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FoodShare Toronto is a non-profit community organization whose vision is Good Healthy Food for All. Founded in 1985 to address hunger in Toronto communities, FoodShare takes a unique multifaceted and long-term approach to hunger and food issues.

We work to empower individuals, families and communities through food-based initiatives, while advocating for the broader public policies needed to ensure that everyone has adequate access to sustainably produced, good healthy food.

Working "from field to table," we focus on the entire system that puts food on our tables: from the growing, processing and distribution of food to its purchasing, cooking and consumption.

FoodShare would like to acknowledge the support of the Ontario Trillium Foundation in the production of this manual.
Welcome to the wonderful world of composting! This guide will help you build a three bin composter for turning kitchen scraps and garden trimmings into rich compost.

Here at FoodShare we use our three bin composters to convert food waste from our industrial kitchen and food distribution warehouse in a nutrient-rich garden amendment. We have also set them up at schools across the city of Toronto.

At the time that the guide was written (March 2015), the materials required to build this composter cost about $600 including tax. You can reduce the cost by using spruce lumber instead of cedar if necessary.

Although we have tried to make the steps for building a three bin composter as straightforward as possible, it’s probably not a project for everyone. If you’re never picked up a power tool before, you’ll likely want to get some help from a handy friend.

Good luck and happy composting!
MATERIALS

- 5 pieces of 2”x4”x12’ cedar† lumber
- 2 pieces of 2”x4”x8’ cedar lumber
- 6 pieces of 2”x2”x8’ cedar lumber *
- 7 pieces of 1”x4”x8’ cedar lumber
- 1 piece of 2”x6”x12’ cedar lumber
- 6 pieces of 1”x6”x8’ cedar lumber
- 26 pieces of 1”x6”x6’ cedar lumber
- 40’ roll of ¼” mesh, 3’ wide
- 6 galvanized 3” strap or T hinges
- 12 galvanized 3/8” carriage bolts, 4” long (with nuts and washers)
- 100 #8 deck screws, 3” long
- 200 #8 deck screws, 1 ¼” long
- 200 #8 deck screws, 1 ½” long
- 3/8” staples
- chop saw or circular saw
- table saw (for ripping 2”x 2” boards from 2”x4” boards if you cannot buy them)
- drill with #2 Robertson bit, #8 countersink bit, and 3/8” drill bit
- tin snips
- staple gun
- ratchet with long 9/16” socket
- pencil and measuring tape
- square
- safety glasses
- gloves (for handling mesh)

OPTIONAL

- 7 pieces of 1”x6”x8’ cedar lumber
- 2 pieces of 1”x4”x8’ cedar lumber (These are for building replaceable bases for the bottom of each bin, to protect the wire mesh from being puncture by shovels.)
- 3 pieces of 1”x6”x6’ cedar lumber (These are for installing slats to protect the mesh between the bins.)

† Cedar lumber contains natural chemicals that make it rot resistant, therefore lasting longer than many other types of wood. However, it is more expensive so if your budget does not allow for it you can use spruce.

**See Appendix A for detailed breakdown**

A - 2” x 4” x 36” [8]
B - 2” x 4” x 31½” [8]
C - 2” x 2” x 46” [4] (cut ends at 45° in Step 2)
D - 3’ x 39” mesh [4]
E - 2” x 4” x 9’[3]
F - 2” x 2” x 29” [4]
G - 3’ x 8’11” mesh
H - 1” x 4” x 8’ (full length) [2]
I - 1” x 4” x 36” [2] and 1” x 4” x 29 [2]
J - 1” x 4” x 5” [2]
K - 3’ x 8’11” mesh
L - 2” x 6” x 36” [4]
M - 2” x 2” x 34½” [6]
N - 1” x 4” x 34” [4]
O - 1” x 6” x 6’ (full length) [2]
P - 1” x 6” x 3’ [2]
Q - 11” x 31” mesh [3]
R - 1” x 4” x 10¼” [18]
S - 1” x 6” x 31” [18]
T - 7” x 30” mesh [9]
U - 1” x 6” x 34½” [12]
V - 1” x 6” x 18½” [6]
W - 17” x 33” mesh [3]
X - 1” x 6” x 6’ (full length) [6]
Y - 1” x 6” x 3’ [18]
Optional
AA - 2” x 4” x 12” [3]
BB - 2” x 2” x 31½” [2] (from left over 2”x4” stock)
CC - 1” x 6” x 33¾” [6]
DD - 1” x 6” x 28½” [21]
EE - 1” x 4” x 30½” [6]

* 2”x2” cedar can be hard to find. Some lumber yards carry it but the boards are often very warped so cutting your own from three 2”x4” boards is a good alternative.

ATTENTION: Power tools can be very dangerous! If you’re not familiar with using them, make sure you get help from someone who is.
Step 1 - Attach two A pieces and two B pieces using 3” screws to form a rectangle. (Using the #8 countersink bit to drill pilot holes before driving in screws will help make it less likely that the wood will split.)

Step 2 - Cut the cross brace by first holding up one C piece diagonally and marking the angle (which should be close to 45°) with a pencil and then cutting the brace to size with the chop saw.
Step 3 - Install the cross brace as shown below with one 3” screw at each end. You will need to make four of these panels in total (see Step 6).

Step 4 - If you are choosing to install the optional inside slats (see Step 29), install BB pieces on two of the panels as blocks that you can screw one end of the slats into. Space them ¾” from the inside of the panel.

Step 5 - Using the staple gun, attach mesh D to the opposite side of the panel from the cross brace. The mesh should be flush with the vertical sides of the panel and overlap about 2” on both the top and bottom. Staple the mesh to the edges of the B pieces and then bend the excess mesh over and staple it to the top and bottom.
Step 6 - Build four of these panels, being sure to make two exactly the same (except for the optional brace) and two as mirror images. Also make sure that the mesh is installed on the opposite side of the frames from the cross braces (flush with the back edge of the frame.)

ASSEMBLE MAIN STRUCTURE

Step 7 - Take the three E pieces and drill 3/8” holes for the carriage bolts that will hold the main structure together. In the first board, drill holes at 1” and 35¾” from each end. The four holes in should be 1” from the front edge of the board. In the second board, drill holes at 1¾” and 36½” from each end, also 1” from the front edge of the board. In the third board, drill holes at 1¾” and 37¼” from each end, once again 1” from the front edge. Label the boards 1, 2 and 3 respectively.
Step 8 - Mark the inside edges of these three boards at 34¾” and 38¼” from each end. These marks will be used to line up the interior panels when the E pieces are installed.

Step 9 - Arrange the interior panels in the order shown below, making sure that the two panels on the right have mesh on the right side and the two panels on the left have mesh on the left side. Also ensure that the cross braces are all oriented the same way.

Step 10 - Take board 1 and place it as shown, flush with the corners of the panels that the cross braces are pointing toward and the 3/8” holes toward the inside. Place board 2 flush with the opposite corners of the panels, again with the holes toward the inside. Align to middle two panels with the marks you made on the edges. Use the 3/8” drill bit to drill holes into the panels through the holes you already drilled in boards 1 and 2. Fasten the boards in place with carriage bolts, placing a washer on the end of each bolt before tightening the nuts.
Step 11 - Flip the whole assembly 180° and install board 3 as shown, again lining the panels up with the marks and drilling 3/8” holes and fastening the board in place with carriage bolts.

Step 12 - Flip the composter upside down again and install the four F pieces as shown using 3” screws.

Step 13 - Staple mesh G onto the bottom of the composter. The long sides of the mesh should be flush with the edges of the E pieces and the short sides (which will be sharp from being cut) should be ½” short of each end of the composter.
Step 14 - Install pieces H, I and J on top of the mesh with 1½” screws as shown. You will need to cut two of the I pieces to fit. These pieces will serve as a base that can easily be replaced when it eventually rots from contact with the ground.

Step 15 - Flip the composter onto its front and staple mesh K onto the back of the composter, making sure that the long sides of the mesh are ¾” back from the edges of the E pieces and the short sides should be ½” short of each end of the composter.
Step 16 - Attach the four L pieces to the fronts of the interior panels with 3” screws. Make sure that the top of each L piece is flush with the top of each panel and that they are centred on the 2”x4” that serves as the front of the panel.

Step 17 - Install the six M pieces using 3” screws, making sure to leave a 7/8” gap between each one and the back of each L piece. This gap will serve as a channel for sliding the door panels in and out.
Step 18 - Install the four N pieces on top of the interior panels with 1½" screws, covering the exposed mesh.

Step 19 - Install the two O pieces and the two P pieces with 1½" screws, leaving a 22½" space from the front of the composter. The gaps between the boards should be between ¼" and ¾", depending on the size of your 1"x6" boards (which can vary from 5" to 5½").

Step 20 - Staple the three pieces of mesh Q to the underside of the top slats that you just installed.
**BUILDING THE DOORS & LIDS**

Step 21 - Fold over 1” of both ends of mesh T so that it measures 7” x 28”. Assemble the doors using two R pieces and two S pieces. Space the S pieces so that the total height of the door is 11¾” and then lay mesh T centred on top before attaching the R pieces with 1¼” screws. They should be 2” from the side of the door and ¾” from the top and bottom. Staple the edges of the mesh to the door.

![Diagram of door assembly]

Step 22 - Fold over 1” of both ends of mesh W so that it measures 17” x 31”. Assemble the lids using four U pieces and two V pieces. Space the U pieces so that the total height of the lid is 21 7/8” and then lay mesh W on top before attaching the V pieces with 1¼” screws. They should be 3½” from each side of the door and 3” from the top, which will be the front edge of the lid. Staple the edges of the mesh to the lid.

![Diagram of lid assembly]
INSTALLING THE DOORS & LIDS

Step 23 - Slide the doors into slots behind the 2”x6” boards. The top of the third door for each bin should be flush with the top of the horizontal 1”x4” boards that were screwed on top of the interior panels.

Step 24 - Install the middle lid by centering it from side to side and leaving a 1/8” gap between the back of the lid and the front slats on the top of the composter. Center one hinge over each 1”x6” board that holds the lid slats together and install the hinges with 1¼” screws. (You may want to use some scrap 1”x6” to make blocks to put under the top slat where the back three hinge screws come through the slat so that the sharp ends do not
Step 25 - Install the other two lids, leaving a ¼” gap between them and the middle door. The bottoms of the lids should touch the top of the doors, or at most there should be a 1/8” gap.

INSTALLING THE OUTER WALLS

Step 26 - Install six Y pieces on each end of the composter. Place the top wall slat flush with the top of the 1”x4” board on top of the panel and the bottom slat flush with the bottom of the 2”x2” spacer under the panel. (Doing so will help ensure that the only part of the composter that is directly resting on the ground is the replaceable base.) Put two 1½” screws in each end of each slat. The spacing between the slats should be between ¾” and 1¼”, depending on the width of your 1” x 6” boards. Install six X pieces and six Y pieces on the back of composter.
OPTIONAL COMPONENTS

Step 27 - You can install a 12” block behind each lid to serve as a stopper so that the lid does not fall all the way back. Place AA piece centred between the hinges and about ¼” back from the front edge of the top slat. Attach the blocks by driving in 1½” screws from underneath, passing through the 1”x6” slat first.

Step 28 - You can also install slats on the outside of the two middle panels to protect the mesh from being punctured by shovels when turning the compost. Screws three CC pieces into the horizontal 2”x4” the makes up the back of the panel on one end and into the 2”x2” block that you installed in Step 1. Space these slats about 1” apart.

Step 29 - Lastly, you can build replaceable bottoms for the three cells to protect the mesh on the bottom of the composter. Use seven DD pieces and two EE pieces to make each base, which should measure 28½” high and 30½” wide. The slats should be spaced about 1” apart.
USING YOUR COMPOSTER

At the end of this document, you will find three printable signs containing information on using your composter and troubleshooting any problems you might encounter. These can be laminated and posted in your composting area for easy reference.

You can maintain a composting system with just a garden spade and a bit of work, but we have found that the following tools can be useful in taking care of a compost pile and making the process as efficient as possible:

- 5-gallon plastic bucket and square shovel (for chopping up food scraps)
- Screen for sifting finished compost (you can build one using leftover mesh and lumber)
- Electric shredder (for chopping up garden waste)
- Compost thermometre and moisture metre
- Compost aerator
- Garden fork
- Bypass pruners
- Organic waste bin with latchable lid for collecting food scraps

If you are using your composter in a cold climate, it is a good idea to cover the lids with burlap sacks (often available for free from your local coffee roaster) to keep snow from getting into your bin and also to help keep the compost warm!

ADDITIONAL RESOURCES

Below are some books that we have found to be useful. You can also download Compost Breakdown: A Guide to Mid-Sized Composting Success from FoodShare’s website at www.foodshare.net/compost-breakdown.

Teaming with Microbes
Jeff Lowenfels and Wayne Lewis

The Rodale Book of Composting
Grace Gershuny and Deborah L. Martin (Editors)

The Complete Compost Gardening Guide
Barbara Pleasant and Deborah L. Martin

How to Make and Use Compost
Nicky Scott
Meet the Field to Table Schools Team

Meredith Hayes  Student Nutrition and School Program Senior Manager
meredith@foodshare.net, 416-363-6441 ext 248

As a founding Field to Table Schools programmer, Meredith is responsible for some of our most well-loved activities and events, including The Great Big Crunch. Bringing a passion for good food and environmental education, Meredith is a major game-changer and one to watch as she collaborates like crazy to change the face of school food through local, provincial and Canada-wide networks.

Contact For: FoodShare’s Recipe for Change Initiative, Ontario Edible Education Network, Ontario Farm to School Challenge, Toronto Partners for Student Nutrition Programs

Katie German  School Grown Senior Coordinator
katieg@foodshare.net

Our very own accredited teacher with recent experience working on Canada’s largest (and coolest) urban farm as well as coordinating FoodShare’s very own farming social enterprise - can engage anyone to do just about anything.

Contact For: The Great Big Crunch, School Grown projects, youth engagement, crop planning, organic growing techniques

Carolynne Crawley  Field to Table Schools Coordinator
carolynne@foodshare.net

With over 20 years of working with children and youth, Carolynne “fountain-of-youth” Crawley is a master at harbouring deep connections with nature and nutrition principals. A keen forager and mentor, Carolynne talks the talk, walks the walk, and more often than not, gardens the garden too. What “Miss C” teaches, students remember.

Contact For: Volunteer or internship opportunities, student workshops, staff wellness, nature connections

Gita Madan  Field to Table Schools Educator
gita@foodshare.net

Deeply rooted in social justice principles, Gita's mad facilitation skills are both creative and engaging - getting students to think critically about the food system, sometimes without even realizing it! Our newest team member is a keen community organizer, soup-sharer and magical music-maker.

Contact For: Student engagement, social justice, equity and arts-based education, educator workshops

Brooke Ziebell  Field to Table Schools Senior Coordinator
brooke@foodshare.net

Brooke applies a more formal nutrition science background (from her previous life in Australia) with a love of get-your-hands-dirty education that encourages smell-touch-and-taste-it investigations, out-of-this-world imaginations and wave-your-hands-in-the-air-like-you-just-don’t-care celebrations.

On maternity leave February 2015 - 2016

James Davis  School Garden Coordinator
james@foodshare.net

The “buildificationator” brings experience in permaculture, holistic design, green building and carpentry. James has successfully tricked hundreds of unsuspecting students into drinking green vegetable smoothies using his bicycle blender-building powers.

Contact For: School food garden enquiries, indoor growing innovations, bicycle blenders, school food garden furniture, File-A-Sprout

Orlando Lopez Gomez  School Grown Educator & Compost Facilitator
orlando@foodshare.net

Microbes and worms and bees - oh my! Orlando is our resident agronomist (that means composting, beekeeping and farming expert) hailing all the way from Nicaragua. Sitting on the fence between FoodShare’s schools and urban agriculture programs, Orlando + us = a match made in edible and sustainable education heaven.

Contact For: Composting in schools, worms, beekeeping, organic gardening techniques
APPENDIX A - DETAILED CUT LIST

2” x 4” x 12’ boards [5]

2” x 4” x 8’ boards [2]

2” x 2” x 8’ boards [6] - cut from three 2” x 2” x 8’ board ripped in half
1” x 4” x 8’ boards [7]

2” x 6” x 12’ board [1]

1” x 6” x 8’ boards [6]
1” x 6” x 6’ boards [26]
Keeping Our Compost Happy

What Goes In...?

“GREENS” & “BROWNS”

- Vegetables
- Fruits
- Grains, Pasta
- & Bread
- Crushed Eggshells
- Coffee Grounds
- Straw
- Wood Shavings
- Dry Leaves
- Shredded Newspaper
- or Cardboard
- Grass Clippings

What stays out...

- Fish Bones
- Meat Bones
- Oils
- Milk
- Eggs
Keeping Our Compost Happy!

Getting Started!
- Chop materials to be composted into small pieces (golf ball size)
- Add this material to the first compost bin
- Keep greens and browns balanced by adding 1 part brown for 1 part green

Maintenance
- For best results, aerate the compost once a week by stirring it up or poking holes etc.
- Maintain the moisture level in the compost: it should feel like a wrung out sponge - if it drips it is too wet & if it falls apart when released it is too dry

Continuing...
- When the first bin is full, move the materials into the second compost bin & begin filling bin number one with your next fresh materials
- When bin 1 gets full again, move the contents of bin 2 into the bin 3 & then move the contents of the bin 1 into the bin 2 & so on
- Continue to aerate & maintain moisture levels in each bin

When the compost is finished, add it to your garden!
Troubleshooting Composting Problems

Damp and warm only

Stinks like rotten eggs, rancid butter, or vinegar

Large, undecomposed items

No activity

CAUSES
- Add some materials to bin
- Check the moisture level and add water if it is too dry
- Insulate the bin or wait until weather is warmer

SOLUTIONS
- Mix up the pile so that it gets some air
- Add coarse dry materials like dry leaves to soak up excess moisture
- Add any materials on top and wait until it dries out a bit before you mix the pile
- You may need to protect the pile from the rain

CAUSES
- Not enough oxygen
- Pile is too wet or compacted

SOLUTIONS
- It is best to chop them into smaller pieces before composting to speed decomposition
- When your compost is finished, screen out the large pieces and use them as a starter for your next pile

CAUSES
- These pieces are likely high in carbon and dense and it is normal for them to take a longer period of time to decompose

SOLUTIONS
- Add greens
- Aerate or turn
- Turn and moisten
- Add materials
- Your pile could also be finished and ready to apply!

CAUSES
- Pile could be too big
- There could be too much green material

SOLUTIONS
- Split the pile
- Add brown material

Attracting rodents, flies or other animals

CAUSES
- Inappropriate materials (like meat, bones, or oil) or food-like material is too close to surface of pile

SOLUTIONS
- Bury kitchen scraps near centre of pile
- Remove inappropriate materials to compost
- Switch to rodent-proof bin

Damp and no heat

Odour like ammonia

Pile is too hot

Pile is consistently too dry

Matted leaves or grass clipping are not decomposing

CAUSES
- Too wet, not enough nitrogen

SOLUTIONS
- Add more green materials and turn or aerate

CAUSES
- Not enough oxygen

SOLUTIONS
- Add brown materials like leaves, straw, hay, shredded newspaper, etc.

CAUSES
- Pile could be too big
- There could be too much green material

SOLUTIONS
- It is best to chop them into smaller pieces before composting to speed decomposition
- When your compost is finished, screen out the large pieces and use them as a starter for your next pile

CAUSES
- The pile could be exposed to a lot of sunlight and wind and getting dried out rapidly

SOLUTIONS
- Protect your pile from sunlight and wind

CAUSES
- Material compacted, poor aeration, or lack of moisture

SOLUTIONS
- Avoid thick layers of just one material as they matt and will not decompose

CAUSES
- This is normal and a part of the natural composting process

SOLUTIONS
- Not a problem

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