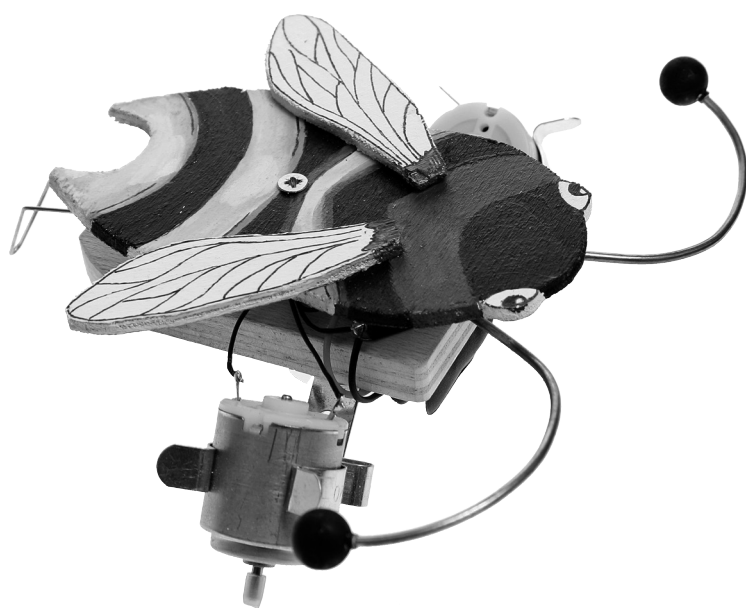


# OPITEC

108.948

## ROBO-Bee



### Necessary tools

Scissors  
Sellotape, All purpose glue  
Side cutters  
Pliers, round nose pliers  
Fretsaw  
Drill  $\varnothing$  3 mm  
Bradawl  
Screwdriver, spanner 5,5  
Cosshead screwdriver  
Paint & Colour

### Please Note

The OPITEC range of projects is not intended as play toys for young children. They are teaching aids for young people learning the skills of Craft, Design and Technology. These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Danger of suffocation!

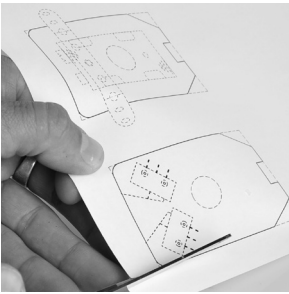
### Warning!

This product contains small parts that can be swallowed  
There is a danger of choking

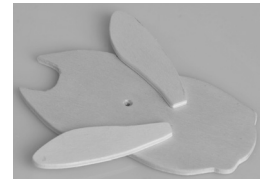
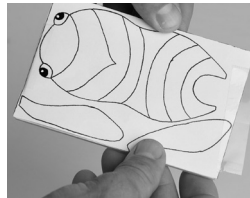
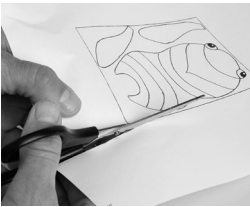
PARTS LIST	Quantity	Size in mm	Description	Part no.
Plywood	1	80x50x10	Base	1
Plywood	1	120x80x3	Cover	2
Flat strip 9 holes	1	90x10	Motor holder	3
Wire	2	$\varnothing$ 2 x 250	Feelers	4
Wire	1	$\varnothing$ 1 x 100	Drive	5
Motor	2	$\varnothing$ 24 x 27	motor	6
Slide switch	1		On/OFF Switch	7
Switch	2		Change over	8
Spring steel clip	2	17-22	Motor fixing	9
Battery holder	1			10
Tube	1	$\varnothing$ 3/1x 10	Drive	11
Tube	1	$\varnothing$ 6/4x 20	Drive	12
Wooden disc	1	$\varnothing$ 15	Cover	13
Cable	1	1000	Feeler	14
Wooden ball	2	$\varnothing$ 10	Feeler	15
Fixing materials			Screws, nuts	

# INSTRUCTIONS

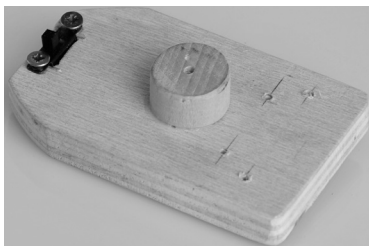
1. Trace the patterns on to the base (1/ page 7) Trace all the parts, mark the position of the screws, holes on both the top and bottom of the parts-use a badawl, saw out / drill the hole for the switch, ,saw out all the parts. Sand the curves and the remaining the parts



2. Trace the pattern for the cover sheet (2/ Page 7) mark out the middle of any holes and drill them. Saw out the contours of the bee and wings Sand all the parts and glue the wings on the body

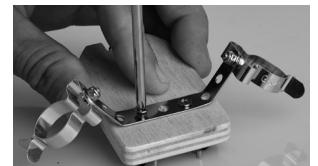
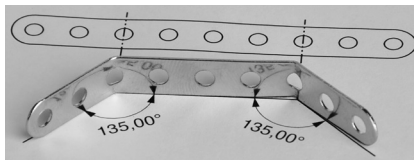
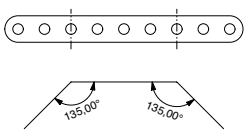


3. Mount the slide switch (7) with two screws on the top of the hole in the base sheet (1) Glue the wooden discs (13) in the middle. Mark the centre with a bradawl. Mount the micro switch with two screws as shown.

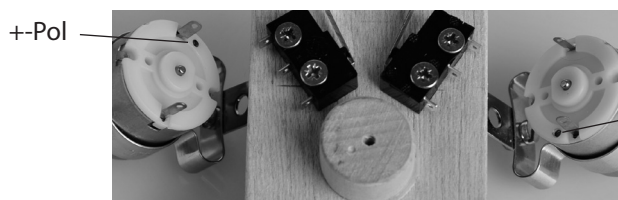
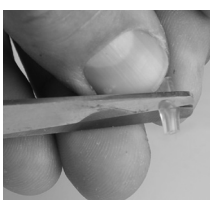


4. Bend the flat metal strip (3) ato the pattern (s. Page 7) Use a vice or pliers to bend the 45°-50° angle-check against the pattern as you go.

Mount the spring clip on the metal strip (9) with two machine screws (M3) and a lock nut (M3). Then mount the metal strip with two screws to the underside of the bee as shown.



5. Cut the PVC tube (11) in half with scissors. Slide one length on the motor shaft (6) so that 1mm protrudes. Insert the motor in the spring clip so the the poles of the motor are horizontal

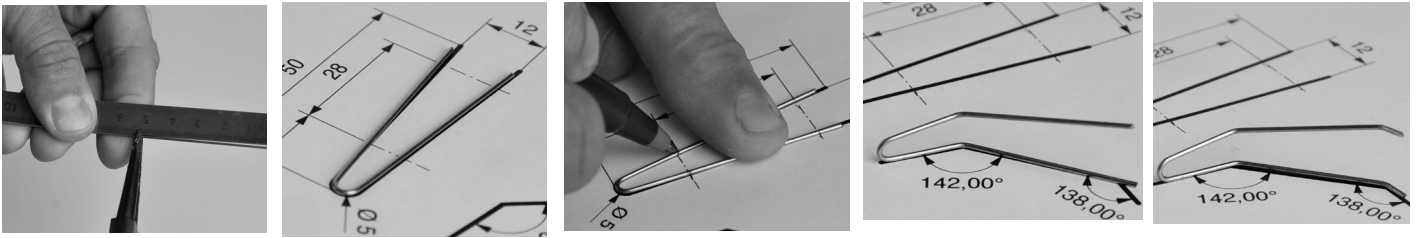


+Pol

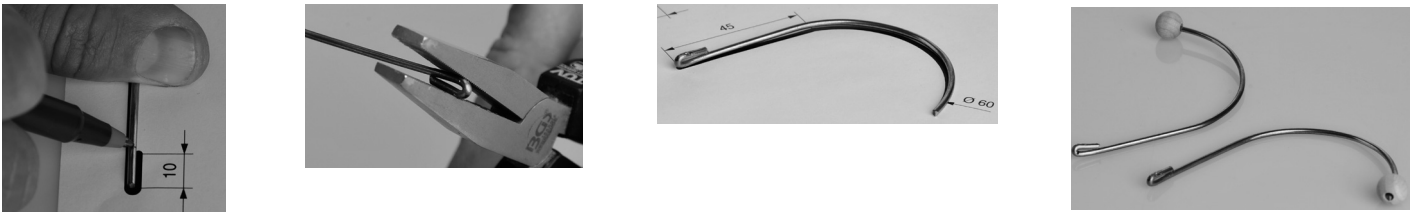
+Pol

# INSTRUCTIONS

6. Mark out the middle of the 1mm (5) wire as shown. Bend the wire to the V shape of the pattern( Page 5) as shown Use a vice or pliers to bend both of the angles- check against the pattern



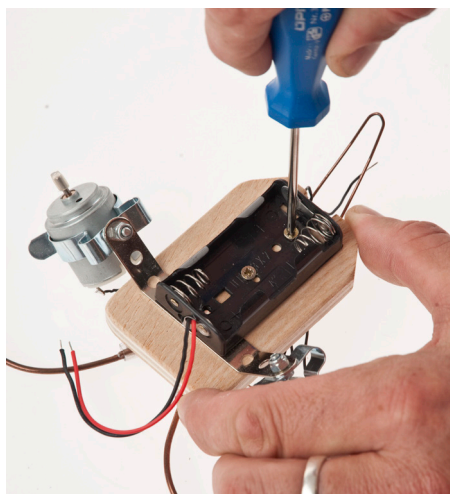
7. Mark the 2mm wire(4) at 10mm. Bend the end at 180 degrees with pliers  
At 45 mm bend a curve (ca. Ø 60mm) with round nose pliers. Bend and shape the wire a little bit at a time checking against the pattern.  
**Important** The unbent end must stretch upwards at 90 degrees. Trim off any excess wire.  
Carry out the same with the other feeler.  
Glue the wooden balls (15) on the bent ends of the wire.



8. Cut the tube (12) in half and slide the pieces on te feelers as shown. Connect the feelers to the metal contacts on the changeover switch.  
**Note** Do not push the tube too far otherwise the switch will not function!  
Fix a 1mm-loop under the slide switch. To do this loosen the screws on the switch and slide the wire support underneath and then re-tighten.



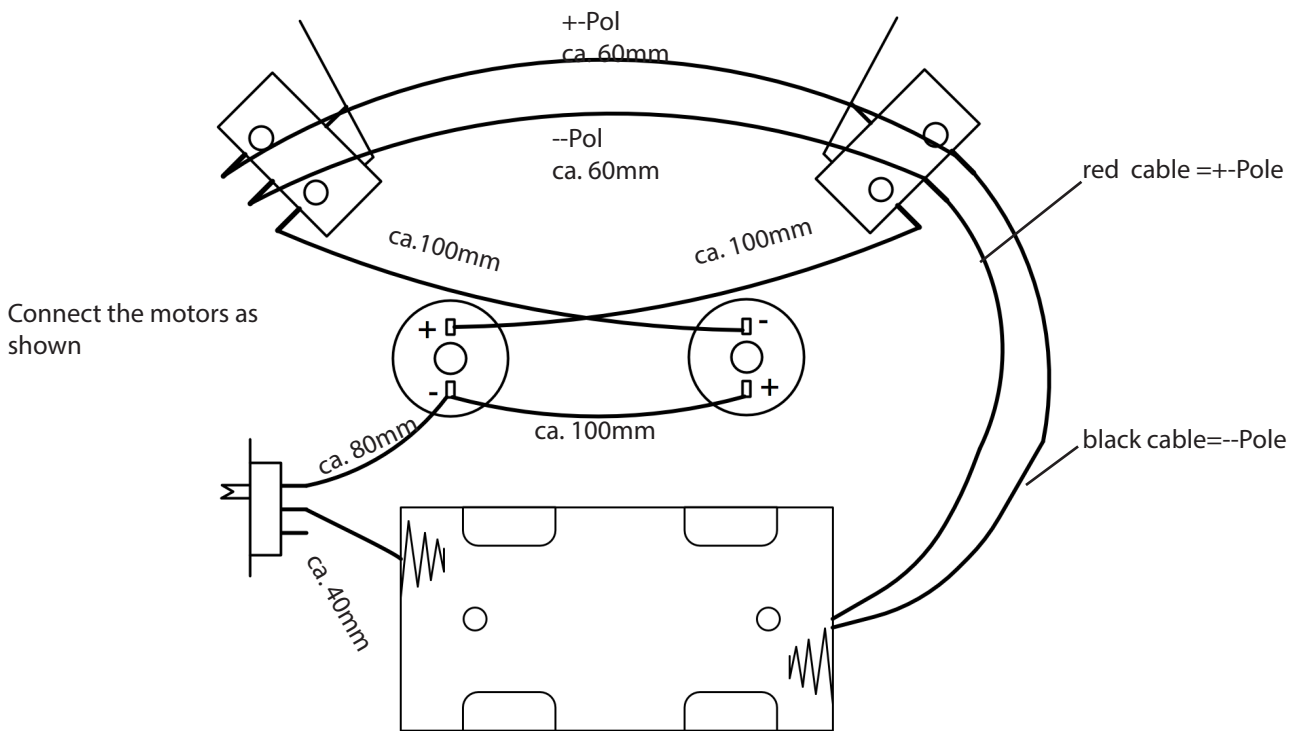
9. Mount the battery holder (10) under the base with two screws. Connections should face forward.



**9. Conect up the components as shown in the wiring diagram.**

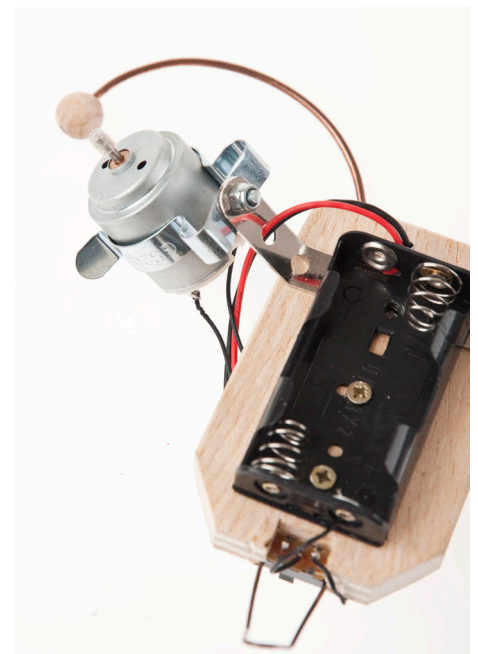
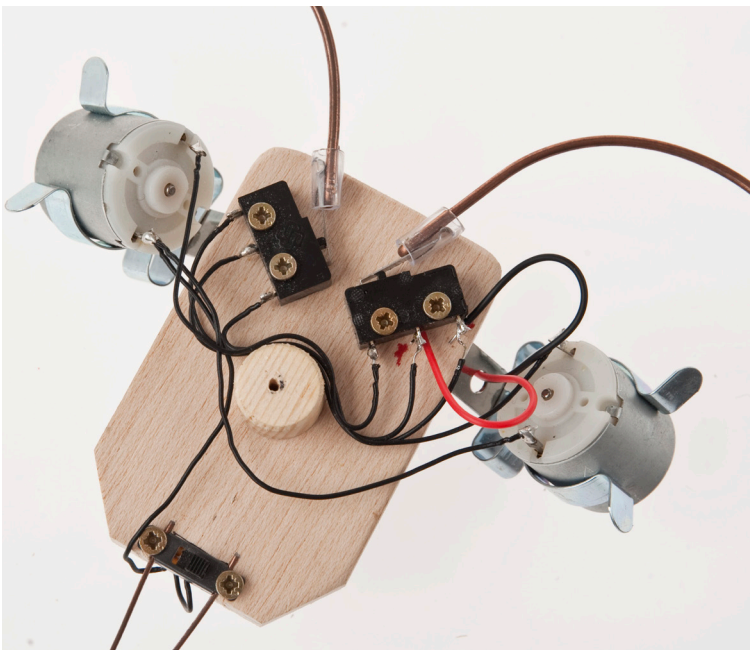
You can make the connections by simply twisting the ends of the cables together on the contacts. To do this remove about 6-8mm from the insulation at the cable ends to expose the inner wires and twist them carefully around rhe contacts  
Or you can solder the connections. Remove the insulation from the cable (14) as above and carefully solder on to the contacts.

Guide the cable ends from the battery holder through the free hole in the metal strip (To the right on the plan view)



**TOP**

**UNDERNEATH**



**10. Insert the battery (Watch the polarity!) and check the circuit connections**

To begin with the ROBO-Bee will travel go forwards.until it hits an object, the switch contact will be made, and the motors will change over and the Robo bee will reverse until the switch is free again.

If this does not work check the circuitry.

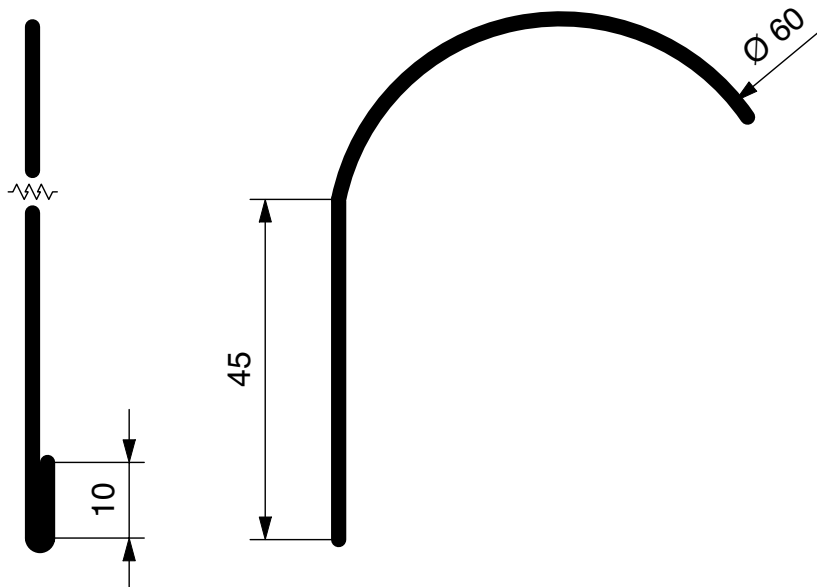
If the Robo bee- turns in a circle, one of the motors is wrongly,connected check with the wiring diagram

11. Once it works you can start on the decoration Use the pattern as a guide.  
 Finally add the cover and fit with screws on to the wooden disc  
 Ready!

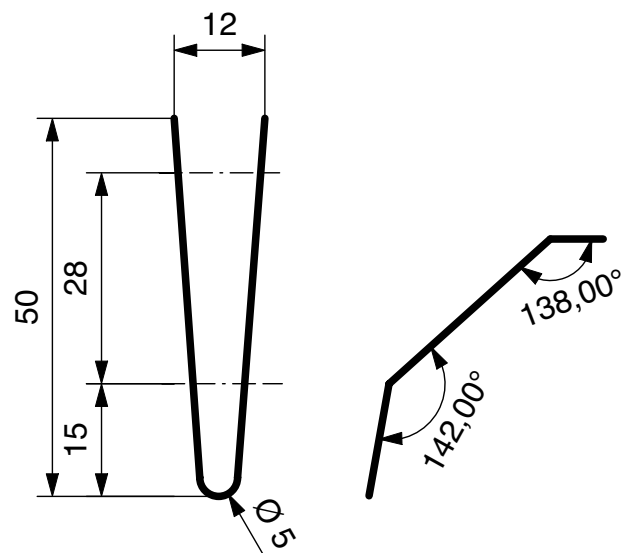


Bending patterns  
 Scale 1:1

2mm-wire



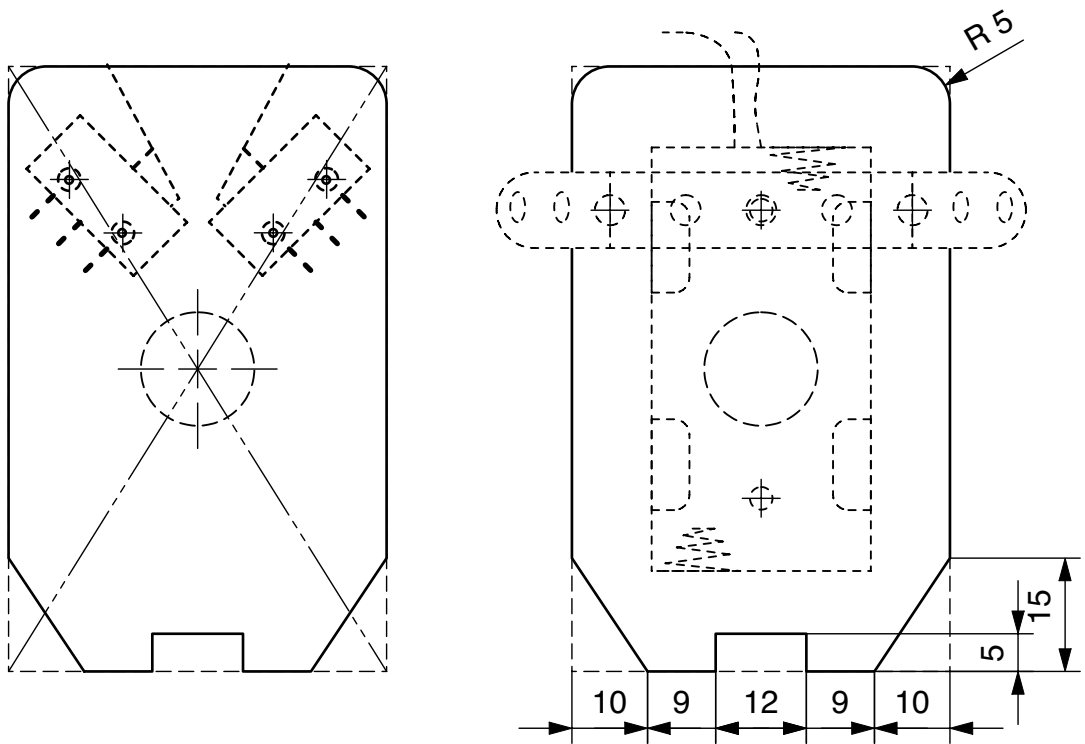
1mm-wire





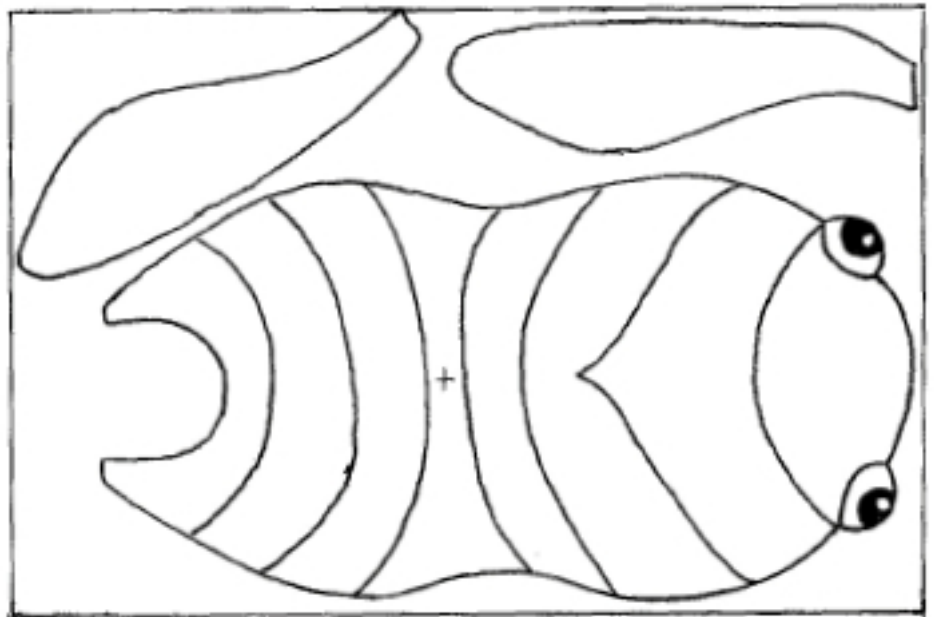
**Pattern for the base**

Scale 1:1



**Pattern for the top**

Scale 1:1



**Pattern Flat strip**

Scale 1:1

