



# Compost Basics

## Home Composting Workshop

Today's Workshop Leaders:  
*Names here*  
Master Composter

Composting  
Education  
Program   
COMMUNITY • HOME • CLASSROOM



# Discussion

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- What is your current experience with composting?
- What do you hope to take away from this workshop?



# Objectives

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- Learn the basic processes for:
  - Backyard Composting
  - Vermicomposting
  - How to use compost
- Enable you to:
  - Decide which composting method is appropriate for you
  - Create a plan to start composting or expand/improve your current composting system
  - Find additional composting resources



# University of California Cooperative Extension: Our Mission

UCCE comprises of a vast network of UC researchers and educators who work together to develop and provide science-based information to solve locally-relevant economic, agricultural, natural resource, youth development, and nutrition issues

**UNIVERSITY OF CALIFORNIA**  
Agriculture and Natural Resources



**UC Cooperative Extension**  
University of California  
Agriculture & Natural Resources

# What is Composting?



Composting: Recycling Organic Materials

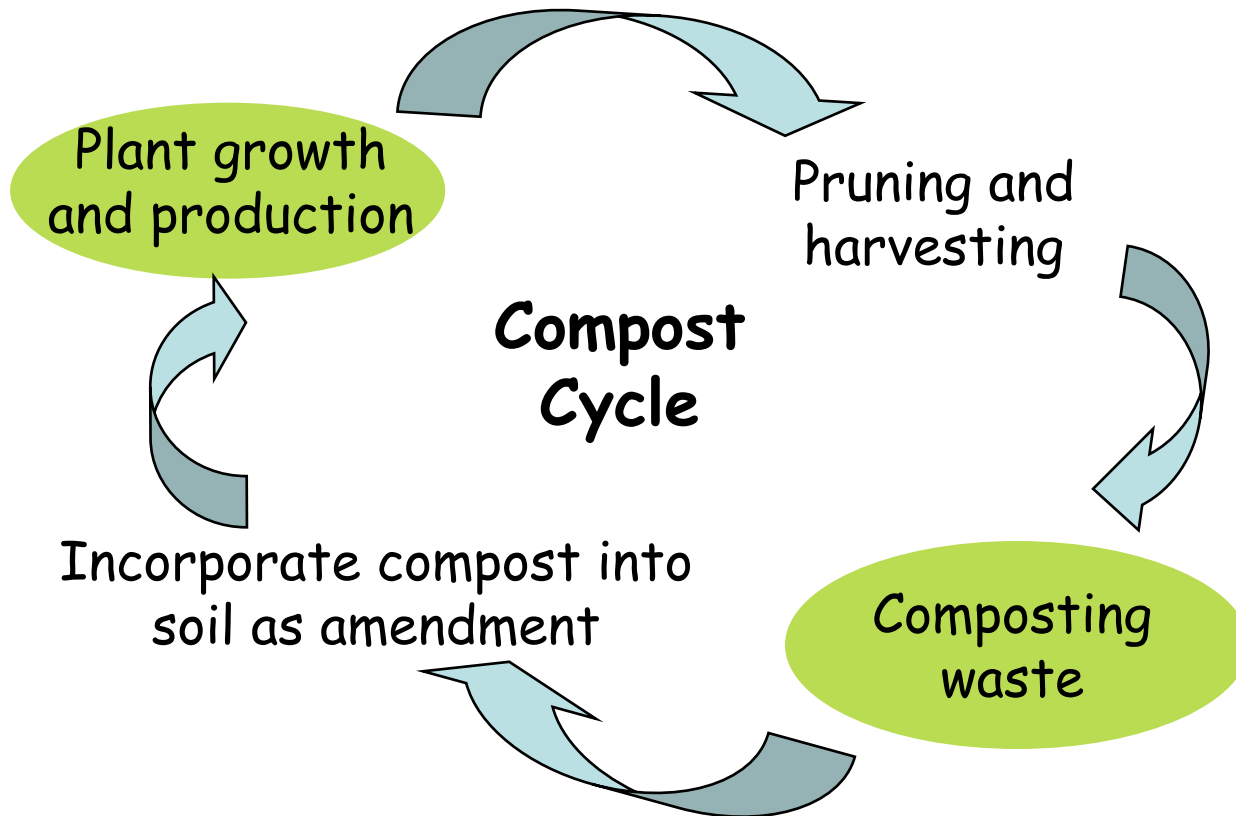
The bio-oxidative degradation of organic wastes under controlled conditions



# What is Backyard Composting?

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An ongoing backyard process





# Why Backyard Composting?

## Let's Minimize:

- Landfills -- they lock away valuable materials in un-usable forms
- Transportation and handling costs
- Using fossil fuels and increasing CO<sub>2</sub> and methane emissions



Landfill



## Commercial Composting

is appropriate when on-site composting is not possible (e.g. restaurants).

Small-scale composting and avoids transportation and processing costs and pollution.



Collected “compostable” material  
is full of contaminants



# SB 1383

## Reducing Short-Lived Climate Pollutants in California

An Overview of SB 1383's  
Organic Waste Reduction  
Requirements



# 1383 Requires California Jurisdictions to:

**Provide Organics  
Collection Services to All  
Residents and Businesses**



**Provide Education and  
Outreach to Community**



**Confirm Capacity for  
Organic Material Recycling  
and Edible Food Recovery**



**Establish Edible Food  
Recovery Program**

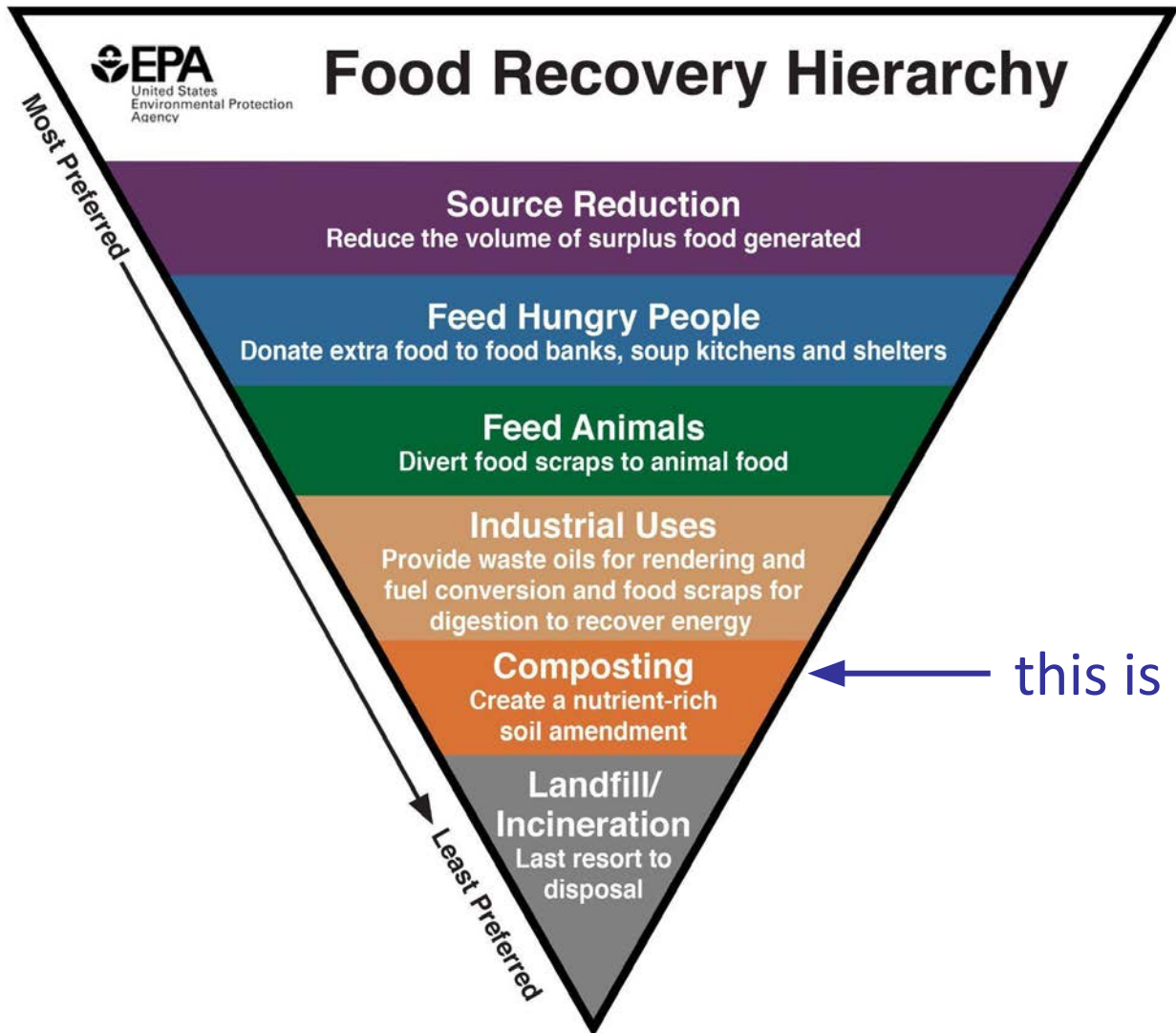


**Buy Recyclable and  
Recovered Organic  
Products**



**Monitor Compliance  
and Enforce Ordinances**

**CalRecycle** 



this is us!



# Two Basic Backyard Pile Types

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## Hot Pile

- Super-active microbes generate heat in proper conditions
- All materials must be available at the same time, chopped ( $\frac{1}{2}$ " -  $1\frac{1}{2}$ " ) & mixed
- Minimum volume: 3'x 3'x 3' (1 cubic yd. = 27 cubic ft.)
- Finished compost in as little as three months

## Cold Pile

- Slow decomposition of materials. Little heat produced
- Minimal chopping of materials
- Minimal concern with proper mixture of materials
- Add materials over time
- No minimum volume
- Finished compost in about six months



# Tradeoffs

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## Hot Pile

- Temperatures over 140° F kill most seeds and plant disease pathogens
- Compost is made quickly
- Little concern with pests due to the heat
- Requires pile to be built over a few days
- Frequent turning required!

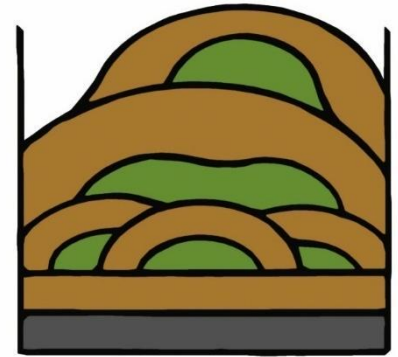
## Cold Pile

- Seeds and many plant diseases are not killed
- Must use rodent-resistant compost bins if food scraps are added to pile
- Piles can be built over months
- Minimal turning



# Building a Cold Compost Pile

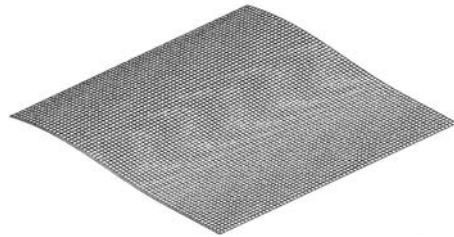
- Materials can be added as they become available
  - Little chopping required
  - Stir new material into pile, mixing greens and browns
  - Add water as needed, keep it damp, not wet
  - Mix food scraps with dry browns, add mixture to center of pile and cover with non-food ingredients
- Fluff once per month, or when pile smells, or has zones that are too wet/too dry
- Harvest compost from the most mature part of the pile





# Compost Bins – Many Designs

Continuous composting: Harvest from the bottom



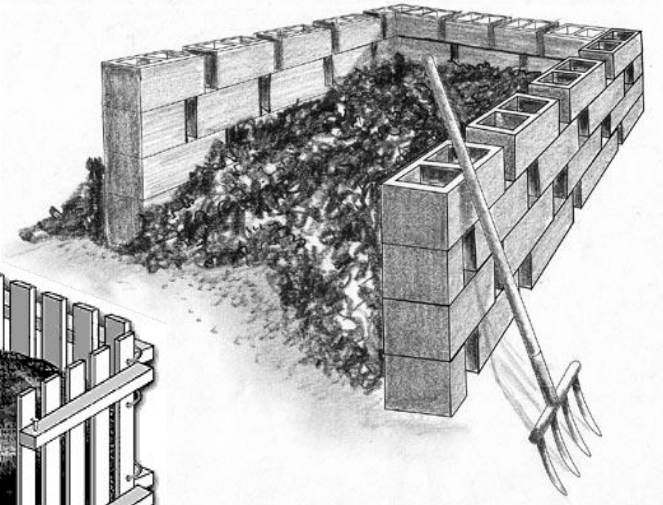
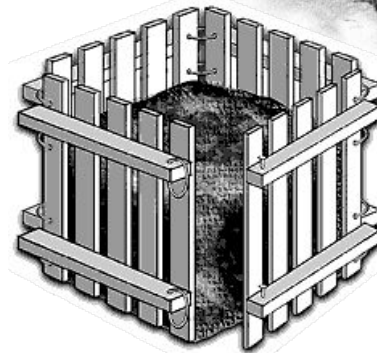
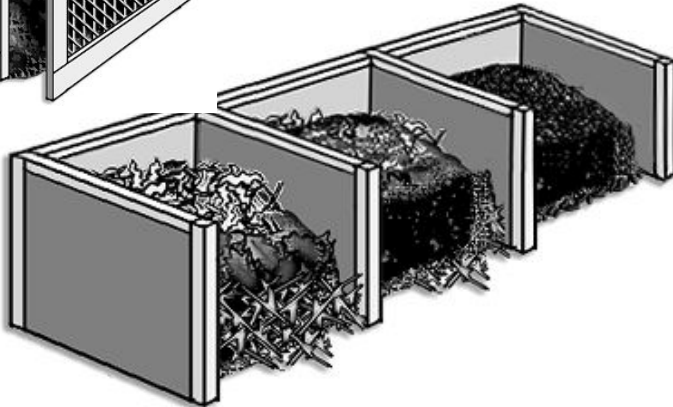
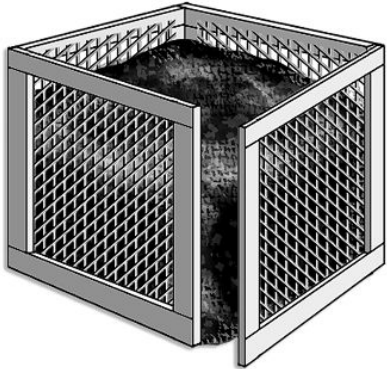
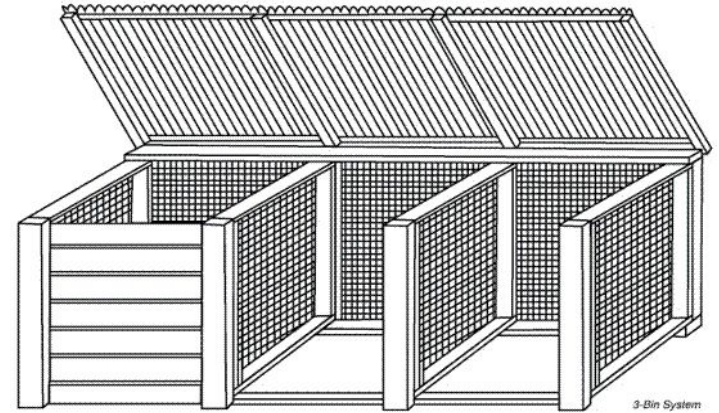
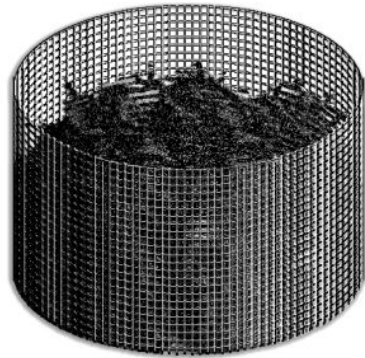
We've not had as much success with these





# Compost Bins – Build Your Own

All shown are more suitable for batch composting





# Example Homemade bins

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Wood bins



Simple fencing wire



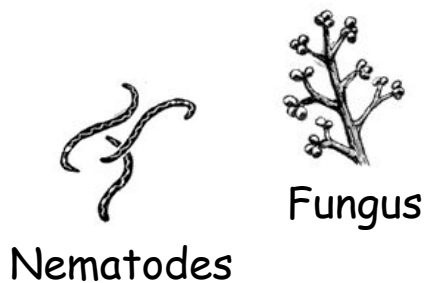
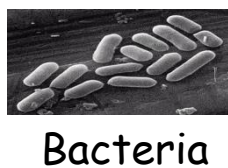




# Inside a Compost Bin

What do you notice about this bin? ➔

## Other Organisms:





# Compost Pile Ingredients

## Greens



## Water



## Air

## Browns





# Ingredient #1: Greens

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## **Nitrogen-rich organic material**

- The majority of our kitchen waste
- Green yard waste

### Examples:

- Green leaves and stems, grass clippings, weeds, vegetable/fruit peels and scraps, coffee grounds, some tea bags, flowers
- Manures: cow, poultry/bird, rabbit, horse droppings and cage cleanings (none from meat-eating animals)





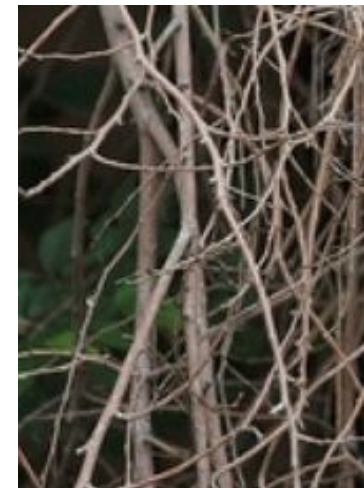
# Ingredient #2: Browns

## Carbon-rich organic material

- Dry, dead yard waste
- Brown, woody plant material

### Examples:

- Dried leaves, straw, coir (coconut husk), shredded woody stems/stalks/branches (a few stalks and thin branches provide good air pockets)
- Also, wood chips, sawdust (from untreated wood), shredded paper/cardboard, tissues, paper towels







# Ingredients #3 - #4

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Air

## Ingredient #3 Air

- Oxygen is necessary for microorganisms to thrive and to breakdown the organic materials into compost
- A compost pile needs aeration by turning or fluffing



## Ingredient #4 Water

- Moisture allows microorganisms to thrive
- Your pile should be kept as moist as a wrung-out sponge



# Do's & Don'ts

## COMPOST

### What To Compost



Vegetables



Houseplants



Yard trimmings



Coffee, tea



Fruits



Nut shells



Eggshells



Paper napkins



Paper scraps and cardboard



### What To Avoid Composting



Dairy products



Fats and oils



Eggs, meat or fish bones and scraps



Pet waste



Diseased plants



Produce stickers

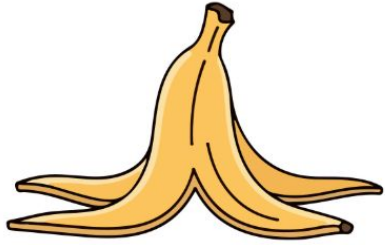


# What to Avoid

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- Plants that remain alive and can be spread in the compost (Bermuda grass, Bind weed, Ivy, Mint)
- Weeds with seed heads or persistent roots: You may be reseeding the weeds with your compost

# Sorting Activity



**Greens!**



**Browns!**



**Browns!**



**Greens!**



**Greens!**



# Troubleshooting

<b>Symptom</b>	<b>Problem</b>	<b>Solution</b>
<b>Smells like eggs</b>	Too much moisture	Add dry ingredients
	Too compact not enough air	Mix more often, turn or aerate
<b>Smells like ammonia</b>	Too much nitrogen (green)	Add more browns (carbon) and mix, turn or aerate
<b>Process is slow</b>	Not enough surface area or water	Shred or break organics into smaller pieces or moisten
<b>Large critters are interested in my compost pile</b>	Wrong material has been added	Don't add any meat or bones (protein)
	Vegetable scraps are exposed	Make sure food is covered with 6" of dry or composted material
<b>Winter is coming – process has slowed</b>	This is normal for cooler temperatures	Continue adding to your compost bin. Process will speed up again in the spring

# Composting Tools



Digging  
fork,  
Pitchfork,  
Shovel,  
Spade



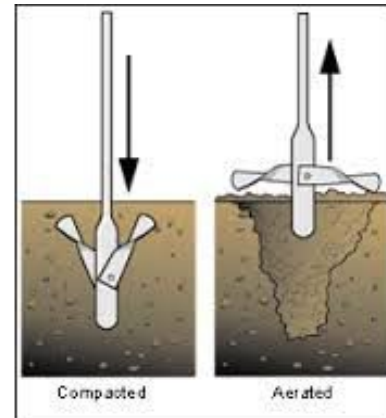
Compost  
Thermometer



Shears, Pruners,  
Chipper/shredder



Compost  
Aerator





# Harvesting Compost

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- The compost is ready to harvest when:
  - Material has turned to a dark brown and *original* materials are *no longer* identifiable
  - The smell is mild and earthy
  - Little or no heat is being produced
  - [Bioassay](#), if you're feeling fancy
  - Screening can be used to remove large pieces that are not fully decomposed
  - Return uncomposted material into the new compost pile
    - It's easy to build your own screen





# Using Compost

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Well-made compost is a nutrient-rich soil conditioner

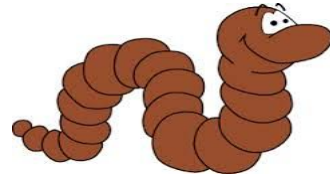
- **Benefits:**

- Improves soil structure by adding organic matter
- Helps a wide variety of bacteria and fungi that feed the plants thrive and multiply
- Holds moisture
- Saves money

- **Typical Applications:**

- Incorporate in soil prior to planting (~25-30%)
- Amend potting mixes
- Mulch or “top dress” planted areas; unsifted fine





Vermicomposting  
a.k.a  
Worm Composting



# Vermicomposting

Cultivating worms to convert our food and paper waste into a soil amendment/ fertilizer for our plants



You're right!  
Worms don't  
actually  
have eyes

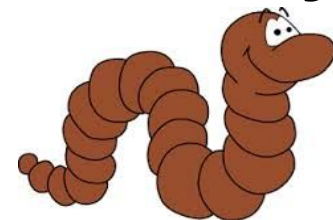




# Vermicomposting

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- Worm composting is neat, easy, and odorless – when properly maintained
- A great way to turn food waste and some paper waste into fertilizer
- Can be done indoors, on the patio or porch, or in any moderate temperature place (50°F - 90°F)
- Keep out of direct sunlight
- **Limited space is ok, apartment friendly**





# Vermicomposting

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And the finished product (worm castings!):

- is a nitrogen rich soil amendment
- can be used on plants both indoors and outdoors
- reduces or eliminates the need for purchased fertilizer



Gardener's Black Gold

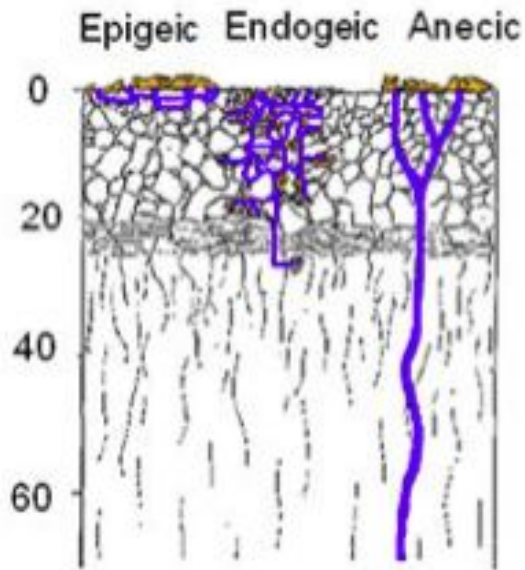




# Worms for Composting



- Thousands of worm species live in the soil, we find some in our gardens and compost piles
- Best compost worm for our area is the Red Wiggler





# Almost Any Size Bin Can Work

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- A rule of thumb is one square foot per pound of food per week (adjust with temperature)
- Start with some worms (purchased or donated by a friend)
- Worms will reproduce to optimal density but will not overpopulate





# Source of Worms

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## Old Toms Wormery (San Jose, CA)

(408) 998-2347

[tom@oldtomswormery.com](mailto:tom@oldtomswormery.com)

## The Worm Farm (Durham, CA)

(530) 894-1276

[info@thewormfarm.net](mailto:info@thewormfarm.net)



Worms are safe to ship in mild temperatures



# Selecting a Worm Bin



Stacking trays



Flow-through bag

**Worm bins are available in many designs and styles!**



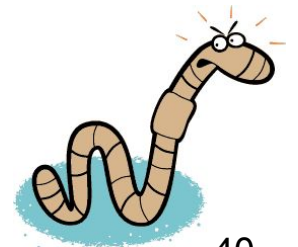


# Selecting a Worm Bin

## Build Your Own Bin – box style



Don't use  
chemically  
treated  
or highly  
aromatic  
wood

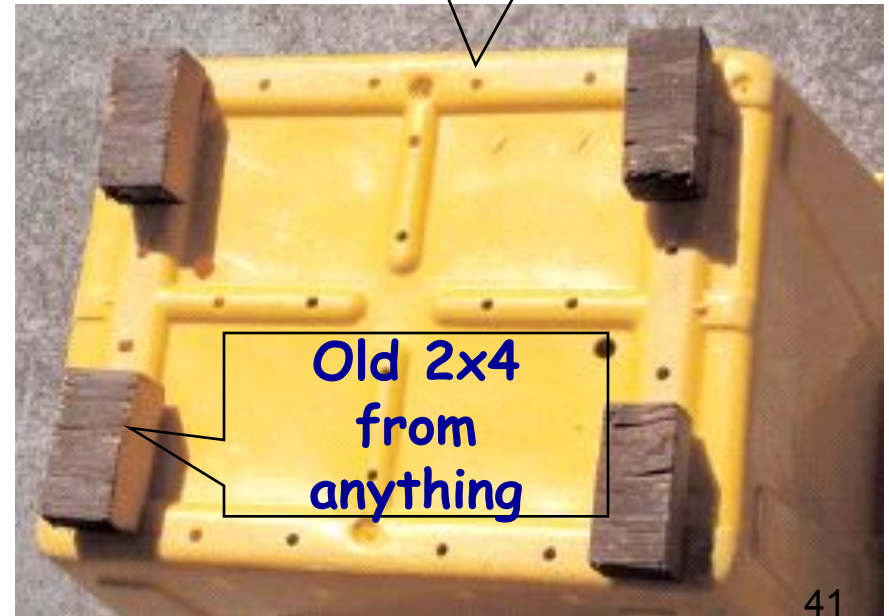




# Making a Worm Bin



Many 1/4" holes for drainage and air circulation





# Inside a Worm Bin

## Setting up





# Inside a Worm Bin

## Example: Stacking Trays



- ← Plastic lid
- ← Cardboard layer and/or bedding
- ← “Fresh” fruit & veggie scraps, bedding material
- ← Partially decomposed →
- ← Ready to harvest
- ← Base: Collector tray with spigot for liquid (leachate)





# Worm Food

- Vegetable and fruit scraps  
e.g., banana peel, apple core, lettuce, potato peel, carrot tops, etc.
  - *Ideally cut into small pieces*
- Pasta, cooked beans
- Coffee grounds, including paper filters
- Tea leaves, tea bags
- Paper towels, napkins (food soiled)
- Egg cartons (paper)
- Egg shells (crushed) worms need a small amount of grit!





# What to Avoid

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- ❌ **Animal products** - meats, bones, fish, etc.
- ❌ **Dairy products** - cheese, milk, yogurt, etc.
- ❌ **Pet wastes** (from carnivores)
- ❌ **Oils or plastics** (petroleum products)
- ⚠️ **Be careful with breads** (for folks with mold allergies)
- ⚠️ **Avoid seeds and nuts with hard hulls & shells** – they break down slowly and may sprout later when conditions are right
- ⚠️ **Avoid large amount of acidic or pungent produce** – lemon, lime, orange, ginger, onion, garlic, etc.
- ⚠️ **Limit yard clippings** - may include herbicides, pesticides; branches & woody stems break down slowly, soft 'edible' leaves ok



# Bedding Material

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The insulating top layer of the vermicompost system

- **Shredded packing paper**
- **Shredded newsprint**
  - Hand-shred or use paper shredder
  - “Spaghetti” shredder works best, cross-cut shredded paper tends to clump when moist
  - Avoid glossy inserts
- **Shredded cardboard**
  - Pizza boxes, cores from paper towel & toilet paper rolls





# Putting It All Together



**Bedding + Moisture + Air + Food + Worms**

Q: How much water?

A: As damp as a wrung-out sponge (moist, not dripping)

And a small amount of grit e.g., crushed eggshells, vermiculite, perlite, etc.



# Maintaining Your Worm Bin

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- **Check weekly** (more often if temperatures are very high)
- Move to a different location if needed (avoid sun)
- Add food if previous batch has been eaten
- Don't over-feed! Remove food if there's too much (smelly)
- If bedding is dry -- add water (spray bottle)
- If bin is too moist -- add dry bedding & mix in to absorb
- Add bedding if bedding layer is thin
- Sprinkle a small amount of grit every month or so
- **Preparing for vacation**
  - Add extra food and moist bedding in thin layers (minimizes anaerobic decomposition) and top with a thick layer of bedding
  - Creative long-lasting food can be: Whole apple or potato with a small hole in skin
  - Add extra moisture in summertime if needed



# Harvesting Castings

Castings should be harvested when most of the bedding materials have become dark castings.

There are many ways to harvest

- Worm box:
  - vertical harvest: take lower layers
  - horizontal harvest: move finished materials to one side and feed on the other side
  - dump and sort: spread out and pick out worms
  - Keep the worms to go back into the worm bin
- Stacking trays:
  - Harvest the “oldest” tray, normally the bottom one
  - If worms are still there, put the tray on top of the stack and leave the cover off. As moisture evaporates, worms head down to the tray below
- Use the castings to fertilize your plants!





# Using Worm Compost

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- Slow Release Nitrogen-Rich Fertilizer
  - Use it instead of fish emulsion on bedding plants in greenhouse
  - Spread around potted plants including house plants
  - Spread around vegetables or flowering plants in the garden
  - Can be sifted onto lawns
  - Incorporate into soil around shrubs and trees
- Can be incorporated into a planting soil mix
- Preferred ingredient for brewing compost tea





# Troubleshooting a Worm Bin

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## Fruit Flies in Worm Bin

- Food scraps not adequately covered
  - Add four or more inches of dry or slightly moist shredded paper over food scrap layer
  - Set a bowl of vinegar in the bin on top of the shredded paper
- Fruit flies already present in food scraps before adding to bin
  - Store food scraps in covered container or freezer before adding to the worm bin

## Worms Die

- Worm box overheated (more than 100°F) common with plastic bins
  - Keep worm bin in shady area
  - Add a few ice cubes for quick cooling
  - Consider using a wood worm bin if adequate shade can't be found
- Bedding material has dried out
  - Check moisture when feeding, add extra water on hot, dry days
- No food scraps have been added for long period of time (weeks/months)
  - Don't be mean to your worms, feed them as required!



# Where Do I Get Help?

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The ROTLINE: (408) 918-4640

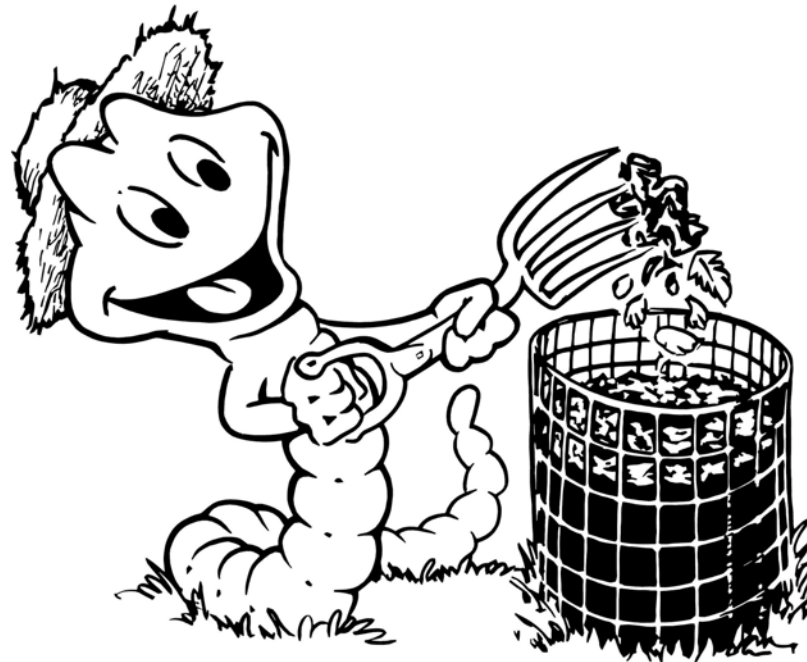
Our website:

<https://ucanr.edu/county/santa-clara-county-cooperative-extension>

- ~~United States Environmental Protection Agency (EPA), Composting At Home~~  
<https://www.epa.gov/recycle/composting-home>
- **California**, CalRecycle, Backyard Composting  
<http://www.calrecycle.ca.gov/organics/homecompost/>
- **Libraries**  
Santa Clara County Library District ([scccl.org](http://scccl.org)) or your city's library  
Search for "home composting" to find related books, magazines and videos
- An excellent how-to for composting with worms "The Adventures of Herman the Worm" <https://web.extension.illinois.edu/worms/>

What are some of your takeaways from this workshop?

What do you plan to implement in your own compost practice?





# Subsidized Compost Bin Information

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## **COST:**

**City of Palo Alto Residents – Free**

**Cupertino Residents - Free**

**City of Santa Clara Residents - \$37.00**

**All other Santa Clara County Cities -  
\$74.00**

**\*Free bins limited to one per household**

**Information on how to claim your bin will  
be sent in the post-workshop email  
(make sure to complete sign-in sheet!)**





# To Stay Involved

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- Follow our Instagram: [@Mastercomposters](#)
- Follow our TikTok: [@compostedprogram](#)
- Follow our Facebook: [UCCE Santa Clara County Composting Education Program](#)
- Check out our YouTube channel: [UCCE Master Composters](#)
- Attend other workshops:  
Vermicomposting and  
Hot piles/windrows
- Check out our [website](#)



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# Thank you!

QR Code to  
our Instagram:



\*Slides will be sent out in  
post-workshop email