

This Action Sheet will help you to build a solar cooker. This design was developed by Solar Cookers International and is known as the Solar CookIt. It works by reflecting sunlight on to a pot inside a plastic bag, which traps heat from the sun during cooking.

What's good about the Solar CookIt?

- No fire: No burns, no risk of house-fire
- No smoke: Less eye and lung disease. Other ways to reduce kitchen smoke can be found in Action Sheet 57.
- No fuel: Save time and money. If you usually burn plant matter left over from farming, it is better for the soil and your farming if you can leave the plant materials on the ground.
- No burnt food: With a Solar CookIt, you don't need to stir and watch.
- Cook gently: Saves vitamins and flavour.
- Good for meat: Gets very tender.
- Good for beans and maize: Use little or no fuel to cook them.
- Portable: A foldable Solar CookIt can be carried to the field or work for midday meal.
- Healthy: You can use the sun's heat to pasteurise milk and water in the CookIt, getting rid of the bacteria that cause diseases (See Action Sheet 25: Solar Pasteurisation).
- Good for business: Some people use Solar CookIts to make bread and cakes for sale. They cost less to make because less fuel is needed, so you could make more of a profit.



Solar CookIt. Image, PACE

Are there any disadvantages to cooking with a Solar CookIt?

The Solar CookIt design shown here is not good for flat breads or deep-fried food or pastries with bottom crusts.

You need to be able to organise an on-going supply of transparent, heat-resistant plastic bags. Each CookIt will use between 10 and 20 plastic bags every year. Solar cooking takes time, and works best when the sun is high in a clear sky, so you may need to change your daily schedule to get the most out of your Solar CookIt. You also need to have a good place to cook outside. It may help if you can leave the food to cook while you do something else.

How do you make a Solar CookIt?

This design is large enough to cook one large pot of food for about 6 people.

Materials

For the reflector: Corrugated cardboard (carton board) – 0.9 x 1.2 m; Aluminium foil (0.3 x 3m); Glue (non-toxic, water based, diluted 1:1 with water); Paintbrush; Utility knife or cutting device; Pencil, pen or other marking device; Large rule or other straight edge.

For use when cooking with the reflector: Three big stones to hold reflector down on a windy day.

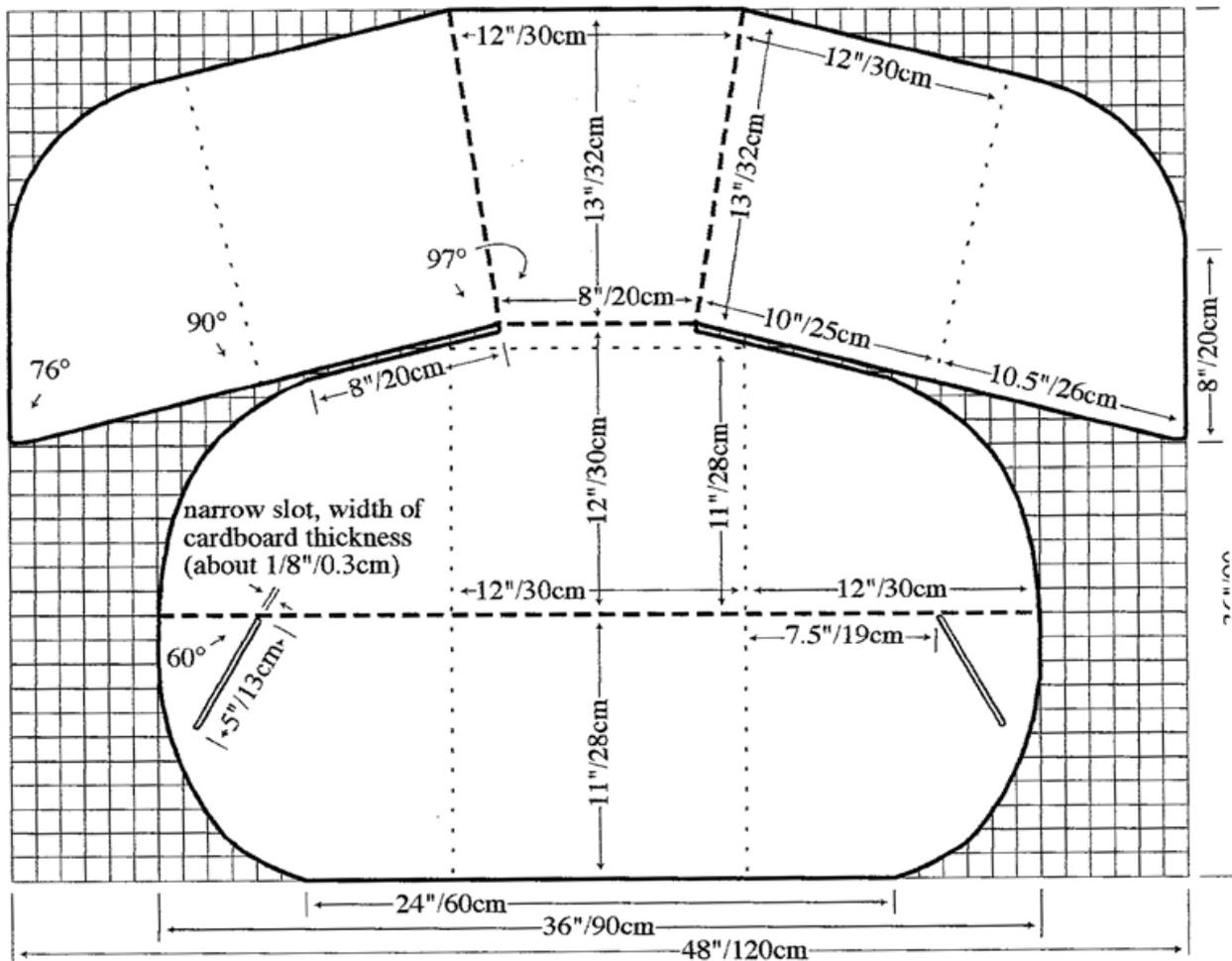
A black pot with a black lid to absorb sunlight and food – a wide shallow thin metal pot with a tight-fitting lid is best. You can paint the pot black yourself. Paint the tops and sides of the pot (outsides only). Use any non-toxic paint, but dry in the sun until the paint smell has gone. Make sure the lid of the pot fits well. Some people have experimented with paint made of wheat-paste and soot.

A clear heat-resistant plastic bag. For fastest cooking, raise the pot on three small sticks or stones, or simply some twisted old cloths or cooking bags.

Construction

1. Draw cut and fold lines on the cardboard as shown below

————— cut lines - - - - - fold lines ······ optional fold lines for compact storage



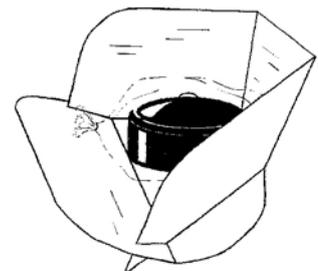
2. Cut out the CookKit shape and the two 60° angled slots in the front panel. Be sure to make the slots narrow so the 76° angled corners from the back panel fit snugly to hold up the front panel.

3. With a blunt edge, such as a wooden spoon handle, score the fold lines. Make straight folds by folding against a firm straight edge. Only score the optional fold lines if you intend to fold the CookKit for compact storage.

4. Using a paintbrush, spread the glue/water mixture on the dull side of aluminum foil and press the glued sheets of aluminum foil tightly and smoothly like wallpaper onto one entire side of the CookKit. A few wrinkles won't hurt.

5. Leave flat until dry. Trim any excess foil.

6. Assemble the cooker in a shaded area, to avoid dazzling your eyes. Lay the panel flat with shiny side up, and the wide back panel away from you. Tilt the back panel towards you and carefully slide the ends of its flaps into the slots on the shorter front panel that is nearest to you. As you do this, you will also need to tilt the front panel up. Clamp the inserted flaps, on the underside of the front panel, using clothespins or similar device. You are ready to cook!



When can I use the CookKit?

You can use the CookKit whenever the length of your shadow on the ground is shorter than your height. This tells you that the sun is high enough in the sky. Cooking is not possible on cloudy days, very early in the morning, or after the sunset.

Where should I use the CookKit?

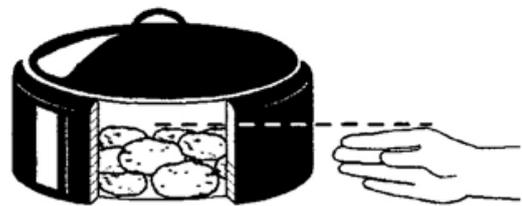
Put the cooker in a sunny place, free from wind and shadows, where your food will be safe. To help with this, some people cook together, so that one person watches several cookers. Some people cook on a flat roof. Some build a sunny secure enclosure. Some people fold up the CookKit and carry it with them to where they will be working that day.



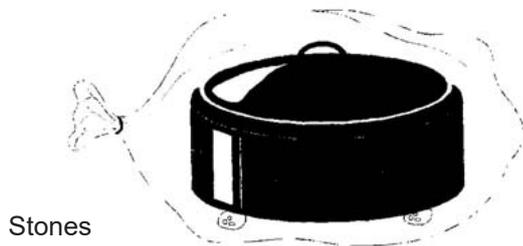
Cooking in the field. Image, Sarah Watson.

How do I cook with a CookKit?

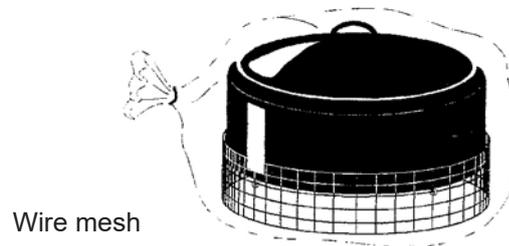
Put food in the dark-coloured pot. The food should be no deeper than a hand-width.



Put the pot into a plastic bag with the pot rest under the pot and inside the bag. Close the bag with a string or tuck the open end in under the pot. Leave a little air in the bag so the bag mostly doesn't touch the pot lid.



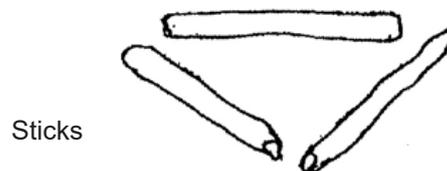
Stones



Wire mesh



Twisted plastic bags



Sticks

Stand in front of the reflector to block the sun and avoid glare to your eyes. Some solar cooks wear sunglasses! Place the pot on the pot rest in the middle of the reflector. Adjust the front panel to shine extra light on the pot (see below) and leave to cook for several hours until done.

No need to stir!

When checking food, use a pot holder (a piece of cloth or thick glove) to protect your hands from the hot pot. Avoid steam burns by sliding the lid toward you so that the steam goes away from you.



What can I cook with the CookKit?

Almost anything! Experiment! You can put all the ingredients in at once!

Heat dried grains, pre-soaked beans, or rice with water and cook without stirring.

- Rice: 1 measure of water to 1 measure of rice.
- Maize meal: 2 measures or less of water to 1 measure of maize meal.
- Pre-soaked beans: Add water so it is just a little above the beans.
- Pasta: Heat water first, then add pasta and return to solar cooker for about 15 minutes.

Cook fresh meat and vegetables with little or no water. They cook in their own juices. Bake bread and cakes in dark, covered pots in the middle of the day when the sun is strongest (from 2 hours before midday to 2 hours past midday). Chewy desserts like cookies come out better than crispy ones. Make tea with half as many tea leaves as usual

How long will it take to cook?

Cooking times vary with time of year, time of day, amount of sun, amount of wind, thickness of pot, amount and size of food, amount of water.

Typical cooking times for 2 kilograms of food are:



Eggs, rice, fruit, above-ground vegetables, fish, chicken.



Potatoes, root vegetables, some beans and lentils, most meat, bread.



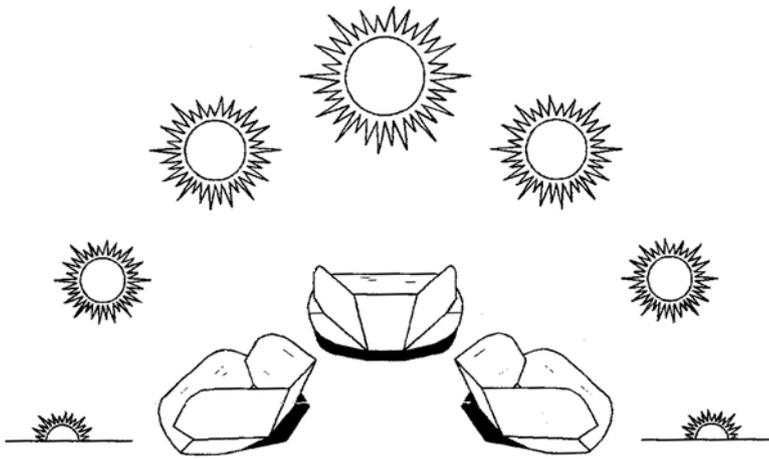
Dried beans, large pieces of meat, soup, stews.

Food cooks fastest between 10am and 2pm, when the sun's energy is most intense. Food always cooks faster if it is chopped into small pieces.

How should I position the CookKit to catch the most sunshine?

The CookKit cooks best if the short front panel is facing towards the sun so that the shadows are behind the sides and under the front. Raise or lower the front flap so there is a small shadow, about half its width under it. The flap should be angled higher when the sun is high and lower when the sun is low. You want this flap to reflect the sun, not block it.

As the sun moves through the sky, you can move the cooker to catch the sun. But if you don't have time, just position it to catch the most sun for the time when you are cooking. For example, when cooking a noontime meal in the morning, aim the shorter front panel towards the east or approximately where the sun will be mid-morning and start cooking by 9 or 10am. For cooking an evening meal, aim the front panel to the West, or approximately where the sun will be mid-afternoon and start cooking by 1 or 2pm. If you are leaving the food in the cooker all day, aim the front panel at where the sun will be at noon or early afternoon.



If it is windy, put a rock behind each side wall and under the front reflector. Cooking time will be longer in a strong wind.

How should I look after the CookKit?

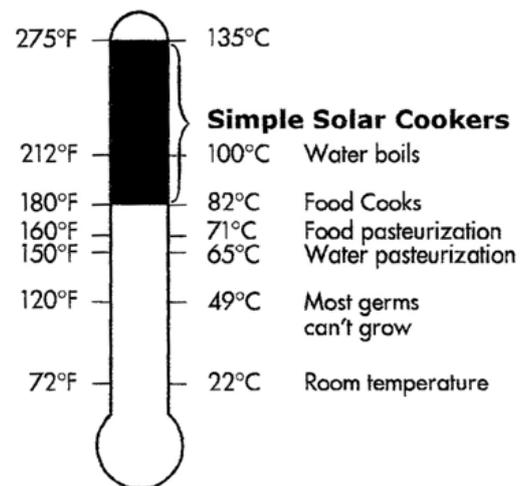
After use, wipe the foil gently and fold the CookKit flat. Store it in a safe place away from moisture and animals. If it gets very wet, keep it flat with the shiny side down until it is dry, so it keeps its shape.

Plastic bags: After use, air-dry bags or wipe gently. DO NOT WRING. Store bags flat inside the cooker, and protect from sharp objects. With care, bags can be re-used 10 to 15 times. When the bags have been worn out they can be used to make ropes, mats, baskets, bags, fans and containers.

How hot does it get inside a Solar CookKit?

The temperature inside the pot will reach between 82 and 121°C or more. Most food cooks at or below 82°C, so these temperatures are hot enough to cook the food but not hot enough to burn or dry out the food, or damage nutrients.

As with any cooking method, bacteria begin to grow in cooked food that is allowed to cool to temperatures between 52 and 10°C. These bacteria might cause people who eat the food to become ill. If cooked food has been left in this temperature range for more than 4 hours, throw it away.



Acknowledgements

This Action Sheet was prepared by Nancy Gladstone and is based on the following sources: Solar Cookers: How to Use, Make and Enjoy by Solar Cooker International; Teaching Solar Cooking, Solar Cookers International Trainers Manual, and has been reviewed by Kevin Porter, Education Resources Director, Solar Cookers International (<http://solarcooking.org>). Illustrations are reproduced from source documents with permission.

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