

# PROPELLER DRIVEN CAR

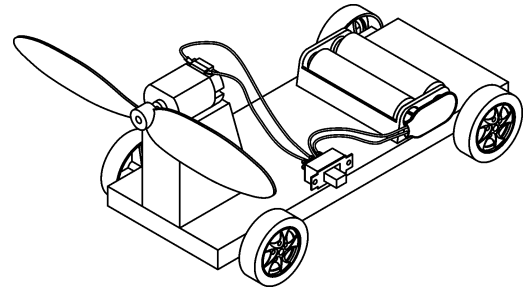
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## DESCRIPTION

This vehicle is a simple four wheeled, propeller driven device. The propeller is driven by a small battery powered electric motor.



## THE PROJECT

The major aspects of this project are the planning, design, construction and assembly stages of the *PROPELLER DRIVEN CAR*.

## SECTION 1: GENERAL AND PLANNING INFORMATION

While this vehicle is at its most basic, it also allows scope for the student to develop and make a more interesting vehicle. Students can fabricate a body to simulate a monster truck, hot rod or other vehicle.

- the designer should look at the design of the vehicle as a complete unit – not just a collection of components.
- The drawings in this unit show the basic construction of the *PROPELLER DRIVEN CAR*.
- The student has to make a full size drawing to determine the size of the vehicle's platform, the size and position of wheels, motor and battery holder. The body can be made from a single long piece of balsa wood or plastic, or even polystyrene. Lighter is better – if the car is too heavy it will have difficulty moving – or just move slowly.
- When deciding on the chassis size, the axle shaft provides an upper limiting factor. At the lower end, while the chassis can be made from any piece of material, even a very narrow one, stability needs to be considered. This is due to the high location of the motor, as it raises the centre of gravity. (The motor support has to be high enough for the propeller to clear the ground). Note: Cut-outs can be made for the wheels to allow wider material to be used
- Weight distribution (which affects the balance) and ease of operation should be taken into account.
- Use the guide tube to make bearings for the axle shafts. Cut the guide tube into four short lengths, or 2 longer lengths, to reduce friction.
- With this vehicle only fixed steering is possible. However, you may wish to make it, so that the steering turns the car in one direction all the time, by angling one or both axles.

## SECTION 2: COMPONENTS & MATERIAL REQUIRED

*Note: it is suggested that, before you commence construction, you check the components supplied in your kit, and ensure that you have everything required.*



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## 1.1 COMPONENTS SUPPLIED

The following components are supplied in a plastic bag :

1x	3 V electric motor (white)	2x	Steel shaft 2.5 mm dia 120mm long
1x	Sliding switch (small)	2x	100mm PVC guide tube
1x	2 x AA battery holder	4x	38 mm dia wheels
1x	Propeller 74 mm long		

## 1.2 ADDITIONAL REQUIREMENTS

1.2.1 Available from us are AA batteries, single-sided tape, double sided foam tape and need to be ordered separately.

1.2.2 The additional requirements are: Material for the chassis and motor pedestal and fine electric wire.

## SECTION 3: FABRICATION & ASSEMBLY

### 3.1 FABRICATION

- Cut the chassis material to the required size.
- Fabricate and attach the motor support to the chassis (screw or glue it).
- Cut the axles to length.
  - To determine the length of the axle, place a nail or piece of wire into the wheel hole to measure its depth.
  - The length of the steel rod needed is worked out by taking the length of the plastic tube plus 2 times the depth of the wheel hole (for both wheels) plus 2 mm for clearance (so the wheel will not jam up against the platform).
  - Remove the burr from the steel shaft ends.

### 3.2 ASSEMBLY

- Press the propeller on to the motor shaft.

*HINT: Place the end of the shaft (where it exits the motor) on a hard surface, and push the propeller down.*

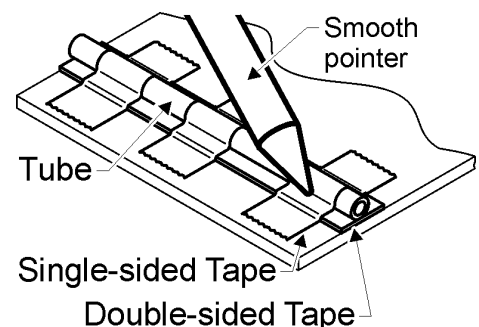
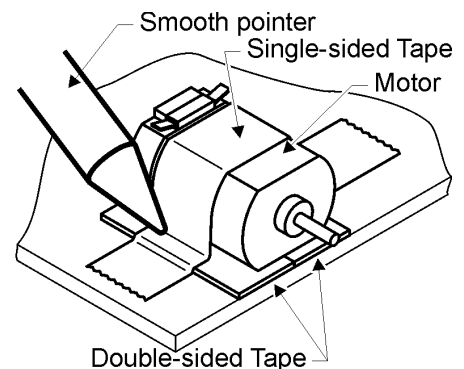
*WARNING: Don't just push the motor down by hand as this can push the motor armature out of its bearings and jam the motor.*

- Attach the motor, switch and battery holder on to the chassis / support using double sided foam tape or hot glue or (roughen the surfaces to be glued with sandpaper to improve adhesion).

*WARNING: if using Hot glue, be very careful, as it can burn you, if you get it on yourself.*

- Glue the plastic tube in place on the platform.

*NOTE: Ensure that the axles guide tubes are at right angles to the car body and both guide tubes are parallel to each other (or the vehicle will steer to one side).*

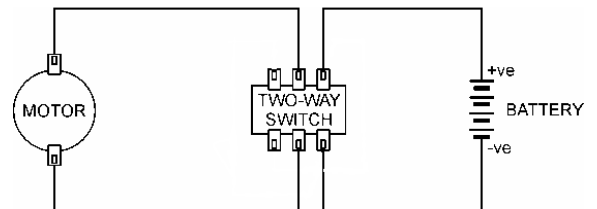


- Insert the steel shafts into the plastic guide tube.
- With the shafts in place, press the wheels on to both shafts.
- Ensure that the shaft guide tubes are at right angles to the car body and both guide tubes are parallel to each other. Glue these in place.

#### SECTION 4: WIRING UP THE *PROPELLER DRIVEN CAR*

The Switch should be wired as shown in the "Circuit Diagram"

- Solder both the battery holder's wires to both of the terminals at one end of the switch.
- Solder two wires to the switch's middle terminals.
- Connect the other ends of those two wires to the motor's terminals.



CIRCUIT DIAGRAM

- Insert the batteries, and turn the switch on
  - If the air is blown rearwards, and the vehicle is propelled forward, solder the wires to the terminals.
  - If the vehicle goes in reverse, swap the wires and then solder them.

**CONGRATULATIONS!**

- *YOU HAVE BUILT A PROPELLER DRIVEN CAR!*