

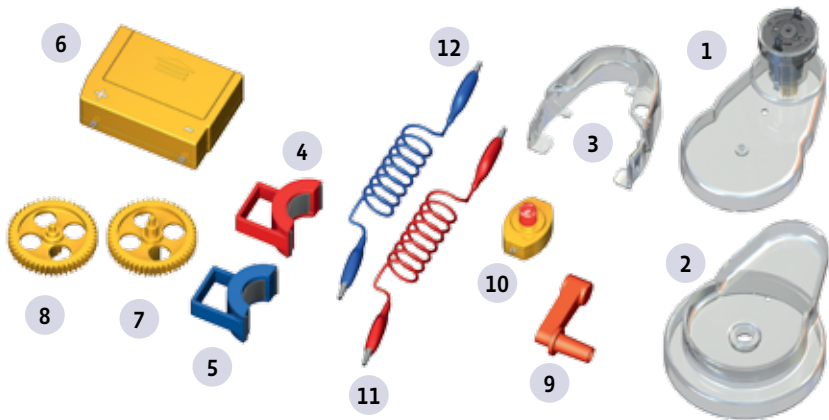
EXPERIMENT MANUAL



# MOTORS & GENERATORS

 THAMES & KOSMOS

## What's in your experiment kit:



## Checklist: Find – Inspect – Check off

✓ No.	Description	Qty.	Item No.
<input type="checkbox"/>	1 Engine block ⓘ	1	704 492
<input type="checkbox"/>	2 Engine cover	1	704 491
<input type="checkbox"/>	3 Stabilizer	1	704 488
<input type="checkbox"/>	4 Red magnet	1	704 489
<input type="checkbox"/>	5 Blue magnet	1	704 490
<input type="checkbox"/>	6 Battery box	1	704 484
<input type="checkbox"/>	7 Gear wheel with crank hookup	1	704 493
<input type="checkbox"/>	8 Gear wheel with drive wheel	1	704 494
<input type="checkbox"/>	9 Hand crank	1	704 581
<input type="checkbox"/>	10 Small lamp	1	706 415
<input type="checkbox"/>	11 Red wire	1	704 486
<input type="checkbox"/>	12 Blue wire	1	704 487

**ⓘ WARNING!** Do not, under any circumstances, take the engine block apart!

Please check all the parts against the list to make sure nothing is missing. If you are missing any parts, please contact Thames & Kosmos customer service.

## Additional things you will need:

*Felt-tip pen, two 1.5-volt AA batteries, jar, teacup, mug, wooden spoon, plastic bag, nails, coins, paper, aluminum foil, scissors, string, tape, saucer, large bowl*

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

**Transmissions**

Page 3 to 6

How gears  
transfer force**Compass**  
Page 22 to 26What points a  
compass in the  
right direction?**Electric Motor**  
Page 27 to 38Get your electric motor  
going!**Circuits and Conductors**

Page 7 to 13

What makes the bulb  
light up?**Generator**  
Page 39 to 48How to produce your own  
electricity**Magnets**

Page 14 to 21

Explore the hidden  
forces of magnets**CHECK IT OUT**You will find supplemental  
information on pages 5, 6, 12,  
13, 20, 21, 25, 26, 36-38, and  
44-48.

# Electricity is conducted — or not

## YOU WILL NEED

- battery box with batteries
- red wire
- blue wire
- lamp
- various household items (such as glass, cup, wooden spoon, plastic bag, nail, coins, paper)

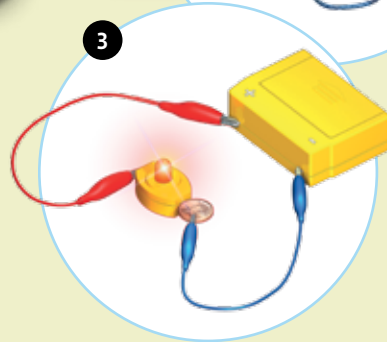
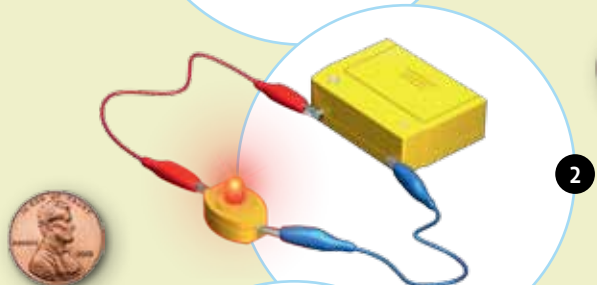
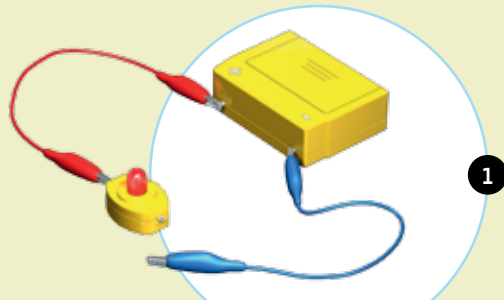


## HERE'S HOW

1. Use the red wire to connect one battery contact to the lamp and clamp the blue wire to the other.
2. Test to see whether everything is working okay with the batteries, wire, and lamp by tapping briefly on the lamp's free terminal with the blue wire. When you do that, it should light up.
3. Now try holding various things between the free lamp contact and the free end of the blue wire.

**What happens when you hold a coin between them?**

Try it with a glass, a cup, a wooden spoon, a plastic bag, a nail, or a piece of paper.



## → WHAT'S HAPPENING?

There are some materials — such as metals — that are good at conducting electrical current. Other materials, such as glass, porcelain, paper, and plastic, do not conduct electricity. Now you know why the wires of an electrical appliance always have a plastic covering: It keeps you from touching the metal underneath, which has dangerous household current flowing through it.

# Polar reversal

## YOU WILL NEED

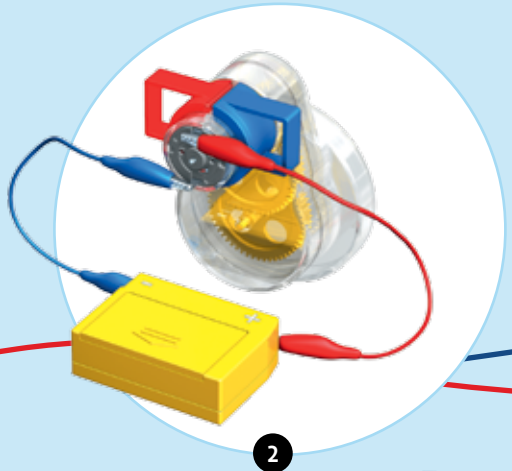
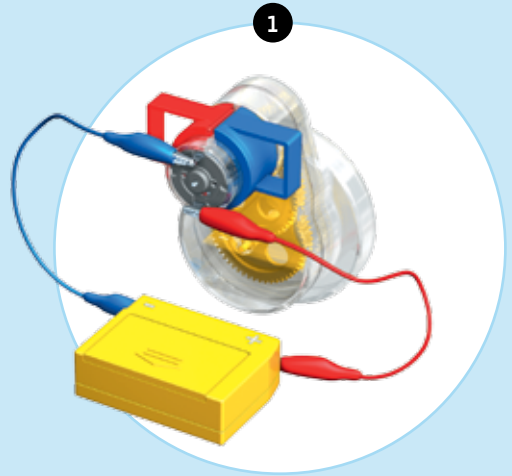
- engine block
- both gears
- cover
- stabilizer
- red magnet
- blue magnet
- battery box  
with batteries
- red wire
- blue wire

## HERE'S HOW

1. Have you been paying attention up to now exactly how the motor is connected to the battery contacts?

Take a look at the motor contact where the blue wire clamp is mounted and note the rotation direction of the motor: clockwise or counterclockwise?

2. Reverse the red and blue wire clamps on the motor.



### → WHAT'S HAPPENING?

The direction of rotation changes. This is an example of how — unlike with the lamp — the polarity of the wires can make a difference.