

Vermicomposting Building Your Worm Habitat

Setting the stage

A worm bin serves to contain the entire vermicomposting operation (bedding, worms and food). Your worm bin should be made of dark material (no light!), have a lid, and provide good ventilation while also maintaining moisture. Eventually your vermicompost system will become its own mini-ecosystem with micro and macro-organisms, helping the worms turn your waste into nutrient rich compost!

The most basic worm composting system is a simply a plastic tote with a snap-on lid and a few holes drilled in the sides for ventilation. Some schools may also use the Worm Factory 360, a ready-made system for housing your worms. If you are using the Worm Factory 360 or another pre-made worm bin, please follow the assembly instructions provided to you with the kit.

What do you need to make worm compost at school or home?

- Worms
- Bin(s) / container(s)
- Bedding
- Food
- Moisture
- Air and the right temperature



A Worm Bin

What is worm bedding?

Composting worms require moist bedding in their worm bin.

Almost any carbon source can be used as bedding in a worm bin, but some are better than others. We believe shredded newspaper is the best worm bedding. Newspapers are printed with vegetable ink and do not use bleached paper. Make sure you do not use the glossy, colored paper. Other sources of bedding include cardboard, egg cartons, leaves or coconut coir. It is also recommended to add some ordinary garden soil to your worm bin as it will be ingested into the worm's gizzard and help them digest their food.

Worm bedding serves a few purposes:

- Controls moisture level
- Provides extra food if needed
- Provides space for breeding
- Contains smell, if any
- Provides temporary respite for worms if conditions are not ideal



Where should you place your bin?

Keep your bin somewhere away from heavy traffic or vibrations. You can store your worm bin outside in the shade or garage during warmer months, but your worms will not survive freezing temperatures. Worms will work most effectively in temperatures of 15 degrees Celsius to 26 degrees Celsius.

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Making your own worm bin

Materials

- 1 35-40L plastic storage containers (ie. Rubbermaid bin 61 x 41 x 22cm. 37.9L)
- 1/8th inch drill bit and drill
- 2 cups of soil
- 20-30 pages of Newspaper
- 1-2lbs of Red Wiggler Worms (~1600-2400 worms/lb)
- 1L of compostable food waste
- Lid of yoghurt container as marking tool
- Water to moisten newspapers

1. Prepare your plastic container (the bin) with air ventilation holes

Using the drill and bit, drill 10 holes in the top 3" of the two longest sides of your bins, as well as 10 holes in the lid. *WHY: Worms need oxygen to live too! If bins are stacked, ensure that holes are also along the top 3" sides of the bin.*

2. Shred the newspaper into thin strips

Newspaper has a grain, making it easiest to rip the newspaper length-wise. Add ripped/shredded newspaper into bin. *WHY: The newspaper provides "bedding" for the worm bin which assists in air flow and a good quantity of "brown material" (which contains a large amount of carbon) provides a balanced diet.*

3. Moisten bedding

Add water to your bin to moisten the newspaper to the dampness of a wrung-out sponge. Pour off excess water and add dry bedding as needed. You should have 3-4 inches of dry bedding in the bin. *WHY: The worm bin needs to stay moist. Newspaper has soy-ink (vegetable-based) which does not contain toxins. Newspaper also decomposes quickly.*



Always cover your food scraps with newspaper bedding. This acts to balance with a carbon source and keeps fruit flies away. This is very important!

4. Add soil and blend with newspaper

Blend the soil/ paper combination (with your hands) until thoroughly mixed. *WHY: The soil adds grit and help the worm's digestion.*

5. Add worms

Add your worms to one corner of your worm bin and cover with bedding.

6. Add worm food

Dig a hole beside the worms, place 1 Litre of food waste and cover with bedding. Use the top of your yoghurt container as your marker, so that you know where you have fed the worms. Check the Feeding Your Worms section to find out how you can best feed your worms. You will feed into a different section each week, in a clockwise motion. Then, move your yoghurt container on top of that section.

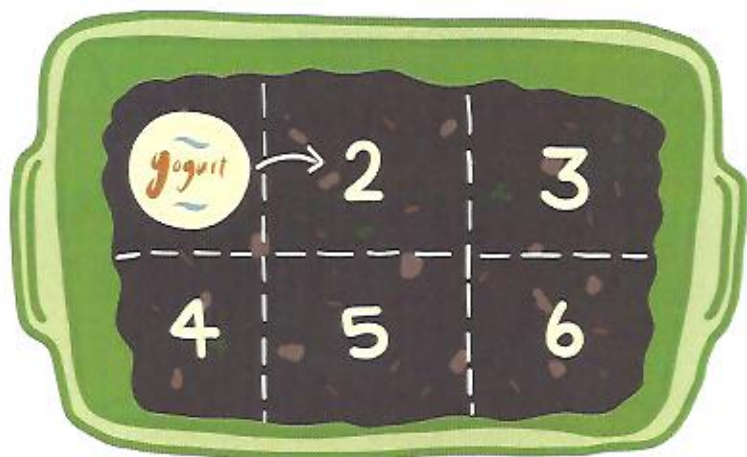
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Feeding Your Worms

You will want to feed your worms each week.

Start feeding worms one litre at the beginning. You can collect your food scraps into a yogurt container all week and feed all at once. You will want to feed your worms in different areas of your bin each time.

The easiest way to do this is to consider your worm bin as 6 separate areas – 4 corner areas and two in the middle center. You will want to start by burying your food scraps into the corner of the bin. Use an extra yoghurt container lid to mark where you last fed your worms. The next week, feed your worms into the next area clock-wise, and move your yoghurt lid marker to this spot.



Preparing Food for Worms

You can add your food scraps directly to your bin, but preparing or pre-treating food scraps will make food easier to digest by your worms. To prepare foods you can:

Chop food with a knife or in a food processor

Remember that food is broken down by microorganisms and is then eaten by worms; the more finely chopped food waste is the greater the surface area for microbes and the faster they will colonize. The worms will process the food much faster.

Make a slurry

Run food scraps through a blender before adding to your bin. This makes a mushy slurry that is easier for worms and bacteria to eat.

Freeze (and then thaw) food

When food is frozen, the water in each cell expands and breaks the cell wall, which speeds up decomposition. Freezing also kills any insect larva that may be in the food. Make sure to thaw before feeding.



Have your students test what food worms like best. They could do this by creating smaller worm bins from yoghurt containers and measuring the rate at which particular foods are eaten. Students might also try this in their classroom worm bin. Place two foods in the centre of the bin. Which food disappears first? How long did it take? Why do you think worms like this particular food better?

Microwave (and then cool) food

Like freezing, microwaving can jump start the decomposition process and can kill any pests that may be present.

Let food sit before feeding

Many people do this anyway simply because they feed their worms produce that has gone bad, but food that has already started decomposing is that much closer to ideal worm food.

Vermicomposting Feeding Your Worms

What to Feed Worms

- Fruit and vegetable waste (avoiding too much citrus)
- Egg shells
- Coffee grounds and tea leaves



What to NOT Feed Worms

- Greasy foods and dairy products. These foods would deposit fats into the soil which would then cause the worms to suffocate, since they breathe through their skin. These types of foods can also cause your vermi-bin to stink! Yuck! Examples of these fatty foods include: cheese, pizza, ground beef, pepperoni, ice cream, butter, etc.
- Grass, vegetable, or other products sprayed with pesticides. This may cause poisoning of the worms and soil.
- Spicy foods such as onions, garlic, and salt.
- Citrus Fruits in large quantities. The citrus peels can be too acidic for the worm environment and the odor could attract unwanted pests.
- Bread, pasta and wheat products should be kept to a minimum.

If you notice that your worms are eating quickly, you can source more food scraps. If you notice there is a lot of food left over in the corners when you get back to them, try adding a bit less of your food scraps to the bin. It is perfectly fine to underfeed worms, but very bad to overfeed. If worms cannot eat their food quickly enough it will rot and the oxygen level in the bin will drop and your worms will suffer. Healthy, active worms will eat about half their weight in a day.



How do worms eat?

Worms don't have teeth, but instead grind their food in small gizzards.

Without teeth, worms don't take a bite out of food. They need to wait until the food begins to rot or break down, so that it is soft enough for them to suck off with their very small mouths. This work is done by micro-organisms before food is eaten by worms.

Have students make their own classroom poster about what they should and should not feed their worms! Hang your poster near or on your worm bin as a reminder.



Find poster example
in the online
Teacher Portal

Vermicomposting Maintenance

Your worm bin is a living ecosystem. It is important that ideal conditions are maintained in the bin for it to operate efficiently.

To keep your worms happy, your worms will need what all living organisms require to survive:

Food

Worms can eat half their body weight in a day, so ensure they are fed regularly! Make sure to bury all food that is put in the bin. This prevents odors and fruit flies from making the vermicompost bin their home!

Water

Your worms will require some moisture in its bin. Try to keep your bedding consistently moist. There should not be standing pools of water in the bin.

Oxygen

Worms should have airflow into the bin. Ensure that your worm bin has holes to allow airflow and that bedding has not hardened, preventing airflow into the bin.

Space

Ensure that worms are not crowded in their bin and that there is ample bedding with space between it. If needed, harvest some of your worms for a second bin or find a friend to give them to.

Proper Temperatures

Red wigglers generally like the same temperatures as us. Worms will survive at temperatures between 6 degrees Celsius and 30 degrees Celsius but will thrive at temperatures between 15 - 26 degrees Celsius.

Always consider your worms' needs!



Worms hate light and will avoid it at all costs.

They are very sensitive to UV light, and may be seriously injured or killed if escape is not possible. For this reason, a worm bin must always be completely opaque and should have a lid or thick cover of some kind.

Checking the moisture level

Take a bit of material from the bin and squeeze it in your hand. If one or two drops of water come out, then it is just moist enough (for most worm types). If more comes out, your bin is probably too wet. Another clue that the bin is too wet is if it is starting to smell sour. Your bedding should be moist like a rung-out sponge. If your bedding is too dry, add water. If the bedding is too wet, add more bedding.



Make a chart of worm-care responsibilities

Ensure that the responsibilities of the worm bin are shared throughout the class. Some student roles can include:

Feeders: Cut food into small pieces and feed worms each week.

Waterer: Check moisture levels each week and adjust as necessary.

Observer: What changes are happening in the bin? Are there lots of cocoons? Other bugs? Write down the observations to track changes.

Doctors: Keep an eye for excessive molds, fungus or fruit flies!