



GUIDE series

Vermicomposting Guide

Using Red Wigglers to reduce your waste

Composting doesn't always have to be done outdoors. Vermicomposting is one way to compost your organic waste indoors, therefore reducing your waste to landfill, creating a great fertilizer and decreasing your environmental footprint.

Vermicomposting or worm composting is the act of using red wiggler worms to turn your organic waste into a soil amendment. Red wiggler worms must be kept in temperatures above zero degrees Celsius and will process their body weight in organic matter about every three days (1/2lb. of worms eats 1/2 lb. of food every three days). This is the fastest way to get finished compost in Calgary!

Vermicomposting has gained considerable popularity in Calgary over the past three years with schools, businesses and individuals building and maintaining bins when they do not have access to an outdoor compost.

This guide will give you all the information and tools to successfully vermicompost in Calgary.

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WORMS

Green Calgary recommends vermicomposting be done with red worms or red wiggler worms (*Lumbricus rubellus* and *Eisenia foetida*) however, it should be noted that night crawlers could also be used. This guide focuses on using red wiggler worms.



Do not be alarmed to find an entire ecosystem in your worm bin; worms, microorganisms and macro-organisms break down the organic material and turn it into worm castings (poop) which can be used as a fertilizer.

Red wigglers prefer an environment that is dark, moist and moderate in temperature. They will not be able to survive outside in our cold winter climate so be sure to keep them indoors, either in the house or a heated garage.

Red wigglers come in two varieties: *Lumbricus rubellus* and *Eisenia foetida*, and both live an average of about two years but can live up to four in ideal conditions. Worms reach maturity at about three months and will reproduce based on the size of their home and how much food is being provided. You should only need to purchase worms once.

Be sure to buy your worms from a trusted source. Green Calgary as well as bait shops sell worms in Calgary.

WORM BINS

A bin contains the entire vermicomposting operation (bedding, worms and food). Worm bins must meet three basic criteria whether you choose to buy one or build your own:

- Be made out of a dark material
 - Worms do not like light
- Have a lid
 - Keeps out children and unwanted pests such as fruit flies
- Have air holes (on the upper part of the bin and lid)
 - Provides good ventilation

Types of Bins

Many people choose to make their own worm bin out of a plastic container. Both hard and soft plastic are suitable for this purpose; just be sure to add air holes. If you choose to make your own bin, go for wider rather than deeper.



Others choose to purchase a bin. Green Calgary sells 'A Worm Friendly Habitat' which is perfect for vermicomposting in Calgary for just \$32.

Ideal Conditions

Red worms have an aversion to light. That is one reason why worm bins should be covered and made out of a dark material. Worms are seldom found on the surface of the bedding material. It is also why worms will never want to escape from the cozy confines of a worm bin.

Worms are aerobic creatures that prefer a moist environment for burrowing. Oxygen is also important in a worm bin. Ensure you have sufficient air holes so your worms will be able to breathe. Like outdoor compost, the bin and bedding material should be as moist as a wrung out sponge. Drain holes can be added if needed to prevent the bedding from becoming wet enough to drown the worms. However they are seldom necessary in Calgary's dry climate. If required, water can be added to the bedding periodically to keep it moist.

The temperature range tolerated by redworms has been quoted as being 5 to 27 degrees Celsius (40 to 80 degrees Fahrenheit), however they are most active between 13 and 25 degrees Celsius (55 to 70 degrees Fahrenheit). Worms will not survive freezing nor will they tolerate high ambient temperatures.

WORM BEDDING

Bedding material is the top layer of a bin providing a variety of functions:

- Controls moisture level
 - If your bin is too dry, add moist bedding or if it is too wet, add dry bedding
- Provides extra food if needed
 - If you forget to feed your worms or go on vacation, bedding is a back-up food source
- For breeding
 - Gives a nice environment for procreation
- To contain smell, if any
 - Sits on top of the organic matter in the bin providing a layer between it and your home

Green Calgary believes shredded newspaper is the BEST bedding material. Newspapers are printed with vegetable based ink and will not harm worms. Do not use bleached paper or paper with chemical based ink. Bedding material can include:

- Shredded newsprint (BEST choice)
 - Vegetable based inks in newsprint are a good source of dietary protein for worms.
- Potting soil
- Shredded leaves
 - Ensure they are pesticide free
- Well rotted and sterilized animal manures
 - Usually only used by vermicomposters who sell their finished castings product.

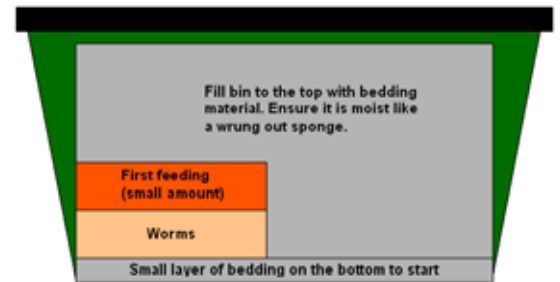
**Unacceptable worm bedding materials include shredded glossy magazines, credit card bills, treated plant waste and topsoil.*

WHAT ELSE IS IN THE BIN?

Worm bins are entire ecosystems and contain microorganisms such as mold, bacteria and fungi. The bins also have some macro-organisms which you will be able to observe. Acceptable macro-organisms include beetle mites (tiny round red mites), springtails (oblong white creatures) and white worms (almost transparent 1cm long worms). Do not be alarmed by their presence; it is a sign of a functioning worm bin!

BUILDING YOUR WORM BIN AND FEEDING YOUR WORMS

When you start your worm bin, it is recommended that you place a layer of shredded newspaper (or other bedding) at the bottom and then add the worms on top. Place all the worms together in one corner - don't spread them out. Feed the worms a SMALL amount (i.e. a small yogurt container) of organic waste directly on top of where you have placed them. Fill the rest of the bin with moist shredded newspaper (or another bedding). The newspaper should feel moist like a wrung-out sponge.



Each week, increase the amount you are feeding the worms and watch as their population grows to process the increases. ALWAYS feed the worms under the bedding material, never on top. Fill the bin up with shredded newspaper (or other bedding) when you are running low. Moisten the newspaper/bedding if your bin is dry, let the newspaper suck up moisture if your bin is too wet.

TIPS FOR SUCCESS

- Feed worms just once a week
 - The smaller the pieces, the faster they will be processed
- Freeze your food first to kill any unwanted fruit fly eggs.
 - Don't forget to defrost before giving it to the worms
- If you cannot freeze food, use the microwave instead (good for schools)
- Feed directly on top of or beside the previous feeding

Worm Food

Worms can generally eat the same things that go into an outdoor composter. They are able to process the scraps quite quickly. If you notice that the scraps are still visible after one week, feed the worms less for a while and wait for their population to increase.

Acceptable materials:

- Fruit and vegetable scrap
 - Skins, peels and unwanted parts
- Plant waste
 - Ensure it is untreated

- Coffee grounds and filter
 - Avoid bleached filters
- Tea leaves and tea bags
 - Staples removed
- Rice and pasta with no butter, oils or sauces

**FOR TEACHERS – Ask students to ONLY feed the worms those parts of fruits and vegetables we would not eat. This will decrease food waste in your classroom.*

Cautioned materials:

- Seeds or pits
 - Cherry pit or larger cannot go in
- Citrus
 - Each bin is different; test it out and see if your bin likes it. Freezing citrus first will help
- Avocado peel
 - Worm spa! They will not eat it but they will love to hang out on it
- Ginger
 - May or may not like it
- Onion
 - Will be the first to smell, so if you are worried about smell, avoid onions for the first little while
- Egg shells
 - Worms will not process them. You can put them in but adding later to finished product is better
- Meat and bones
 - Will smell – try it if you want to but it is not recommended

Unacceptable materials:

- Processed food
 - Any prepared foods from a home or restaurant
- Dairy products
 - Including cheese, yogurt etc.
- Oils, grease and fats
 - Can coat the skin of worms, making it hard for them to breathe
- Metal, plastics
 - Elastics, tea bag staples and fruit labels
- Pet waste from cats and dogs
- Meat, fish and bones

HARVESTING

Vermicompost contains worm castings as well as small amounts of decomposed organic matter broken down by microorganisms and partially decomposed bedding soil. Finished vermicompost must be taken out of the bin for usage. Green Calgary recommends the first two of the three options below:

Option 1 – Using light to harvest - the easiest method



Use the red wiggler's aversion to light to your benefit. For best results, do not feed your bin for at least two weeks before starting, allowing all unprocessed food to be fully processed. When you are ready, remove the top layer of unprocessed bedding and place it to the side. Spread out a tarp or plastic sheet. Dump out the worm bin contents and create small mounds over the entire tarp. Leave it to sit in the sun (or indoors under light) for 20 to 60 minutes. Worms will migrate away from the sun

and to the bottom of the piles. Scrape the top layer of castings off, returning uneaten material or bedding to the worm box.

When you are down to a pile of wiggling worms, place them back in the bin and move onto the next pile. You will now have to create a new home for the worms.

Option 2 – Partition method

When your bin is about 3/4 full, move the contents to one side (usually will be 3/4 of the bin and 1/4 will be empty) and place a piece of cardboard in the bin to divide it. In the newly created space, place food and bedding. Essentially, you have built a new bin on 1/4 of your existing bin. Only feed the worms in the “new bin” area.

Over the course of a few months, the old side will be totally worked through and ready to harvest, while the worms will make their way over to the new side. To ease your harvesting process, leave the lid of the worm bin off and exposed to sunlight (or indoor light) for about one hour to encourage the remaining worms to move out of the finished vermicompost.



Option 3 – Quick and easy – worm and all!

Green Calgary does not recommend this method. Simply reach in and scoop out the brown crumbly compost, worms and all. Use as needed.

TROUBLESHOOTING

Problem 1 – The bin is too moist

You may have pooling water (leachate), beetle mites all over you lid and sides or simply too much humidity. Try the following:

- Add more newspaper
- Take out some water with a turkey baster
- Add more air holes

If the problem persists, you may need to add drainage holes in the bottom; however this is very unlikely in Calgary.

Problem 2 – The bin smells

If your bin smells you may have the wrong materials in it or you have overfed your worm:

- Feed the worms less for a while
- Add more newspaper
- Take out unacceptable materials

Problem 3 - I have fruit flies

OH NO! Try to avoid this problem before it starts by freezing or microwaving food first. Fruit flies take 4-6 weeks to get rid of. Follow the steps below:

- 1) Fill a cup with dish soap and apple cider vinegar.
- 2) Cover the cup with a tight cling-wrap seal. Poke small holes in the cling wrap
- 3) Place it in the bin
- 4) Remove any undecomposed organic waste from the bin
- 5) Starve your worm bin for a while so the flies have nowhere to breed. Do not worry about the worms; they will eat the bedding.
- 6) Eliminate any breeding grounds for fruit flies outside the bin.

This is a very frustrating problem. If you need help, please contact Green Calgary.

Problem 4 - The worms are escaping

If you are providing your worms with a happy home they will have no reason to leave and risk certain death. Please note that worms will sometimes explore their bin (lid and sides). Only if you find dead, dried-up worms outside the bin is there need for concern.

If you have escapees, ask the following questions:

- 1) Do you have any of the previous problems? Solve as directed.
- 2) Have you been drilling or causing vibrations near your bin? Move your bin away from the vibrations.
- 3) Is there enough oxygen in the bin? Add more holes and aerate the bin by “fluffing” up the castings/vermicompost.

VERMICOMPOSTING WORKSHOPS

Compost in your home, at work or at school with red wiggler worms! Green Calgary’s vermicomposting workshops help take the mystery out of indoor composting. Participants learn about different bin types as well as the role that worms and micro-organisms play in vermicomposting. The workshop also covers how to do it properly, the job and anatomy of red worms, and what can and cannot be put into a vermicompost bin. After the presentation participants will confidently be able to build, maintain and troubleshoot a worm bin.

For individuals

Workshops run monthly at our EcoStore (809-4 Ave SW.). Visit our website at www.greencalgary.org for upcoming dates. Please call the EcoStore at (403) 230-1443 x222 to pre-register as they fill up fast!

Cost: Just \$8.00/person

For Businesses

The workshop can be delivered onsite as a lunch and learn, part of a staff meeting or during a professional development day. Our education team would be happy to bring worms and a bin to set up and leave with you after the workshop. To book a presentation for your office, organization, church or group please contact Environmental Education at [403] 230 1443 ext 225 or education@greencalgary.org . Cost is \$175 for businesses (non profit rates available).

For Schools

Worms are great for classrooms and students get many benefits from a vermicomposting workshop including:

- Students learn the science behind each of the steps involved in setting up a vermicomposting bin.
- Through activities designed to illustrate worm life cycles, students gain an in-depth understanding of the biology and ecology of worms.
- Students discover what can and cannot be composted in a worm bin at school or at home.
- Decomposition and how it works is explained and exemplified for the students.
- Students will learn about and identify other soil animals that live and interact with worms.
- The class will have a chance to see a worm bin in action or create their own if ordered by the teacher.

Please email schools@greencalgary.org or call Environmental Education at 403-230-1443 ext 230 to book or for more information. The cost of one workshop is \$75 however Green Calgary offers discounts on multiple workshops to one school on the same day:

- One workshop = \$75
- Two workshops in one day at the same school = \$140
- Three workshops in one day at the same school = \$200
- Four workshops in one day at the same school = \$250

YEAR-ROUND ACTIVITIES OF GREEN CALGARY

Empowering Calgarians to create healthy homes and communities by providing environmental education, products and services.

Green Calgary offers a variety of programs to help achieve mandates of waste reduction and water protection including:

Environmental Education

Green Calgary is pleased to offer a wide variety of presentations to businesses and employees to help answer tough questions about the environment, explain how to practically become green and share

Calgary-specific knowledge. These can be done as part of a staff meeting, as a ‘Lunch and Learn’ or any other time.

Waste at Work: Reducing your company’s environmental footprint

Green Procurement: Using buying power to influence change

Waste at Home: How individuals can make a difference in daily life

Getting There Green: Environmentally friendly driving and alternative transportation

Green Cleaning: How to improve indoor air quality and choose green products

Composting: Learn how to recycle your organic waste and make great fertilizer

Vermicomposting: Don’t have a yard? Learn to compost indoors with red wiggler worms!

Please contact the Education team at [403] 230 1443 ext 225 or education@greencalgary.org for more information or to book. Member discounts apply.

Healthy Homes Calgary

The Healthy Homes Calgary program is our newest residential service, providing free home visits to Calgarians interested in creating a healthy living environment, while reducing the home’s “eco-footprint”. We will provide the tools and information needed to improve indoor air quality, energy and water efficiency, waste reduction, and more.

Please call Ashley at [403] 230 1443 ext. 223 or email ashley@greencalgary.org.

Commercial Environmental Services

Assisting companies to reduce their environmental impact associated with waste. We offer customized, one-on-one service and the information, education, resources and tools necessary to divert waste from landfill and help reach your waste-diversion goals.

Services include:

- Waste Reduction Solutions / Consultation
- Online Recycling Directory
- Waste Measurement Toolkit Assessments
- Calgary Materials Exchange - www.cmex.ca

Please call Sarah at [403] 230 1443 ext. 226 or email sarah@greencalgary.org.

EcoStore - selling environmental products that reduce our environmental footprint

The Green Calgary EcoStore sells products that are environmentally sustainable and help to reduce waste and conserve water. Products include compost bins, recycling bins, rain barrels, water saving kits and much, much more. Visit the website for details: www.greencalgary.org

We are wheelchair accessible and located in downtown Calgary on the southwest corner of 4th Avenue and 7th Street SW.

809 Fourth Avenue SW

[403] 230 1443 ext. 222

Open Tuesday and Wednesday 10-5:30

Thursday 10-7

Friday and Saturday 10-4

Closed Sunday and Monday

Information Services & E-newsletter

We respond to thousands of public requests for environmental information. Calgarians want to know how to recycle their household waste and otherwise reduce their environmental footprint.

Please contact Green Calgary if you would like more information about our programs or if you are interested in volunteering.

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