

Ugestem originated in South Africa where access to both education and toys is a luxury that still evades many children. As part of an outreach program Ugestem has committed to sponsor many communities from underprivileged areas with a range of our educational toys.

For more information, contact: [info@ugestem.com](mailto:info@ugestem.com)



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**ugestem**

Having fun while learning

**DIY KIT**

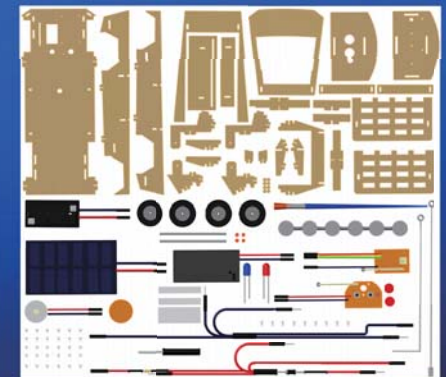
Inspired by the

**TESLA CYBERTRUCK**

**Instruction book**



**51 PIECE SET!** (Instructions included)



**Instruction video**

You can also follow the instructions on video by scanning the QR code.



**SCIENCE**



**TECHNOLOGY**



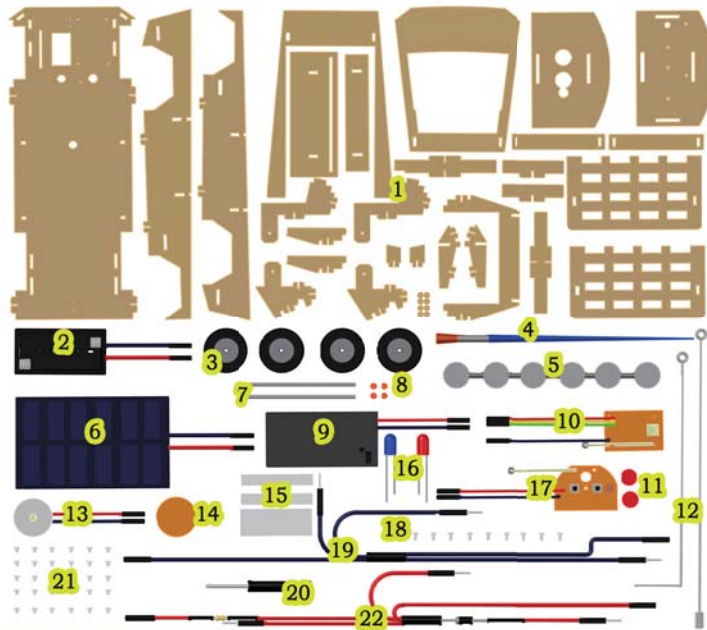
**ENGINEERING**



**MATHEMATICS**

# Complete kit

## Complete Kit



|                          |     |
|--------------------------|-----|
| 1- Wooden blocks         | X29 |
| 2- Battery Holder A      | X1  |
| 3- Wheels                | X4  |
| 4- Paint Brush           | X1  |
| 5- Paint                 | X6  |
| 6- Solar Panel           | X1  |
| 7- Axles                 | X2  |
| 8- Wheel Spacers         | X4  |
| 9- Battery Holder B      | X1  |
| 10- Car Circuit Board    | X1  |
| 11- Remote Buttons       | X2  |
| 12- Aerials              | X2  |
| 13- Motor                | X1  |
| 14- Gear                 | X1  |
| 15- Double Sided Tape    | X2  |
| 16- LED Lights           | X2  |
| 17- Remote Circuit Board | X1  |
| 18- Large Screws         | X9  |
| 19- Black 5 Point Cable  | X1  |
| 20- Screw Driver         | X1  |
| 21- Small Screws         | X36 |
| 22- RED 5 Point Cable    | X1  |

### SPARE PARTS INCLUDED



**Parent/Guardian or Teacher to read these instructions carefully and be present.**



### WARNING

CHOKING HAZARD - Small parts. Not for children under 8 yrs.  
Keep out of reach of small children to prevent accidental swallowing.

**Make sure to read these carefully before use.**

- \* Assembly instructions are included.
- \* Batteries not included. Batteries are to be inserted with correct polarity.
- \* The supply terminals are not to be short circuited.
- \* Do not connect motor to any power source other than the included solar cell.
- \* The packaging must be retained since it contains important information.
- \* Be sure to run the solar miniature car in a safe place.
- \* Store this product away from high temperatures, humidity, and direct sunlight.

# Testing

## Testing

Test your car by inserting batteries into the battery holders (car and remote). Switch on both battery packs. Immediately you should see the LED's light up. Now press any of the buttons on the remote control and this should cause the car to either move forward or move backwards. You can also remove the batteries from the car (not the remote), and place the car in direct sunlight. On a sufficiently hot day, when the solar panels face the sun directly, the solar panel should provide enough power to mobilize the car without batteries. If the car is not working, then it is time for some engineering troubleshooting.

### See if the following problems have occurred?

1. Why doesn't the car move after installation?
  - \* Check whether the orange spacers are too tight. It is recommended to leave a 1mm gap.
  - \* Check whether the battery is low, it is recommended to replace the battery with a new one.
  - \* Check whether the circuit is connected correctly. Please refer to wiring diagram.
  - \* Check that the plugs are all connected properly and correctly.
  - \* Check that the diode faces the correct way.
2. Under what circumstances is the solar panel of this model useful?
  - \* The solar panel needs to be in direct sunlight.
3. Why do the car wheels spin when remote buttons are not being pressed?
  - \* The remote control board uses a universal frequency radio signal, and it will rotate when it receives the same frequency signal, which is a normal phenomenon.
4. Can multiple remote control cars be controlled separately?
  - \* This model uses a universal frequency remote control board. Remote control cars of the same frequency cannot be used together at the same time, they will interfere with each other.
5. Can flashlights and LED lights illuminate solar panels to generate electricity?
  - \* Flashlights and LED lights can illuminate the solar panel to generate electricity, but the electricity emitted is very weak and your car will perform poorly.

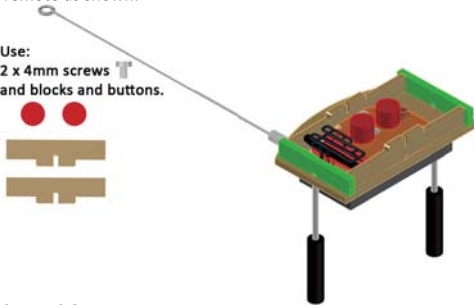


# Steps

## Step 26

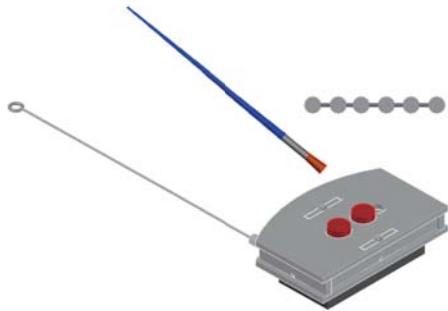
Attach the two wooden blocks using 2x4mm screws and add the red buttons simply by pushing them into the positions as shown below. Tightly group all the wires on the inside of the remote as shown.

Use:  
2 x 4mm screws  
and blocks and buttons.



## Step 28

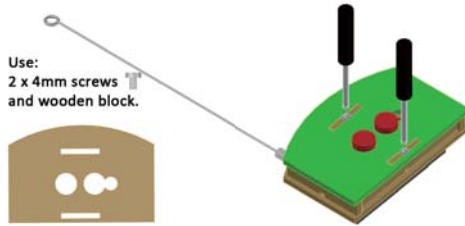
Paint the wooden panels of the remote.



## Step 27

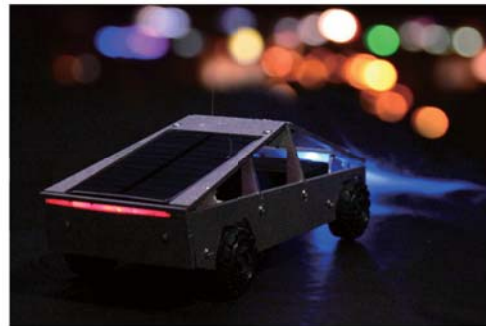
Make sure that all the wires are inside the remote control unit and attach the final wooden block using the 4mm screws as shown.

Use:  
2 x 4mm screws  
and wooden block.



## Complete!

Congratulations! You have completed the construction of the solar electric car!



# Introduction

## Project inspiration

This project was inspired by the Tesla Cybertruck. The Cybertruck is a battery electric light-duty truck announced by Tesla, Inc. in 2019. As of the publishing of this book, three models have been announced, with EPA range estimates of 400-800 kilometers (250-500 mi) and an estimated 0-100 km/h (0-62 mph) time of 2.9-6.5 seconds, depending on the model.

The stated goal of Tesla in developing the Cybertruck is to provide a sustainable energy substitute for the roughly 6,500 fossil-fuel-powered trucks sold per day in the United States.

## Project goals

This project is to serve as an educational aid. After completing this project you should have a better understanding about electricity, solar energy and the need for electric cars in general.

## Limitations

The final assembled model is very a basic RC (remote controlled) car with very limited speed and functionality. It is NOT a racing grade RC car. This project is educational in nature and uses very basic components to reduce the difficulty of the construction. Furthermore, the model is only loosely based on the aesthetic design of the Cybertruck. The actual Cybertruck differs in aesthetic design.

## Precautions

Please be careful when opening the package to avoid the loss of small components. Read instructions and diagrams carefully.

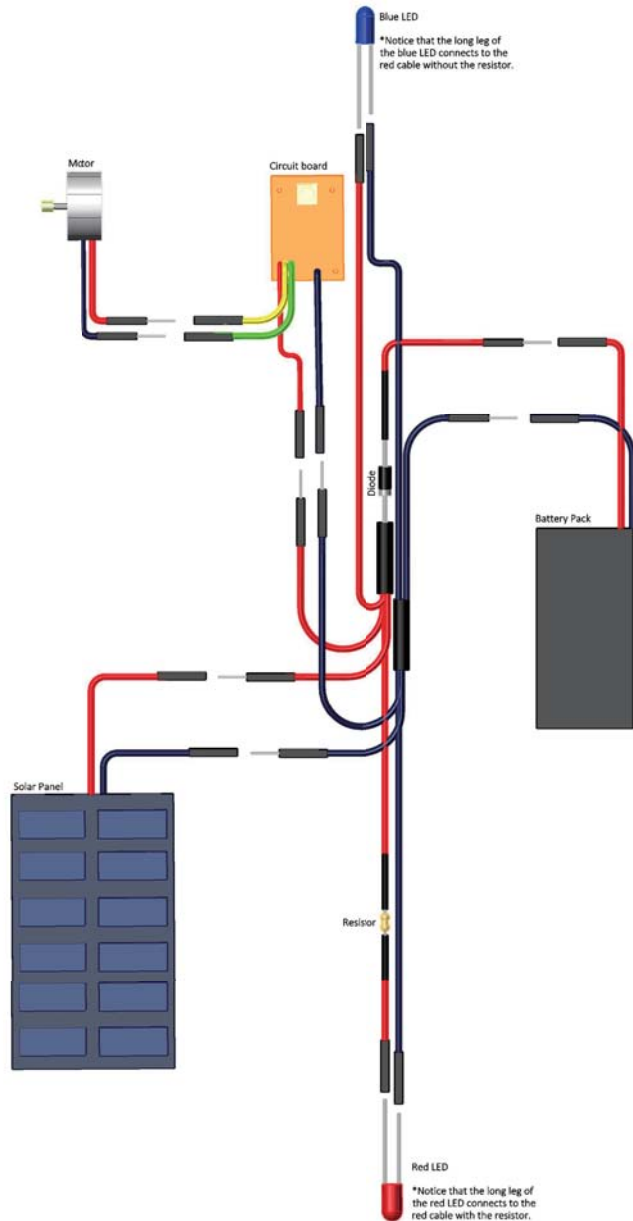
## FCC Statement

**WARNING:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

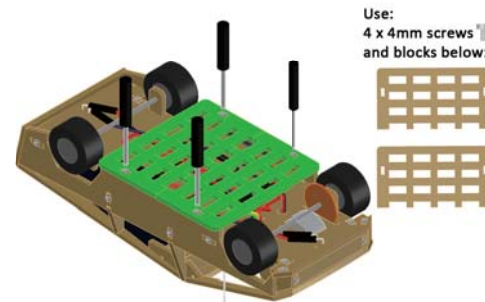
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**The device must not be co-located or operating in conjunction with any other antenna or transmitter.**



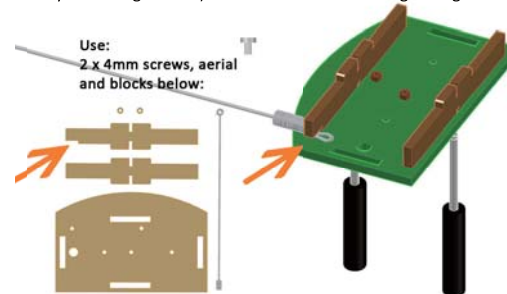
## Step 20

Attach the two wooden blocks as shown below.



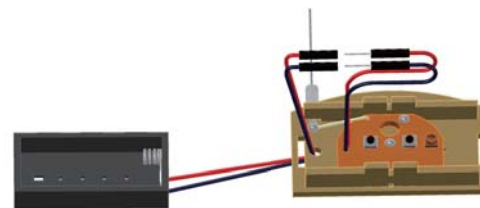
## Step 22

Attach the wooden blocks and align the two wooden spacers as shown. Notice the groove cut into one of the blocks (shown by the orange arrow). Place end of aerial through the groove.



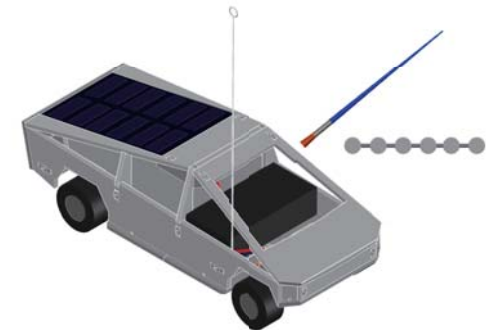
## Step 24

Connect the battery pack to the remote control as shown. Red clips in with red, black clips in with black.



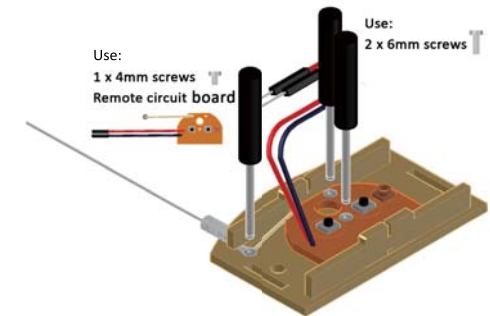
## Step 21

Paint all the wooden surfaces as shown below.



## Step 23

Attach the aerial and the remote circuit board as shown below:



## Step 25

Tighten the battery pack to the back of the remote controller. Connect using two 4mm screws as shown below:



# Steps

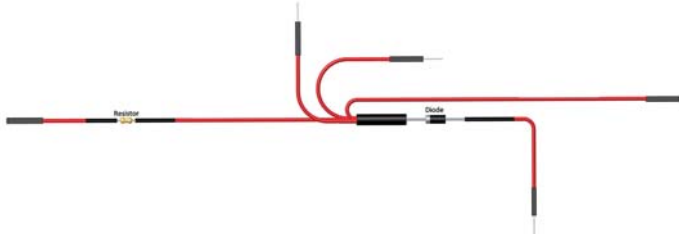
## Step 19

Use the black and the red cable nest provided to connect all the components according to the wiring diagram.

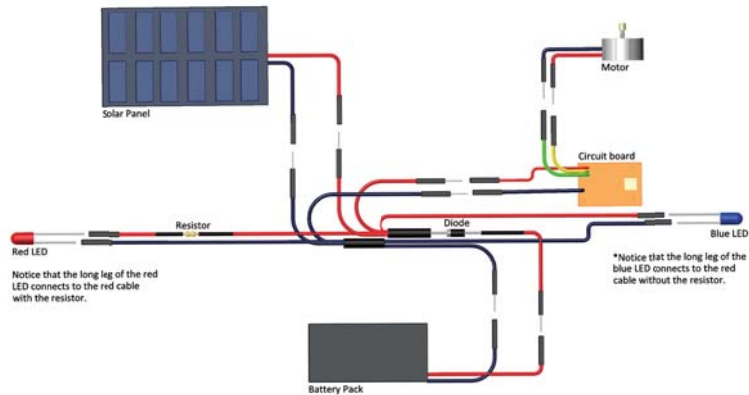
Black cable nest:



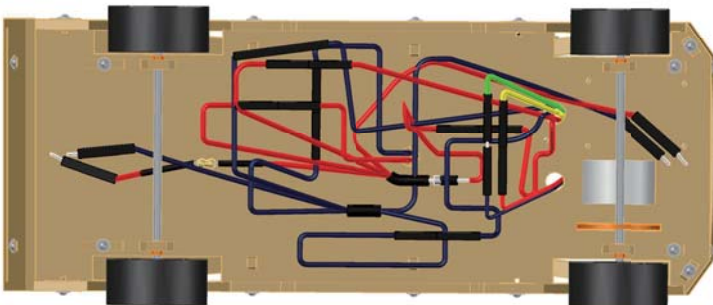
Red cable nest:



Wiring diagram:



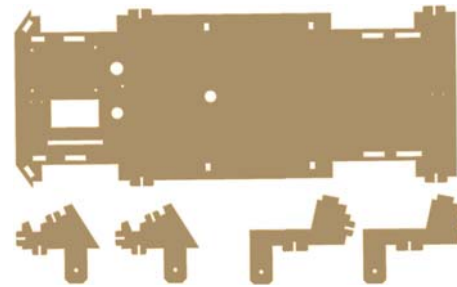
Final look:



# Steps

## Step 1

Remove all the excess wood from the car panels. Find the blocks shown below, separate these blocks from the rest and proceed to step 2.



## Step 3

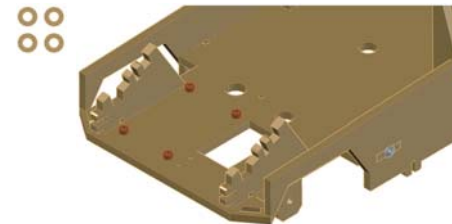
Find and put aside the wooden panels shown below.



## Step 5

Find and place the 4 **wooden** circular spacers in the positions as shown below. This will serve as a spacer keeping the circuit board suspended and protected from damage.

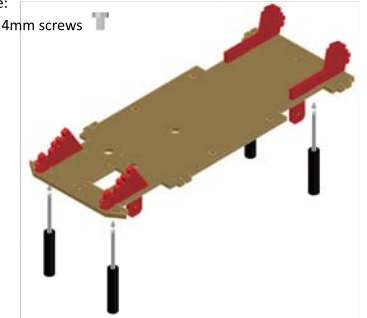
Use:  
4 wooden spacers



## Step 2

Combine the blocks as shown below. Use the screw driver provided to tighten the small 4mm screws into position.

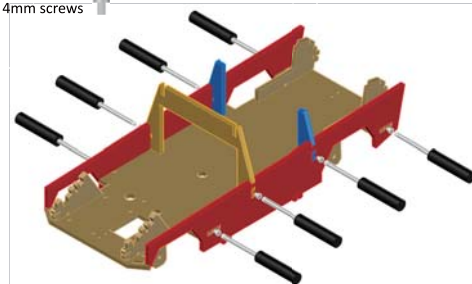
Use:  
4 x 4mm screws



## Step 4

Combine the blocks as shown below. Use the screw driver provided to tighten the small 4mm screws into position.

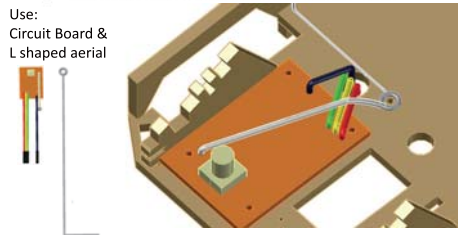
Use:  
8 x 4mm screws



## Step 6

Find the circuit board and the L shaped aerial. Place the circuit board on top of the wooden spacers and align the holes. Place the L shaped aerial in the position as shown and push the wires through the holes as shown.

Use:  
Circuit Board &  
L shaped aerial



# Steps

## Step 7

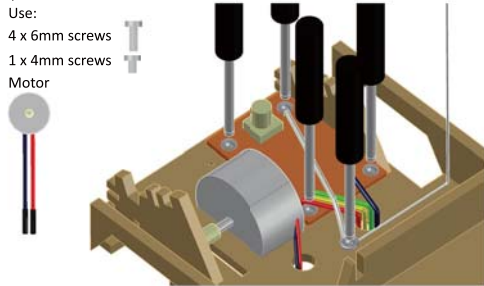
Use 4 of the large 6mm screws to tighten the circuit board. Use 1 small 4mm screw to tighten the white wire and the L shaped aerial as shown below. Also add the motor to the position as shown below.

Use:

4 x 6mm screws

1 x 4mm screws

Motor

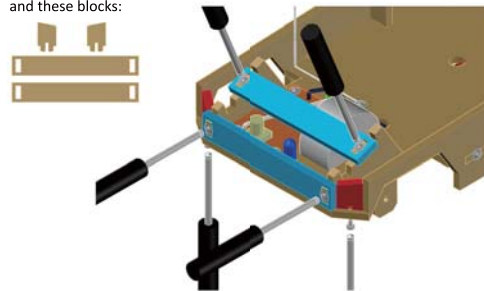


## Step 9

Find and attach the below blocks using 6 small 4mm screws.

Use:

6 x 4mm screws  
and these blocks:

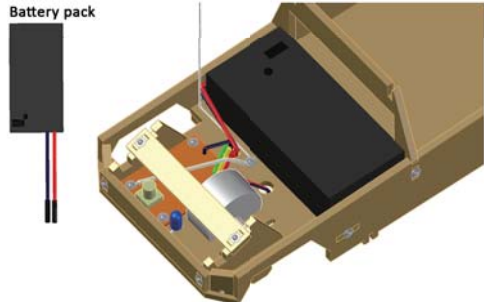


## Step 11

Place the battery pack on top of the double sided tape. Push the wires through the hole as shown below.

Use:

Battery pack

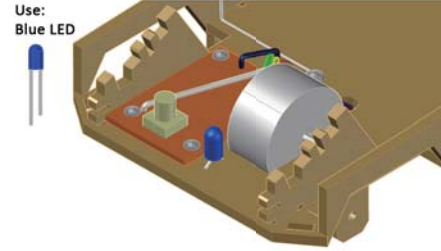


## Step 8

Insert the blue LED (labelled blue if colourless) as shown in the position below. For convenience, insert the LED so that the long leg is at the front of the car. Take note that the LED has a long leg (to get attached to a red wire later on) and a short leg (to get attached to a black wire later on).

Use:

Blue LED

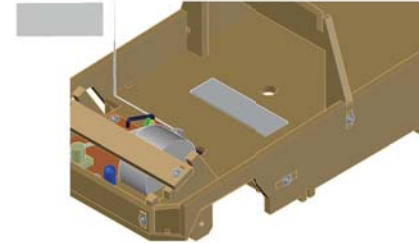


## Step 10

Add the large cut of double sided tape to the position as shown below.

Use:

Large cut double sided tape

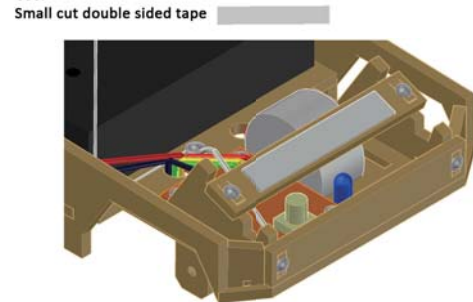


## Step 12

Add the small cut of double sided tape to the position as shown below.

Use:

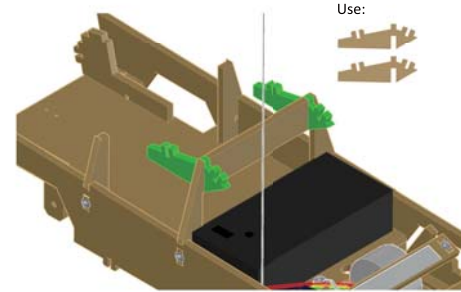
Small cut double sided tape



## Step 13

Attach the two wooden blocks as shown below.

Use:

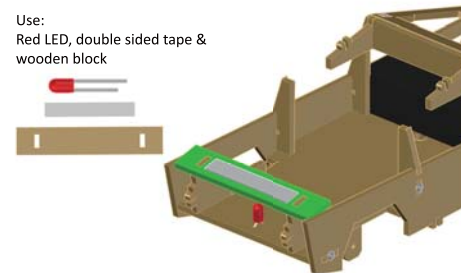


## Step 15

Attach the wooden block, red LED and the double sided tape as shown below. For convenience, attach the red LED so that the long leg is at the back of the car.

Use:

Red LED, double sided tape & wooden block



## Step 17

Insert the solar panel into the position as shown. Make sure that the wires are at the front and that the cables are inserted into the hole as indicated by the arrow below.

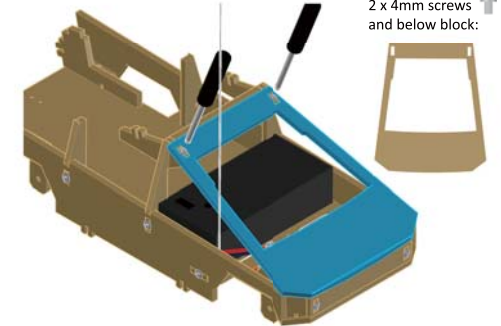


## Step 14

Attach the wooden block as shown below.

Use:

2 x 4mm screws  
and below block:

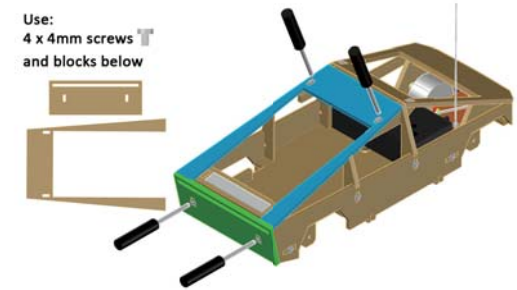


## Step 16

Attach the two wooden blocks using the 4mm screws as shown below.

Use:

4 x 4mm screws  
and blocks below



## Step 18

Attach the wheels. Take note the LED light cables must run underneath the axle. The axle goes through the orange spacers and orange gear. Make sure the gear is moved into position so that it fits into the rectangular hole in the chassis and connects to the motor arm as shown below.

