

“In the Beekeeper’s Work Shop”

A 3-in-1 Sugar Dusting/Feeder Frame

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A 3-in-1 Sugar Dusting/Feeding Frame

When working with bees, beekeepers often find that they need various gadgets to help them along. A sugar dusting/feeding frame falls into this category; while the frame is not essential to the operation once you have one you will wonder how you got along without it.

Feeding you bees has always been an essential job in the bee yard. Lately, sugar dusting the colony for varroa mite control and monitoring has also joined the ranks of the “must dos”.

For feeding, beekeepers might use a liquid sugar syrup or a hard sugar “candy” block depending on the season and the situation at hand.

In feeding liquid syrup in small scale operations, many beekeepers use the “Ziploc® baggie” method. A one gallon baggie is partially filled with the syrup, put directly on top of the frames in the hive and a small slit is made on the upper side of the baggie. You would think that the syrup would run out but it doesn’t; it just pools at the top allowing the bees to feed. Once the baggie is in place, you need to put on a spacer (a frame) to provide space for the baggie.

In feeding sugar blocks, which typically happens in the later winter and early spring, you want to put the block directly over the frames in the top hive body. A small space below the block allows room for the bees to move about and you also need a space around the block in order to reinstall the inner



and outer covers (like the baggie method).

Sugar dusting involves spreading about a cup of fine (10x) powdered sugar over each brood chamber and super. There are two reasons for doing this. First, sugar dusting dislodges phoretic mites on the bees which can then be collected on a sampling tray beneath a screened bottom board. You can count and monitor the mite population and use this data in mite control decisions. Second, sugar dusting is also a non-chemical means of controlling the varroa population. Once mites fall to the sampling board, you can discard them away from the hive. Any dead mite is a good mite and repeated sugar dusting helps in this regard.

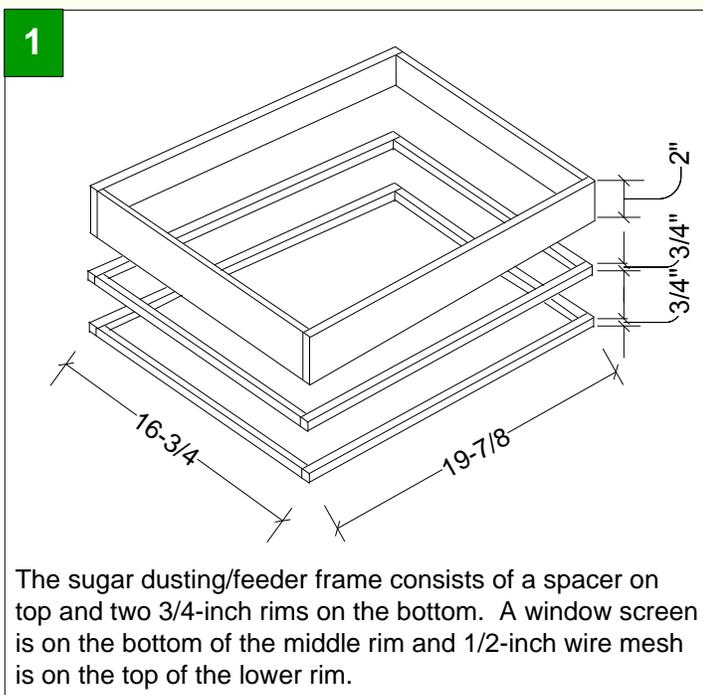
Using The Frame in the Bee Yard

The sugar dusting/feeder frame is a simple device that consists of a spacer frame on top and two, detachable rims on the bottom (Figure 1). The middle rim has standard aluminum window screening stapled to the bottom. The lower rim has 1/2-inch hardware cloth stapled to the top. The assembled frame is only about 3-1/2 inches high (see photo above).

The rims are attached using screws and can thus be re-configured for the job at hand. Here is how it works.

Sugar Block Feeding

To use the frame for feeding with blocks of sugar candy, remove the middle rim (the one with the window screen). You now have a spacer frame on top and a 1/2 wire mesh above a 3/4-inch space on the bottom. When feeding simply put the configured frame on the top hive body underneath the inner



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cover. You can do this, even in the middle of winter, with minimal disturbance to the cluster which will probably be at the top of the frames. Position the sugar block directly over the cluster. The 3/4-inch space below the mesh allows you to put on the block without mashing the bees, and the 1/2-inch mesh is large enough for the bees to crawl through and get access to the sugar.

Reinstall the inner and outer covers and go on your way. You only need a minute or two to get the job done and the bees will barely notice that you have been there. But they will surely appreciate the sugar candy to get them through a tough time of the year.

Liquid Syrup Feeding

A colony of bees is typically fed liquid syrup in the spring, when installing a package, or in the fall to help build up winter stores for weak hives. With the baggie method, the baggie is filled one half to two thirds full with prepared syrup, zipped closed and taken to the bee yard.

In the hive, the baggie is placed directly on the top of the frames in the top hive body. Make a small slit on the top of the baggie or use a knife to poke a couple of holes in the top. Syrup will pool above the openings allowing the bees to feed.

Remove the bottom two rims on the frame, leaving only the top spacer. Put the spacer on the hive to provide room for the baggie full of syrup then reinstall both the inner and outer covers. Of course, you can also configure the feeder frame like in the sugar block feeding setup described above.

If the colony is taking the syrup, you will be amazed at how quickly the baggie will be drained. It might take only a few days. So plan on checking the colony and replacing the baggie of syrup when needed.

Sugar Dusting a Hive

To use the frame for sugar dusting, use all three pieces together. The middle rim has the window screen on its bottom side and the lowest rim has the mesh on its top side. The

mesh helps support the window screen and keeps it from sagging. This helps you get an even spread of the powdered sugar over frames below.

The recommended “dose” is one cup of powdered sugar per hive body. This usually means that you have to take the hive apart, dust the lowest hive body (the brood chamber), put on the next box and dust that, and so on. Spread the cup of powdered sugar on the frame’s screening and brush it around with your bee brush. The idea is to get an even spread over the entire surface.

As the bees groom themselves, the powdered sugar and a certain proportion of the phoretic mites (mites on the body of the bees and not in the sealed larvae cells) will fall to the sampling board beneath the screened bottom board. It is a good idea to count these mites and keep accurate records.

Studies are available that allow you to translate your mite count to an approximate mite population in the hive. Perhaps more important is the trend of your mite counts. If you notice a (steep) increase in your counts, it may be time to consider more aggressive mite control. This is particularly true in the late summer as the colony begins to prepare for winter.

Basic Construction

The sugar dusting/feeder frame basically a simple box made from 3/4-inch pine. After the box is made, we cut two 3/4-inch slices (rims) off the bottom. The screening and mesh are stapled to these rims and then they are reattached to the frame using screws. By assembling the pieces in various combinations, we can reconfigure the frame for the various uses described above.

If you only need one frame, then you can make it out of a standard 1x4 board. However, in the plans that follow we will use a 1x8 board and make two frames at the same time with very little additional effort. You will probably want one frame for each hive in your operation. If you are running only one hive, then you may still want to consider making two frames and giving one away to a beekeeping buddy.

Before You Begin...

All of the dimensions shown in the drawings and cut list are for a standard 10-frame hive. A table is provided at the back of this article with the sizes of the various components for an 8-frame hive and a 5-frame nuc.

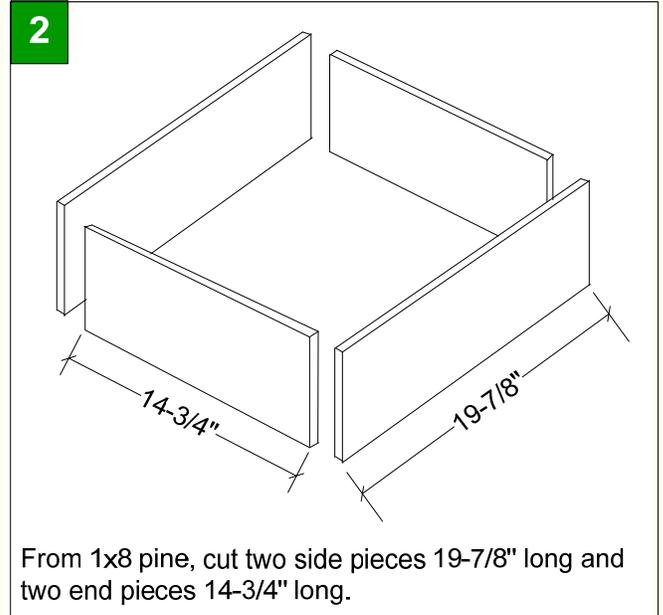
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Step 1. Cut the Frame Sides and Ends

Cut two side pieces 19-7/8" long and two end pieces 14-3/4" long (Figure 2). Note: if you are only making one frame, then cut these pieces from 1x4 pine. In the drawings we are using a 1x8 board in order to make two frames at once.

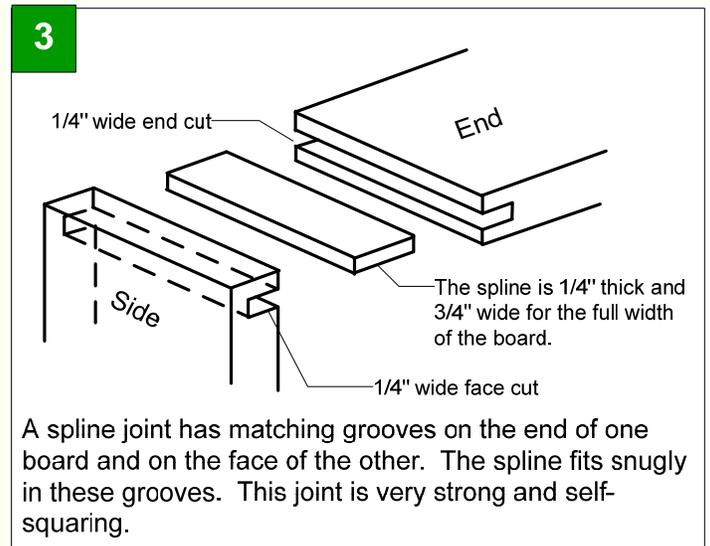


Step 2. Join the Sides With a Spline Joint

We use a spline joint (Figure 3) to join the ends to the sides, thus completing the box. A spline joint is very strong, self squaring and relatively easy to make, though accurate cuts are important.

A spline joint consists of 1/4" matching grooves 3/8" deep on each piece being joined (Figure 4). On the side, the groove is dado cut into the face of the board; on the end the groove is a tenon pocket cut into the end of the board.

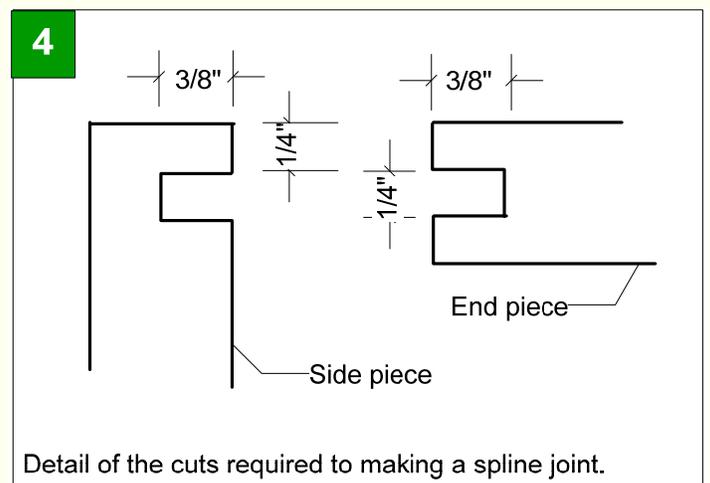
Cut the the tenon groove on the end boards and the dado on the side boards (Figure 3). For a more detail description of making these cuts, refer to the "In the Beekeeper's Workshop" article on making hive bodies (see reference on page 6).



Step 3. Making the Splines

From 1x4 pine cut the splines which are 1/4" thick and 3/4" wide. The length of the splines should be at least the width boards being joined if not a little longer (Figure 3). When making the splines, cut along the length of the board (a rip cut) and not across the board (a cross cut).

You may need to cut a test spline or two making minute adjustments to the saw's fence each time. You want the spline to fit snugly into the grooves without having to be forced (which might split the joint). Also, dry fit the spline in an assembled joint to make sure that it is not too wide thus forcing the boards apart. For splines that are a bit too thick, you can sand the splines with a coarse sandpaper to get a proper fit.



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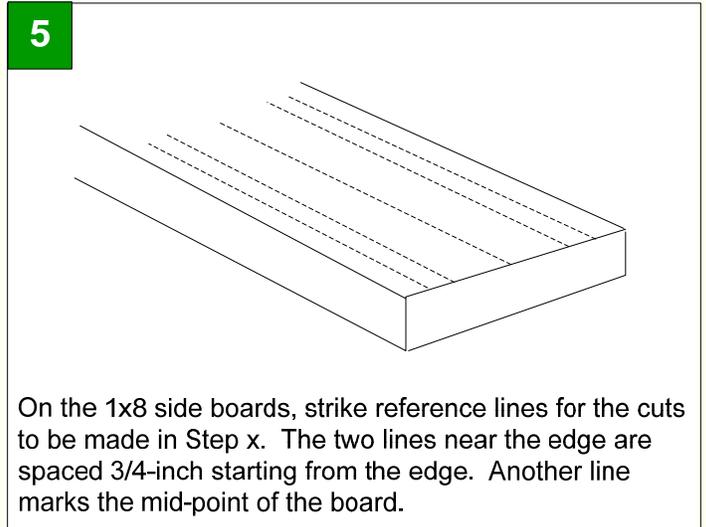
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Step 4. Layout Cut Lines

It is a good idea to do a bit of preplanning at this point to layout the cut lines of the assembled box. After the box is assembled we will cut the box to make the frames and rims (Step 8). As the box is assembled (in the next step), we want to avoid nailing where there will be a cut. Marking out the cut lines will remind us where not to nail.

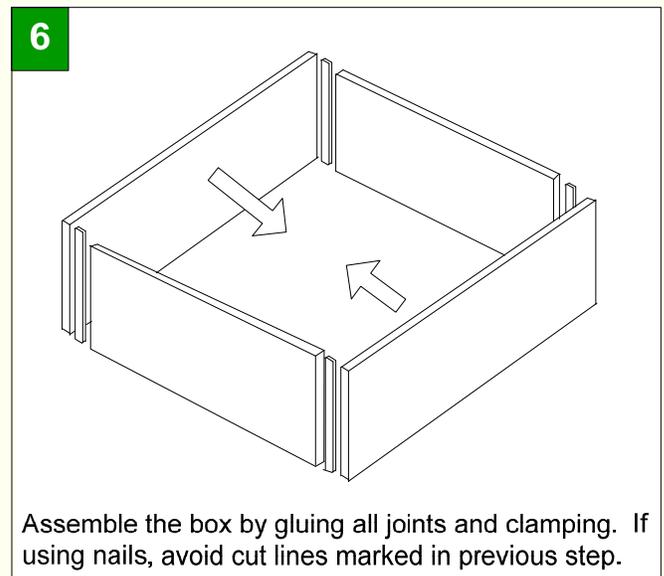
When using 1x8 lumber for this project, we like to first cut the the 3/4-inch rims from each side and then cut remaining box in half (Figure 5). You may choose to make these cuts differently.



On the 1x8 side boards, strike reference lines for the cuts to be made in Step x. The two lines near the edge are spaced 3/4-inch starting from the edge. Another line marks the mid-point of the board.

Step 5. Assemble Box

Dry assemble the box making sure the splines fit snugly and are not too thick or too wide (Figure 6). Check for square. Disassemble the hive body and then reassemble gluing each joint, groove and spline as you go. We recommend Franklin’s exterior Titebond® for the glue. Bar clamp the sides together then nail along the sides using 18 ga. 1-1/2-inch finish nails. If you use a heavier gauge nail, you may want to pre-drill to prevent splitting. Be sure to avoid the cut lines marked out in Step 4.



Assemble the box by gluing all joints and clamping. If using nails, avoid cut lines marked in previous step.

Step 6. Paint Box

Now is a good time to paint the box. Use a quality latex primer and two top coats. Don’t skimp on the paint job since it will probably be the last time you paint the frames. A good paint job will greatly prolong the life of your equipment. After the box is cut into the spacers and rims (in Step 8) you will also need to paint the freshly cut edges to complete the paint job.

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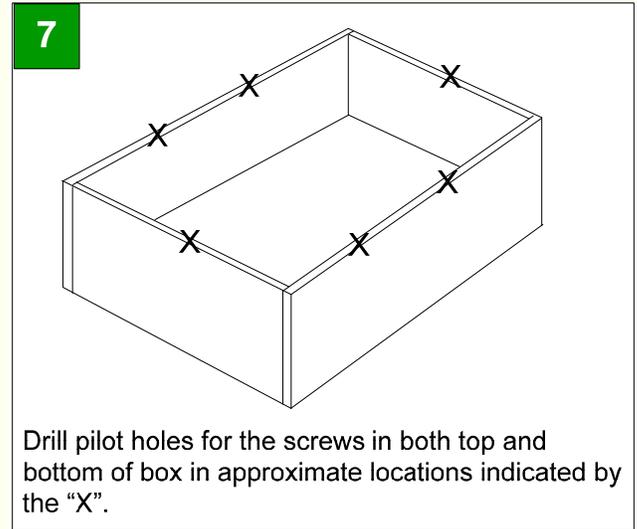
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Step 7. Drill Pilot Holes

Since the rims will be attached to the frame with several screws, we suggest that you drill pilot holes (Figure 7) for the screws before the rims are cut. That way, the holes will exactly match up when screwing the rims to the frame. Countersink the pilot holes so that the screw heads will be flush with the rims.

After the rims are cut (Step 8, below) you will need to countersink the pilot holes on the bottom of the middle rim.

Also, we like to make a mark on the inside of the uncut box so that we can reassemble the frames as they were in the uncut box. This ensures that the pilot holes will line up correctly.

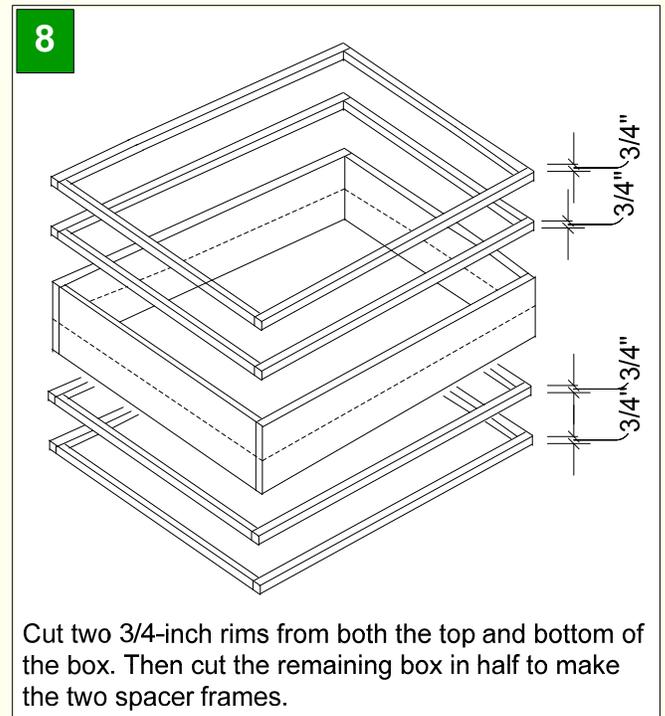


Step 8. Cut Out Frames and Rims

We are now ready to cut the frames and rims from the assembled box. First, cut two 3/4-inch rims from both the top and bottom of the box (Figure 8). Then cut the remaining box exactly in half to make the two spacers.

Note: some may prefer to cut the box in half first and then the rims. It really doesn't make any difference as long as you end up with the correct pieces.

After making the cuts, paint the exposed edges to complete the paint job (from Step 6).



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Step 9. Install Screening

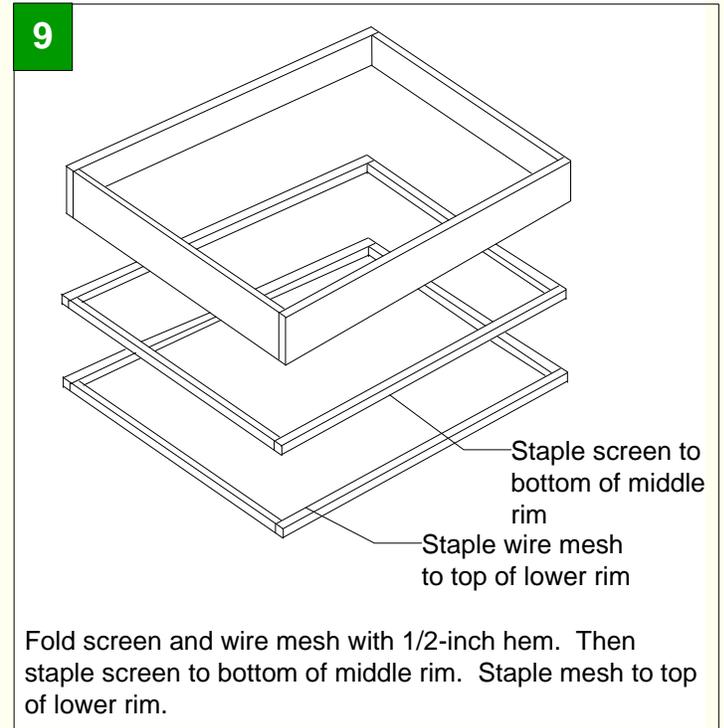
Staple a piece of aluminum window screen on the bottom of the rim immediately below the frame (Figure 9). Cut a piece of screen 20-7/8 by 17-1/4 inches, which is 1 inch larger than the foot print of the rim. Fold a 1/2-inch rim on all four sides of the screen and staple to the bottom of the rim. A hand stapler is sufficient for this step.

Step 10. Install Wire Mesh

Staple a piece of 1/2-inch wire mesh on the top of the bottom rim (Figure 9). Like the screen, cut the mesh 1-inch larger than the footprint of the rim and fold the edges to make a 1/2-inch hem. An air stapler with 1/2-inch staples is the tool to use. Try to catch the mesh where the wires cross with the staples.

Step 11. Attach Rims to Spacer

Using 2-1/2 inch screws, attach the rims to the spacer using the pilot holes prepared in Step 7. During use, you will unscrew the rims and reassemble in various configurations for the job at hand.



Resources

Dadant & Sons (1997). The Hive and the Honey Bee. Chapter 14. Discussion and recipes for feeding bees.

"Building a Bee Hive" series. Published on-line at www.michiganbees.org/beekeeping. Click on "In the Beekeeper's Workshop".

For other workshop plans, go to www.michiganbees.org and search for "workshop".

A video of this and other projects are available on our YouTube channel...

<http://www.youtube.com/user/beepersworkshop>

Revision history:
3/26/12: Original version

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List of Materials: Sugar Dusting/Feeder Frame

WOOD (for one frame)

			Reference Figure
A	Frame Sides (2)	3/4 x 3-1/2 - 19-7/8	3
B	Frame Ends (2)	3/4 x 3-1/2 - 14-3/4	3

WOOD (for two frames)

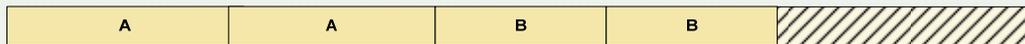
			Reference Figure
A	Frame Sides (2)	3/4 x 7-1/4 - 19-7/8	3
B	Frame Ends (2)	3/4 x 7-1/4 - 14-3/4	3

HARDWARE

20-7/8" x 17-1/4" aluminum window screen
 20-7/8" x 17-1/4" 1/2-inch hardware cloth
 1-1/2" nails for assembling frame
 1/2" staples (for hand stapler and air stapler)
 Franklin's Titebond® Glue
 2-1/2" screws for attaching rims to spacer
 Paint

Cutting Diagram: Sugar Dusting/Feeder Frame

To make a single frame...
 3/4" x 3-1/2" - 96" (1X4 Pine)



To make two frames...
 3/4" x 7-1/4" - 96" (1X8 Pine)



Sizes for Sugar Dusting/Feeder Frame

	Sugar Dusting/Feeder Frame Size (Assembled)				
				Board Length (in)	
	Width (in)	Length (in)	Height (in)	A	B
5 - Frame	9-1/4	19-7/8	3-1/2	19-7/8	7-3/4
8 - Frame	13-3/4	19-7/8	3-1/2	19-7/8	12-1/4
10 - Frame	16-1/4	19-7/8	3-1/2	19-7/8	14-3/4

Note: Height shown when using a 1x4 board for construction. If using 1x8 lumber, the height will be slightly more (3-5/8 inches).

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Photo Gallery...



Photo Captions:

1. Cutting 3/4-inch rims from assembled box.
2. Drilling pilot holes for frame screws.
3. Stapling window screen to middle rim.
4. Air stapling 1/2-inch mesh to bottom rim.
5. Using frame for fall sugar syrup feeding..