

Chinese Stir Fry Using a Simple Cardboard Solar Cooker

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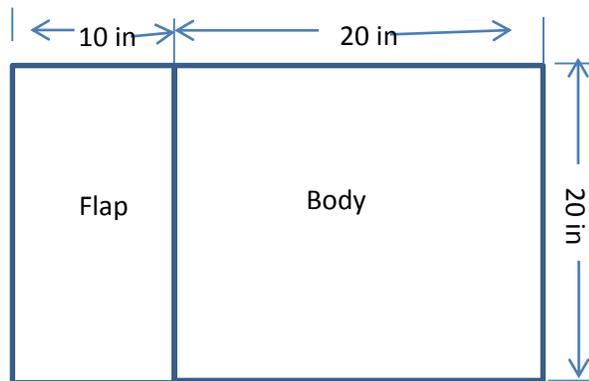
Background:

Solar cooking is one of the attractive ways of using renewable energy in our daily lives. However, one of the limitations in solar cooking is that it is difficult to use the solar cooker for stir fry. For example, one of the key elements in Chinese stir fry is to use extremely hot oil to “fry” a small amount of green onions so that the onion flavor will penetrate the vegetable being cooked. Solar cookers generally are not able to collect enough instant energy to produce the same result.

This procedure introduces a method of using a simple cardboard solar cooker to prepare a dish with similar appearance and taste of a Chinese stir fry.

Materials:

1. Cardboard box: 20 x 20 x 20 in
2. Each cardboard box can be cut into four pieces to make two solar cookers (each piece should have a main body (20 x 20 in) and a flap (10 x 20 in) as shown below:



3. White glue: diluted with water 1:1
4. A semicircle for each group of two students
5. Aluminum foil, 18 in width
6. Aluminum tape, 2 in width
7. Rollers for glue
8. Paint pan

9. Clean rollers to eliminate bubbles
10. One green pepper (~0.5 lb)
11. Small amount of salt & oyster sauce
12. Two tea spoon of vegetable oil
13. A folding chair
14. A parabolic shaped clear glass food container
15. A dark wok for cooking
16. A spatula
17. An insert from a slow cooker (see photo A)
18. A parabolic shaped glass container (see photo B)



A

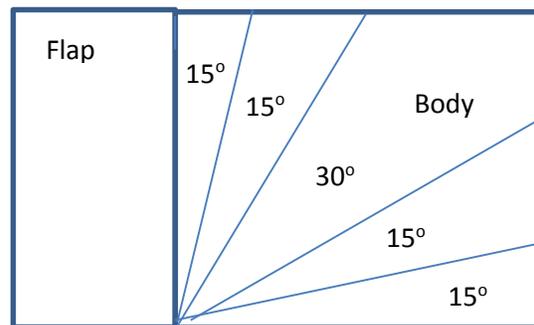


B

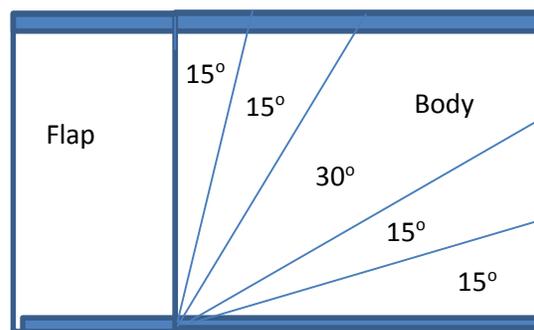
Procedures:

A. Building the cooker

1. Use a key or paint chip to draw division lines on each piece as shown below:

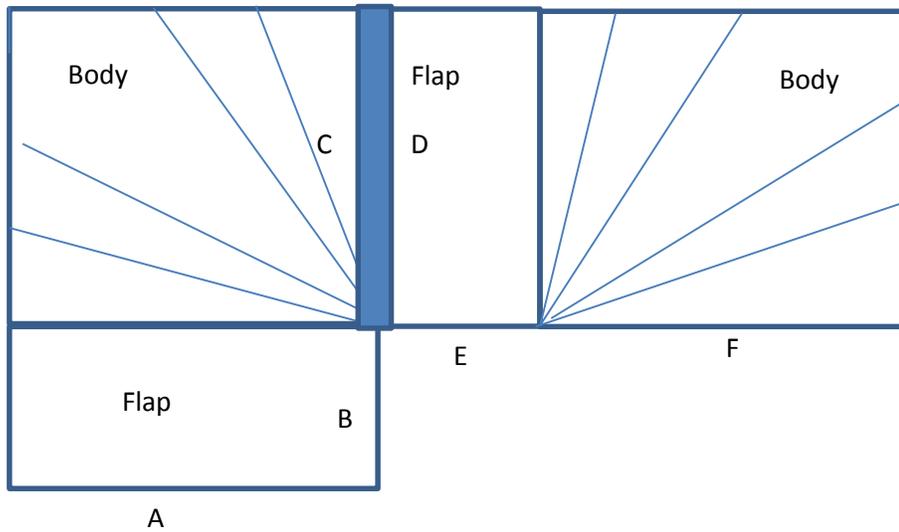


2. Fold along the division lines (be careful not to break the cardboard)
3. Use the roller to evenly distribute white glue on the board, leaving one inch on each side:



4. Place a sheet of aluminum foil on the glue and push down on all surfaces, make sure no bubbles trapped underneath. You can use a sharp item to poke a little hole if some air were trapped between the aluminum foil and the cardboard.

5. Use aluminum tape to seal all sides of the boards.
6. Lay the two pieces of cardboard as shown below:



7. Use a piece of aluminum tape to join & seal C & D sides as shown above. Fold the cardboards so that B & E sides meet. Use another piece of aluminum tape to join and seal A & F sides. Now your solar cooker is constructed as shown in the following picture:



B. Cooking

1. Prepare the green pepper by cleaning and splitting into small pieces (~ 0.5 x 0.5 in); Add a small amount of salt and oyster sauce.
2. Prepare green onions by cutting into small pieces (~0.2 x 0.1 in).
3. Place the solar cooker on a folding chair, stack the glass container and the insert from a slow cooker on top of the solar cooker (see photo, A). Pre-heat for an hour. This pre-heating period is to store enough heat for the top surface of the glass container. Alternatively, you can cook something using this pre-heating time. I cooked some porridge before I stir fry.
4. After the top surface of the glass container turns hot, almost brings a burning sensation if you touch the surface using your fingers. Remove the insert of the slow cooker & place the wok on top of the container.



A



B

5. Add 2 tea spoon of vegetable oil in the wok. Then place the prepared green pepper and green onions next to the wok. See photo B. **Wait for 15 minutes.**
6. Then, add the green onions into the wok. Use the spatula to stir. Be careful NOT to block the sun. A few minutes later, the green onions will start to shrink and the onion flavor starts to come out.
7. Add prepared green pepper into the wok. Stir with the spatula. Be careful NOT to block the sun. Cooking time can be variable in this step, depending on your

preference. If you would like the green pepper to be crunchy, you can cook about 8 minutes (This is what I did). You can also cook the green pepper for 10-15 minutes. (See photos below A: cooking & B: dish)



A



B

Results and Discussion:

- 1.** Although the process is different than regular stir fry with splashing oil, the onion flavor penetrated into the green pepper. The appearance and taste are quite similar to a Chinese stir fry.
- 2.** One of the advantages in solar cooking is that the process is actually much cleaner than a regular stir fry.
- 3.** Future improvements:
 - a.** To build a parabolic shaped cooker to better focus the sun light;
 - b.** To replace the wok with a heavy duty cast iron pan with better heat capacity.