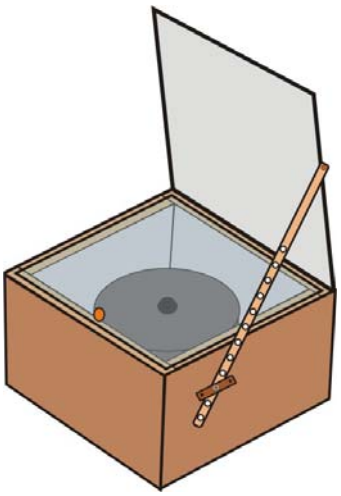
Constructing a solar box cooker, without a top lid and with one reflector

Solar cookers are not a new invention. Ever since 1767 the Swiss scientist *Horace De Saussure*, constructed "**hot boxes**", where he could cook food, in a much similar way we cook in solar ovens today. Nevertheless, a more general spread and use of solar ovens begun in the '70s. Nowadays, it is estimated that over a few millions solar cookers are used worldwide, most of them in China, in India and in African countries. Approximately 65% of these solar cookers or solar cookers are made out of two boxes, one fitted inside the other, with insulation between them and 1-4 reflectors adjusted on the outer box. The rest appear to be parabolic and semi-cylinder solar cookers, whereas the recent advancement of open solar panel cookers tends to become very popular, especially in Africa.

Materials

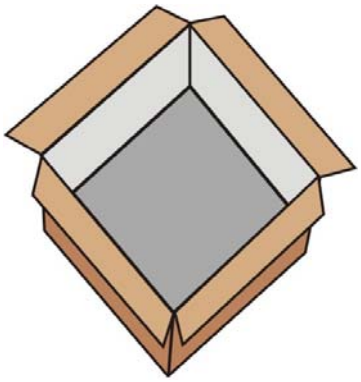
- ✓ 2 cuboid cardboard boxes, the smaller with base dimensions at least 38 × 38 cm
- ✓ a glass frame 3-4 mm thick in relevant dimensions to the open top of the cooker base
- ✓ a wooden knob and a piece of felt cloth
- ✓ aluminium foil and pieces of cardboard or a few old newspapers
- ✓ white glue, tape, aluminium tape (optional)
- ✓ a small piece of wood or a piece of thick wire
- ✓ scissors, cutter, ruler, pen or pencil



Let's put it together

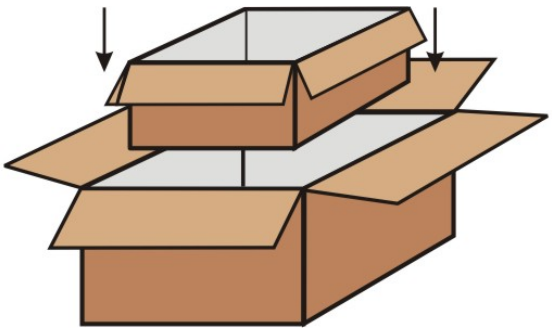
1 Take the outer box and glue 3-4 pieces of foiled cardboard at the bottom for insulation.

Do not cut out the four flaps, because they will be used later on to form the open top frame of the cooker base, where the glass frame will be placed.

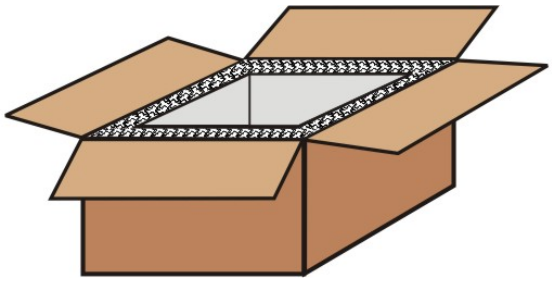


2 You may insulate the bottom of the inner box in the same way and then put it inside the outer box.

It is better to choose boxes that fit one inside the other, reaching roughly the same height, leaving an empty space of 3-6 cm wide, in every side all around.

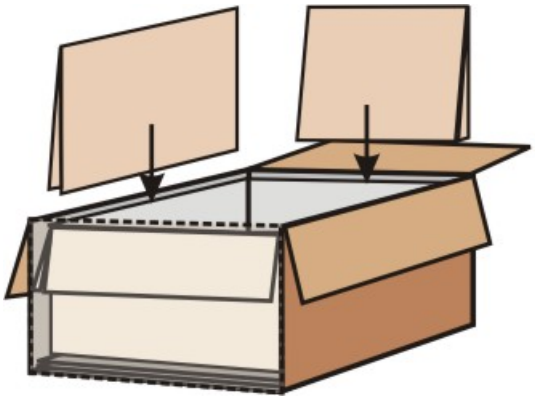


3 You may insulate the sides of the two boxes by inserting crushed pieces of newspaper inside the empty space left between them.



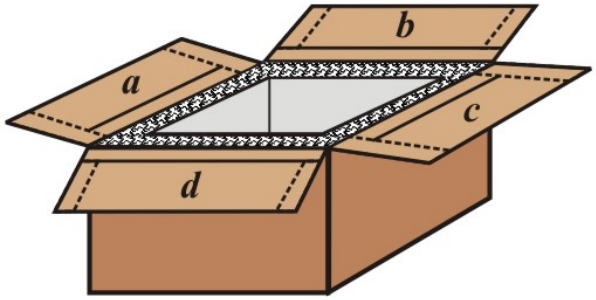
4 Alternatively, you can cut and fold pieces of cardboard and then insert them in the empty space between the outer and the inner box, in order to insulate the cooker base.

No matter which insulation technique you will use, the insulated space between the two boxes will then have to be closed from top, using the flaps of the outer box.



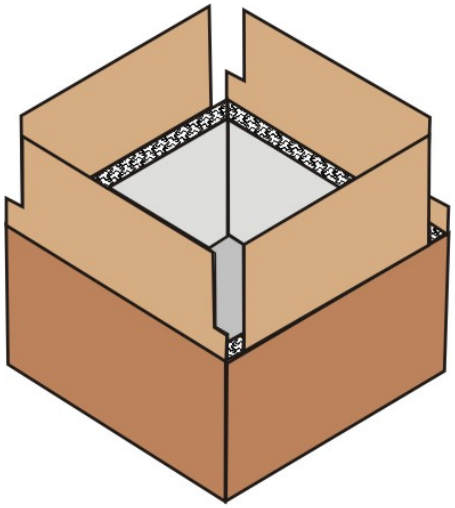
5 Take each flap of the outer box, fold it along the continuous lines and cut it along the dotted lines.

Notice that flaps ***b*** & ***d*** are treated differently from flaps ***a*** & ***c*** *(see drawing)*.



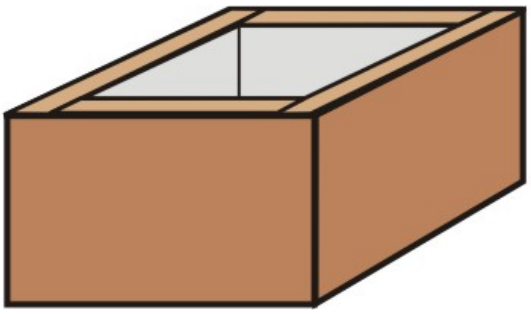
6 After cutting along the dotted lines, the four flaps are shaped as shown in the drawing. Fold each flap over the insulated area and glue it inside the inner box.

If the flap comes a bit short and does not cover the whole side, you may glue extra pieces of cardboard to cover that area.



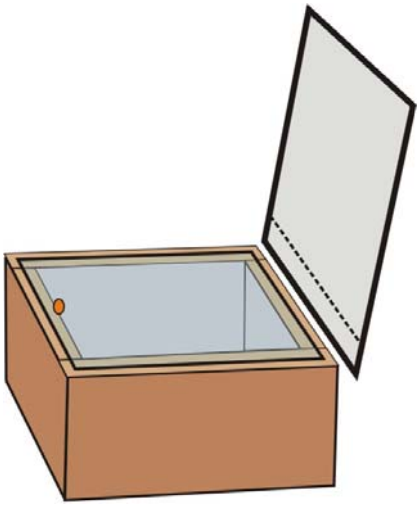
7 Glue the dull side of aluminium foil all around the sides of the inner box.

The base of the solar box cooker is now ready.



8 To construct the reflector, take a piece of cardboard, roughly at the same dimensions of the base open top. Add an extra strip 5-8 cm wide, which will later be glued on a side of the cooker.

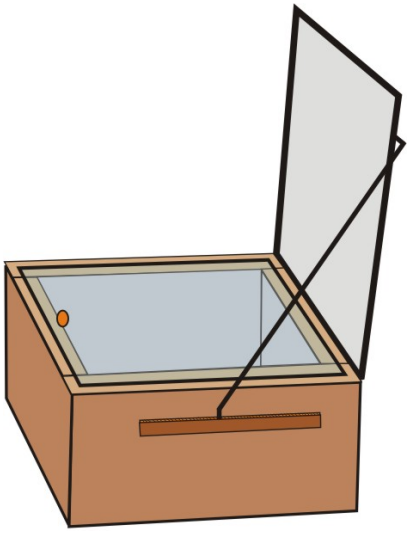
Glue aluminium foil on the surface of the cardboard, using its dull side. The reflector can be fixed and adjusted by using a piece of thick wire in a "**Z**" shape, as shown in the drawing below or by using a piece of wood, as shown in the first drawing.



9 A glass frame needs to be cut in a shape to fit the open top of the base. The glass frame is safer and has greater endurance if its sharp edges are buffed.

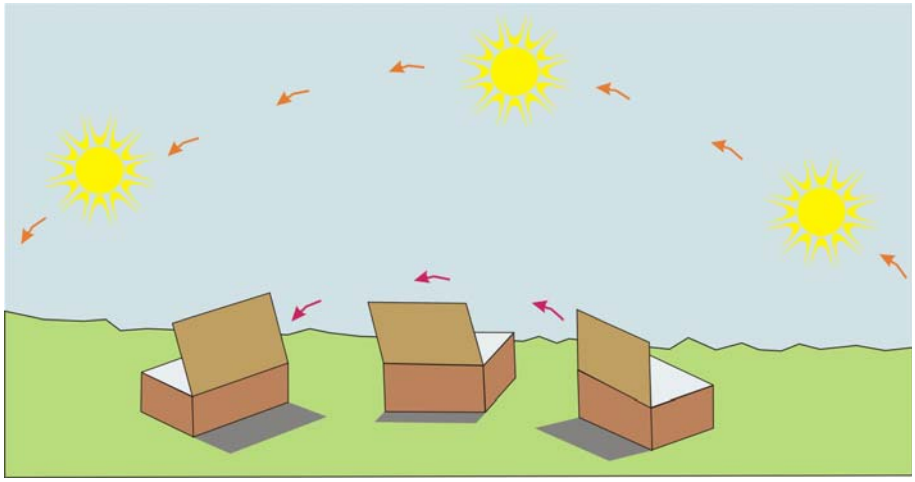
You may glue pieces of felt along the top edges of the box to provide a smooth, firm resting place for the glass frame and to seal in the heat. Optionally, a wooden knob can be fixed on the glass.

The solar box cooker is now ready to cook!



Useful information and comments

This solar box cooker can reach temperatures up to 150 ºC, depending on the construction and weather conditions. It can cook nearly everything, from pies, cakes, and biscuits to chicken and fish with vegetables, rice or even spaghetti. You can cook in dark metal pots or casseroles with lids, in Pyrex glass pots with lids (preferably the brownish ones) or even in recycled glass jars with lids. Be careful to use oven gloves when you take your pots out of the solar box cooker, because they are hot!



Photos from the construction of a solar box cooker with children at school …

Photo 1: Finding the appropriate boxes appears to be a rather difficult task.

Photo 2: Transforming and reshaping the boxes in a way …

Photo 3: Sticking extra pieces of cardboard at the bottom of the inner box.

Photo 4: Sticking extra pieces of cardboard at the bottom of the outer box.

Photo 5: After putting insulation in between the boxes, we now stick aluminum foil at the bottom …

Photo 6: Sticking aluminum foil at the sides of the box …

Photo 7: We have constructed the reflector and now we stick it on one of the sides of the cooker base ...

Photo 8: Sticking some pieces of felt on the top frame of the box cooker, so the glass rests firmly …

Photo 9: Painting the outer part of the box ...

Photo 10: Well, now the solar box cooker is ready!!!

References & Resources

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Solar Cookers: How to make, use and enjoy (2004) [10th ed.]. An e-book of joint effort by the *Solar Cookers International*, Sacramento California. The ".pdf" file of this document is available at URL: < http://solarcooking.org/plans/Plans.pdf >.

The Solar Cooking Archive (*sponsored by the "Solar Cookers International"*). The ultimate website for solar cookers. Available at URL: < http://solarcooking.org/ >.