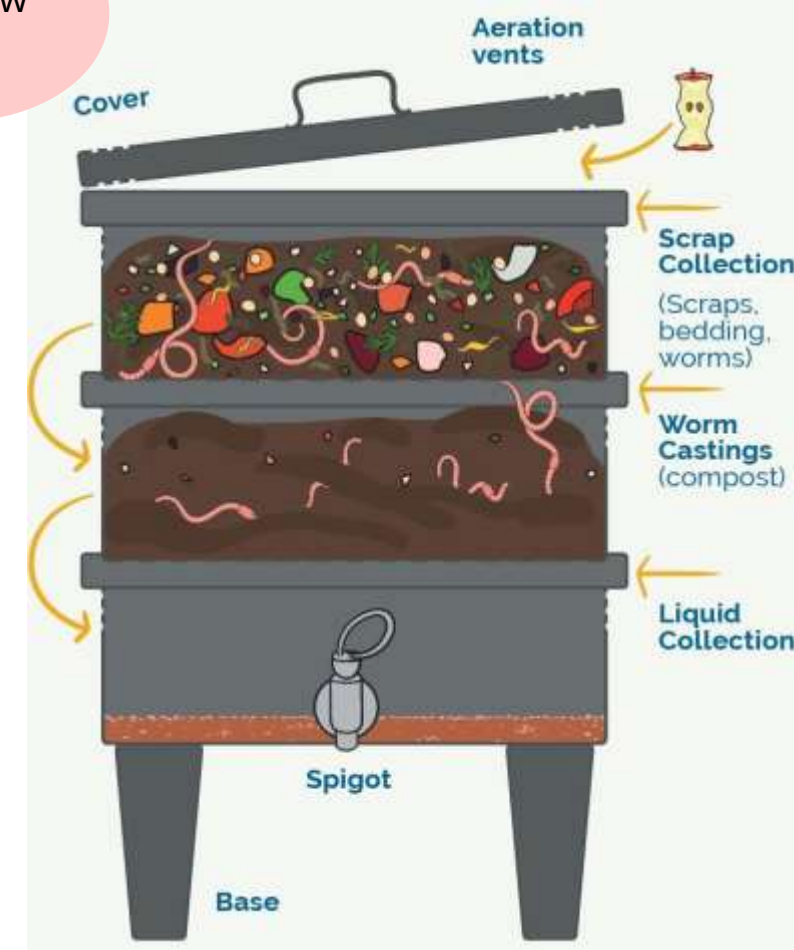
# Vermicomposting and its Science

## How to start your worm bin

1. Add moist bedding to the top layer
2. Place your worms over the bedding
  - 1 pound is about 1,000 worms = ~\$55-60
  - Worms normally come to you in a bag or container
3. **You are ready to start feeding (slowly)!**



Don't bury me,  
I can burrow  
myself!



# Vermicomposting and its Science

## Preparing bedding

Material for bedding needs to have a high **carbon** to **nitrogen** ratio

- **20:1** and **35:1** or higher



Shredded paper or cardboard about 1"



Coco Coir (this comes with most purchased bins)

## Best Practices for Maintaining your Worm Bin

### When Feeding Your Worms:

- ✓ Start slow
- ✓ Feed in quadrants
- ✓ Bury the food 2 - 3 inches under the bedding
- ⊗ **Do not overfeed**
  - **1,000 worms** will eat about **½ pound of food scraps each day**

### Other Maintenance Includes:

- ✓ Keep bedding moist
- ✓ Add new bedding/covering every week
  - Damp newspaper



# Vermicomposting and its Science

## Troubleshooting your Worm Bin

### Too much moisture

- ✓ Increase **brown material**
- ✓ Add new bedding

### Fruit flies present

- ✓ Freeze and thaw the fruit before putting it in the bin to kill fruit fly eggs and larvae
- ✓ Bury/cover food scraps when putting them in the bin

### Clumps of castings in the bin

- ✓ If clumps are dry, break them up and spray with water
- ✓ If clumps are wet, break them up and add dry bedding





## Harvesting and Using Vermicompost

# Harvesting and Using Vermicompost

## When is vermicompost finished?

### **2 - 3 months of steady feeding for a full bin layer**

- ✓ Vermicompost is the reward for a good worm environment
- ✓ Can harvest as soon as castings are created but make sure to leave behind raw feedstock and worms.

## How to Identify 'Finished' Worm Compost

- ✓ Dark brown color
- ✓ Uniform texture
- ✓ Worm reproduction slows
- ✓ Worm size



# Harvesting and Using Vermicompost

## 3 Different Methods of Harvesting Worm Compost

- ✓ By hand
- ✓ By migration (lure)
- ✓ By exposure (photosensitivity)



# Harvesting and Using Vermicompost

## Best practices for storing vermicompost

- ✓ Store castings in a container
  - Repurpose what you have
  - Ex: 1-gallon ice cream tub
- ✓ Make sure the container has holes for airflow and a lid
- ✓ Fill up the container with castings
- ✓ Add wet newspaper on top & cover with lid
- ✓ Check container every 6 months and add more wet newspaper if dry



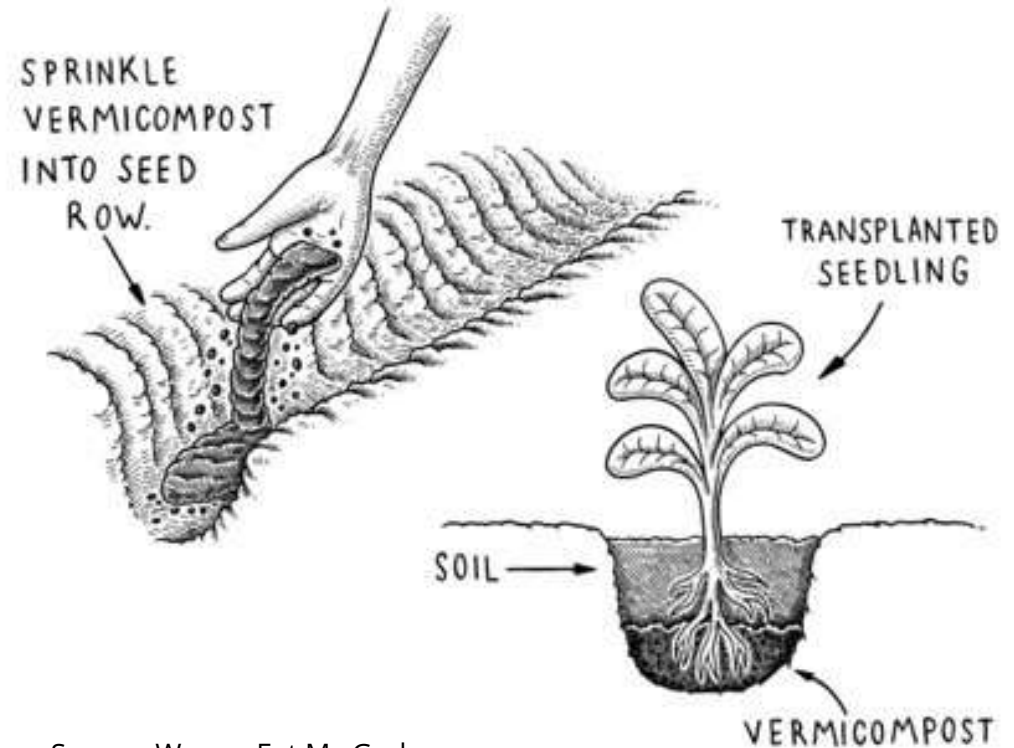
**Store in a cool  
dark place!**

# Harvesting and Using Vermicompost

## Use Vermicompost for:

- ✓ Seed beds
- ✓ Transplanting
- ✓ Topdressing
- ✓ Potting mixes

- $\frac{1}{4}$  worm castings: for nutrients
- $\frac{1}{4}$  coir: for moisture retention
- $\frac{1}{4}$  perlite: for aeration
- $\frac{1}{4}$  sand or garden soil: for body



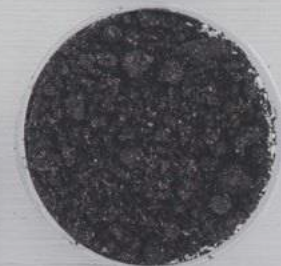
Source: Worms Eat My Garbage

# Vermicomposting and its Science

Questions?



# Soil Science



## What is Soil?

The organic material on the immediate surface of the Earth that serves as a natural medium for the growth of plants on land.

Soil is comprised of **mineral particles, organic matter, living things, gas, and liquid.**

**Urban soils** are those found within cities, largely built environments, or areas with a high population density

**Applying compost to soil:**

- ✓ Adds nutrients
- ✓ Increases organic matter
- ✓ Benefits soil microorganisms
- ✓ Increases carbon sequestration

Soil is not the same as dirt - dirt is dead and has no organic matter living in it!

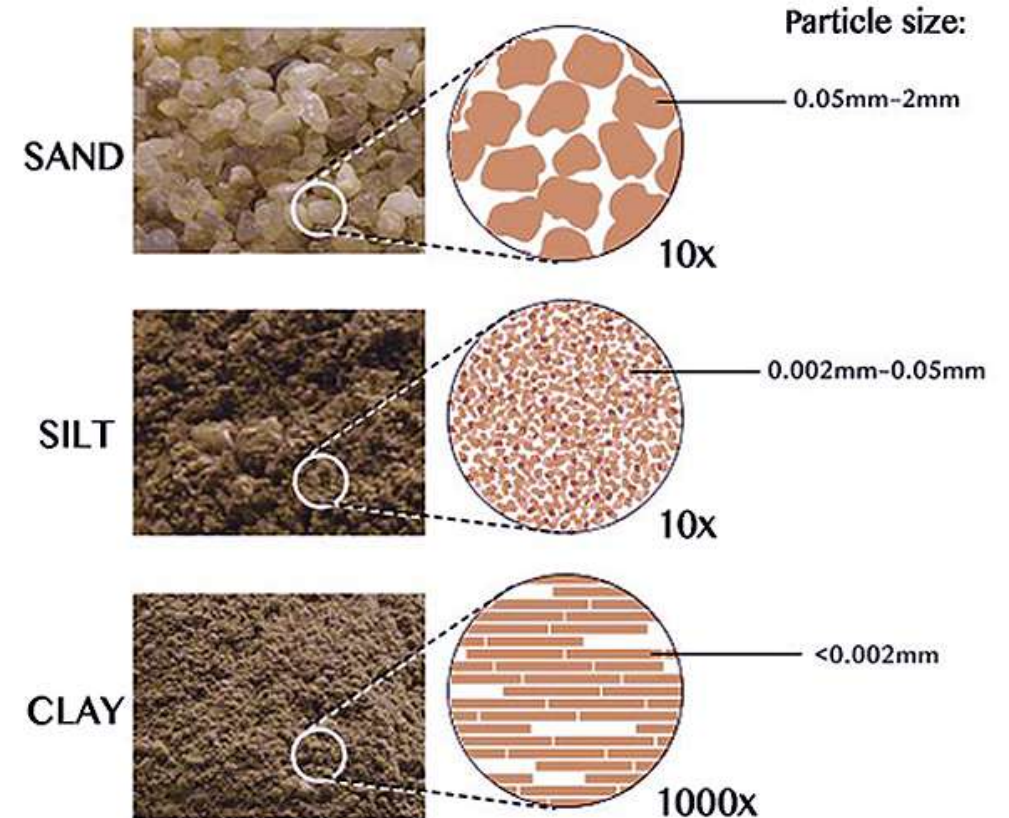


## Sand, Silt, and Clay

Inorganic soil particles are named for their size and can be classified based on their composition.

- These particles range in size from **clay** (*the smallest*) to **sand** (*the largest*).

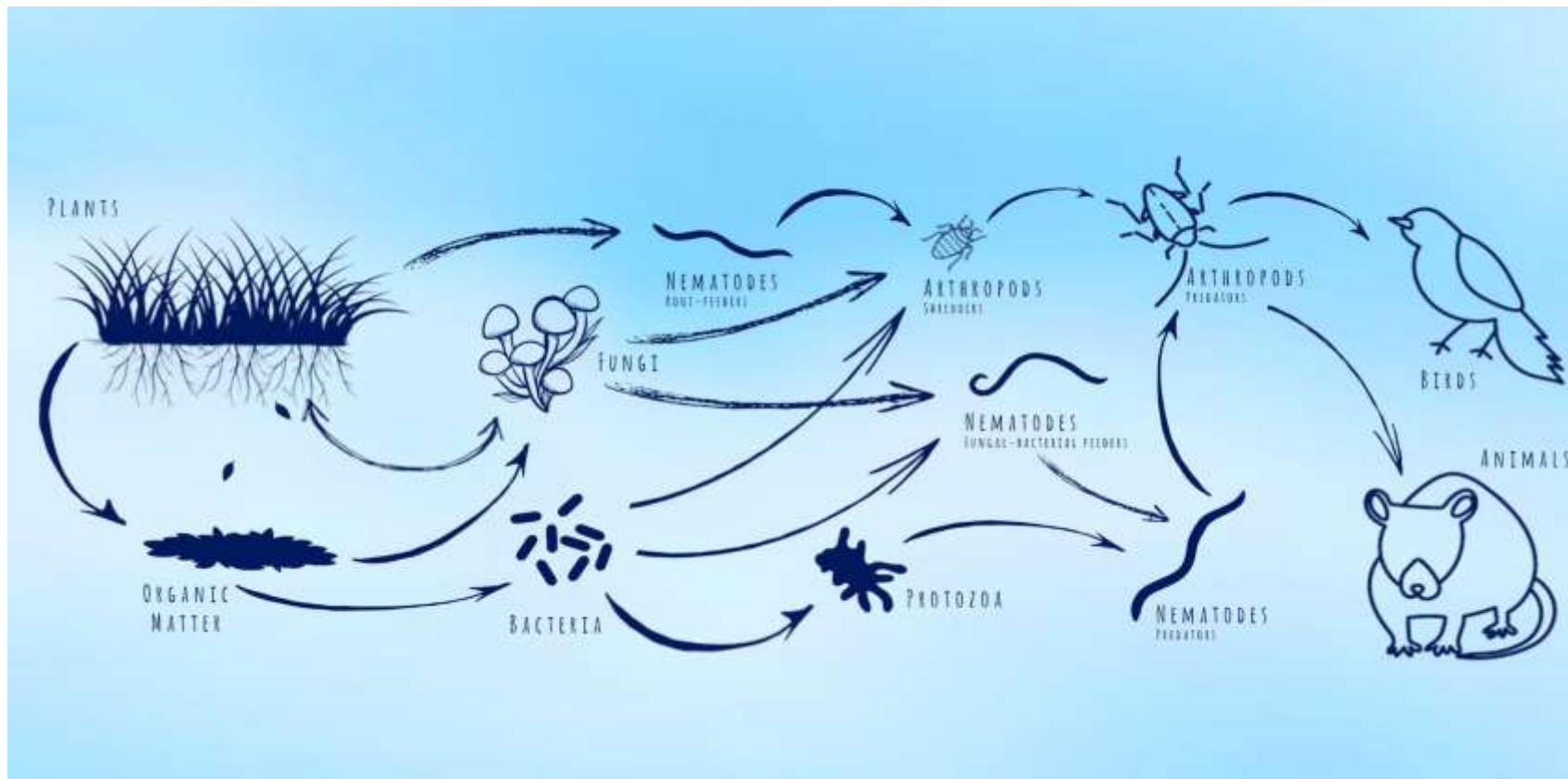
Sand + Silt + Clay + Humus = **Soil**



Source: [https://www.bio.miami.edu/dana/330/330F19\\_8.html](https://www.bio.miami.edu/dana/330/330F19_8.html)

## The Soil Food Web

- Soil is home to a complex community of living organisms
- Bacteria & fungi break down organic matter and releases nutrients in plant available form
- Small predators eat microbes



## Types of Compost: Are they the same?

- **Compost can be produced in different ways and at different scales**
  - Examples: backyard composting, vermicomposting, and commercial composting
- **Every type of compost adds organic matter, microbes, and nutrients to the soil**
- **The main differences are nutrient levels, consistency, and microbial activity**

## Backyard Compost

- ✓ Variable texture and nutrient levels
- ✓ Depends on household organic materials (feedstock) and management
- ✓ Great for garden beds or to improve overall garden soil on the ground

## Commercial Compost

- ✓ Produced in large windrows or aerated systems
- ✓ Consistent and usually fully stabilized
- ✓ Commonly used in landscaping, farms, and large gardens

## Vermicompost has extra benefits!

- ✓ Suppresses plant diseases
- ✓ Natural pesticide
- ✓ Removes heavy metals
- ✓ Plants grow faster
- ✓ Increased yield
- ✓ Soil aeration



Questions?



# Assignment for next class

1. Submit the survey or let me know which compost system you would like to take home before the end of the day
2. Watch “Inside a professional composting operation”
  - Take notes of anything you found interesting to share next week



<https://forms.office.com/g/Xz9AyacdWQ>

# Optional Field Trip

Let's meet one of our community partners!

We will now head out to  
Long Beach Community Compost  
located at:

**2714 California Ave**  
**Signal Hill, CA 90755**

- ✓ Feel free to carpool and we will meet you there
- ✓ **Please take all your belongings with you!**



# Quote of the week:

**“Be the change you wish to see in the world.”**

-- Mahatma Gandhi

CITY OF  
**LONG BEACH**



# Thank you for an amazing session

Reach out if you have any questions,  
see you next Thursday, March 26!

 [www.longbeach.gov/lbrecycles](http://www.longbeach.gov/lbrecycles)

 [lbrecycles@longbeach.gov](mailto:lbrecycles@longbeach.gov)

   @LBRecycles

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[longbeach.gov](http://longbeach.gov)