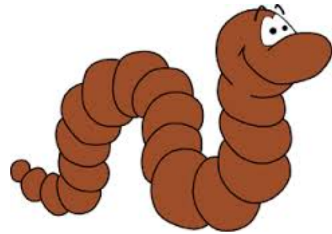




Vermicomposting



a.k.a

Worm Composting

Workshop Leaders:
Master Composters
Volunteers, SCC CEP



Santa Clara County, Composting Education Program



Why Compost?



The Compost Story

<http://kisstheground.com/thecompoststory/>

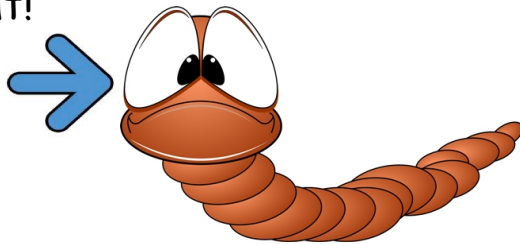


What is Vermicomposting?



Cultivating worms to eat our food and paper waste and produce the best fertilizer for our plants

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





Vermicomposting

- Worm composting is neat, easy, and odorless – when properly maintained
- A great way to turn hard-to-dispose food waste and some paper waste into fertilizer
- Can be done indoors, in garage, on the patio or porch, or in any moderate temperature place (50°F - 90°F)
- **Compost year round**
- **Limited space is ok**





What's in a Worm Bin?

FBI

Fungi Bacteria Invertebrates



Fungi

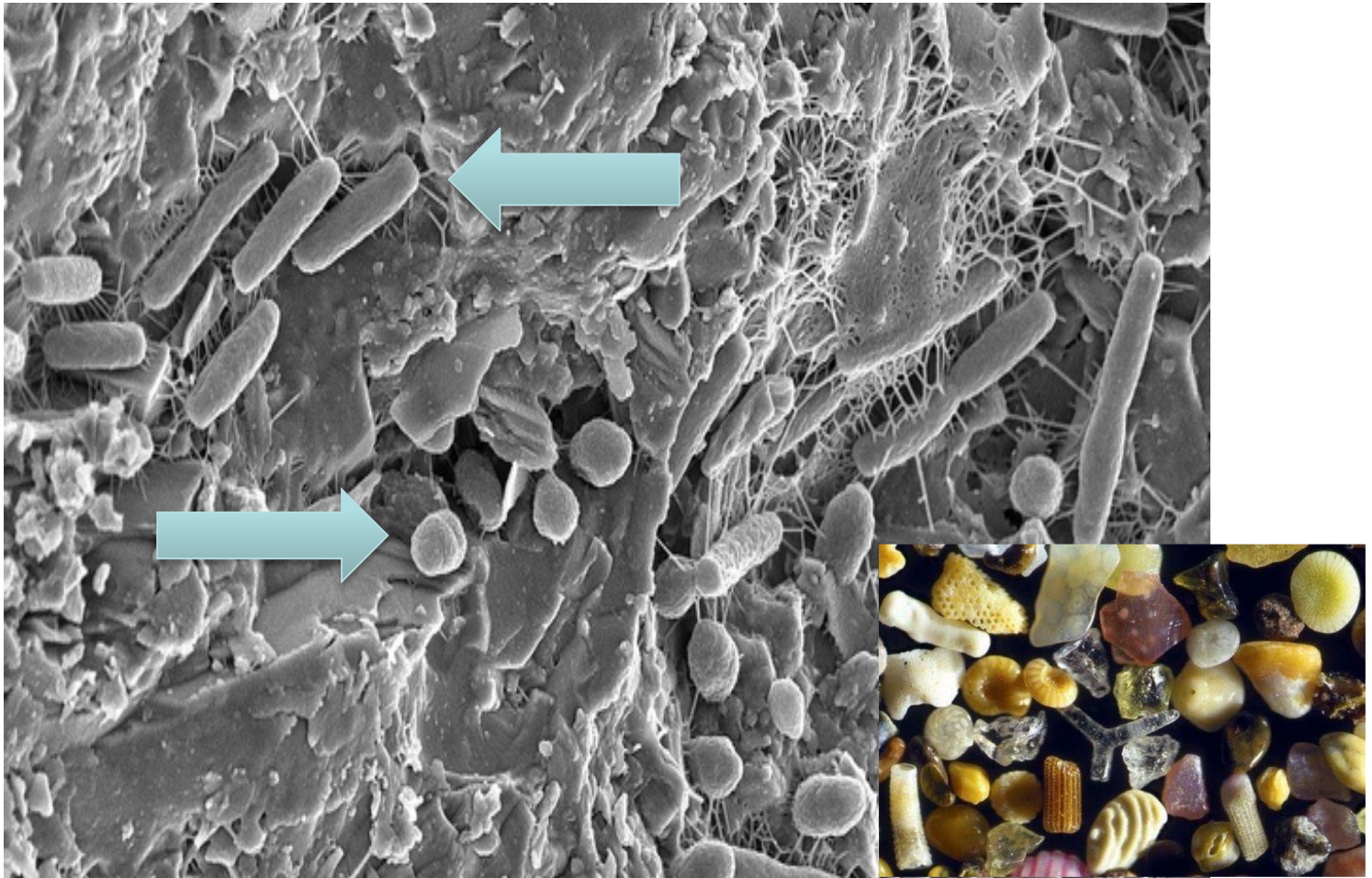
- Examples of fungi are mushrooms and molds





Bacteria

- Bacteria are really tiny!





Invertebrates

- Examples: Worms, beetles, centipedes, roly poly bugs, and ants



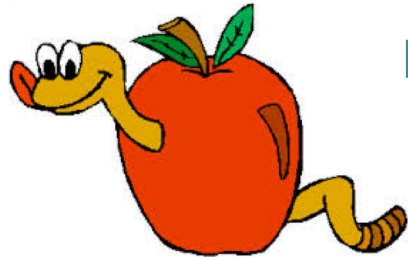
Sow Bug
Soldier Fly Larve
Millipede





Worms for Composting

- Thousands of worm species live in the soil
- Some are in our yards and compost piles
- Only a few species are feasible for vermicomposting:
 - 1) Red Wiggler (*Eisenia foetida*)
 - 2) Red Worm (*Lumbricus rubellus*)
 - 3) Red Tiger (*Eisenia andrei*)
 - 4) Blue Worm (*Perionyx excavatus*)
 - 5) African Nightcrawler (*Eudrilus engeniae*)
 - 6) European Nightcrawler (*Eisenia hortensis*)



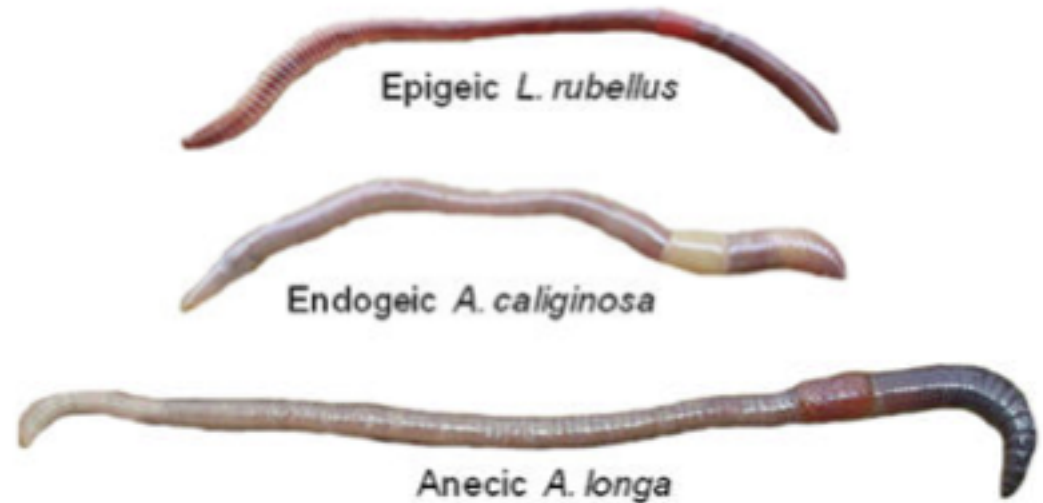
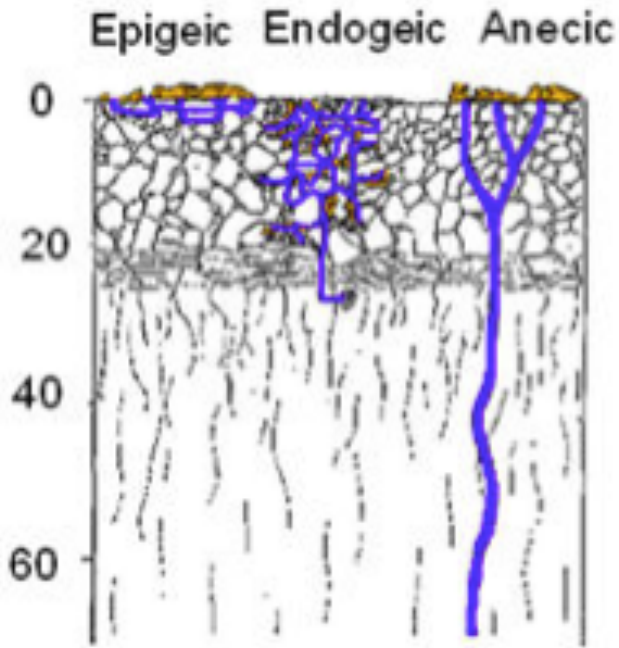
**Best compost worm
for our area is:
Red Wiggler**





Species of Worms

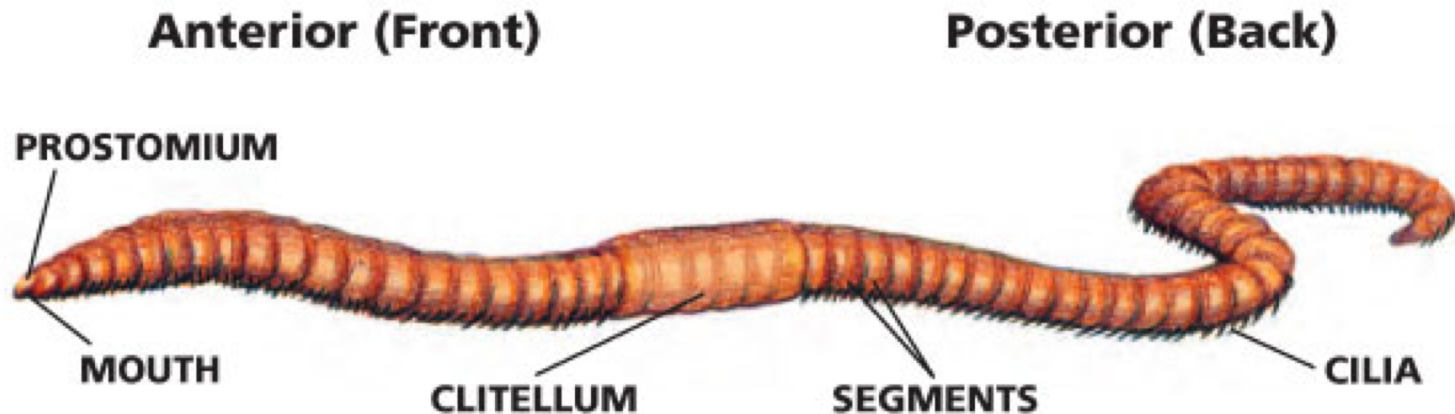
There are more than 4400 different types of worms!





What are the parts of a Worm?

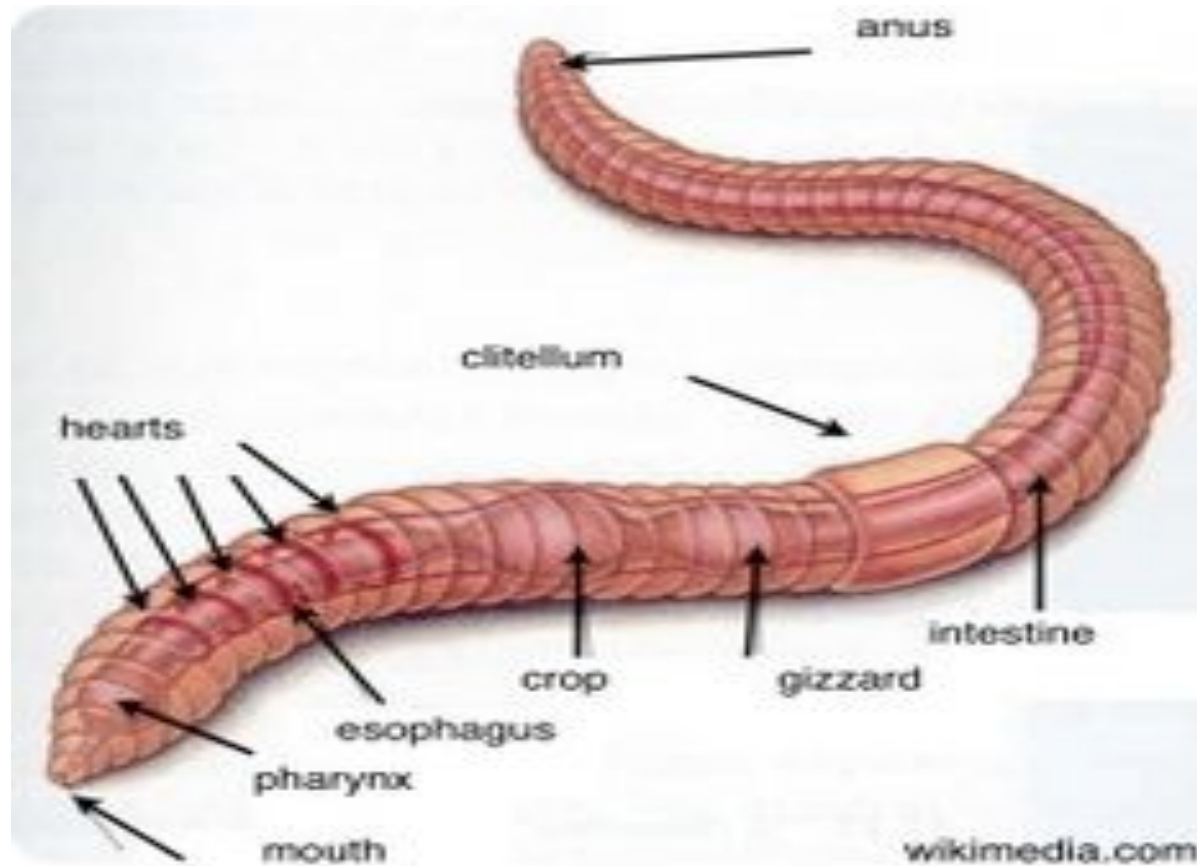
Adult Red Worm (*Eisenia Fetida*)



Did you know a worm has a crop, a gizzard, and 5 “hearts”?

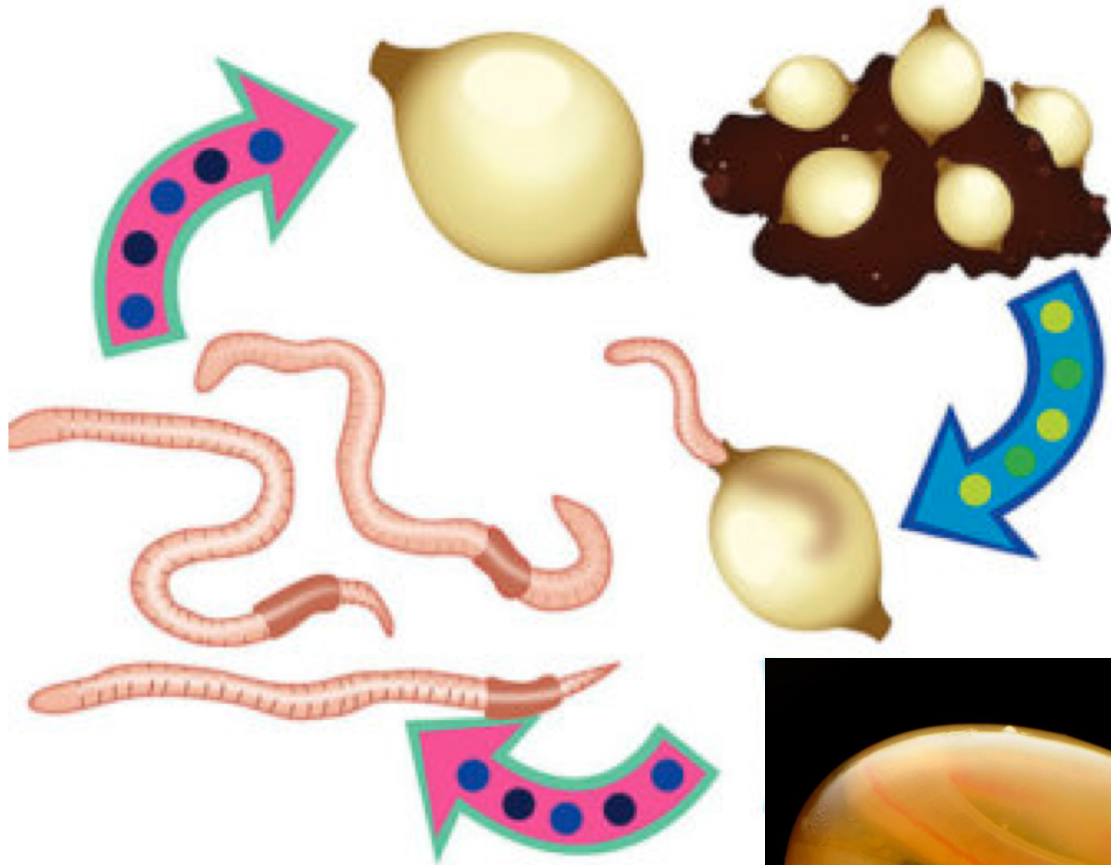


What are the parts of a Worm?





A Worm's Life Cycle



Worm Cocoon: 3-5 baby worms in each cocoon





Other Things in the Worm Bin

Fruit Flies



Pot Worms
(not baby compost worms)



These are not harmful to the worm bin but do tell us that there is something wrong

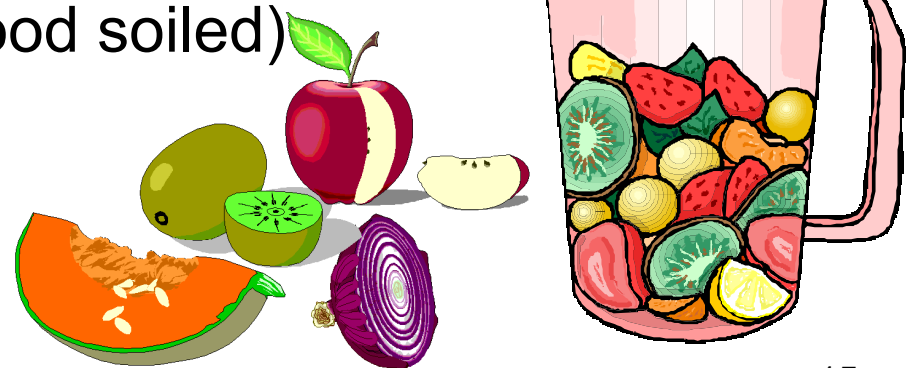


Worm Food

- Vegetable and fruit scraps
e.g., banana peel, apple core, lettuce,
potato peel, carrot tops, etc.

***Cut into small pieces, bruise/pierce
hard skins***

- 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

- ❌ **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 amounts of acidic or pungent produce** – lemon, lime, orange, ginger, onion, garlic, etc.
- ⚠️ **Yard clippings** - may include herbicides, pesticides; branches & woody stems break down slowly, soft 'edible' leaves ok
- ⚠️ **Soil** (small amount ok)



Bedding Material

- **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
- Cardboard is a valuable recyclable material, best in recycle bin

- **Shredded office and junk mail paper**

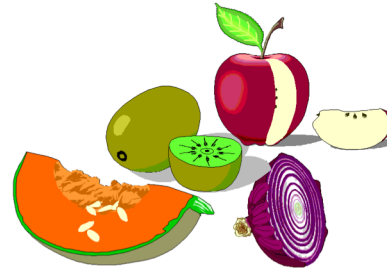
- Use sparingly, mix with shredded newsprint
- Can dry out faster than newsprint, or clump together
- Some inks are petroleum-based, best avoided

- **Dried, partially-decomposed leaves**

- Avoid leaves that decompose slowly
- Coir (coconut husk fiber) is good, but few coconut trees in bay area



Putting It All Together



Bedding + Moisture + Air + Food + Worms

Q: How much water?

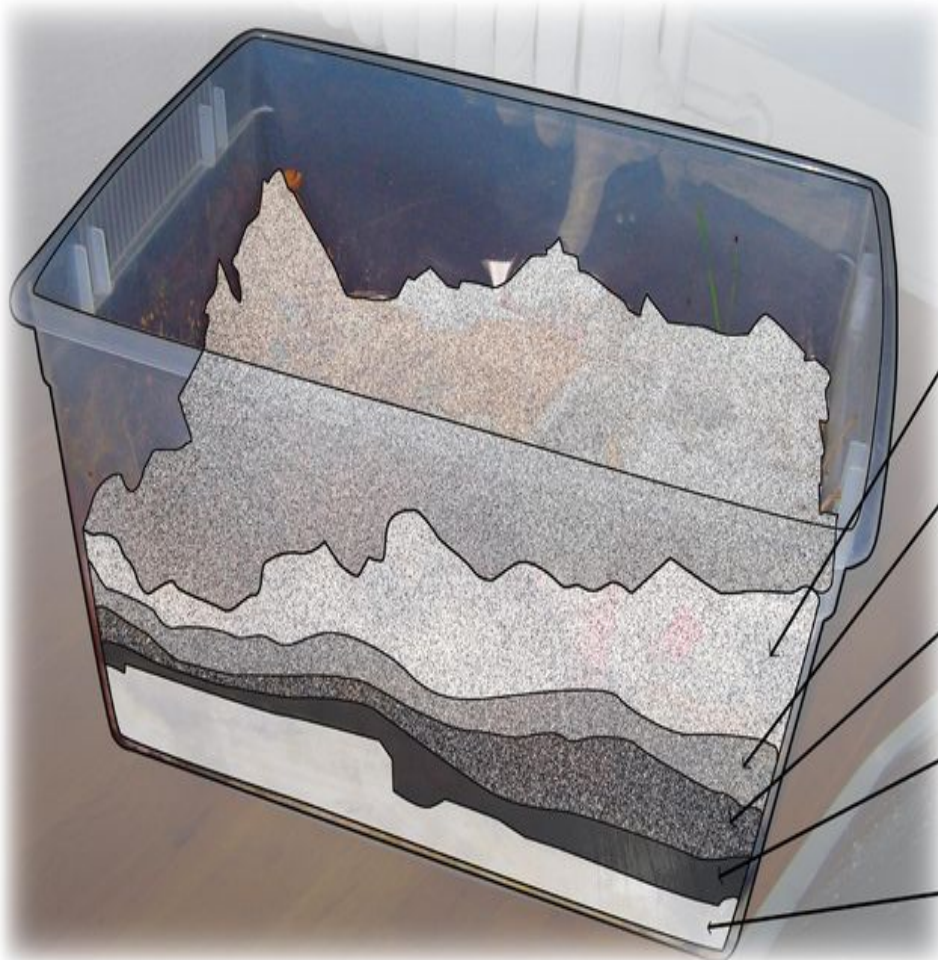
A: Keep bedding as damp as a wrung-out sponge
(moist, not dripping)

Note: And a small amount of grit

e.g., crushed egg shells, coffee grounds, fine sand, vermiculite, perlite, etc.



Putting It All Together



WORM BIN LAYERS

Leaves/paper/cardboard/sawdust
-Covers scraps and protects bin from flies and fungus

Food scraps
-Feeds worms and breaks down into usable soil.

Leaves/paper/cardboard/sawdust
-Provides habitat for red wigglers.
-Breaks down into usable soil.

Organic soil
-Absorbent layer keeping above layers relatively dry.
-Creates a moist environment for Nightcrawlers.

Paper lining
-Absorbs any remaining moisture.



Locating the Worm Bin

- Ideal temperature is between 55°F and 77°F
- Plenty of air circulation



- In the shade during summer, especially if a plastic bin is being used
- Good locations include: under a shade tree or in covered patio, garage or laundry room, or under the kitchen sink



Maintaining Your Worm Bin

- **Check weekly** (more often if temperatures are very low or very high)
- Move to a different location if needed
- Add food if previous batch is being eaten (disappearing)
- 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 moist 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 anerobic 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, sprinkling of flour, cereal, raisins, etc.
 - Add extra moisture in summer time



Harvesting Castings

Castings are toxic to worms and 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





Using Worm Compost

- Slow Release Nitrogen-Rich Fertilizer
 - Use it instead of fish emulsion on bedding plants in greenhouse
 - Spread around potted 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





Where Do I Get Help?



The ROTLINE: (408) 918-4640

cesantaclara.ucanr.edu/Home_Composting_Education/

- **United States** Environmental Protection Agency (EPA), Composting At Home
<https://www.epa.gov/recycle/composting-home>
- **California**, CalRecycle, Backyard Composting
<https://www.calrecycle.ca.gov/organics/homecompost>
- **South Bay Green Gardens** <https://www.southbaygreengardens.org/>
- **Libraries**
Santa Clara County Library District ([sccl.org](https://www.sccl.org)) or your city's library
Search for "home composting" to find related books, magazines and videos

Lots of Info Available!



Worm Bin Exploration

1. Pair up with a classmate
2. Find a spot at a table outside with worm bin contents spread out
3. Find and discuss 3 things you've learned while you explore together
4. Fold a piece of paper to form a cone/holder
5. Fill your cone with damp shredded paper
6. Add 2-5 worms & 2 pieces of food
7. Take it to the worm box and gently place it inside
8. You've started composting your food scraps!





Worm Bin Exploration

1. Pair up with your kindergarten buddy
2. Guide your buddy to a table outside with worm bin contents spread out
3. Tell your buddy 3 things you've learned while you explore together
4. Fold a paper square to form a cone/holder
5. Fill your holder with damp shredded paper
6. Add 2 worms & 2 pieces of food
7. Take it to your worm box and gently place it inside
8. You've started composting your food scraps!

