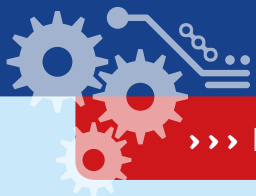


# REMOTE-CONTROL MACHINES

## CUSTOM CARS



 THAMES & KOSMOS

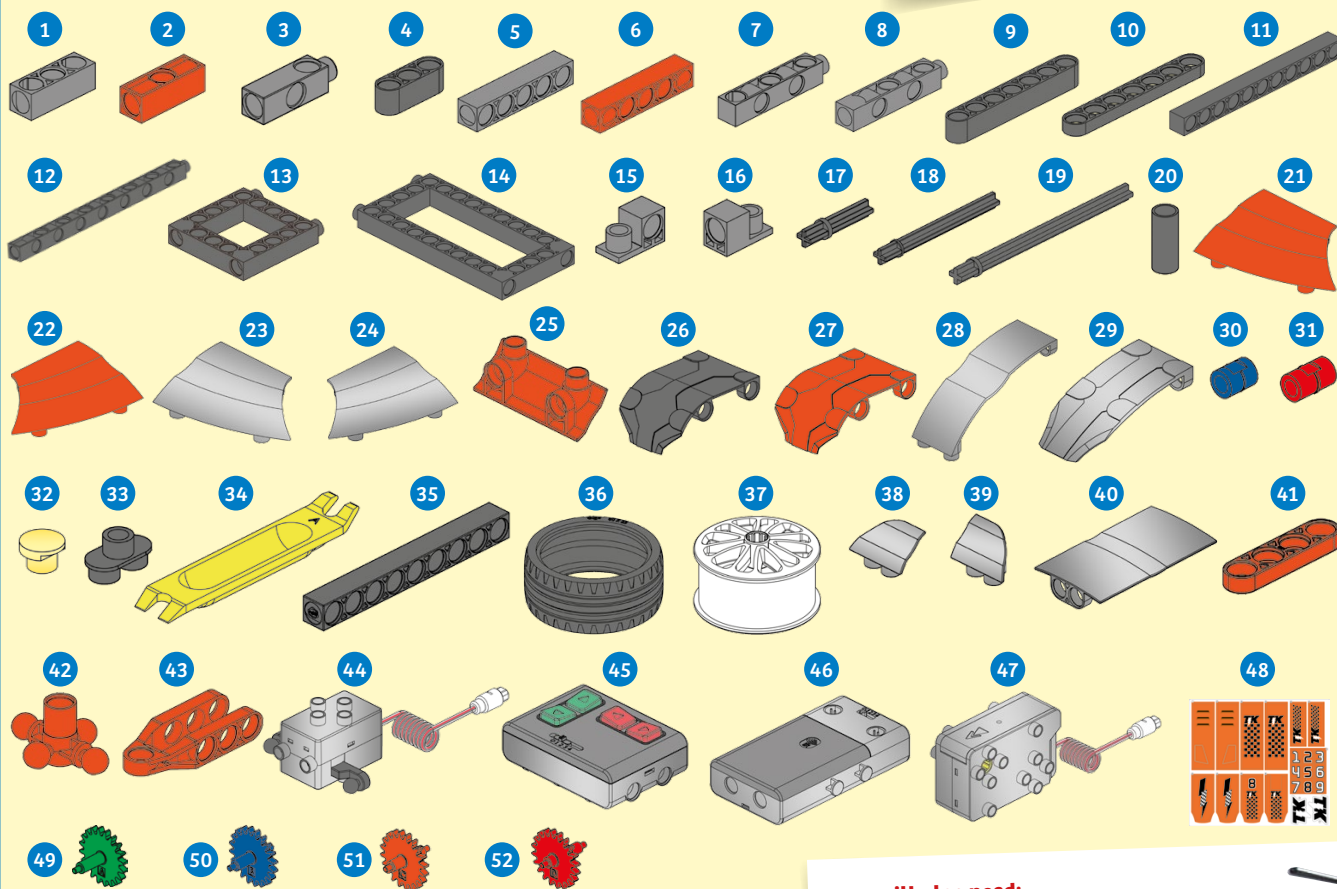


## >>> KIT CONTENTS

**GOOD TO KNOW!** If you are missing any parts, please contact Thames & Kosmos customer service.

US: techsupport@thamesandkosmos.com  
 UK: techsupport@thamesandkosmos.co.uk

## What's inside your experiment kit:



### You will also need:

2 x AAA batteries (1.5-volt, type AAA/LR03) and  
 3 x AA batteries (1.5-volt, type AA/LR6)

## Checklist: Find – Inspect – Check off

✓	No.	Description	Qty.	Item No.
<input type="checkbox"/>	1	3-hole rod	13	7026-W10-Q2S2
<input type="checkbox"/>	2	3-hole cross rod, orange	8	7026-W10-X10
<input type="checkbox"/>	3	3-hole dual rod, gray	2	7061-W10-R1S3
<input type="checkbox"/>	4	3-hole wide rounded rod, black	4	7404-W10-C1D
<input type="checkbox"/>	5	5-hole rod B, gray	6	7413-W10-K2S2
<input type="checkbox"/>	6	5-hole rod C, orange	9	7413-W10-K3O1
<input type="checkbox"/>	7	5-hole dual rod B, gray	2	7026-W10-S2S2
<input type="checkbox"/>	8	5-hole dual rod C, gray	4	7026-W10-S3S3
<input type="checkbox"/>	9	7-hole wide rounded rod, black	4	7404-W10-C2D
<input type="checkbox"/>	10	7-hole flat rounded rod, black	4	7404-W10-C3D
<input type="checkbox"/>	11	11-hole rod	2	7413-W10-P1D
<input type="checkbox"/>	12	15-hole dual rod	2	7413-W10-H1D
<input type="checkbox"/>	13	Square frame	2	7026-W10-T2D
<input type="checkbox"/>	14	Short frame	2	7413-W10-I1D
<input type="checkbox"/>	15	90-degree converter X, gray	6	7061-W10-J1S3
<input type="checkbox"/>	16	90-degree converter Y, gray	6	7061-W10-J2S3
<input type="checkbox"/>	17	Axle, 35 mm	2	7413-W10-O1D
<input type="checkbox"/>	18	Axle, 70 mm	2	7061-W10-Q1D
<input type="checkbox"/>	19	Axle, 100 mm	2	7413-W10-L2D
<input type="checkbox"/>	20	Tube, 20 mm	12	7400-W10-G2D
<input type="checkbox"/>	21	Body plate left, orange	3	7392-W10-L10
<input type="checkbox"/>	22	Body plate right, orange	3	7392-W10-L20
<input type="checkbox"/>	23	Body plate left, black	1	7392-W10-L1TD
<input type="checkbox"/>	24	Body plate right, black	1	7392-W10-L2TD
<input type="checkbox"/>	25	Side plate	4	7392-W10-M10
<input type="checkbox"/>	26	Small body plate A, black	4	7392-W10-J1D

✓	No.	Description	Qty.	Item No.
<input type="checkbox"/>	27	Small body plate A, orange	2	7392-W10-J10
<input type="checkbox"/>	28	Large body plate	2	7398-W10-C1TD
<input type="checkbox"/>	29	Small body plate B	2	7398-W10-C2TD
<input type="checkbox"/>	30	Short anchor pin, blue	59	7344-W10-C2B
<input type="checkbox"/>	31	Anchor pin, red	42	7061-W10-C1R
<input type="checkbox"/>	32	Long button pin	4	7061-W10-E1TY
<input type="checkbox"/>	33	Two-to-one converter	4	7061-W10-G1D
<input type="checkbox"/>	34	Anchor pin lever	1	7061-W10-B1Y
<input type="checkbox"/>	35	9-hole rod	2	7407-W10-C1D
<input type="checkbox"/>	36	Tire	4	7407-W10-A1D
<input type="checkbox"/>	37	Wheel	4	7407-W10-B1W
<input type="checkbox"/>	38	Small body plate C, left	2	7407-W10-D2TD
<input type="checkbox"/>	39	Small body plate C, right	2	7407-W10-D3TD
<input type="checkbox"/>	40	Flat body plate	2	7407-W10-D1TD
<input type="checkbox"/>	41	4-hole flat rounded rod, orange	2	7407-W10-F20
<input type="checkbox"/>	42	4-ball joint	2	7407-W10-F10
<input type="checkbox"/>	43	U rod	4	7407-W10-E10
<input type="checkbox"/>	44	IR steering motor box	1	7407-W85-A
<input type="checkbox"/>	45	4-channel IR remote control unit	1	7407-W85-C-US
<input type="checkbox"/>	46	4-channel battery box	1	7407-W85-D-US
<input type="checkbox"/>	47	Adjustable gearbox	1	7407-W85-B
<input type="checkbox"/>	48	Electrostatic sticker sheet	1	R20#7407-US
<input type="checkbox"/>	49	Green gear for gearbox	1	7407-W10-O1G
<input type="checkbox"/>	50	Blue gear for gearbox	2	7407-W10-O2B
<input type="checkbox"/>	51	Orange gear for gearbox	1	7407-W10-O3O
<input type="checkbox"/>	52	Red gear for gearbox	1	7407-W10-O4R

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**TIP!**

You will find additional information in the "Check it out" sections on pages 14, 15, 21, 29, 30, 31, 39, 46, and 80.



**TIP!**

Above each set of assembly instructions, you will find a red bar:

>>> It shows you the difficulty level for the model's assembly:

● ○ ○ ○
● ● ○ ○
● ● ● ○

easy      medium      hard

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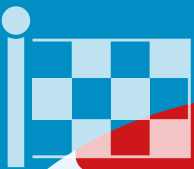
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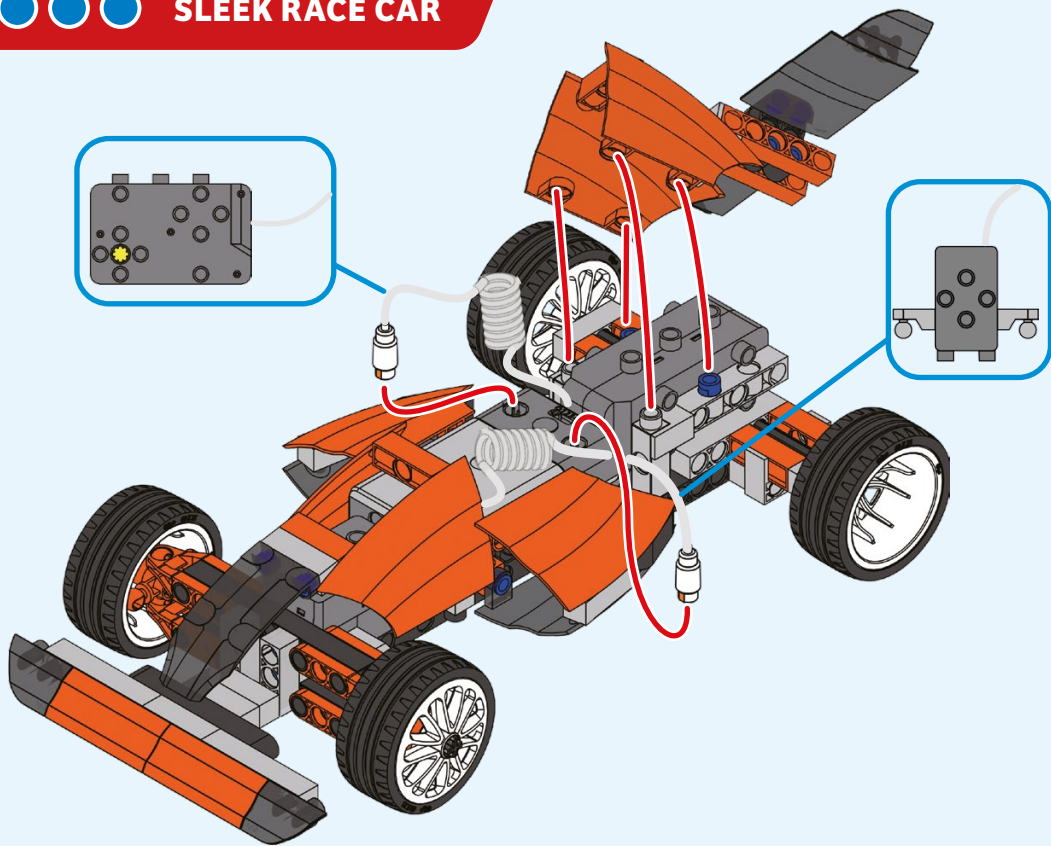
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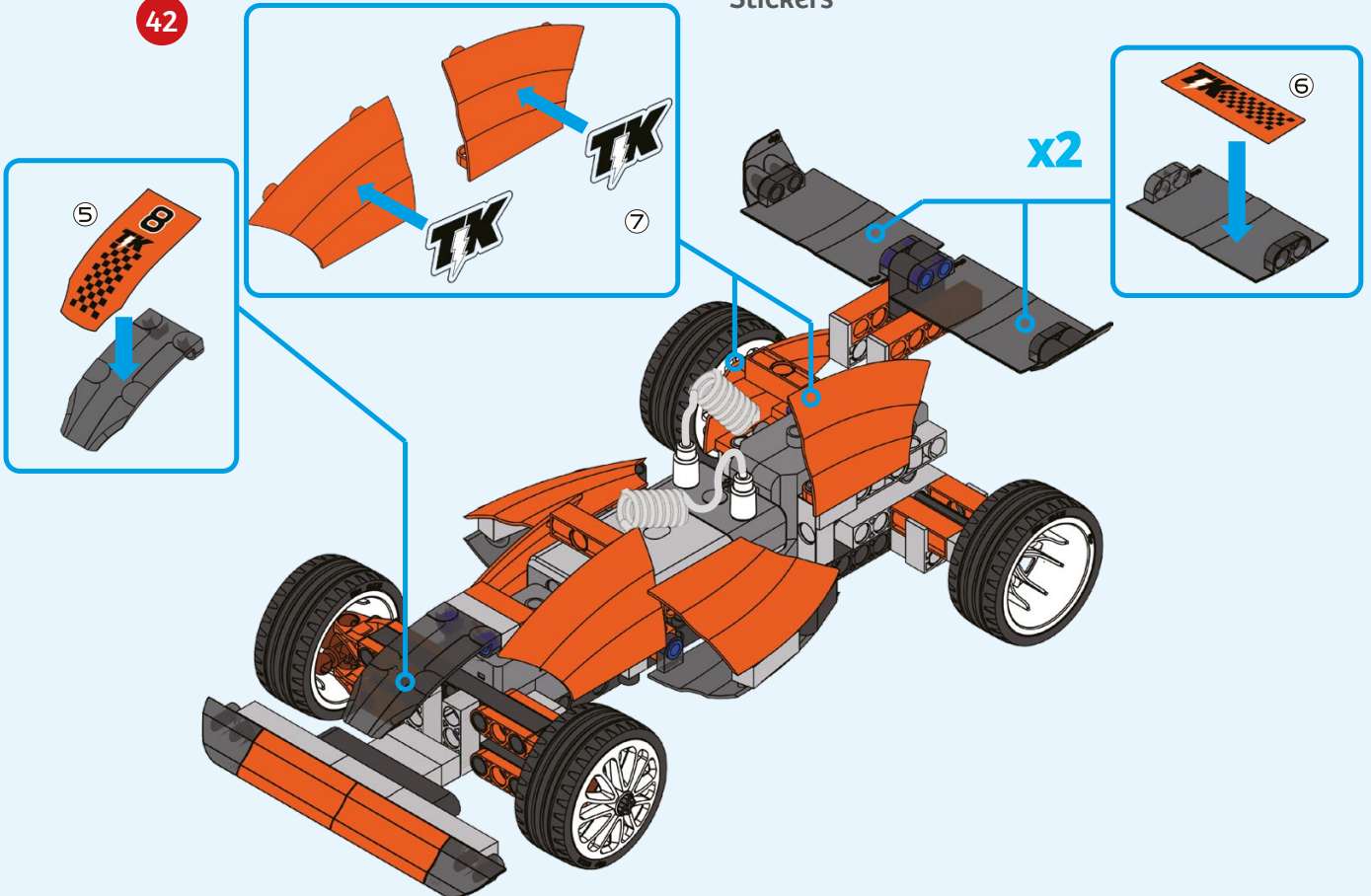
SLEEK RACE CAR

41

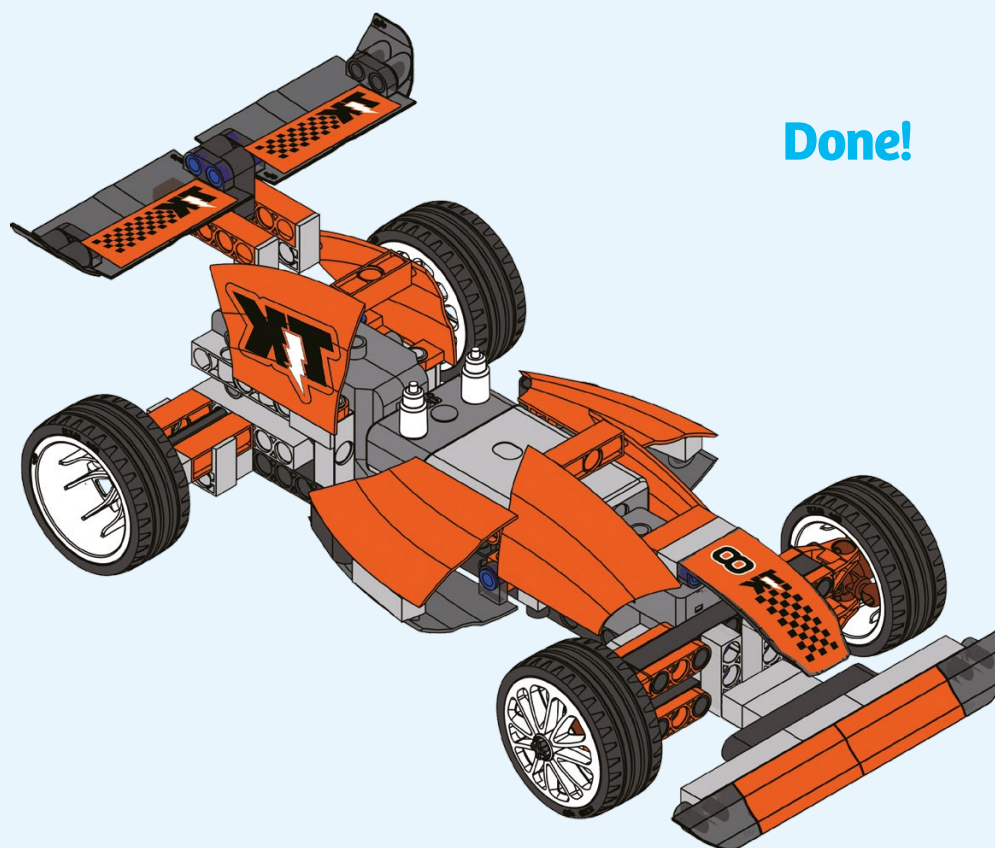


42

Stickers



43



Done!

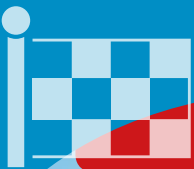
## EXPERIMENT 1

### Building a race track

#### HERE'S HOW

Have a friend or family member set up a race course in a room in your house. He or she can gather various objects, such as small cardboard boxes (e.g., tea boxes and matchboxes), toys, and empty cans, and place them around the room. Set up a start and finish line. Turn on your model and race around the track as fast as you can! Take turns timing each other and see who can drive the model car around the track the fastest.





CHECK IT OUT



# The Physics of Cars

## ACCELERATION

**Acceleration** is a change in the velocity of an object. That means that the object could be speeding up, slowing down, or changing direction and it would be accelerating. The time it takes for a car to go from 0 to 60 miles per hour is a common measure of a car's ability to accelerate.



## FORCE

When a car turns a corner sharply, accelerates, or decelerates, you feel a push or a pull on your body. This is because the car is exerting a **force** on you. A force is necessary to make an object move and is proportional to the amount of mass and the acceleration of an object. It is very important for the engineers who design cars to understand the forces that a car experiences when in motion. Based on your experiences, what forces do you think act on a car when it is moving?



## WORK

The way that physicists define work is different than the common usage of the word. **Work** is when a force causes a displacement in the same direction as the motion of an object. For example, if you were walking around at a steady velocity with a box in your arms you would *not* be performing work. This is because the force required to hold up the box points in the upward direction, while the displacement from your walking around is in the horizontal direction. However, if you were to push a box along the floor or lift a box up, you would be performing work.

