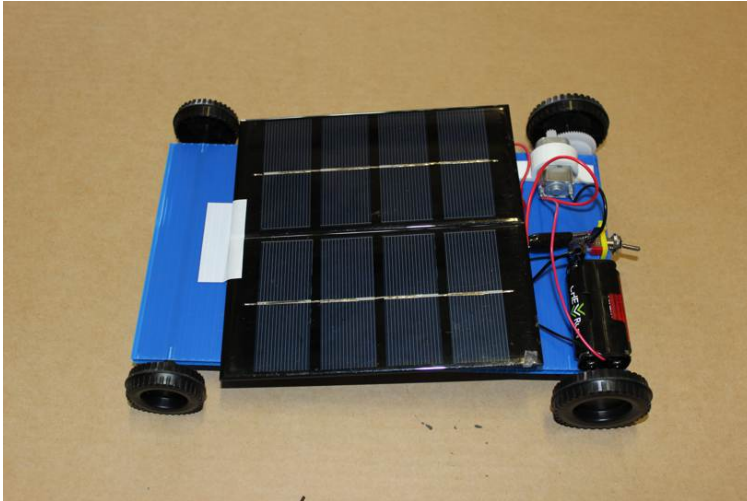
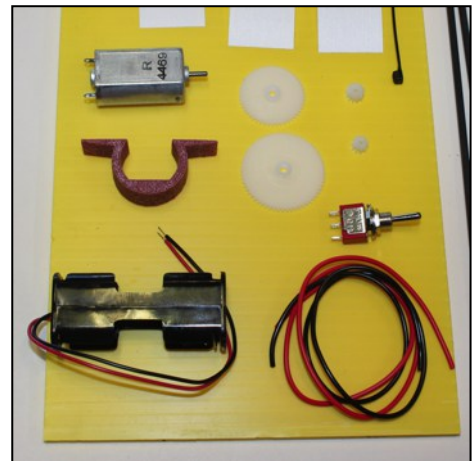


Mini EV Prize - Solar Car Kit



Each Kit includes

- 2 Solar Panels - 2v 700mA
- 8 Wheels 4 x 50mm, 4 x 40mm
- 2 Axels(short & Long) & 4 Axel Collars
- 1 Motor - F18 & 3D printed mount
- 2 Large Spur Gear 60T & 48T
- 2 Small Pinion Gear for the motor 12T & 10T
- 2 Pieces of wire
- 1 Chassis (Coloured Coreflute)
- 1 Battery pack (2 x AA)
- 1 Two Way Switch, centre off
- 2 White tape, to hold panel & battery pack
- 4 Alligator clips for solar panels 2 x red&black
- 3 Double sided tape for motor mount
- 1 Cable Tie



Aim of this kit.

This kit has been designed to allow experimentation and variation. To build a four wheeled car you do not need eight wheels but if they are different sizes this may effect the speed or the look of the car. Initially you can twist or push fit all the components to make it work. However to improve the durability you may need the tools below to make a really strong and fast car. The kit also allows you to enter the Mini EV Prize competition at the Hunter Valley Electric Vehicle Festival. For more details visit <http://www.hunterevfestival.net/mini-ev-prize.html>

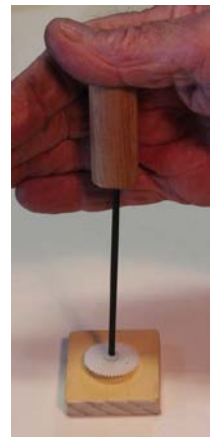
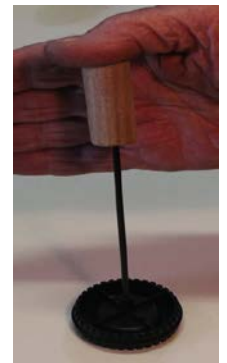
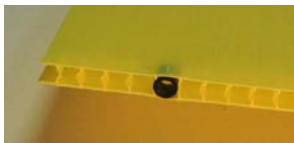
Tools you may require.

The tools you may need to help put your car together are a pair of pliers and although not necessary a soldering iron can make connections more permanent and secure. Wire strippers will help with cutting and stripping the ends of the wire. We provide the block of wood and dowel. Also super glue and electrical tape can help.



Steps to put your Model Car Together

1. First, let's set up the chassis. We have included two sets of wheels you will need to make the decision on which ones to use and what mix. We will need to put together the front and rear axels and place these through the coreflute chassis. The front axel consists of two wheels, an axel and two axel collars. Place the round wooden dowel over the end of the axel and use this to push the axel into the wheel. Place a wheel on the bench and push the axel into it. Now push an axel collar into the side of the coreflute near the front, follow the channel across and place another collar on the opposite side. Slide the axel through the collars and push the other wheel onto the end of the axel. It should now spin easily and look like the picture below.



The back axel is similar but you need to put the two large spur gears in place. This time you will need to also use the square block. Place the smaller 48 tooth gear on the block where the hole has been drilled. Now push the axel through the gear using the round dowel "pusher". Now place the larger 60 tooth spur gear on the block and push the axel through both. See the photo to the right. Now push the axel end with the two gears into a wheel. Place the two axel collars into the coreflute at the other end of the chassis in the same way you did for the front axel. Slide this axel through the collars and push a wheel on the other end. This rear axel should spin freely but not wobble from side to side.

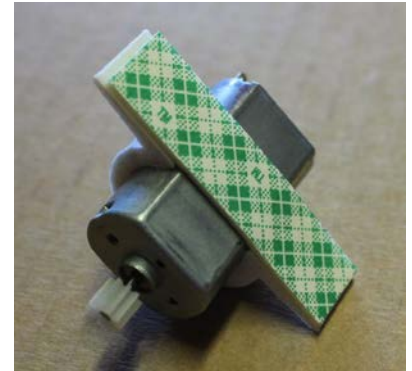


2. Now we need to put the motor and switch together. The best position for the switch is on the very back of the chassis. To hold it in place we have supplied a small cable tie. It will require two holes in the coreflute. Drill, poke or burn these two holes and then use the cable tie to hold it firmly in place. See the photo to the right.



3. Now push the small white Pinion Gear onto the end of the motor shaft. You have a choice of either a 10 tooth or 12 tooth gears. You will need to learn how the change in gear ratio affects the cars performance in different sun conditions. Try one gear and then do lots of testing but remember to record your results.

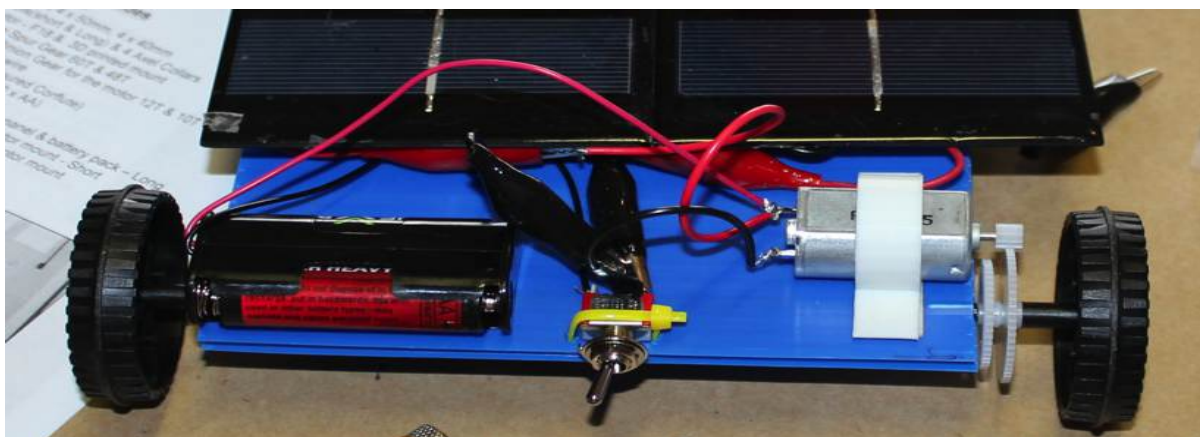
4. To place the motor on the chassis you will need the 3D printed motor mount. Slide it over the motor and it should hold in place. With the car on the bench now place the motor so it lines up with the large (60T) or small (48T) spur gear. Roll the car backwards and forwards to make sure it turns the pinion gear on the motor. Now place one of the double sided tape across the motor mount. Refer to picture right. Peel off the green side and place the motor just where you tested it before. The gears need to line up but don't need to be too tight.



5. Now with all the major components in place you will need to complete the wiring. The two types of wiring either series or parallel which are detailed on the attached sheet. Also we have included a battery pack for low light conditions. The battery pack needs to be installed so that batteries can be placed into the pack if required for the Mini EV Prize event at Cameron Park – Newcastle. The event is hosted by the Tom Farrell Institute for the Environment at the University of Newcastle.

6. First set up the wiring with the connections just twisted together. This will allow you to test the different ways to set up the car, series or parallel. The motor and switch have connection lugs that have holes in them. Cut the wires to the correct length and strip the ends using a wire stripper or a pair of pliers. With the wires twisted at the ends you should be able to poke them through the holes and make the connections. If fine wires are poking out and touch each other you can create a “short circuit” and the car won't work. You need to take some care. We have provided alligator clips for the solar panels so you can make easy changes to test series and parallel output of the solar panels.

7. Once you have done some testing you might want to solder some of the connections. If your car goes the wrong way (forwards or backwards) you can change the wires on the motor and it will go the other way (reverse the red and black wires). We have included 4 small electrical



connectors that might help secure the wiring in places.

8. If you want to race the car down the track you will need to set up a method of keeping the car on the track. Some form of guide will be needed. This part is up to your imagination.

Warning

When you put the batteries in the holder please ensure you do not touch the two leads from the battery holder together. The batteries will get very hot and smoke. Also make sure you do not have any short circuits in your wiring. If you are unsure do not place the batteries in the holder until you get help or advice. This can be dangerous.

Some Tips and Ideas.

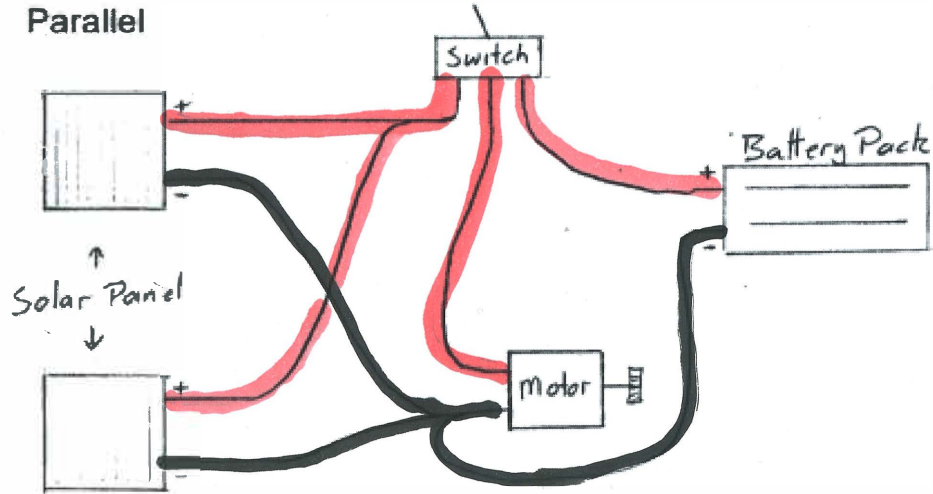
1. If you are using the kit to enter the Mini EV Prize race at Cameron Park - Newcastle please read the rules for the current year. Each year we make some changes.
2. The kit and these instructions are just a guide to making a car which will work. You are free to make your car any way you like as long as it fits inside the rules.
3. Testing the car with different gear ratios and different light conditions is most important.
4. The biggest mistake is incorrect alignment of the motor to the gears on the axel. If they slip you will end up with no movement.
5. Electrical connections need to be secure. Once you have the car set up correctly solder the connections so you won't have problems on the day.
6. The track is now a 17mm wide U channel. Your guides need to keep your car on the track.
7. We do have spare parts and if you need any further help please contact us.
8. Please try and reuse the packaging. Let's think of good ways not to create waste and try to save our resources.
9. If you have any questions or feedback we would love to hear from you.

All the best and above all have fun.

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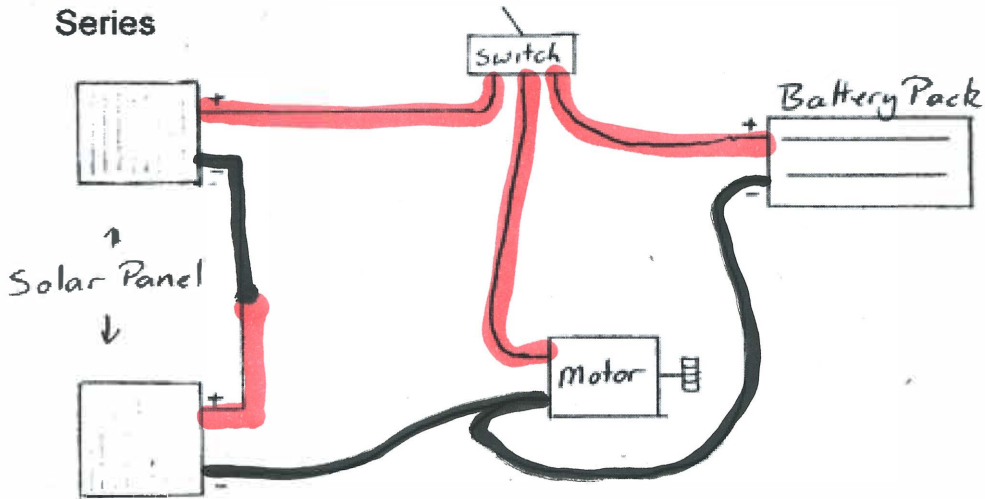
MiniSprint Solar Car Kit – Wiring circuit diagram

Parallel



With the panels connected this way what is the output to the motor?
_____ Volts _____ Amps

Series



With the panels connected this way what is the output to the motor?
_____ Volts _____ Amps

Use a multimeter to test these two set ups. Also test under different sun conditions. Remember to record your data.