### Simple Solar Cooker

by **yaaay** on January 18, 2006

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http://www.instructables.com/id/Simple-Solar-Cooker/
**intro:** Simple Solar Cooker

Solar cooking for the world's poor.*

The aim of this project is to create instructions for a Solar Cooker that can be sent to developing countries. For this to reach the widest population the instructions must be non-language based and that it can be constructed with the barest minimum of tools, materials and skill.

The instructions should be as simple as possible so that they can be easily hand drawn and modified.

The cooker will use the curve of a hanging rope or chain which will be approximately parabolic. (google catenary if you do not know why) This shouldn't matter as a catenary gets closer and closer to being a parabola the wider you stretch it and we are focusing on a pot, not a point.

The dimensions are important. Using a 4:1 ratio means the focus will be in the middle along the top of the cooker in line with the two ends which makes setting it up really easy. (See step three)

The materials could be anything from corrugated cardboard to plywood with aluminium foil to broken glass for the reflector.

I have not made this at all as I do not have the space (tiny london flat) and the required sunshine.

If someone builds and tests this cooker it would be great to hear about your experience and please make improvements!

I have placed this in the public domain, I want this idea to grow, mature and most importantly be used.

- **HAL 9000 EDIT**

Or for recreational, less heroic purposes. I, for example, will be taking this with me to Burning Man '07 as a practical, green way of cooking my food. How about cooking hot dogs? You can use this where you may not be allowed to use a barbecue, and it requires no fuel or lighting. Instant heat!

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**step 1:** Measure two boards 4:1

If you can come up with a clearer way to show a 4:1 ratio, do so!
step 2: Use a rope, heavy string or chain to trace curve from top corners to bottom
This really needs to be clearer.

The images needs to portray that you can use any heavy rope or chain and that it goes from one top corner to the other and reach the bottom.

It is also clear that there needs to be extra material for strength along the bottom.

step 3: Cut out curve

step 4: Attach boards to a base of same length but width can vary
I've left the attachment method to the ingenuity of the builder as i cannot make any assumptions to what tools or resources the builder will have.

What I don't know how to do is indicate on the diagram that you can have any width to the base. Any Ideas?

step 5: Cut a flexible board of the same length as rope/chain in step 2.
As mentioned by Hal 9000 you can use the length of the chain/rope in step 2 to measure the length of the reflector. This way your length will turn out perfectly, and you will have no trimming at all once you have mounted it to the cooker base.

An improvement to the diagram would be to draw it slightly curved to show that it is to be flexible.
step 6: Glue tin/aluminium foil or broken glass/mirror to board

step 7: Attach flexible board to curved cut out.

step 8: Show how to use
The cooker can be tilted along its length and rotated so that the sun is always in line with the focus.

(I admit that the main picture of this project makes it look like the cooker remains on its flat base)

Related Instructables

Make a "compound" parabolic solar cooker from election signs! by gaiatechnician
Adapt a clock today! Cheap trackers boost solar panel and solar cooker performance. by gaiatechnician
Optics experiments on the cheap (video) by gaiatechnician
DIY 2 bucket dripper tracker for solar cookers and solar panels is cheap and it works! (video) by gaiatechnician
Solar parabolic cooker with the mechanical mathematician! by gaiatechnician
Let's go green! Build a Solar Powered Parabolic Cooker! by Weissensteinburg
Clock Based solar tracker experiment (video) by gaiatechnician
Arranging your life ecologically, ethically and simple by Green_Anarchist

http://www.instructables.com/id/Simple-Solar-Cooker/
gaiatechnician says:
I began experimenting with solar cookers with "compound" parabolic dishes this September. I found them to be far better than parabolics for what I did.
My cooker gets 3 hours of collection with having to move the dish.
I wonder is there an easy way to make the compound parabolic shape?
I have now done the dome mold thing I suggested and it works really well.
And I made an instructable and have a template for the compound parabolic dishes.
Just in case anyone is interested.
Brian

yaaaay says:
Could even use a polished un-rolled 40 Gallon drum.

static says:
But that would be a cylindrical reflector that doesn't focus on a single point or line.
http://www.fossilfreedom.com/increase-output.html
Even if the drum has a white coating or lining, I would think more reflective surface would perform better. Not that I'm saying one shouldn't give it a try if they have the drum. One drum would make 2 cookers if it works.

yaaaay says:
This would be used as the reflector and strong enough to not need a back board. Although you'd probably need something like plywood for strength.

yaaaay says:
To clarify:
Although you'd probably need to build the whole thing out of something like plywood for strength.

gaiatechnician says:
First, it seems that deep dish parabolic solar cookers are best.
Second, it seems that it is hard to make them (though I have made a 4 ft by 4 ft one from cob and it was a good first model).
Why not this idea?
1 Design a generic deep dish. Say 4 ft round,
Then design a dome that it fits exactly over.
The dome might have a hole in it to just below the focal point (to easily mark the point).
Build the dome centrally in villages.
People can then use the dome as a form for making cardboard, or cob or mud or daub and wattle parabolic bowls!
They do not have to completely cover the dome to succeed.
No need to make exact cuts either!
You make the first radial cuts in the cardboard, you fold the cardboard in and cut and tape to match the parabolic dish.
It might be pretty quick!
Perhaps try it with the outside of an old satellite dish as the dome?
I dont have one.

gowithflo says:
I'm gonna try this out! live in New Mexico so I know it'll work great. Especially for my plan to kill bermuda grass (with boiling water in a galvanized watering can).
Why dont you add this to the full belly project group? (designs for third world solutions).

yaaaay says:
Hi,
How did it go at Burning Man? (so jealous)
Did you try out the design?

kellusion says:
a lot of the designs on the solarcooking site make use of the greenhouse effect to trap heat ed air around the pot. i don't think its essential, and i've never build a parabolic one, only the box style, but it might be worth considering. oven bags are a popular and relatively cheap solution, since they're clear and withstand the heat.
gaiatechnician says:
I have found the bags to be really important. You can easily boil water with the bag around. No bag and the air dissipates heat rapidly. That comes from experience with funnel cookers and with parabolic cookers.

SacTownSue says:
This reminded me of something I saw a couple of weeks ago which I cannot find right now.
I think they used a box lined with foil and somehow placed inside it an aluminium roasting pan that had been sprayed black on the bottom and placed inside the roasting bag that was tied shut.
I've been working on a design of my own which is adaptations of others. Planning on using the cooking bag. My design won't work for the outback tho. It's very much a city version.

SacTownSue says:
Here's the one I found a couple weeks ago:
http://www.re-energy.ca/t-i_solarheatbuild-1.shtml

puffin_juice says:
This website is where I got my inspiration from to build one of these solar cookers http://sci-toys.com/scitoys/scitoys/light/solar_hotdog_cooker.html
And this has got to be one of the best DIY websites for solar cookers
http://solarcooking.org/plans/default.htm

SacTownSue says:
I really like that one on scitoys.com

puffin_juice says:
I have personally built the solar funnel cooker and was impressed with its simplicity and effectiveness. If you build one though I would advise not to use corrugated card because it doesn't bend nicely instead use flexible card as it will form a smoother funnel

gaiatechnician says:
I made funnel cookers too. The only problem is there is a size limit.
You really have to match your pot size and your pot placement to the size of the funnel. You can make a huge funnel but you have to have a much larger pot as the light will mostly miss a smaller one.
Has anybody tried a black painted oven bag round a small pot in a solar funnel? The bag might heat the air really hot and transfer the heat to the little pot? Thats the problem with funnel cookers, placement. Really they should have a long flask in the centre of the funnel part pointing at the sun.

HAL 9000 says:
Very nice idea! I like it, and i have a suggestion
the length you will need in step 5 is the same length as the chain/string you used in step 2. no guesswork, just use the string ad your guide.

yaaaay says:
Yes of course, that is a really simple solution.
Thank you, that does make sense.
I'll update the text instructions now. One day I'll improve the diagrams too. (Unless of course you would like to :-)

blodefood says:
There are solar box cookers that can be home made for a few dollars or you can buy them manufactured in the hundreds of dollars.
The solar box cookers are being made for developing countries where firewood is scarce. The device virtually eliminates the lengthy time needed for firewood collection which can be spent on other activities.
Something which I don't see very much in instructions for making solar cookers is cautions around looking at solar cookers. The reflected sunlight is potentially damaging to the eyes.
yaaaay's line of thinking is helpful though. We need more people who think this way.

normi says:
How about sending the instructions out with a mylar emergency blanket?(They're cheap ($1-$2) and lightweight and work perfect for a solar cooker). I like the idea of pictograph instructions.
turdomatic says:
I heard about some folks using pieces of mirrors glued to their roofs in order to reflect sunlight, thereby infinitesimally helping reverse global warming - so I
tried it for cooking too - well, it did take some time but I got a nice hot cup of tea out of it.

wrique says:
Rather than gluing aluminum foil to the reflector, consider using aluminum duct tape. It comes in 2” & 3” widths so you’d have to lay down several strips.

I’ve use this kind of tape for all kinds of stuff, including covering my custom bike frames & other parts to get an inexpensive chrome-like finish -
http://wrique.blogspot.com/2006/01/ice-trikes.htm

yaaaay says:
That would work really well and it is the type of ingenuity the builder should incorporate when making this.

If you can come up with a generic way to describe applying a reflective surface to something, that can be understood with a simple drawing, so that it
does not need to be translated into multiple languages (phew) I’d really like to know!

Cool trikes! - although the above link is dead (had to go via your blog - an 'l' missing in the url) - it must feel very strange riding a rear steered trike, it'd
feel like over-steer on a normal turn!

radiorental says:
The idea could be expanded to two sections, three boards. The outer two board being higher than the center and providing a parabolic along the width as
well as length:

See other designs here: http://solarcooking.org/plans.htm#parabolic-style

yaaaay says:
I’d like to see a sketch of your expansion :-)

radiorental says:
no problem, I’ll knock out some sketches when I get a moment. You should be able to put something like this together in your london flat and test in a
park when the sun decides to make an appearance.

I’ll try to sketch something that is foldable, which seems to be a plus feature on the site above.

yaaaay says:
Yes I have seen the above site and contacted the owner about this design. He like the idea but, quite rightly, replied that he couldn’t host this design until it
had been properly tested in the field. As I don’t have the resources or sunshine to test this I thought that I could post it here and have a collaboration test and
fine tune the idea.

The many highly efficient cookers on the above sight are also quite complex and require special tools to manufacture. This cooker requires the barest
minimum.