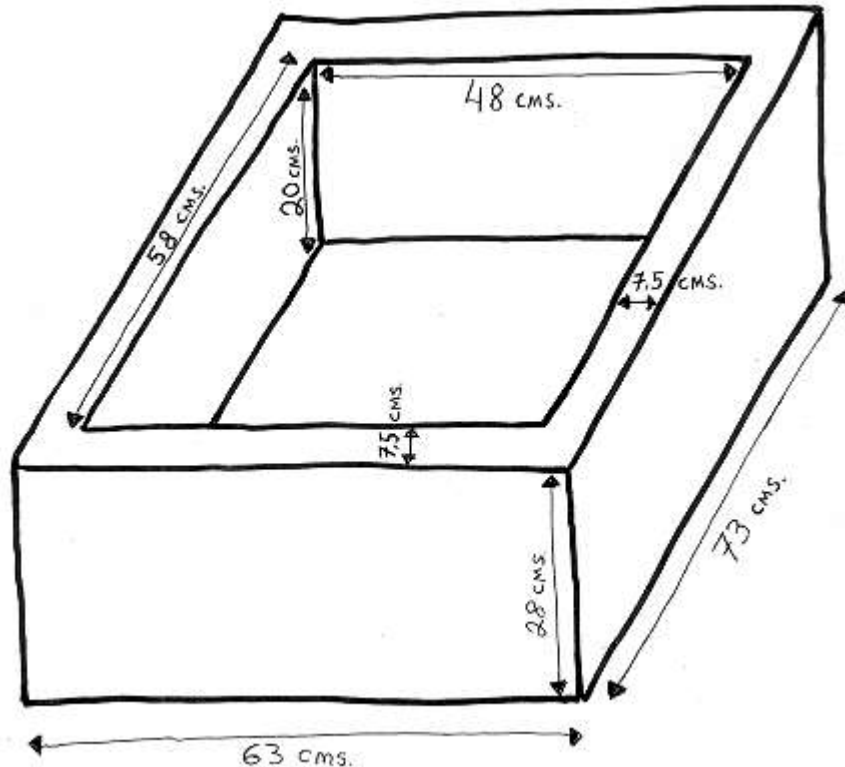


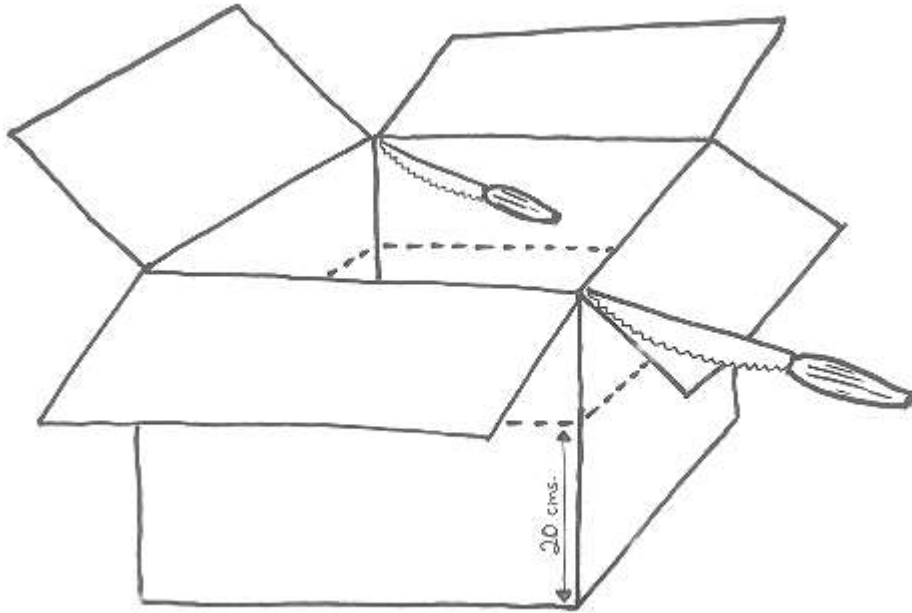
MAKING A CARDBOARD SOLAR BOX OVEN

Start by choosing two boxes of adequate sizes. Any size oven will work but a larger oven will hold more pans and will be hotter. See typical size in centimeters:

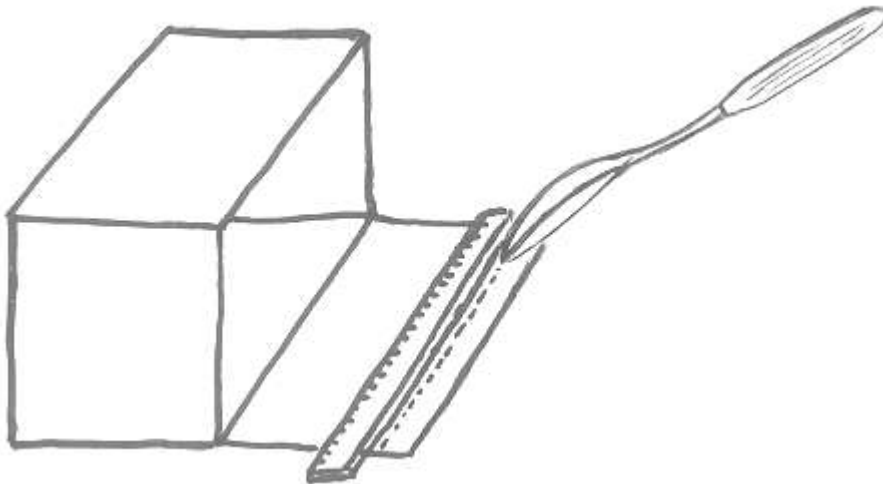


Glue all loose cardboard flaps in the bottom of both boxes. This will make them stronger.

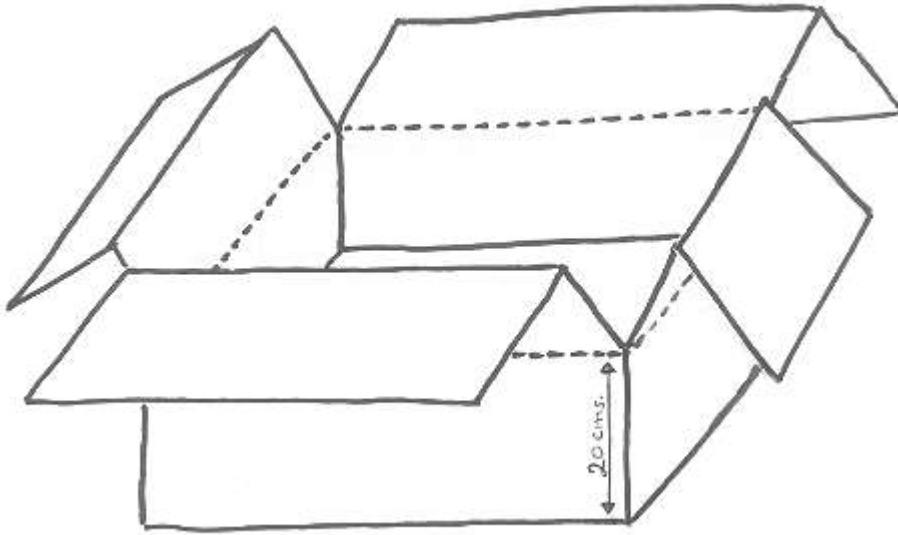
Start working on the smaller box. Measure, mark and cut the four corners so it will be 20 cms. deep. Use a pencil or ink marker to draw a dotted line on the four sides of the box, 20 cms. up from the bottom:



Press the edge of a spoon along the dotted lines using a ruller so it will be easyer to fold out:



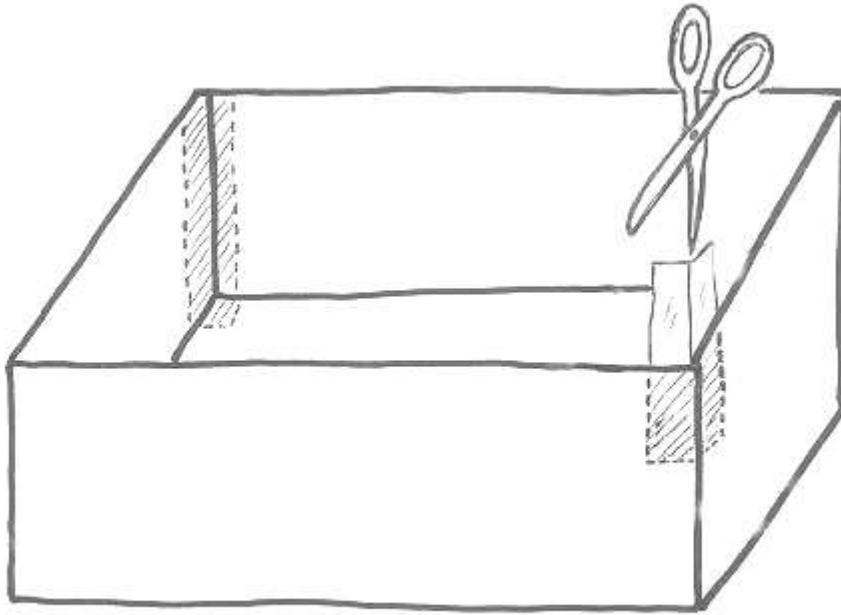
The cut box will look like this:



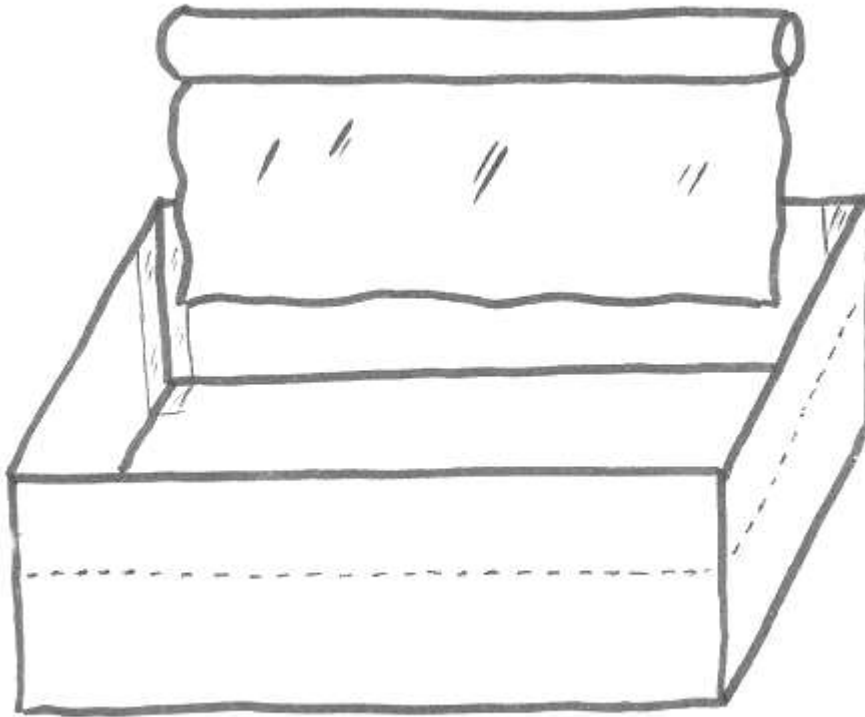
Fold and glue all four flaps on the sides and bottom of the box to make it stronger as shown in this cut view:



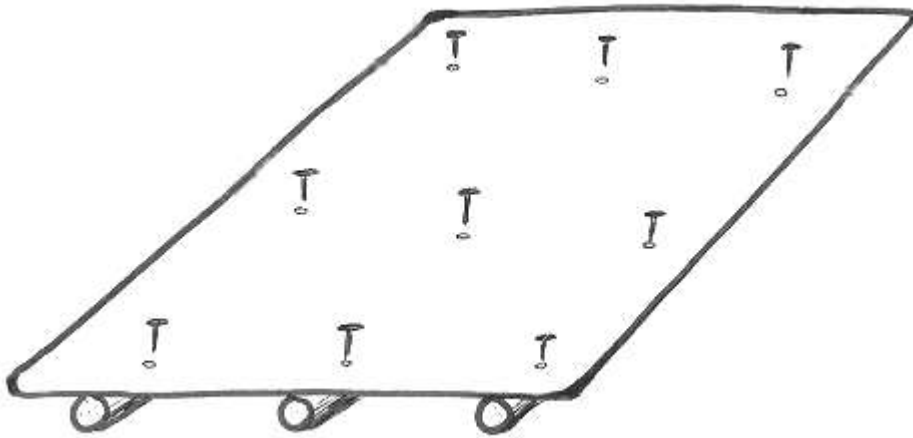
Apply glue to shaded area in all four corners of the box. Glue stripes of aluminum foil, longer than the depth of the box. Cut the stripes protruding over the rim of the box, along the corners, fold down and glue the excess aluminum on the outside walls like this:



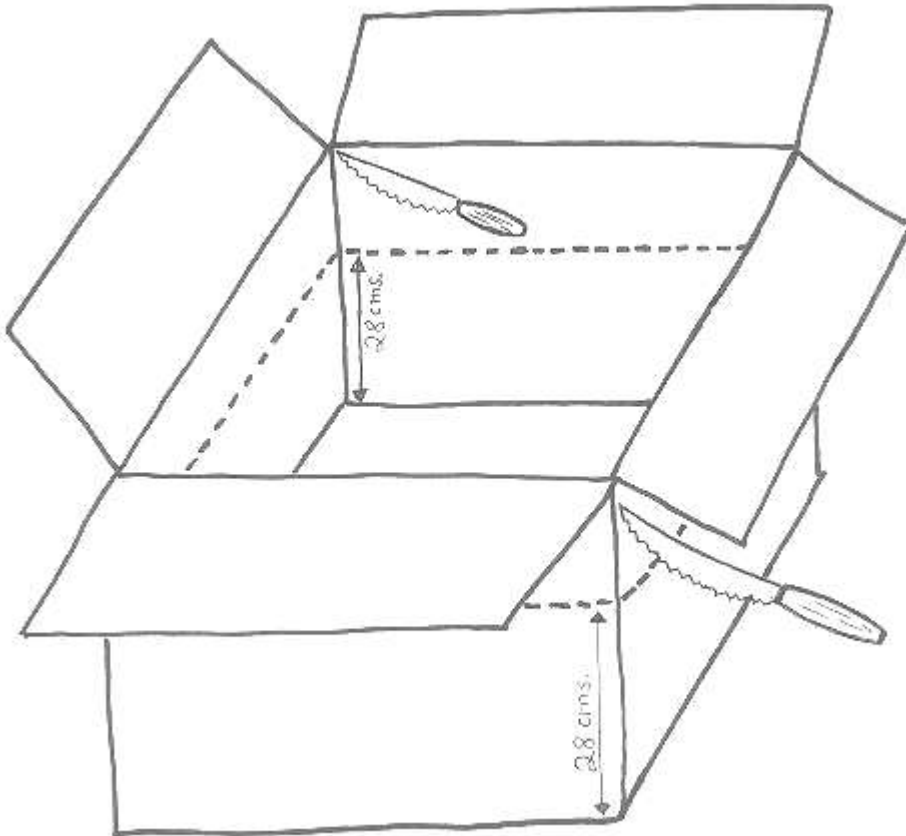
Apply glue all inside the box and halfway down the outside walls and glue the aluminum foil flattening it with a piece of cloth to get rid of most air bubbles and wrinkles:



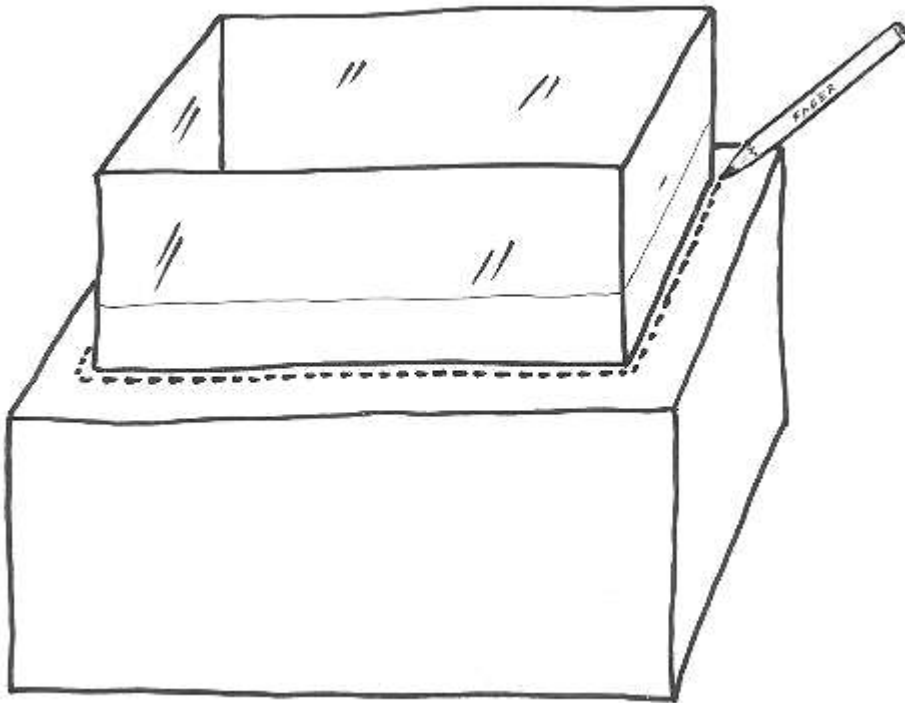
With the smaller box ready, you can now work on the metal plate that will be put on the bottom of the box to hold the pans. Use any kind of sheet metal. Use two or three pieces of wooden broom handles to make the metal plate stronger and planer and to create insulation between the plate and the bottom of the box so that the heat generated won't be drained to the bottom of the box (so more heat will be available to be transferred to the bottom of the pans). Make holes and drive nails through the metal plate to attach the pieces of broom handles underneath:



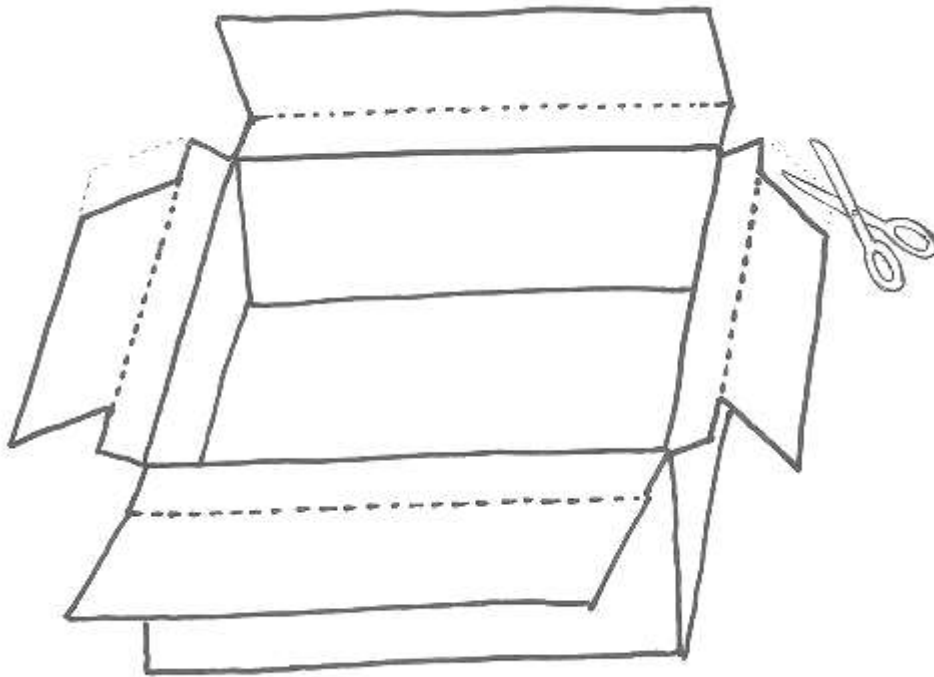
Now, work on the larger box, cutting the four corners so it will be 28 cms. deep. Use a pencil or ink marker to draw a dotted line 28 cms. up from the bottom:



Press a spoon along the dotted lines and fold the four flaps down, covering the top of the box. Then, center the smaller box on top of the larger box marking all four sides on all four flaps on top of the larger box:



Press a spoon along the dotted lines so you will be able to fold all four flaps down into the larger box creating a thick wall. The two longer flaps will fold down creating a hole where the smaller box will fit. To fold down the shorter flaps, you will need to cut out the edges so they will fit into the hole:

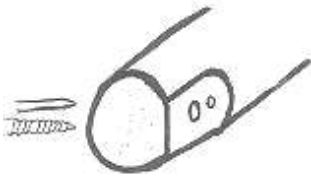
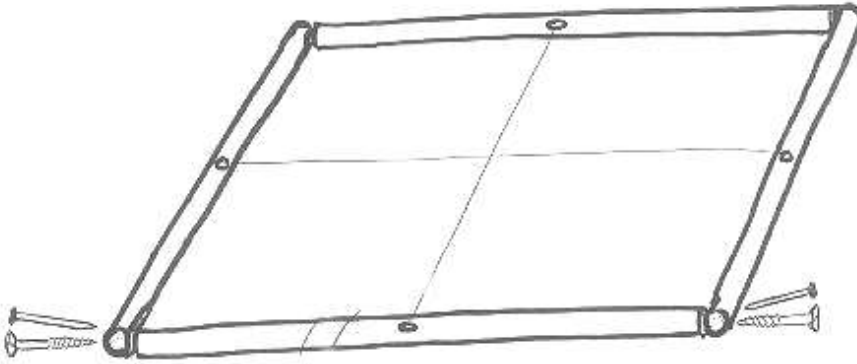


To reach a higher temperature in the oven, you should glue aluminum foil inside the larger box as you did in the smaller box. The aluminum foil lining will act as further insulation, reflecting the heat back into the walls of the larger box.

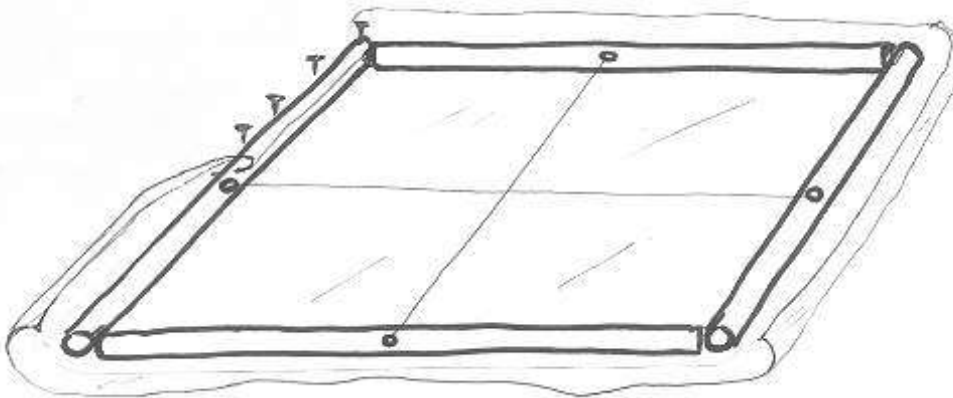
Now you can work on the insulation that will fill the space between the boxes. For the bottom of the larger box, I like to use several rectangles of cardboard piled on top of each other until they reach a layer 8 cms. thick. For the walls, I like to use plastic bags containing materials such as cotton, rice husks, dry straw, chicken feathers, saw dust, glass fibers, wool, coconut fibers, etc. Fold all flaps into the box to creat the thick insulated walls:



Now you can prepare the lid making a rectangle of broom handles. The picture shows the use of a screw and a nail in each junction but you can just use two nails. I fix two pieces of wire or nylon, crossing the top of the wooden frame (these cross wires will support the weight of the plastic sheet that will cover the lid and the whole box):



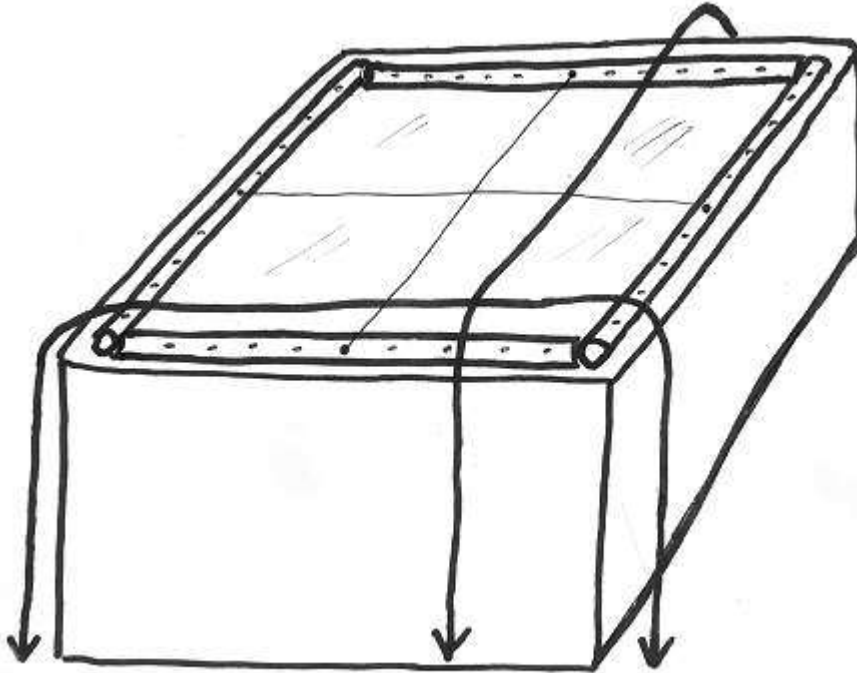
Now you will nail a piece of transparent plastic to the wooden frame. Stretch the plastic under the frame, fold up and nail or staple it on the top of the frame:



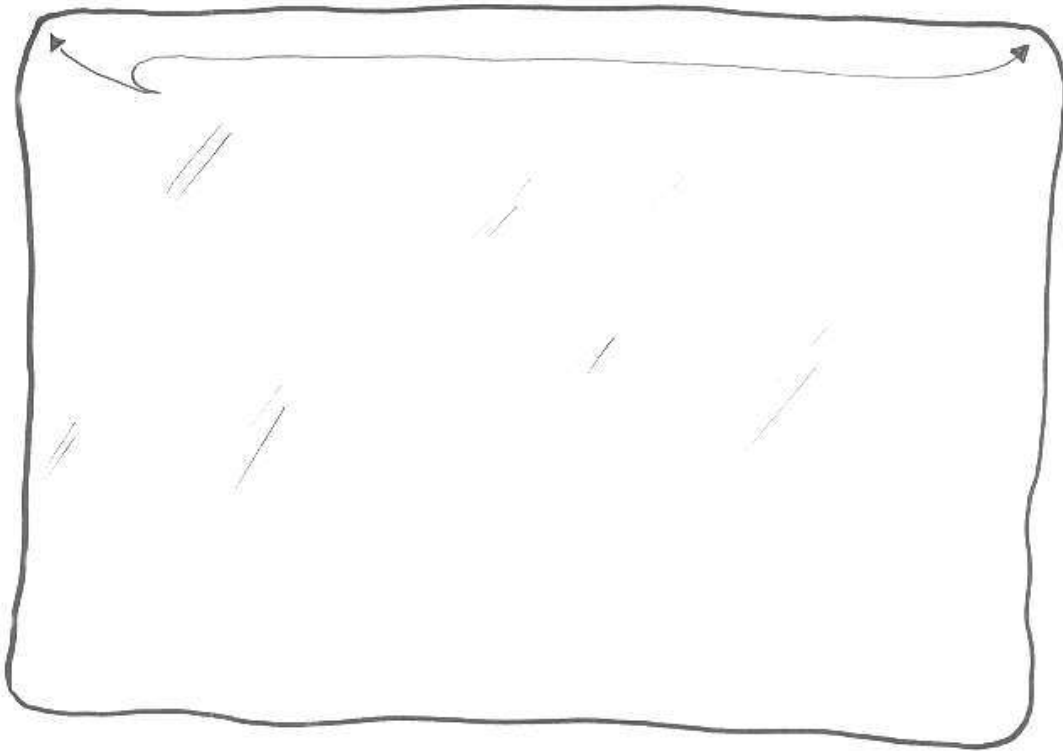
Set the lid over the top of the box.

Now, using a metric tape, measure the distance from the front bottom line of the larger box all the way over and behind to the bottom line in the back. Likewise, measure the distance from the bottom line of the left side of the box, all the way over and down to the bottom line of the right side of the box. Use the measurements to cut a piece of transparent plastic that will be draped over, covering all of the box (that is, the top and all four sides). Hold this plastic sheet in

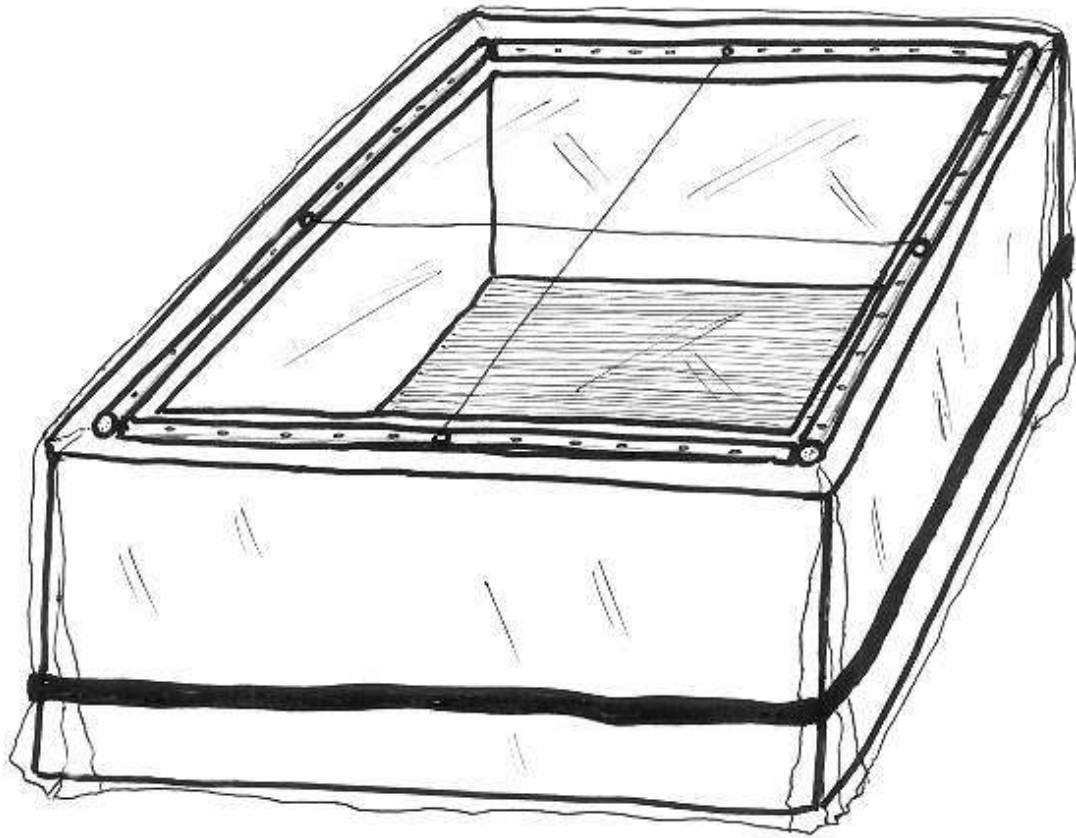
place using a rubber band of elastic or a strip of rubber cut from the rubber tube of a car tire:



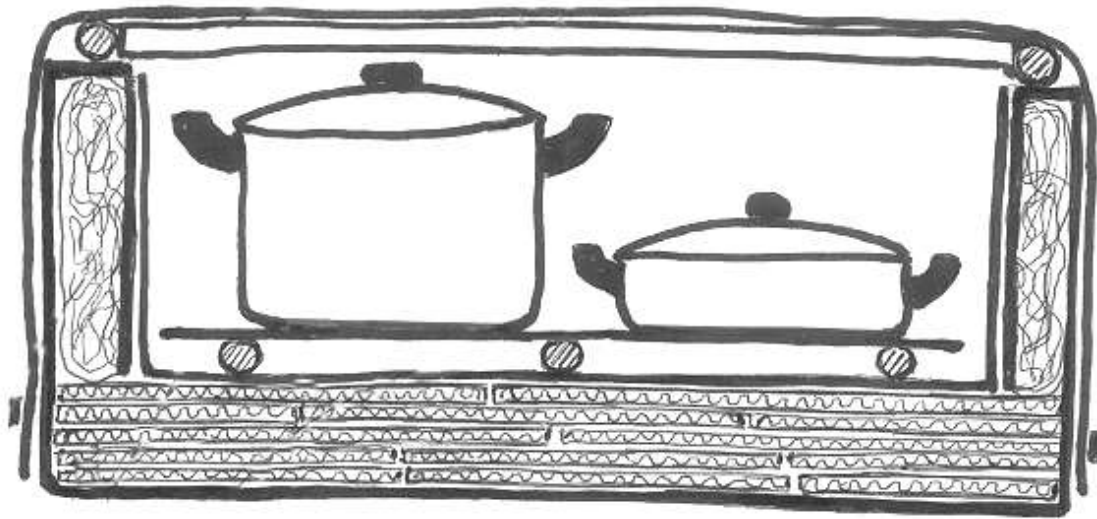
The rectangular piece of transparent plastic that will be draped over the entire larger box should have the corners rounded off so it will be even with the base of the box when in place. The plastic is the same that was stapled on the wooden frame. Besides eliminating the need to have a gasket between the lid and the top of the larger box, this piece of plastic covering the lid and the sides of the box provides an effective elimination of hot air leaks, increases the temperature by trapping a layer of air as thick as the wooden frame of the lid while protecting the solar oven from getting wet in the case of an unexpected rainshower.



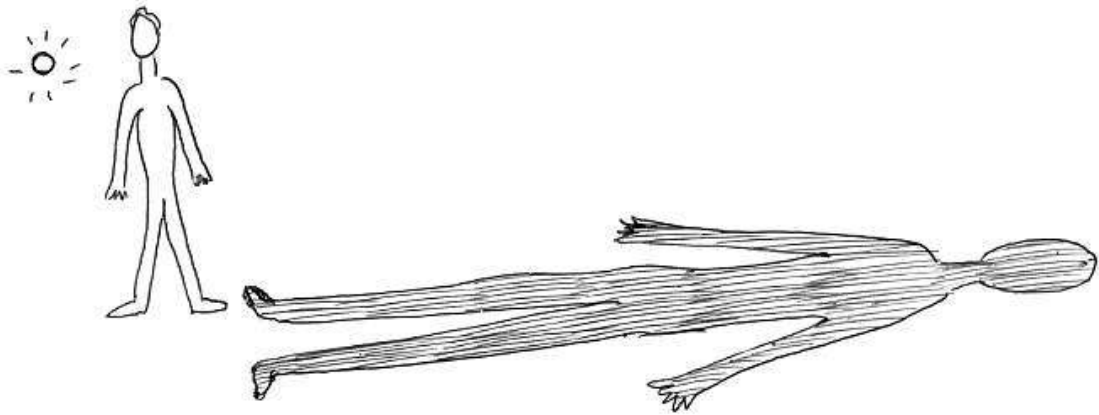
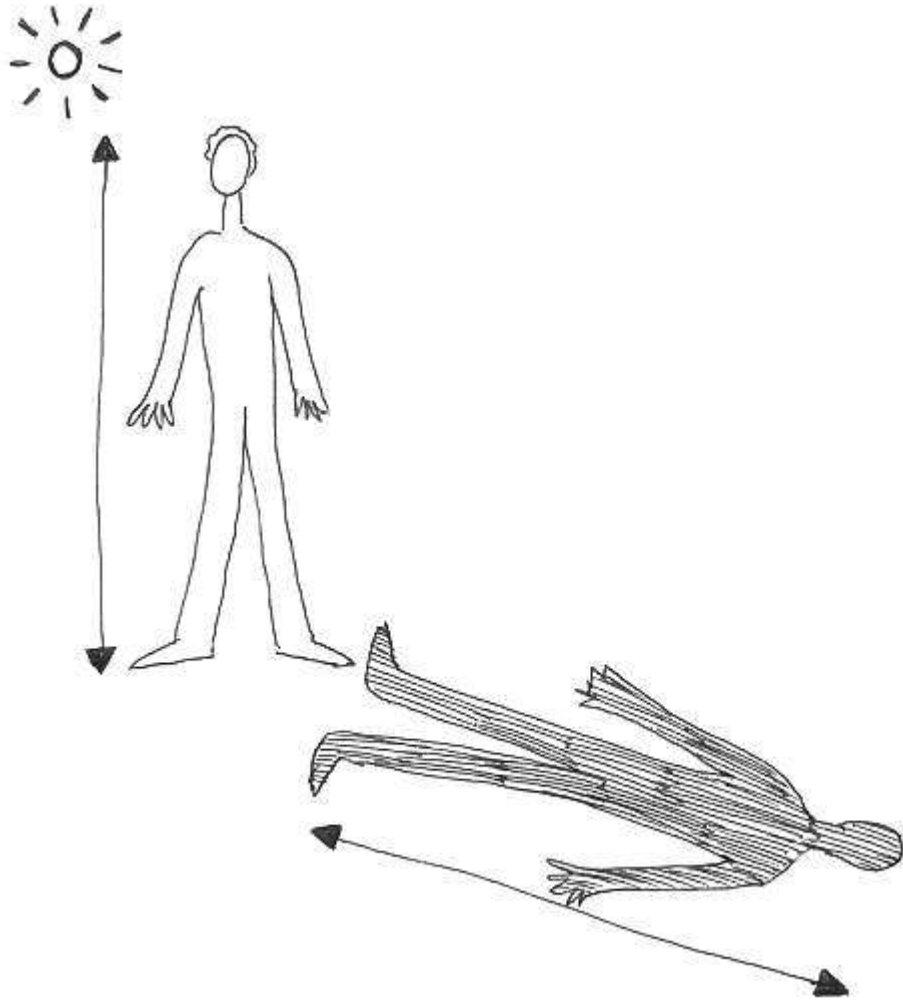
This is what the solar box oven will look like when ready to cook in the sun (only the pans are missing):

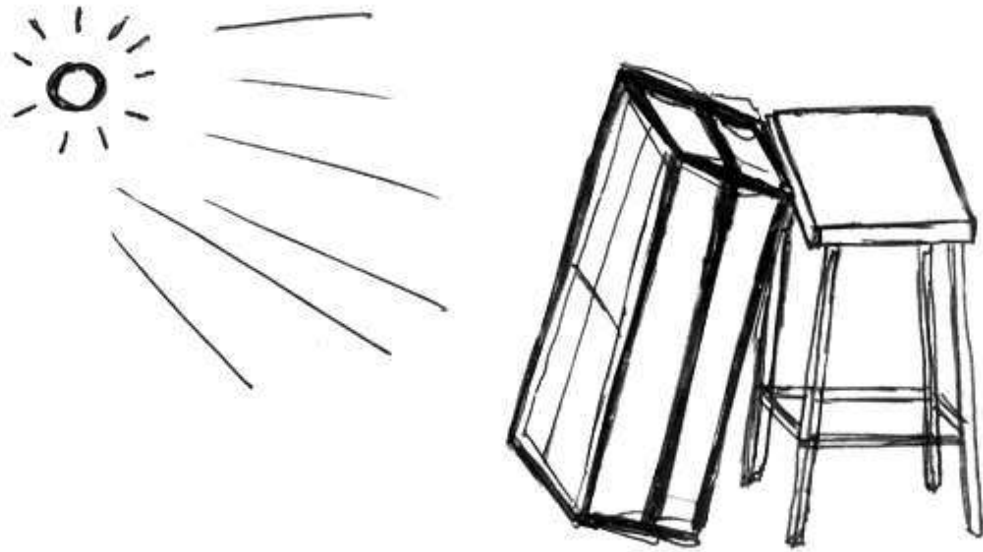


A cross section drawing will help understand the design details of the complete solar box oven (the pans are white for clarity of the drawing but they must be painted black to cook food in the solar box oven):

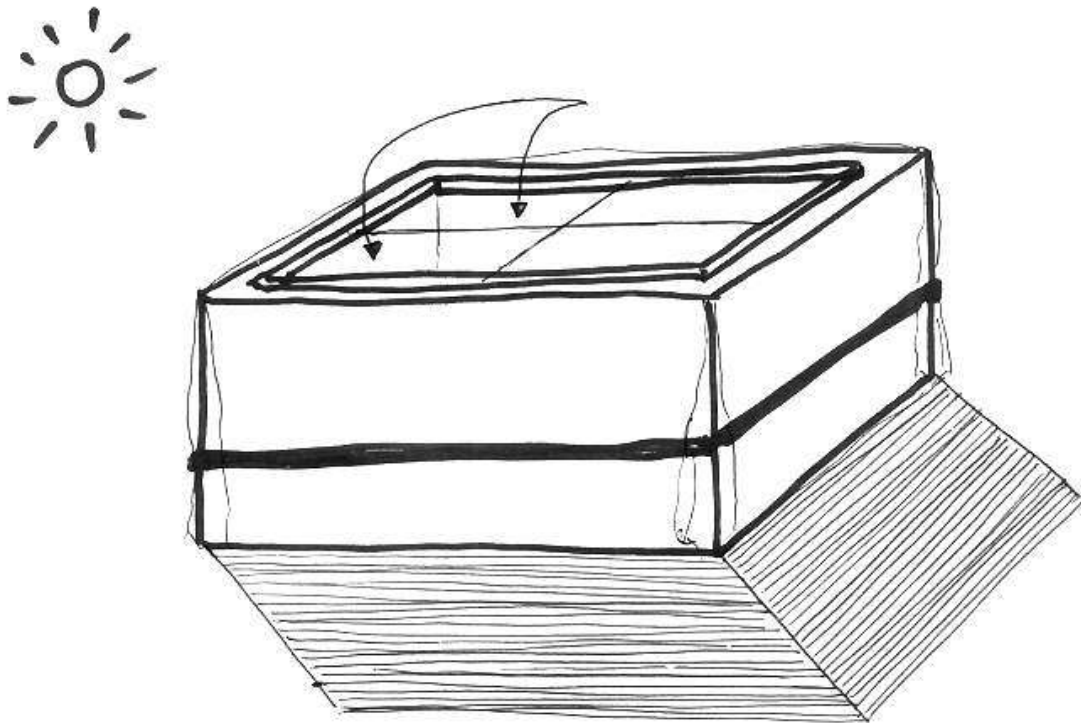


The ideal time to start cooking is when the shadow of your body reaches the same length as your height. Before that, early in the morning when the sun is low in the sky and projects a long shadow of your body, it's desirable to start heating your solar box by leaning it against a stool or a wall with the opening facing the sun.

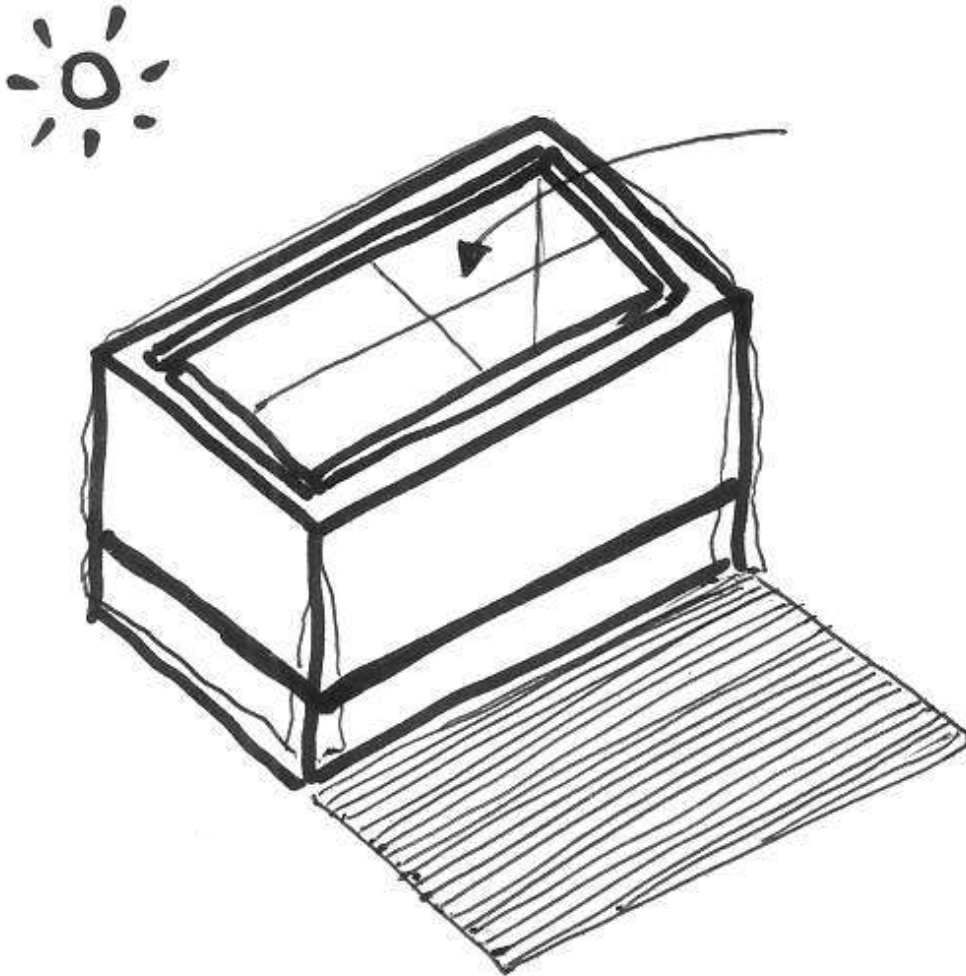




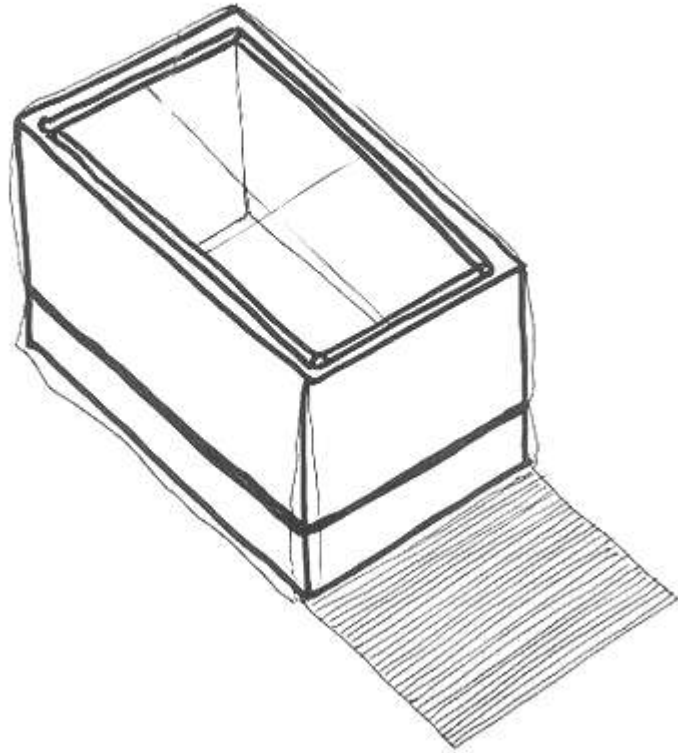
When positioning the solar box cooker in the sun, avoid a double shadow as it means two of the internal walls are in shade, reducing the build up of heat.



When turning the box to produce just one shadow, avoid the shadow cast by the wider side of the box.



When heating the box and when you start cooking, position the oven so as to produce the least amount of shadow (the narrow side of the box should be turned toward the sun):



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