

EXPERIMENT MANUAL

SOLAR MECHANICS



 THAMES & KOSMOS

Checklist: Find – Inspect – Check off

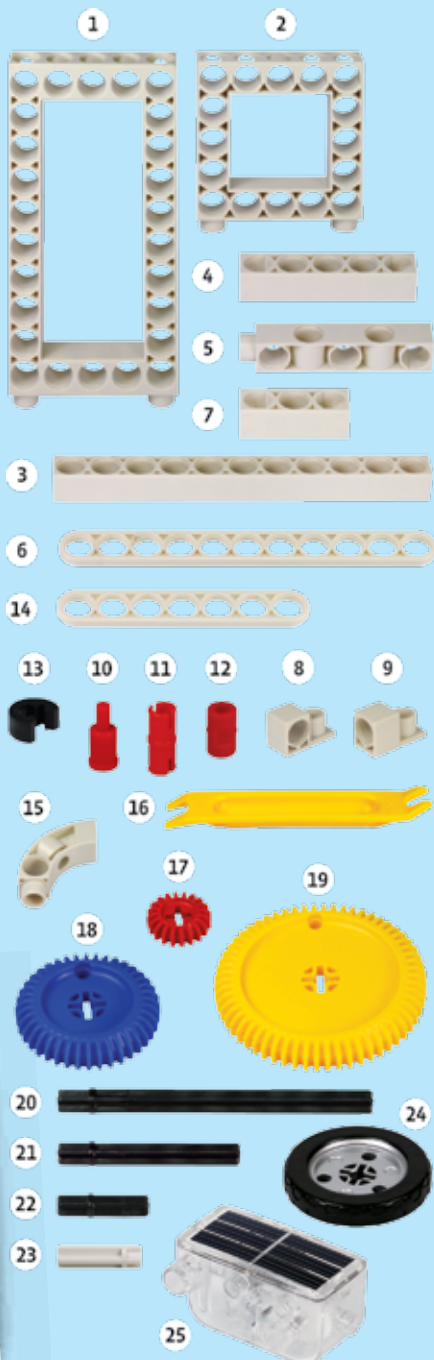
✓	No.	Name	Qty.
<input type="checkbox"/>	1	Large frame	1
<input type="checkbox"/>	2	Square frame	1
<input type="checkbox"/>	3	Long rod	2
<input type="checkbox"/>	4	5-hole rod	2
<input type="checkbox"/>	5	3-hole dual rod	4
<input type="checkbox"/>	6	11-hole flat rod	2
<input type="checkbox"/>	7	3-hole rod	1
<input type="checkbox"/>	8	90 degree converter - L	2
<input type="checkbox"/>	9	90 degree converter - R	2
<input type="checkbox"/>	10	Shaft pin	2
<input type="checkbox"/>	11	Joint pin	2
<input type="checkbox"/>	12	Anchor pin	14
<input type="checkbox"/>	13	Axle lock	2
<input type="checkbox"/>	14	7-hole flat rod	2
<input type="checkbox"/>	15	Curved elbow rod	4
<input type="checkbox"/>	16	Part separator tool	1
<input type="checkbox"/>	17	Small gear wheel	3
<input type="checkbox"/>	18	Medium gear wheel	2
<input type="checkbox"/>	19	Large gear wheel	1
<input type="checkbox"/>	20	Long axle	2
<input type="checkbox"/>	21	Medium axle	1
<input type="checkbox"/>	22	Short axle	2
<input type="checkbox"/>	23	Motor axle	1
<input type="checkbox"/>	24	Wheel (44 mm)	4
<input type="checkbox"/>	25	1.5 Volt Solar Motor Unit	1
		Total	61

If you are missing any parts, please contact Thames & Kosmos customer service.

Any materials not contained in the kit are marked in *italic script* in the “You will need” boxes.

Additional things you will need:

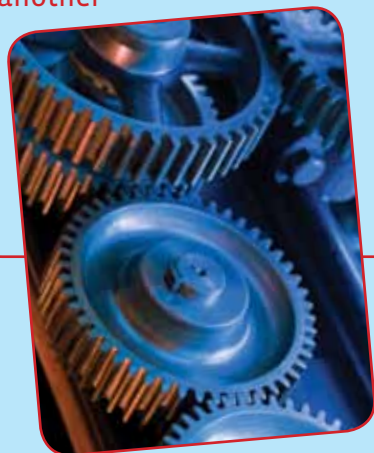
sunlight, desk lamp with incandescent bulb, fluorescent lighting, index card, wooden blocks, tape measure or yard stick, chalk or tape, stopwatch or timer, plank of wood



Gearing Up: Transmissions Pages 4 to 9



How to move mechanical energy from one place to another



Powering Up: Solar Cells Pages 9 to 24

Learn how solar cells convert sunlight into electricity, and how to use that electricity



The Models: Part 1 Pages 25 to 38

Assemble solar powered vehicles



The Models: Part 2 Pages 39 to 56

Assemble other solar powered devices and machines



CHECK IT OUT

You will find supplemental information on pages 9, 16 to 17, 21 to 24, and 38.

Optimum tilt of the solar panel

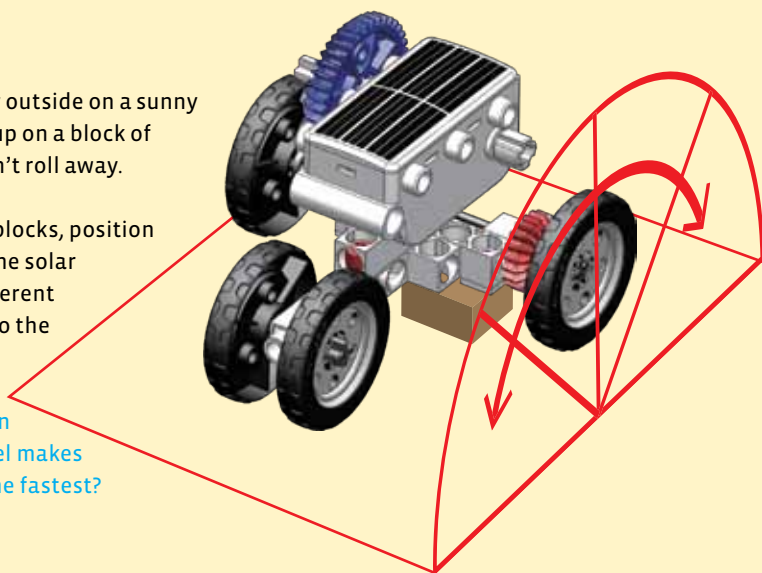
YOU WILL NEED

- test car model
- a sunny day, when the sun is high in the sky
- small blocks of wood

HERE'S HOW

1. Take the test car outside on a sunny day and prop it up on a block of wood so it doesn't roll away.
2. Using different blocks, position the car so that the solar panel sits at different angles relative to the sun.

What orientation of the solar panel makes the motor run the fastest?

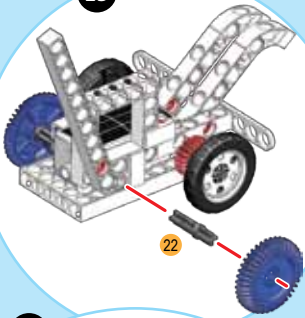


→ WHAT'S HAPPENING?

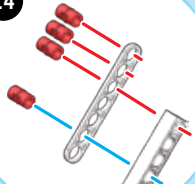
The motor runs the fastest when the solar panel is most directly facing the sun. Because the sun is so far away, its rays hit Earth virtually parallel to one another. When the solar panel's surface is directly facing the sun, the light rays hit it perpendicularly. When the solar panel's surface is tilted at an angle to the sun, the light rays hit it at an angle. The more perpendicular the angle is, the more energy per surface area there is. See page 23 to learn more about this.

Excavator

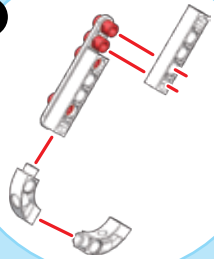
13



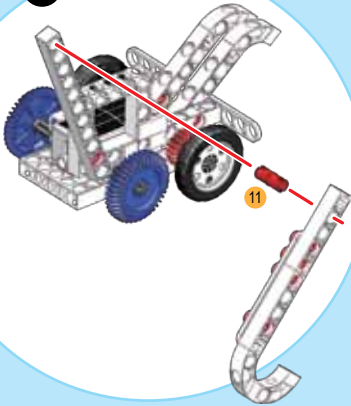
14



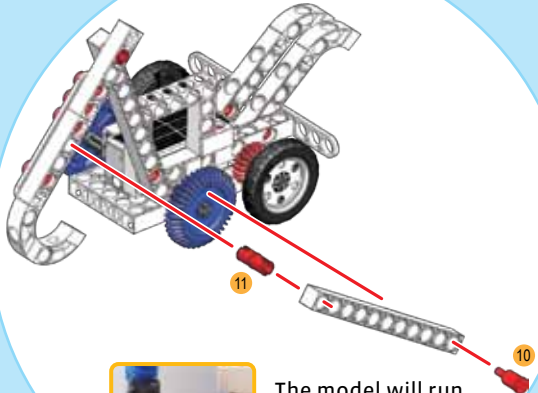
15



16



17



18



The model will run better with a 1mm gap between the gear and frame.

Make sure this axle does not stick out through the gear.

