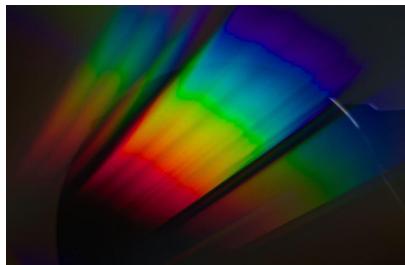
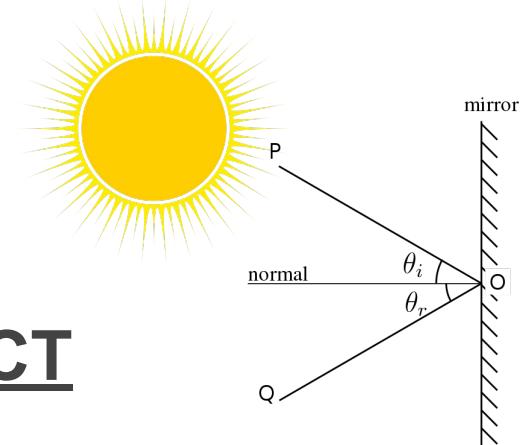


SOLAR COOKER PROJECT



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COMMON DESIGN IDEA

- Box type solar cooker with reflecting plane mirrors
- Adjustable freely rotatable lid with reflector
- Box sourced from Cardboard
- A fixed hinge type mechanism in order to keep the angle fixed to allow maximum reflected light entry inside box
- Usage of transparent glass middle lid so as to account for greenhouse effect to avoid radiant heat losses
- Usage of insulating material in between the inner utensil and box to avoid heat loss by conduction

Aabir - Materials Used



Transparent 5mm glass



Acrylic black spray paint



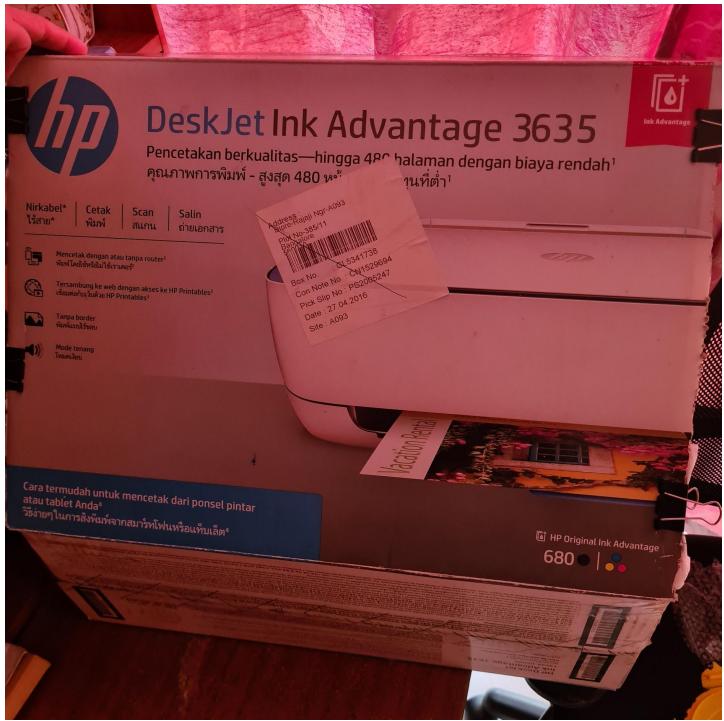
Black steel box with
insulated black lid



Cellophane tape and binder clips



Thick wire to act a friction hinge for the lid



Printer box with adjustable lid for outer casing

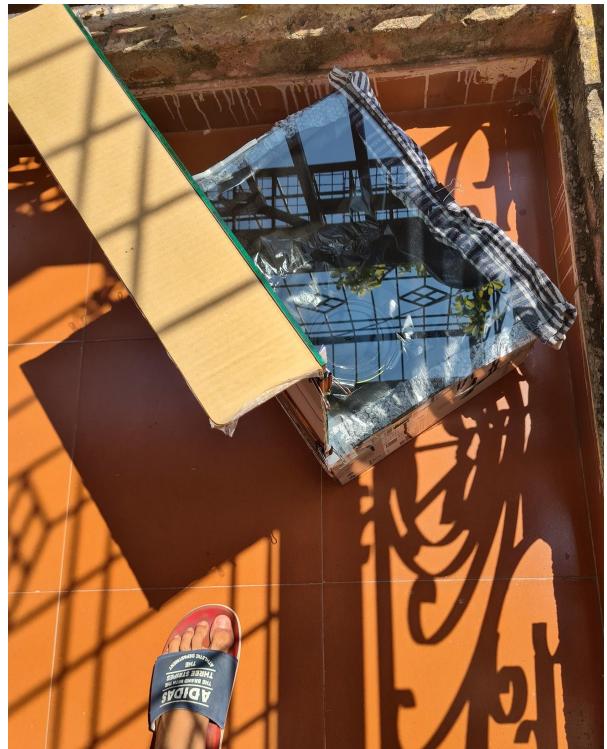


Mirror for reflecting Lid

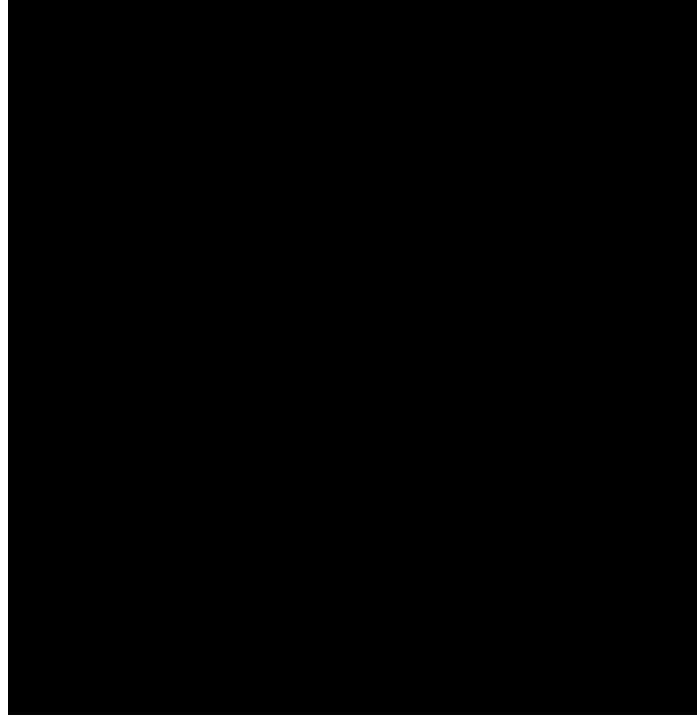


Bubble wrap and newspaper for insulation

Aabir: Final Product



Aabir: Cooking experience



Aabir - Design Parameters

- Outer Length of box = 44 cm
- Outer Breadth of box = 36 cm
- Outer Height of box = 18 cm
- Weight of box = 1.2 kg
- Dimensions of glass lid = 44 x 36 cm
- Dimensions of mirror = 44 x 36 cm
- Dimensions of inner cavity of box to hold utensil = 34 cm x 30 cm x 16cm
- Average diameter of nearly cylindrical utensil = 14 cm
- Height of cylindrical utensil = 6 cm

All materials except the glass, mirror and spray can used in this project were collected from all around my house. Since all the objects fit the necessary size parameters, they were used for the project making it a low budget project.

The glass and mirror piece were bought at the 2D dimension of the box for high efficiency.

Rohan - Materials Used



Old Waste Box with Adjustable Lid (Should be freely rotatable for 180°)



L shaped bracket

To hold the mirror, to be attached to friction hinge



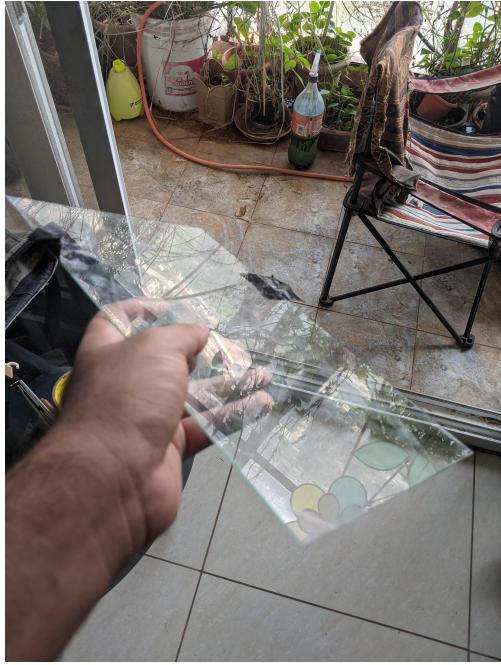
Acute Angled Friction Hinge

To allow the mirror to be adjusted in any acute angle



Obtuse angled Friction Hinge

Sourced from old broken toy, to allow adjusting of mirror in obtuse angle



Transparent 4mm glass
top to serve as
greenhouse effect
barrier to prevent
escape of radiant heat



Bubblewrap to serve as
insulating material



Aluminium Foil spray
painted black for uniform
distribution of heat in top
layer of insulation



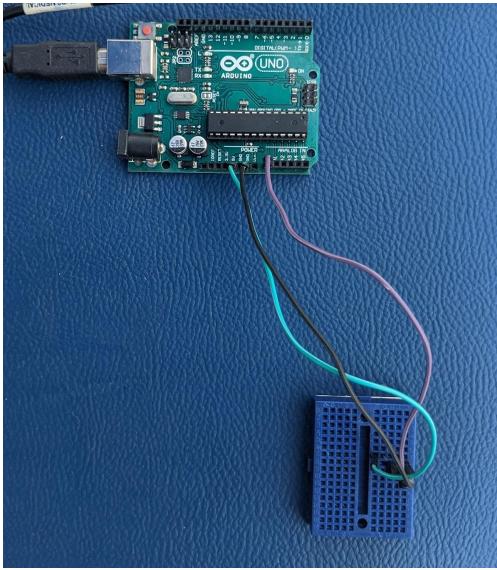
4mm thick one side mirrors
of dimensions of the inner
faces of the box



Small steel vessel
with lid spray
painted black from
outside



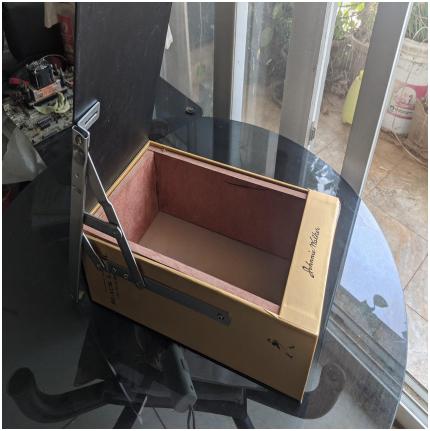
Small cardboard planks
to give box strength



Also an Arduino UNO microcontroller board was used (which I had previously) with a LM35 temperature sensor to measure the temperature data as a function of time

Few other materials like screws, adhesive glue to stick mirror on faces of the cooker, adhesive tape .etc to bring the solar cooker system together

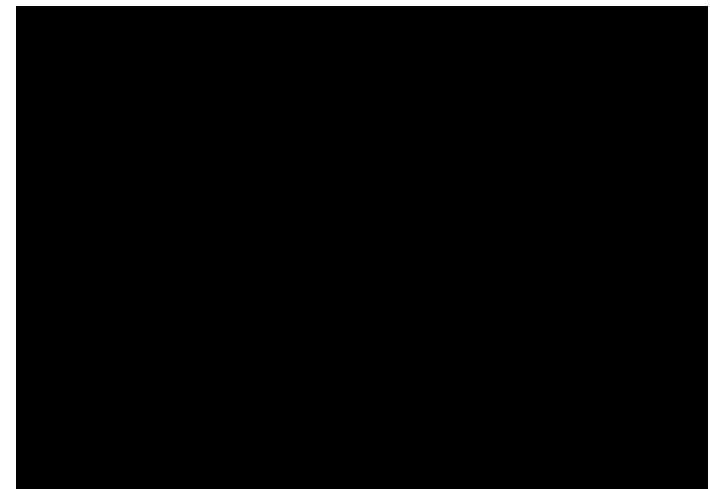
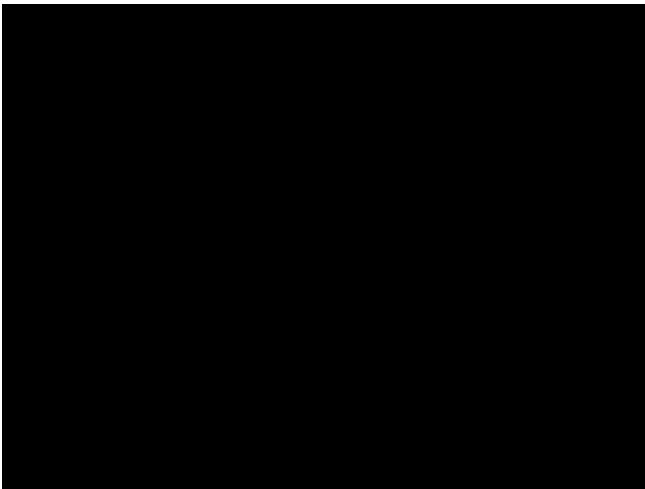
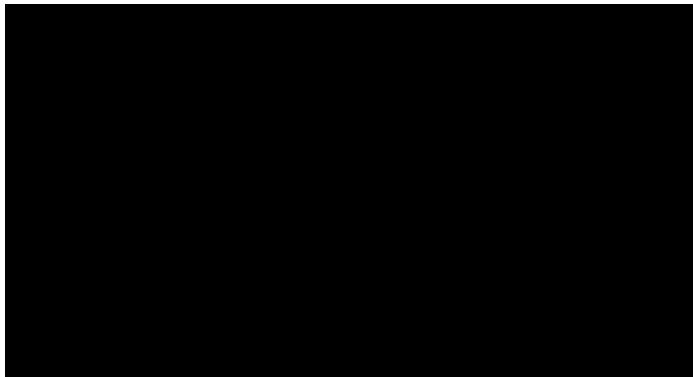
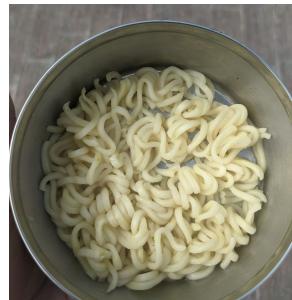
Rohan - Assembly of Solar Cooker



Rohan - Final Product



Rohan - Cooking Experience



Rohan - Design Parameters

- Outer Length of box = 33cm
- Outer Breadth of box = 20 cm
- Outer Height of box = 11cm
- Weight of box = 3.6 kg
- Dimensions of glass lid = 33 x 20 cm
- Dimensions of inner cavity of box to hold utensil = 26cm x 17cm x 11cm
- Area of upper reflecting mirror = 26cm x 17cm
- Average diameter of nearly cylindrical utensil = $(7.5+11)/2 = 9.25$ cm
- Height of cylindrical utensil = 6cm

Reason for Choosing Design Parameters:

Box was chosen, as it satisfied the rotatable lid and cardboard criteria chosen in common design. Glass dimension was chosen to be same as flat outer dimensions of box to avoid hot air loss for greenhouse effect. Mirror dimension was chosen so as to allow maximum light to be reflected into the box and for geometric symmetry. Utensil was chosen as no other suitable utensils were found. Bubble Wrap and Foil insulation was used as efficiency of cooking increased, in their absence noodles also were not cooking properly. The inner surface and utensil were painted black to allow maximum radiant absorbance. Both acute and obtuse hinges were used to allow maximum reflected light to enter the cooker.