Agriculture & Natural Resources Compost Handbook

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Compost System Design: The Three-bin Composting System

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Yard waste like leaves, grass clippings, garden plants, or just about anything that originates from plants can be disposed of by composting. Composting is simply the natural process of microorganisms breaking down organic materials, like plant wastes, into a stable humus-like material.

The difference between active composting and just "letting it rot" is the way the waste is managed. Simply allowing a pile of leaves to break down without doing anything to it can, over a period of a year or two, produce a good finished compost — at least in parts of the pile. If you have a lot of trees on your property or if you collect your grass clippings and therefore generate a lot of yard waste, you need to help the natural composting process along, so that you can deal with all of the waste you collect.

One of the fastest methods of backyard composting is the three-bin composting system (Figure 1). It is designed for easy management of the compost so that decomposition can proceed as fast as possible. It is relatively expensive to build (\$100 to \$200), but it is durable and one of the more attractive and effective composting systems.

Materials

- 2 18-foot pressure-treated 2x4s
- 4 12-foot or 8, 6 foot pressure-treated 2x4s
- 1 16-foot cedar 2x6
- 9 6-foot cedar 1x6s
- 22 feet of 36" wide 1/2" hardware cloth
- 12 1/2" carriage bolts, 4" long
- 12 washers and 12 nuts for bolts
- 3 lbs. of 16d galvanized nails
- 250 poultry wire staples or power stapler with 1" staples

(For optional lid)

- 1 9-foot 2x2
- 2 6-foot 2x2's
- 1 9-foot 2x4
- 1 12-foot and one 8-foot sheet 4 oz. clear corrugated fiberglass
- 3 8-foot lengths of wiggle molding
- 40 gasketed aluminum nails for corrugated fiberglass roofing
- 1/2 lb 8d galvanized casement nails
- 2 3" zinc plated hinges for lid
- 8 flat 4" corner braces with screws
- 4 flat 3" T-braces with screws



Tools

Hand saw or circular power saw drill with 1/2" and 1/8" bits screwdriver hammer tin snips tape measure pencil 3/4" socket or open ended wrench carpenter's square (option - power stapler with 1" long galvanized staples) safety glasses ear protection Construction details - (Construction details reproduced with permission of the Seattle Engineering Department Solid Waste Utility and the Seattle Tilth Association.)

1. Cut two 31-1/2" and two 36" pieces from each twelve-foot 2x4. Butt end nail the four pieces into a 35" x 36" "square" (Figures 2 and 3). Repeat for the other three sections.



2. Cut four 37" long sections of hardware cloth, bend edges back 1". Stretch the hardware cloth across each frame. Check for squareness of the frame and staple screen tightly into place every 4" around the frame. These are the end pieces and dividers of the compost unit.

3. Set up dividers parallel to one another three feet apart. Measure and mark centers for the two inside dividers. Cut four nine-foot pieces out of the two eighteen-foot 2x4 boards. Place two nine foot base boards on top of the dividers and measure the positions for the two inside dividers. Mark a center line for each divider on the nine-foot 2x4. With each divider, line up the center lines and make the base board flush against the outer edge of the divider. Drill a 1/2" hole through each junction centered 1" in from the inside edge. Secure base boards with carriage bolts, but do not tighten yet.

4. Turn the compost unit right side up and repeat the process for the top nine-foot board. Using the carpenter's square or measuring between opposite corners, make sure the bin is square and tighten all bolts securely. Fasten a nine-foot-long piece of hardware cloth securely to the back side of the unit with staples every 4 around the frame.

5. Cut four 36"-long 2x6's for front slat runners. Rip cut two of these boards to 4-3/4" wide and nail them securely to the front of the outside dividers and baseboard, making them flush on top and outside edges. Save remainder of rip cut boards for use as back runners. Center the remaining full width boards on the front of the inside dividers flush with the top edge, and nail securely (Figure 4).



6. To create back runners, cut the remaining 2x6 into a 34"-long piece and then rip cut into four equal pieces, 1-1/4"x 2". Nail the back runner parallel to front runners on side of divider leaving a 1" gap for slats (Figure 4). Cut all the 1x6" cedar boards into slats 31-1/4" long.

Optional Fiberglass Lid

1. Use a nine-foot 2x4 for the back of the lid. Cut four 32-1/2 inch 2x2's and one nine-foot 2x2. Lay out into position on ground and check for squareness. Screw in corner braces and T- braces on bottom side of the frame. Center lid frame, brace side down on bin structure and attach with hinges.

2. Cut wiggle board to fit the front and back ninefoot sections of the lid frame. Predrill wiggle board with a 1/8" drill bit and nail with 8d casement nails.

3. Cut fiberglass to fit flush with front and back edges. Overlay pieces as least one channel wide. Predrill fiberglass and wiggle board for each nail hole. Nail on top every third hump with gasketed nails.



Procedure for Managing the Three-Bin Composting System

1. Add yard waste to one of the end bins. Mix in "green" materials like grass clippings or other fresh plant refuse with "brown" materials like dried leaves, wood chips or shredded branches.

2. If little green waste is available, add about one cup of a fertilizer that contains some nitrogen, such as an 8-8-8 or similar analysis fertilizer. Kitchen scraps or grass clippings will generally not need additional fertilizer since these already have a lot of nitrogen compared to carbon.



3. Add a layer of garden soil to introduce some of the microorganisms which do the composting. Once the composting process is under way, it is not necessary to add more soil.

4. Check the temperature of the compost from time to time, ideally with a compost thermometer (Figure 5). The pile should be warm in the middle. After the middle has reached 140 to 150 degrees F, turn the pile from the original bin into the adjacent center bin. Close monitoring of the temperature is essential only for the most rapid composting since the process will go on at varying rates even if close attention is not given to temperature.

5. Additional yard waste can be placed on the recently turned compost, but turn the pile back into the original end bin when the temperature has been up around 150 degrees.

6. Turning should be repeated whenever the temperature gets high enough. Over time, less frequent turning will be needed, and the composted material can be held in one of the end bins until you are ready to use it in the yard or garden.

7. Repeat the process using the vacant end bin and alternate turning between that bin and the center bin.

8. Use the compost in the original end bin until it is gone; then you can start the composting process again in the vacated end bin.

9. Once set up, the three-bin compost system will consist of one bin with yard waste being composted; one bin empty, to or from which the compost is turned; and one bin containing finished, or nearly finished, compost (Figure 6).

Nearly one cubic yard of compost can be produced per bin in the three-bin composting system. However, the rate of composting differs greatly according to the kinds of materials placed in the system and the precision with which you manage the composting process.





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