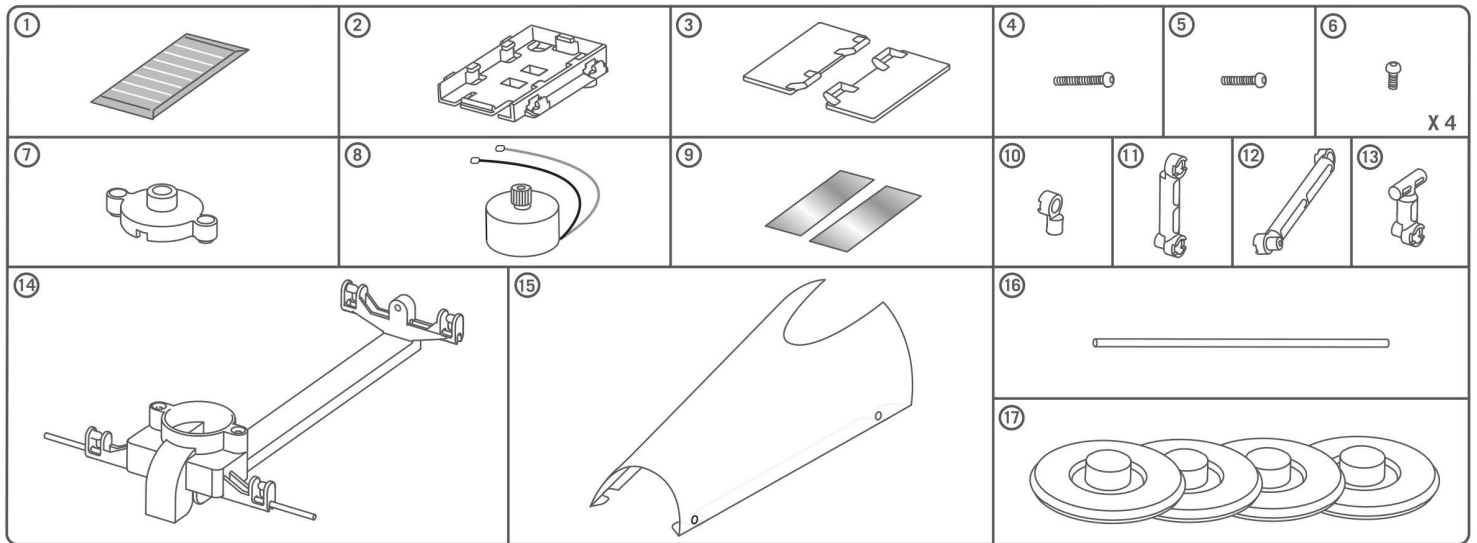


Solar Rover

A. SAFETY MESSAGES:

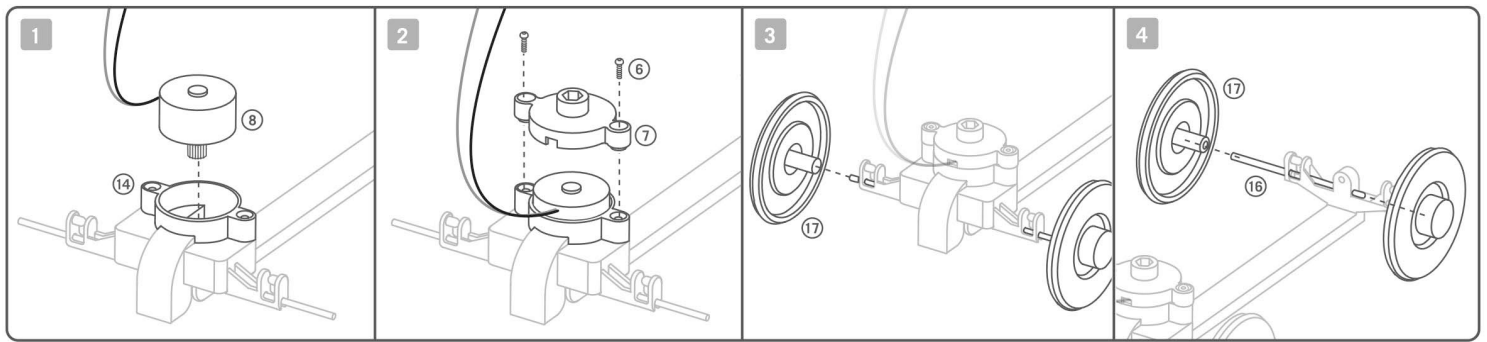
1. Adult supervision and assistance are required at all times.
2. Intended for children of ages over 8.
3. This kit and its finished product contain small parts which may cause choking if misused. Keep away from children under 3 years old.
4. Do not attempt to take the solar panel apart.



B. CONTENTS:

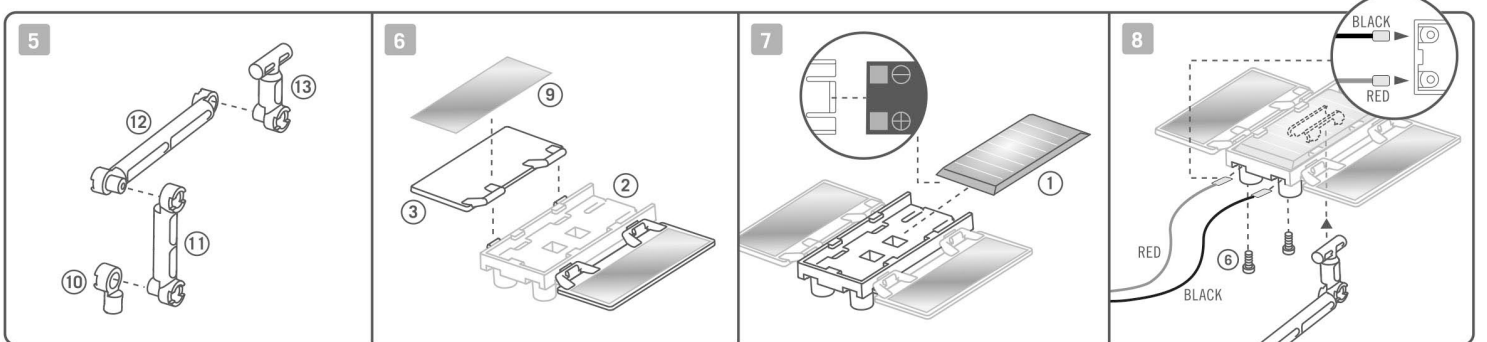
- Part 1: Solar panel,
- Part 2: Solar panel holder,
- Part 3: Reflective panel x 2,
- Part 4: Long screw,
- Part 5: Medium screw,
- Part 6: Short screw x 4,
- Part 7: Motor cover,
- Part 8: Motor with wires and gear,
- Part 9: Reflective sticker x 2,
- Part 10: Base joint,
- Part 11: Short arm section,
- Part 12: Long arm section,
- Part 13: Top joint,
- Part 14: Chassis with rear axle in place,
- Part 15: Transparent chassis body,
- Part 16: Axle,
- Part 17: Wheel x 4.

Also required, but not included in this kit: small crosshead screwdriver, empty soda can.

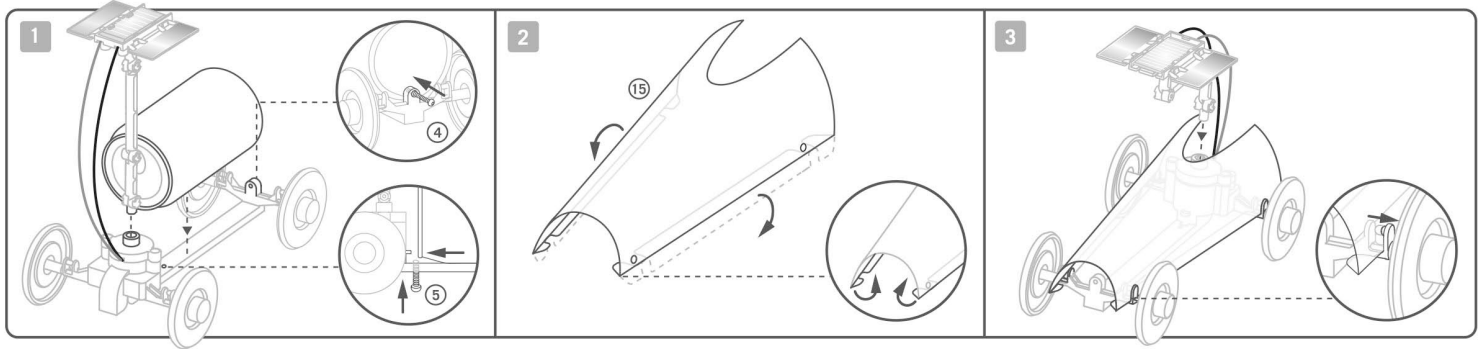


C. ASSEMBLING THE CHASSIS:

1. Look at the chassis. The end with the motor housing and the pre-installed axle is the rear of the Solar Rover. Carefully insert the motor into the motor housing. The worm gear on the motor's spindle must interlock with the gear wheel on the rear axle. Lubricate the gears with some cooking oil/lotion from home.
2. Place the motor cover over the motor with the cut-outs in the cover facing to the rear. The wires from the motor should come out through one of the cut-outs. Secure the cover with two short screws.
3. Push a wheel onto each end of the rear axle.
4. Push the axle through the slot in the front of the chassis and push a wheel onto each end of the axle.



5. The support arm is made of the base joint, a short arm section, a long arm section and a top joint. Push the base joint onto one end of the short arm section. Push the other end of the short arm section onto one end of the long arm. Push the top joint onto the spare end of the long arm.
6. Attach the reflective stickers on the reflector panels. Clip the two reflectors onto the sides of the solar panel holder.
7. Examine the solar panel. On the underside (the flat side) there is + sign and a - sign at one end. Slide the panel into the holder, with this marked end first, into the holder, until you hear a click.
8. On the underside of the solar panel holder are two holes for screws. These are for connecting the wires to the panel. Place the holder with the solar panel facing down, and with these holes facing up, and with the end of the holder with the holes facing away from you. The motor has two wires attached to it — one red and one black — each with a metal tab on the end. Slide the tab of the black wire into the right-hand connector (as you look at it) and secure it with a screw. Slide the tab on the red wire into the left-hand connector and secure this with another screw. Then clip the holder onto the top joint of the supporting arm.



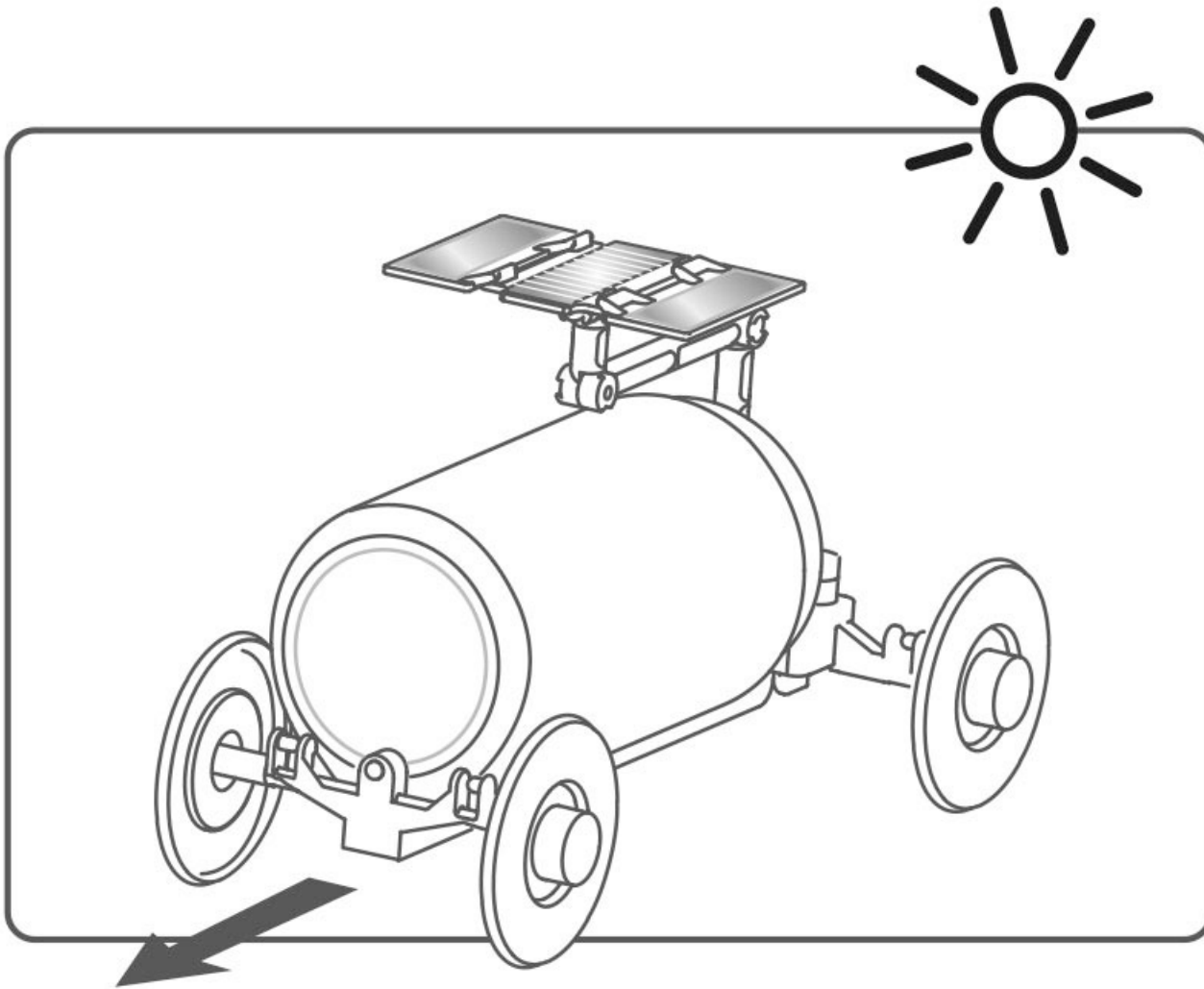
D. ASSEMBLING THE BODY:

1. We encourage recycling, so use an empty soda can to make the body of your Solar Rover. Clean the soda can first. Then place the soda can onto the chassis with its hole to the rear, so that the rim of the can is just below the slot in the motor cover. Secure the can in place with one long screw at the front of the chassis and one medium screw under the rear.

2. There is also a transparent plastic body sheet provided in this kit that you can use to make a body shell. Fold the plastic sheet along the edges as diagram.

3. Fit one side of the plastic cover onto the pins on one side of the chassis. Bend the cover over and fit the other side onto the pins on the opposite side of the chassis. Why not stick some your favorite stickers on the body to make your Solar Rover look cool.

Congratulations! Your Solar Rover is ready to go.



E. OPERATION:

Put your Solar Rover in the sunshine. Twist and tilt the solar panel so that the panel faces the Sun. This allows the panel to collect as much sunlight as possible. Adjust the reflectors so that they reflect sunshine onto the solar panel. The motor should start running, making the Solar Rover move forwards. When you are not using your Solar Rover, keep it out of the sunshine so that the motor doesn't operate. Don't use the Solar Rover outdoors when it is raining as water may damage the solar panel and motor.

You may also use the Solar Rover indoors or at an indoor school science fair. Ask an adult for a desk lamp with a 60-watt incandescent light bulb (not a fluorescent energy saving bulb). The bulb will act as a simulated Sun. Shine the lamp close directly onto the solar panel from close up. The light should be enough to drive the Solar Rover. Warning: An adult's permission and supervision is required when using a desk lamp.

F. TROUBLESHOOTING:

If your Solar Rover does not move:

- Ensure that the metal tabs of wires and the solar panel are tightly secured.
- The floor surface may be too rough or uneven. A rough surface will create friction which affects the performance of your Rover.
- Try giving the Solar Rover a gentle push to get it started.
- The sunlight may not be strong enough. Adjust the angle of the panel so that it faces directly at the Sun. If it's cloudy you may have to wait until a sunnier day.
- Check that the gears are lubricated. Friction between the gear wheels will affect the performance of the motor.

If your Solar Rover runs backwards:

- Check whether the wires from the motor are on the wrong connectors. If so, swap them over.

G. HOW YOUR SOLAR ROVER WORKS:

The solar panel is made up of solar cells. When sunlight hits the solar cells, the cells create an electric current. The current makes the motor turn, which turns the wheels. The gears make the wheels turn more slowly than the motor. This allows the motor to turn the wheels more easily.

H. FUN FACTS:

- Energy we get from the Sun is called solar energy. It's a renewable form of energy because the Sun keeps shining all the time.
- Only about one billionth (a thousandth of a millionth) of the energy the Sun gives out hits the Earth.
- When light hits a solar cell, the solar cell works like a battery. In the Solar Rover, it pushes electricity through the motor.
- Solar cells are made from a material called silicon. Most silicon used to make them comes from sand.
- We use solar cells to make electricity in all sorts of gadgets, from watches to garden lights.
- Experimental solar vehicles work just like Solar Rover. They have roofs made from solar panels that provide electricity to work their electric motors.
- In 2007 and 2008 Solartaxi drove right around the world just using its solar panels. It also used its solar panels to recharge its batteries.
- NASA's robot rovers called Spirit and Opportunity drive across the surface of Mars using electricity from solar cells.

QUESTIONS & COMMENTS:

We treasure you as a customer and your satisfaction with this product is important to us. In case you have any comments or questions, or you find any parts of this kit missing or defective, please do not hesitate to contact our distributor in your country, whose address is printed on the package. You are also welcome to contact our marketing support team at Email: infodesk@4M-IND.com, Fax (852) 25911566, Tel (852) 28936241, Web site: WWW.4M-IND.COM