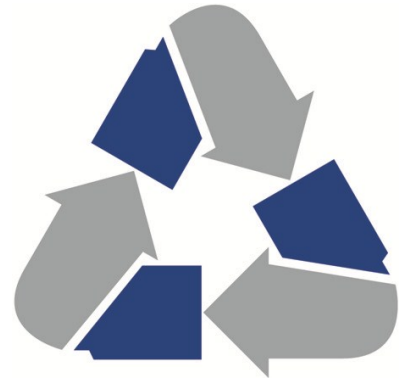


Vermicomposting Guide



Over 50% of the municipal solid waste generated in the US is compostable. Vermicomposting is a great way to recycle your organic waste (food scraps, yard trimmings, and paper) using worms!

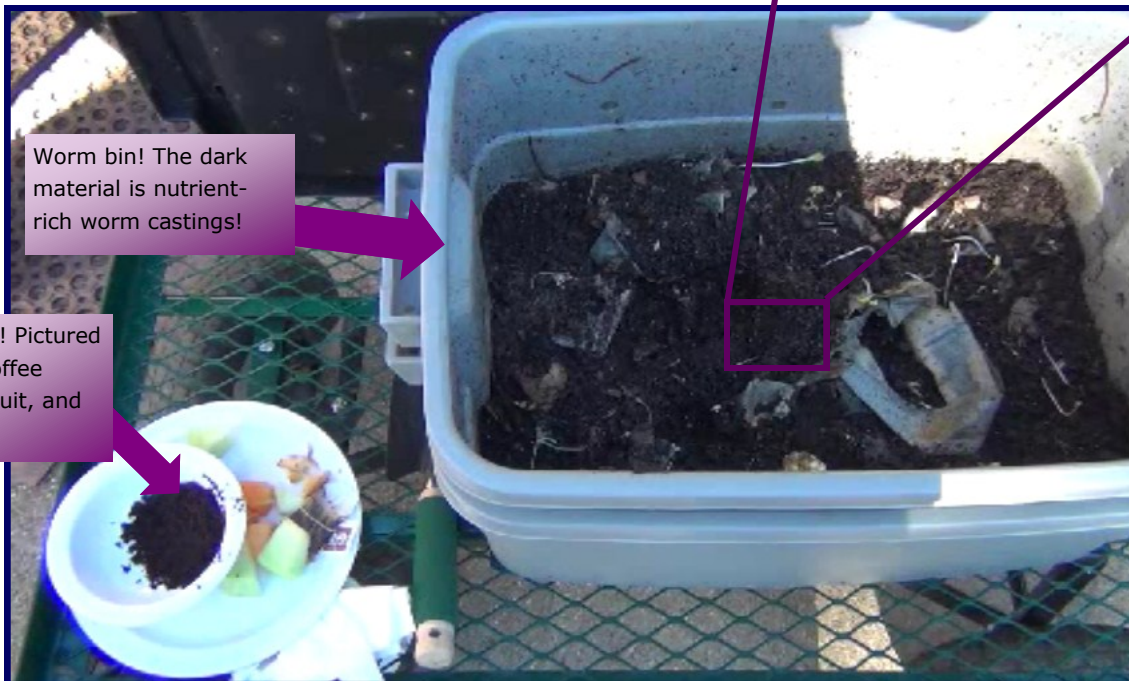
• The Big Picture

Vermicomposting uses earthworms, specifically red wigglers (*Eisenia foetida*), along with microorganisms, to turn organic waste into a nutrient-rich soil amendment. Composting reduces the amount of waste that get landfilled and creates a great natural fertilizer. Vermicomposting can be done year-round, indoors, and in confined spaces. It's easy to set up and maintain!



Worm bin sample: red wigglers, food scraps, newspaper, and worm castings.

Check it out:



Worm bin! The dark material is nutrient-rich worm castings!

Worm food! Pictured here are coffee grounds, fruit, and a tea bag.

Questions or comments? Contact NDEP's Nevada Recycles program at 1.800.597.5865 or check NevadaRecycles.nv.gov for staff contact information.

• Where to Store a Bin

Make sure you have an appropriate location to store your worm bin. Red wigglers can tolerate temperatures between 40 and 80° F. They are most active between 55 and 77° F. It is also important to keep the bin in an easily accessible spot that is well-ventilated and sheltered from wind and animals that may tamper with the bin.

Cool Bin	Warm Bin
Stays moist	Requires more frequent addition of moisture
Worms appear more active	Worms appear more lethargic
May have more mites	

• How to Build a Bin

You can purchase worm bins and other specialized vermicomposting units; however, building your own is cheap and simple!

Materials:

- dark-colored plastic bin with lid (it's more important to have a **wide** bin rather than a deep bin)
- electric drill
- newspaper (shredded office paper is ok too)



1. Drill several rows of holes around the upper half of the bin.

*Holes should be a couple of inches apart.

2. Drill holes in the lid as well for additional ventilation.

3. Wash the bin with mild dish soap and water.

4. Spread bedding (preferably newspaper) across the bottom of the bin.

*The newspaper should be torn into thin strips. The vegetable-based ink is actually a good source of protein.

*Bedding should be moist, like a *wrung-out sponge*.

*Do not use glossy paper.

*Yard trimmings may also be included as bedding materials.

*About 6 inches of bedding is plenty. Make sure there is always a layer of bedding to bury food under.

Other Options: Some people prefer to nest two bins. By drilling holes in the inner bin, excess moisture will drain. Put a spacer such as a brick in between the two bins.



Why is bedding important?

- To control moisture levels
- To provide extra food
- To provide a breeding habitat

• Starting worms in a new bin

When first adding worms to a bin, start with about 1 pound and **place them together in one corner** on top of a thin layer of bedding. Cover them with a small amount (a couple ounces) of food. Then cover the worms and food with more of the bin's bedding. Wait until the first batch of food is consumed before adding more. In subsequent feeding you can slowly spread the food further across the bin.

About 1 pound of worms can be added to 1 square foot of bin space (that's about 500-2,000 worms).

• Feeding the Worms

Worms can eat half of their body weight each day in favorable conditions!

Only feed organic (once alive) materials! No plastic, glass, or rubber.

TIPS


Smaller pieces are processed faster.
Cut up large pieces.

Freezing or microwaving food will kill fruit fly eggs.

Don't overfeed, or you will have rotting food sitting in your bin.

Bury food in the bedding to reduce the number of flies and mites. The worms live in the dark shelter provided by the bedding, not on top of it.

Serve a variety of organic matter to prevent a pH imbalance.

DO	DON'T
Yard trimmings including grass and leaves (no herbicides or insecticides)	Oil, grease, fats (it can coat the worms and make it hard for them to breathe)
Newspaper, office paper, cardboard	Citrus (acidic; freezing helps)
Fruit and vegetable scraps, skins, & peels	Broccoli (smelly), onion (smelly), ginger (varies by bin), banana (attracts flies)
Tea bags and coffee grounds and filter	Avocado peel
Plain rice or pasta without oil or butter	Animal feces
Egg shells (if dried and crushed)	Meat (smelly)
	Dairy

• Other Bin Life

Many other organisms help decompose organic matter. Here are some common ones you may find in your bin:

- White worms (almost translucent, thin, up to 1 inch long)
- Mites (round, 8-legged, appear in clusters; white, brown, or bright red)
- Fruit Flies (small flies) and fungus gnats
- Springtails (tiny, look like grains of salt, try to jump away if you try to touch them)
- Sow bugs (gray or brown, 0.5 inches long, look like little armadillos)
- Bacteria, mold, fungi

• Harvesting

When the worms are well-fed, active, and reproducing, compost will need to be emptied every 3-6 months. The vermicompost contains worm castings, organic matter (including bedding) at various stages of decomposition, worms, and microorganisms.

Method 1: Light Reduce feeding about 2 weeks before harvesting. Remove any unprocessed bedding from the top of the bin. Dump the rest of the bin contents onto a tarp and form them into small mounds. Leave the contents in the sun or bright light for 15 minutes. Brush the tops of the mounds and wait a few minutes for the worms to burrow further down and cluster. Repeat. Then place the clusters of worms back into a bin with bedding.



Method 2: Partition When the bin is about 3/4 full, move the contents to one side. Use a piece of cardboard to create a partition. On the empty 1/4, place food and fresh bedding. Over the course of the next several weeks the worms will migrate to the fresh 1/4. Add fresh bedding once one side has been harvested.

Method 3: No Hassle This quick and dirty method just involves scooping out the vermicompost without any separation of worms.

Apply sparingly due to high nutrient content. For potted plants, no more than 1/5 of the material should be castings. In the garden, apply 1" around plants (till in if possible) at the beginning of spring, summer, and fall.

• Troubleshooting

Symptom	Causes	Solutions
Bin smells bad	-too much food in bin -wrong materials added as food	-cut back on feeding -add more newspaper bedding -take out unacceptable materials
Bin attracts flies (you can try preventing this problem before it starts by freezing or micro-waving food first)	-exposed food -too much food	-add to the cover of damp newspaper & sprinkle garden lime -fill a cup with dish soap and apple cider vinegar; cover with cling wrap and poke holes; place in bins; remove undecomposed food and stop feeding (worms will eat bedding).
Worms are dying	-bin too wet or dry -extreme temperatures -not enough oxygen or food	-if too wet, add dry bedding. If too dry add moist bedding. -find a location where temperature stays 55-77° F -for more air, fluff bedding and drill more holes -for more food, add bedding and food scraps
Worms crawling away	-too much vibration -not enough oxygen -bin conditions not right (see other solutions above)	-move bin to a still spot -fluff the material in the bin and add air holes -try other solutions listed above -shine bright light on bin
Water collecting on bottom	-poor ventilation -too much food with high water content	-leave lid off to help dry bin out; add dry bedding -reduce feeding with coffee grounds and other foods with high water content

• Vermi-facts

If a worm is cut in half the head portion will regrow its back half if there are at least 13 segments.

Worms are hermaphrodites—they have both male and female parts.

Worms have five hearts.

Worms breathe through their skin.

Worm start reproducing when they are 4-6 weeks old, and can make 2-3 cocoons each week.

The key ingredients in fertilizer are nitrogen (N), phosphorus (P), and potassium (K). Worm casts have 5x more N, 7x more P, and 11x more K than ordinary soil.

Worms are born from eggs. A worm cocoon hold 3-4 eggs.

Red wigglers live to be about 4 years old.

• Recommended Resources

Nevada Recycles Curriculum Page: http://www.nevadarecycles.gov/main/curr_main_pg.htm

The Clean Calgary Association's Vermicomposting Guide: <http://www.greencalgary.org/images/uploads/File/Vermicomposting.pdf>

4-H Leader's Guide to Vermicomposting: <https://www.bae.ncsu.edu/topic/vermicomposting/pubs/aq-464-vermi-curriculum.pdf>

Whatcom County's Vermicomposting Page: <http://whatcom.wsu.edu/ag/compost/Redwormsedit.htm>

How to Use Harvested Compost: <http://mastercomposter.com/pile/useapply.html>

Toward Zero Waste Australia Guides: <http://www.zerowastewa.com.au/documents/>