



SOLAR POWER 2.0

GREEN ENERGY



#7303

120 PCS

8+



10 MODELS
TO BUILD

ENLIGHTEN ECO-CONSCIOUS WITH
SOLAR POWER TECHNOLOGY



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Product Features

- The new solar energy experiment kit from Gigo has an all new design that will bring you a completely different technology experience.

Design

- The new high performance solar energy rechargeable battery box can be toggled to charge/discharge modes.
- The 40X motor and newly designed solar panel can provide 3 volts of power to move such a massive model; this is an innovative breakthrough in solar power blocks.
- The solar panel and battery box are conveniently linked with one cable, allowing you to drive your model at night using standard batteries.

Learning

- The 28-page full-color manual demonstrates how to assemble 5 types of models; as well as detailed assembly steps, there are also advanced principles and application.
- Understand the development and application of solar energy to inspire children's curiosity and awareness of the importance of this planet's sustainability.
- The combination of solar energy and motors allows further understanding of why models can move through the sunlight.
- Various types of models will stimulate the boundless imagination and children's creativity.

Innovation

- Gigo possesses the imagination that moves and is driven by solar energy models. Children can add their own experiences and thoughts through this they will be guided to develop their individual ambition and creativity to assemble unique models. Let children play happily and safely.

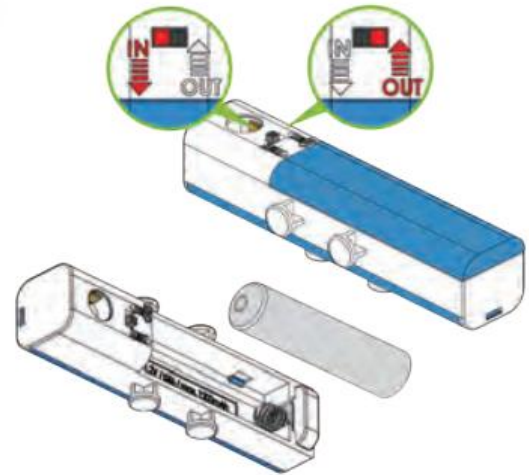
Suggestions to Parents

- Please carefully read the safety instructions within the instruction manual. We suggest that you follow the steps in the manual in the assembly of models. Soon, you will understand how to assemble the various parts and learn how to construct various models as you wish.
- This set is a toy appropriate for children above 8 years of age. It can help children explore and learn the solar power through the assembly of models.
- Please teach your children battery precautions before they start assembling models.
- Do not place wires or other items in household sockets. This is very dangerous. The models are only suitable for use with rechargeable and ordinary batteries (ordinary batteries should never be recharged).



Dual battery box

- Gigo has made innovative strides in the design of this battery box. Insert the rechargeable battery in the battery box and use the windmill model to charge it.
- When assembling other models, the battery box has a discharge function that allows models to move. Simply toggle the switch on the battery box to in (charge) / out (discharge) to achieve this.



Safety Guidelines

- Don't expose the 3V solar panel to the high temperature bulb for a long while to avoid short circuit.
- Please experiment with at least 60W bulb or outdoors under sunshine on sunny day. The normal electric torch is too weak to work.
- Loading and removing the battery should be carried out by an adult.
- Rechargeable batteries are only to be charged under adult supervision.
- Pay attention to the positive and negative polarity of the battery.
- Do not charge ordinary batteries.
- Alkaline batteries are recommended.
- Different types of batteries or new and used batteries are not to be mixed.
- Use only recommended or similar type batteries.
- The supply terminals are not to be short-circuited. A short-circuit can cause the wires to overheat and the batteries to explode.
- Do not mix alkaline, standard (carbon zinc), or rechargeable (nickel-cadmium) batteries.
- Exhausted batteries are to be removed from the toy.
- Dispose of used batteries in accordance with environmental provisions, not in household trash.

Product cleaning

- Please remove the battery from the battery box before cleaning it.
- Use a slightly damp cloth to clean the parts.
- Do not use detergent.

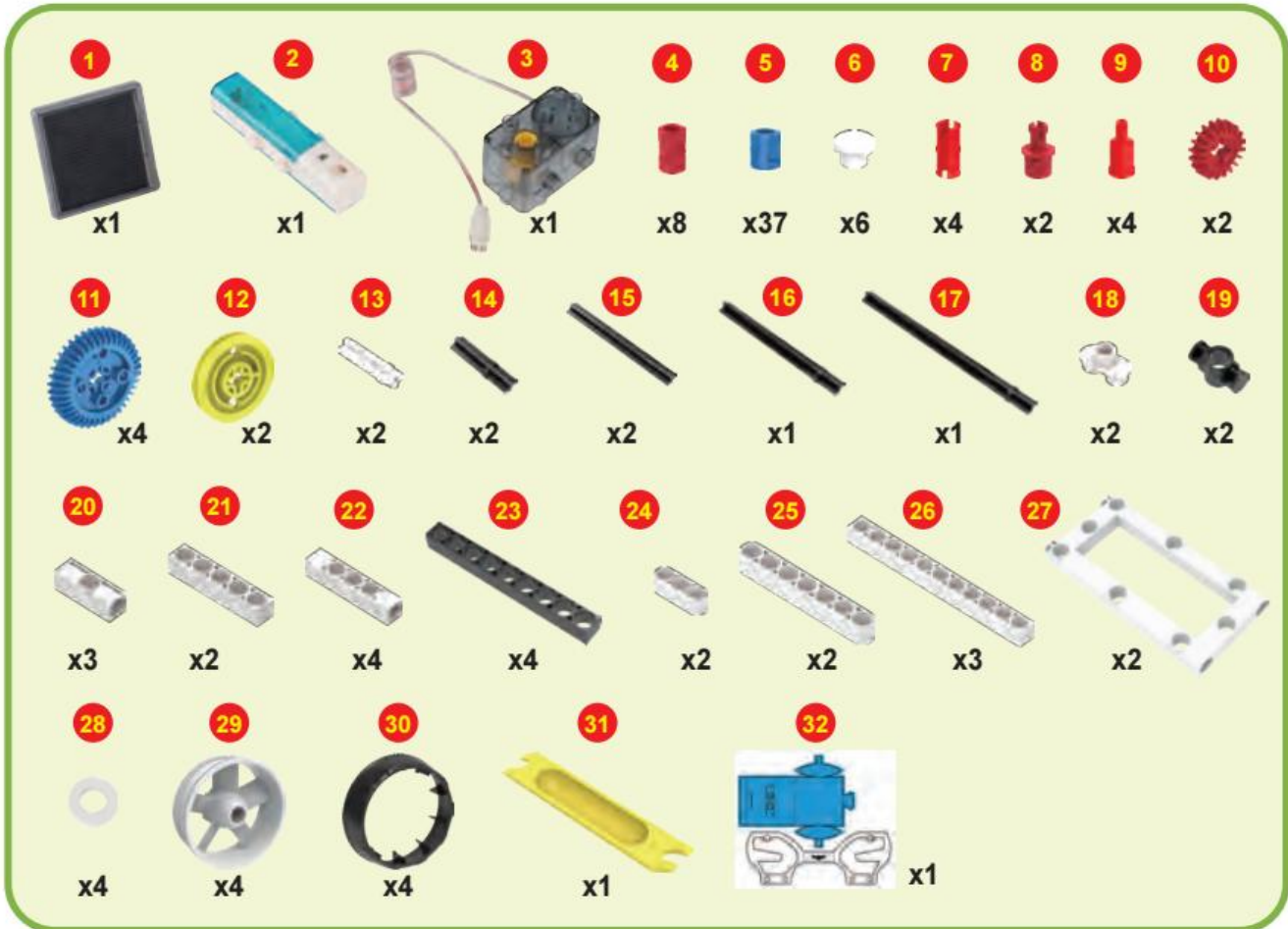
Caution

- Incorrect use of batteries may cause leakage, which could damage the surrounding environment, cause a fire or result in personal injury.

Warning

This set of toys is not suitable for children under three years old. Young children might swallow the small parts. Keep toys in a place that children can't reach.

PARTS LIST



No.	Description	Qty.	Item No.	No.	Description	Qty.	Item No.
1	C-3V SOLAR PANEL	1	7346-W85-A	18	C-TWO-IN-ONE CONVERTER	2	7061-W10-G1W
2	C-1.5V DUAL BATTERY BOX	1	7400-W85-B	19	C-1 HOLE CONNECTOR	2	7430-W10-B1D
3	C-40X MOTOR WITH WIRE CONNECTOR	1	7400-W85-A	20	C-3 HOLE ROD FRONT CLOSED	3	7026-W10-X1W
4	C-LONG PEG	8	7061-W10-C1R	21	C-5 HOLE ROD	2	7413-W10-K2W
5	B-SHORT PEG	37	7344-W10-C2B	22	C-5 HOLE ROD FRONT CLOSED	4	7413-W10-K3W
6	C-SHORT BUTTON FIXER	6	7061-W10-E1W	23	C-9 HOLE ROD	4	7407-W10-C1D
7	C-AXLE CONNECTOR	4	1156-W10-A1R	24	C-3 HOLE ROUND ROD	2	7404-W10-C1W
8	C-AXLE	2	7026-W10-H1R	25	C-7 HOLE ROUND ROD	2	7404-W10-C2W
9	C-CAM CONNECTOR	4	7026-W10-J3R	26	C-11 HOLE ROD	3	7413-W10-P1W
10	C-20T GEAR	2	7026-W10-D2R	27	C-5x10 ARCH FRAM	2	3941-W10-A1W1
11	C-40T GEAR	4	7346-W10-C1B	28	C-WASHER	4	R12#3620
12	C-OD33 PULLEY	2	7344-W10-N2Y	29	C-TURBO WHEEL	4	7392-W10-H1W
13	C-MOTOR AXLE	2	7026-W10-L1W	30	C-TIRE BLACK	4	7392-W10-G1D
14	C-30mm AXLE II	2	7413-W10-N1D	31	B-PEG REMOVER	1	7061-W10-B1Y
15	C-65mm AXLE I	2	7416-W10-C1D	32	P-DIE-CUT-PAPER	1	K16#7340-BUK13
16	C-70mm AXLE II	1	7061-W10-Q1D				
17	C-100mm AXLE II	1	7413-W10-L2D				



Getting to Know the Sun

It is common knowledge that living organisms rely on 3 elements to survive: "sun", "air", and "water". The earth we live on exists in the solar system with the sun as the centre of the solar system.

The sun's diameter is roughly 1,392,000 (1.392×10^6) kilometres, which is 109 times the earth's diameter. It is a sphere composed mainly of hot plasma and magnetic fields with a mass of 1.987×10^{30} kg (330,000 times the mass of earth).

From a chemistry standpoint, approximately 3/4 of the sun is hydrogen while the remaining 1/4 is nitrogen; other heavy elements account for less than 2% of the sun and include oxygen, carbon, and neon. The temperature on the surface of the sun is close to 6000°C and its energy is derived from the nuclear reaction of hydrogen fusion with helium. The sun's core burns 620 million tons of hydrogen per second.

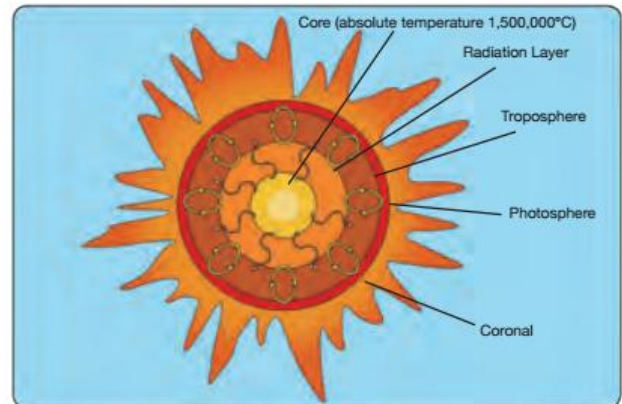


diagram 1

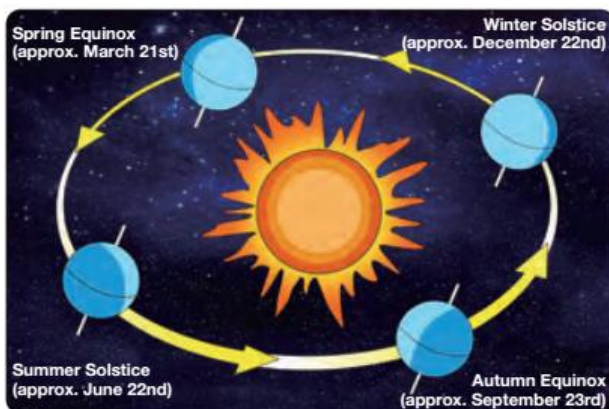


diagram 2

Energy from the sun provides growth nutrients for all organisms on earth through photosynthesis while also controlling the earth's climate and weather.

By calculating average distance, sunlight from the sun travels 8 minutes and 19 seconds to arrive at earth. The sun has always deeply impacted the earth and in many cultures humans can be seen worshiping the sun.

Correct scientific understanding of the sun only began at the beginning of the 19th century when scientists began to form an understanding of the matter that composes the sun. Up until today, mankind is still trying to understand the sun, its mechanisms for activity, and there are still massive amounts of mysteries waiting for mankind to solve.



Global Warming

Why did mankind want to develop solar energy? The primary reason is the growing awareness of global warming.

Global warming is due to the greenhouse effect, but what is that exactly?

Greenhouses are used in agriculture to maintain temperatures in a space so that plants can grow in controlled temperatures (for example, if you want to grow tropical plants in cold regions you need a greenhouse).

The ozone layer acts as a greenhouse and when radiation light and heat is reflected into space, the gases in the ozone layer absorb this light and heat; the ozone layer wraps around the earth and thus it maintains a certain temperature.

The gases that absorb light and heat in the ozone are what we call "greenhouse gases".

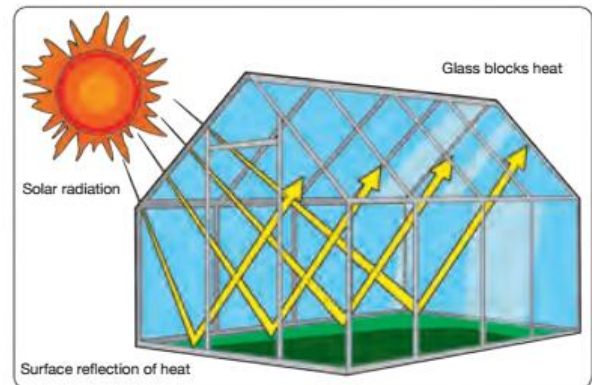


diagram 3

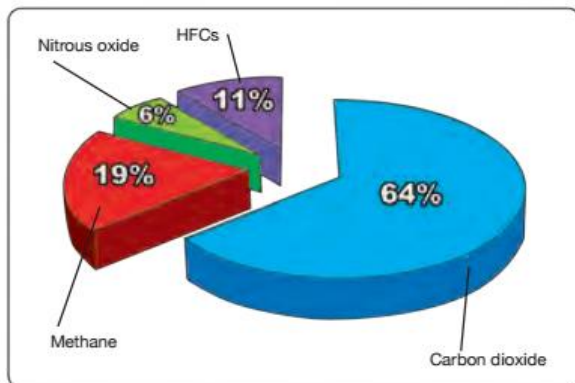


diagram 4

The phenomenon of global warming is due to excess greenhouse gases created by mankind. These gases include carbon dioxide (CO_2), water vapour, methane (CH_4), chlorofluorocarbons (including CFCs, HFCs, and HCFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and more.

After the industrial revolution, emission of greenhouse gases rose rapidly and caused the earth's temperature to increase at a rate double to a century ago. This is all from human activity such as burning fossil fuels and mass deforestation.

Now, mankind has developed green energy (including solar energy, hydro power, wind power, geothermal power) in the hope of replacing traditional energy sources and solve the global warming crisis. (The main characteristic of green energy is that it does not produce greenhouse gases.)



Solar Battery Principles

Actually in the early 19th century scientists had already discovered the phenomenon of electricity generated by light and this led to the invention of solar batteries. In the 1950s, with a better understanding of semiconductors and improvements in technology, solar batteries began to see widespread applications. But not until 1954 Bell Labs in the U.S. invented the first solar battery with practical applications in 1954.

Solar batteries use the semiconductor material silicon (Si) as a transistor and integrated circuit components to take advantage of photovoltaic effect technology (direct sunlight can produce energy).

The basic structure of batteries is connecting P-type and N-type semiconductors and we call this structure a PN junction. The differing concentration of carriers produce a flow field from N to P and when photons are absorbed by the semiconductor, the electrons generated will flow to N-type due to the electric field; the electric holes flow towards the P-type and are collected by the electrodes on both sides. Once they are connected, electricity is produced.

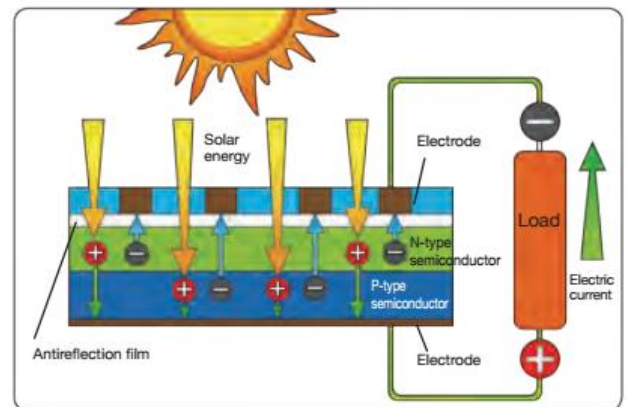


diagram 5

Solar batteries produce direct current (DC) electricity so if you want to provide electricity to the home, an inverter must be installed.

Types of Materials in Solar Batteries

The materials used in solar batteries can be categorized as: silicon, compound semiconductors, and organic semiconductors.

The primary material silicon can also be categorized as: monocrystalline silicon, polycrystalline silicon and amorphous silicon.

This image shows the manufacturing method of representative solar batteries.

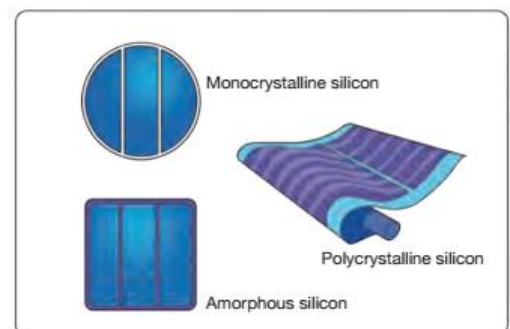
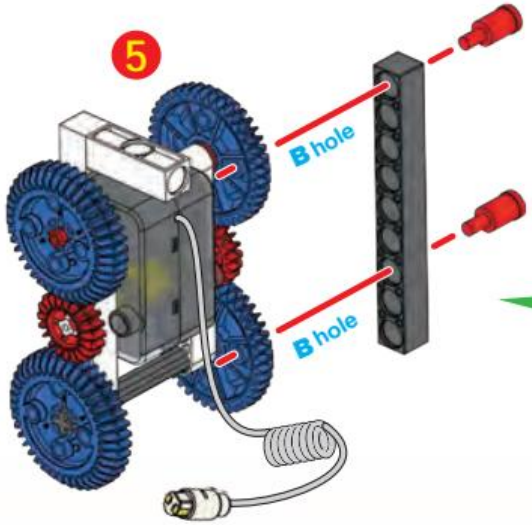
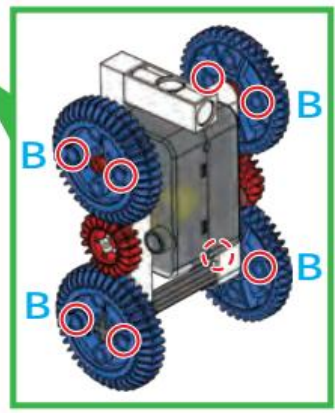
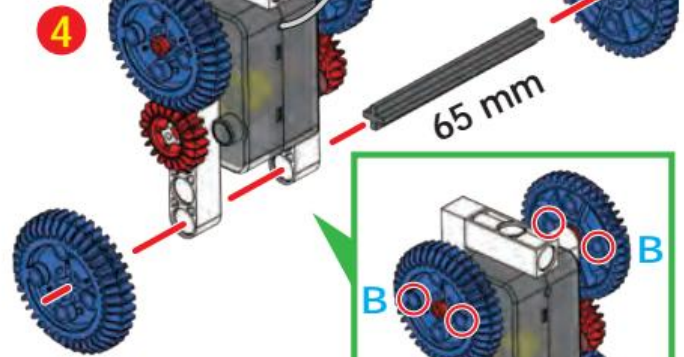
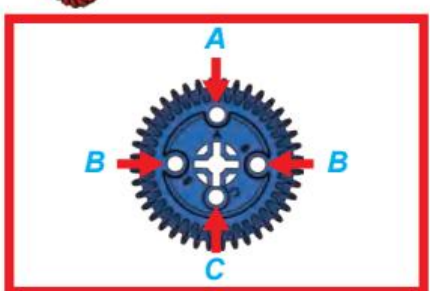
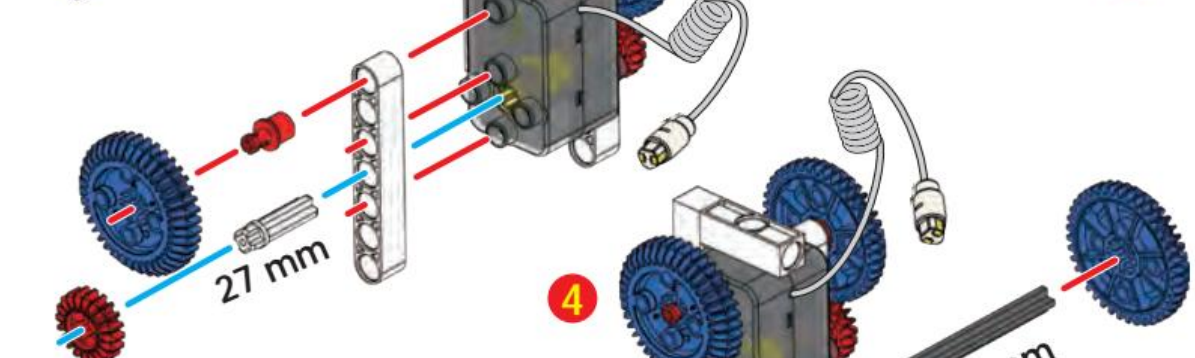
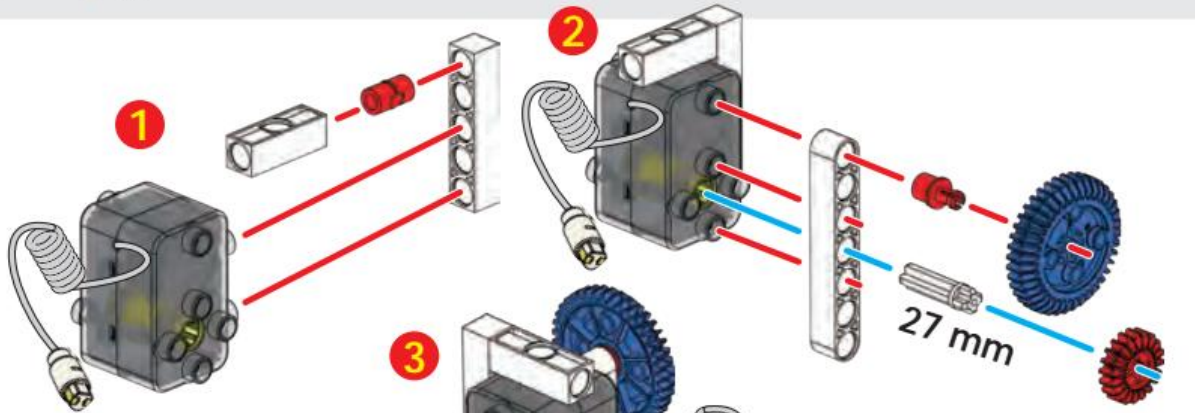


diagram 6

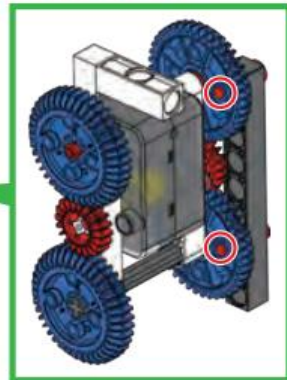
Single crystal silicon batteries were the earliest developed but were flawed due to a complicated manufacturing process and high cost. Later, semiconductor polysilicon batteries had a lower conversion efficiency but were much cheaper in terms of cost. Currently the market is still dominated by these two types amorphous silicon solar cells, which is the newest technology, therefore materials and cost are all drastically lowered, and it is expected to be a solar battery with more competitive price.

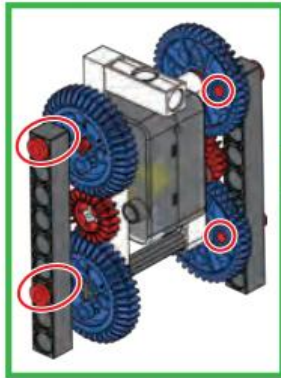


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| 1 | 3 | 4 | 8 | 9 | 10 | 11 | 13 | 15 | 18 | 19 | 20 | 21 | 22 | 23 | 25 | 31 |
| | | | | | | | | | | | | | | | | |
| x1 | x1 | x5 | x2 | x4 | x2 | x4 | x2 | x1 | x2 | x2 | x1 | x1 | x4 | x4 | x2 | x1 |

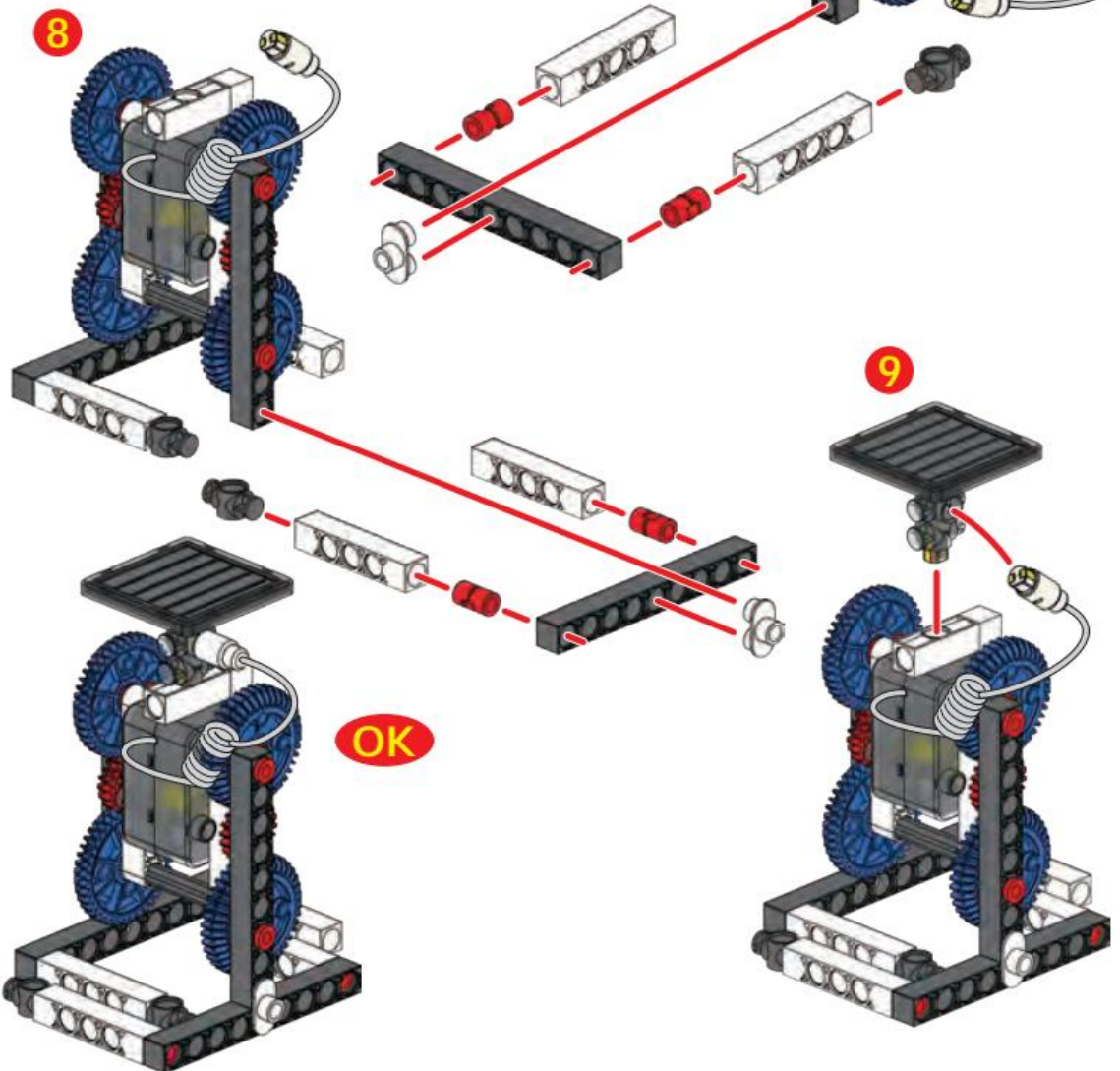
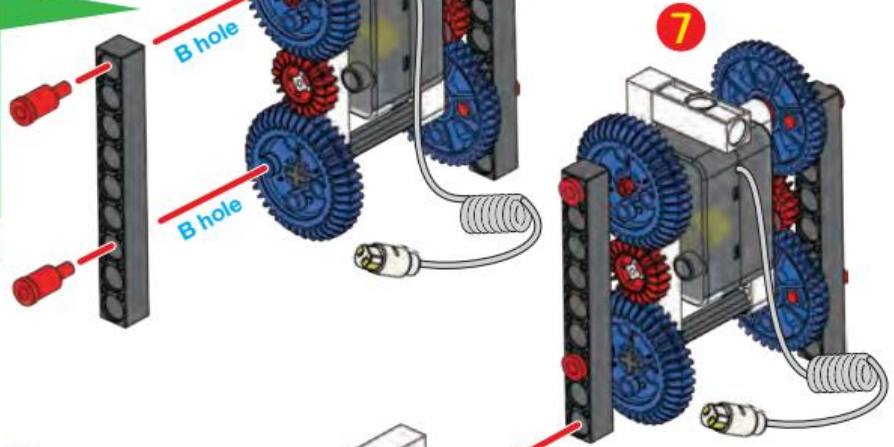
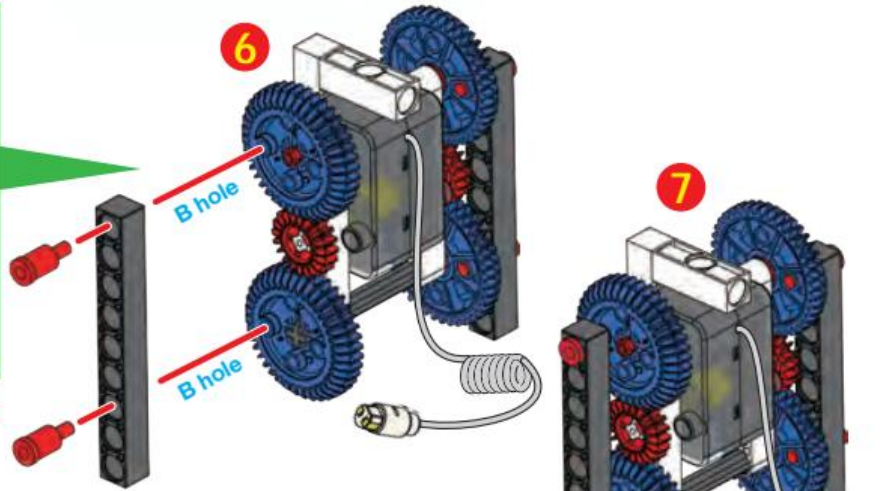


Holes B need to be parallel.



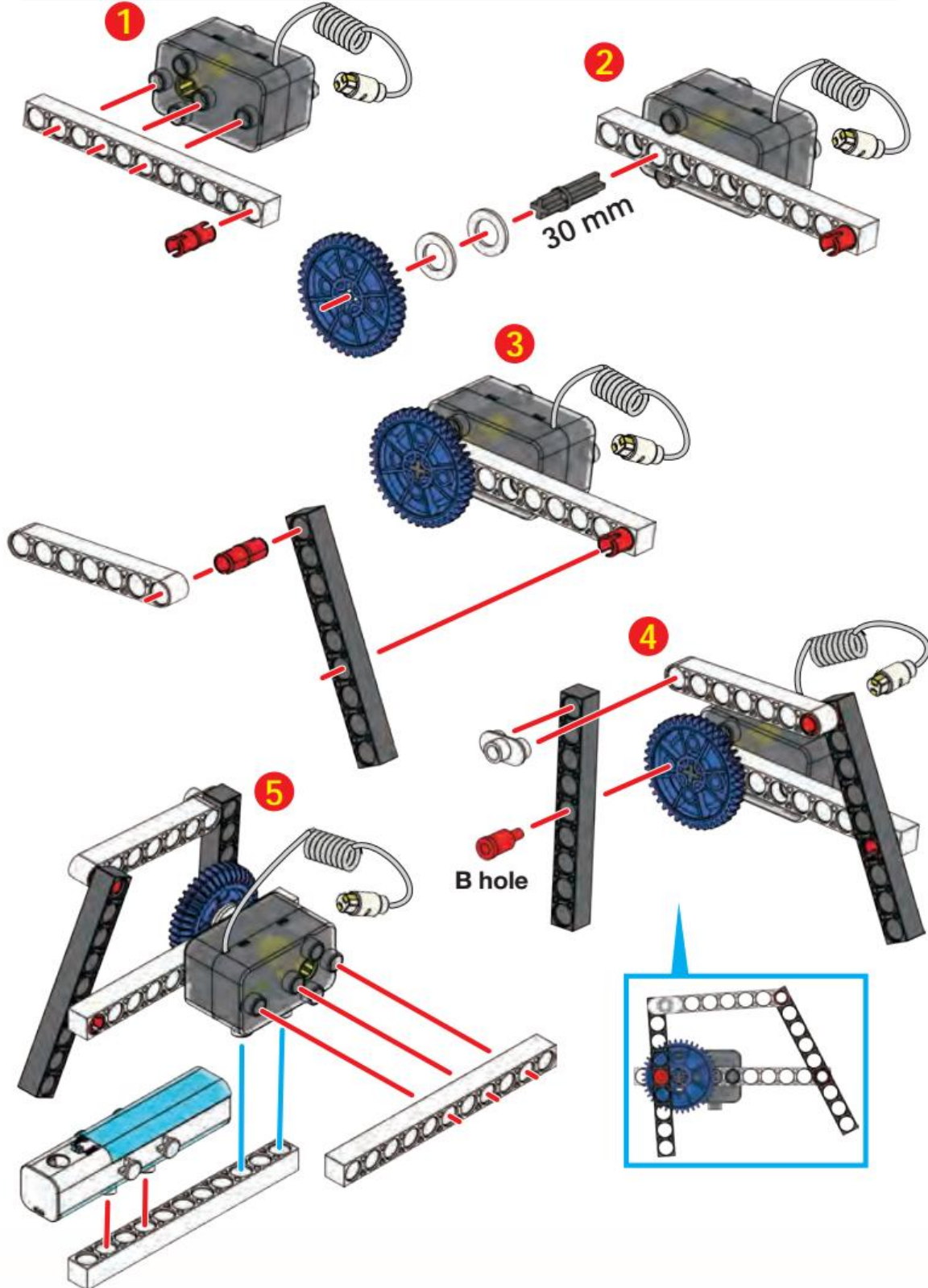


Note the direction to mount



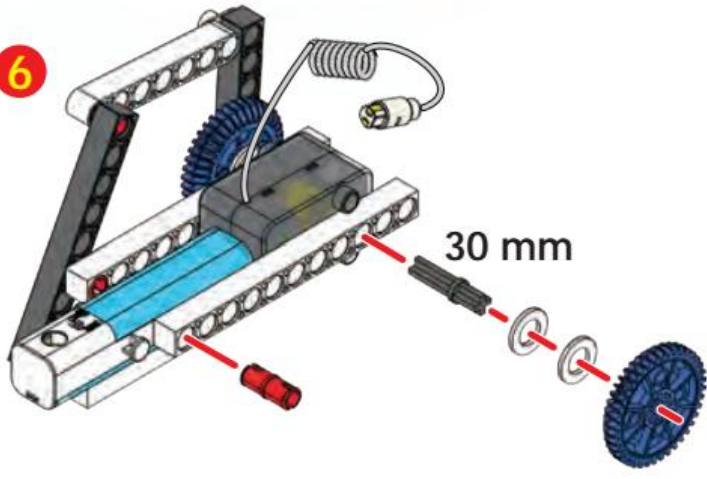


- 1 x1
- 2 x1
- 3 x1
- 7 x4
- 9 x2
- 11 x2
- 14 x2
- 18 x2
- 23 x4
- 25 x2
- 26 x3
- 28 x4
- 31 x1

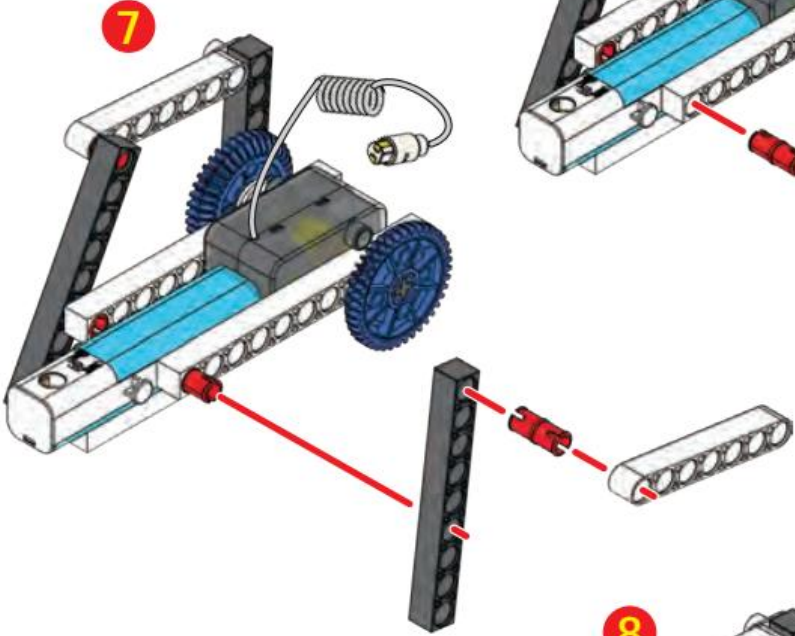




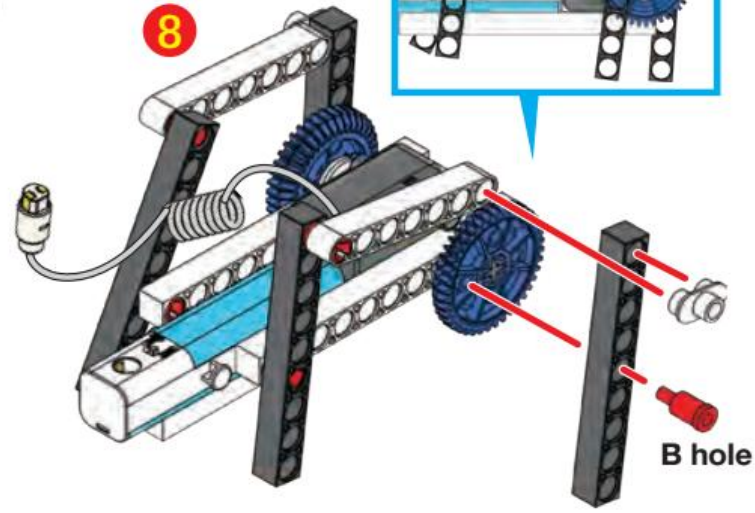
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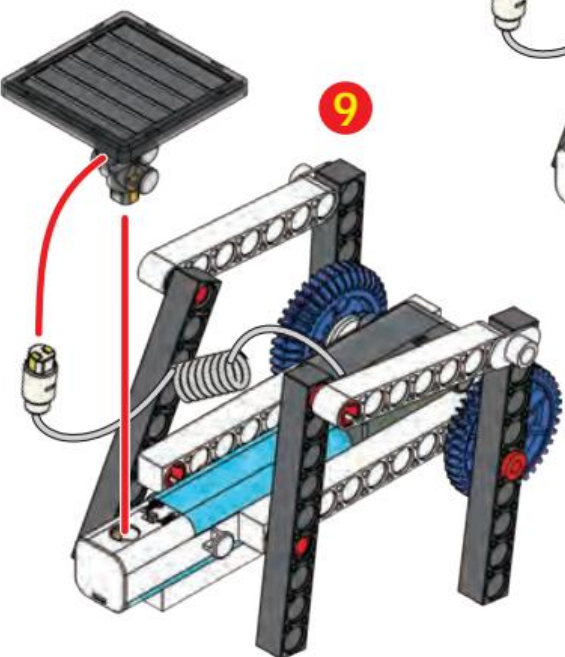
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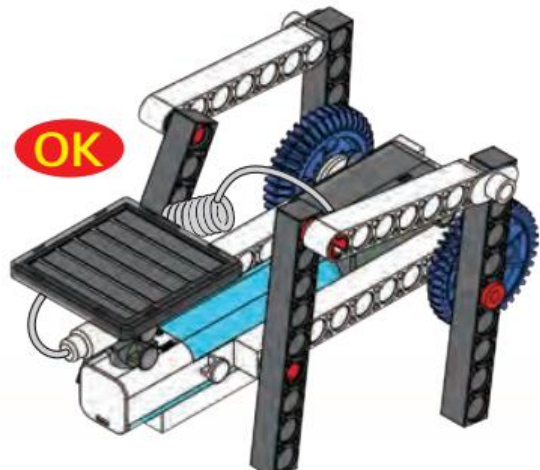
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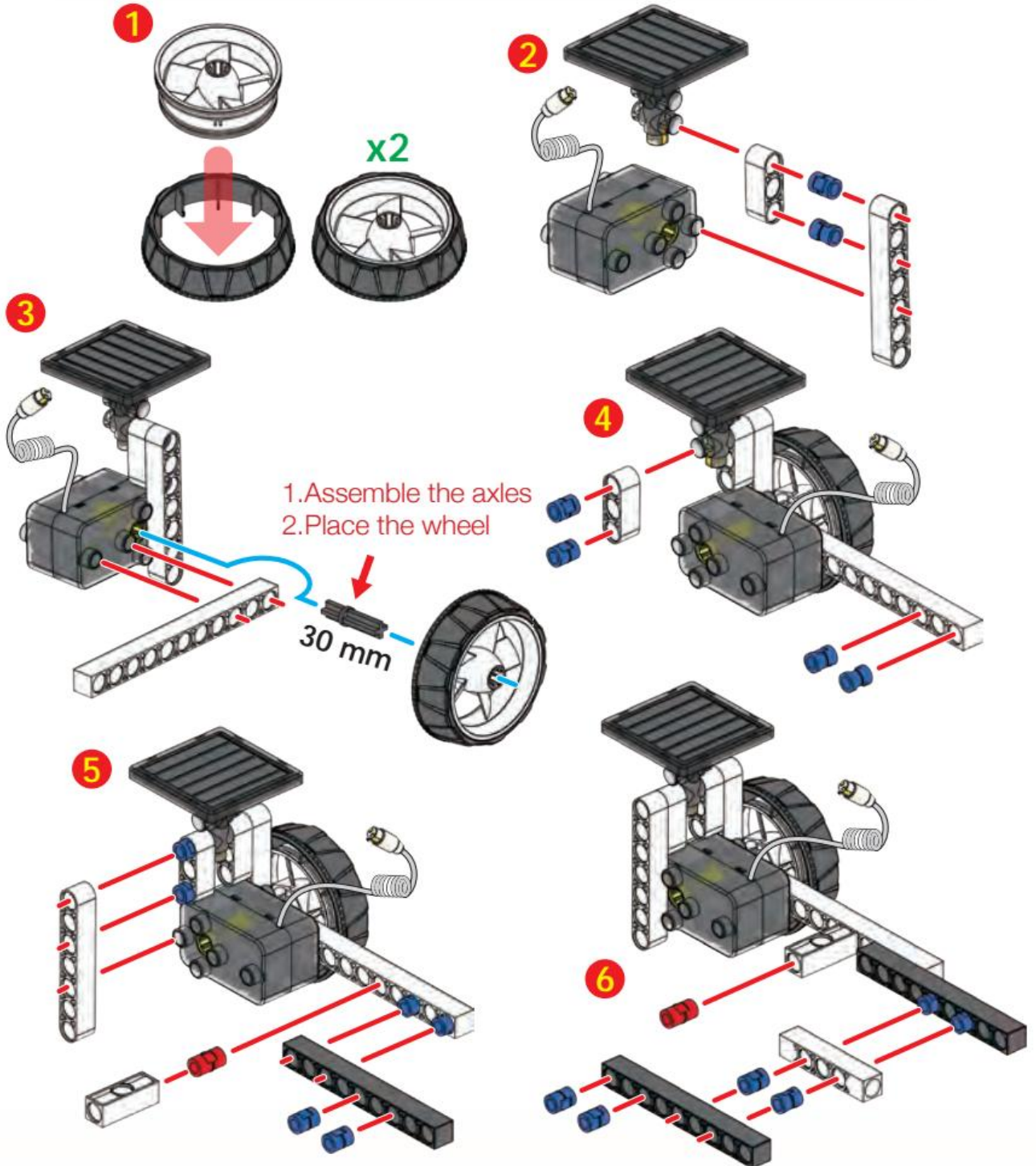


9



OK







7

1. Assemble the axles
2. Place the wheel

30 mm

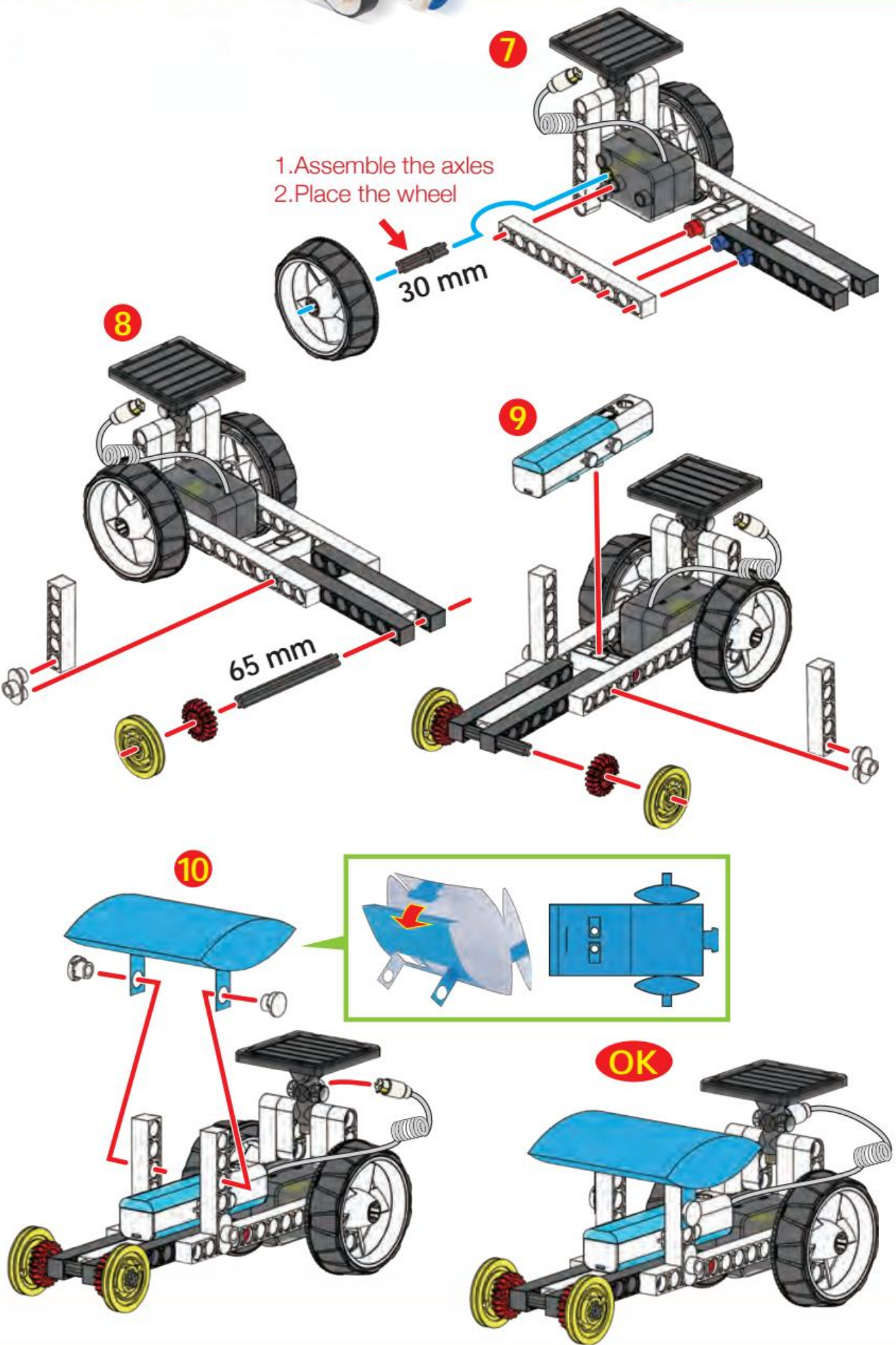
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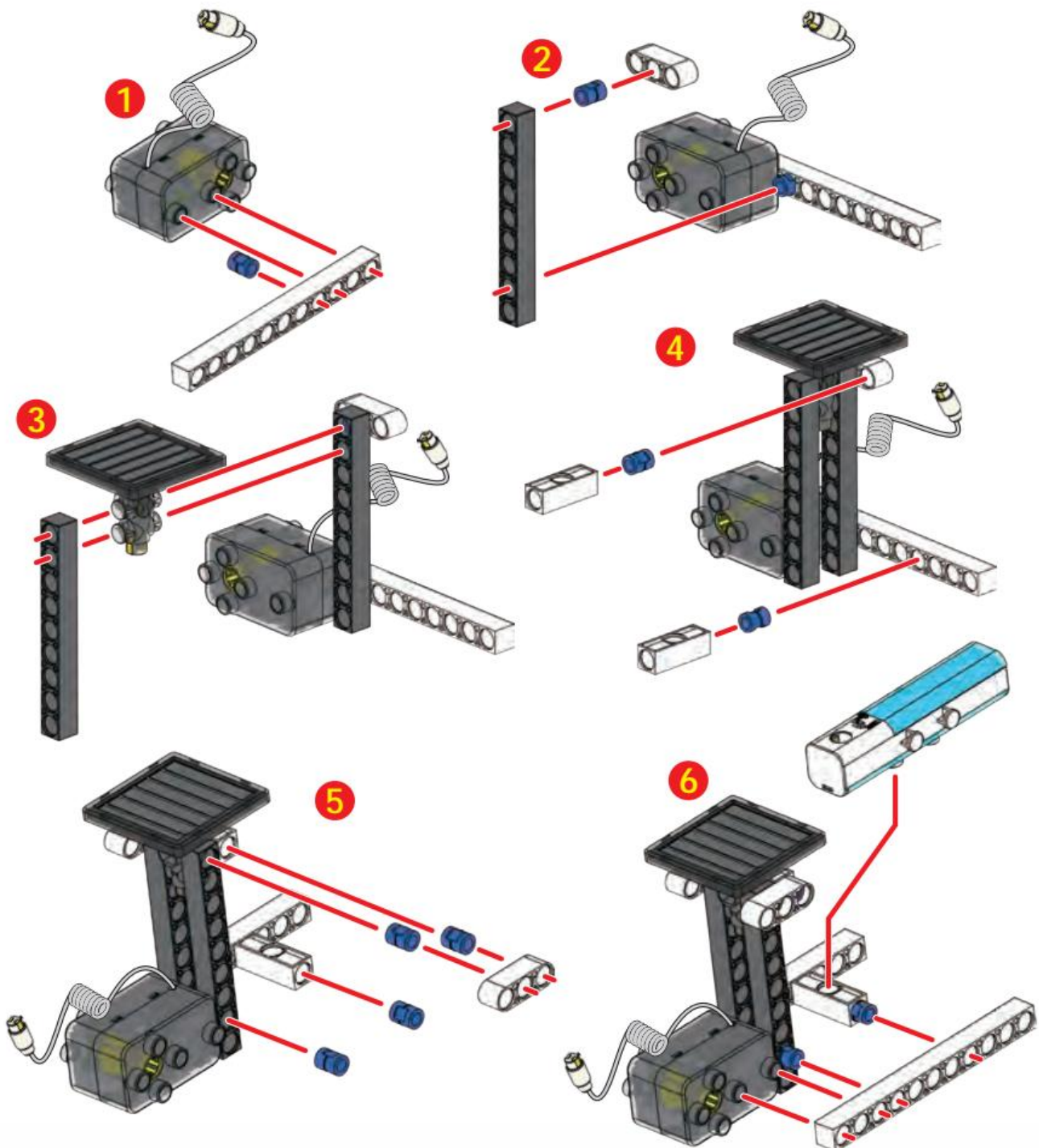
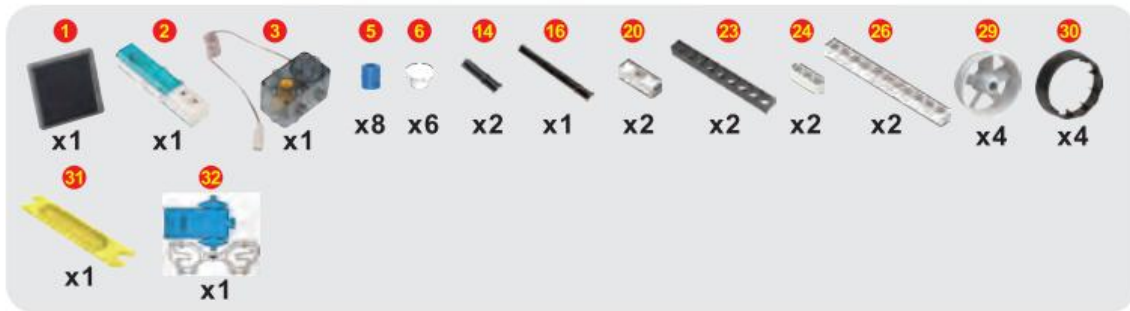
65 mm

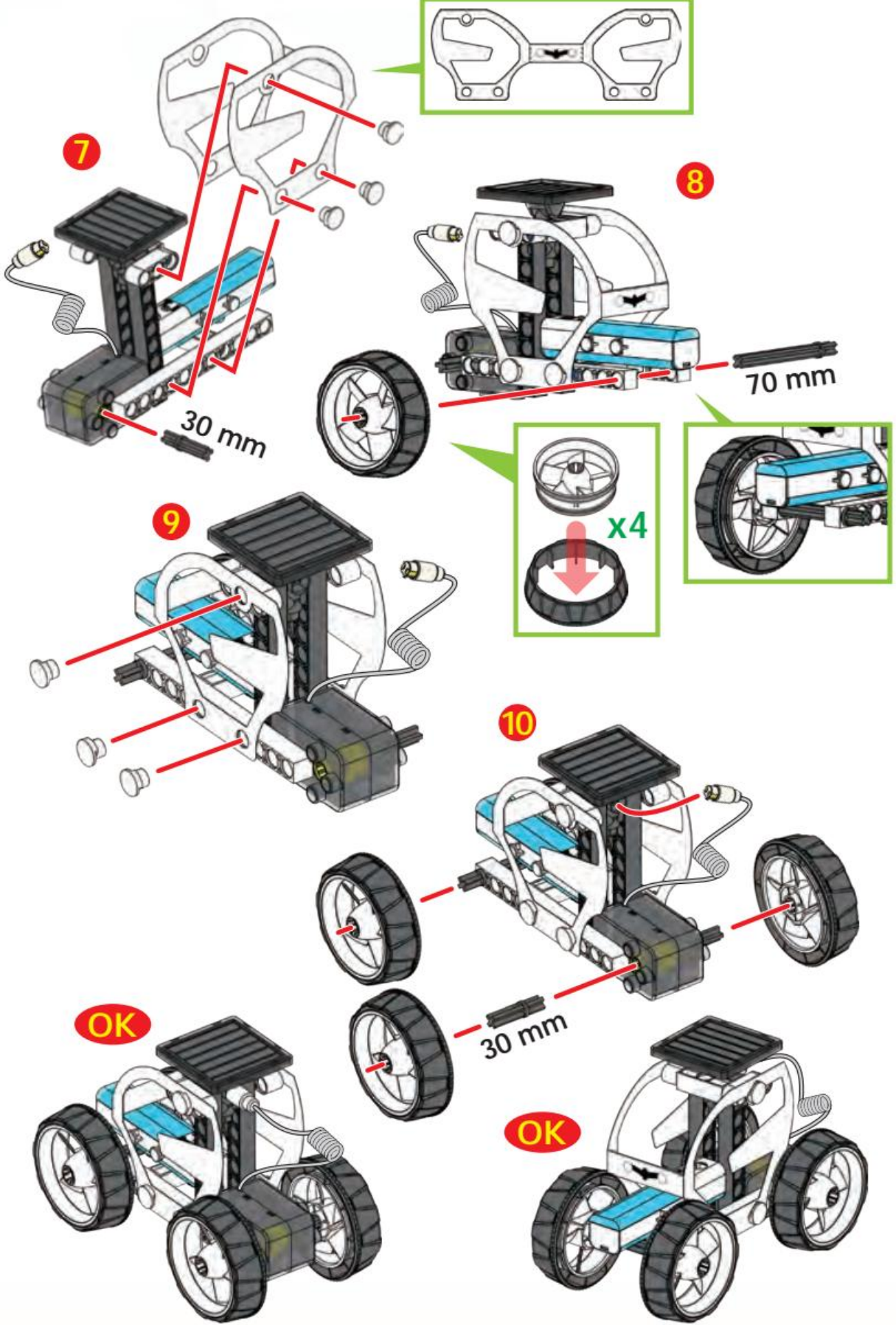
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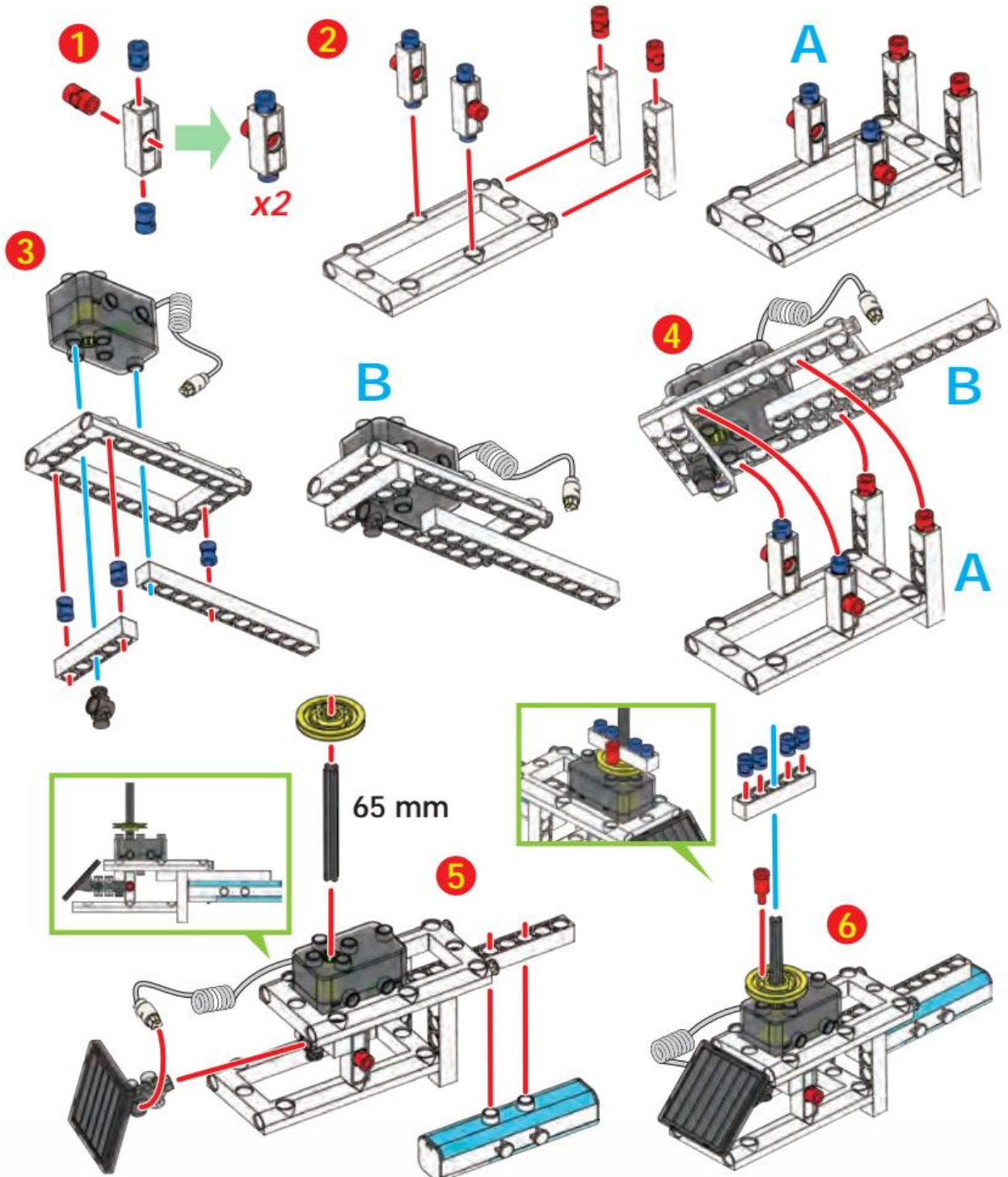
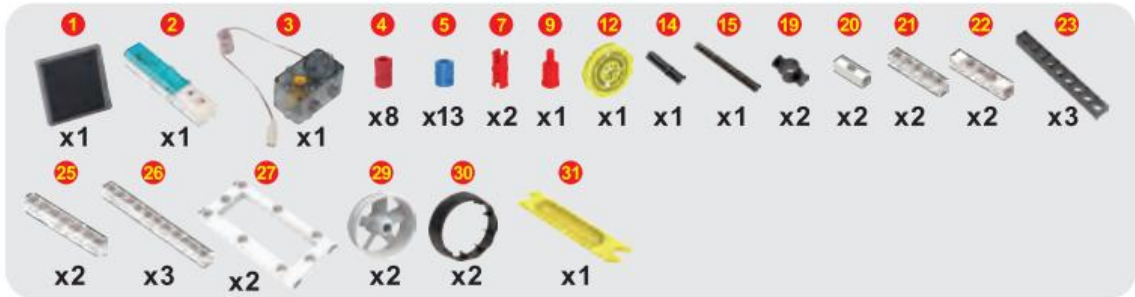
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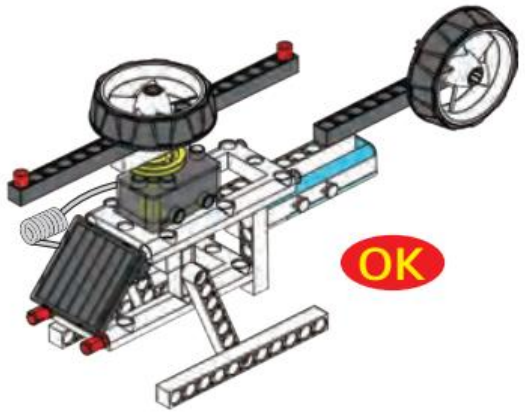
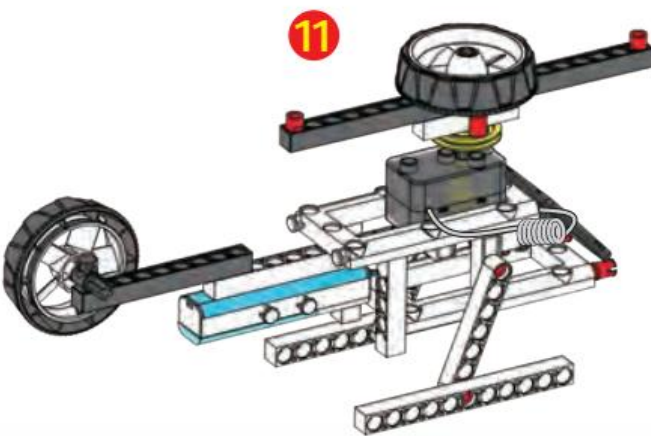
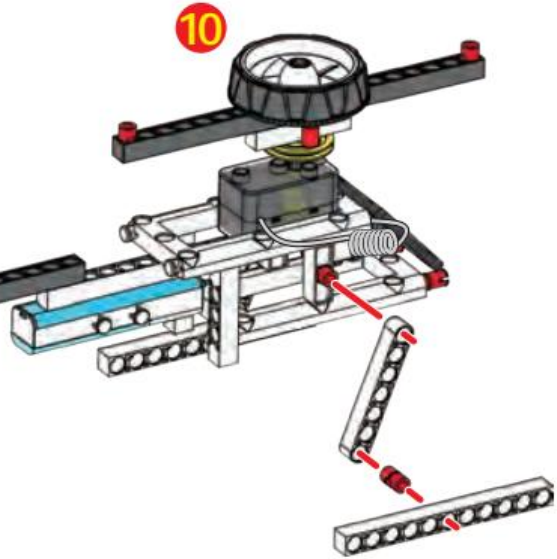
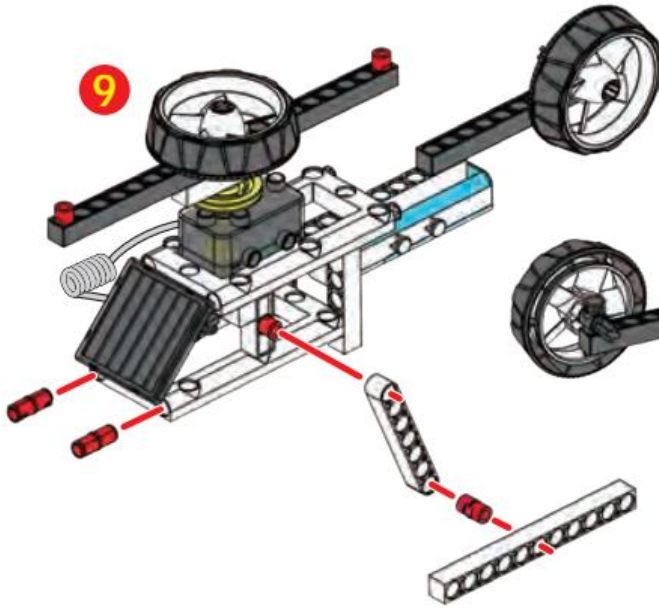
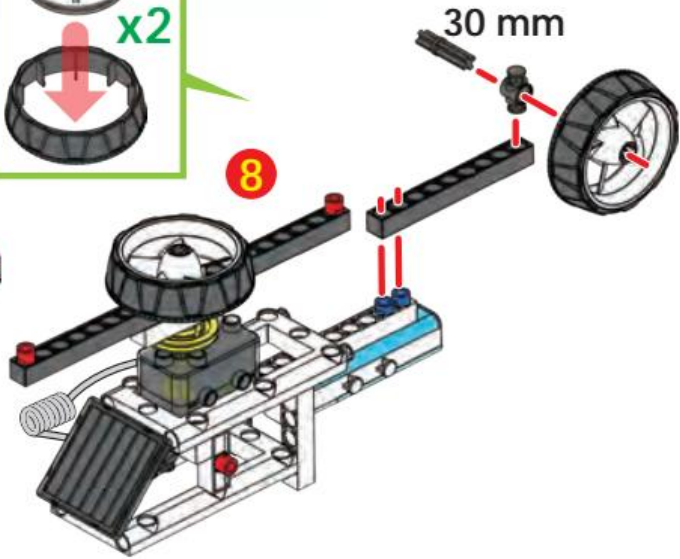
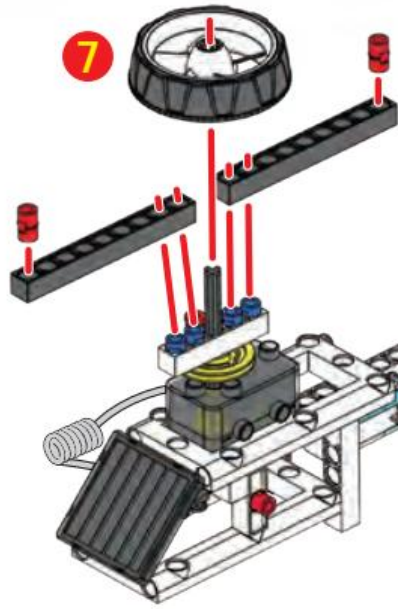
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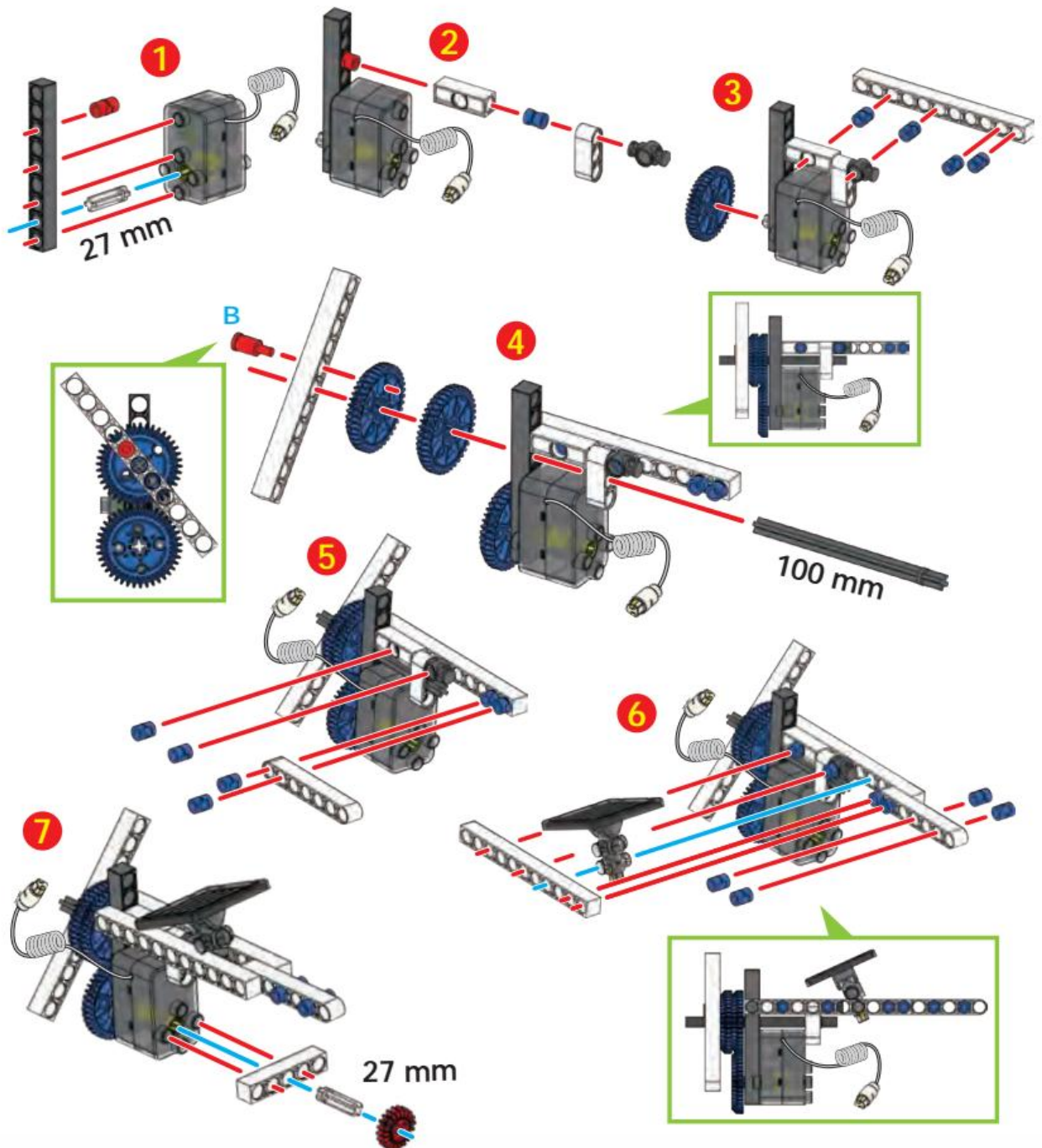


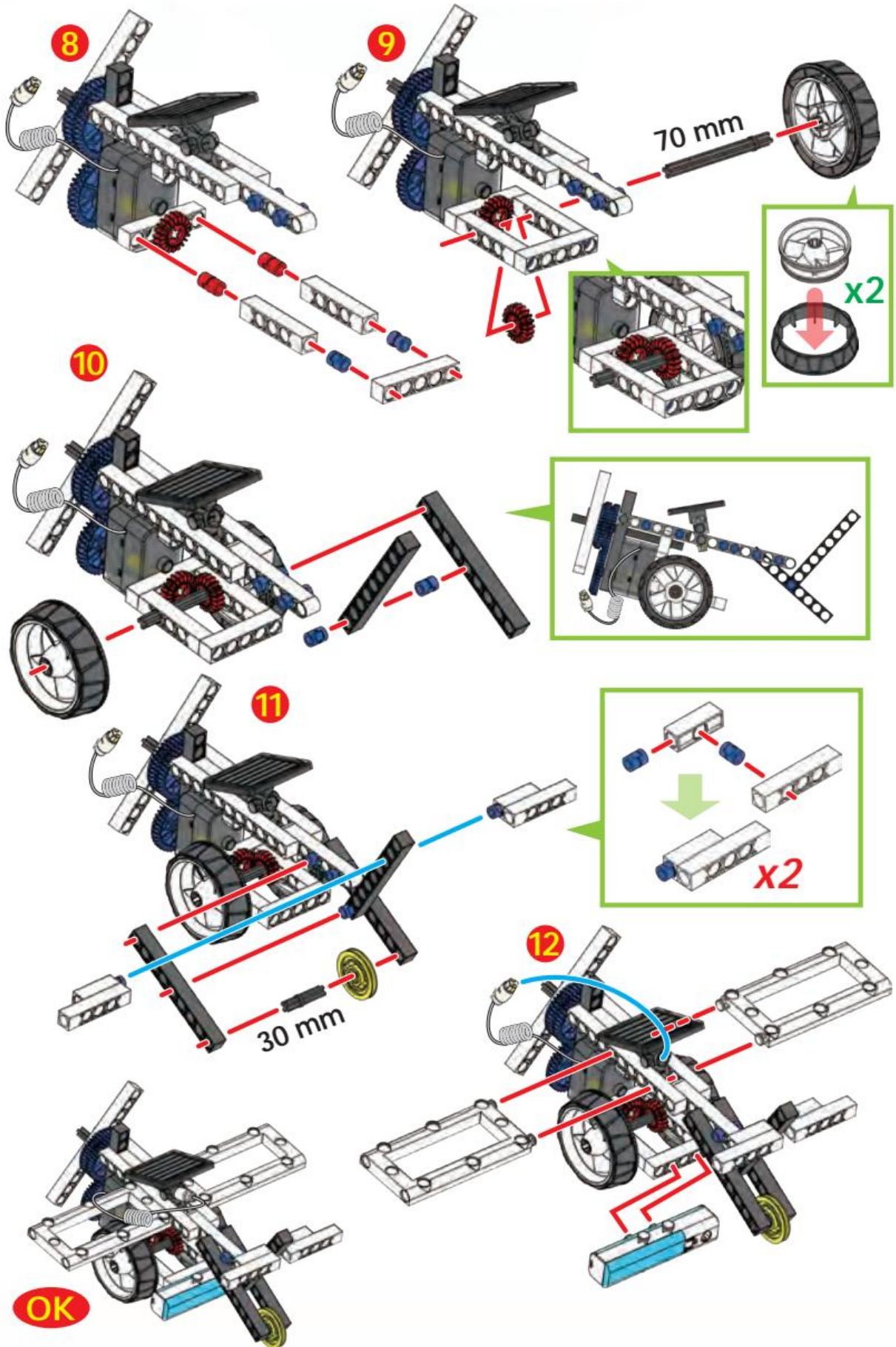






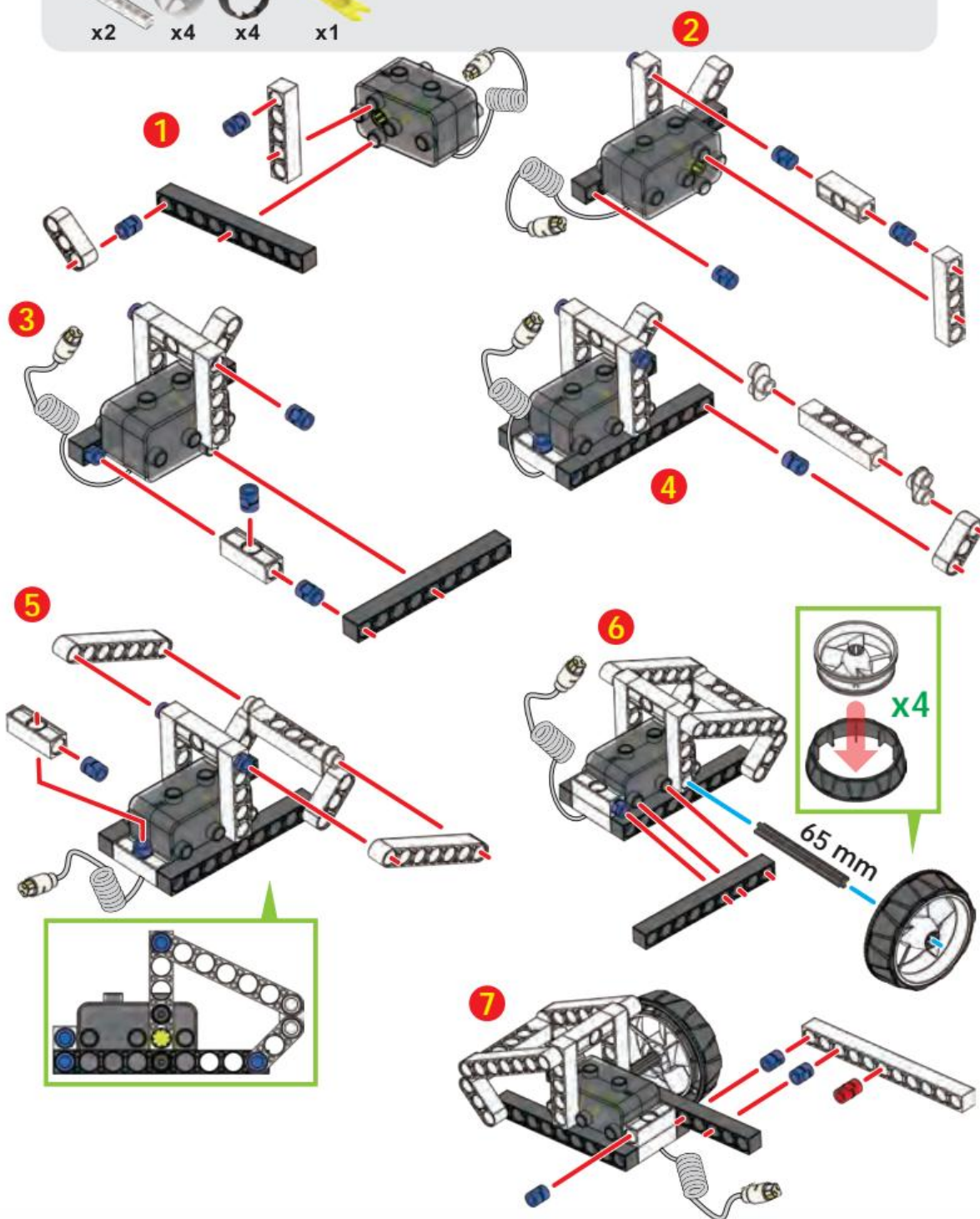


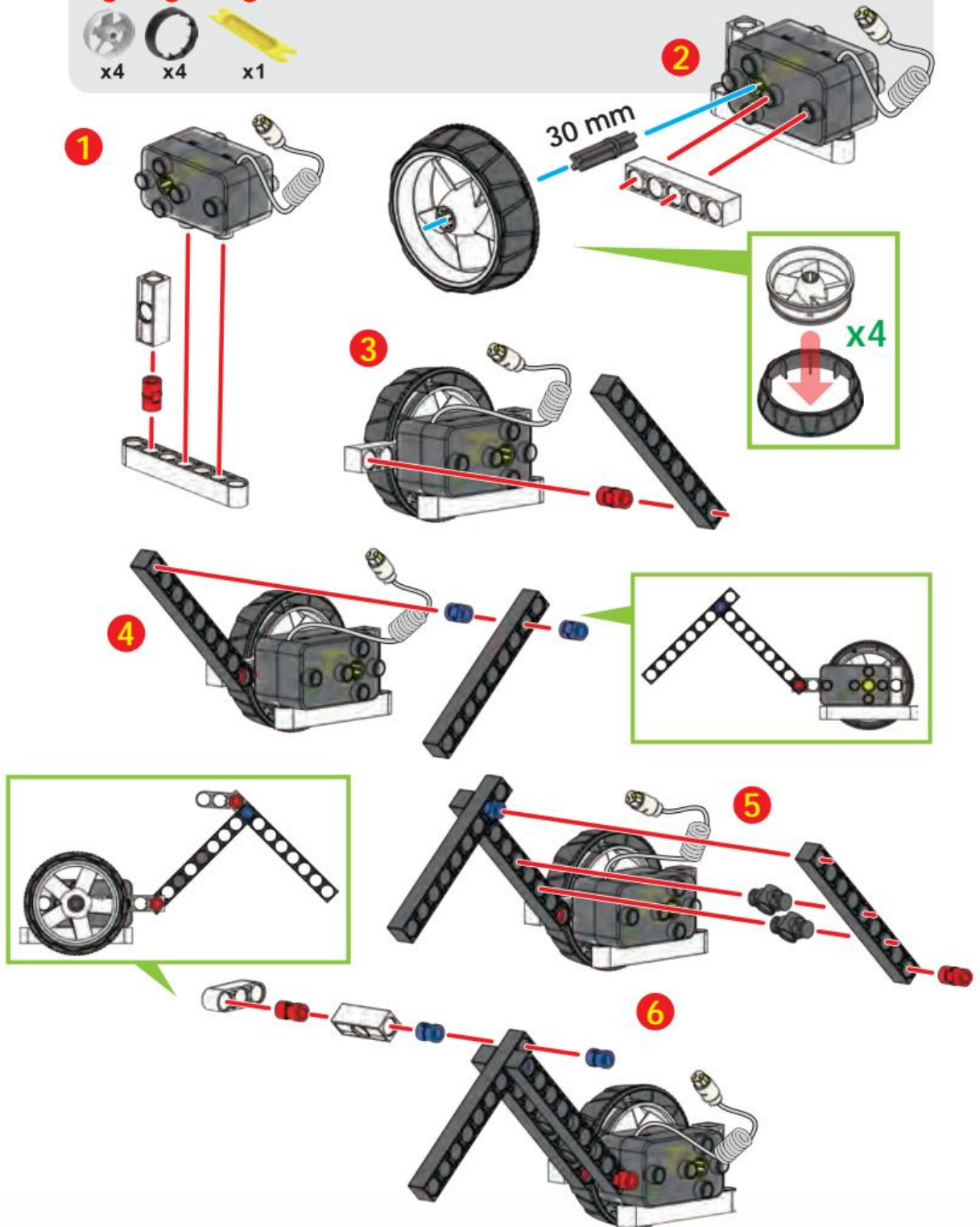


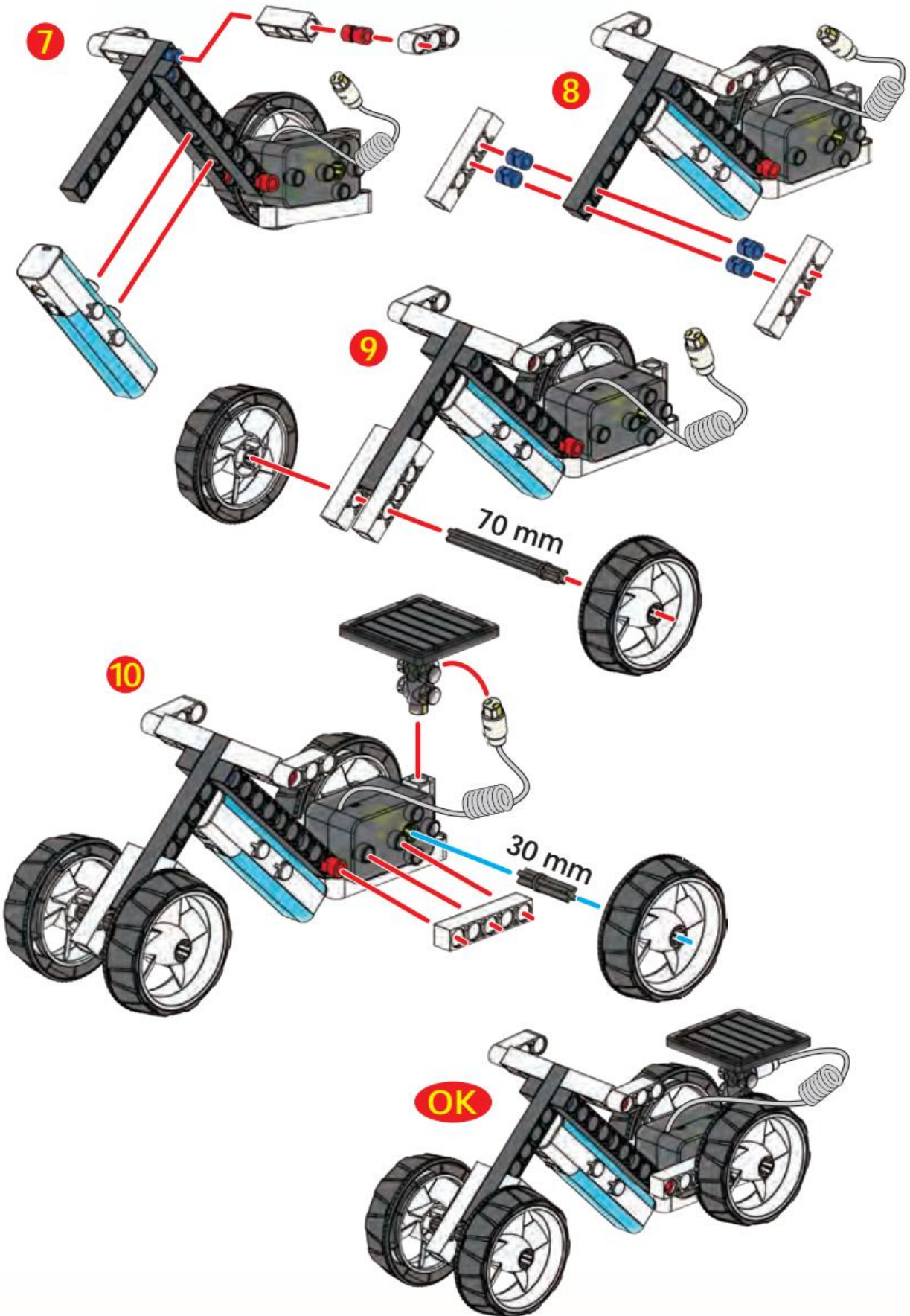


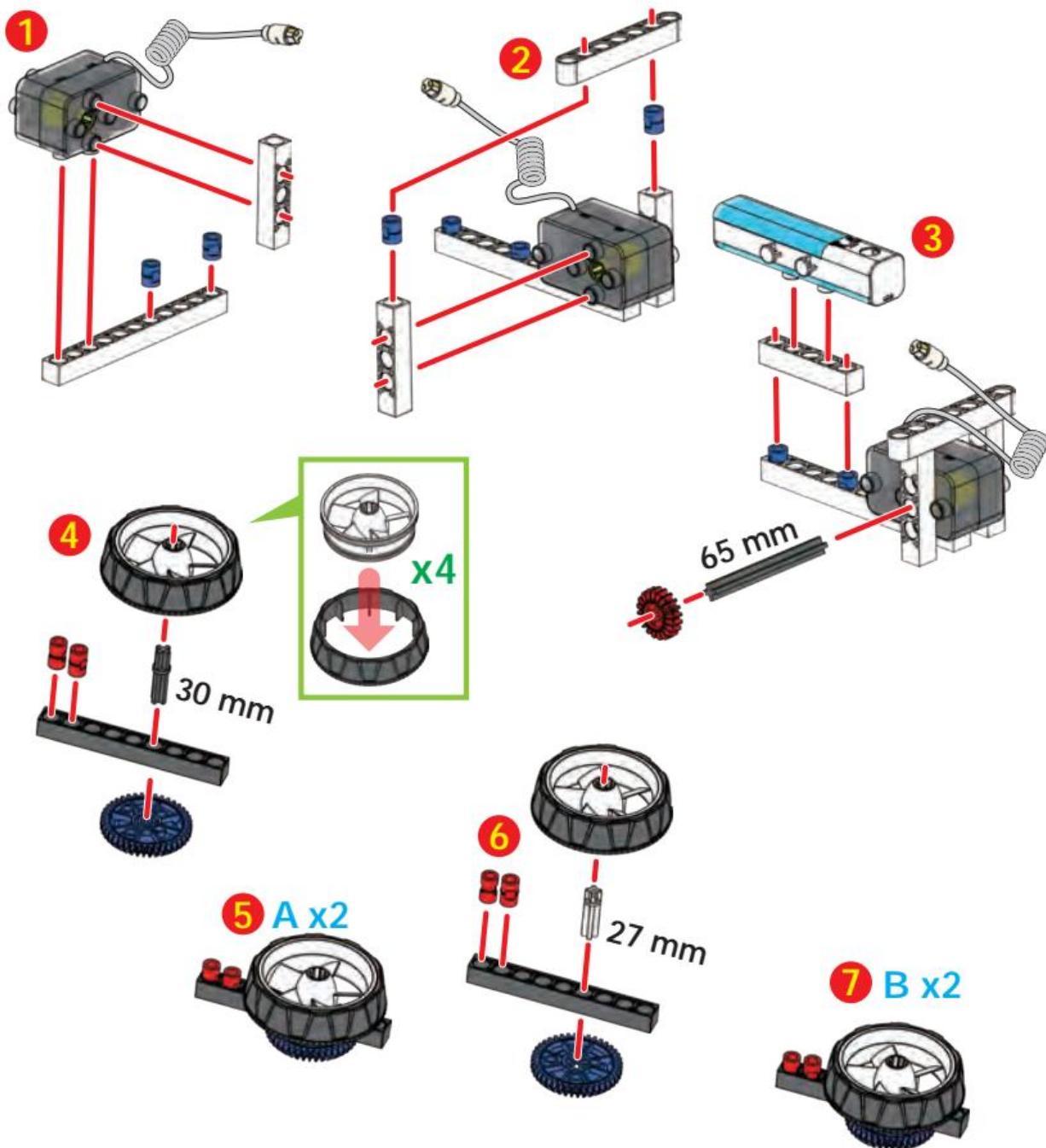
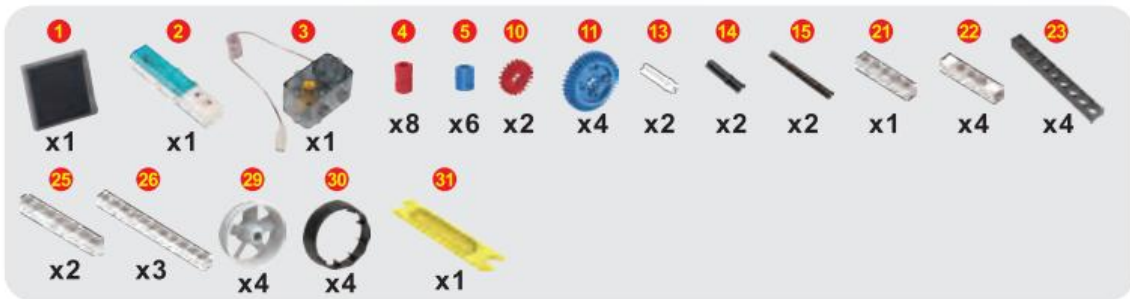


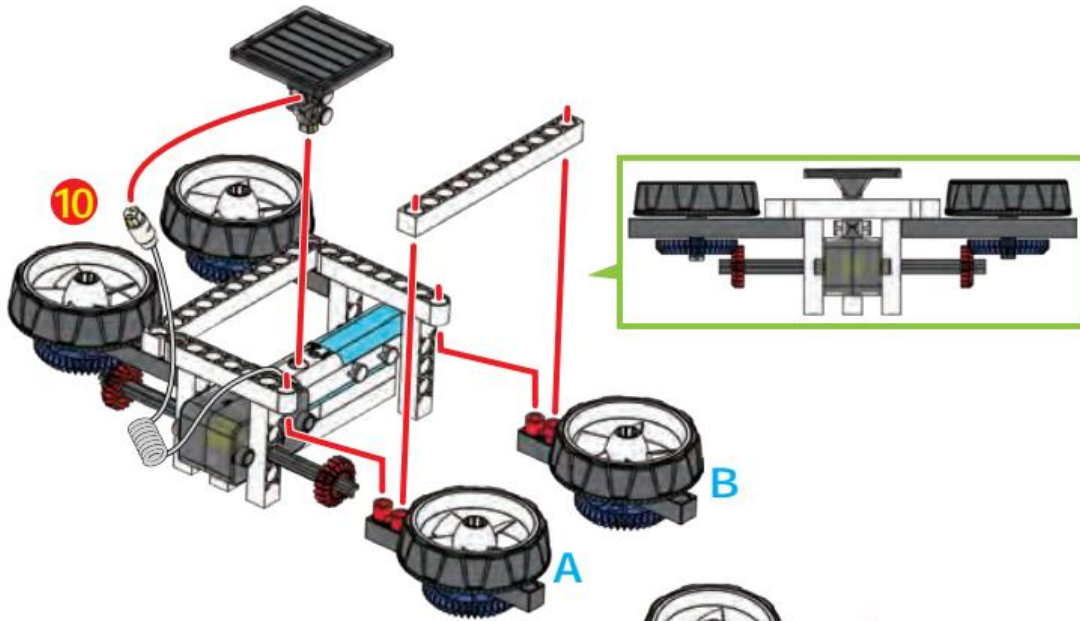
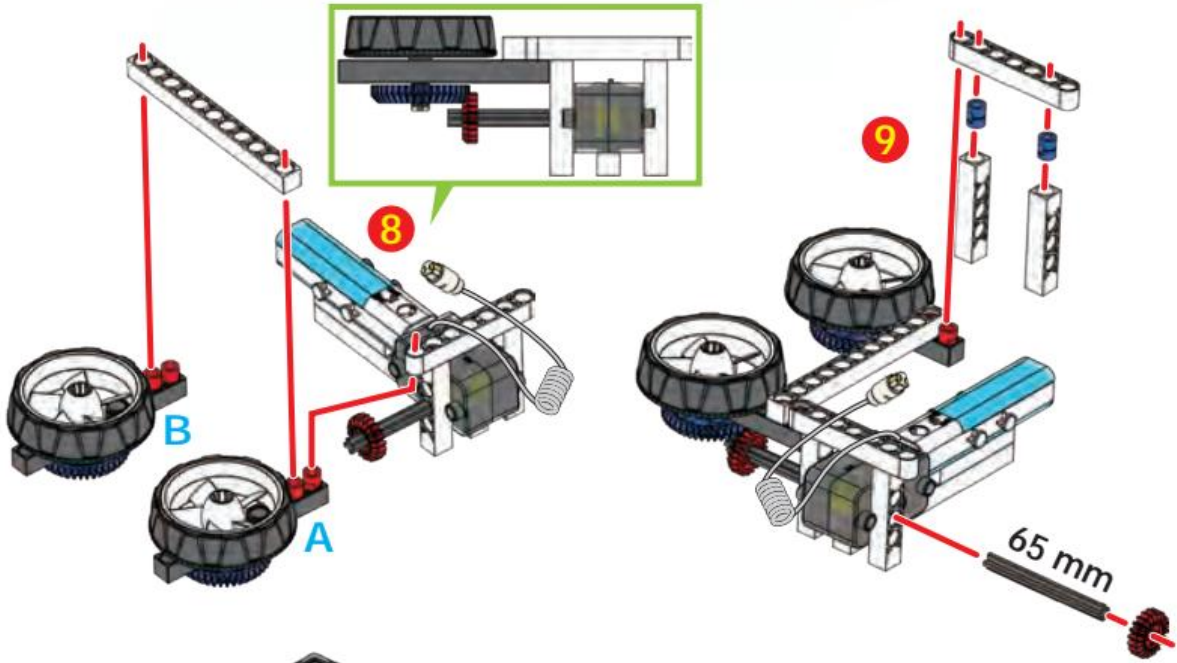
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x1 | 4
x2 | 5
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x2 | 23
x4 | 24
x2 | 25
x2 |
| 26
x2 | 29
x4 | 30
x4 | 31
x1 | | | | | | | | | | |











GREEN ENERGY



ELECTRICITY & MAGNETISM
#7065
10 Models to build
137 PCS



ELECTRICITY DISCOVERY 2.0
#7059R
14 Models to build
110 PCS



CROSSBOWS & CATAPULTS
#7406
10 Models to build
110 PCS



ORNITHOPTER
#7405
4 Models to build
49 PCS



MINI GYRO
#7395
20 Models to build
88 PCS



GECKOBOT
#7409
7 Models to build
176 PCS



WIND POWER
#7324
8 Models to build
133 PCS



WATER POWER
#7323
15 Models to build
165 PCS



WIND TURBINE
#7400
5 Models to build
77 PCS



MADE IN TAIWAN

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