

From Trash to Soil

Estimated Time: 2 hours

SUMMARY

In this activity, learn how to build a worm composting bin. These compost bins can be constructed with cheap supplies from around the house with just a few tools. They do a great job of creating high quality compost relatively quickly. After building the compost bin, go on a hunt to find appropriate food to feed your worms.

WHAT YOU'LL LEARN

- Basic measurement and building skills
- How composting works
- How to identify low-fat worm food

Materials Used	Resources Used
<p>Worm Compost Bin</p> <ul style="list-style-type: none"> ● Two 8-10 gallon plastic storage boxes with lids (dark, not see through!) ● Drill (with 1/4" and 1/16" bits) for making drainage & ventilation holes ● Newspaper ● Cardboard ● About one pound of redworms (these are best, but others can be used. They are relatively cheap to purchase or can be collected using a method outlined in the second activity) <p>Compost Material Hunt</p> <ul style="list-style-type: none"> ● 2 containers for compost materials (size is mostly dependent on how much you want to do. At least one should be airtight to prevent it smelling bad) 	<ul style="list-style-type: none"> ● Worm Compost Bin: http://whatcom.wsu.edu/ag/compost/easy/wormbin.htm ● Other Compost Options: https://extension2.missouri.edu/g6957 ● Compost Bin Contents: https://www.gardeningknowhow.com/composting/ingredients/what-can-you-compost.htm ● Brown and Green Composting: https://www.gardeningknowhow.com/composting/ingredients/browns-greens-compost.htm

WHAT TO DO

Worm Compost Bin

1. Begin by discussing worms and soil:
 - a. Every year leaves fall off the trees, but now they are gone. Where did they go? Why aren't we all covered in leaves?
 - b. Some bacteria, fungi, animals, and even plants eat things that are dead. When they excrete their waste (feces in animals), that excretion can usually be used by other living things to grow. Think of cow manure; cows eat hay, which is dead grass, and then their feces are spread on fields to help other plants grow.
2. Worms do what cows do, but on a larger scale. They break down stuff further and can break down all kinds of things. The next activity explores more of what they can eat. Interestingly worms can eat many of the same foods that people eat, but they can also eat things like newspaper. If we do a good job of preparing the compost bin, we can get worms to make us lots

of high-quality soil to use as fertilizer from our garbage, called “composting” (composting also uses bacteria and fungi, but we’ll concentrate on worms).

3. The key to the science of fertilizer is nitrogen. For more info, see the Tips section below.
4. There are many ways to compost. There are excellent machines you can purchase, but to make your own, see the Resources section. I’d recommend the Worm Compost Bin because it is cheap, easy, the part that requires care and use of power tools or sharp objects is punching/drilling holes in plastic, and it works quickly.

Compost Material Hunt

1. Composting requires three main components: brown materials (mostly bulk carbon), green materials (nitrogen-rich), and stuff to break it down (worms, bacteria, fungus). Regardless of the type of compost bin you be use, you’ll need all three.
2. To collect worms, from the worm compost bin site: “One way to gather redworms, is to put out a large piece of wet cardboard on your lawn or garden at night. The redworms live in the top 3 inches of organic material, and like to come up and feast on the wet cardboard! Lift up cardboard to gather the redworms.”
3. Find a variety of “brown” ingredients and store them in the larger/less airtight container. In this first activity, variety is best. See the Resources section for lists, but the main guideline is items that are fibrous that you cannot digest. Newspaper and cardboard are great sources, and are frequently thrown away otherwise.
4. Find a variety of “green” ingredients and store them in the more airtight container. In this first activity, variety is best. See the Resources section for lists, but the main guideline is food scraps that are not meat, dairy, or fatty.

TIPS

- The main active ingredient of fertilizer is nitrate. The Nitrogen Cycle is my favorite cycle in nature, and is oft underappreciated. Some more info:
 - The reason that manure (compost and otherwise) is such good fertilizer is because it makes nitrate available for life to use again.
 - The vast majority of air is nitrogen (~78%).
 - Nitrogen in the air comes in the form of two nitrogen atoms bound together with a very strong triple bond that makes it essentially unusable to all life. This bond is so strong that a major source of that one of the main ways nitrogen freed from this bond is lightning!
 - Atmospheric nitrogen can be converted into nitrate and brought back to the soil by a special fungus and root combination called mycorrhizae that exists on the roots of some plants like clover and legumes. Planting these can help improve your soil without using fertilizer.
- At my house, we keep an airtight bin in my kitchen for food scraps and a 5 gallon bucket with an airtight lid in my garage to store food scraps before bringing them out to our compost heap. This system works for us and limits the amount of stink that we experience, while allowing us to gather a lot of compost material.