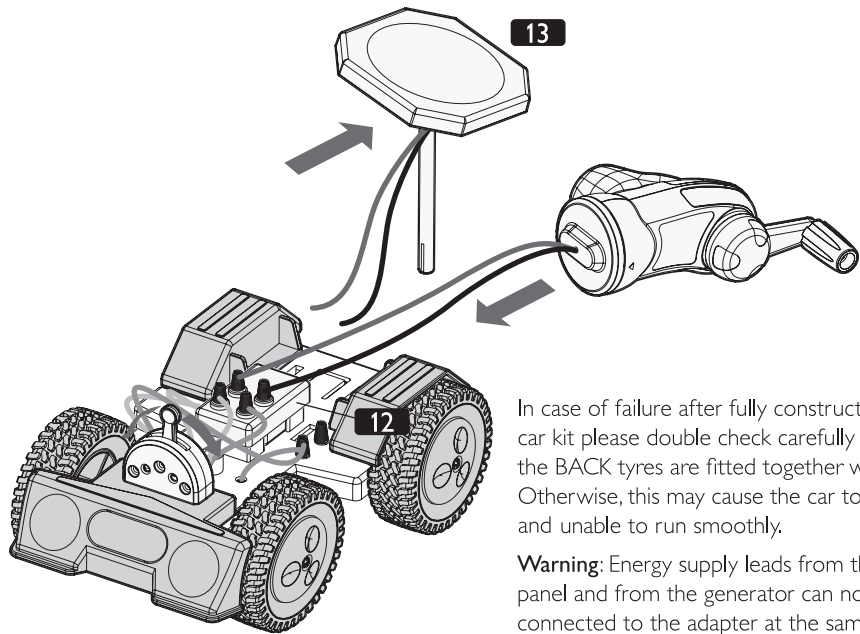


14 In case there is no sunlight or the sunlight is too weak, disconnect the leads of the solar panel (13) from the two springs on the adapter (12) and connect the two leads of generator instead.



In case of failure after fully constructing the Solar car kit please double check carefully that both the BACK tyres are fitted together with the hubs. Otherwise, this may cause the car to get stuck and unable to run smoothly.

**Warning:** Energy supply leads from the solar panel and from the generator can not be connected to the adapter at the same time. The solar panel will be damaged by the surge voltage from the generator.

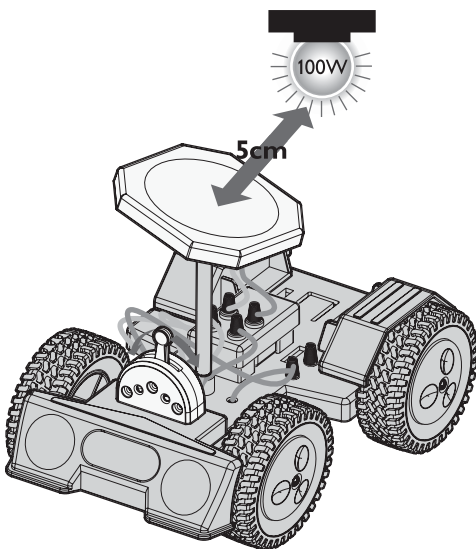
#### Solar power hints and tips

##### 1 Outdoor

To operate this toy outdoors on solar mode, you must direct the solar panel in the direction of the sun. Therefore turn the 360° adjustable solar panel by aiming it at the sun. Remember to switch to the handle generator when the sunlight is weak.

##### 2 Indoor

For indoor operation, the minimum light source requirement is equivalent to a 100W bulb at about 5cm away from the solar panel. This should only be for testing purposes as plastic may melt under the heat during extended use. Use handle generator during indoor use. Warning: Very strong light beam such as a laser beam will destroy the solar panel.



##### 3 Tips on using the generator

To operate this toy on generator mode, remember to ensure that the solar leads are disconnected. Otherwise solar panel will be damaged by the surge voltage from the generator.

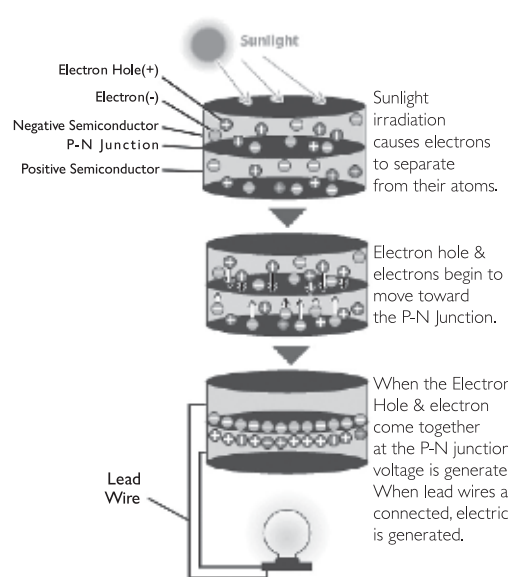
Generator can be cranked dockwise or anti-clockwise. This will cause the car to go forwards or backwards. You can try and see which direction will go forwards and which direction will go backwards.

Always remember to check that everything is connected properly as per the instruction manual.

#### Educational hints

##### Principles of a Solar Power Generation System

How does a solar cell generate electricity ?



A solar car is an electric vehicle powered by solar energy obtained from solar panels on the surface of the car. Photovoltaic (PV) cells convert the sun's energy directly into electrical energy.

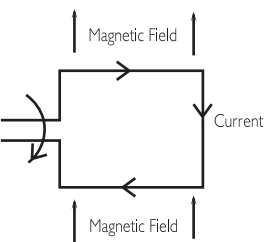
**Electrical Generator** is a machine which converts mechanical (rotational or kinetic) energy into electrical energy. A simple diagram of a basic electric generator is pictured here. In this picture, the magnetic field is static while the coil (the loop) is rotary.

##### 4 Switch knob

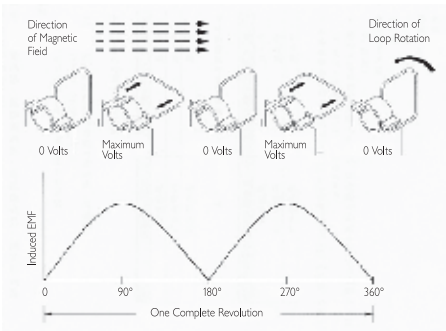
The switch knob has three positions. By placing the switch knob to the central position the kit is switched OFF.

By shifting the switch knob to either left or right position, the car will go forwards or backwards. You can try and see which direction will go forwards and which direction will go backwards.

In this generator a loop is immersed in a magnetic field. When the top leg of the loop is pushed into the paper and the bottom leg of the loop is pulled out of the paper, the loop will produce a current as shown in the direction indicated. Then, by using a commutator (see next diagram) we can make the generator output DC current



**DC generator** can also be created by connecting four diodes in a specific way in AC generator's output circuitry. This combination of diodes is called a Rectifier. It turns AC into DC. In an AC generator, the coils are always designed to be static while the magnetic field is designed to be rotary. This can prevent sparking, which is potentially dangerous.



#### WARNING!

• Adult supervision and assistance is required.

• Read and follow all instructions in the manual before use. Follow the instruction manual to perform the circuit connection.

• This toy contains small parts and functional sharp points on components, leads and metal wire. Keep away from children under age 3 years.

• Not suitable for children under 3 years. Small parts – Choking hazard.

• Because of long cord(s) – choking and entanglement / strangulation hazards.

• Remove all packaging before the toy is given to the child.

• Colour, designs, and decorations may vary from those shown in the photographs.

• Hair entanglement may result if the child's head is too close to the mortised unit of this toy.

• Please note: As an extra precaution, check this toy regularly for signs of wear or damage.

• This unit is only for use by children aged 8 years and older.

• Please retain the information and this manual for future reference.

#### CAUTION!


Before setting up any experiment, please double check and make sure all wiring connections you have made are correct before connecting the solar panel or generator and switch on the unit, as failure may result in damage to components or circuit board unit.

When experiment is finished, make sure that the solar panel or generator is disconnected and switch off the unit before you clear away the wires.

Do not apply any components or parts to the experiment other than those provided in this kit

#### General

To correctly construct this DIY kit please make sure all instructions are carefully read and review the illustrated diagram for easy following.

This symbol  indicates that batteries should not be disposed of in the normal household waste but taken to appropriate local recycling facilities, where and when these are available. Never throw batteries in a fire or attempt to open outer casing. This product should not be treated as normal household waste and it should be recycled, John Lewis do not operate instore take back, but as members of the Distributor Take Back scheme have funded the development and upgrade of recycling facilities across the UK. Please take it to your nearest collection facility or for further details contact your local council or visit [www.recycle-more.co.uk](http://www.recycle-more.co.uk).

John Lewis Plc  
171 Victoria Street  
London SW1E 5NN  
[johnlewis.com](http://johnlewis.com)



Please retain these instructions for future reference

Made in China

No.75660201\_36013 instruction size :145mm x 210mm



## Build your own Solar powered car

#### Solar powered car

Thank you for purchasing this toy. Please read the instructions and warnings carefully before use to ensure safe and satisfactory operation of this product. Please retain this information leaflet for future reference.

Check the contents in the box. You should have all the components listed in the PARTS LIST below.

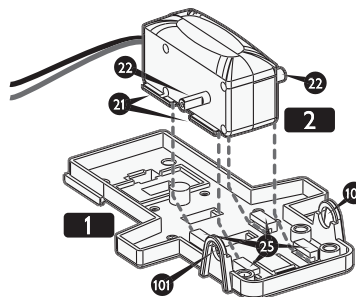
#### Parts list

1 Body	x 1pc
2 Gearbox	x 1pc
3 Tyre	x 4pcs
4 Hub	x 4pcs
5 Screw	x 4pcs
6 Front shaft	x 1pc
7 Front bracket	x 1pc
8 Front cover	x 1pc
9 Rear wing	x 2pcs
10 Spring	x 4pcs
11 Switch	x 1pc
12 Adapter	x 1pc
13 Solar panel	x 1pc
131 Solar panel rod	x 1pc
14 Screw driver	x 1pc
15 Generator	x 1pc

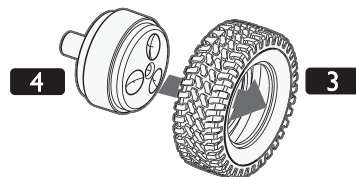
#### Instructions for use

##### Assembly

1 Place the gearbox (2) over the body (1), align four rims (21) to the guides (25), and push gearbox (2) to the end. In doing so, the shafts (22) will align to the holes (10), and the gearbox (2) will fit together with the body (1).

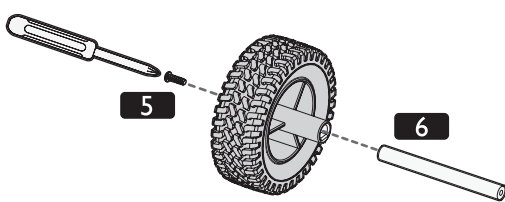


2 Slip four Tyres (3) on four hubs (4). Make sure they are fitted together properly, otherwise the car will not move smoothly.

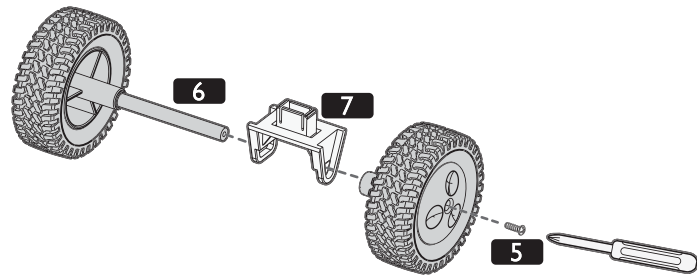


For the following steps 3-6, it's important that each wheel hub is fitted with the correct shaft. Therefore, for easy fitting, each hub is clearly marked. Wheel hubs marked with "1" can be fully inserted to the front shaft, and wheel hubs marked with "2" can be fully inserted to the back shaft.

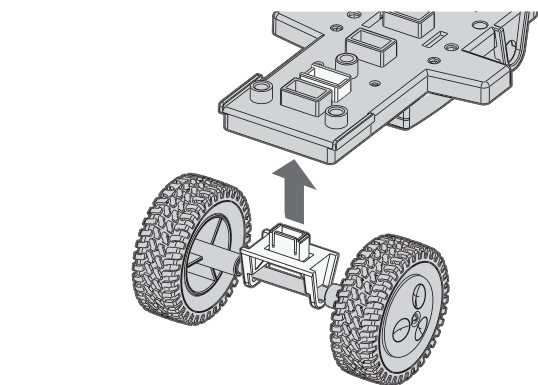
3 Fix one front wheel hub on front shaft (6). Tighten the screw (5) to fasten. Note that only the correct wheel hubs can be fully inserted to front shaft (6)



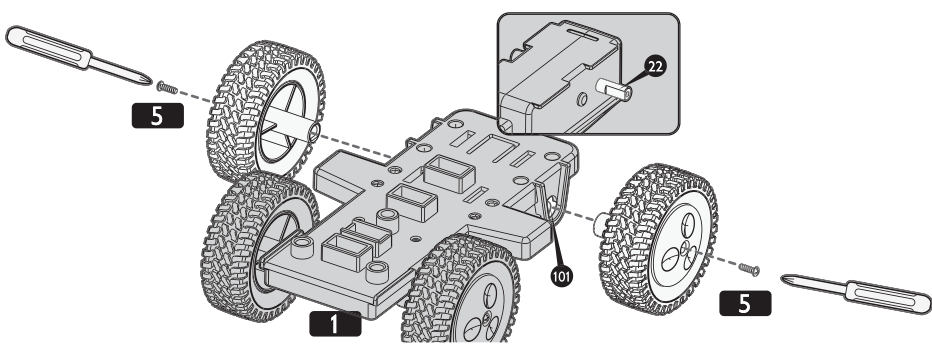
4 Slip the front shaft (6) onto the front bracket (7). Fix another front wheel hub in the front shaft (6). Then fasten the screw (5) to fix them tightly. Again note that only the correct wheel hub can be fully inserted to front shaft (6)



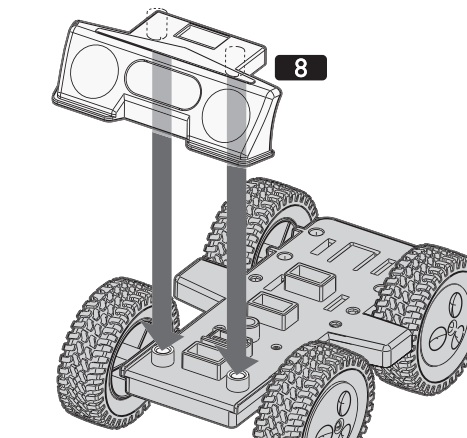
5 Insert the front bracket (7) into the rectangular hole (19).



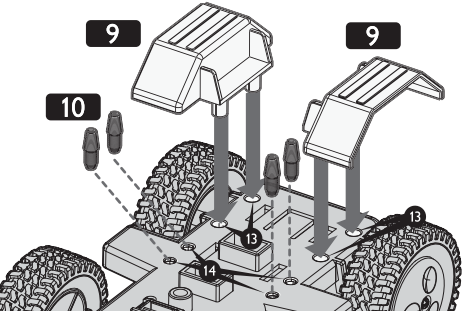
6 Insert the two remaining rear wheel hubs through holes (101) to the shafts (22). Then screw the screw (5) to fix them tightly.



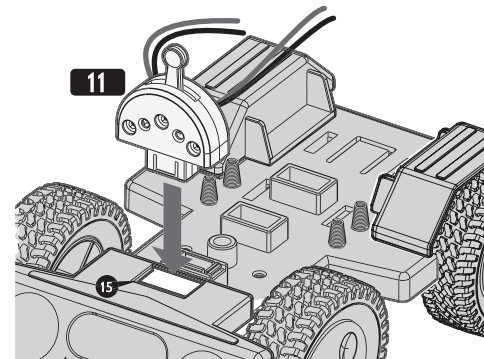
7 Install the front cover (8) into the holes in the front of the body (1).



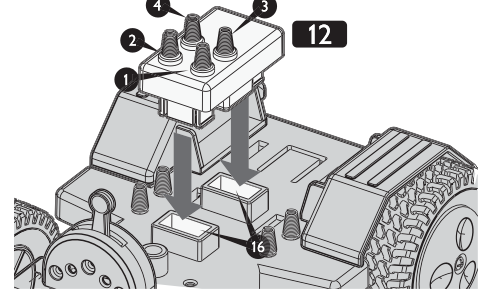
8 Insert a pair of rear wings (9) into each of the hole on the back of the body (1). Place four springs (10) into the four holes of the body (1).



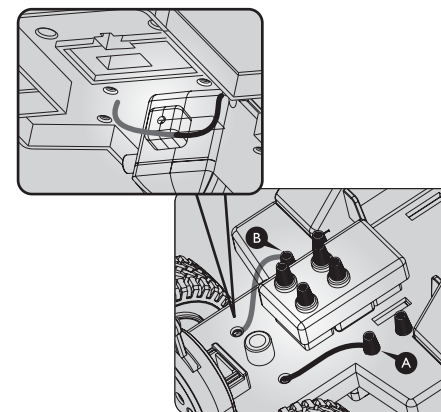
9 Insert switch (11) through the front cover in the rectangular hole of body (1).



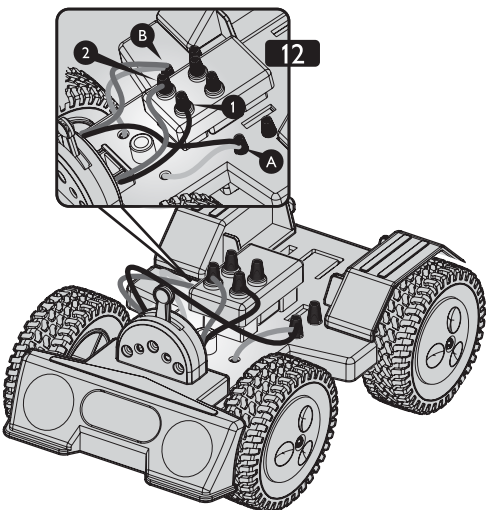
10 Insert adapter (12) into the two rectangular holes (16) of body (1).



11 Connect two leads of the gearbox (2) through the two holes of the body (1) to the nearest pair of springs on body (1). Connect the red lead to [B] and the black lead to [A]



12 Connect any pair of the leads of the switch (11) to springs [A][B]. Same as the above, remember to always put the red lead(s) on the right and always put the black lead(s) on the left. Connect another pair of leads of the switch (11) to springs [1] [2] on the adapter (12). Black to [1] and red to [2].



13 Insert the round head of solar panel rod (131) into the centre hole of the solar panel (13), and then insert the other end of solar panel rod (131) into the hole (18) on the body (1). Then connect the two leads of the solar panel (13) to the lower two springs [3] and [4] of the adapter (12). Red lead to [4] and the black lead to [3].

