

MY ROBOTIC PET ***TUMBLING HEDGEHOG***

LET'S GET
ROLLING!



THAMES & KOSMOS

Dear Parents and Adults,

Before building and experimenting, read the instructions together with your child and discuss the safety instructions. Please provide your child with the help and advice that he or she needs for tricky assembly steps and experiments, and accompany him or her every step of the way.

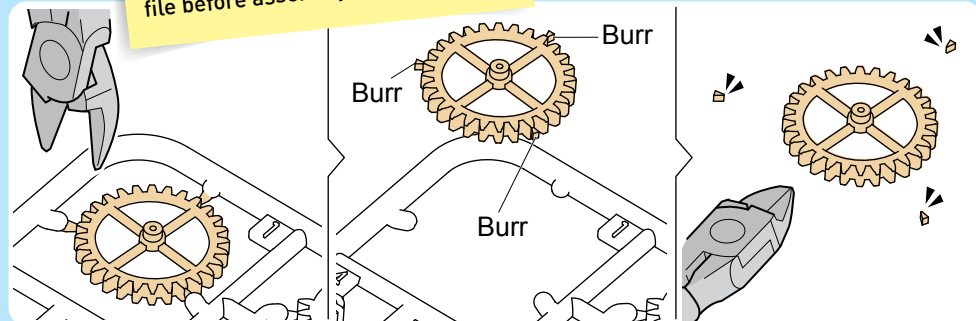
Should your child work on a table, give them a table mat to prevent damaging the furniture.

When cutting the plastic parts with a cutter, special care must be taken to avoid sharp edges, rough edges, and burrs. These can be removed using a cutter and a file. Provide your child with a cutter and supervise him or her until you are sure that he or she can use it without supervision.

We wish you and your child a lot of fun with the Tumbling Hedgehog!

IMPORTANT!

Remove the parts from the plastic molds only when they are needed. Remove excess material and burrs using a cutter and a nail file before assembly.



Warning. Not suitable for children under 3 years.
Choking hazard — small parts may be swallowed or inhaled.

Keep the packaging and instructions as they contain important information.

Only for use by children from 7 years or older. Instructions for parents or other responsible persons are included and must be observed.

NOTES ON ENVIRONMENTAL PROTECTION/NOTES ON DISPOSAL OF ELECTRICAL AND ELECTRONIC COMPONENTS:

The electronic components of this product are recyclable. For the sake of the environment, do not throw them into the household trash at the end of their lifespan. They must be delivered to a collection location for electronic waste, as indicated by the following symbol:



Please contact your local authorities for the appropriate disposal location.

>>> TABLE OF CONTENTS

Safety Information.....	Inside front cover
Table of Contents.....	1
Equipment	2
Tumbling Hedgehog Comic: Part 1.....	3
Assembly Instructions.....	7
Handling the Robot	31
Using the Robot	32
Tumbling Hedgehog Comic: Part 2.....	36
Replacing the Batteries.....	38
Troubleshooting	39

TIP!

Additional information can be found in the Check It Out section on page 40.



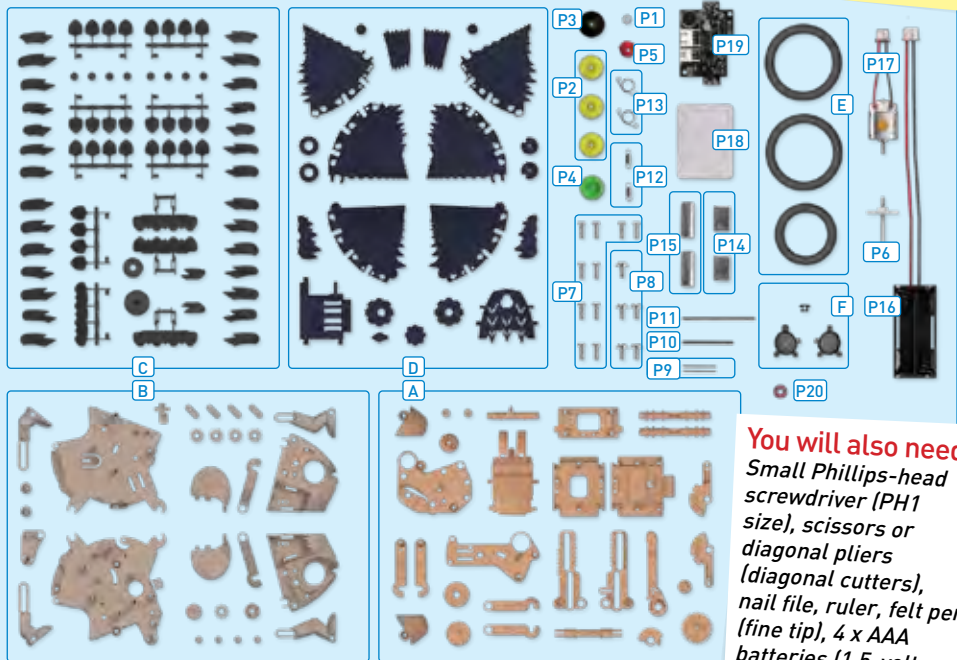
GOOD TO KNOW!

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:

Small Phillips-head screwdriver (PH1 size), scissors or diagonal pliers (diagonal cutters), nail file, ruler, felt pen (fine tip), 4 x AAA batteries (1.5-volt, Type LR03)

Checklist: Find — Inspect — Check Off

✓	No.	Description	Quantity
<input type="radio"/>	P1	Small gear, white	1
<input type="radio"/>	P2	Gear, yellow	3
<input type="radio"/>	P3	Gear, black	1
<input type="radio"/>	P4	Gear, green	1
<input type="radio"/>	P5	Gear, red	1
<input type="radio"/>	P6	Gear with metal shaft	1
<input type="radio"/>	P7	Screw	10
<input type="radio"/>	P8	Wide head screw	5
<input type="radio"/>	P9	Round metal shaft	2
<input type="radio"/>	P10	Hexagonal metal shaft short	1
<input type="radio"/>	P11	Hexagonal metal shaft long	1
<input type="radio"/>	P12	Main spring	2
<input type="radio"/>	P13	Torsion spring	2

✓	No.	Description	Quantity
<input type="radio"/>	P14	Metal block	2
<input type="radio"/>	P15	Metal cylinder	2
<input type="radio"/>	P16	Battery compartment with connection cable	1
<input type="radio"/>	P17	Motor with connection cable	1
<input type="radio"/>	P18	2 Flexible connectors (+2 as spare parts)	2
<input type="radio"/>	P19	Circuit board	1
<input type="radio"/>	P20	Washer, red	1
<input type="radio"/>	A	Plastic parts group A with parts A1 – A27	1
<input type="radio"/>	B	Plastic parts group B with parts B1 – B21	1
<input type="radio"/>	C	Plastic parts group C with parts C1 – C37	1
<input type="radio"/>	D	Plastic parts group D with parts D1 – D20	1
<input type="radio"/>	E	Plastic parts group E with parts E1 – E2	1
<input type="radio"/>	F	Plastic parts group F with parts F1 – F3	1

NUNA!

THE TUMBLING
HEDGEHOG



... AND THE TEMPLE
OF THE GAAA



ANOTHER QUIET NIGHT IN THE JUNKYARD. EVERYONE IS ASLEEP ...
... EXCEPT TOM AND IZZY.

HERE, WHERE OTHER PEOPLE JUST SEE JUNK, HEROES SEE ENDLESS POSSIBILITIES.

TOM & IZZY



IZZY CAN REPAIR ANYTHING. SHE IS A GENIUS WHEN IT COMES TO MECHANICS.

TOM ON THE OTHER HAND IS A SCIENTIST THROUGH AND THROUGH...

TOGETHER, THEY CAN BUILD ANYTHING!



... HE'S ALWAYS GAME TO TRY OUT AN EXPERIMENT.

YES! WE DID IT!

NOTHING CAN STOP US NOW!




WHERE SHOULD WE FLY TO FIRST?

WHEREVER WE WANT!

WE CAN GO ANYWHERE!

AS THEY WERE PASSING BY A BEAUTIFUL PLANET IN SECTOR TF-078-XQ, A CRITICAL PIECE OF THEIR SPACESHIP BROKE OFF AND FELL DOWN TO THE PLANET. THEY QUICKLY DESCENDED TO RETRIEVE IT ...



WOW, A TEMPLE! DO YOU THINK THE PART FELL IN THERE, TOM?

THE ARCHAEOLOGICAL EXPLORATION OF AN ANCIENT STRUCTURE AWAKENS MY SCIENTIFIC CURIOSITY, IZZY.

COOOOOOOOL ...

AMAZING! THERE'S THE SPACESHIP CONTROL RING ON THAT PEDESTAL!

I WONDER WHO PUT IT THERE. FROM THE LOOKS OF THIS ROOM, I'D GUESS IT IS PROTECTED BY BOOBY TRAPS.

RUBBISH. THERE ARE NO BOOBY TRAPS!

CLICK

AAARGH!

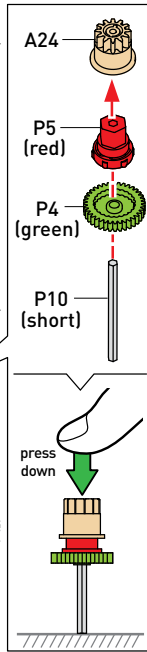
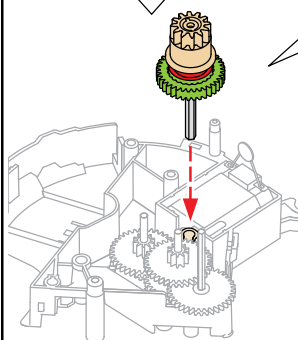
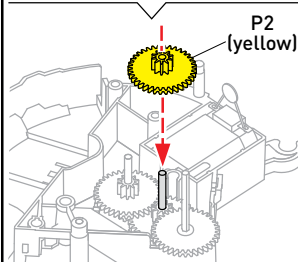
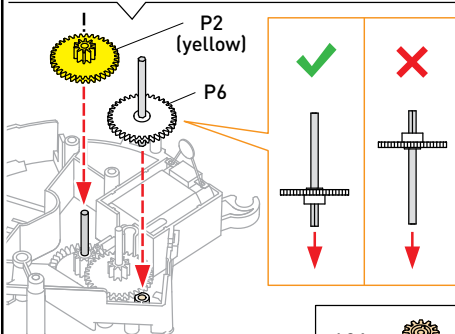
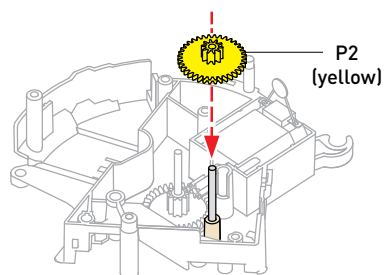
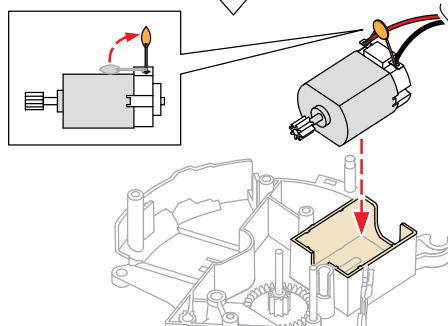
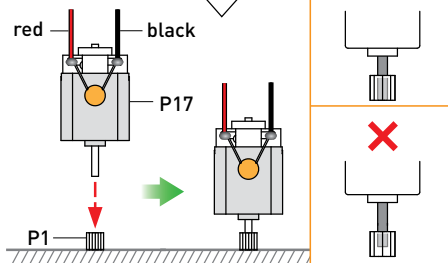
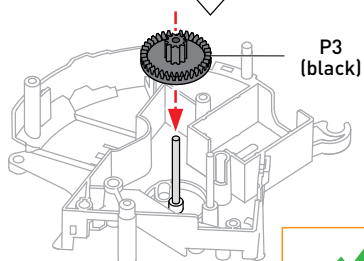
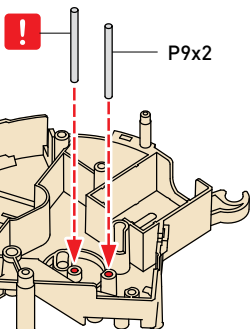
AS I THOUGHT: BOOBY TRAPS CONNECTED TO THE FLOOR. THIS IS VERY RISKY.

I'VE GOT AN IDEA! READY TO BUILD?

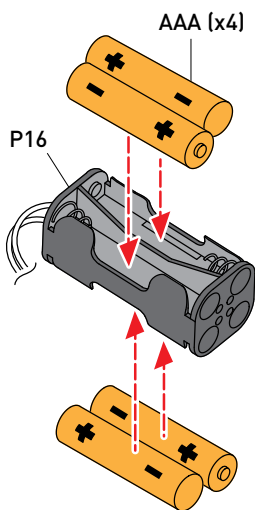
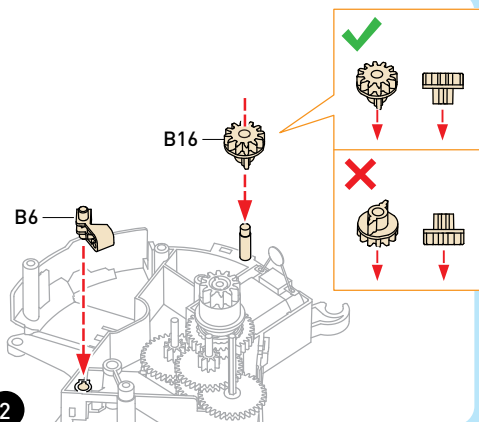
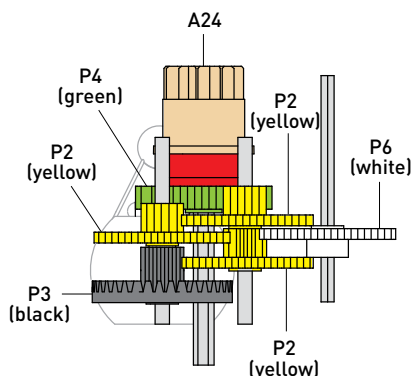
CONTINUED ON
PAGE 36

TRANSMISSION MODULE

Press the rods in



TRANSMISSION MODULE



› Avoid a short circuit of the batteries. A short circuit can cause the wires to overheat and the batteries to explode.

› Different types of batteries or new and used batteries are not to be mixed.

› Do not mix old and new batteries.

› Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.

› Batteries are to be inserted with the correct polarity.

› Non-rechargeable batteries are not to be recharged. They could explode!

› Rechargeable batteries are only to be charged under adult supervision.

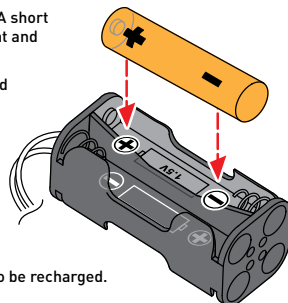
› Rechargeable batteries are to be removed from the toy before being charged.

› The supply terminals are not to be short-circuited.

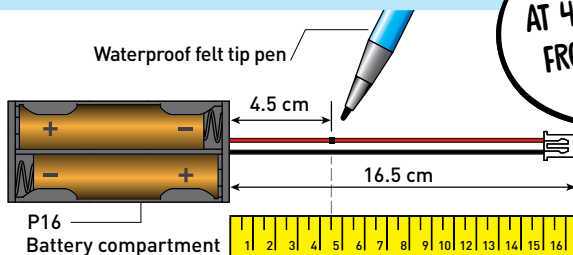
› Exhausted batteries are to be removed from the toy.

› Dispose of used batteries in accordance with environmental provisions, not in the household trash.

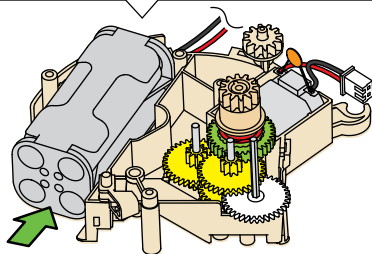
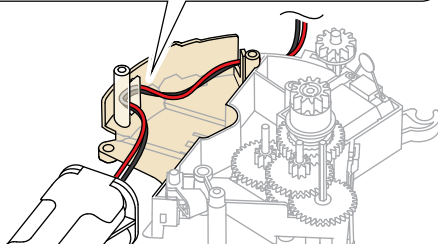
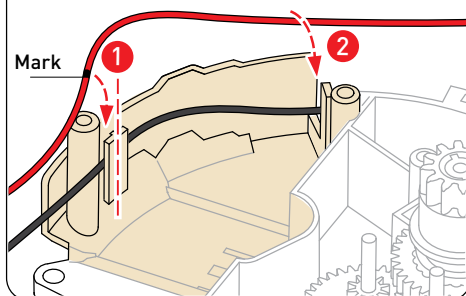
› Avoid deforming the batteries.



MARK THE CABLE
AT 4.5 cm (1.75 in)
FROM THE BATTERY
COMPARTMENT.

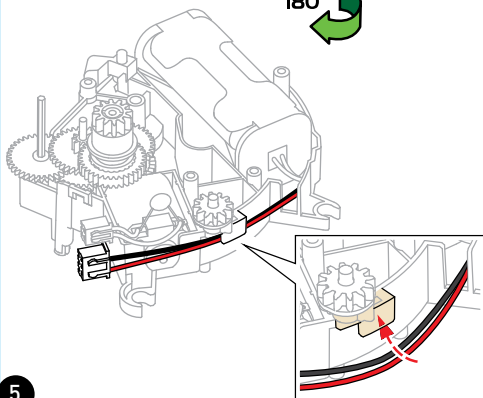


! Lay the cable so that the pen mark lines up with the dashed line.

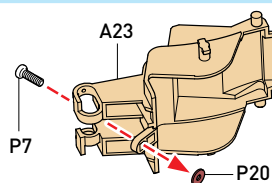
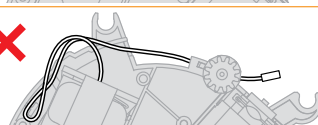
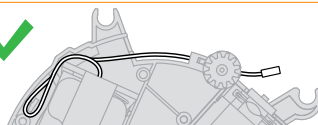


Press

180°

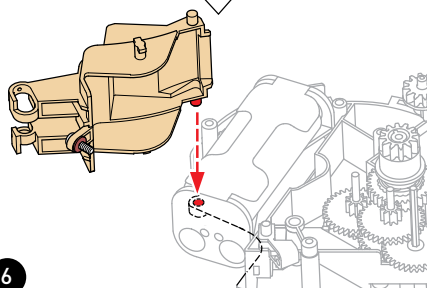


5

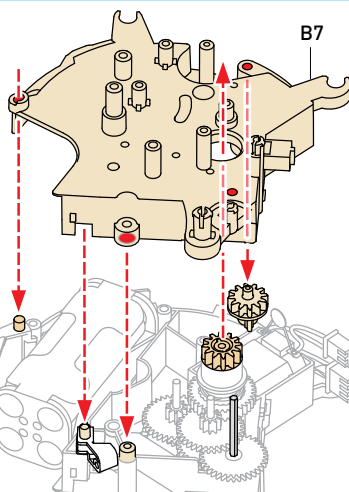


P7

P20

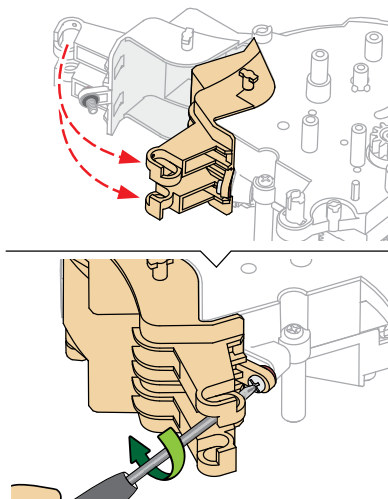
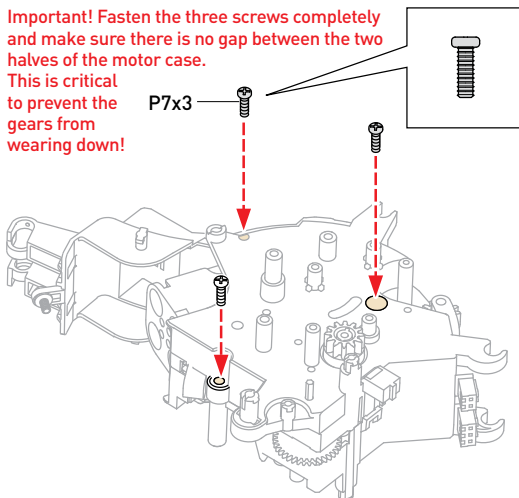


6



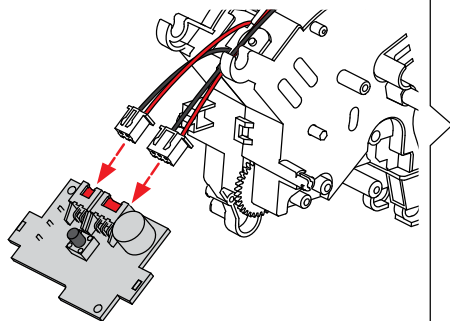
7

Important! Fasten the three screws completely and make sure there is no gap between the two halves of the motor case. This is critical to prevent the gears from wearing down!

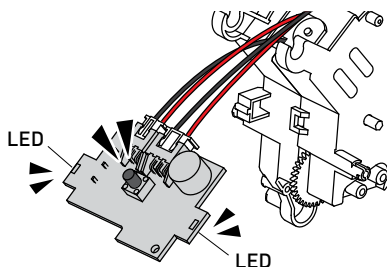


Testing the transmission module

- 1 Connect the two cables to the circuit board as shown in the picture.



- 2 1. Hold down the black button on the board for two seconds. The LEDs on the board light up.
2. Press the button again (briefly) and the LEDs should light up in green and orange.

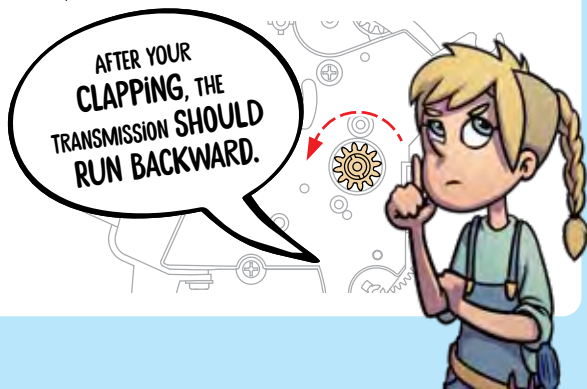


- 3 Let the transmission run for about 10 seconds. Then clap your hands and see if the transmission still runs smoothly.

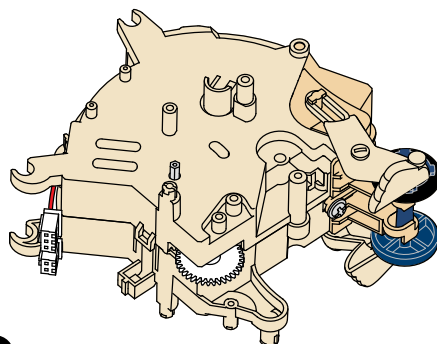
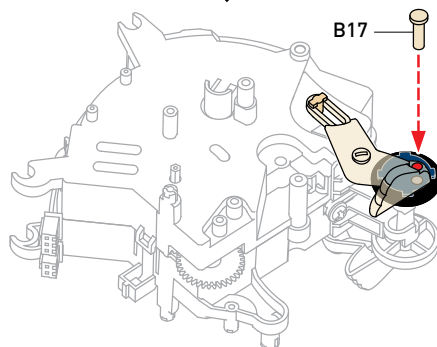
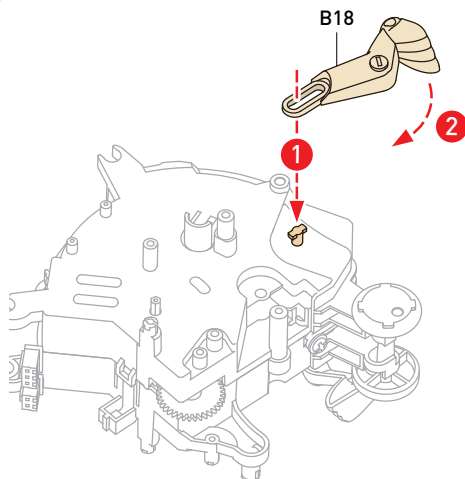
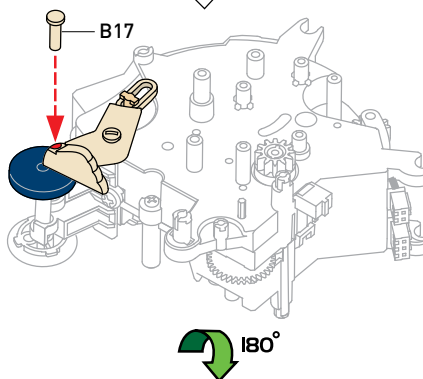
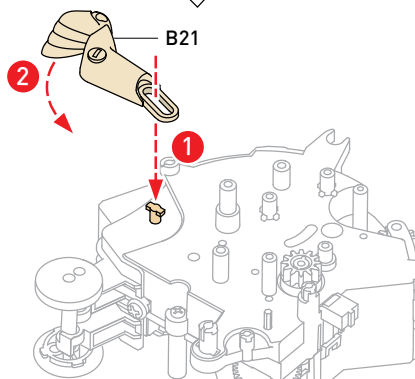
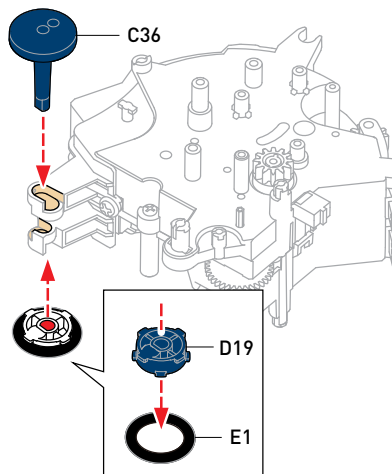
If everything runs smoothly, you can continue with the assembly.

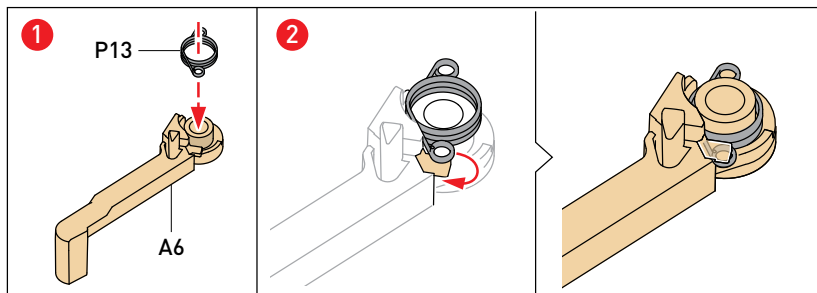
If the transmission does not run, go back to page 7 and rebuild the transmission.

AFTER YOUR CLAPPING, THE TRANSMISSION SHOULD RUN BACKWARD.

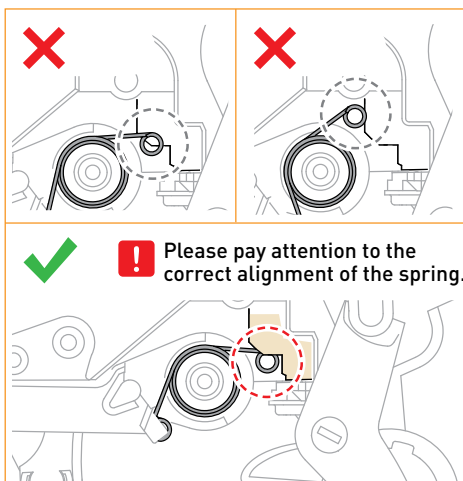
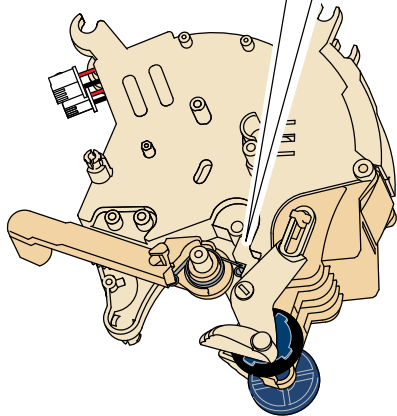
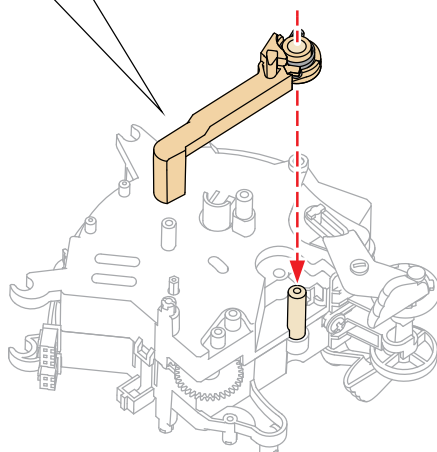
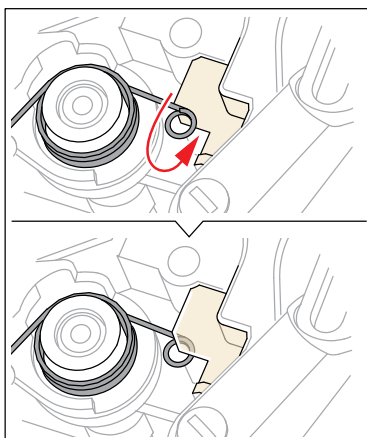


RUNNING AND MOVEMENT MECHANICS

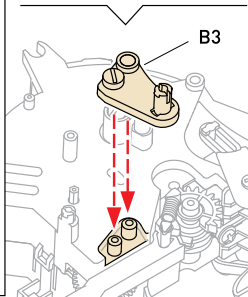
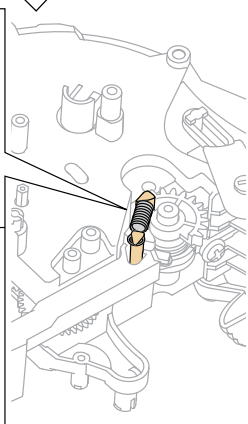
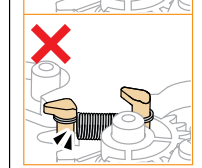
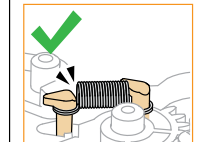
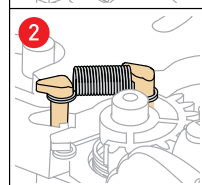
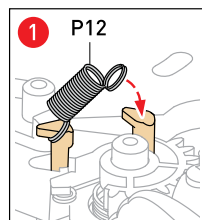
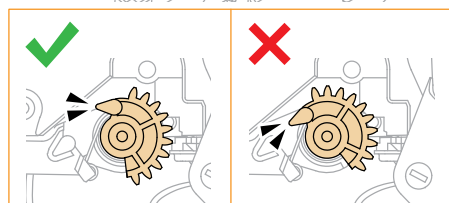
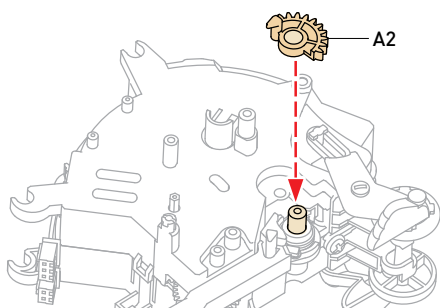




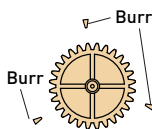
3



4

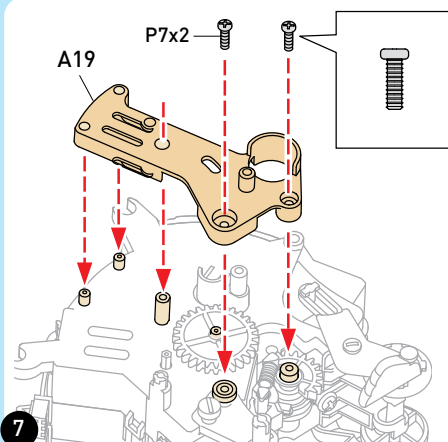


! Remove any plastic burrs before assembly.

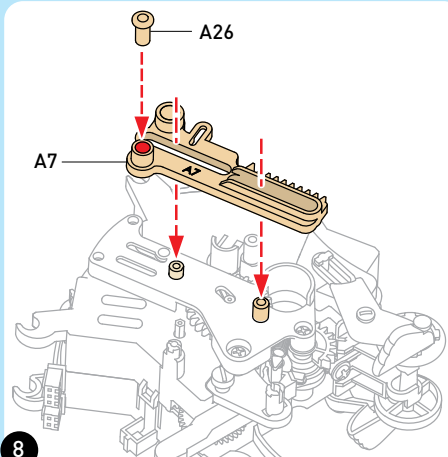


A1

6

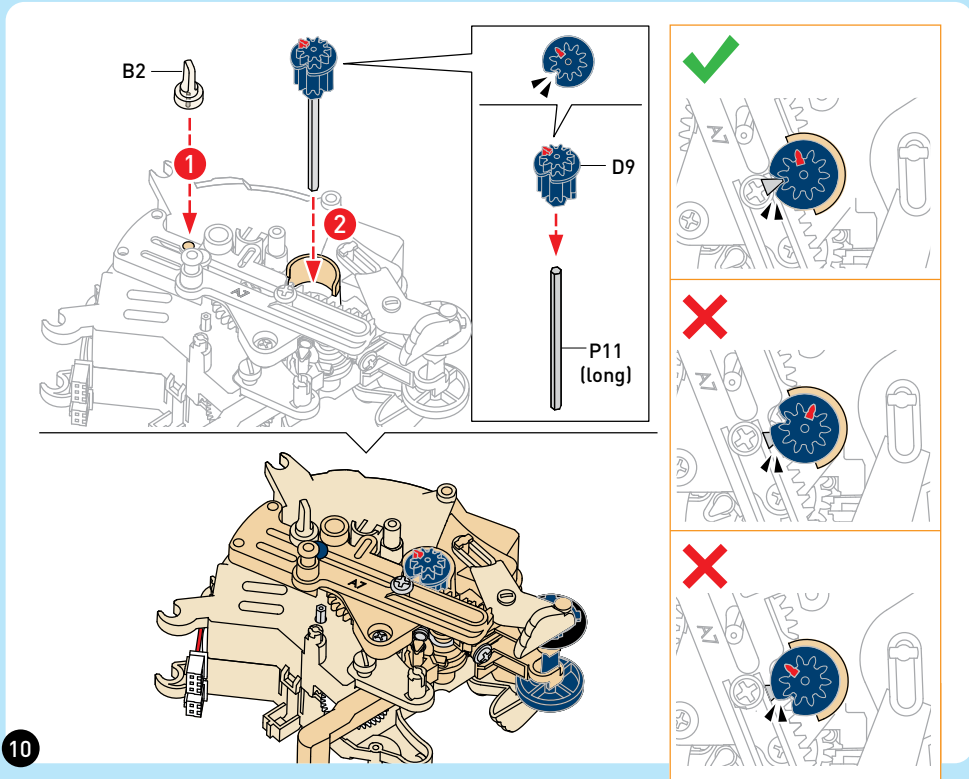
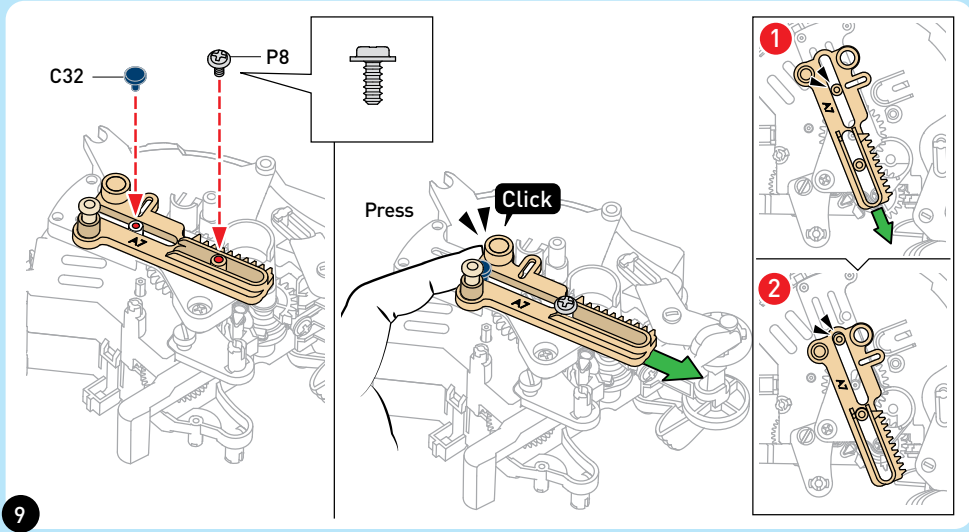


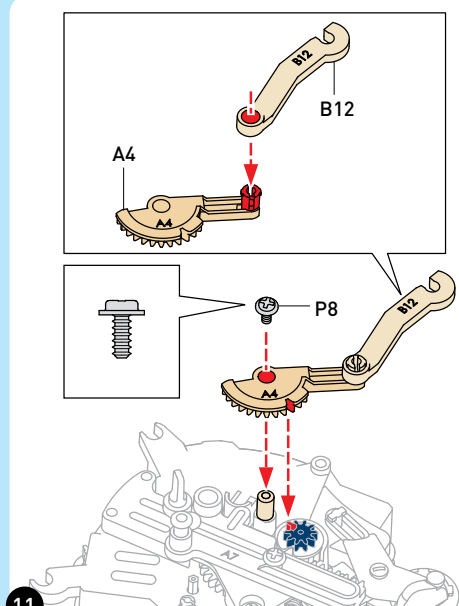
7



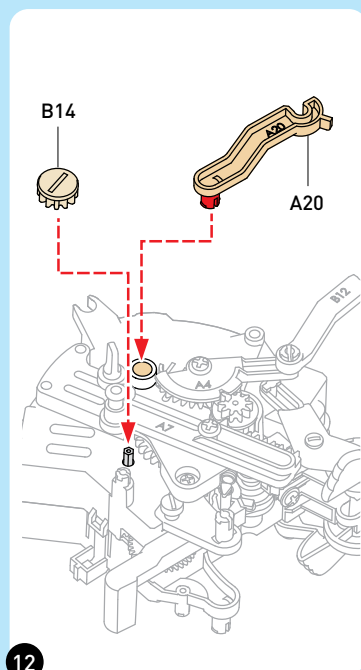
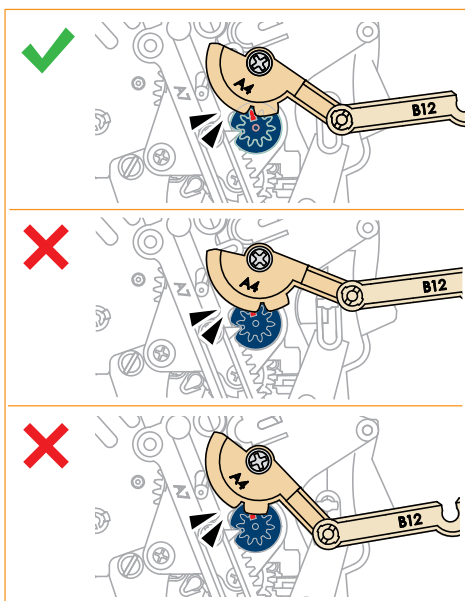
8

5

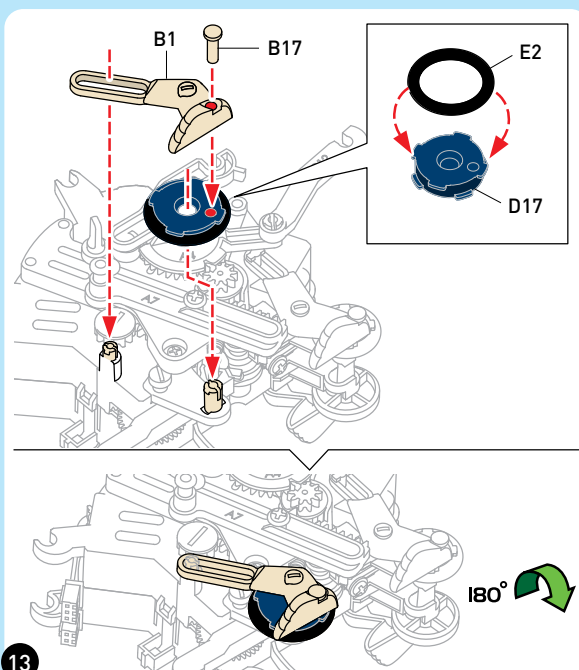




11

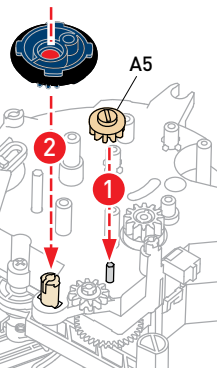
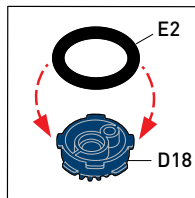
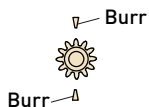


12

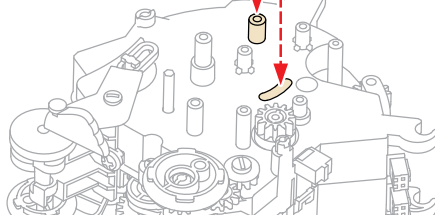
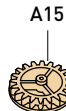
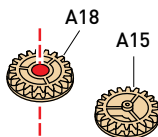
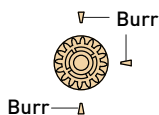


13

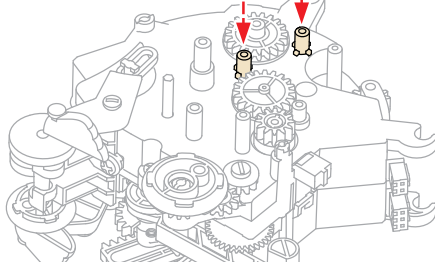
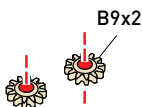
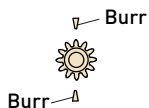
! Remove any plastic burrs before assembly.

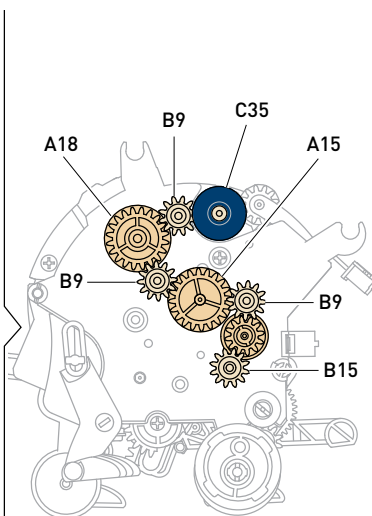
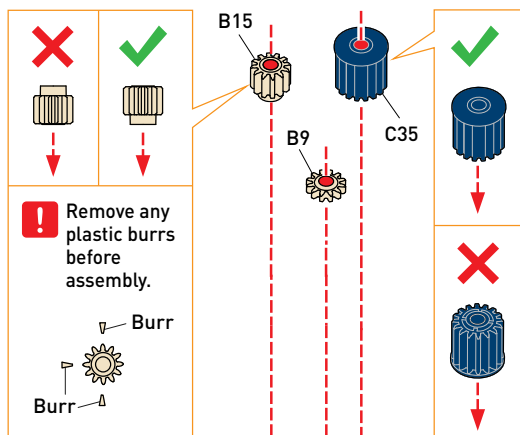


! Remove any plastic burrs before assembly.

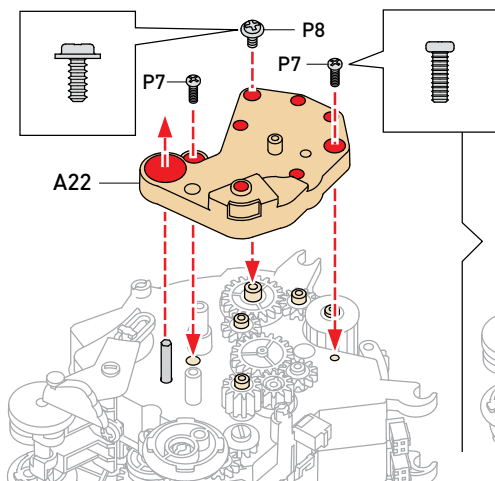


! Remove any plastic burrs before assembly.

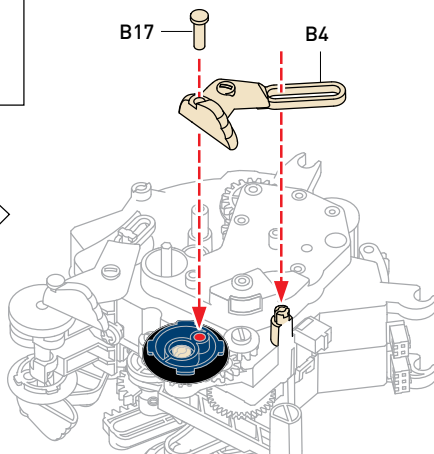


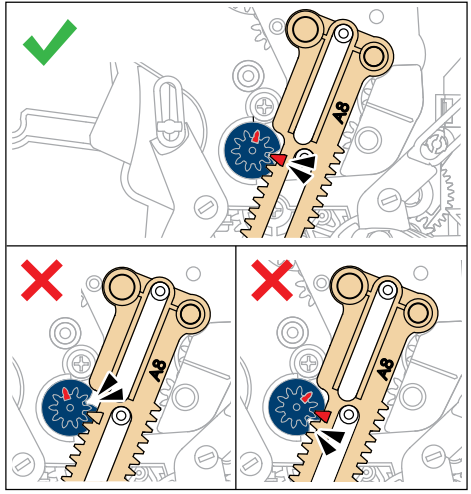
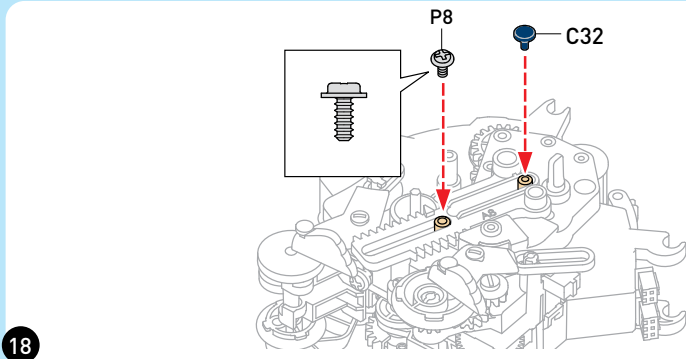
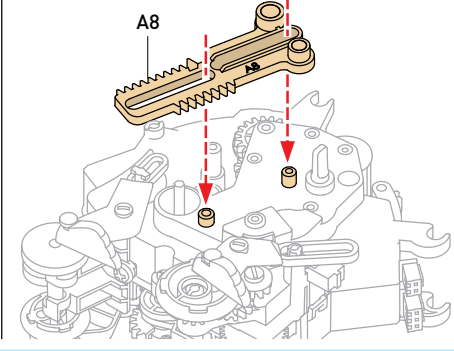
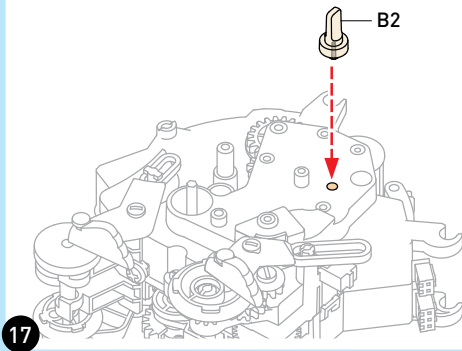


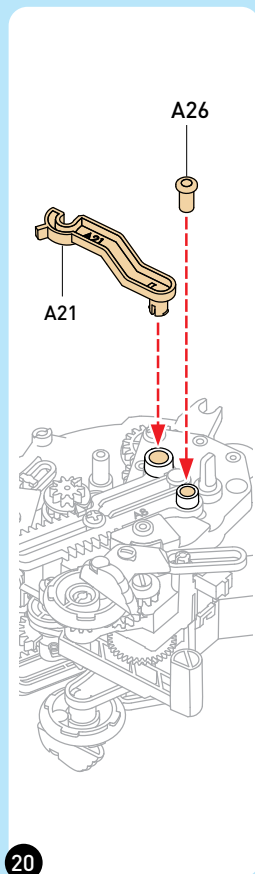
15



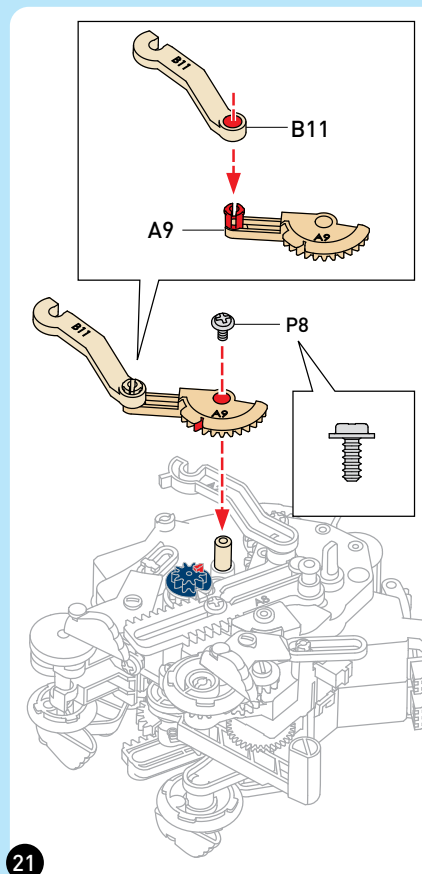
16



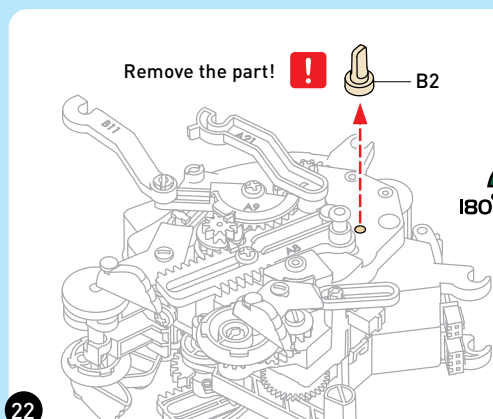
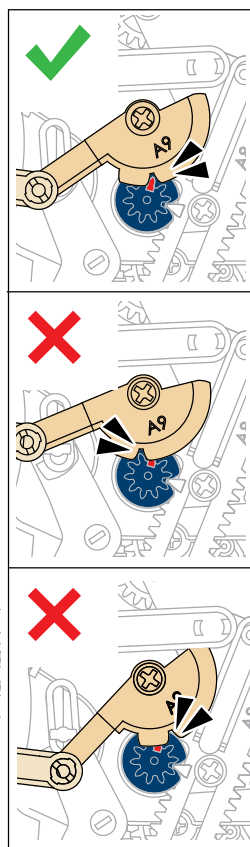




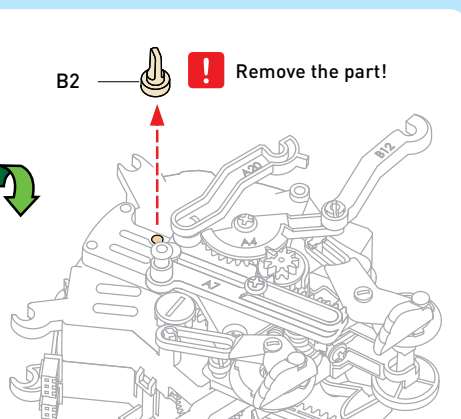
20



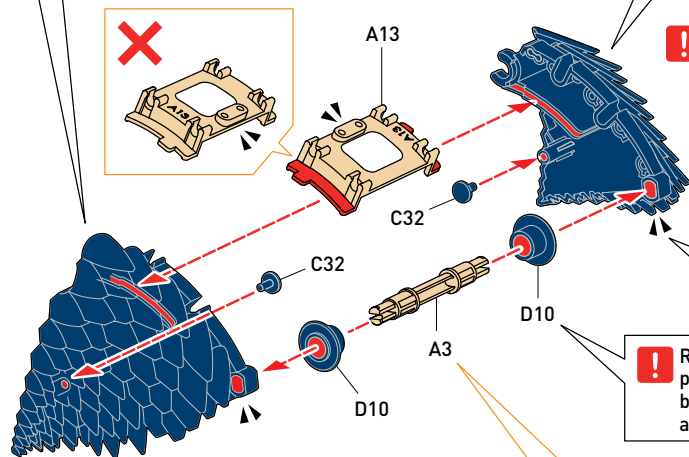
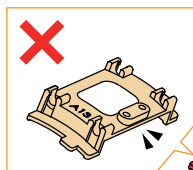
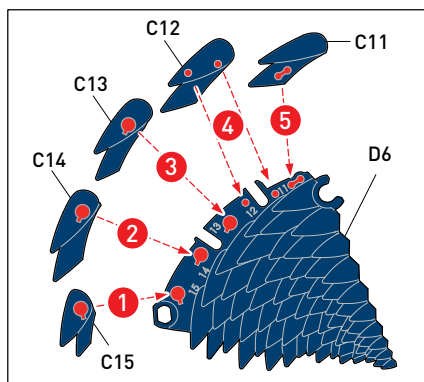
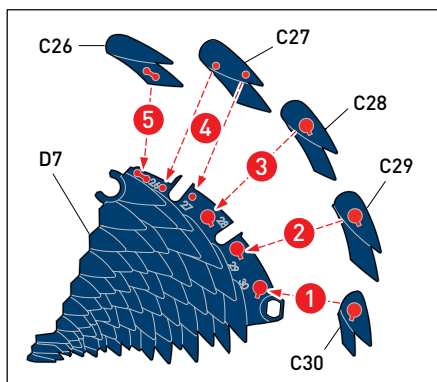
21



22



OUTER SHELL



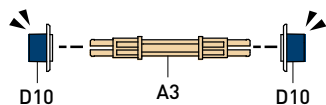
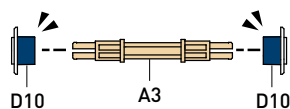
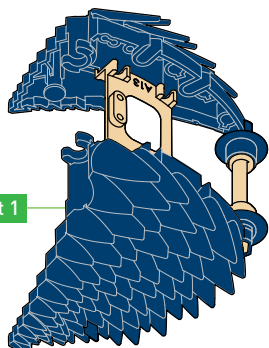
! Please note that the marked holes in D6 and D7 are not round. Connect A3 so that the ends fit exactly in the holes.

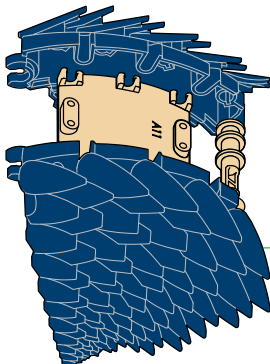
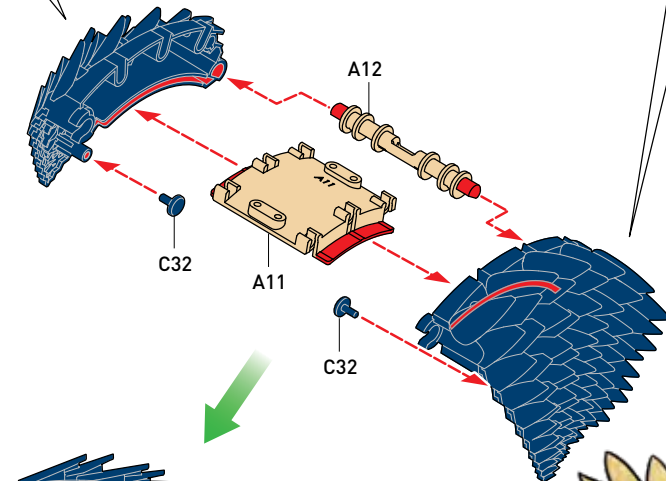
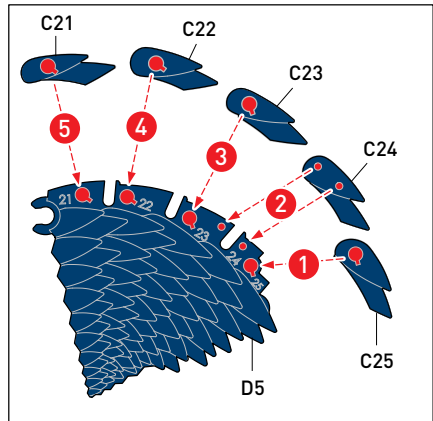
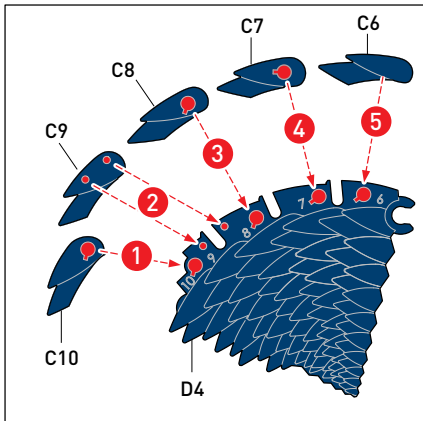


! Remove any plastic burrs before assembly.



Shell part 1

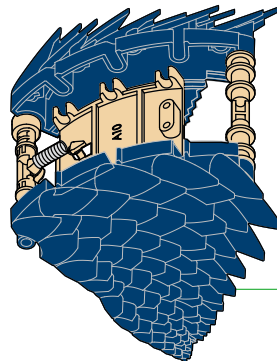
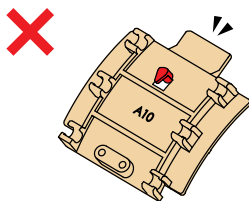
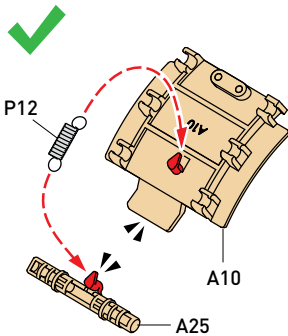
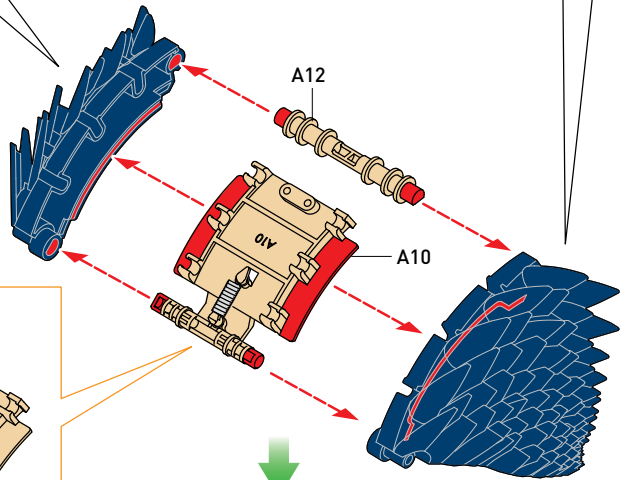
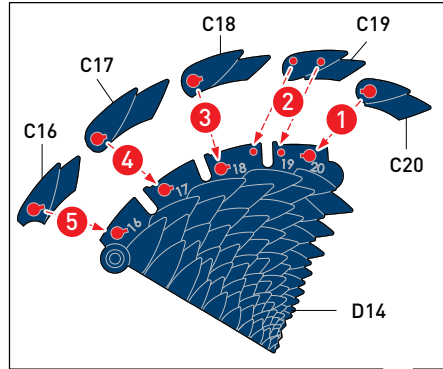
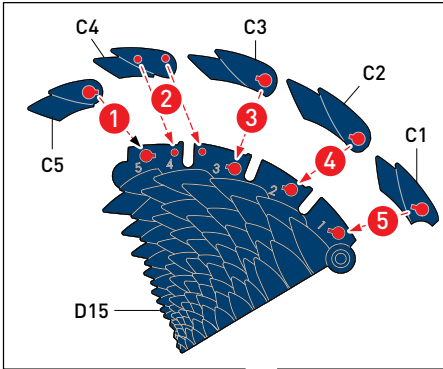




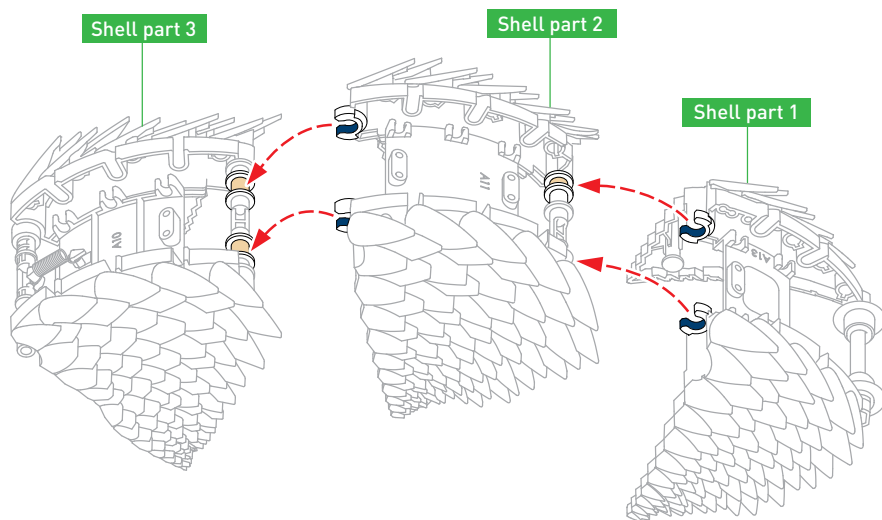
Shell part 2



OUTER SHELL

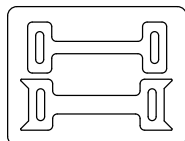


Shell part 3



4

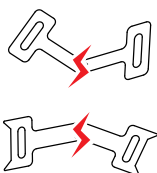
P18



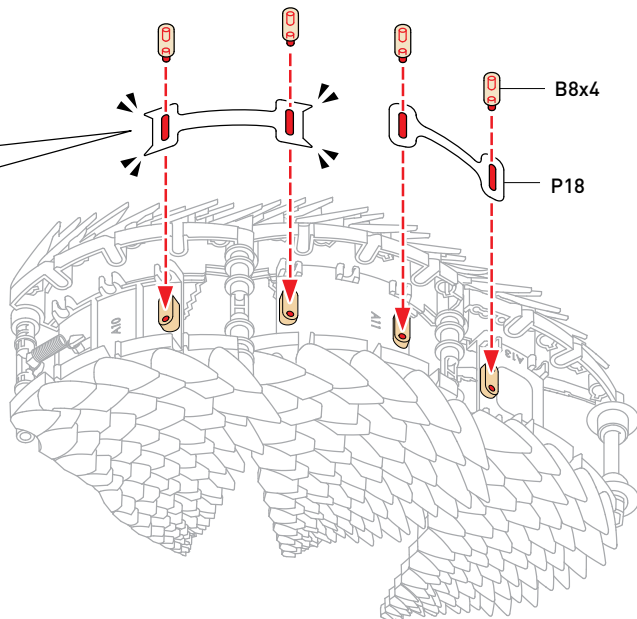
Carefully remove the plastic strips.

! Careful!

Make sure that the plastic strips are not folded or creased. Folded strips can lead to malfunctions.

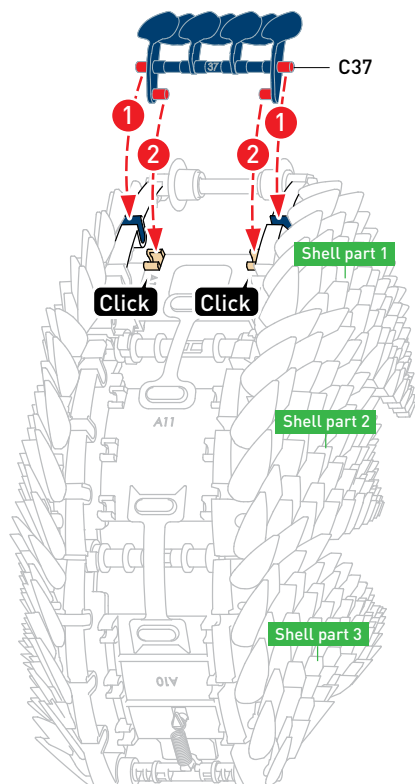


The two strips are different. Pay attention to the correct positioning.

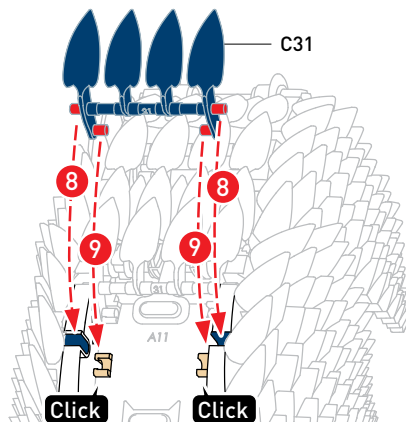
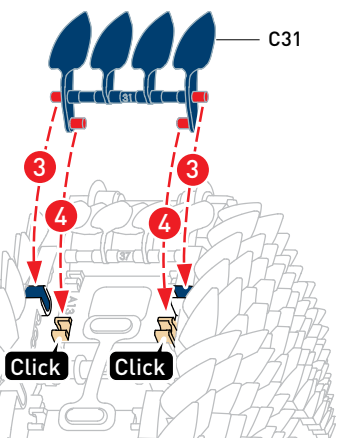
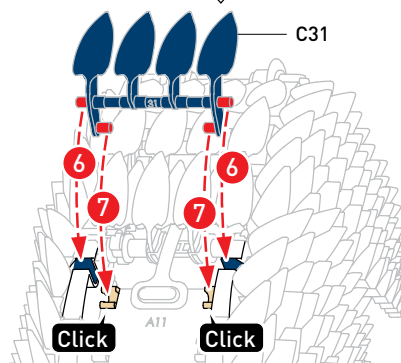
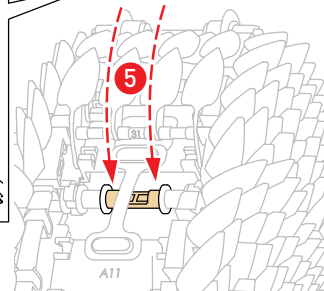
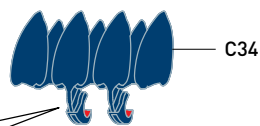
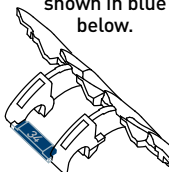


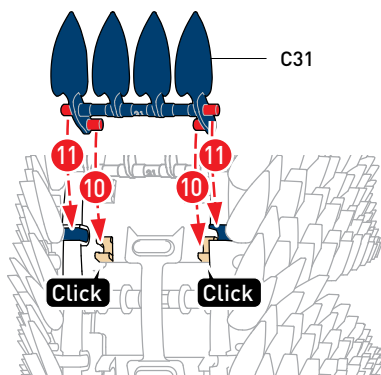
5

OUTER SHELL

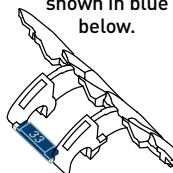


Before assembling, remove the section of part C34 marked with the number, shown in blue below.

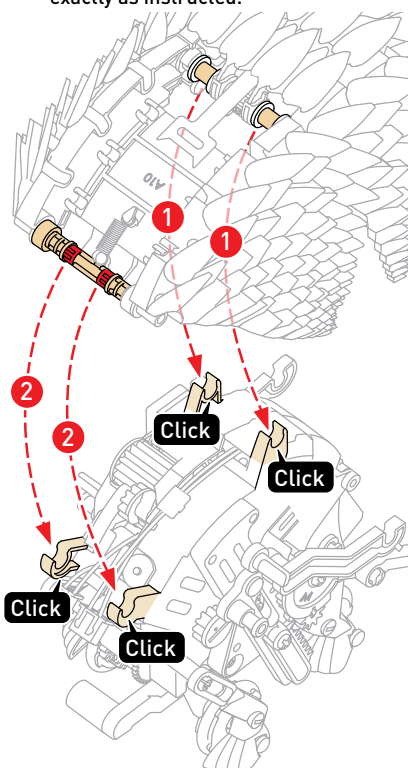




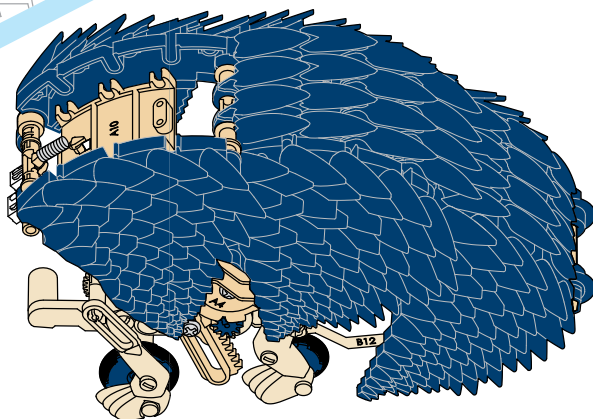
Before assembling, remove the section of part C33 marked with the number, shown in blue below.



Be careful to do this step exactly as instructed.

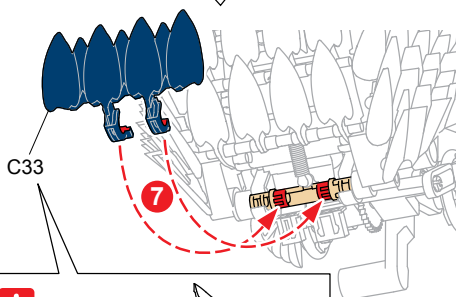
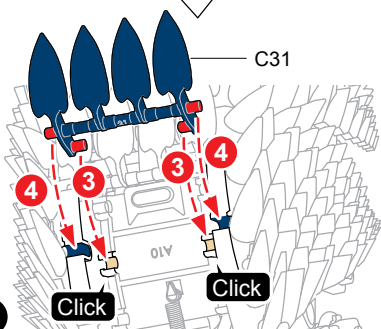
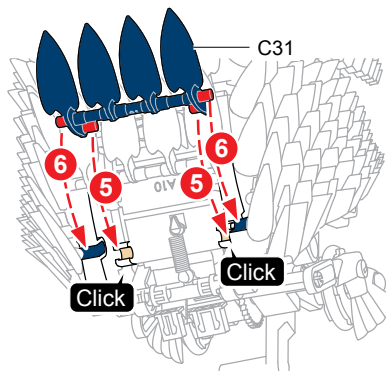
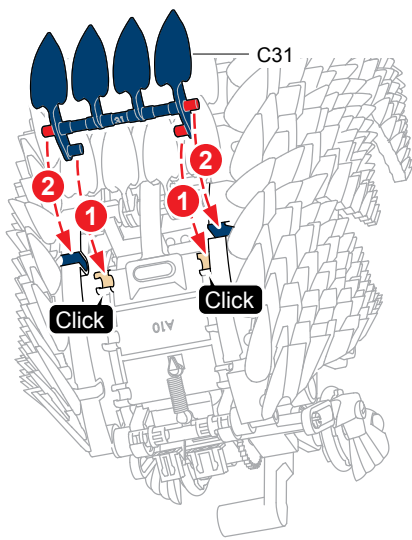


6

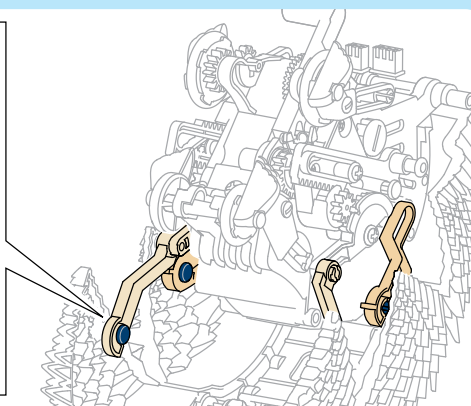
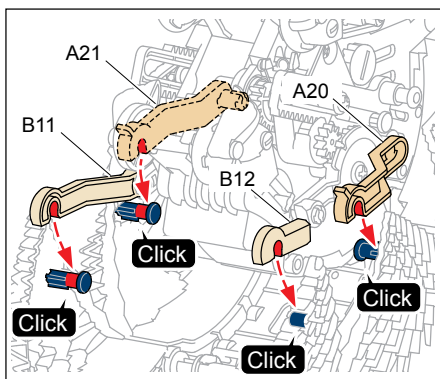
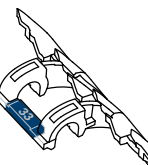


7

OUTER SHELL

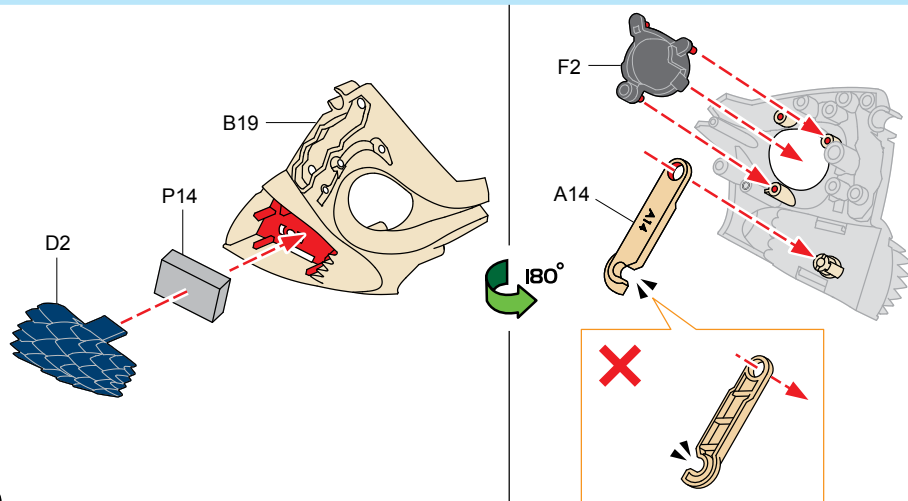


Before assembling,
remove the section
of part C33 marked
with the number,
shown in blue here.

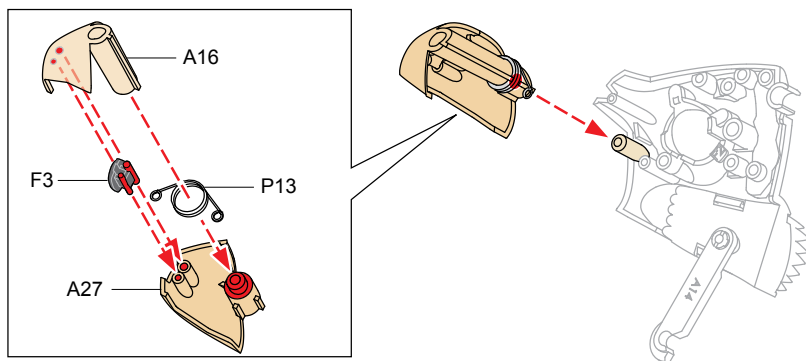


HEAD

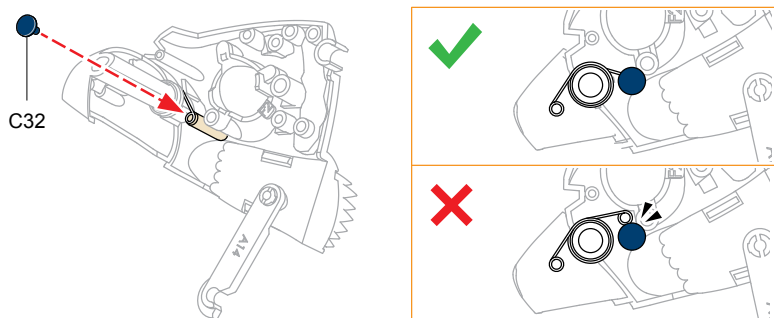
1

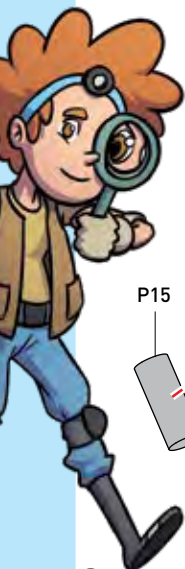


2

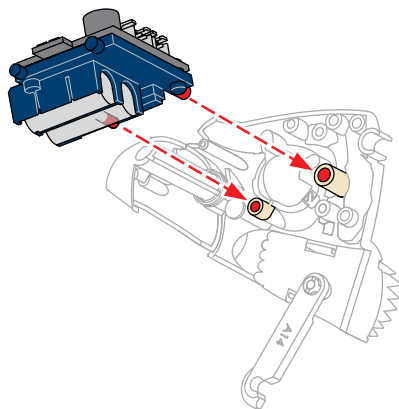
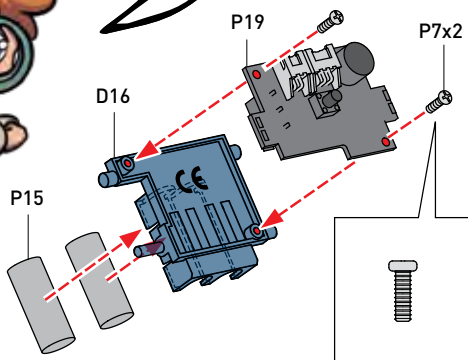


3

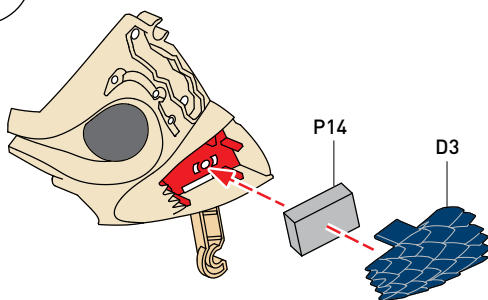
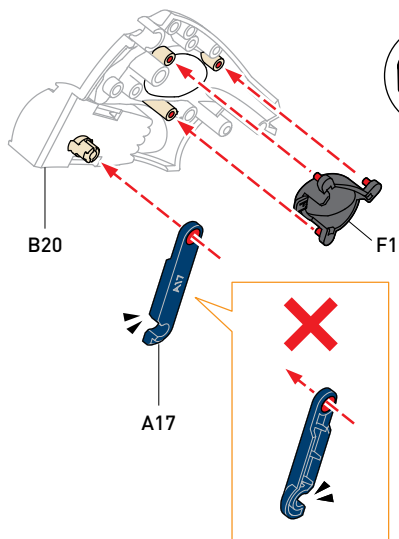




PLEASE PAY ATTENTION
TO THE EXACT
ALIGNMENT OF
P19 AND D16.

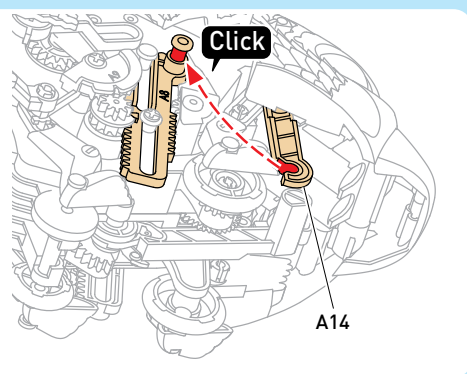
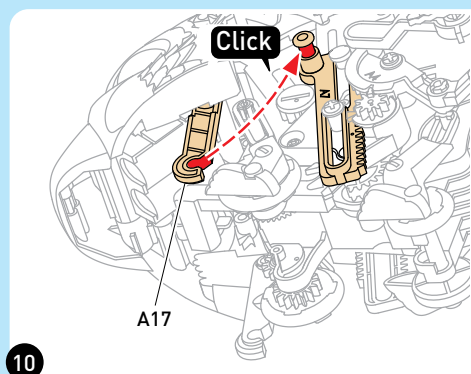
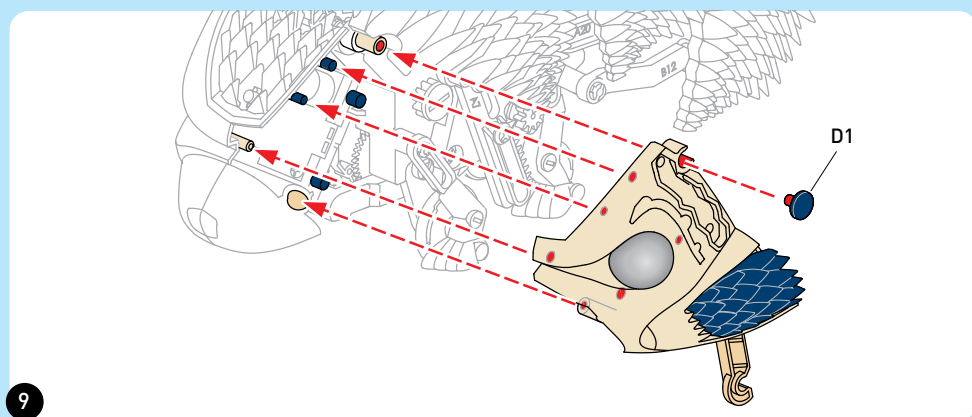
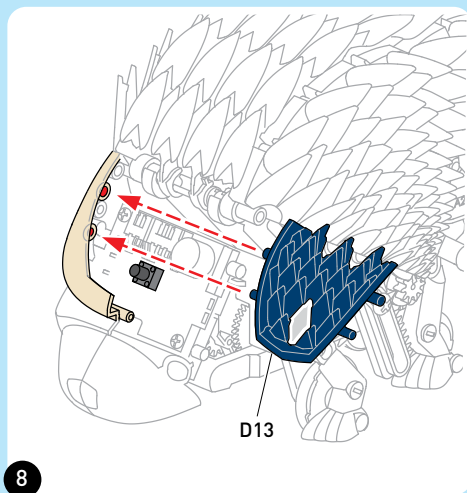
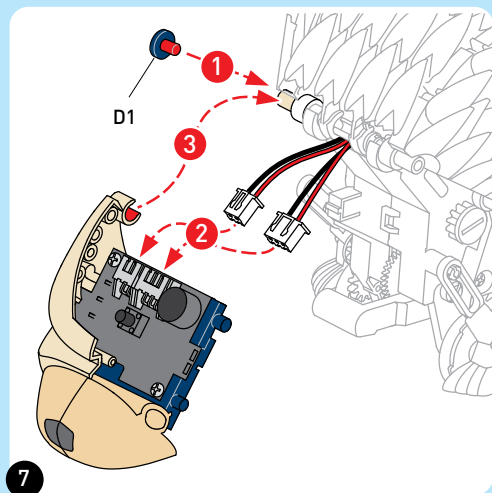


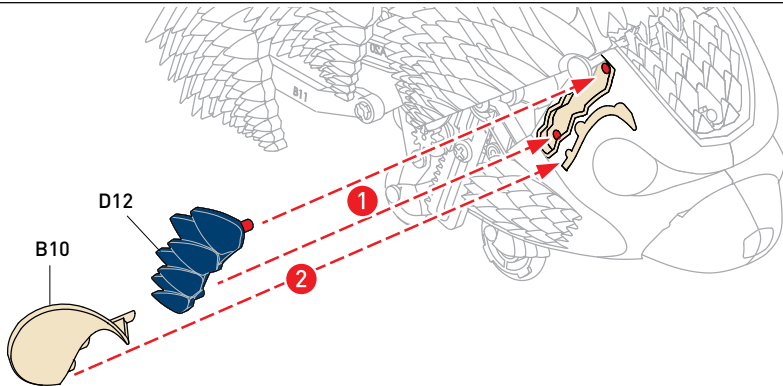
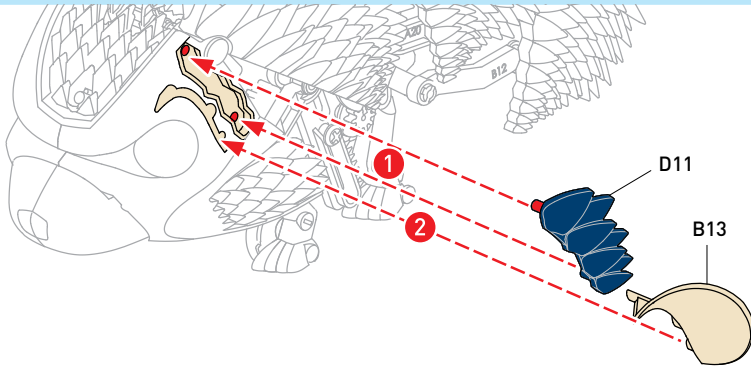
4



5

6

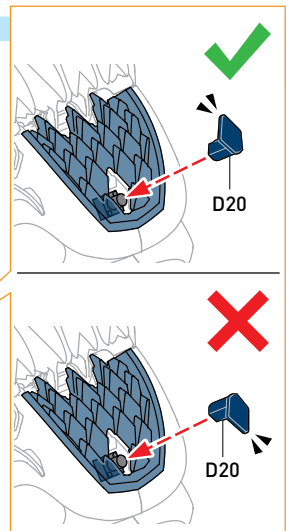




11



12

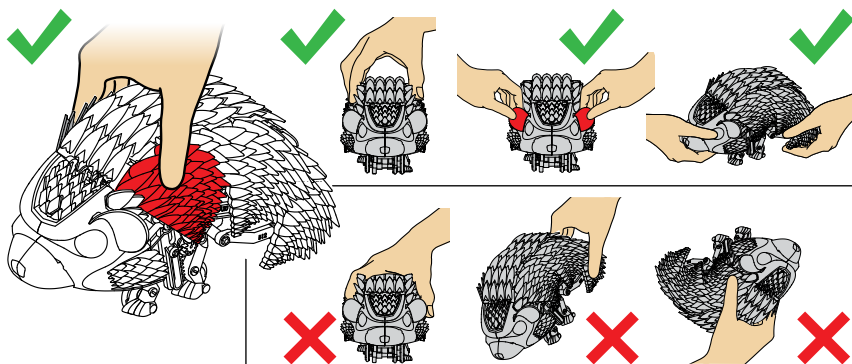


HANDLING THE ROBOT

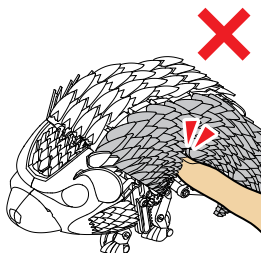
Appropriate care and handling

So that you may have fun with your robotic hedgehog for as long as possible, you should remember some things:

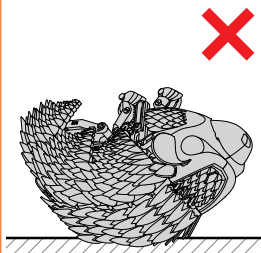
When you pick up the hedgehog, hold it as shown in the pictures.



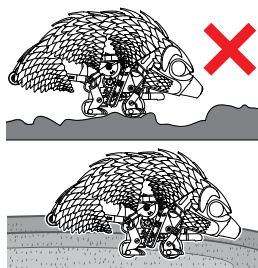
To avoid injury, never put your finger in the moving parts of the hedgehog. If the hedgehog curls up, it could trap your finger.



If the hedgehog ends up on its back, you have to turn it over again. When on its back, the hedgehog's eyes flash orange and green at the same time to alert you that it is in the wrong position.



The hedgehog works best on smooth surfaces. Your hedgehog robot will only be able to perform some of its functions (if any at all) on carpets or uneven floors.



1. Power on and standby mode

To turn your robotic hedgehog on, simply hold down the button on its forehead for two seconds. The hedgehog's eyes will then start to flash green. Now it is in standby mode and waiting for your next move.



The hedgehog is a little impatient. If you leave it waiting, it stamps its feet to remind you that it's waiting. If you let it wait for more than 60 seconds, it will automatically switch off again.

2. Turning off

You turn the hedgehog off the same way that you turned it on.

This time, hold down the button for three seconds and the hedgehog shuts down and its eyes go dark.



Operating the Robot

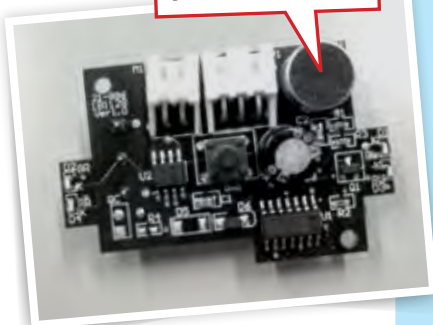
The hedgehog robot can run like a real hedgehog and curl up. Fortunately, though, it listens to your orders and does not immediately start to curl up when you approach it.

You have given the hedgehog a built-in sound sensor, which is located on the circuit board in its head. You can use this sensor to control the hedgehog by giving orders by clapping.

Your hedgehog robot has three different modes. In each mode, you can give different clap commands.

Always make sure you clap close to its head where the sound sensor is located. If you're too far away or clapping too softly, the robot might not hear your commands properly.

SOUND SENSOR



IMPORTANT

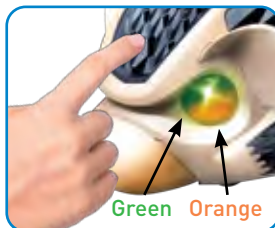
The hedgehog robot only accepts orders when its body is completely stretched out. As soon as it curls up or if it is already curled up, the sound sensor is inactive and the robot will not follow your clap commands.



Mode 1: Roll backward and sleep

To activate mode 1, the hedgehog robot must be in standby mode. Now you just have to briefly press the button on its forehead and mode 1 is activated. The robot indicates that it is in this mode with its eyes glowing orange and green.

In mode 1, the robot can accept the following commands:



Command: 1 x Clap

Function: Roll backward

1x



Clap



Command: 2 x Claps

Function: Roll backward, afterwards it stays curled up and sleeps.

2x



Clap



Command: 3 x Claps

Function: The robot awakens from its sleep and unrolls itself.

3x



Clap



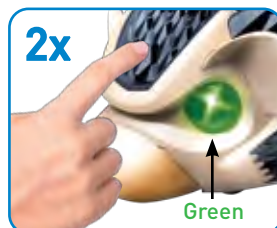
TIP!

Once the robot is turned on, you can cycle through the different modes by pushing the button on its forehead: Mode 1 → Mode 2 → Mode 3 → Mode 1 → and so on ... You can see which mode it is currently in by the colors that light up in its eyes.

Mode 2: Multiple backward rolls

When the robot is in standby mode, you activate mode 2 by pressing the button on its head twice. The robot indicates this mode with its eyes glowing green.

In mode 2, the robot can accept the following commands:



Command: 1 x, 2 x, 3 x, 4 x, or 5 x claps

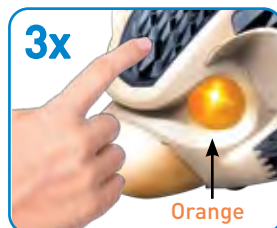
Function: The robot does as many backward rolls as you want (up to 5) — depending on how often you clap. It rolls in short intervals; that means it does a roll, unrolls, runs a little, and begins with the next roll.



Mode 3: Applauding for a backward roll

When the robot is in standby mode, you activate mode 3 by pressing the button on its head three times. The robot indicates this mode with its eyes glowing orange.

In mode 3, the robot can accept the following commands:



Command: Fast, consecutive clapping

Function: In this mode, the robot wants to be encouraged to move backward. Clap until it has done the roll. If you stop clapping beforehand, it will stretch out again and start walking.





NUNA!

HERE'S THE PLAN NUNA: YOU ROLL AS FAST AS YOU CAN THROUGH THE HALL TO THAT PIECE OF OUR SPACESHIP OVER THERE AND DON'T GET CAUGHT BY THE BOOBY TRAPS! GOOD LUCK! ROLL, ROLL!



MADE IT!
WOOHOO!

ANOTHER TRIUMPH
FOR SCIENCE!

I FEAR WE HAVE
A NEW PROBLEM ...

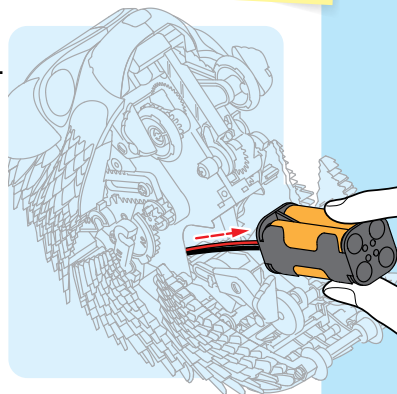
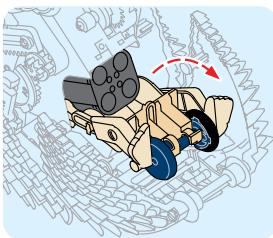
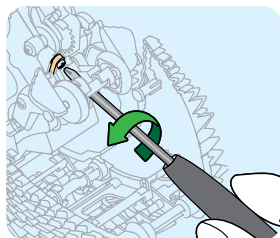
WE GOT IT BACK!
YOU DID GREAT
NUNA!



Replacing the batteries with the body stretched out

Changing the batteries when the body is stretched out is in general a little easier. If you want to change the batteries while the body is stretched out, proceed as follows:

- Loosen the screw on the robot's underside (between the hind legs).
- Open the battery compartment cover by folding the flap and the back legs backward.
- Pull out the battery compartment and change the batteries.



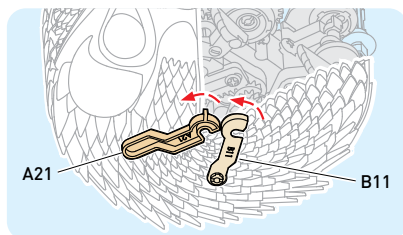
TIP!

If the robot is curled up and there is still some energy in the batteries, you can activate maintenance mode. In this mode, the body is stretched out and you can change the batteries as described. You activate the maintenance mode by keeping the button on the robot's head pressed for **seven seconds**.

Replacing the batteries with the body curled up

It could obviously happen that the batteries completely run out while the robot is curled up. In this case, you have to stretch the robot's body out by hand.

- Loosen clips A21 and B11.
- Loosen clips A20 and B12.
- Now you can manually stretch out the robot. This will help you get to the battery compartment and change the batteries as described above.
- You then have to refit the clips in their places.



Please observe the instructions for handling batteries on page 8.

TROUBLESHOOTING

Troubleshooting

If the robot does not work as expected, check the following notes to detect and fix any problems.

1. Make sure the batteries are inserted correctly.
See page 8, step 3.
2. Make sure all cables are connected correctly.
See page 29, step 7.
3. When the robot is on and lying on its back, its eyes flash green and orange to alert you that it is in the wrong position. Turn it over again and press the button on the head for 7 seconds, until the body stretches out and the lights in the eyes go out. Then you can press the button and again, hold for 2 seconds to restart the robot.
4. Should the robot's eyes flash green and orange after powering up for the first time (in standby mode), this means that it was put together incorrectly. If that happens, you should check the following steps:
 - Make sure that the part B2 has been removed. See page 19, step 22.
 - Make sure step 7 on page 25 has been done correctly.
 - Make sure all cables are connected correctly.
See page 29, step 7.
5. If the robot's spines do not stand up properly, make sure that you have correctly installed all movable spines.
See pages 24 to 26, steps 6 to 8.
6. If the lever on the robot's underside does not stand up correctly (in the reverse roll), you should make sure the steps 3 to 5 on pages 12 and 13 were performed correctly.
7. The following problems indicate batteries that are too weak:
 - The robot turns off automatically.
 - The robot does not respond when the button is pressed.
 - The robot goes into standby mode by itself.
 - The robot cannot curl up / unroll as usual.

FIND OUT HOW
TO CHANGE THE
BATTERIES
ON PAGE 38.



REAL HEDGEHOGS

Hedgehogs are fascinating animals that are found in many parts of the world, including Europe, Asia, Africa, and New Zealand. They are not found in the wild in America or Australia.

Your hedgehog robot has quite a few spines. However, a true, full-grown hedgehog has up to 9,000 spines, each of which is sharper than a pin.

Like your robotic hedgehog, real hedgehogs curl up into a ball. But only if they feel threatened. They will then roll up so tightly that their delicate undersides are almost invisible. By doing so, they are well protected against attackers.



WHAT IS BIONICS?

Bionics is when natural phenomena or amazing things from nature are transferred to technology. People copy what you could call tricks right out of nature. A good example of this is the invention of Velcro. The technique for it came from a plant called burdock. The flowers of this plant have fine hooks that get caught in our clothes or in the fur of our pets. Velcro works on the same principle.

The robotic hedgehog was also designed to mimic its natural model, the hedgehog. In that way, it is a bionic robot.



Close up of Velcro



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.

© 2019 Franckh-Kosmos Verlags-GmbH & Co. KG, Stuttgart, Germany

This work, including all its parts, is copyright protected. Any use outside the specific limits of the copyright law is prohibited and punishable by law without the consent of the publisher. 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 other copyright or other protection.

Project Management: Jonathan Felder
Technical product development: Deryl Tjahja; CIC Components Industries Co., Ltd., Taiwan

Instructional Design Concept: Atelier Bea Klenk, Berlin
Layout instructions: Studio Gibler, Stuttgart
Material images: CIC Components Industries Co., Ltd., Taiwan
Comic illustrations: Daniel Alles, Bianca Meier

Photos instructions: picsfive (all push pins); askaja (all paper clips); Jaimie Duplass
(all adhesive tapes); Matt Bianco, p. 40 o; Suzanne Tucker, p. 40 m; Cristan Ritchie, p. 40 &;
(all prior © shutterstock.com)

Packaging Design Concept: Peter Schmidt Group GmbH, Hamburg
Layout packaging: Peter Schmidt Group GmbH, Hamburg
Photos packaging: CIC Components Industries Co., Ltd., Taiwan

Packaging design concept: Peter Schmidt Group GmbH, Hamburg
Packaging layout: Dan Freitas

The publisher has made every effort to identify the owners of the rights to all photos used. If there is any instance in which the owners of the rights to any pictures have not been acknowledged, they are asked to inform the publisher about their copyright ownership so that they may receive the customary image fee.

4th English Edition © 2019, 2020, 2021 Thames & Kosmos, LLC, Providence, RI, U.S.A.

© Thames & Kosmos is a registered trademark of Thames & Kosmos, LLC.

Editing: Ted McGuire, Ed Gartin
Additional Graphics and Layout: Dan Freitas

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

We reserve the right to make technical changes.

Printed in Taiwan / Imprimé en Taiwan

Model: 620500

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

