

Solar Cooking

Box Cooker

What You Will Need

- ▶ Two cardboard boxes. We would suggest that you use an inner box that is at least 15 inch x 15 inch (38 cm x 38 cm), but bigger is better. The outer box should be larger all around, but it doesn't matter how much bigger, as long as there is a half inch (1.5cm) or more of an airspace between the two boxes. The distance between the two boxes does not have to be equal all the way around. Also, keep in mind that it is very easy to adjust the size of a cardboard box by cutting and gluing it.
- ▶ One sheet of cardboard to make the lid. This piece must be approximately 2 to 3 inch (4 to 8 cm) larger all the way around than the top of the finished cooker (the outer box).
- ▶ One small roll of aluminum foil.
- ▶ One can of flat-black spray paint (look for the words "non-toxic when dry") or one small jar of black tempera paint. Some people have reported making their own paint out of soot mixed with wheat paste.
- ▶ At least 8 ounces (250 g) of white glue or wheat paste.
- ▶ One Reynolds Oven Cooking Bag®. These are available in almost all supermarkets in the U.S. They are rated for 400 °F (204 °C) so they are perfect for solar cooking. They are not UV-resistant; thus they will become more brittle and opaque over time and may need to be replaced periodically. A sheet of glass can also be used, but this is more expensive and fragile, and doesn't offer that much better cooking except on windy days.

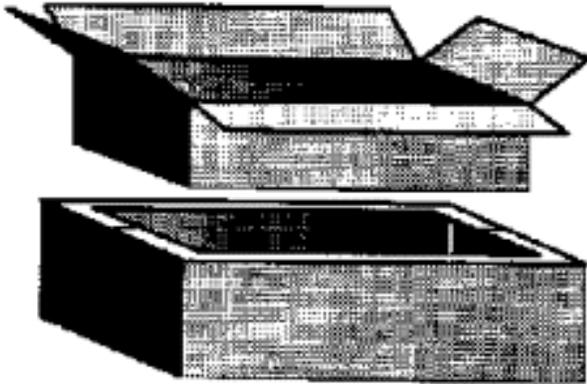


Figure 1

Fold the top flaps closed on the outer box and set the inner box on top and trace a line around it onto the top of the outer box. Remove the inner box and cut along this line to form a hole in the top of the outer box (Figure 1).

Decide how deep you want your oven to be. It should be about 1 inch (2.5 cm) deeper than your largest pot and about 1" shorter than the outer box so that there will be a space between the bottoms of the boxes once the cooker is assembled. Using a knife slit the corners of the inner box down to that height. Fold each side down forming extended flaps (Figure 2). Folding is smoother if you first draw a firm line from the end of one cut to the other where the folds are to go.

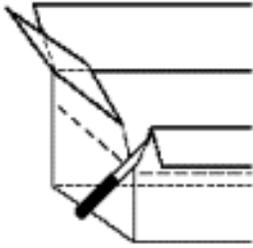


Figure 2

Glue aluminum foil to the inside of both boxes and also to the inside of the remaining top flaps of the outer box. Don't bother being neat on the outer box, since it will never be seen, nor will it experience any wear. The inner box will be visible even after assembly, so if it matters to you, you might want to take more time here. Glue the top flaps closed on the outer box.



Figure 3

Place some wads of crumpled newspaper into the outer box so that when you set the inner box down inside the hole in the outer box, the flaps on the inner box just touch the top of the outer box (Figure 3). Glue these flaps onto the top of the outer box. Trim the excess flap length to be even with the perimeter of the outer box. Finally, to make the drip pan, cut a piece of cardboard, the same size as the bottom of the interior of the oven and apply foil to one side. Paint this foiled side black and allow it to dry. Put this in the oven so that it rests on the bottom of the inner box (black side up), and place your pots on it when cooking. The base is now finished.

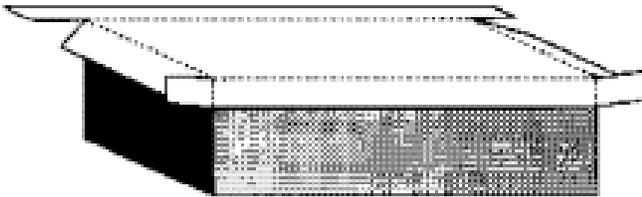


Figure 4

Take the large sheet of cardboard and lay it on top of the base. Trace its outline and then cut and fold down the edges to form a lip of about 3" (7.5cm). Fold the corner flaps around and glue to the side lid flaps. (Figure 4). Orient the corrugations so that they go from left to right as you face the oven so that later the prop may be inserted into the corrugations (Figure 6). One trick you can use to make the lid fit well is to lay the pencil or pen against the side of the box when marking (Figure 5). Don't glue this lid to the box; you'll need to remove it to move pots in and out of the oven.

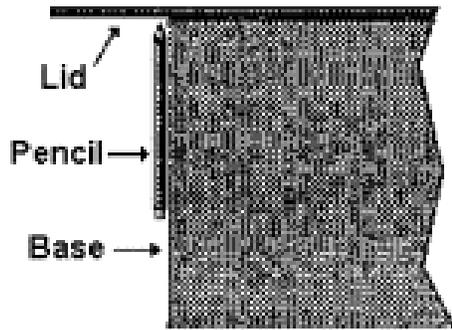


Figure 5

To make the reflector flap, draw a line on the lid, forming a rectangle the same size as the oven opening. Cut around three sides and fold the resulting flap up forming the reflector (Figure 6). Foil this flap on the inside. To make a prop bend a 12" (30cm) piece of hanger wire as indicated in Figure 6. This can then be inserted into the corrugations as shown.

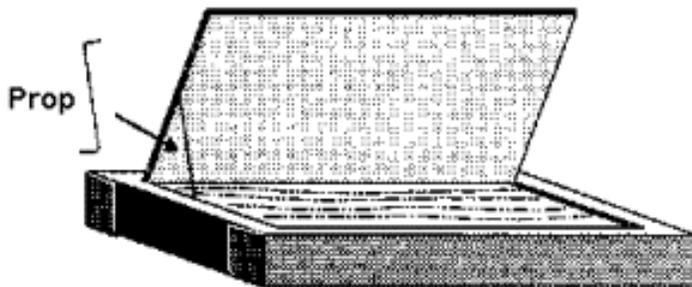


Figure 6

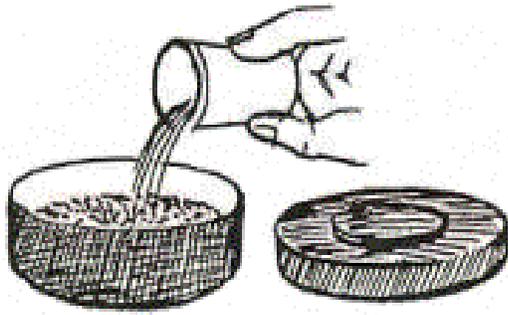
Next, turn the lid upside-down and glue the oven bag (or other glazing material) in place. We have had great success using the turkey size oven bag (19" x 23 1/2", 47.5cm x 58.5cm) applied as is, i.e., without opening it up. This makes a double layer of plastic. The two layers tend to separate from each other to form an airspace as the oven cooks. When using this method, it is important to also glue the bag closed on its open end. This stops water vapor from entering the bag and condensing. Alternately you can cut any size oven bag open to form a flat sheet large enough to cover the oven opening.

Solar Tire Cooker

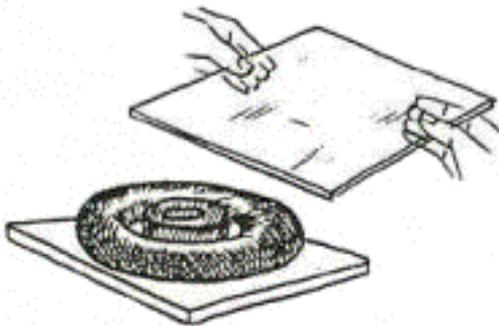
What You Will Need

- ▶ An old car tube. If the tube is punctured get it patched and inflate.
- ▶ A wood board
- ▶ An aluminum cooking pot with lid, painted flat black
- ▶ A piece of glass large enough to cover the tire tube

Take an aluminum cooking vessel with a lid. Paint it black from the outside. Put all the ingredients for cooking in the cooking pot.



Place the cooking vessel inside the tube. Cover the tube with a piece of plain glass and place in direct sunlight. Within a few hours the food will be cooked.



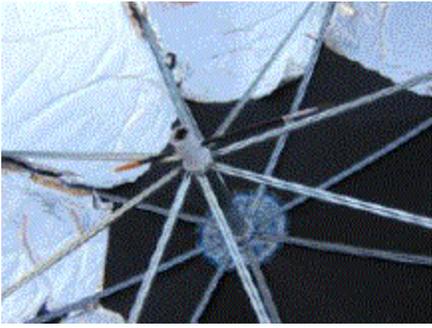
The place in the well of the tube is a closed cavity so air neither goes out nor come in. The rays of the sun enter the glass and get trapped. Slowly, the temperature of the cooking vessel rises and the food cooks.

Solar Umbrella Cooker

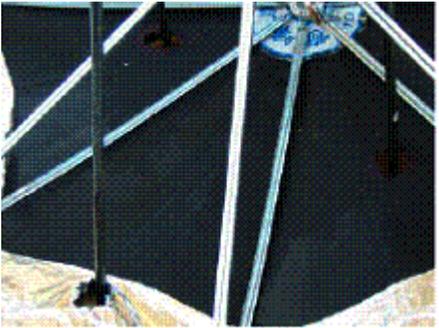
What You Will Need

- ▶ An umbrella (if can be, with a minimum of 120 cm of diameter when is open)
- ▶ Conventional aluminum paper
- ▶ White standard glue
- ▶ A manual saw for metals
- ▶ A manual drill.
- ▶ A tripod (any support for flowerpots of 3 legs will serve)
- ▶ Tools: tape measure, brush, permanent labeler, scissors.

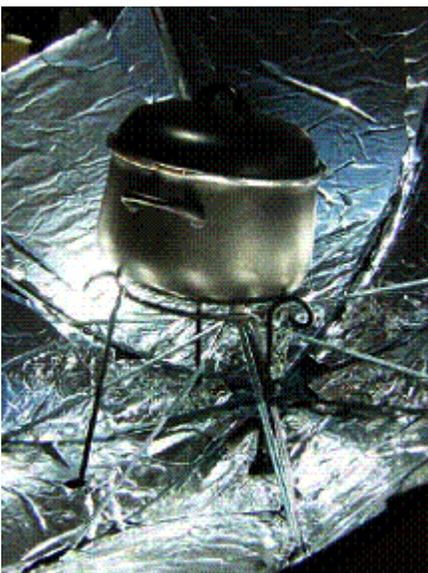
First we must open the umbrella and stick, with white glue, one strip of aluminum paper on each one of the “sides” that form the umbrella. We will try to adapt with the maximum accuracy, using the scissors, the shape of aluminum strips to the form of the umbrella. Next, with the aid of the scissors, we will cut and stick more aluminum pieces in order to fill the places of the umbrella that still haven’t got reflector. Now we should have already the umbrella all covered with aluminum paper.



Next, we will look for the focal point. (PAY ATTENTION: use sunglasses at this point!) Facing the umbrella the sun, we will look at the handle and we will indicate, with the permanent labeler, the most shining zone. Before cutting the main handle, we must make a hole that penetrates the plastic piece that moves above and under the handle, and also the handle. Through this hole we will pass any elongated piece that blocks the movement of folding (a pencil, a brush, etc.) Once blocked the umbrella, we will cut the handle with the manual saw. Remember to keep the handle, since therefore the cooker will be able to be folded. In order that the two parts could fit together again when we fold the cooker, we will double, with the aid of pliers, the sides of the handle.



We almost have the cooker ready. It only lacks making the holes for the tripod. In order to do them, first we should mark with the labeler the points where the tripod will stand, and later we can make the holes with the scissors. If we were mistaken there is no problem, because we can extend the holes without damaging the structure of the cooker.



With this cooker we can cook without problems during the months of spring, summer and autumn in Valencia (Spain). In winter, we will need to cover the pot with a bag of high density polyethylene (HDPE) or polypropylene (PP) plastics. In this last case, we should follow the same guidelines of baking that we normally use in the classic panel cookers, like Cookit type.



Solar Windshield Shade Funnel Cooker

What You Will Need

- ▶ Reflective accordion-folding car sunshade
- ▶ Cake rack (or wire frame or grill)
- ▶ 12 cm. (4 ½ in.) of Velcro
- ▶ Black pot
- ▶ Bucket or plastic wastebasket
- ▶ Plastic baking bag

You can turn a windshield shade into a version of the solar funnel simply by attaching little Velcro tabs along the long notched side. Here's how:



Lay the sunshade out with the notched side toward you, as above.



Cut the Velcro into three pieces, each about 4 cm. or 1 ½ inches long. Stick or sew one half of each piece, evenly spaced, onto the edge to the left of the notch.

Attach the matching half of each piece onto the underneath side to the right of the notch, so that they fit together when the two sides are brought together to form a funnel. (I first tried sewing these on a sewing machine, but found it cut through the reflective material.). If using stick-on Velcro, you can align the two pieces easily like this: Stick down one side of the Velcro, then press the two pieces of Velcro together, fold the shade into the funnel shape and stick down the second side. Press the Velcro pieces together, and set the funnel on top of a bucket or a round or rectangular plastic wastebasket. Place a black pot on top of a square cake rack, placed inside a plastic baking bag. A standard size rack in the U.S. is 25 cm. (10 in.). This is placed inside the funnel, so that the rack rests on the top edges of the bucket or wastebasket. Since the sunshade material is soft and flexible, the rack is necessary to support the pot. It also allows the sun's rays to shine down under the pot and reflect on all sides. If such a rack is not available, a wire frame could be made to work as well. Note: The flexible material will squash down around the sides of the rack.



The funnel can be tilted in the direction of the sun. A stick placed across from one side of the funnel to the other helps to stabilize it in windy weather (see photo). After cooking, simply fold up your "oven" and slip the elastic bands in place for easy travel or storage.

I have found this totally simple solar oven extremely practical, as it is so lightweight and easy to carry along anywhere. But in addition, it has reached a higher temperature in a shorter time than all the other models I have experimented with so far (I haven't used a parabolic) - a little above 350 degrees F.. The Velcro was available in fabric stores. Cost of the sunshade was about \$3.00 USD; the Velcro about \$.25.