

EXPERIMENT MANUAL

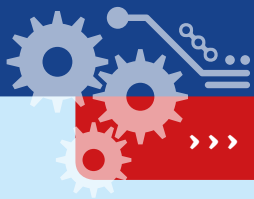
ROBOTICS

SMART MACHINES



 THAMES & KOSMOS

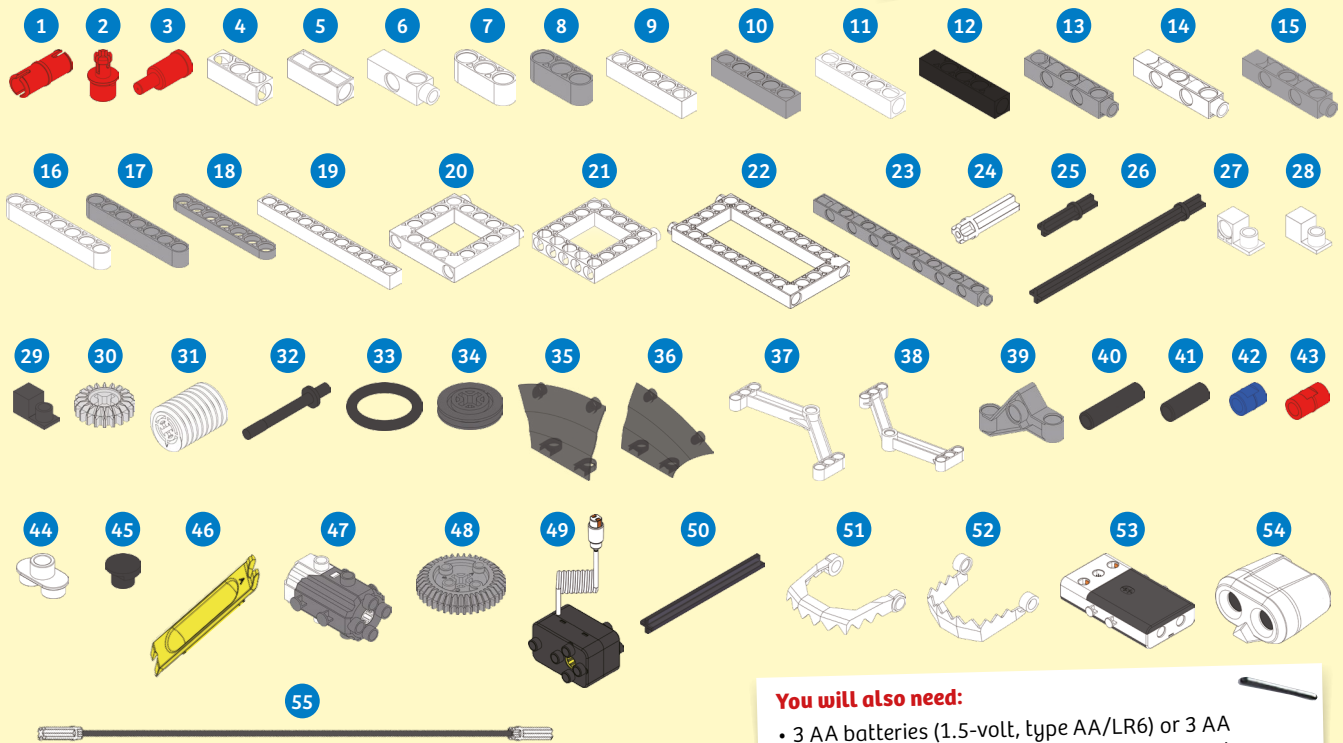
Franckh-Kosmos Verlags-GmbH & Co. KG, Pfizerstr. 5-7, 70184 Stuttgart, Germany | +49 (0) 711 2191-0 | www.kosmos.de
Thames & Kosmos, 301 Friendship St., Providence, RI, 02903, USA | 1-800-587-2872 | www.thamesandkosmos.com
Thames & Kosmos UK Ltd, Goudhurst, Kent, TN17 2QZ, United Kingdom | 01580 212000 | www.thamesandkosmos.co.uk



>>> 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:

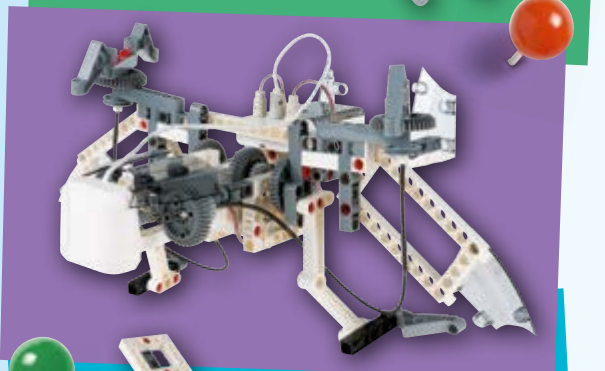
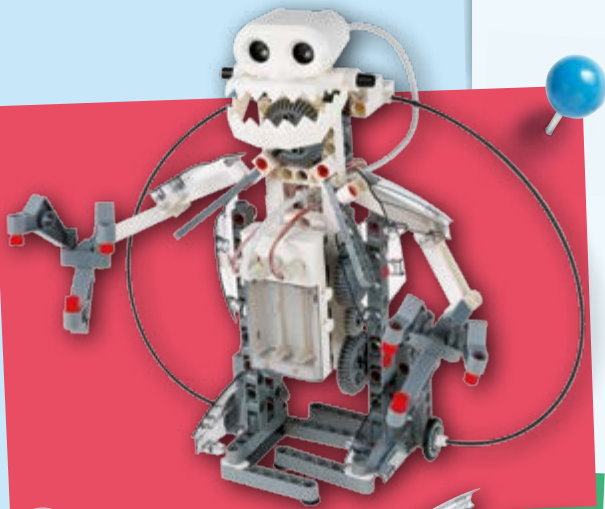
- 3 AA batteries (1.5-volt, type AA/LR6) or 3 AA rechargeable batteries (1.2-volt, type AA, HR6/KR6) and a tablet or smartphone running iOS or Android (see page 7 for hardware requirements)

Checklist: Find – Inspect – Check off

✓	No.	Description	Qty.	Item No.
<input type="checkbox"/>	1	Joint pin	18	1156-W10-A1R
<input type="checkbox"/>	2	Shaft plug	8	7026-W10-H1R
<input type="checkbox"/>	3	Shaft pin	9	7026-W10-J3R
<input type="checkbox"/>	4	3-hole rod	1	7026-W10-Q1W
<input type="checkbox"/>	5	3-hole cross rod	5	7026-W10-X1W
<input type="checkbox"/>	6	3-hole dual rod	2	7061-W10-R1W
<input type="checkbox"/>	7	3-hole wide rounded rod, white	2	7404-W10-C1W
<input type="checkbox"/>	8	3-hole wide rounded rod, gray	6	7404-W10-C1S
<input type="checkbox"/>	9	5-hole rod, white	1	7413-W10-K2W
<input type="checkbox"/>	10	5-hole rod, gray	4	7413-W10-K2S1
<input type="checkbox"/>	11	5-hole cross rod, white	2	7413-W10-K3W
<input type="checkbox"/>	12	5-hole cross rod, black	2	7413-W10-K3D
<input type="checkbox"/>	13	5-hole dual rod B, gray	6	7026-W10-S2S1
<input type="checkbox"/>	14	5-hole dual rod C, white	2	7026-W10-S3W
<input type="checkbox"/>	15	5-hole dual rod C, gray	2	7026-W10-S3S2
<input type="checkbox"/>	16	7-hole wide rounded rod, white	2	7404-W10-C2W
<input type="checkbox"/>	17	7-hole wide rounded rod, gray	6	7404-W10-C2S
<input type="checkbox"/>	18	7-hole flat rounded rod, gray	3	7404-W10-C3S
<input type="checkbox"/>	19	11-hole rod, white	2	7026-W10-C1W
<input type="checkbox"/>	20	Square frame B	2	7026-W10-T2W
<input type="checkbox"/>	21	Square frame A	1	7026-W10-V1W
<input type="checkbox"/>	22	Short frame, white	2	7413-W10-I1W
<input type="checkbox"/>	23	14-hole dual rod, gray	2	7413-W10-H1S1
<input type="checkbox"/>	24	Motor shaft	4	7026-W10-L1W
<input type="checkbox"/>	25	3-cm axle	1	7413-W10-N1D
<input type="checkbox"/>	26	10-cm axle	1	7413-W10-L2D
<input type="checkbox"/>	27	90-degree converter X, white	4	7061-W10-J1W
<input type="checkbox"/>	28	90-degree converter Y, white	4	7061-W10-J2W

✓	No.	Description	Qty.	Item No.
<input type="checkbox"/>	29	90-degree converter Y, gray	6	7061-W10-J2S2
<input type="checkbox"/>	30	Small gear	8	7026-W10-D2S
<input type="checkbox"/>	31	Worm	1	7344-W10-A1W
<input type="checkbox"/>	32	Crank bar	1	7026-W10-J2D
<input type="checkbox"/>	33	O-ring	2	R12-08S
<input type="checkbox"/>	34	Small pulley	2	7344-W10-N3S
<input type="checkbox"/>	35	Body plate 3	3	7392-W10-L1TD
<input type="checkbox"/>	36	Body plate 4	3	7392-W10-L2TD
<input type="checkbox"/>	37	Leg left	1	7397-W10-C1W
<input type="checkbox"/>	38	Leg right	1	7397-W10-C2W
<input type="checkbox"/>	39	Diagonal connector	6	7404-W10-B2S
<input type="checkbox"/>	40	30-mm tube	4	7400-W10-G1D
<input type="checkbox"/>	41	20-mm tube	1	7400-W10-G2D
<input type="checkbox"/>	42	Short anchor pin	6	880-W10-M1B
<input type="checkbox"/>	43	Anchor pin	51	7061-W10-C1R
<input type="checkbox"/>	44	Two-to-one converter	4	7061-W10-G1W
<input type="checkbox"/>	45	Button pin	4	7061-W10-E1D
<input type="checkbox"/>	46	Anchor pin lever	1	7061-W10-B1Y
<input type="checkbox"/>	47	Motor unit 1	1	7392-W85-B1
<input type="checkbox"/>	48	Medium gear	10	7346-W10-C1S
<input type="checkbox"/>	49	Motor unit 2	1	7400-W85-A
<input type="checkbox"/>	50	6.5-cm axle	3	7416-W10-C1D
<input type="checkbox"/>	51	Jaw, upper	1	7416-W10-A1W
<input type="checkbox"/>	52	Jaw, lower	1	7416-W10-A2W
<input type="checkbox"/>	53	Bluetooth battery box	1	7416-W85-A
<input type="checkbox"/>	54	Ultrasonic sensor	1	7416-W85-B
<input type="checkbox"/>	55	Flexible shaft	2	7416-W85-C

>>> TABLE OF CONTENTS



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

Safety Information Inside front cover

Kit Contents..... 1
Tips and Tricks 2
Table of Contents..... 3

Robots: Sensing, Thinking Machines

Getting Started 4
About Ultrasound 5
Downloading and Using the App 6
Writing Programs..... 7

The models:

Bipedal Droid 13
Programming the Bipedal Droid 17

Spy Bot.....18
Using the Spy Bot23

Beetle24
Programming the Beetle31

Crocodile.....32
Programming the Crocodile.....38

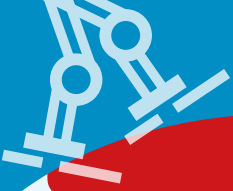
Tiltrotor Aircraft.....39
Programming the Tiltrotor Aircraft.....49

Robo Dog.....50
Programming the Robo Dog.....55

Robotosaurus.....56
Programming the Robotosaurus.....61

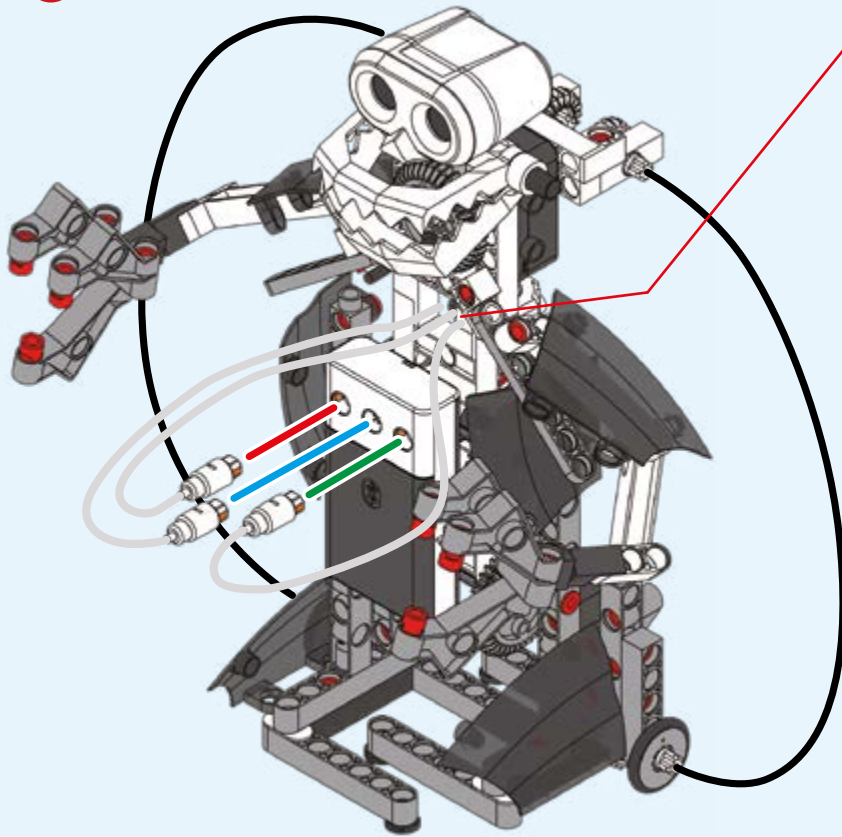
Catapult62
Programming the Catapult64

Publisher's informationInside back cover

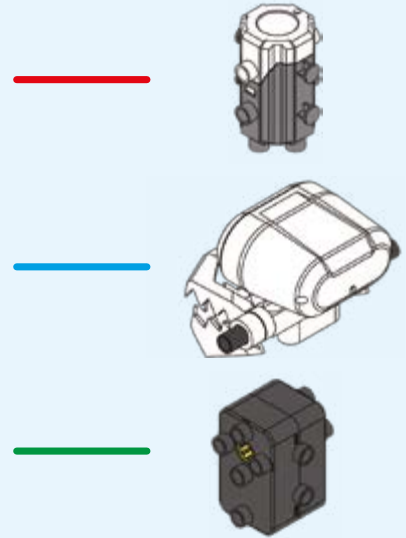


● ● ● BIPEDAL DROID

11

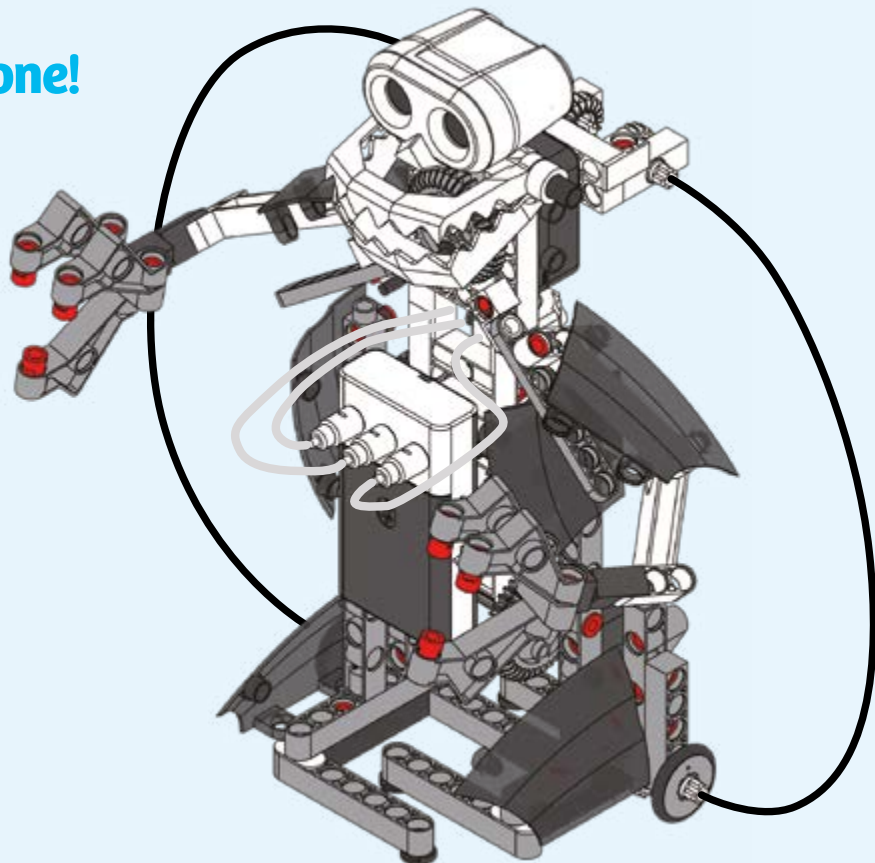


The three wires pass through the middle frame.

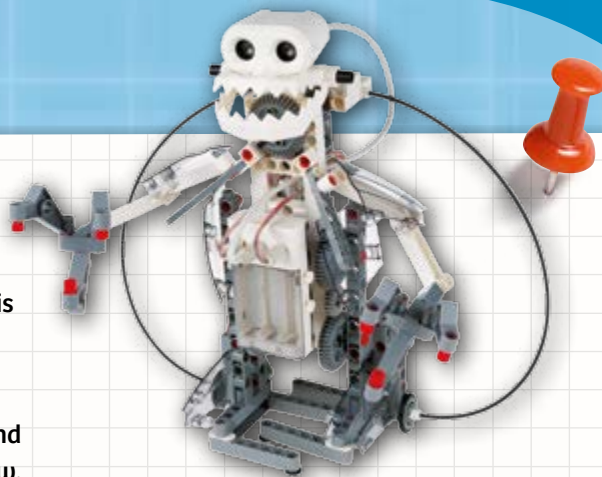


12

Done!



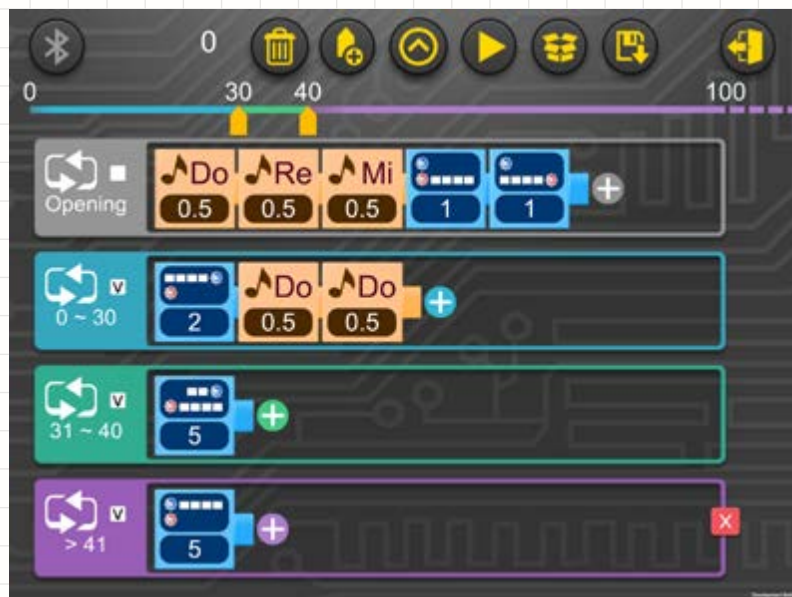
PROGRAMMING



SAMPLE PROGRAM FOR THE BIPEDAL DROID

Use this program to make your bipedal droid walk forward until it detects an obstacle with the ultrasound sensor. When the obstacle is detected, the robot will turn to the side. When the robot no longer detects an obstacle, it will walk forward again.

This program is preloaded in the app under Program 7. Test it out and write down how the robot behaves for each program segment below.



PROGRAMMING NOTES

DEMO PROGRAM:

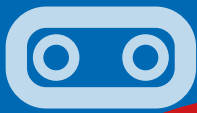
Program 7

OPENING SEGMENT:

SEGMENT 0-30:

SEGMENT 31-40:

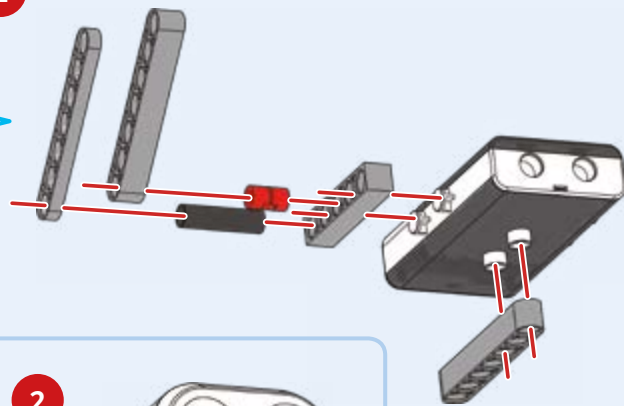
SEGMENT >41:



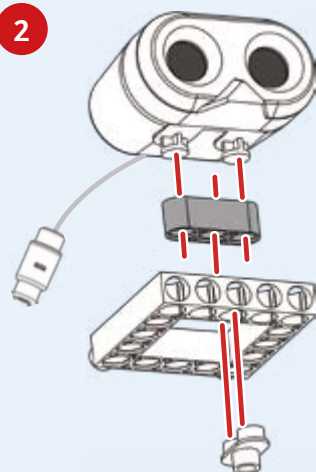
SPY BOT

1	2	3	5	6	7	8	9	10	11	13	15
1x	2x	2x	3x	2x	2x	5x	1x	2x	1x	3x	2x
16	17	18	19	20	21	22	24	26			
2x	6x	2x	2x	2x	1x	1x	2x	1x			
27	28	29	30	33	34	37	38	39	40	42	43
2x	4x	4x	5x	2x	2x	1x	1x	2x	2x	6x	30x
44	47	48	49	50	53	54					
2x	1x	4x	1x	1x	1x	1x					

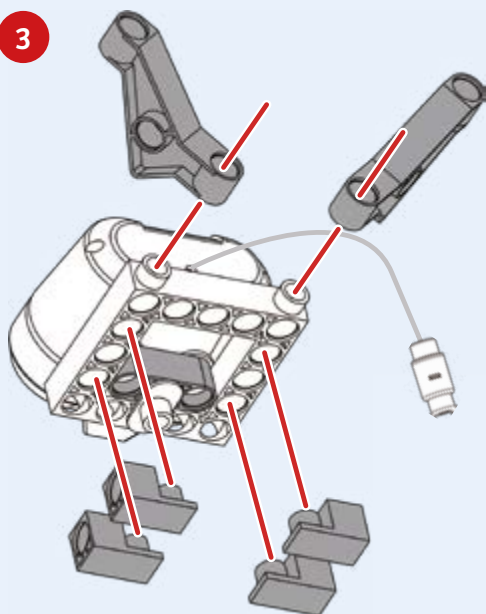
1



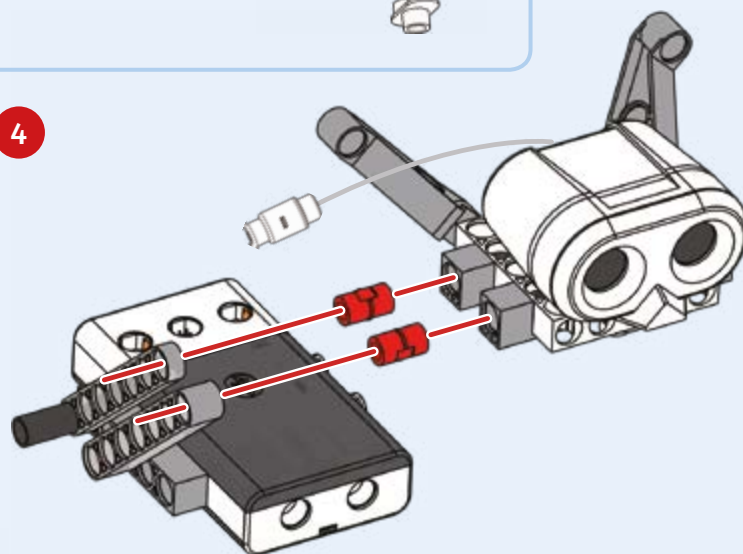
2



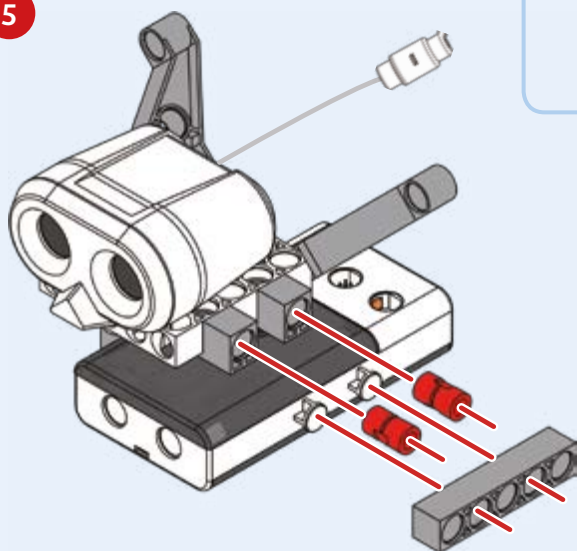
3



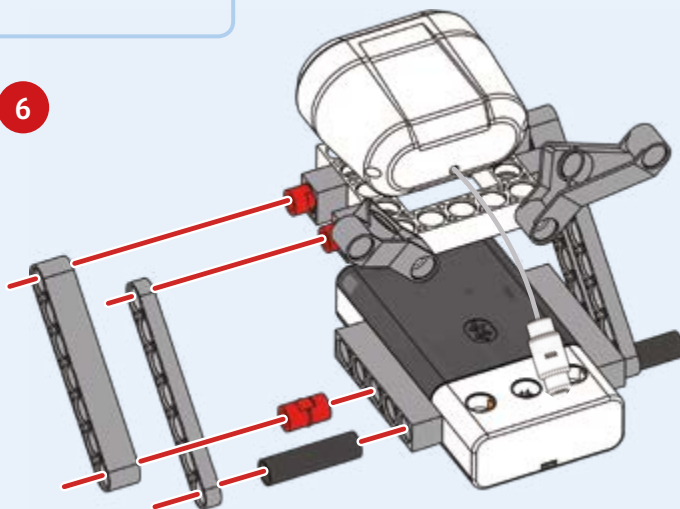
4



5



6





Kosmos Quality and Safety

More than one hundred years of expertise in publishing science experiment kits stand behind every product that bears the Kosmos name. Kosmos experiment kits are designed by an experienced team of specialists and tested with the utmost care during development and production. With regard to product safety, these experiment kits follow European and US safety standards, as well as our own refined proprietary safety guidelines. By working closely with our manufacturing partners and safety testing labs, we are able to control all stages of production. While the majority of our products are made in Germany, all of our products, regardless of origin, follow the same rigid quality standards.

1st Edition 2015 Thames & Kosmos, LLC, Providence, RI, USA
Thames & Kosmos® is a registered trademark of Thames & Kosmos, LLC.

This work, including all its parts, is copyright protected. Any use outside the specific limits of the copyright law without the consent of the publisher is prohibited and punishable by law. This applies specifically to reproductions, translations, microfilming, and storage and processing in electronic systems and networks. We do not guarantee that all material in this work is free from copyright or other protection.

Technical product development: Genius Toy Taiwan Co., Ltd., Taichung, Taiwan, R.O.C.
Text and Editing: Ted McGuire
Additional Graphics and Packaging: Dan Freitas

Manual design concept: Atelier Bea Klenk, Berlin
Manual illustrations: Genius Toy Taiwan Co., Ltd., Taichung, Taiwan, R.O.C., and Thames & Kosmos

Manual photos:
© istockphoto.com: microolga, p. 4 bottom left; all animal photos, p. 6
© fotolia.com: nataliafrei, p. 4 bottom right; Maxisport, p. 4 top center
© shutterstock.com: Slavoljub Pantelic, p. 4 top right
Courtesy of DARPA, p. 4 top left
All other photos: Genius Toy Taiwan Co., Ltd., Taichung, Taiwan, R.O.C., and Thames & Kosmos

The publisher has made every effort to locate the holders of image rights for all of the photos used. If in any individual cases any holders of image rights have not been acknowledged, they are asked to provide evidence to the publisher of their image rights so that they may be paid an image fee in line with the industry standard.

Distributed in North America by Thames & Kosmos, LLC, Providence, RI 02903
Phone: 800-587-2872; Web: www.thamesandkosmos.com

Distributed in United Kingdom by Thames & Kosmos UK, LP, Goudhurst, Kent TN17 2QZ
Phone: 01580 212000; Web: www.thamesandkosmos.co.uk

We reserve the right to make technical changes.

Printed in Taiwan / Imprimé en Taiwan

