

# **ASSEMBLY INSTRUCTIONS**



## NOTES:

- 1. Punch out the parts and assemble with care.
- 2. Store the small parts carefully after removing them from the board to avoid losing pieces.
- 3. Some parts have numbers, match the numbers while assembling.
- 4. Be sure to fully assemble pieces for a proper fit.
- 5. Extra pieces can be used as spare parts.
- 6. Use sandpaper to polish any rough edges.
- 7. Keep these instructions for future reference.



#### **ATTENTION:**

- 1. Keep the product away from open flames and don't soak it in water.
- 2. Do not use chemicals like alcohol or ammonia for cleaning. Clean with a dry cloth.

## FAQ:

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Problem	Cause	Solution			
The rover doesn't move.	<ol> <li>Sunlight is not direct enough.</li> <li>The gears didn't mesh correctly.</li> </ol>	<ol> <li>Expose the solar panel to stronger, more direct sunlight.</li> <li>Fix the gears so they mesh together. Revisit any instructions to help ensure product was assembled correctly.</li> </ol>			

# Parts List

ltem	Shaft Sleeve	Square Shaft Sleeve	Gear	Gear Set	Gear	Steel Shaft	Solar Motor Set	Ring	Metal Chain
Number	P1	P2	P3	P4	P5	P6	P7	P8	P9
Illustration	0			L=35mm		L=75mm		Ô	
Quantity	20	8	2	1	1	4	1	4	1

## Key



Make sure the gears are appropriately engaged with each other.



Assemble the parts symmetrically.



Complete step 2 times.



Complete step 4 times.

Special attention in assembly.

can rotate freely.



Rotate the product based on the direction of the arrow to match the new perspective.



Use a hard surface to help push together pieces for assembly.



Step 2

Step 1





Printed side

Back side































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### SOLAR ENERGY

Solar panels are made up of many solar cells called photovoltaic cells. When the sun is strong enough, these cells absorb solar energy which then outputs electricity. This electricity can be converted for a variety of uses. The Curiosity Rover, that was launched by NASA, utilizes solar panels to power its journey. The sun only provides four hours of sunlight each day that is strong enough to be converted to energy for this rover.

When the Transport Rover is placed in direct sunlight, the sun provides energy through the solar panel, which then turns the gears to make the wheels move.





## **ROVERS IN REAL LIFE**

After dropping onto a planetary or lunar surface, rovers take photos of the surface and samples of the soil using a variety of sensors and instruments to collect data. Rovers can measure temperature, humidity or even acidity of materials.

The Curiosity Rover is a Mars rover. It has cameras aboard that can take high-resolution photos of planetary features as small as 12.5 microns—that is approximately the thickness of plastic wrap. The Curiosity Rover also has features to measure radiation that will help pave the way for human exploration of Mars' surface one day.

One of the longest working rovers was the Opportunity Rover that NASA launched in 2004. It worked on Mars for over 14 years collecting data and clocked over 26 miles of terrain. Rovers that explore places like Mars and the moon need special equipment such as gold paint or heaters to help control their operating temperatures and keep their tools safe.





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