



# Composting Ins and Outs

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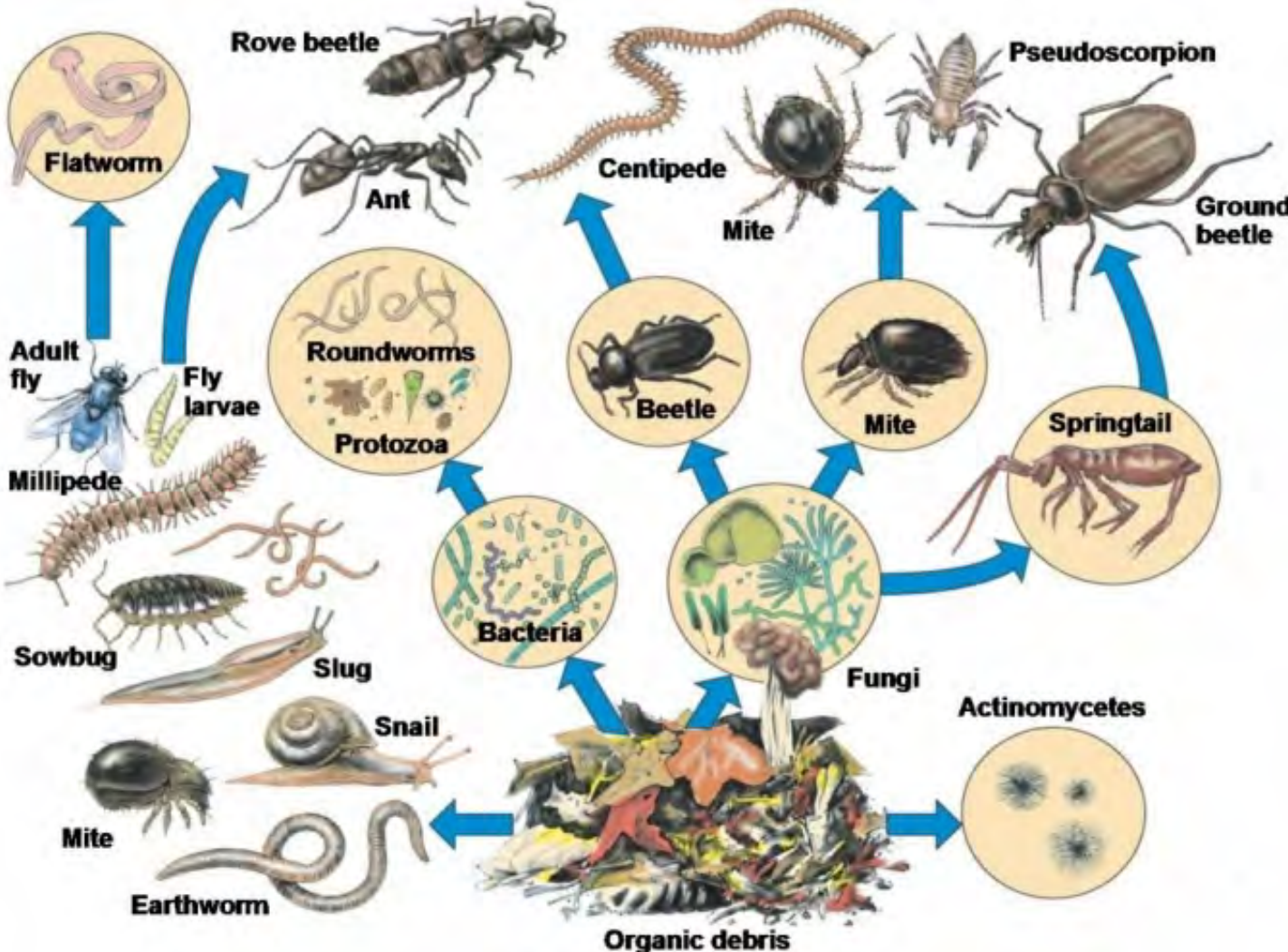
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# Why compost?

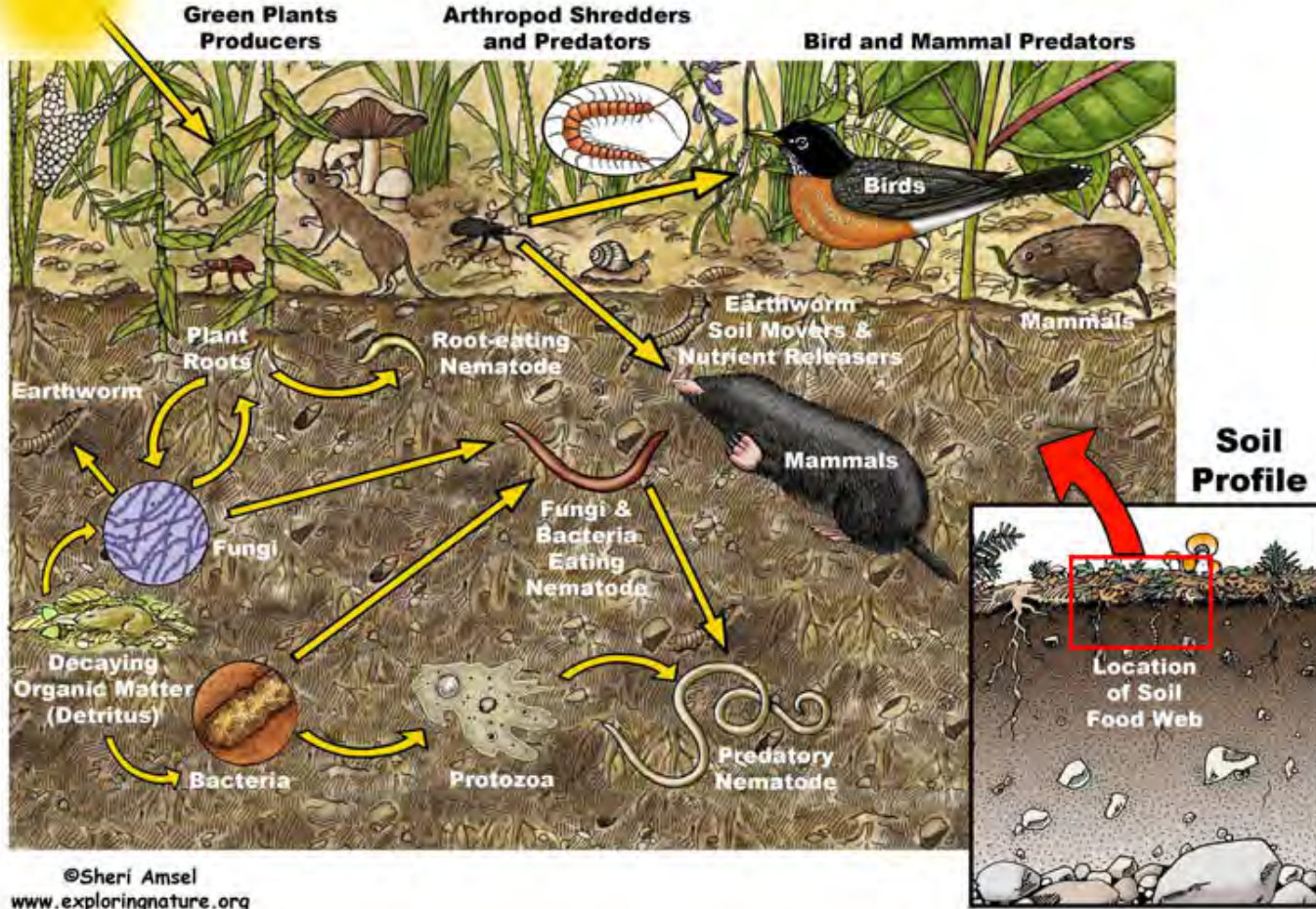
- Reduce waste in landfill
- Rich fertilizer
- Improves soil structure
- Fun and educational!



# Soil food web



# Soil surface

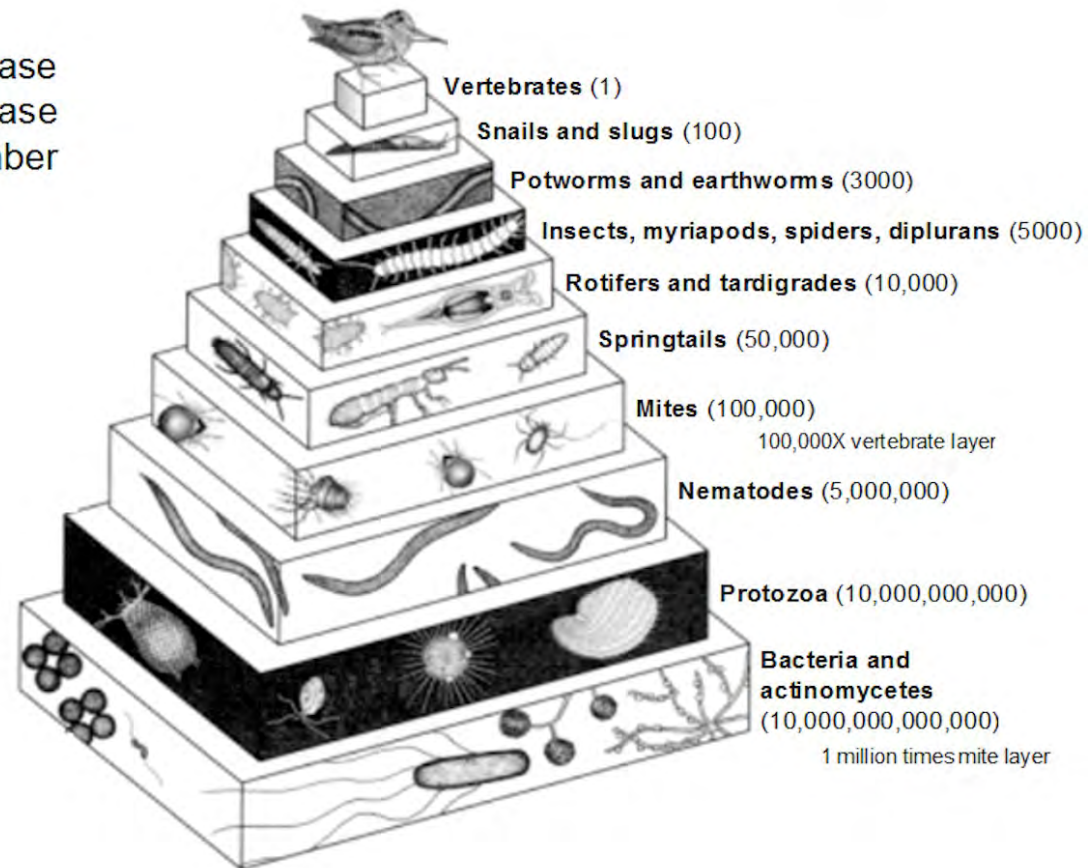


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# Soil Pyramid

In one square meter of soil....

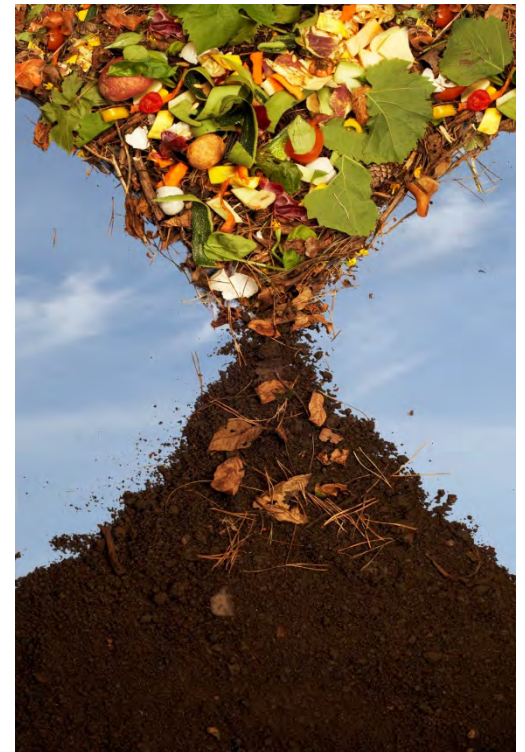
Organisms decrease  
in size and increase  
in number



# Composting is...

The acceleration of natural decomposition by one or more of the following:

- Providing ideal nutrient ratios
- Maintaining structure and moisture
- Increasing number of organisms





# Necessary nutrients

Carbon – provides energy

Nitrogen – incorporated into protein

A maximum of 35% of the carbon in fresh organic material will be converted into compost **IF** there is sufficient nitrogen present.

A minimum of 65% of the carbon in fresh organic material will be given off to the atmosphere as carbon dioxide due to microbial respiration.

# Ideal nutrient ratios

30:1 Carbon:Nitrogen

15:1 Cubic Feet

3:1 Pounds



Browns  
High in Carbon



Greens  
High in Nitrogen



# Nutrient sources

## Brown carbon-rich

- dry leaves
- straw and hay
- shrub prunings
- pine needles/cones
- chopped twigs/branches
- wood ash
- newspaper
- shredded paper (avoid glossy paper)
- cardboard (shredded)
- corn cobs, stalks
- dryer lint (from natural fibers)
- sawdust (from untreated wood)
- eggshells
- brown paper bags (shredded)

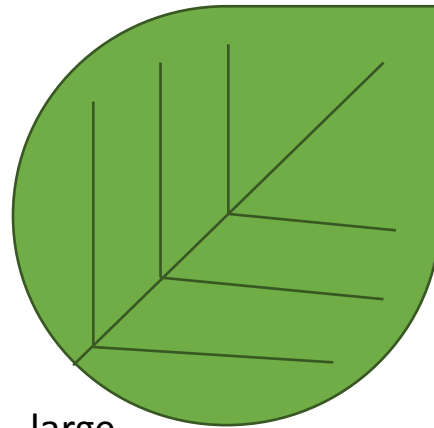
## Green nitrogen-rich

- table scraps
- fruit scraps
- vegetable scraps
- fresh grass clippings
- lawn and garden weeds (if they have not gone to seed)
- flowers
- seaweed and kelp
- chicken manure
- coffee grounds/filters
- tea leaves (loose or in bags)
- corn cobs, stalks
- hedge clippings
- garden waste
- fresh leaves

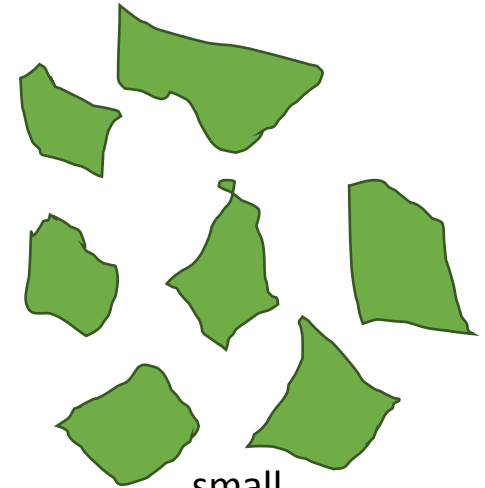
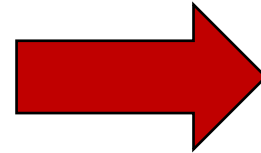
# Nutrient composition

Organic Material	% C	% N	C:N
Chicken manure	30	4.3	7:1
Cow manure	20	1.7	12:1
Food scraps	8	0.6	16:1
Green weeds	6	0.3	19:1
Lawn clippings	8	0.3	20:1
Seaweed	8	0.3	25:1
Straw	36	0.4	100:1
Paper	36	0.2	170:1
Sawdust	34	0.1	450:1

# Size/shape considerations



large

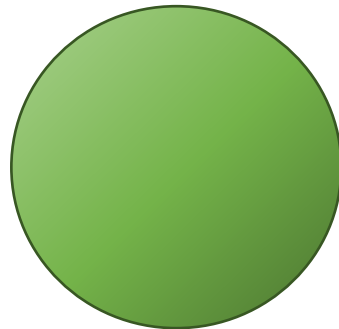


small

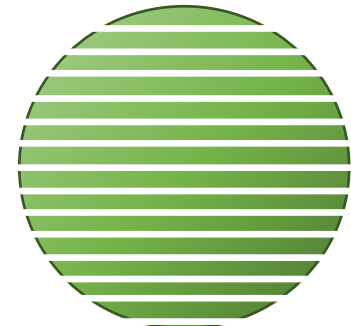
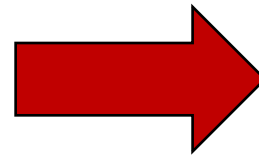
**More surface area**

=

**More digestible**

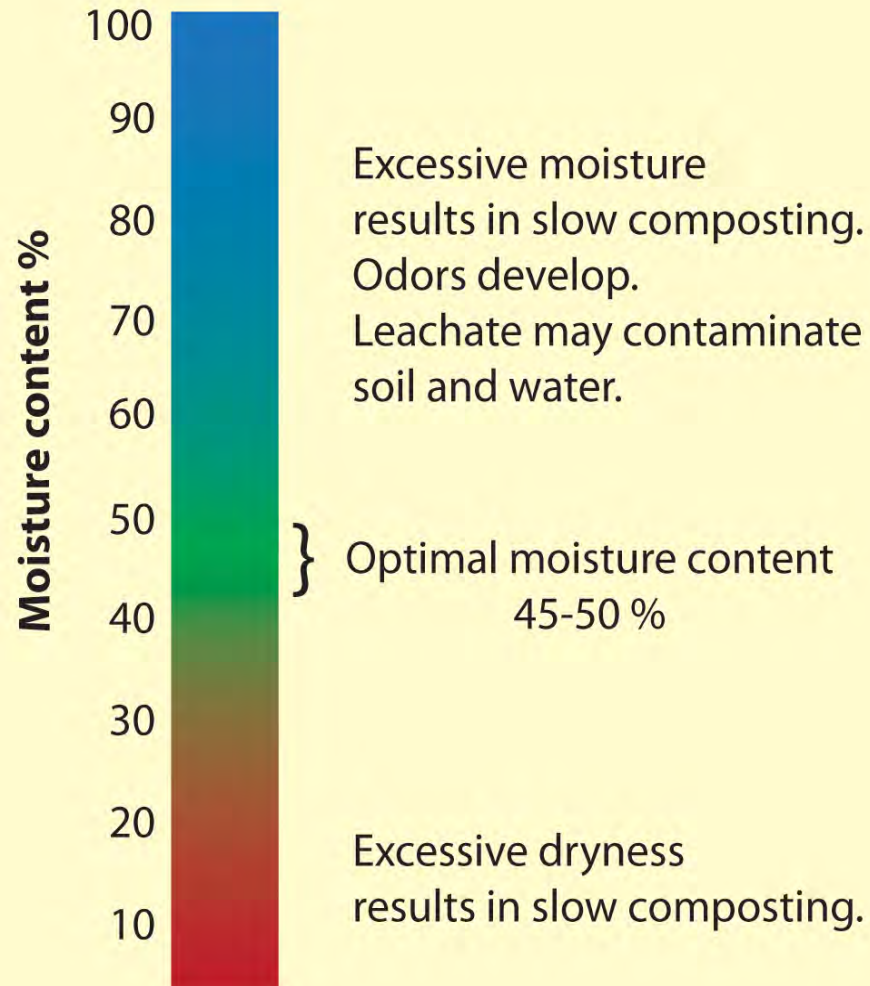


spherical



flat

# Moisture considerations



# Attracting /adding decomposers

Outdoors –  
“If you build it,  
they will come”

Indoors –  
Population can  
be established  
and sustained



# Outdoor composting

## Advantages

- Good for getting rid of large amounts of yard waste
- Many different systems
- Less concern about pests and odors

## Disadvantages

- May attract pests
- Inconvenient in winter
- Might bother neighbors



# What to compost?

## Compost

### greens:

fresh, moist, nitrogen-rich materials

#### FROM YOUR GARDEN

- green plants and garden trimmings
- fresh leaves and flowers
- grass clippings (or recycle by leaving on the lawn)



#### FROM YOUR KITCHEN/HOME

- fruit and vegetable scraps
- coffee grounds and tea bags
- manure and bedding from animals that ONLY eat plants



### browns:

dead, dry, carbon-rich materials

#### FROM YOUR GARDEN

- fall leaves, small twigs, and woody prunings
- dry plant material
- straw and hay
- pine needles
- potting soil



#### FROM YOUR KITCHEN/HOME

- bread and grains
- egg shells
- nutshells
- corncobs
- food-soiled paper towels and napkins
- shredded newspaper



## Don't Compost any of these:

#### FROM YOUR GARDEN

- pesticide-treated plants or pesticide-treated grass clippings
- diseased or pest-infested plants
- poison ivy
- Invasive weeds
- weeds with seeds
- large branches (call 311 to schedule a special removal)
- non-compostable materials such as sand or construction debris

#### FROM YOUR KITCHEN/HOME

- meat or fish scraps
- cheese or dairy products
- fats, grease, or oil
- cat or dog feces; kitty litter
- colored or glossy paper
- sawdust made from pressure-treated plywood or lumber
- coal or charcoal ashes
- non-compostable materials such as plastic, metals, or glass

### Tips for a Healthy Compost Bin:

- Add equal amounts of "browns" and "greens" to your bin.
- Cut materials for faster composting.
- Always maintain a top layer of browns.
- Keep the bin moist but not wet.
- Stir well to aerate contents.
- For more assistance, contact your borough's Compost Project.





# Getting started

Site selection – choose shady area that is easily accessible and has water available, avoid large trees

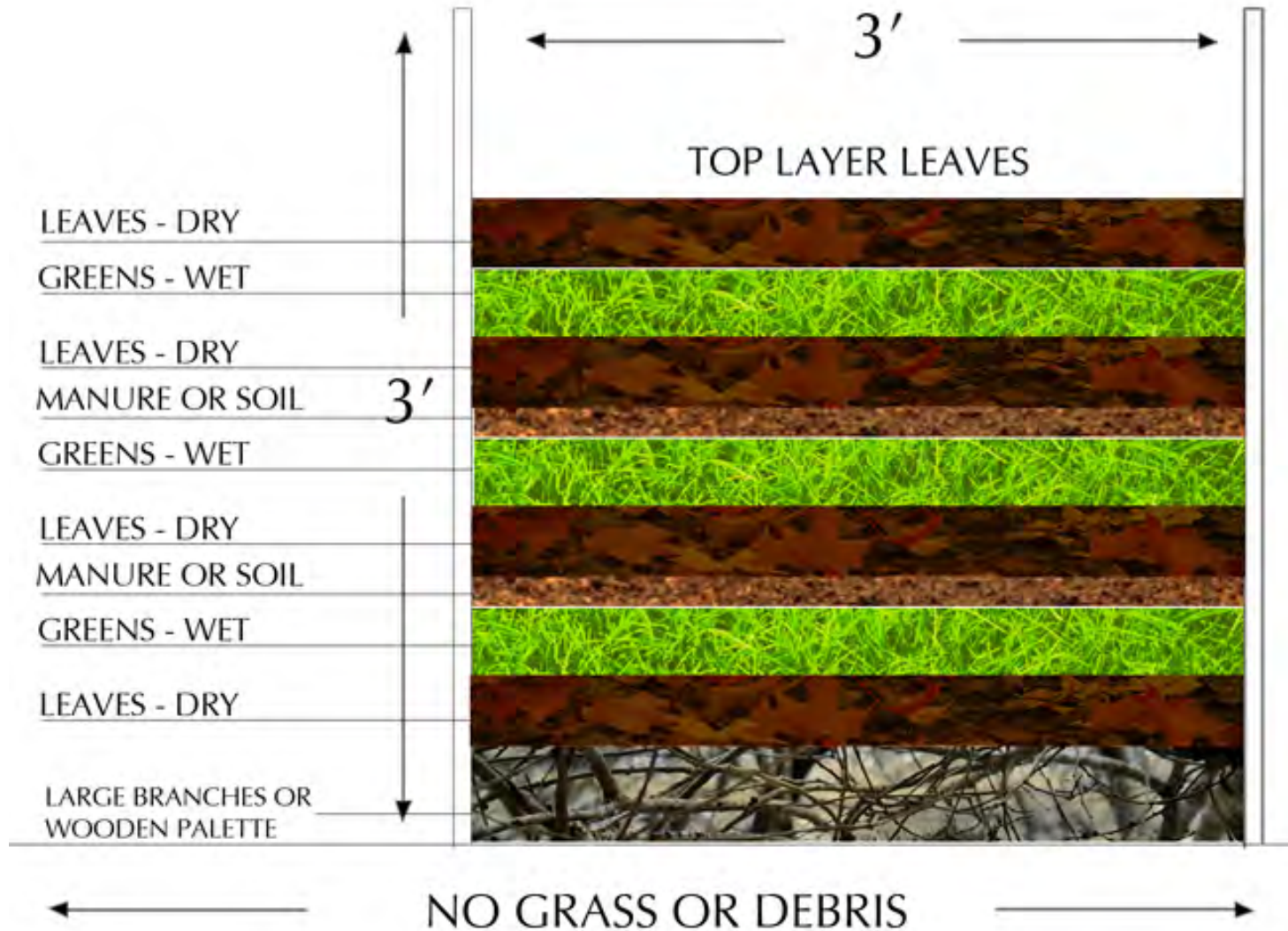
Season – can be started anytime, but fall is best for materials

Containment – can be a simple pile or purchased or homemade bin/system

Materials – browns, greens, soil



# Layering



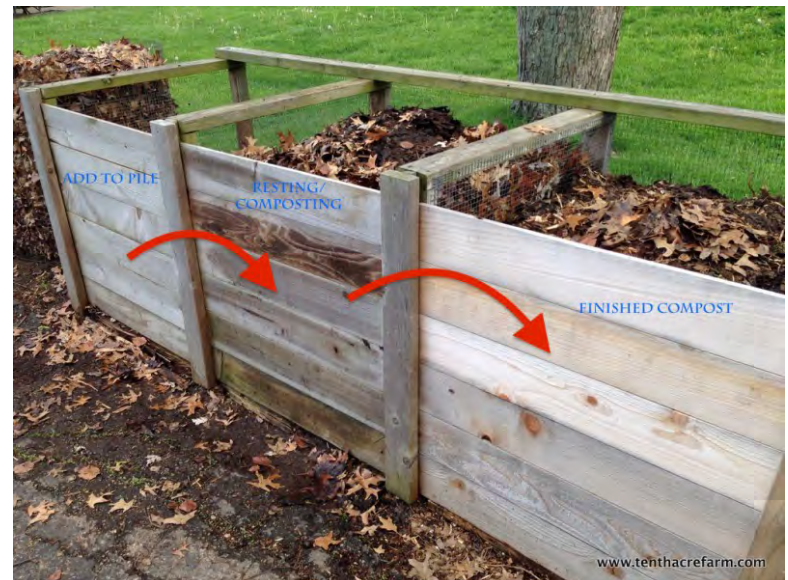
# Turning

Tools – pitchfork or shovel

Technique – can re-pile/water or simply stir

Frequency – as often as you like, or never

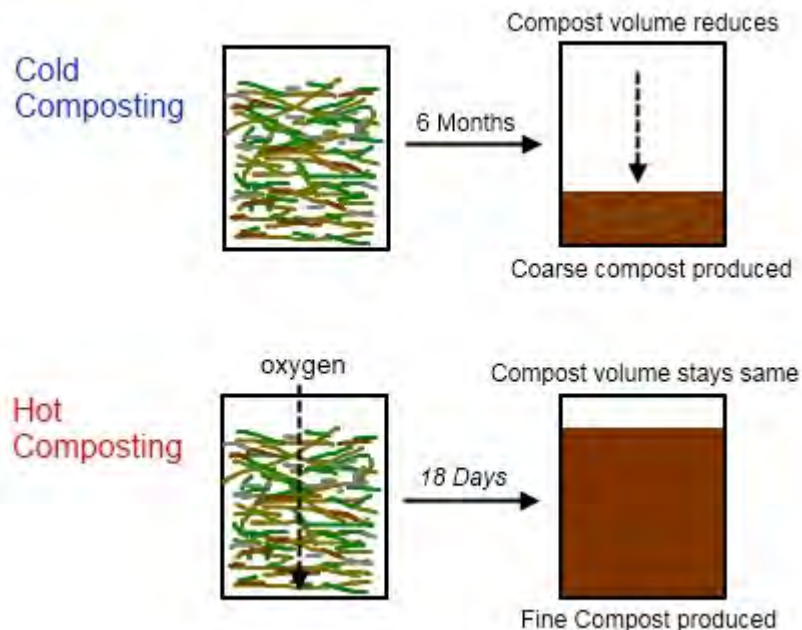
**more turning =  
hotter, faster  
composting**



# Hot or cold?

Cold (Passive) Composting - less effort, but slow (a year or more) and does not kill weed seeds

Hot (active) Composting - more effort, but faster, better yielding, and kills weed seeds



# When is it finished?

Dark, crumbly,  
pleasant  
smelling, no  
traces of greens  
(some coarse  
browns OK)



**Baggie test:** Place a small amount in a plastic bag and take a whiff before sealing. Then place the bag in a drawer for a few days. When you open the bag, the sample should smell the same as it did before. If it smells worse, your compost needs more time in the pile!

# Troubleshooting

Symptom	Cause	Solution
Unpleasant odor	Too much nitrogen	Add high carbon material such as straw, pine needles, grass clippings or vegetable trimmings and aerate.
	Compaction	Aerate.
	Overwatering	Add dry leaves or wood chips to soak up water and aerate.
Pile not heating up	Lack of nitrogen	Add a nitrogen source such as fresh manure, grass clippings or blood meal. Mix the pile.
	Pile needs to be turned	Mix pile by bringing outside material to the center.
	Low moisture	When watering make sure the moisture gets to the center of the pile. Try poking deep holes in the pile before watering.
	Compost is finished	Finished compost smells earthy rather than rotten or moldy and is dark and crumbly.
Compost is damp and only the center is warm	Pile is too small	Add more compost material.



# Simple pile

## Advantages

- No expense
- Easy to turn

## Disadvantages

- Hard to build large pile
- Easy access for vermin
- Can get messy
- Tends to spread



# Wire containment



# Wood containment





# Plastic containment

## Advantages

- No need to turn
- Finished compost easy to remove
- Inexpensive

## Disadvantages

- Not vermin proof
- Slow, cool composting
- Sometimes flimsy



# Tumblers

## Advantages

- Vermin proof
- Aeration allows for faster composting



## Disadvantages

- Expensive
- Often undersized
- Difficult to turn when full



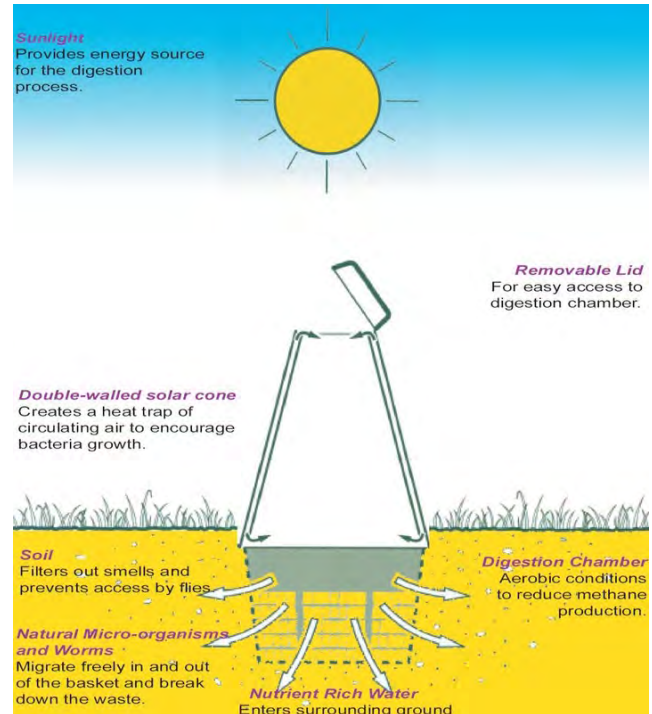
# Digesters

## Advantages

- Very low effort
- Can accept pet waste
- Relatively small

## Disadvantages

- Do not accept yard waste
- No compost generated



# Trenching

Burying kitchen scraps means:



No visible collection bin



No detectable odor



Less waste



Fast and easy composting



Deeper, stronger root structure for neighboring plants



This method may not be the best way to compost for families with dogs



## HOW TO

Dig a trench about 12 inches deep

Cover with soil

Fill it with 4 to 6 inches of kitchen scraps





# Lasagna gardening

**Final Layer** – Compost or manure.

**Repeat steps 2-5 until your lasagna garden is about 2 feet deep.**

**Layer 5** – Your “brown” layer, shredded leaves, hay, shredded newspaper, and other similar material

**Layer 4** – Your “green” layer, peat moss, manure, vegetable scraps, and/or lawn/garden clippings

**Layer 3** – Your “brown” layer, shredded leaves, hay, shredded newspaper, and other similar material

**Layer 2** – Your “green” layer, peat moss, manure, vegetable scraps, and/or lawn/garden clippings

**Layer 1** – Cardboard or several layers of newspaper that have been soaked in water.

# Indoor composting

## Advantages

- Convenient
- Weed-free, superior compost
- Relatively fast and easy

## Disadvantages

- Can get smelly
- Need starter organisms
- Might attract flies



# Vermicomposting

- Improves soil structure
- Enhances germination, plant growth, and crop yield
- Stimulates root growth
- Enriches soil with good microbes
- Gives off less greenhouse gasses than traditional composting





# Worm bins



## Rubbermaid Bin

Pros: Cheap

Cons: no moisture control, more handling, must be drilled



## Worm Factory 360

Pros: Worms separated from finished compost  
Cons: Expensive, some maintenance required



## Worm Inn Mega

Pros: Good moisture control, large capacity  
Cons: Expensive



### RED EARTHWORMS

*Lumbricus rubellus* 1" to 4"

Common in composting circles. They can survive cold winters which makes them a threat to the ecosystem if released.

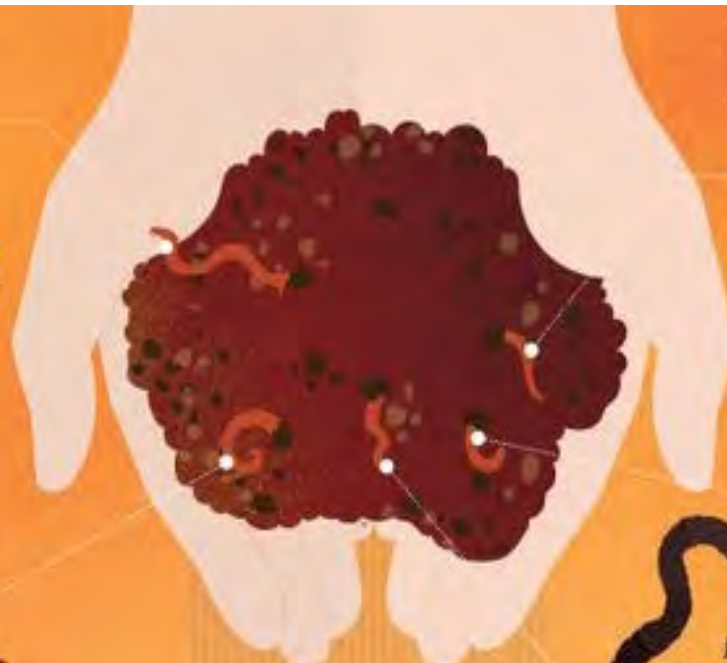


### BLUE WORMS

*Perionyx excavatus*

1 1/4 to 2 3/4"

Common composting worm for tropical climates



### RED WIGGLERS

*Eisenia foetida*

*Eisenia andrei* 2" to 4"

These species are nearly impossible to tell apart and normally occur together in the same habitat. They are shallow burrowers and perfect for composting.



### AFRICAN NIGHTCRAWLERS

*Eudrilus eugeniae* 6" to 8+"

Common composting worm for sub-tropical and tropical climates.



### EUROPEAN NIGHTCRAWLERS

*Eisenia hortensis* 3" to 8"

a common worm used for fishing bait and gaining popularity for composting

## Common Types of WORMS

**CANADIAN NIGHTCRAWLERS**  
*Lumbricus terrestris*



Not suitable for composting because they bury deeper into the soil.

# Requirements

- Carbon rich bedding – leaves, shredded paper (avoid glossy ads and magazines)
- Moisture – damp, but not saturated
- Soil for grit
- Food scraps

## YES

- Vegetable & fruit waste (avoid citrus fruit)
- Starchy materials - bread, pasta, rice, potatoes - all in moderation
- Aged animal manures
- Egg shells (best if ground up and in moderation)
- Coffee grounds
- Tea bags

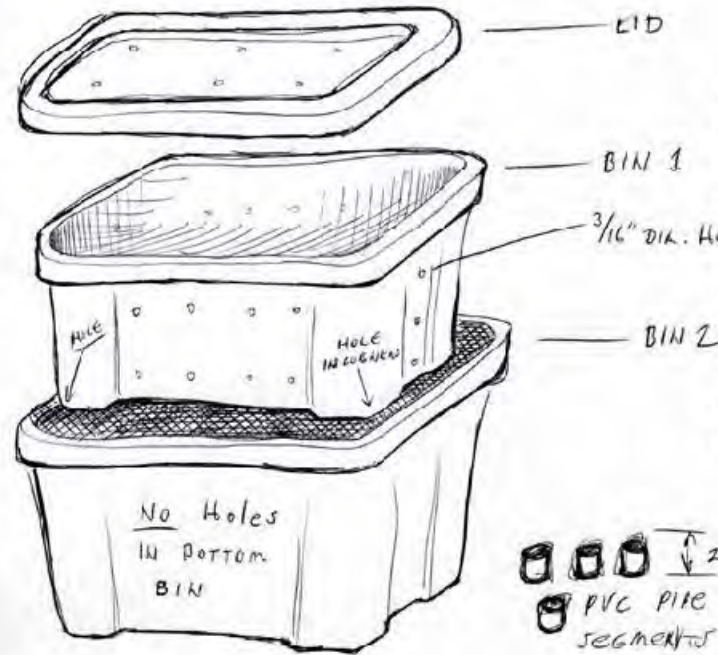
## NO

- Human/pet waste
- Non biodegradable materials
- Dairy/meat
- Oils/grease
- Harsh chemicals
- Onions

# Single bin




# Double bin



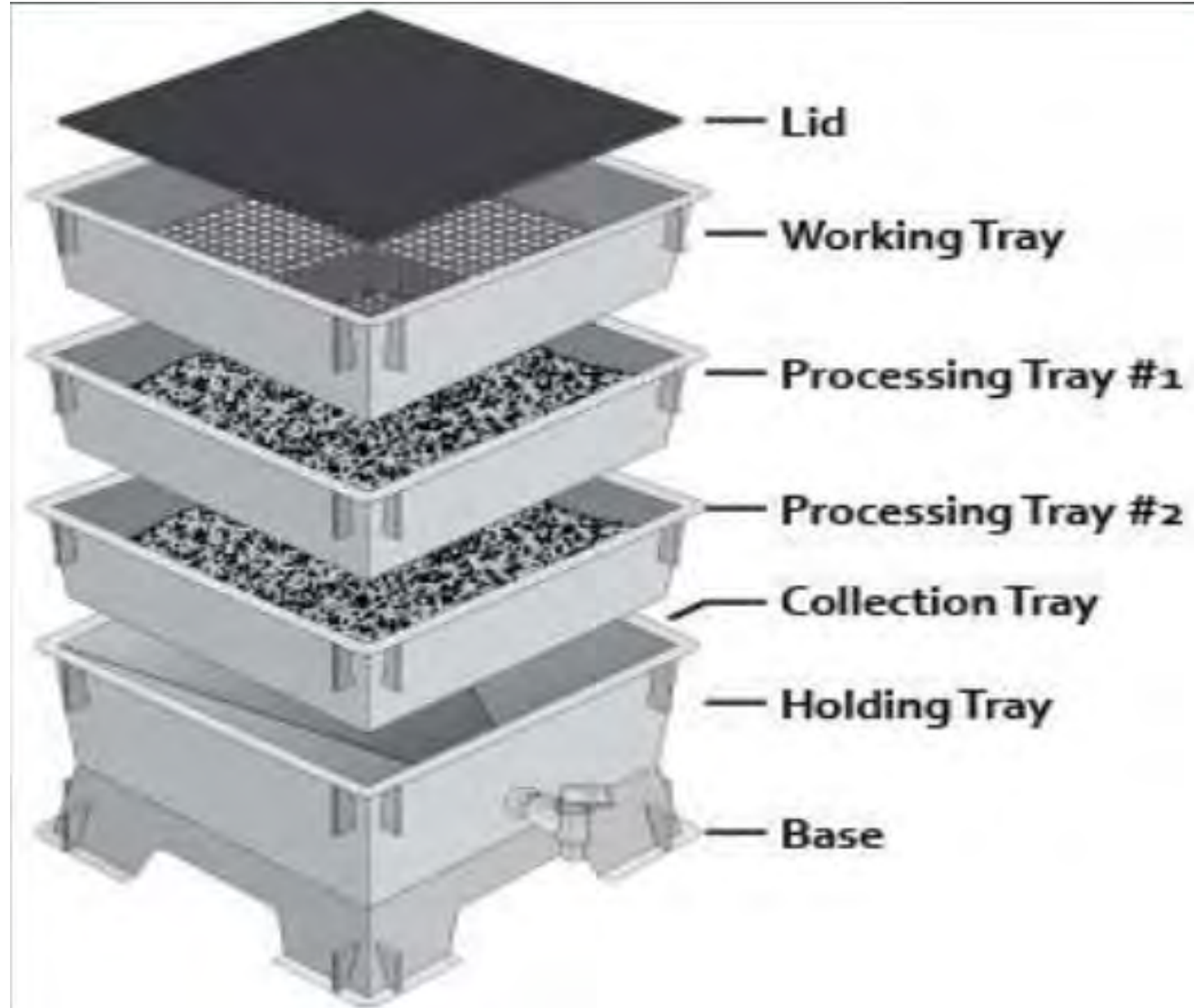
Your very own kitchen composter  
I used 2 22gl storage bins from the store.  
Total cost: \$13.45

Collected the worms after a rain. Avoided night crawlers only red wigglers here.


 $\downarrow$  2 1/2" LONG  
 PVC PIPE \* PUT ONE IN EACH SEGMENT'S CORNER.

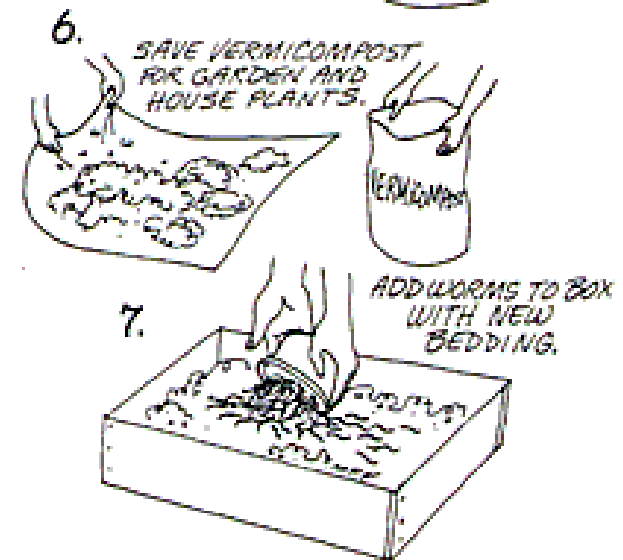
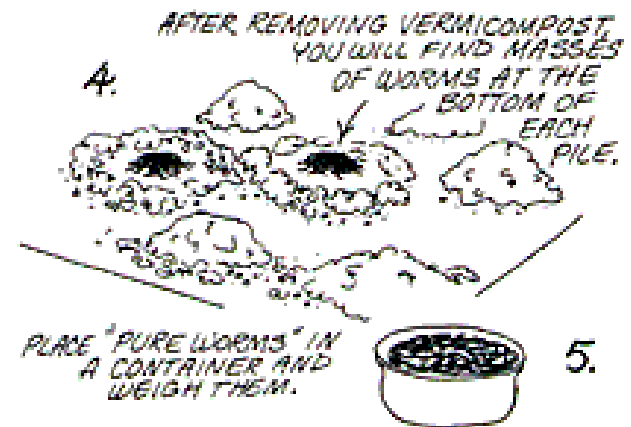
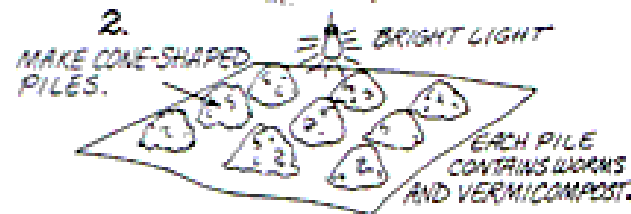
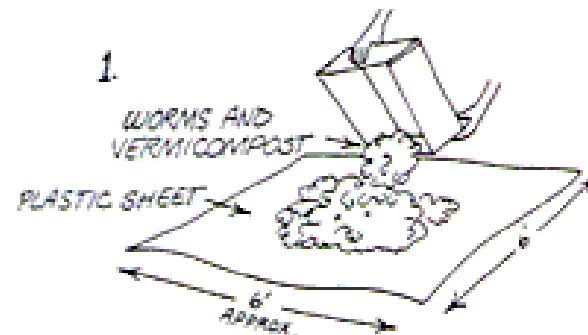


# Tower



# Harvesting option 1

## The Dump and Sort Harvesting Method



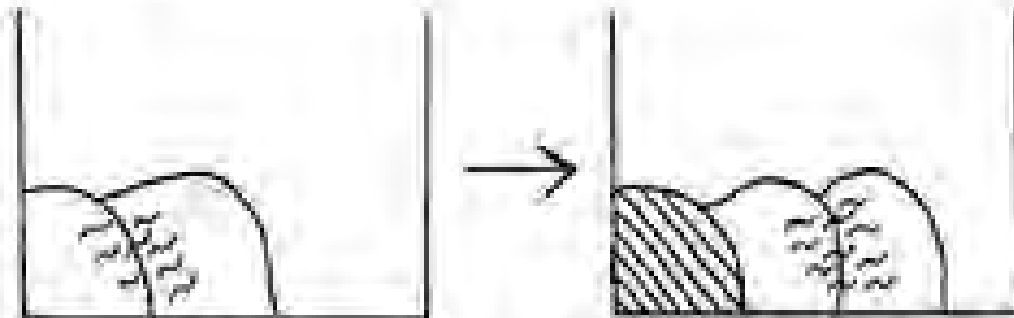
# Harvesting option 2

## Horizontal Harvesting of Vermicompost

Key symbols

 = New layer of organic matter

 = Vermicompost to be harvested



As organic matter is added to the right, the worms slowly migrate with it composting along the way. Eventually the matter on the left is worm free compost to be harvested.



# Harvesting option 3

## Vertical Harvesting of Vermicompost

Key: new worms

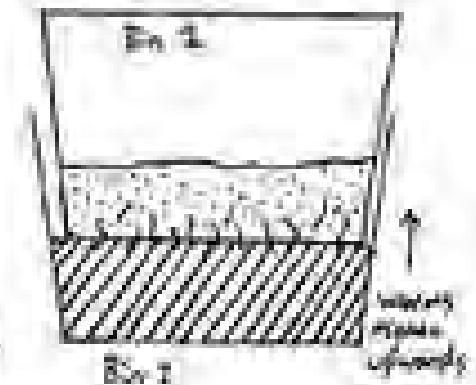


= New organic matter



= Vermicompost to be harvested

A new storage area with fresh bedding and organic matter is placed on top of old organic matter. Worms crawl through holes in bottom to new organic matter, allowing the vermicompost to be harvested.



# Troubleshooting

## Fruit Flies

1. Avoid putting rotting or rotten food in your worm bin. Fly larvae are more likely to be present on rotten food.
2. Cut food scraps into small pieces.
3. Don't overfeed worms.
4. Bury food. Burying the food will help keep unwanted pests and pets from intruding on your bin.
5. Keep bedding material moist, but not too wet.
6. Feed worms a varied diet.
7. Loosely place a piece of plastic or a sheet of newspaper inside the bin on top of the worm bin contents
8. Limit citrus fruits.



# Troubleshooting

## Odor Problem

1. Bin is too wet. Solve the problem by adding more dry bedding.
2. Bin does not get enough air. aerate, add fresh bedding and mix bin contents daily.
3. The food in bin is naturally smelly. Simply remove any food source that smells bad from the bin.
4. Bin contains non-compostables.

## Worm Death

1. Bin is too wet and worms are drowning.
2. Bin is too dry and worms dry out.
3. Bin does not get enough air and worms suffocate.
4. Worms do not get enough food.
5. The bin is exposed to extreme temperatures.

# Bokashi composting

- Japanese fermentation composting
- Requires activated bran
- Accepts all raw and cooked food (except large bones)
- Fast, effective, low odor





### ORDER OR MAKE SUPPLIES

1.



You can purchase or create your own bran and bin. We are going to show you how to use a pre-made kit, which should come with an airtight container, drain, cup, filtering tray and 2 lbs of bokashi bran.

### INSERT TRAY INTO CONTAINER

2.



Insert the filter tray into the bottom of your bin. This will separate any liquids from your waste into a "tea" that is rich with nutrients.

### START ADDING SCRAPS & BOKASHI

3.



Create about a 3 inch layer of food waste. Flatten down the scraps and sprinkle a small handful of bran across the top of the surface and then cover the bin.

### KEEP ADDING FOOD WASTE

4.



Repeat the last step over time whenever you have enough food scraps to create a new layer. Keep filling until your bin is full.

### LET BIN SIT & DRAIN

5.



Let the bin sit and ferment covered for two weeks. Drain the tea regularly so that your bin does not get too moist.

### USE YOUR 'TEA'

6.



Diluted with water, you can use the tea on your houseplants as a fertilizer, or you can just dump it down the drain. It's great for clearing drains and septic tanks.



**FOOD WASTE GOES IN THE  
COMPOST**

**NOT THE GARBAGE, DEAR**