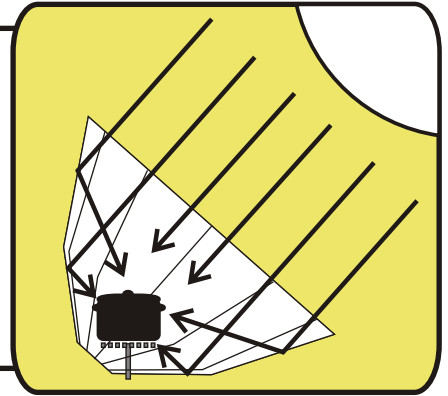


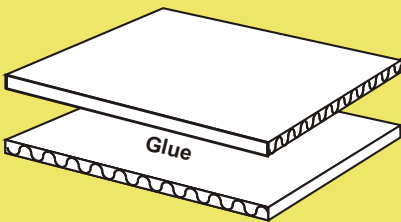
FOLD-UP PARABOLIC SOLAR COOKER

These instructions will show you how to make a low-cost parabolic solar cooker using corrugated cardboard, aluminium foil, glue, string, screws and cloth.

The cooker works when the sun's rays hit an aluminium surface and are reflected to a focal point in the parable where a black pan is placed, thus heating up the contents of the pan. This cooker can be used to prepare vegetables, grains, meat, pasta, cakes, etc. It can also be used to sterilize water, make jam...there is no limit to both its use and its construction.



1



Main material used: Corrugated cardboard

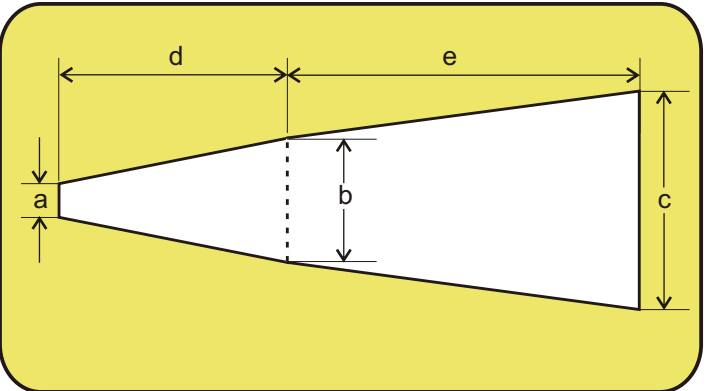
Flattened cardboard boxes or sheets of cardboard can be used.

To make the cooker more resistant, glue two pieces of cardboard together using wood glue, with the undulations perpendicular to each other. Using a paintbrush, apply some watered down glue and leave to dry with a heavy weight on top so that it doesn't lose its shape.

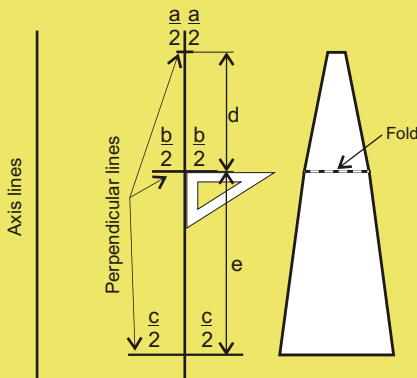
2 The parable is composed of 12 segments. By increasing the surface area, greater temperatures can be reached: to make other sizes, simply change the measurement proportionally.

Segment size

(in cm)	Small	Large
a	3.5	4.0
b	13	15.0
c	23	26.5
d	24	27.6
e	37	42.6
Surfac.(m ²)	0.6	0.8



3

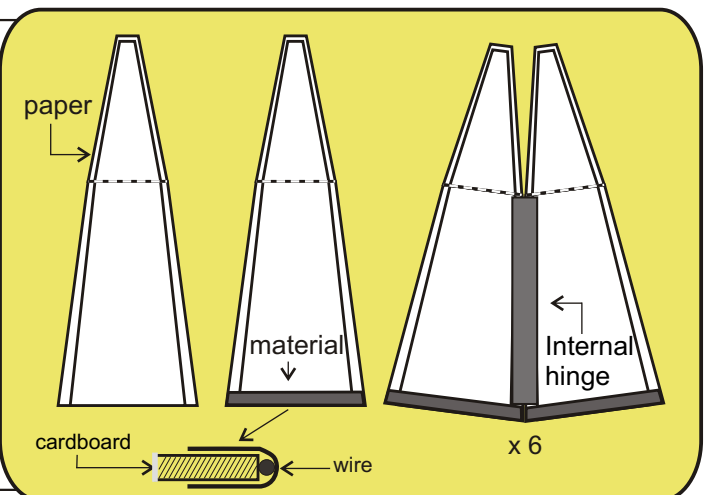


Model of one segment

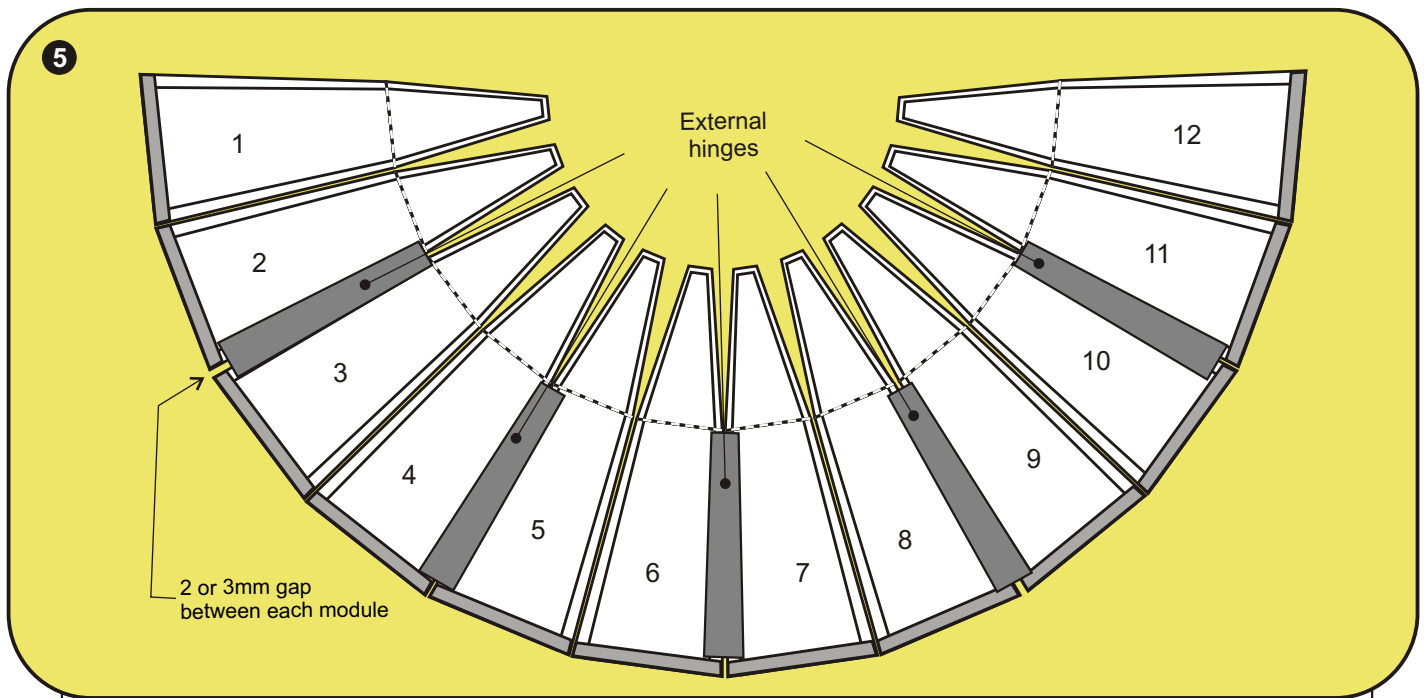
The easiest way is to draw one full-sized segment on a piece of card, cut it out and then use it as a template for drawing the other 11 segments.

First draw an axis line and then a 90° perpendicular line using a set square. Then make a mark on the perpendicular line, each side of the axis, at a distance equal to half of "a". Next, measure "e" on the axis and mark the next perpendicular line, corresponding to "b" and repeat the first step. When the perpendicular lines have been completed, join the end points to make the final shape. To cut, use a scalpel and a metal ruler or pipe. As each module is completed, fold along the dotted line, pressing with a ruler or other hard object to mark the line.

4 In order to protect the cooker and make it last longer, reinforcements can be made along the borders. This is not vital but it is recommended. Apply wood glue with a paintbrush onto a strip of paper 5cm wide and then stick it onto the lateral sides and the narrow end. After this has dried, use a spatula to apply strong glue to pieces of denim 5cm wide, which should then be stuck to the free end. Suggestion: Between the cardboard and the denim, glue on a piece of thick wire, since this part is most exposed to damage. Suggestion: Internal hinge: Using strong glue, stick on a piece of material 5cm wide as shown in the picture. The 6 pairs of segments should be prepared in this way. At this stage you could paint the side without hinges and all the borders with fibre paint (for roofs) or beeswax so that it is more resistant to damp.

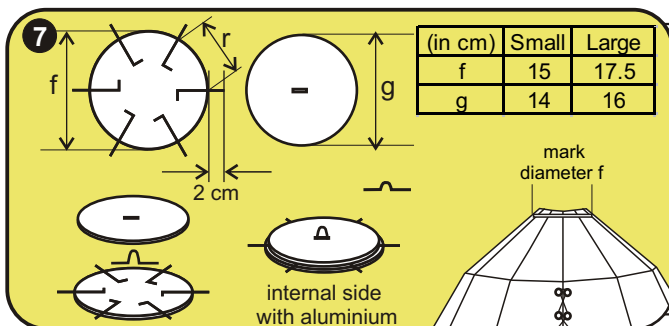
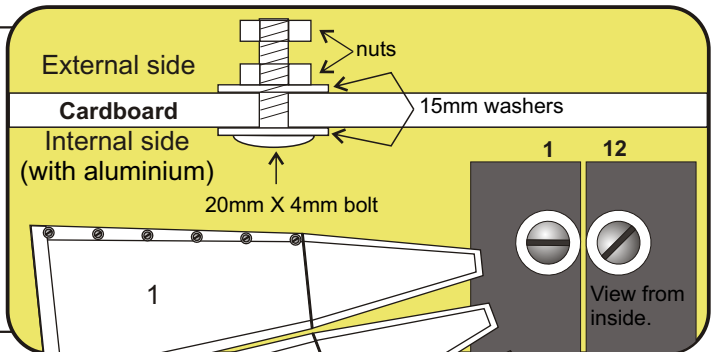


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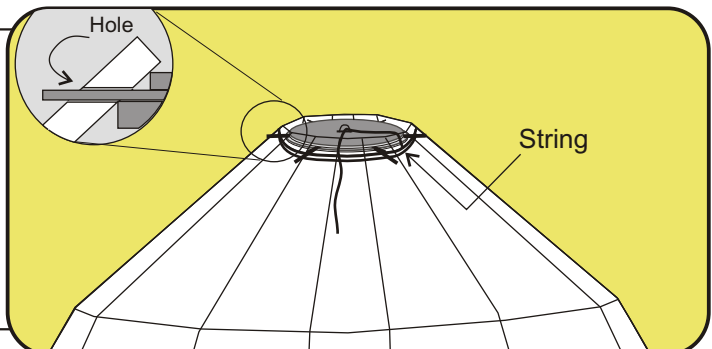
External hinges: Glue on 5 strips of cloth, each 5cm wide, thus joining the 6 modules. Between each module leave a small gap of around 2 or 3cm so that they can fold inwards when the parable is set up.
 To add aluminium to the internal surface: Using a spatula, apply a layer of strong glue onto the side where the 6 hinges are located and stick on a sheet of kitchen foil so that the shiny side is uppermost. Repeat to cover the 12

6 To close the parable: Punch 6 holes along the open edges 1 and 12, as shown in the illustration, so that when the parable is closed the holes meet. Join the two sides with nuts, bolts and washers. Thread some string between the nuts on the outside, to close the ring.
 The nut which is in contact with the washer can be fixed in place by putting a little glue on the thread. The other can be left free to hold the string in place when the cooker is set up or to fold for storage.

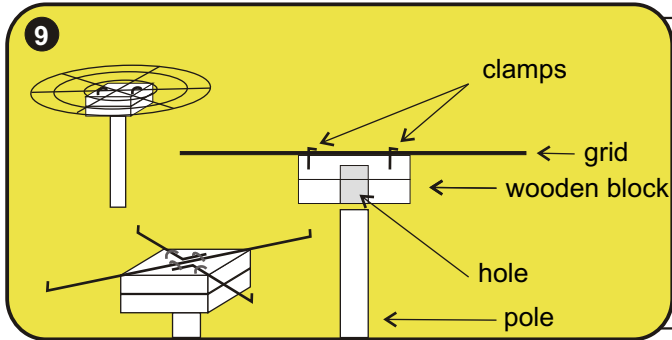


The closing circle: Cut out two circles of reinforced cardboard following the measurements indicated in the table. Set up the parable with string. Close the small segments provisionally with tape and mark internally where the diameter f coincides with the inside of the parable. This is the point where holes will be made for threading wire through the closing circle.
 Glue the two circles together with the wire in between. The distance between the pieces of wire is equal to the radius (r) of the circle. Then glue on strips of paper to seal it.

8 Make holes in 6 alternate segments, in the middle of each. To set up the parable, tie string around the bolts and then insert the pieces of wire from the circle into the holes on the small flaps. Tie more string onto the ends of the pieces of wire which are sticking out, wrap it 3 times around the wire and then thread the end through the piece of wire in the centre.

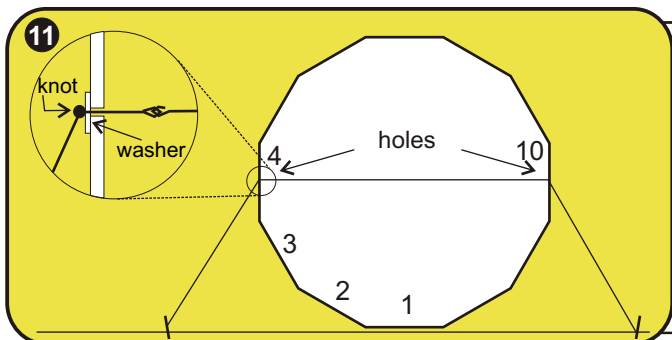
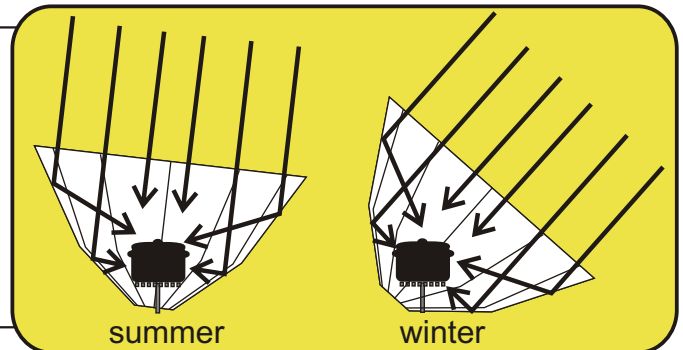


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The ideal recipient for cooking is a pan painted with synthetic black matte paint. In order to keep the pan steady in the focal point of the parable (the point of maximum temperature), a detachable stand can be made by drilling a hole part of the way through a block of wood 10 x 10 x 5 cm or through two pieces of wood measuring 10 x 10 x 2.5, glued together. The hole should be slightly wider than the pole which will be used as the axis, for example the pole of a broom. Self-feed drill bits are particularly recommended for this. A grid or several short metal bars around 4 mm thick should be nailed onto the block.

10 To set up the cooker, the pole should be stuck into the ground so that it is vertical. The pole could also be mounted onto a wooden base. As the pole will stick up through the parable, two holes should be made using a scalpel: one in the closing circle, which will be used in summer when the sun is more vertical, and one in the small flap of segment 1, which will be used in winter when the sun is in a more horizontal position.



To stop the cooker from moving, make two holes in opposing segments 4 and 10, through which two pieces of string should be threaded. At the end of one piece of string make a loop and at the end of the other piece tie on a wire hook. Insert the loop through one of the holes and the hook through the other so that they join together inside the parable. Thread washers onto the other ends of the string and fix them in place with a knot, as shown in the illustration. Fix the lines of string to the ground using small stakes or pegs.

Simplified version: Non fold-up cooker

A version of this cooker which does not fold up is much easier to make. Just follow the instructions from 1 to 4 but make the hinges out of paper and stick them all on the inside. Instead of using screws to close the parable, stick a strip of paper on the outside between segments 1 and 12.

The closing circle does not need any wire and can be glued together with strips of paper. As this version can not be folded up, the edges should be protected. In the fold-up version cloth and wire were used, but in this version strips of rubber can be glued on.

Recommendations: Cooking time depends on many factors, including the amount of food, the size of the pieces of food and the intensity of the sun's rays. In general, cooking time is double the standard cooking time for a gas cooker. Start by preparing simple dishes, such as rice or baked potatoes, until you get used to using this type of cooker. To get the best results, move the cooker every 30-60 minutes so that the opening of the parable is always pointing directly at the sun.

To avoid being dazzled, use dark glasses.

There is a lot of information about solar cookers on internet: visit:

www.solarcooking.org

