



Solar Electricity

Build Your Own

Solar Car

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Build It!

These step-by-step instructions provide you with a plan for making a basic solar car. If you can think of ways to improve the design of your car, try them out. Experiment with the materials. Substitute parts to try to make the car lighter and faster. Keep a record of your design improvements as you go.

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The tools and materials for making a solar car.
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Order a Solar Car Kit:
SunWind Solar Industries
1-866-248-5350 (toll-free)
Web site:
<http://www.sunwind.ca>

Materials

The Solar Car Kit should contain the following materials:

- 2 solar panels, with contacts
- 2 wooden axles
- 4 screw eyes
- 5 wheels (2 large, 3 small)
- 4 black rubber tires
- 2 elastic bands
- 1 motor shaft pulley
- 1 alligator clip test lead
- 2 cm clear vinyl tubing
- 1 electric hobby motor
- 1 self-adhesive motor clip
- 1 brass paper fastener
- Fine sandpaper
- 1 piece of foam board (24 cm by 7 cm)

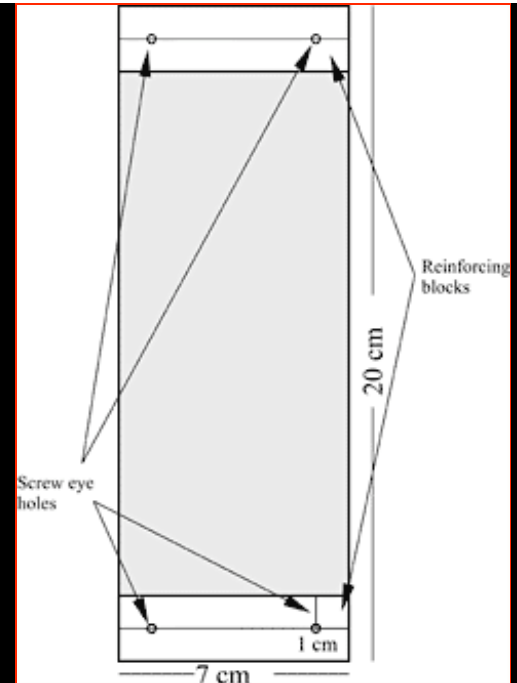
Tools and Other Materials

Gather together the following tools and materials:

- Hot glue gun with glue sticks
- Scissors
- Retractable utility knife
- Metal ruler
- Pliers
- Roll of clear tape

A. Construct the Body

- Using the utility knife, cut the foam board into three pieces - one measuring 20 cm by 7 cm, and two measuring 2 cm by 7 cm. Use the metal ruler to guide your cuts.
- Glue the two smaller foam board pieces to the large foam board piece as shown in the illustration below.
- Using a ruler, carefully mark the positions of the screw eyes on the two smaller pieces as shown in the illustration .
- Turn the screw eyes into the foam board pieces. Be sure the screw eyes penetrate both layers of foam board.



Dimensions of the foam board pieces for the body of the solar car.

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Turn the screw eyes firmly into the foam board.

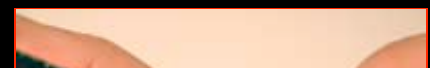
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- Slip an axle through the screw eyes to check their alignment. The axle should be parallel to the end of the foam board. If necessary, adjust the screw eyes.

B. Mount the Wheels

- Slip a rubber tire onto each of the two large wheels, and two of the small wheels. The smallest wheel will be used later.
- With scissors, cut the vinyl tubing into small sections approximately 5 mm in length. These will be used as spacers on the car's axles (see below).

- Test the fit of the wheels and axles. The

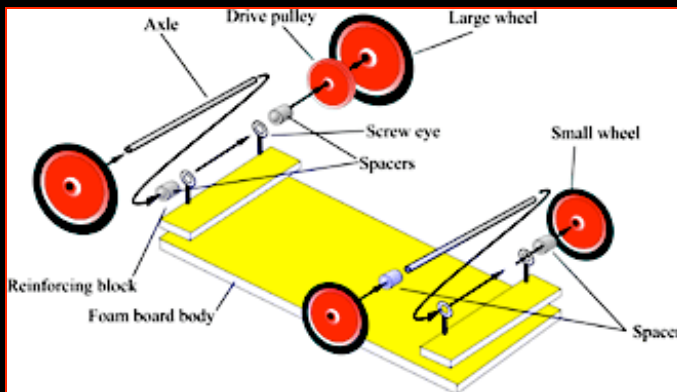


wheels should grip the axles firmly. If the wheels cannot be pressed onto the axles, try sanding the ends of the axles to reduce their thickness slightly, and check again for fit.



If necessary, sand the end of the axle to obtain a good fit with the wheel.

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Mount the axles and wheels of the solar car.

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4. Assemble the rear axle as shown in the illustration. Do this by slipping the axle through the screw eyes, then adding the spacers followed by the drive pulley (the third small wheel) and wheels. You may need to sand the axle a little to allow the drive pulley to slide on.



The rear axle with its drive pulley.

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1. Add the front axle with its wheels and spacers, as shown in the illustration.
2. At this point, check your car to see how well it rolls. Put the car on the floor and give it a gentle push. Make sure it rolls easily and in a fairly straight line. Adjust the axles slightly to get a better alignment, if necessary. If the screw eyes seem loose, carefully place a drop of hot glue where the screw eyes come through the foam board to hold them in position.

C. Mount the Motor

1. Push the small black pulley onto the shaft of the motor, as shown below. Slip the motor into its clip.



Motor assembly. The electric motor in its mounting clip.

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2. Stretch the elastic band over the rear wheel and place it on the axle-mounted drive pulley.
3. Position the motor so that the elastic band makes good contact with both pulleys without being stretched more than 5 mm. Once you know where the motor should fit, mark that location on the foam board with a pencil. Remove the backing from the self-adhesive motor clip, and press the clip and motor onto the foam board in the position that you marked.

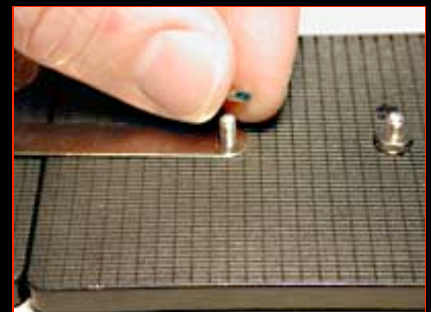


Motor and pulley mounted. Position the motor on the car body.

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D. Prepare the Solar Panels

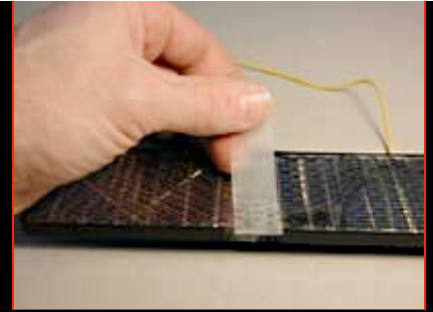
1. On the back of each solar panel you will find a metal connecting bar and two threaded metal contacts. Each contact is equipped with a small washer and a nut. The metal bar and contacts are used to connect the panels together, and to connect wires to the panels. Remove the nuts, washers and metal bars from the connectors and set these aside, being careful not to lose them.
2. Connect the two solar panels using one of the metal connecting bars, as shown below. Be sure the bar connects the positive terminal on one panel to the negative terminal on the other. Secure the connecting bar using washers and nuts, tightening them gently using the pliers (do not over-tighten).



Join the two solar panels using the metal connecting bar.

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Strengthen the joint between the panels by adding a strip of clear tape on both sides of the panel.



Use clear tape to strengthen the joint between the two panels.

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4. Use scissors to cut the alligator clip test lead into two pieces of equal length. Strip about 1 cm of insulation from the two cut ends, and in each case twist the exposed copper wires tightly together.



Stripping wire. Strip insulation from the test lead.

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5. Using the pliers, carefully bend the spare connecting bar to form an angled support for the solar panels, as shown.



Use pliers to bend the metal connecting bar.

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1. Position the second connecting bar on the threaded metal contact, as shown. This will be used to help support the panels in a later step.
2. Loop the bared ends of each test lead over the threaded contact and screw a nut onto each. Gently tighten each nut using pliers, making sure the wire is well secured.



Connecting wires. Connect the wires to the solar panels.

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E. Mount the Panels

1. Use the utility knife to carefully cut a small slot in the large foam board section as shown.



Slot cutting. Cut a slot for the paper fastener.

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2. Use the brass paper fastener to secure the connecting bar to the foam board. Push the fastener through the hole in the bent connecting bar, and spread the tabs where they poke through the slot in the foam board.



Brass fastener. Secure the connecting bar using the brass paper fastener.

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3. Arrange the panel and its support so that it sits at an angle on the body of your solar car. Use a small piece of clear tape to fasten the lower end of the panel assembly to the foam board.
4. Use the alligator clips to connect the wires to the terminals on the electric motor. If necessary, tape loose wires to the body of the car to keep them from touching either the ground or moving parts of the car.



Connect motor. Connect the motor to the solar panels.

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