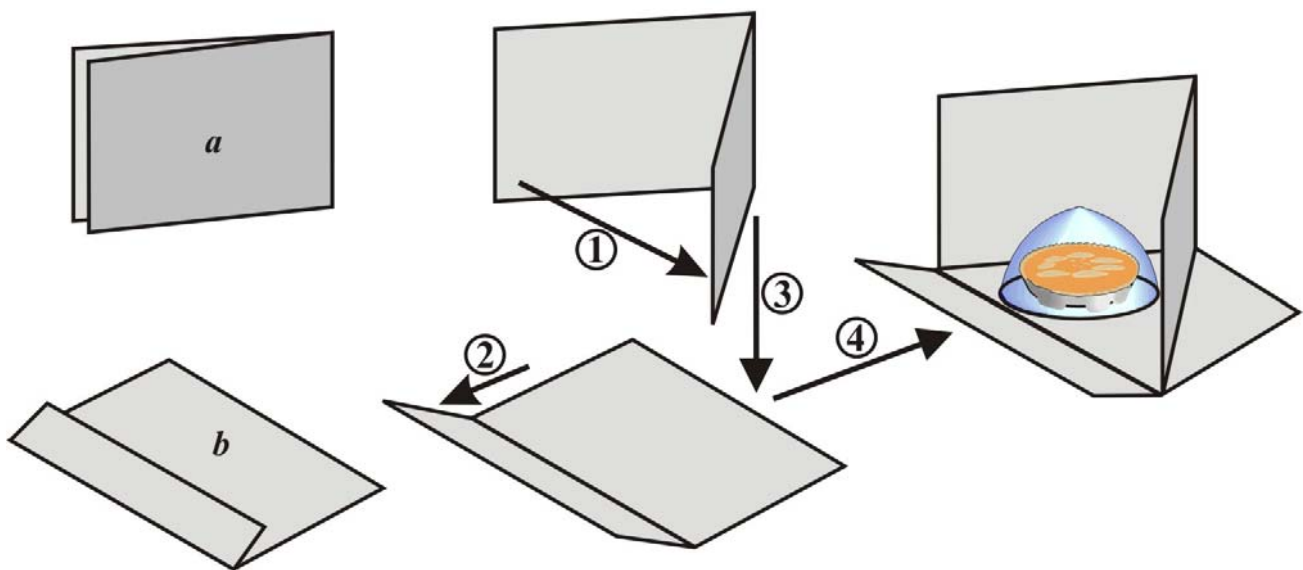


Constructing a collapsible open panel solar cooker with two pieces of cardboard

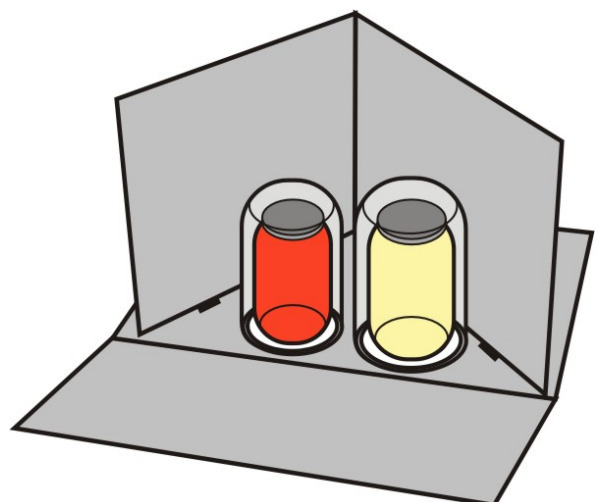
The idea of **open panel solar cookers**, basically constructed with pieces of cardboard covered with reflective materials such as aluminium foil and arranged all around a central cooking area, appears to be a rather recent one developed in the early 90's by Roger Bernard and his colleagues (cf. Bernard, 1999; Koflak, 1995; Halacy & Halacy, 1992; Narayanaswamy, 2001; Anderson & Palkovic, 2006). Nevertheless, the original idea of using solar radiation to heat up objects is perhaps as old as Archimedes and his legendary "burning mirrors", which reflected solar beams and managed to burn Marcellus ships at a distance from the port during the siege of Syracuse, 215-212 BC.

Perhaps the easiest way to construct an open panel solar cooker is to find two rather large pieces of cardboard, say (a) and (b), as shown in the drawing below. Then fold them accordingly and glue aluminium foil to their inner surfaces (*see steps 1 and 2 below*). Finally, put one piece of cardboard on top of the other creating the reflectors and the cooking area (*see steps 3 and 4 below*). The disadvantage of this design is that it cannot withstand any sort of wind without being blown away. Thus, we must invent an elaborated construction, where the two pieces of cardboard are fixed and gripped together, but at the same time our solar cooker remains collapsible and easily assembled ...



Materials

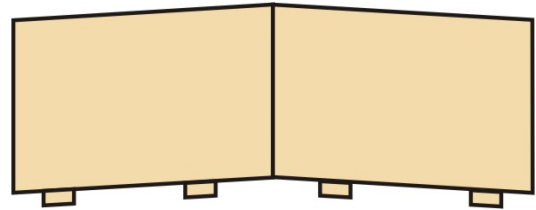
- ✓ 2 large pieces of cardboard, possibly cut out of the sides of big cardboard boxes
- ✓ aluminium foil
- ✓ white glue and a paint brush
- ✓ scissors, cutter
- ✓ ruler, pen or pencil



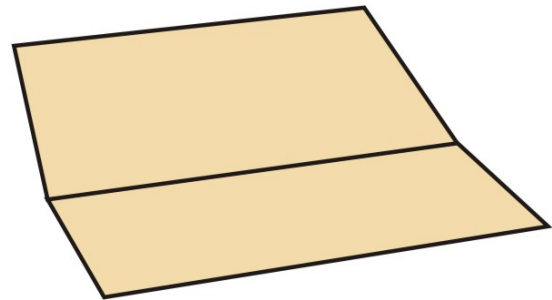


Let's put it together

1 Find a large piece of cardboard for reflectors or cut a piece out of the sides of a big cardboard box used of packing a refrigerator or a washing machine etc. The important thing is to leave two rectangular tabs in each folded side of the cardboard, as shown in the drawing

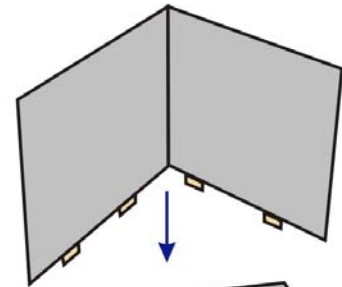


2 Find another big piece of cardboard for the base and the front reflector of the solar cooker. Fold it roughly in 2/3 by leaving the bigger part for the base of the solar cooker and the smaller part for the front reflector.

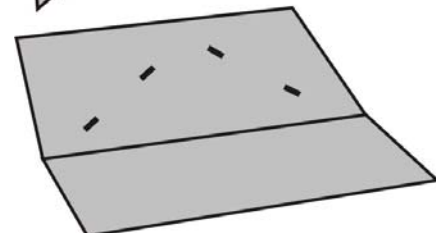


Glue aluminium foil on top of the inner surface of both pieces of cardboard, with its shiny side facing outwards.

3 Then fold the reflector cardboard and roughly adjust it on the base of the other piece of cardboard.

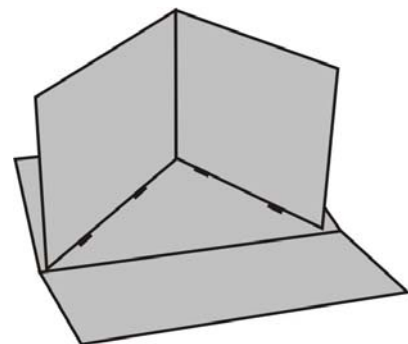


Mark with a pencil the 4 spots where the tabs touch the base (*see drawing aside*). Then remove the reflectors and gently use a cutter or scissors to intersect along the 4 lines marked before.



Those sections will be used to fix and stabilize the top reflectors in the right place.

4 Insert the top reflectors into the base of the bottom piece of cardboard by aligning the tabs. Bend the tabs under the base, so that when a cooking vessel is placed on top the tabs will be locked down and held affixed by the weight of the vessel.

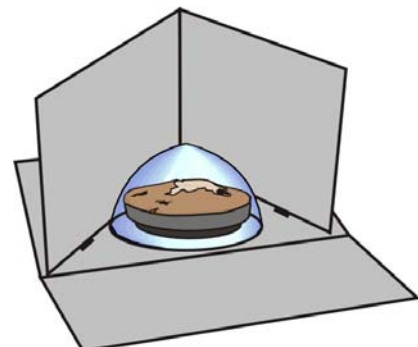


The front reflector can easily be adjusted up and down by inserting a small stone underneath it, pushing it towards the base.

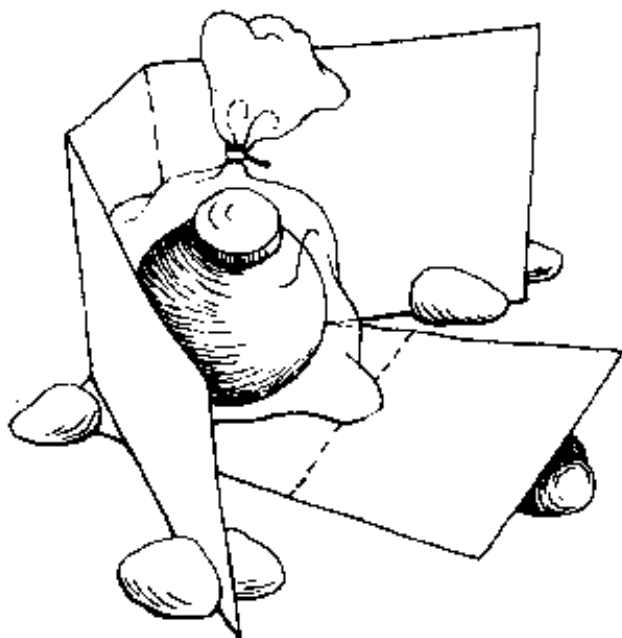
5 The open panel solar cooker with two pieces of cardboard is now ready to cook!

Its advantage is that the top reflectors can be steadily affixed to the cooking base and will remain in place on a rather windy day.

For additional reinforcement and stability against stronger winds you can put a couple of stones at the sides of the base of the solar cooker, behind the top reflectors.

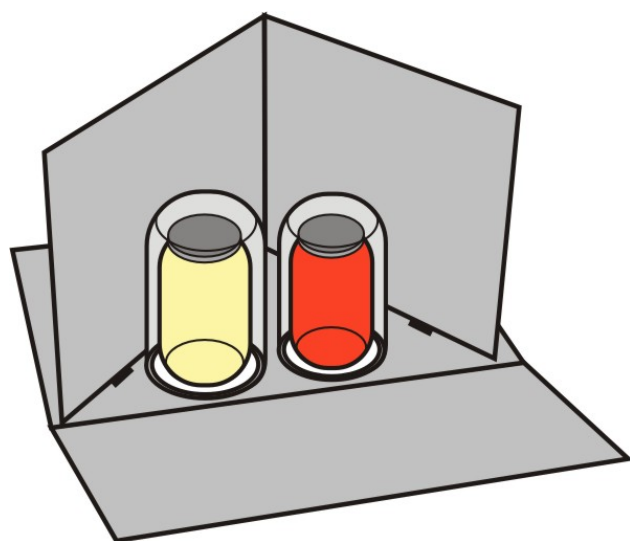


Some tips for open panel solar cooking ...



As one of the pioneers of solar cooking **Barbara Kerr** recommends, we should "place the cooking pot in an oven cooking bag with the opening at the top we can open the bag, check the food and seal it again without disturbing the cooking. And that part of the bag is usually dry. This is important because food in a panel cooker usually does need to be stirred and checked, since the heat is not as even", as it is in solar box cookers.

She then describes her methods for sealing the oven bags. "First I closed the baking bags with clothes pins-too heavy and bulky. Then with paper clips tore up the baking bag which otherwise was good for many uses. Then with a thin piece of wire worked well but the twisted wire broke after several uses. Now I am using wire but simply wrapping it tightly around the baking bag top, without twisting. Since there is no pressure, it works fine and the twist ties last a long time". (cf. URL: < <http://solarcooking.org/plans/spc.htm> >).



Alternatively, we can use pairs of vases that fit one inside the other. The outer vase is turned upside down, in the same manner like the salad bowl in the last construction drawing. It then provides a heat trap for the inner vase or the inner space of the salad bowl respectively.

In any case, solar cooking becomes more effective if we lift a bit the cooking vessel, pot, vase etc. a couple of centimetres above the base of the cooker, within the area of the heat trap provided by the outer vessel (reversed salad bowl, vase or the oven bag). This can be achieved even with a flat black stone or a kitchen grid. As an effect, the hot air inside the solar "heat trap" circulates under the vessel for a more even cooking.

References & Resources

- Anderson, L. & Palkovic, R.** (2006). *Cooking with Sunshine – The complete guide to solar cuisine with 150 easy sun cooked recipes*. New York: Malone & Company.
- Bernard, R.** (1999). *La Cuisson Solaire Facile*. Editions Jouvence.
- Halacy, B. & Halacy, D.** (1992). *Cooking with the sun: How to build and use solar cookers*. Lafayette: Morning Sun Press.
- Kaufman, A.** (1989). *Exploring Solar Energy: Principles and Projects*. Prakken Publications, Inc.
- Kerr, B.P.** (1991). *The expanding world of solar box cookers*. ISBN: 096326740X. Available at URL: < <http://www.solarcooking.org/kerr.htm> >.
- Kofalk, H.** (1995). *Solar Cooking*. Summertown: Book Publishing Company.
- Narayanaswamy, S.** (2001). *Making the Most of Sunshine: A Handbook of Solar Energy for the Common Man*. New Delhi: Vikas.