

PROPELLER DRIVEN CAR

(NO SOLDER KIT)

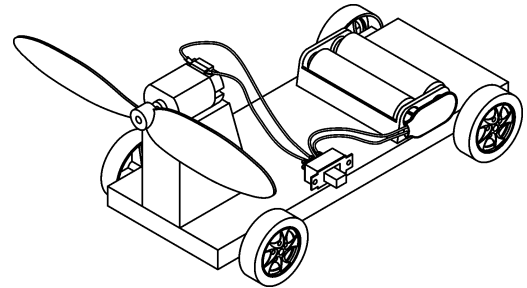
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DESCRIPTION

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.



SCORPIO TECHNOLOGY VICTORIA PTY. LTD.

A.B.N. 34 056 661 422

17 Inverell Ave., Mt. Waverley, Vic. 3149

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Tel: (03) 9802 9913 Fax: (03) 9887 8158 www.scorpiotechnology.com.au

1.1 COMPONENTS SUPPLIED

The following components are supplied in a plastic bag :

1x	Electric motor (white with wires)	2x	Steel shaft 2.5 mm dia 120mm long
1x	Sliding switch (small with 2 wires)	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.

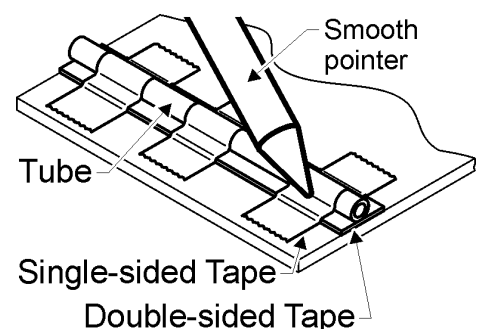
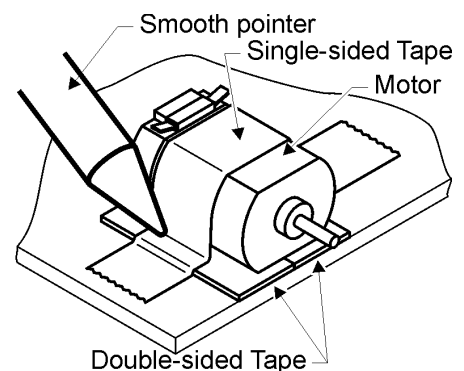
WARNING: Don't just push the motor down by hand as this can push the motor armature out of its bearings and jam the motor.

- 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"

- Connect the battery holder's red wire to one of the red wires from the switch. Twist them firmly together.

NOTE: do not put any insulation tape around any of the twisted wires at this stage.

- Connect the switch's other red wire, to the motor's red wire. Twist them firmly together.

- Twist the black wires from the motor and battery holder together.

- Insert the batteries, and turn the switch on:

- when connected correctly the propeller will spin and blow air back over the motor.

- If the propeller spins in the correct direction, your wiring is correct - apply insulation tape over all the joined wires

- If the propeller spins in the wrong direction, you will need to swap the motor's wires:

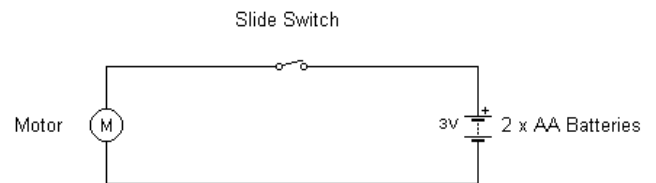
- remove the motor's red wire from the switch and untwist the black wires from the motor and battery holder.

- twist the red wire from the motor to the black wire from the battery holder .

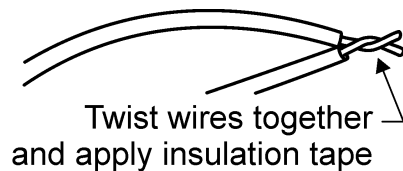
- connect the motor's black wire to the remaining red wire on the switch.

- twist them firmly together.

- apply insulation tape to all the joined wires.



CIRCUIT DIAGRAM



Note: this kit has components that allow this to be assembled without soldering. However, the connections will be more effective and permanent if they are soldered.

CONGRATULATIONS!

- *YOU HAVE BUILT A PROPELLER DRIVEN CAR!*