

Single Motor Hovercraft Manual



Please note:

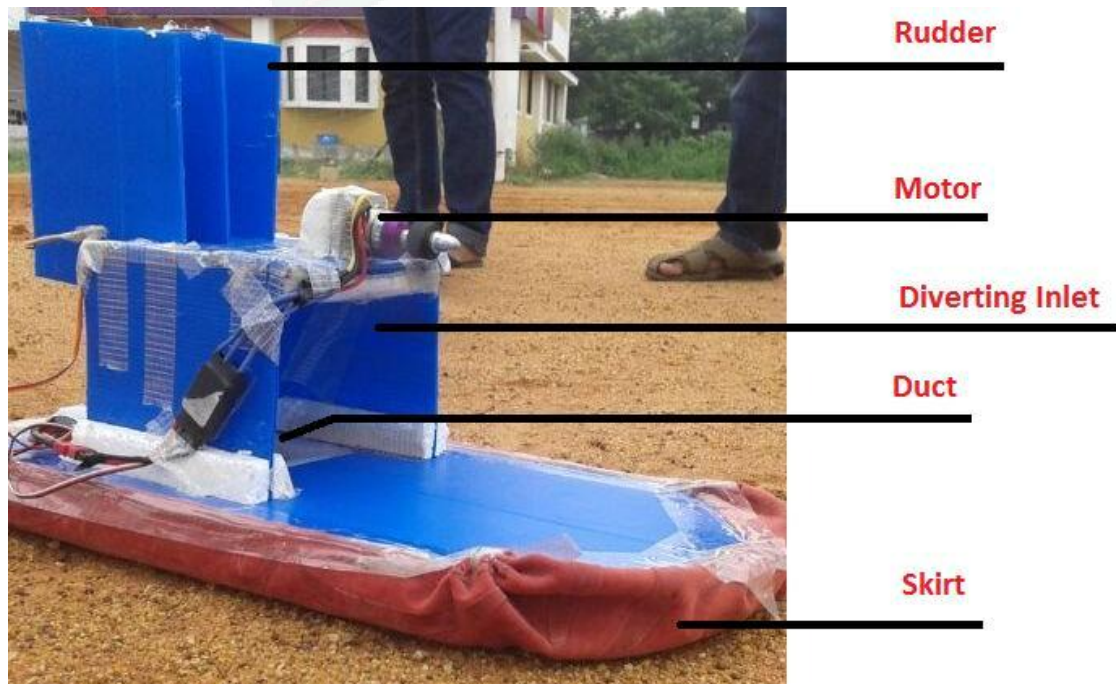
- This is a step by step procedure to build a **sample** single propeller hovercraft.
- Supporting images have been provided which include the design.
- Readers are strongly urged to experiment with materials, dimensions and components. The given model is **not guaranteed to win HoverOne**, or give any sort of advantage.
- All dimensions in centimeters, unless otherwise indicated.

About Single Motor Hovercraft:

1. This Hovercraft uses only one fan to provide both lift and thrust.
2. The fan is usually mounted vertically using the top two thirds for thrust and the bottom one third for lift (as shown in the figure below).
3. The lift air is directed into the skirt through the duct by the diverting inlet.
4. The air under the hovercraft is known as the air cushion. This air cushion leaks away under the bottom of the skirt to provide a film of air which the hovercraft rides on.
5. The servo is used for positioning the rudder in the thrust air stream to deflect the thrust air.

Advantages:

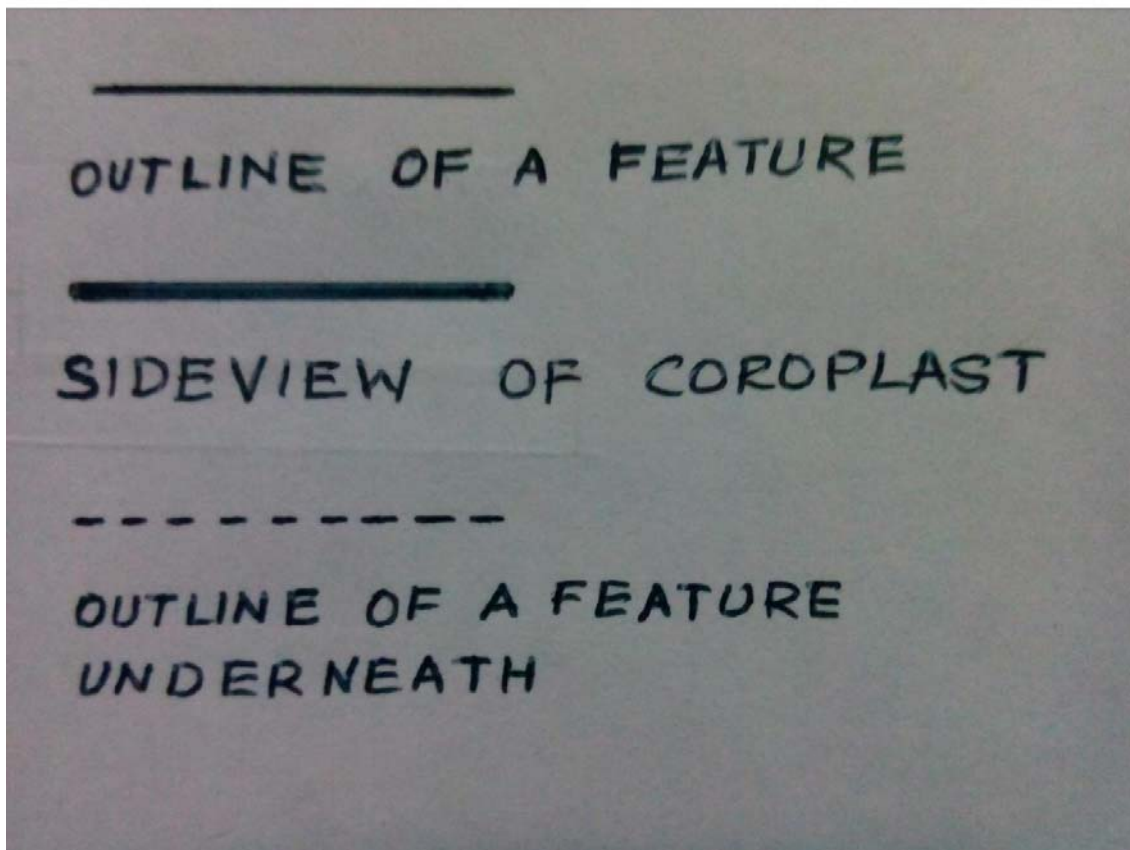
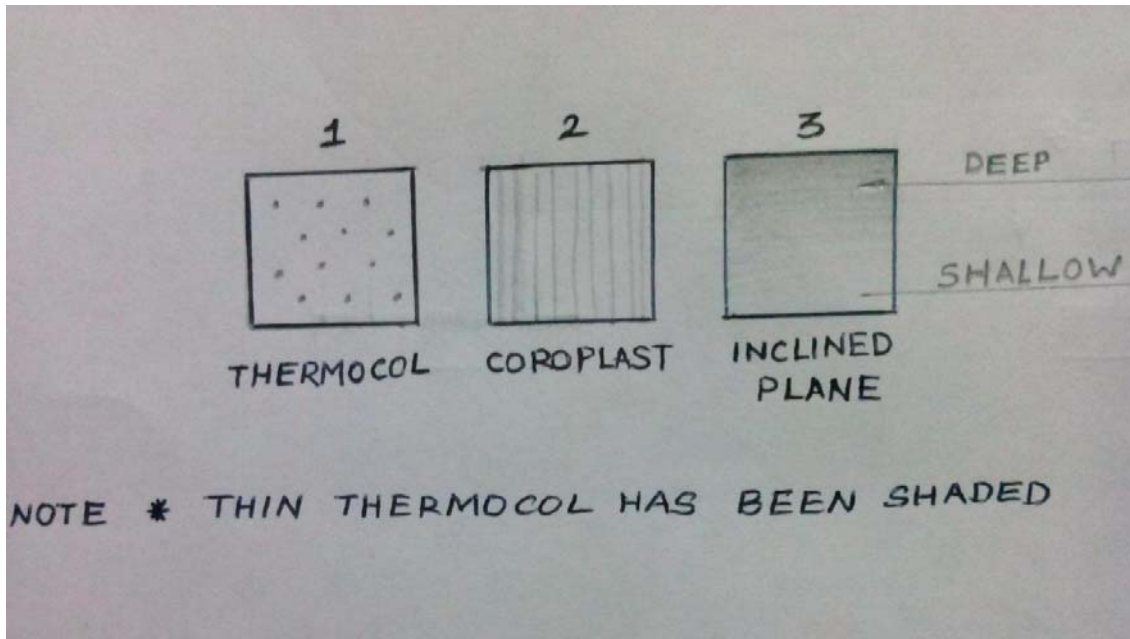
This hovercraft requires only one motor, electronic speed controller and propeller for fabrication. Hence, it is *cost effective*.



Points to remember:

- As a thumb rule for fixing dimensions, you can keep the length to be twice the width of the hovercraft.
- The capacity of the hovercraft\payload should be enough to support twice the weight of the electronics on it.
- Reducing the area won't reduce weight, it increases the pressure.
- Make your electronic connections water proof.
- Check the direction of thrust before mounting the motor.
- Give enough clearance for all dimensions.
- The motor mount should not vibrate or be brittle.
- Never apply hot glue or super glue to thermocol or coroplast.

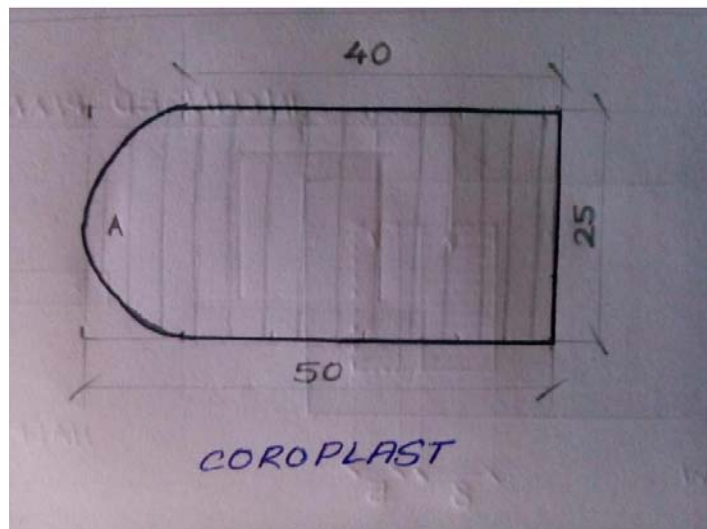
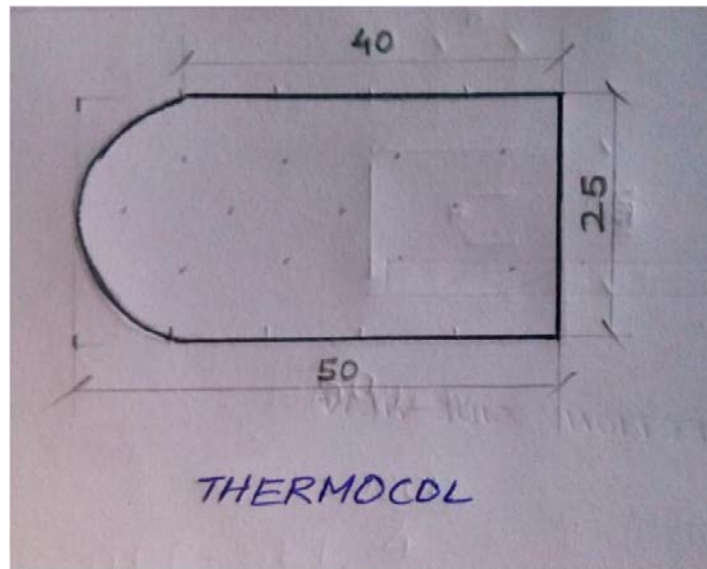
General Instructions:



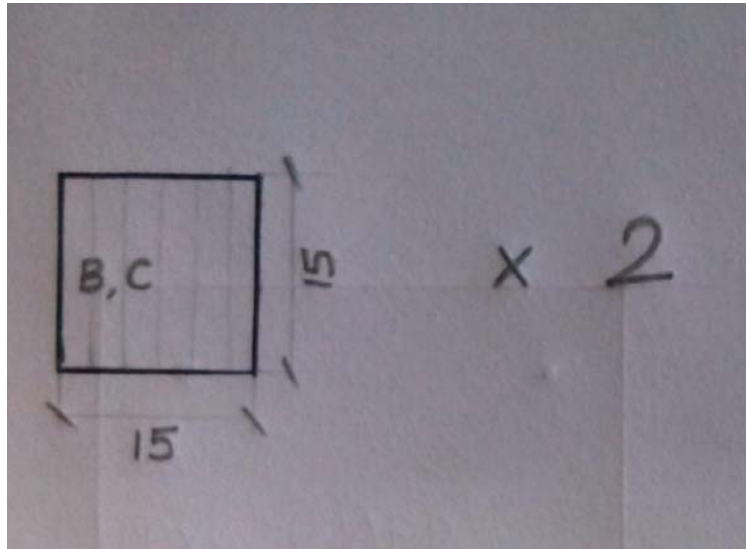
Fabrication Steps:

Instruction Set 1:

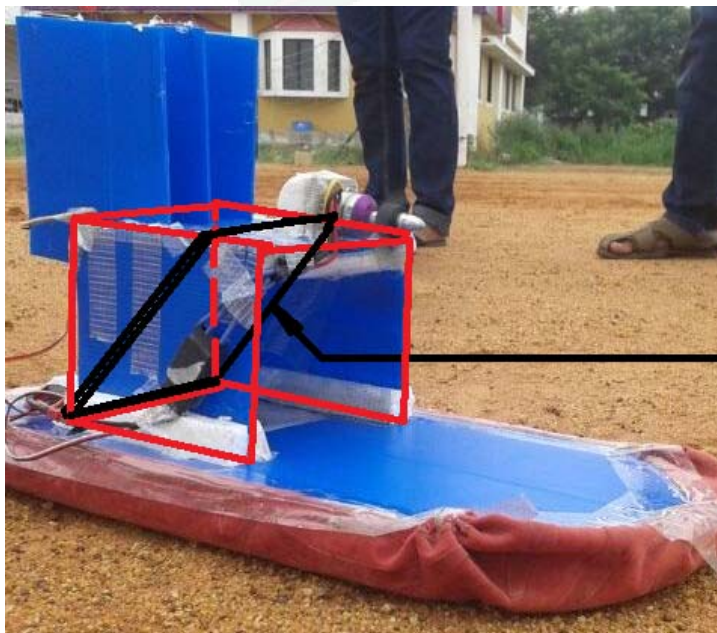
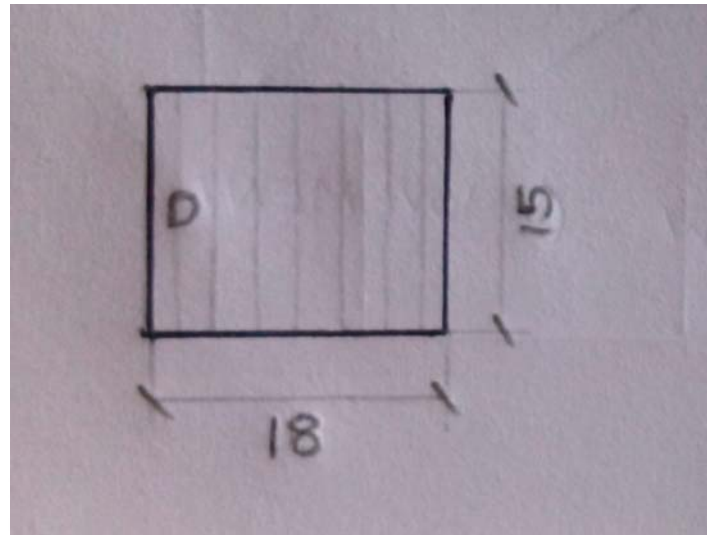
1. Cut pieces of thermocol and coroplast to rectangles of size 25cm by 50cm. Then cut them as shown below, to make the **base** of the hovercraft. Please note the flute orientation of the coroplast. (Indicated through lines in figures)



2. Cut 2 rectangles of dimensions 15 cm by 15 cm for the side walls of the diverting inlet.



3. Cut a rectangle of dimensions 18 cm by 15 cm for the slant wall of the duct from coroplast.

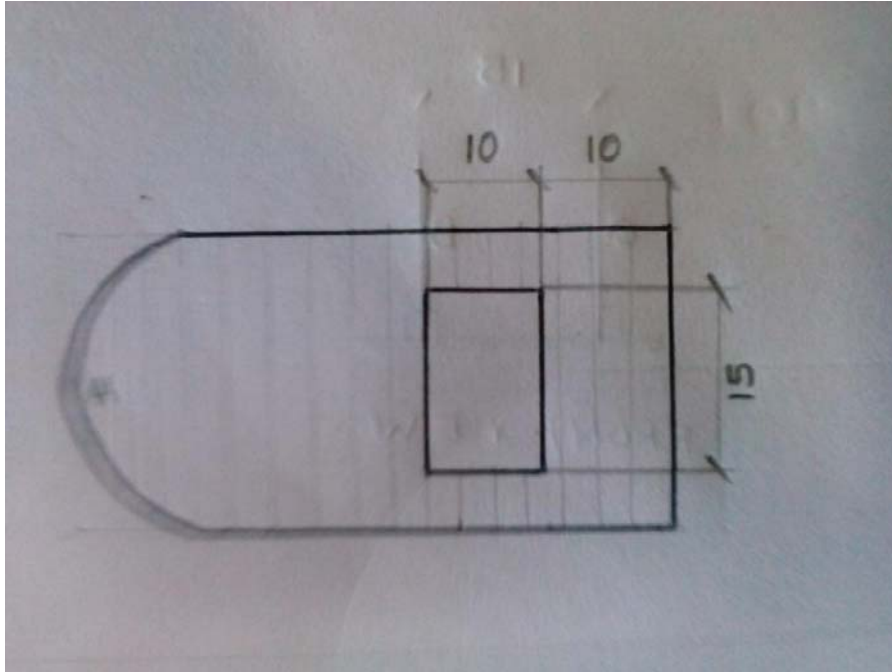


18 x 15 Slant wall

To direct air into the duct.

4. Draw a rectangle of dimensions 15 cm by 10 cm as shown on the 25 by 50 cm **coroplast** sheet and cut it out.

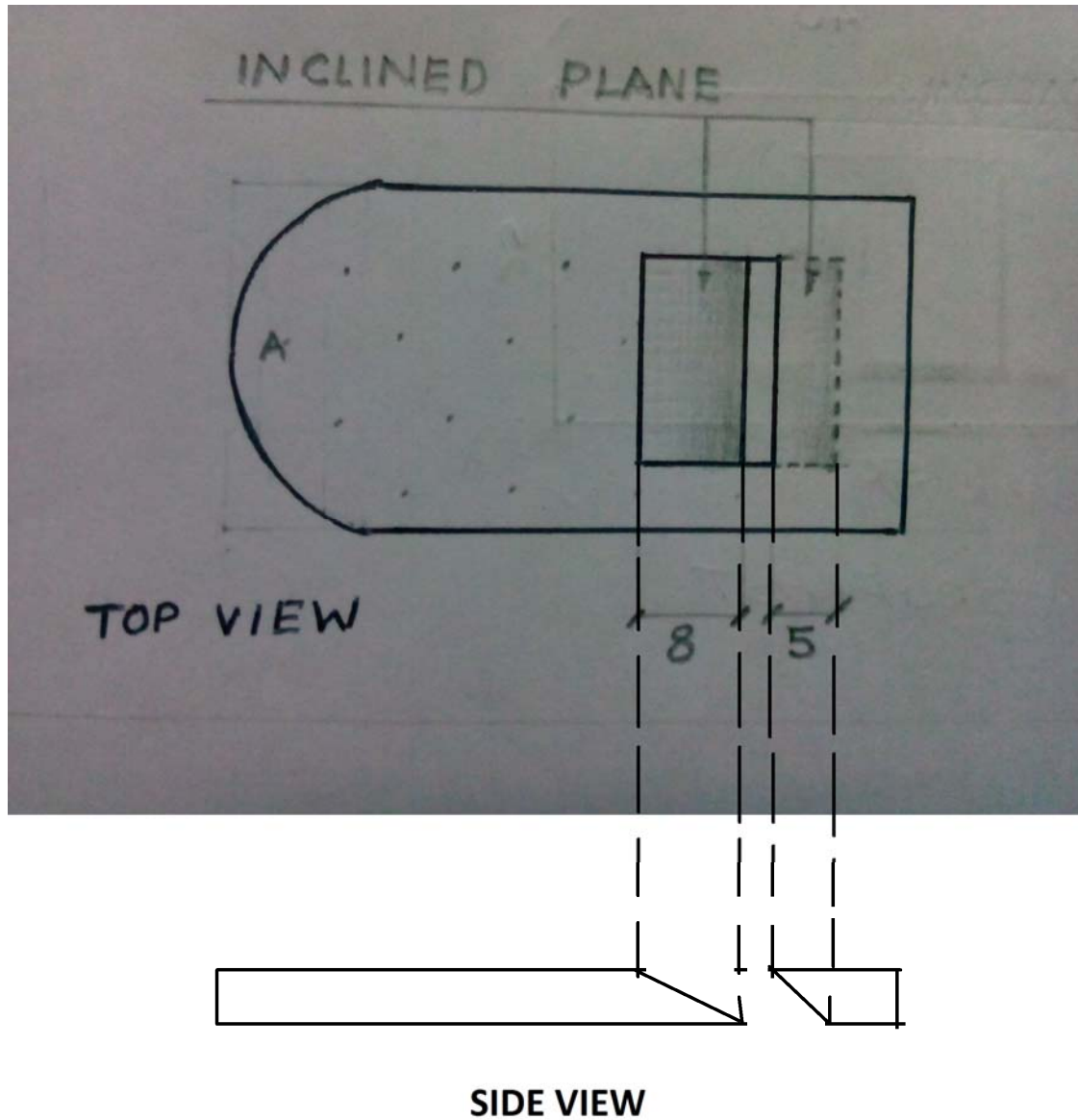
This cut is to provide the **duct cavity**.



Instruction Set 2:

1. Draw a rectangle of dimensions 15 cm by 10 cm on the thermocol as shown and cut it out as illustrated in the figure given below.

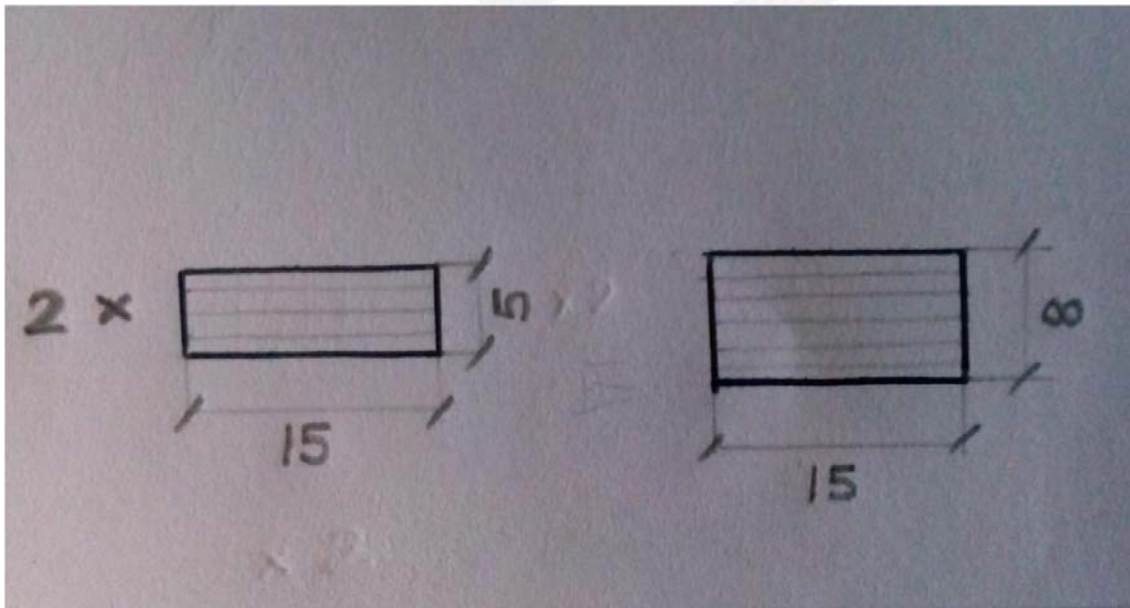
Side view of the duct gives a clear idea.



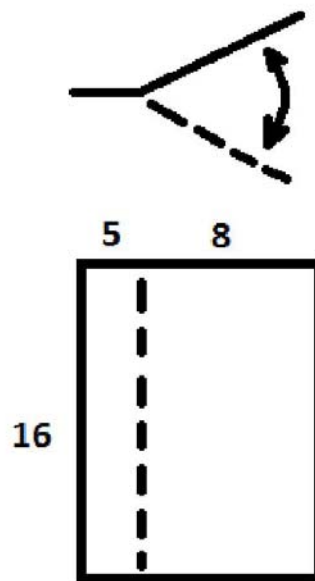
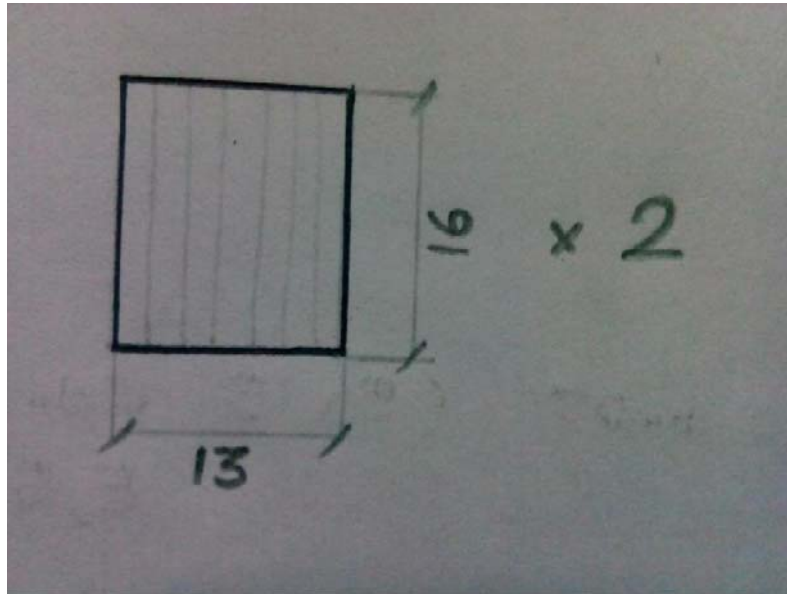
2. Stick strips of thermocol to the base of the side wall pieces, and to the edges along the length of the slant wall pieces.

(Refer to the image in Instruction set 1, point 2)

3. Cut out 3 pieces of coroplast, one of dimensions 8 cm by 15 cm and two of dimensions 5 cm by 15 cm for the ceiling of the air box.



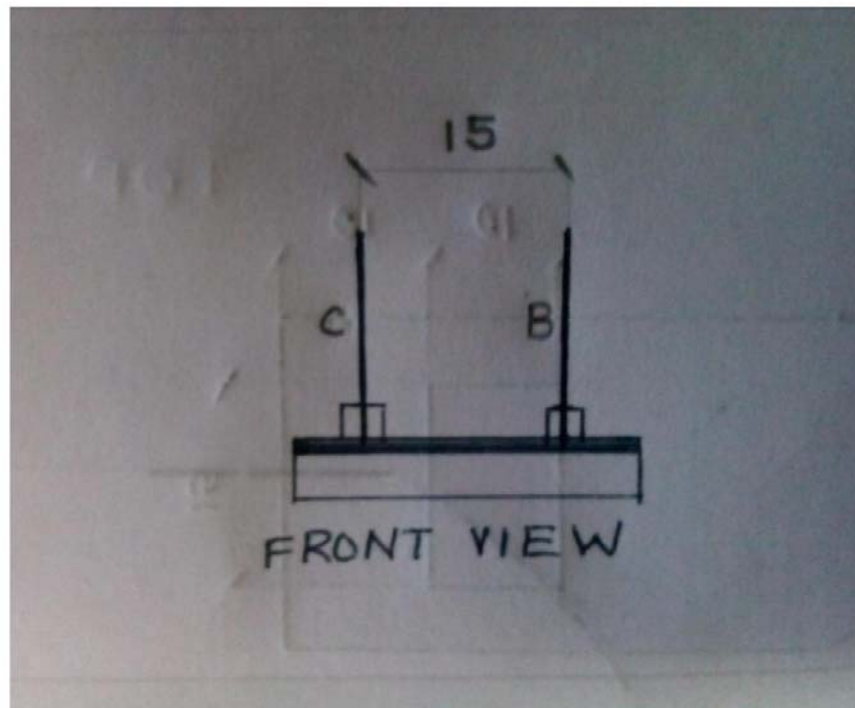
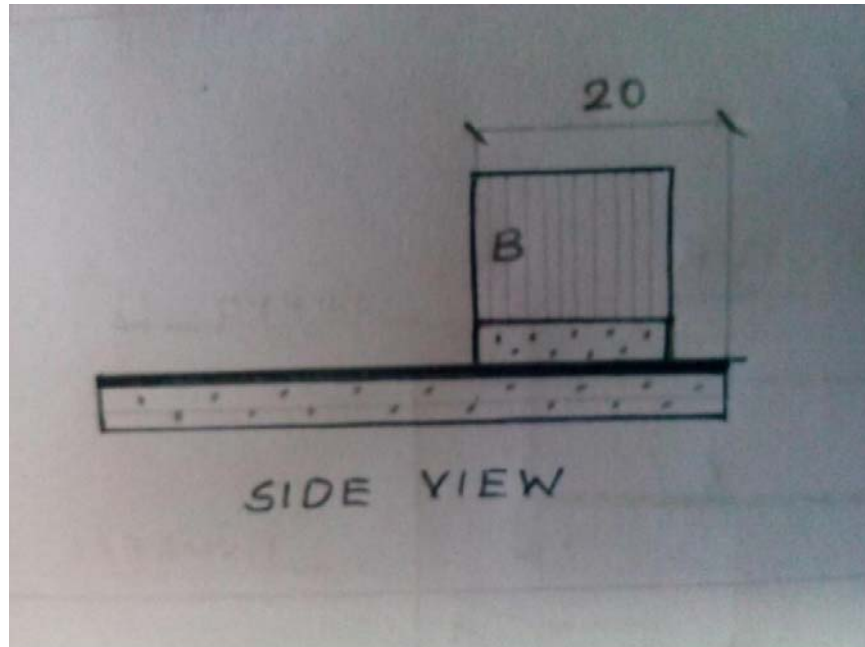
4. Cut out **two** rectangular pieces of dimension 16 cm by 13 cm for the **rudders**. Make half cuts at 5 cm from one end on the breadth, **along the length** in both pieces. (Refer to the diagrams to get a clear picture)



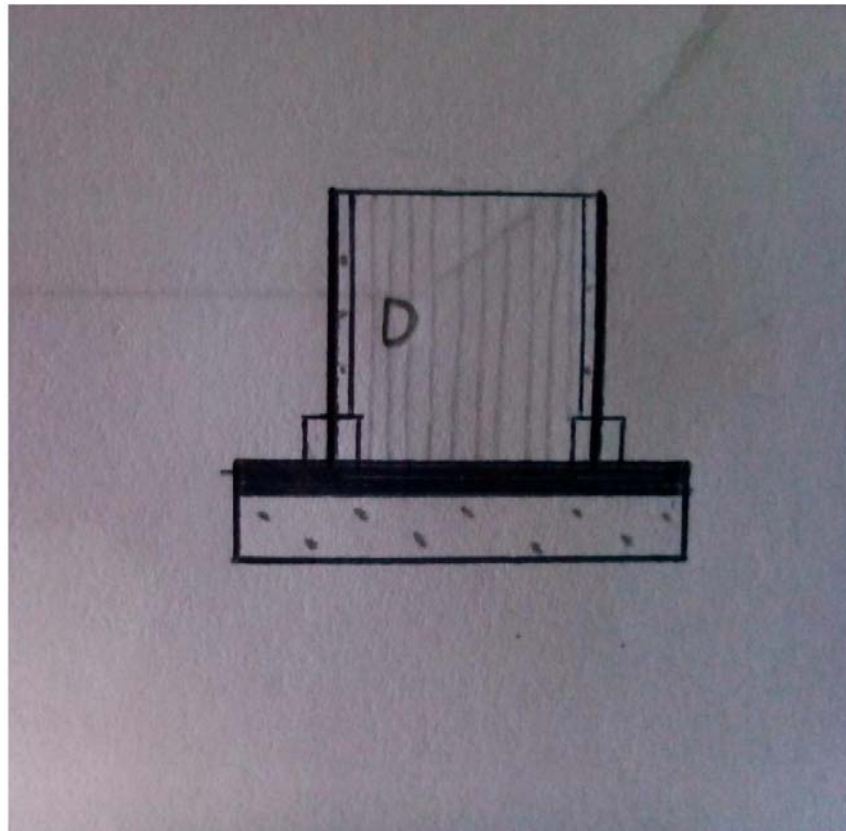
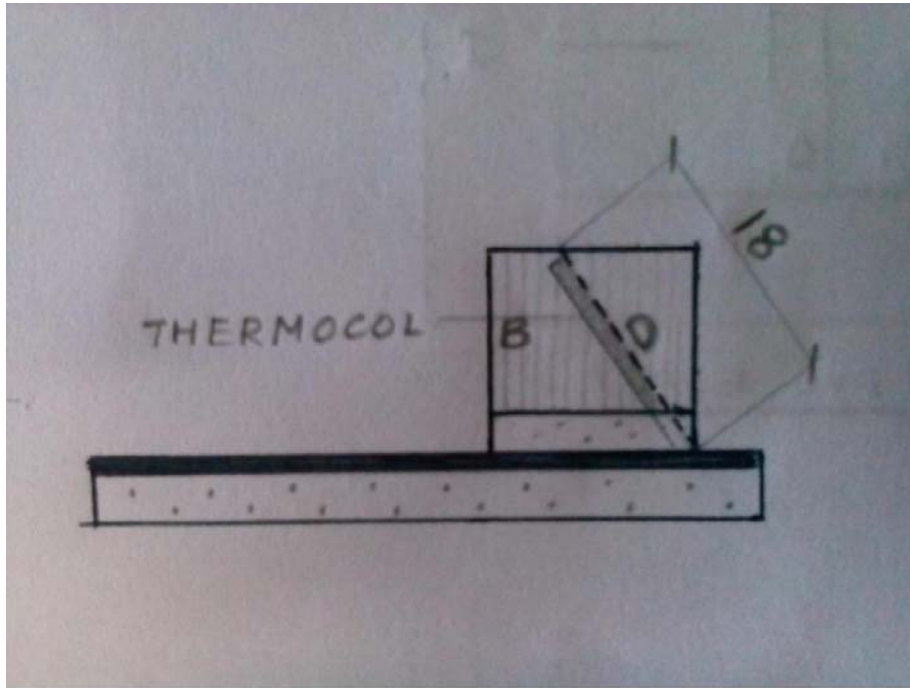
half cut along vertical

Instructions Set 3:

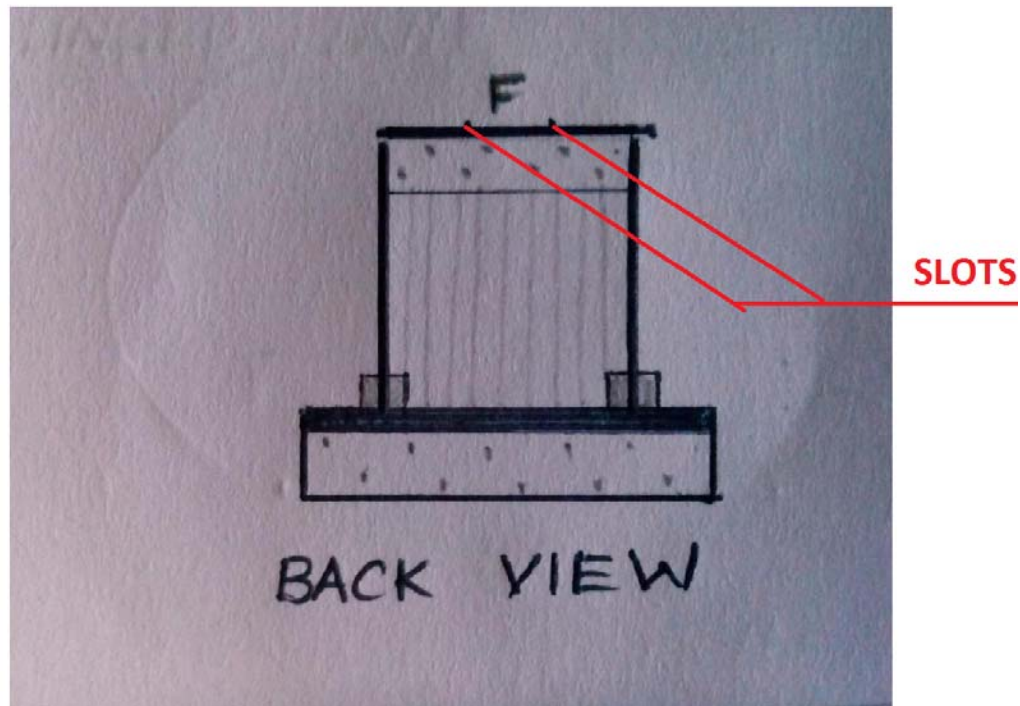
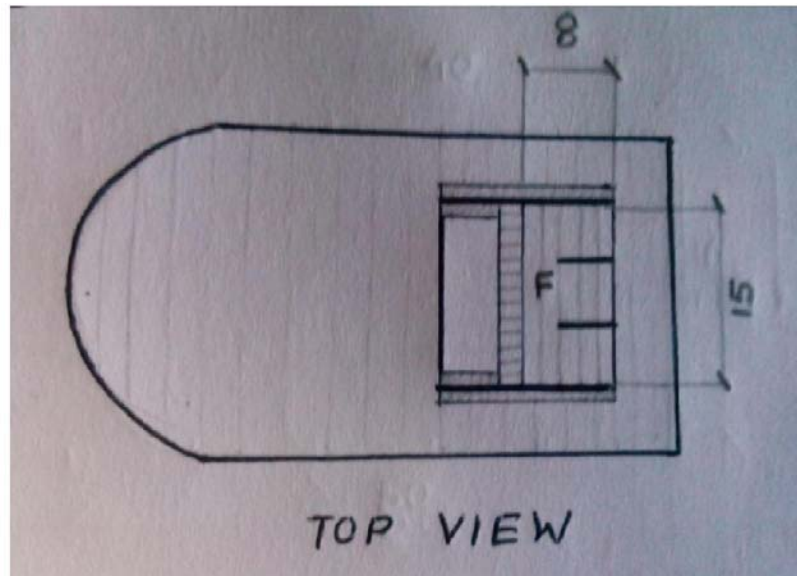
1. Stick the 25 by 50 coroplast on the thermocol, in such a way that the 15 by 10 rectangles are aligned.
2. Set up the side walls of the air box as shown below.



3. Set up the **slant wall** as shown. (Refer Instruction Set 1, Point 3)

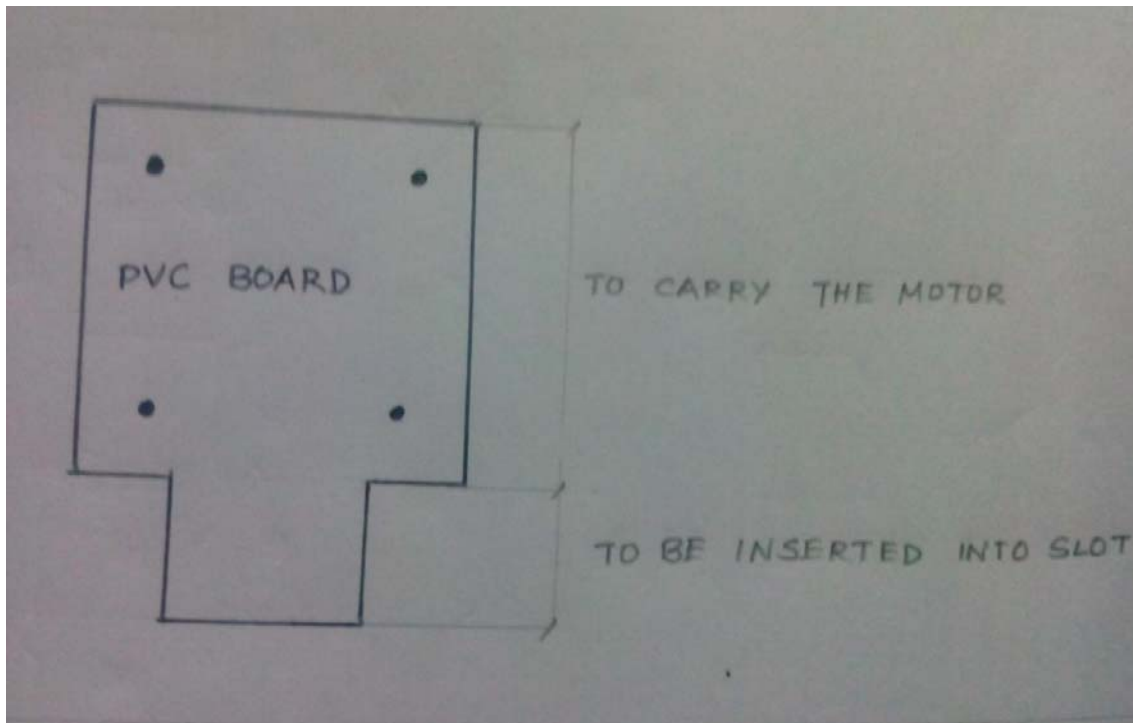


4. Make slots on the 8 by 15 piece as shown for attaching the rudders. Place the coroplast as shown in the figure (thus forming the ceiling).

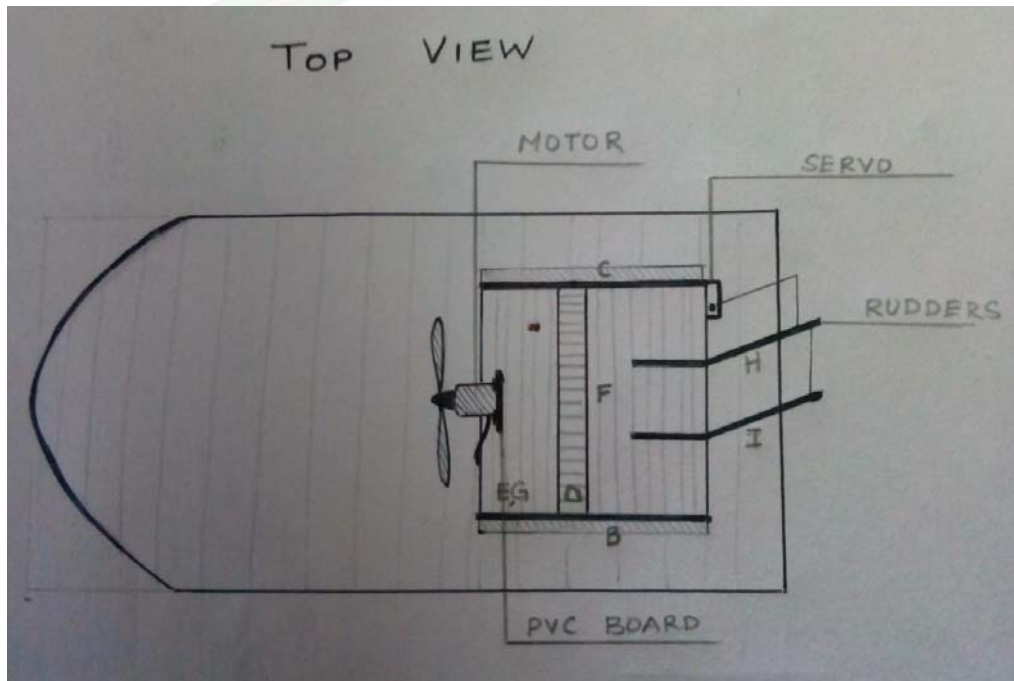
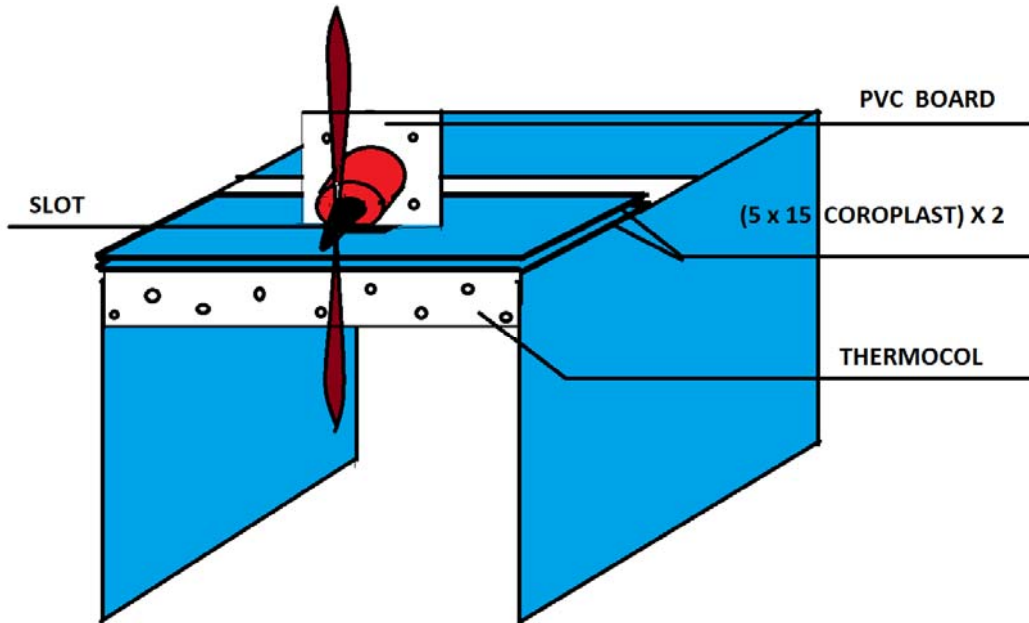


Instruction Set 4:

1. Insert the rudders into their slots and apply glue. Attach the servo firmly to the back.(refer figure on next page)
2. Connect the rudders with connecting rods.
3. Prepare the motor mount using PVC board, with the given dimensions.



4. Stick the 5 by 15 pieces together (as indicated below) and make a slot to allow the PVC motor mount to pass through.



Instruction Set 5:

1. Seal the side walls to the ceiling of the air box using connecting rods and fiber tape.
2. Fit the propeller with the motor and screw the motor on to the mount.
3. Fit the motor mount into the slot on the 5 by 15 piece of the air box.
4. Connect the rudders with connecting rods, and connect one rudder to the arm of the servo.
5. From the skirt material, cut out a rectangular piece of 30cm by 55cm. Fold it and cut slits for the air to escape *in a restricted manner*.

Instruction Set 6:

Electronics:

Make the connections between the various electronic components as shown in the circuit diagram.

