EXPERIMENT MANUAL

MY ROBOTIC PET
Tumbling Hedgehog

LET'S GET ROLLING!

THAMES & KOSMOS

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Thames & Kosmos, 89 Ship St., Providence, RI, 02903, USA | 1-800-587-2872 | www.thamesandkosmos.com

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!

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

WARNING: This toy is only intended for use by children over the age of 7 years due to accessible electronic components. Instructions for parents or caregivers are included and shall be followed.

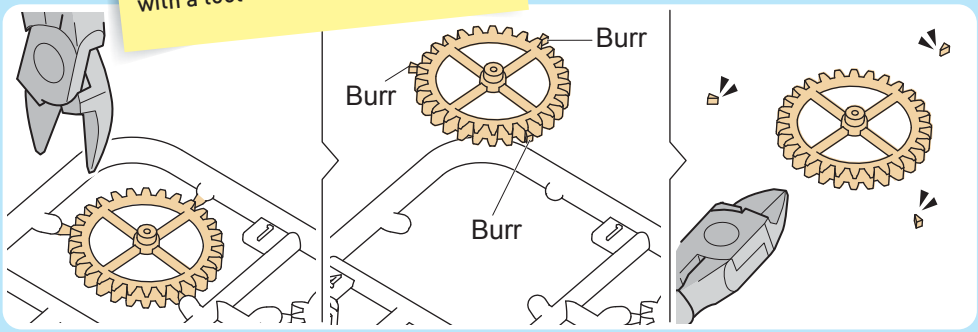
Keep packaging and instructions as they contain important information.

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.

IMPORTANT!
Remove the parts from the plastic frames only when they are needed. Remove excess material and burrs using a cutter and a nail file before assembly. Remove them with a tool and not your bare hands.



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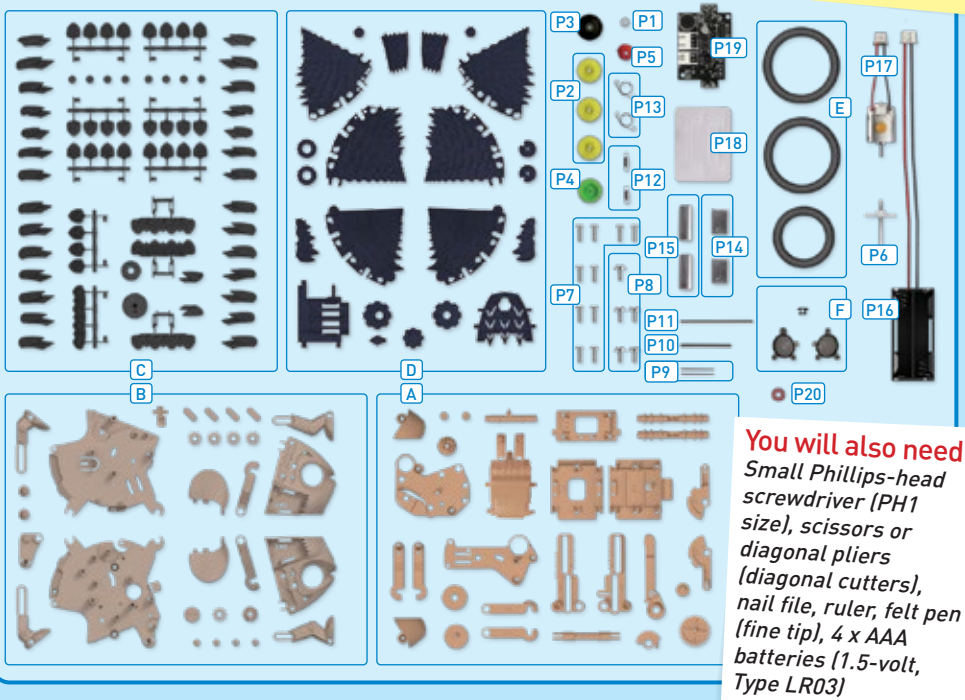
TIP!
Additional information can be found in the Check It Out section on page 40.

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:



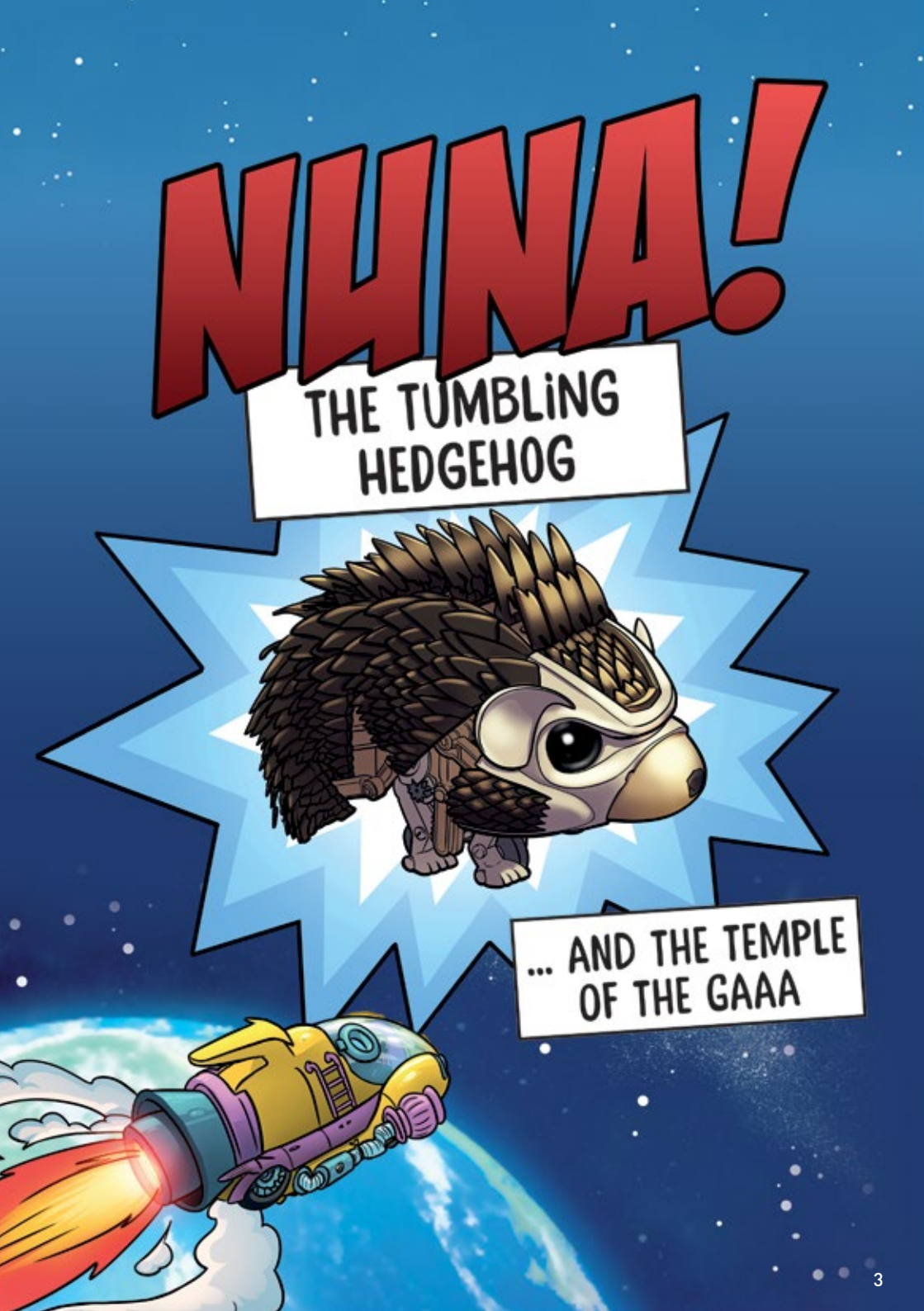
You will also need:

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
❍	P1	Small gear, white	1
❍	P2	Gear, yellow	3
❍	P3	Gear, black	1
❍	P4	Gear, green	1
❍	P5	Gear, red	1
❍	P6	Gear with metal shaft	1
❍	P7	Screw	10
❍	P8	Wide head screw	5
❍	P9	Round metal shaft	2
❍	P10	Hexagonal metal shaft short	1
❍	P11	Hexagonal metal shaft long	1
❍	P12	Main spring	2
❍	P13	Torsion spring	2

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

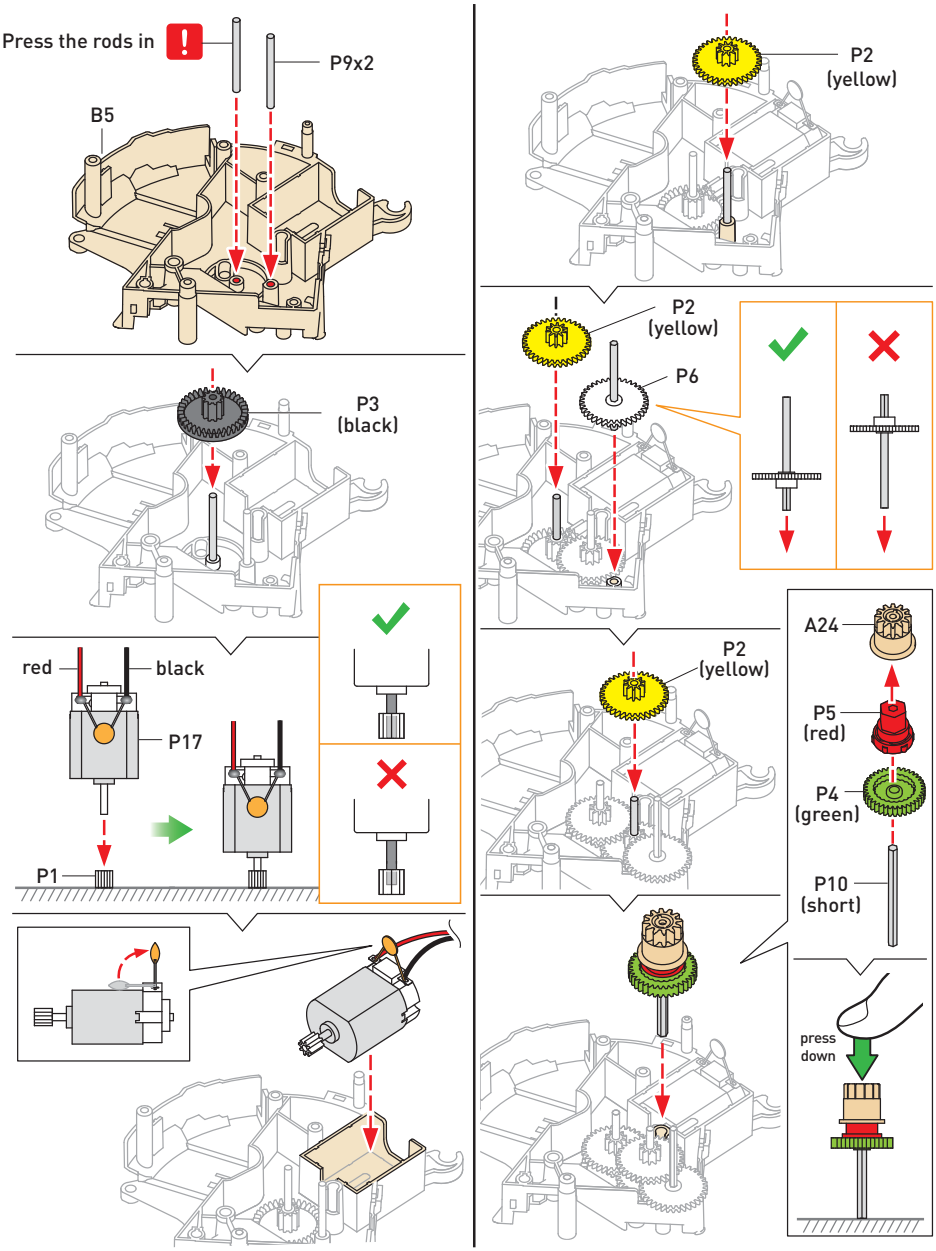

NUNA!
THE TUMBLING HEDGEHOG
... AND THE TEMPLE OF THE GAAA

TOM & IZZY
ANOTHER QUIET NIGHT IN THE JUNKYARD. EVERYONE IS ASLEEP ...
... EXCEPT TOM AND IZZY.
HERE, WHERE OTHER PEOPLE JUST SEE JUNK, HEROES SEE ENDLESS POSSIBILITIES.
THE THRUST MUST BE INCREASED BY FACTOR 10.
WE NEED MORE BOOST...
...TO OVERCOME THE GRAVITY.
I'VE FOUND SOMETHING!
IT'S THE PIECE WE NEEDED!
HMM ... THAT COULD WORK.
...AS LONG AS IT'S NOT BROKEN.
DON'T WORRY! THIS LEAK WILL BE EASY TO PLUG UP.
LET'S GET TO WORK!

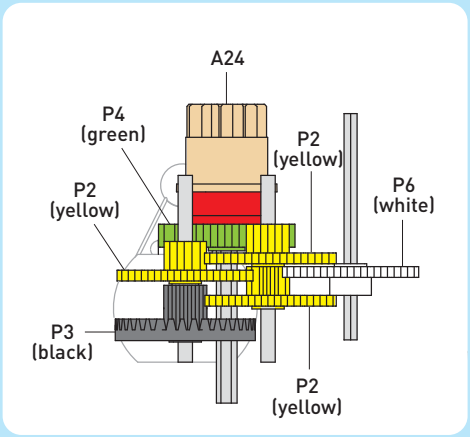
IZZY CAN REPAIR ANYTHING. SHE IS A GENIUS WHEN IT COMES TO MECHANICS.
TOM ON THE OTHER HAND IS A SCIENTIST THROUGH AND THROUGH...
... HE'S ALWAYS GAME TO TRY OUT AN EXPERIMENT.
TOGETHER, THEY CAN BUILD ANYTHING!
I THINK IT'S READY!
YES! WE DID IT!
NOTHING CAN STOP US NOW!
WHERE SHOULD WE FLY TO FIRST?
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 ...

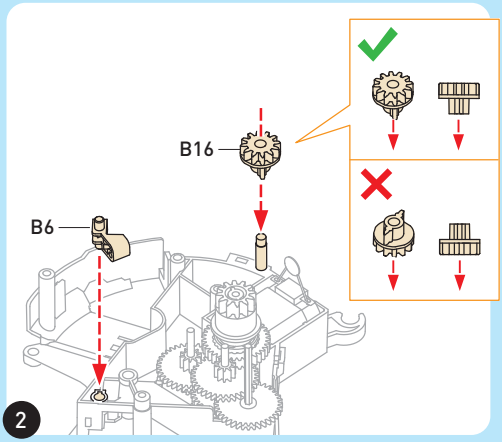
CONTINUED ON PAGE 36

TRANSMISSION MODULE



1





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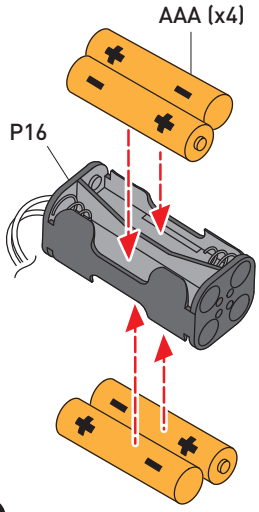
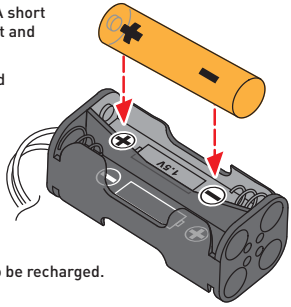
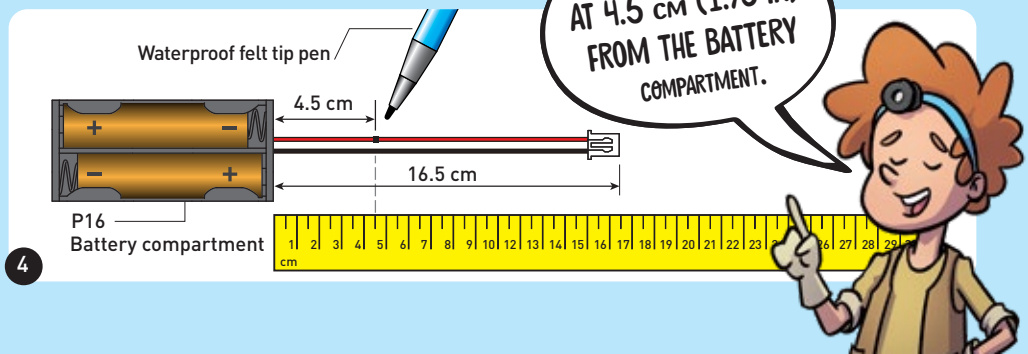




- Avoid a short circuit of the batteries. A short circuit can cause the wires to overheat and the batteries to explode.
- Different types of batteries or new and used batteries are not to be mixed.
- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) 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.

3



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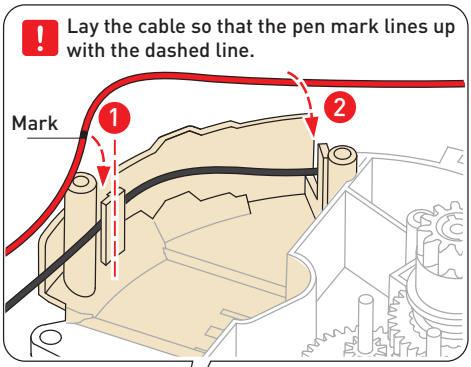
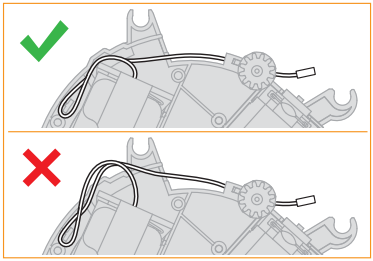
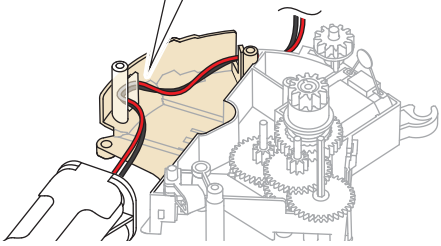
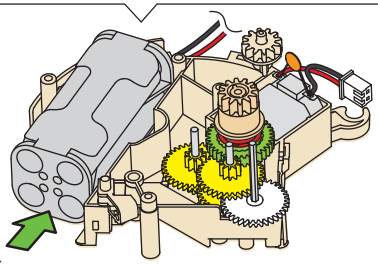
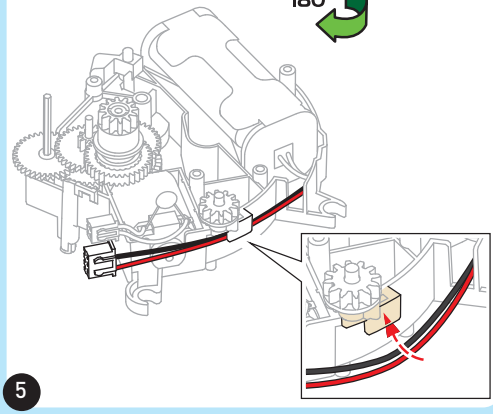

Lay the cable so that the pen mark lines up with the dashed line.
Mark
1
2

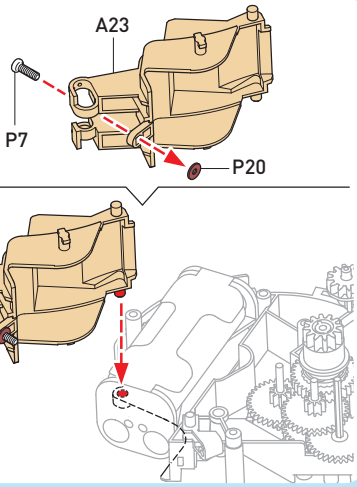




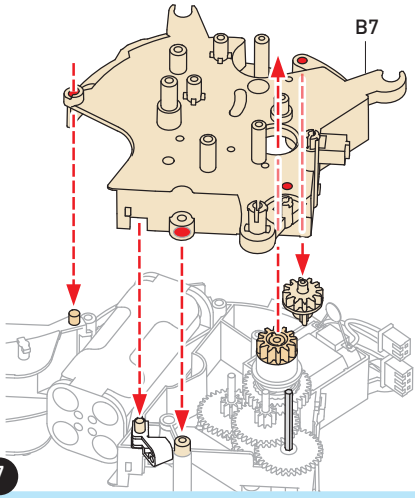

Press


180°

5

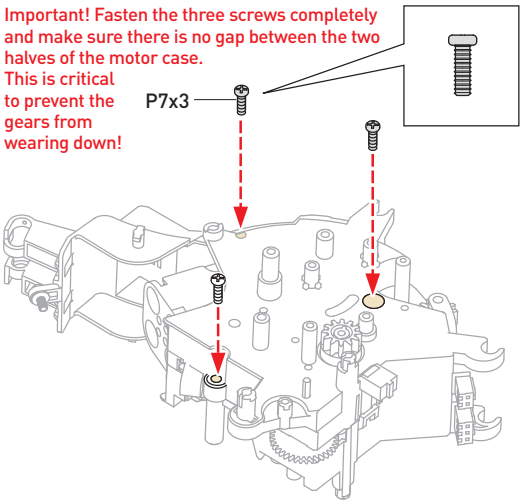

A23
P7
P20

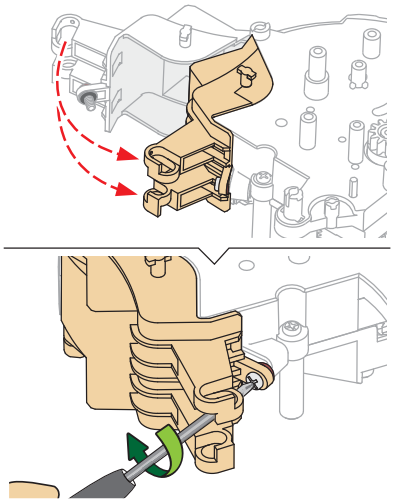
6


B7

7

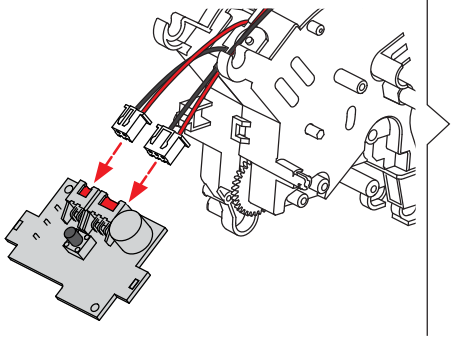
Important! Fasten the three screws completely and make sure there is no gap between the two halves of the motor case. This is critical to prevent the gears from wearing down!



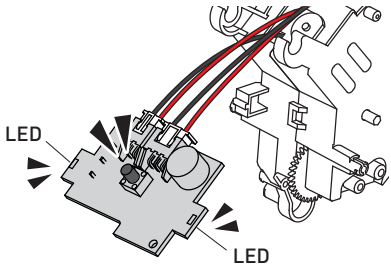


Testing the transmission module

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.



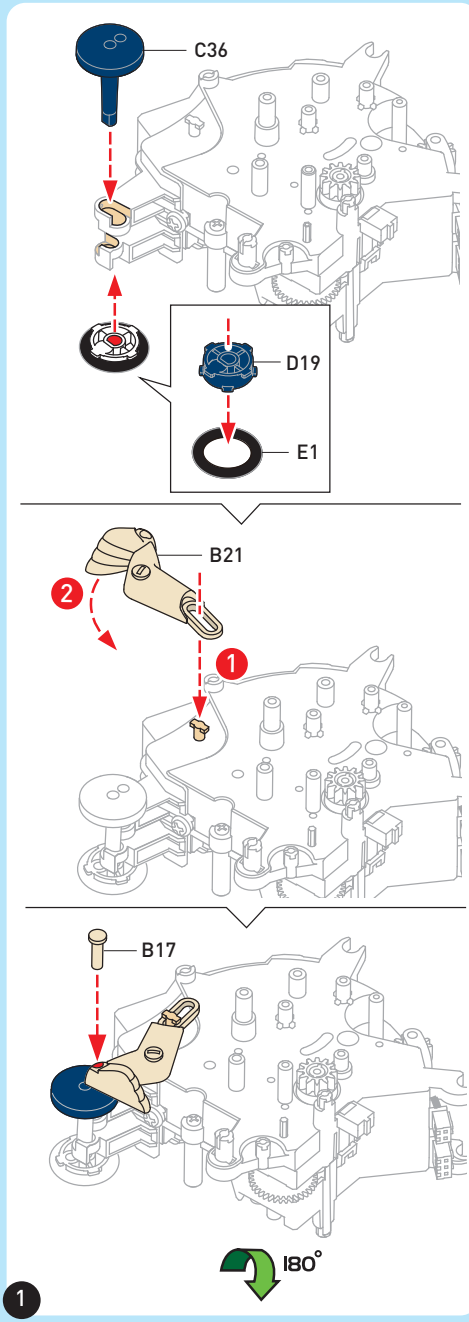
3. Let the transmission run for about 10 seconds. Then clap your hands and see if the transmission still runs smoothly.

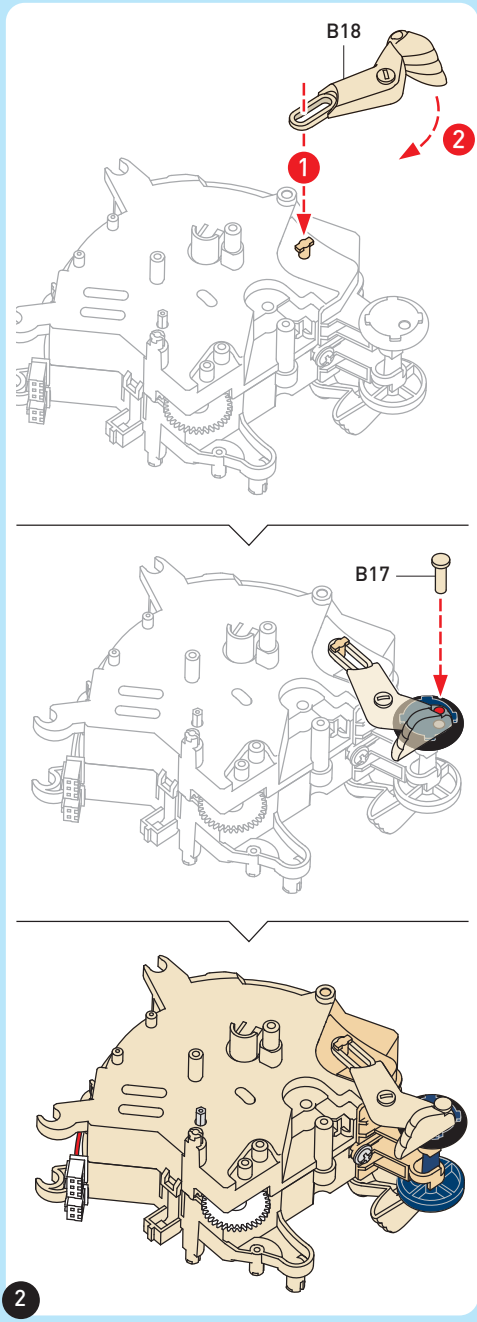
   If everything runs smoothly, you can continue with the assembly.

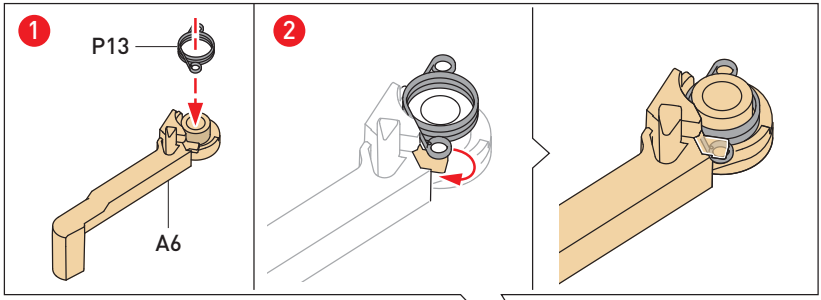
   If the transmission does not run, go back to page 7 and rebuild the transmission.

8

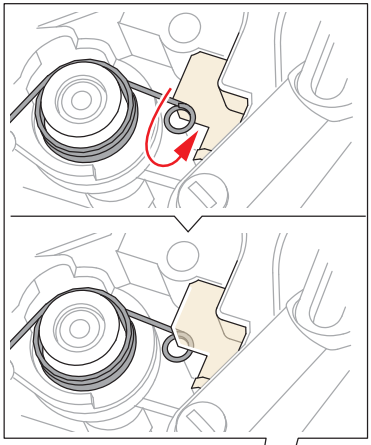
RUNNING AND MOVEMENT MECHANICS

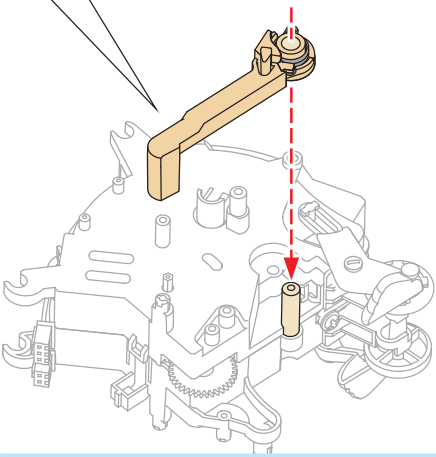


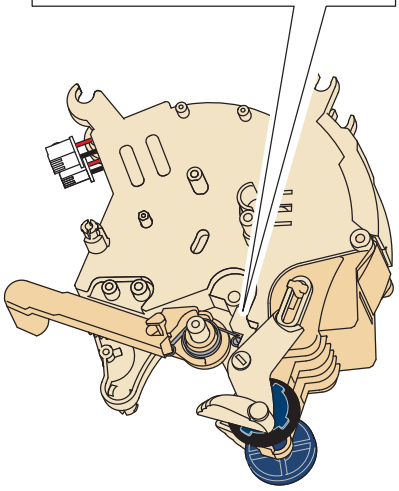



1
P13
A6
2

3







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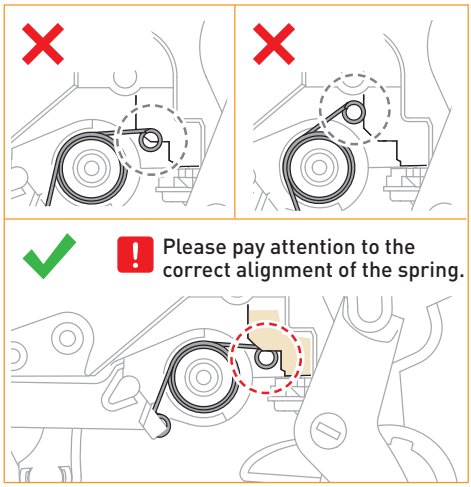
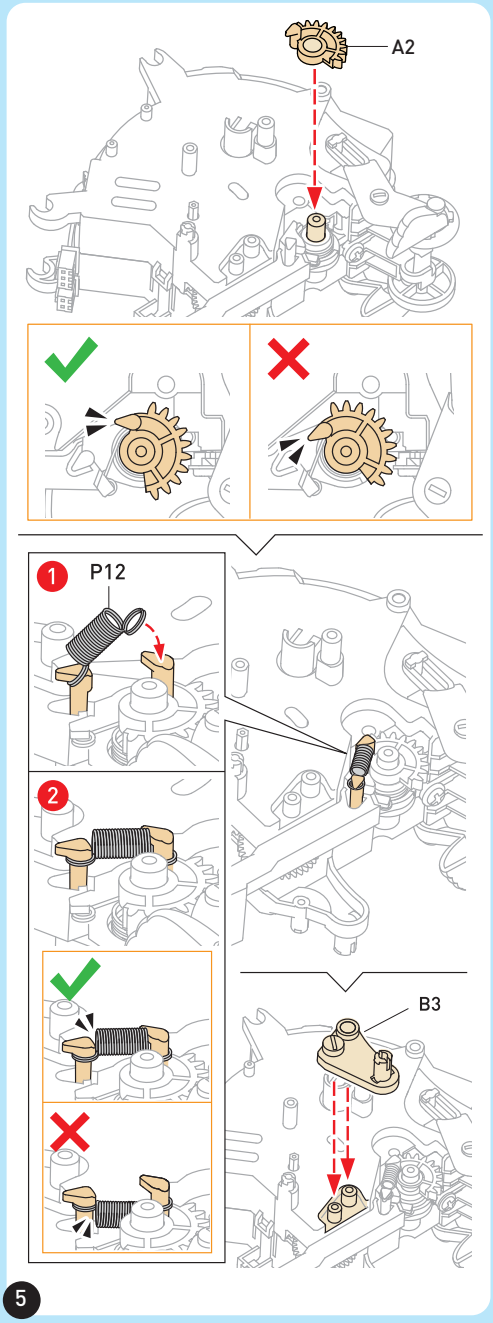
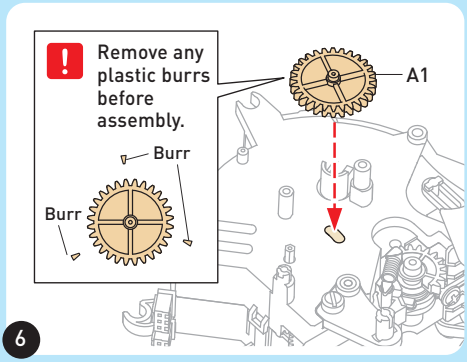
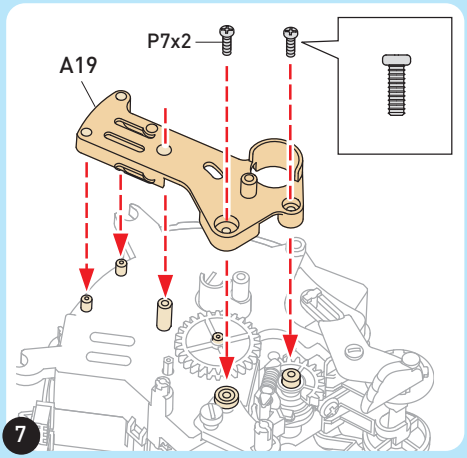
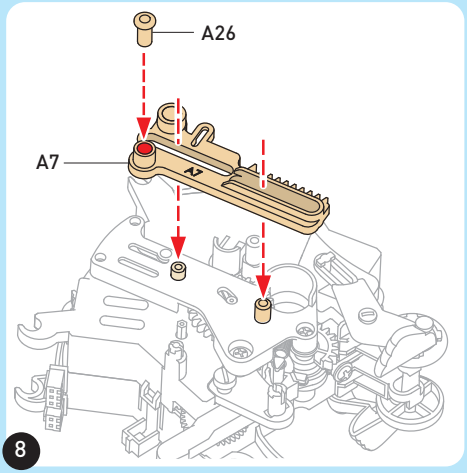
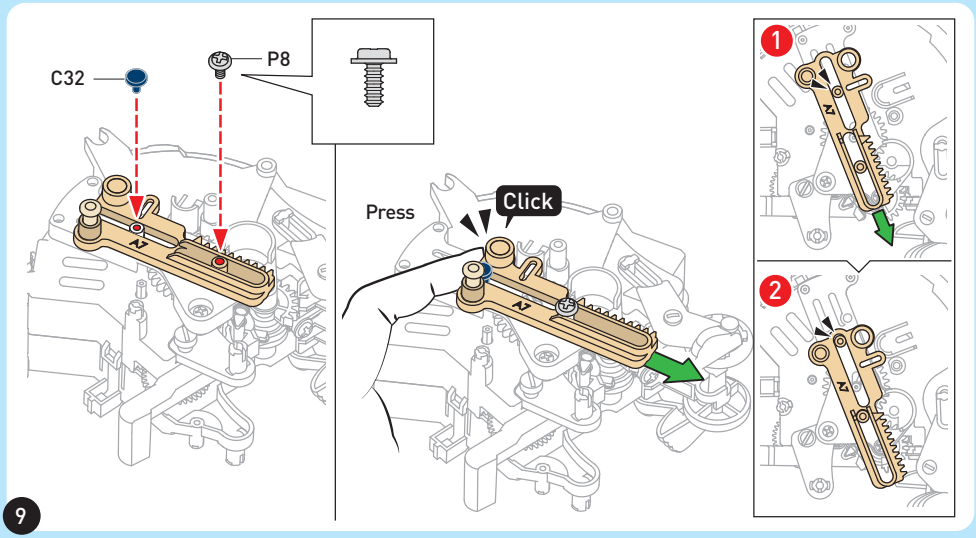

Please pay attention to the correct alignment of the spring.

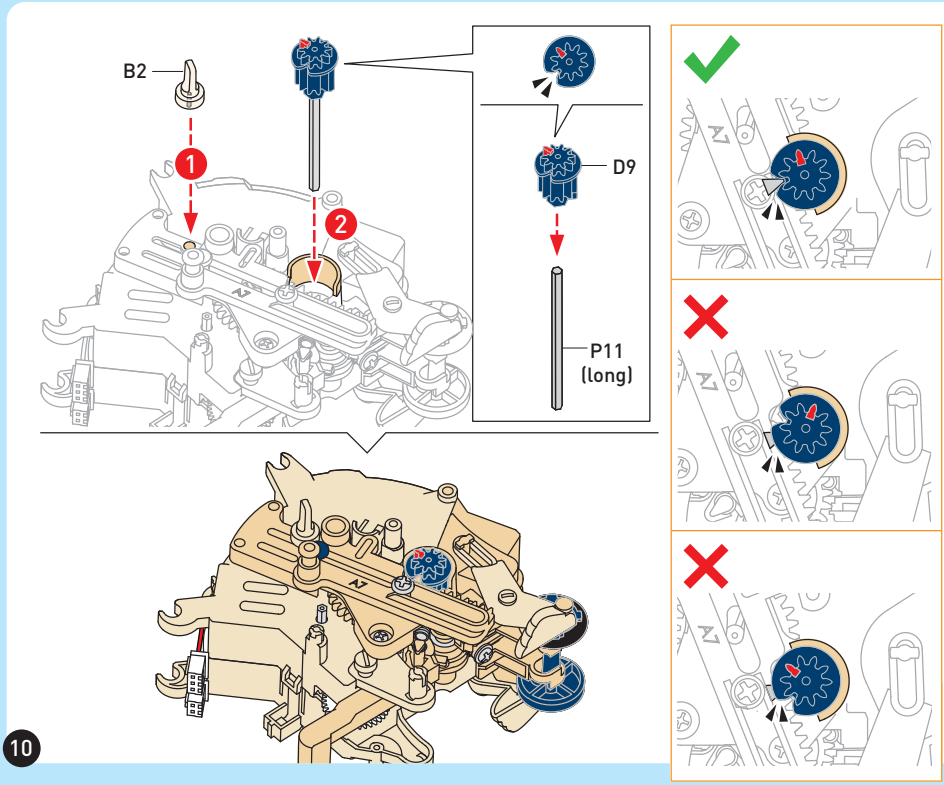

A2
1
P12
2
B3
5

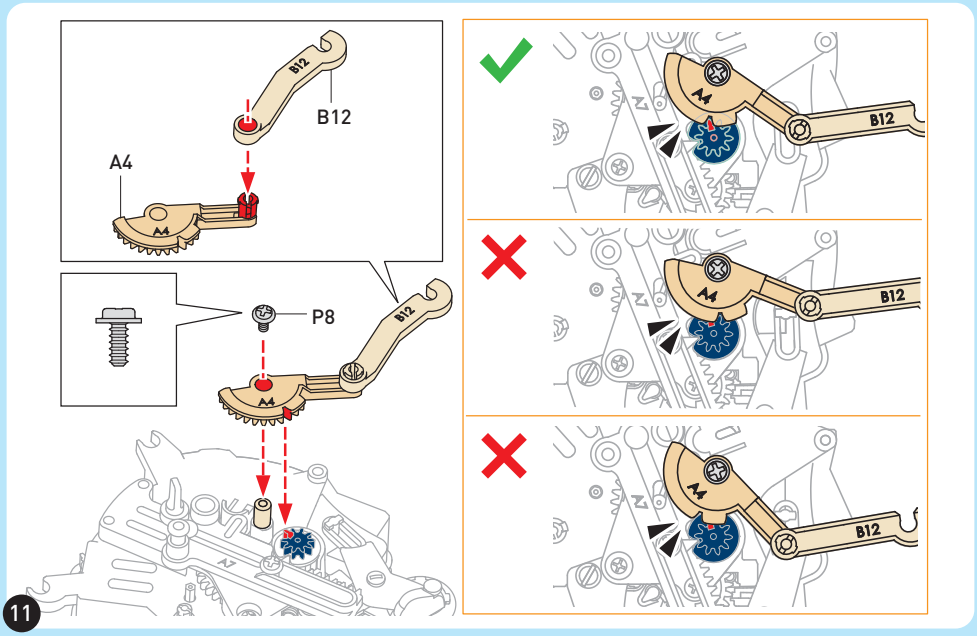

Remove any plastic burrs before assembly.
Burr
Burr
A1
6


P7x2
A19
7

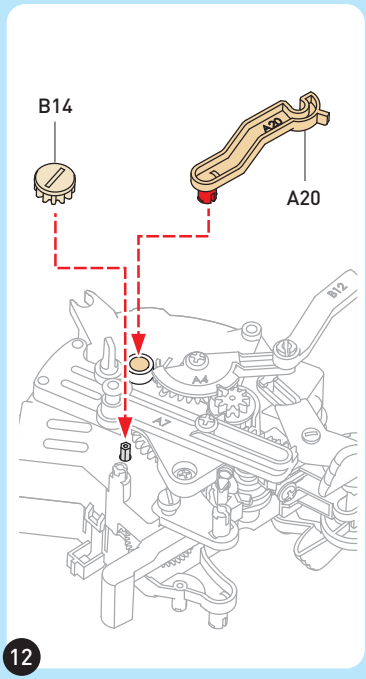

A26
A7
8


C32
P8
Press
Click
1
2
9

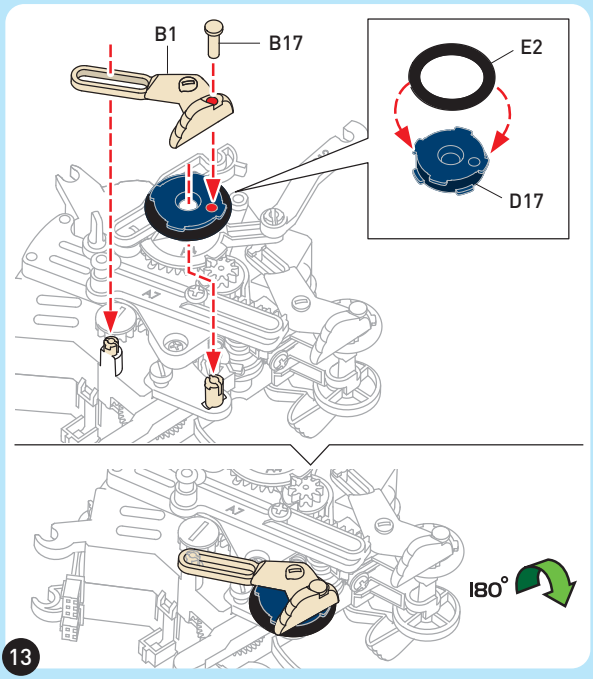

B2
1
2
D9
P11
(long)
10


B12
B12
A4
P8
A4
B12
A4
B12
A4
B12
A4
B12

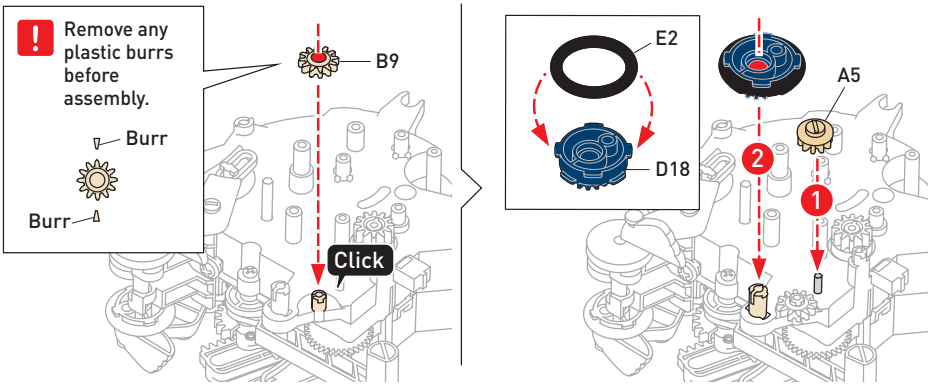
11

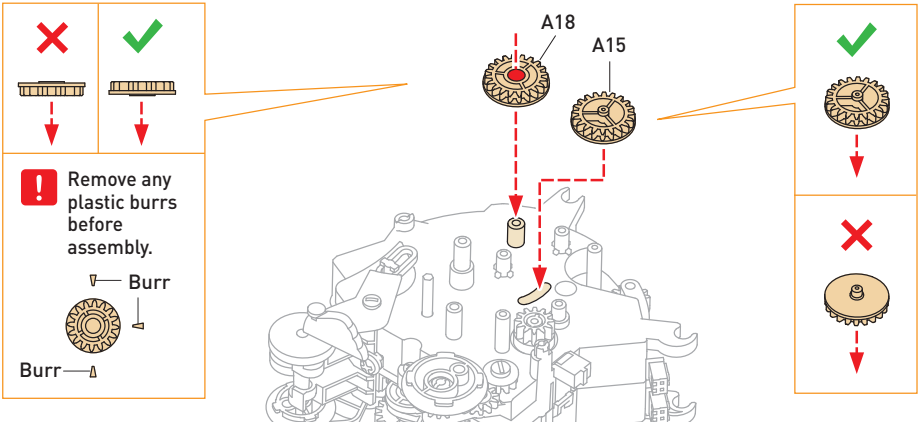

B14
A20
A20
B12
A4
A7

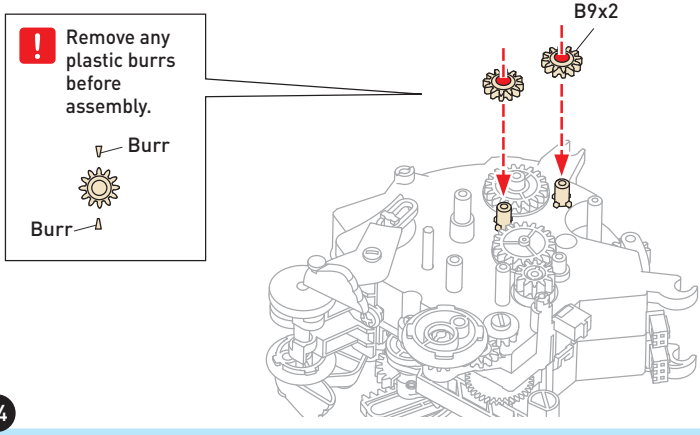
12


B1
B17
E2
D17
A7
A7
180°

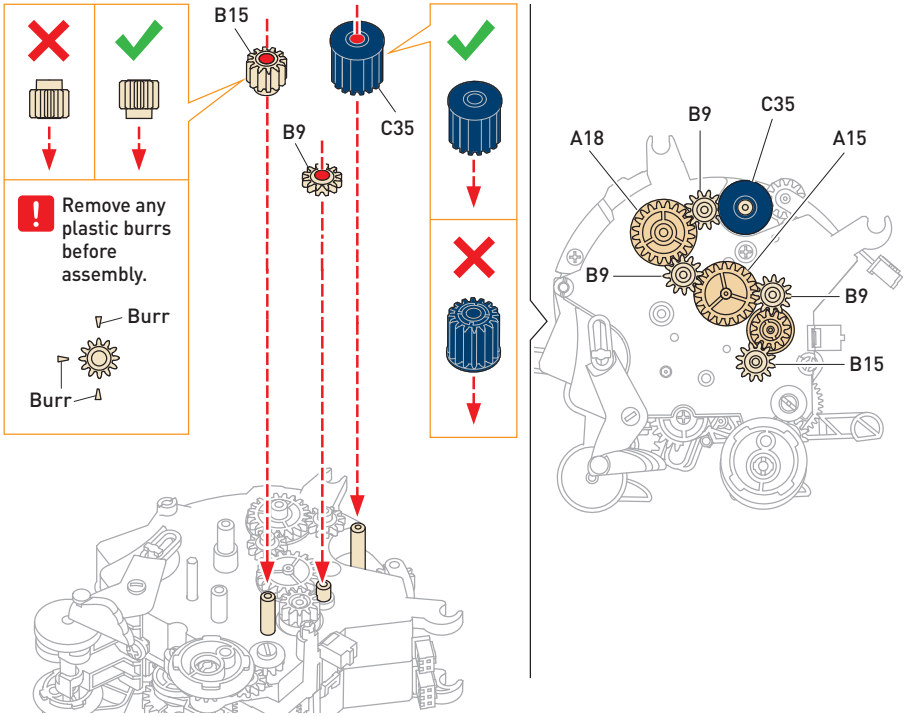
13


Remove any plastic burrs before assembly.
Burr
Burr
B9
Click
E2
D18
A5
2
1

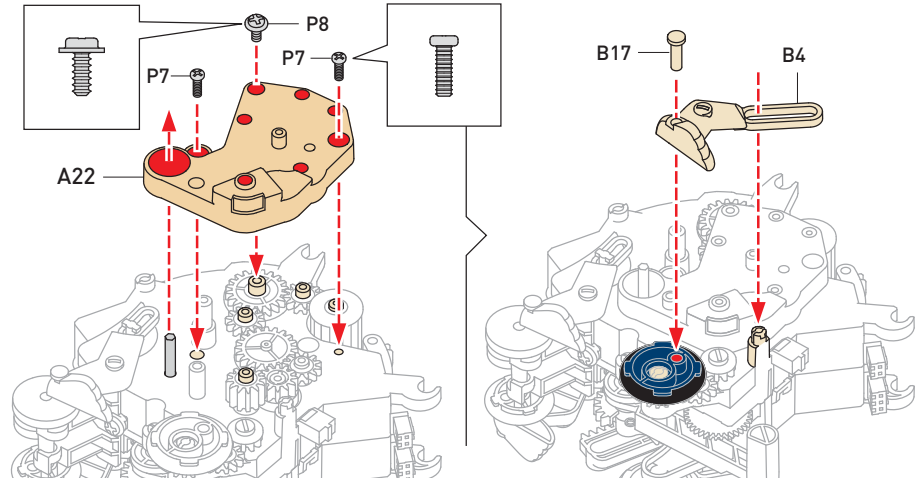

Remove any plastic burrs before assembly.
Burr
Burr
A18
A15


Remove any plastic burrs before assembly.
Burr
Burr
B9x2

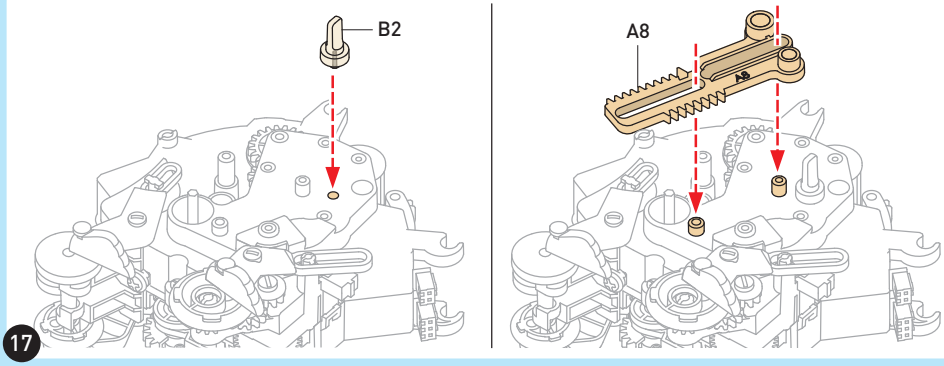
14


B15
B9
C35
Remove any plastic burrs before assembly.
Burr
Burr
A18
B9
C35
A15
B9
B9
B15

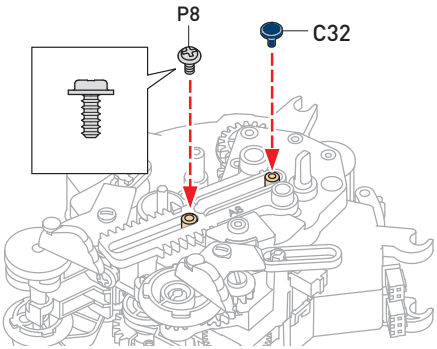
15


P8
P7
P7
A22
B17
B4

16



17



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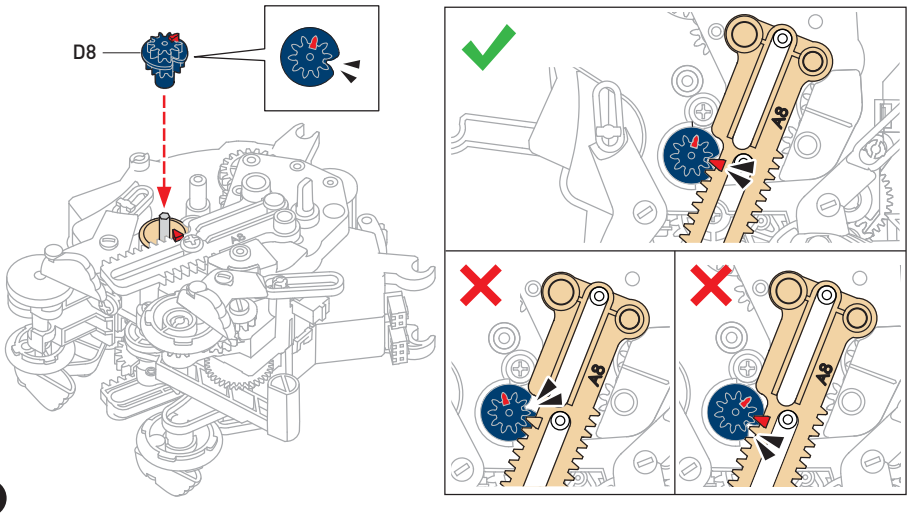

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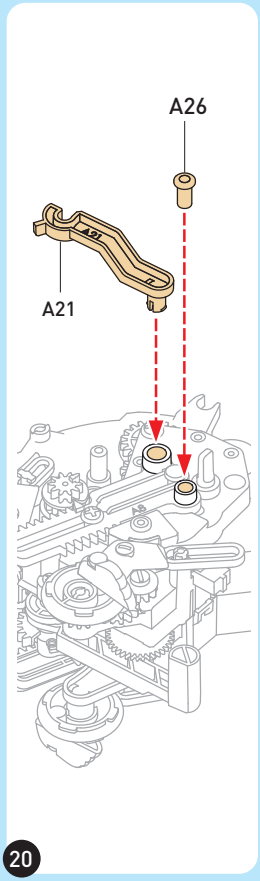
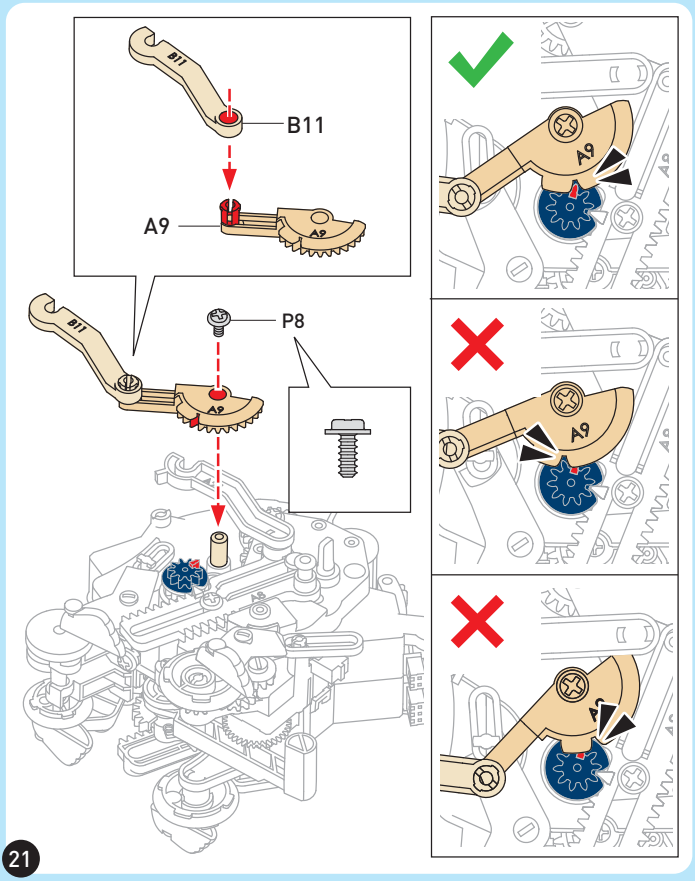
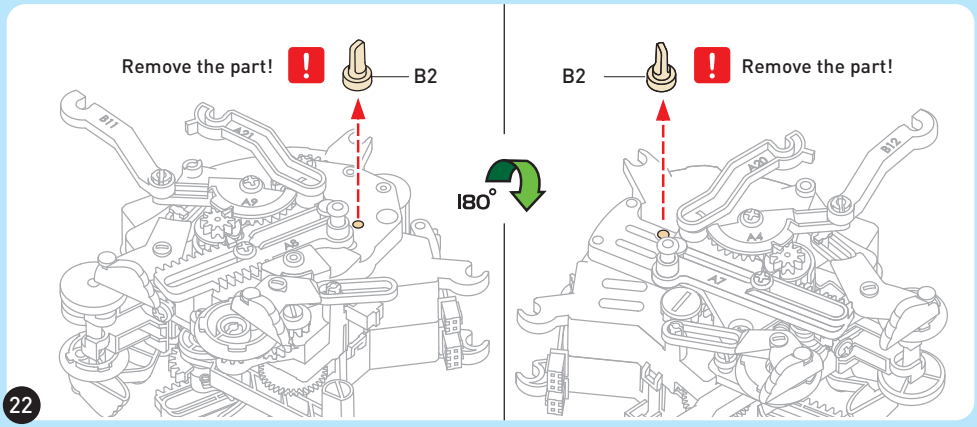
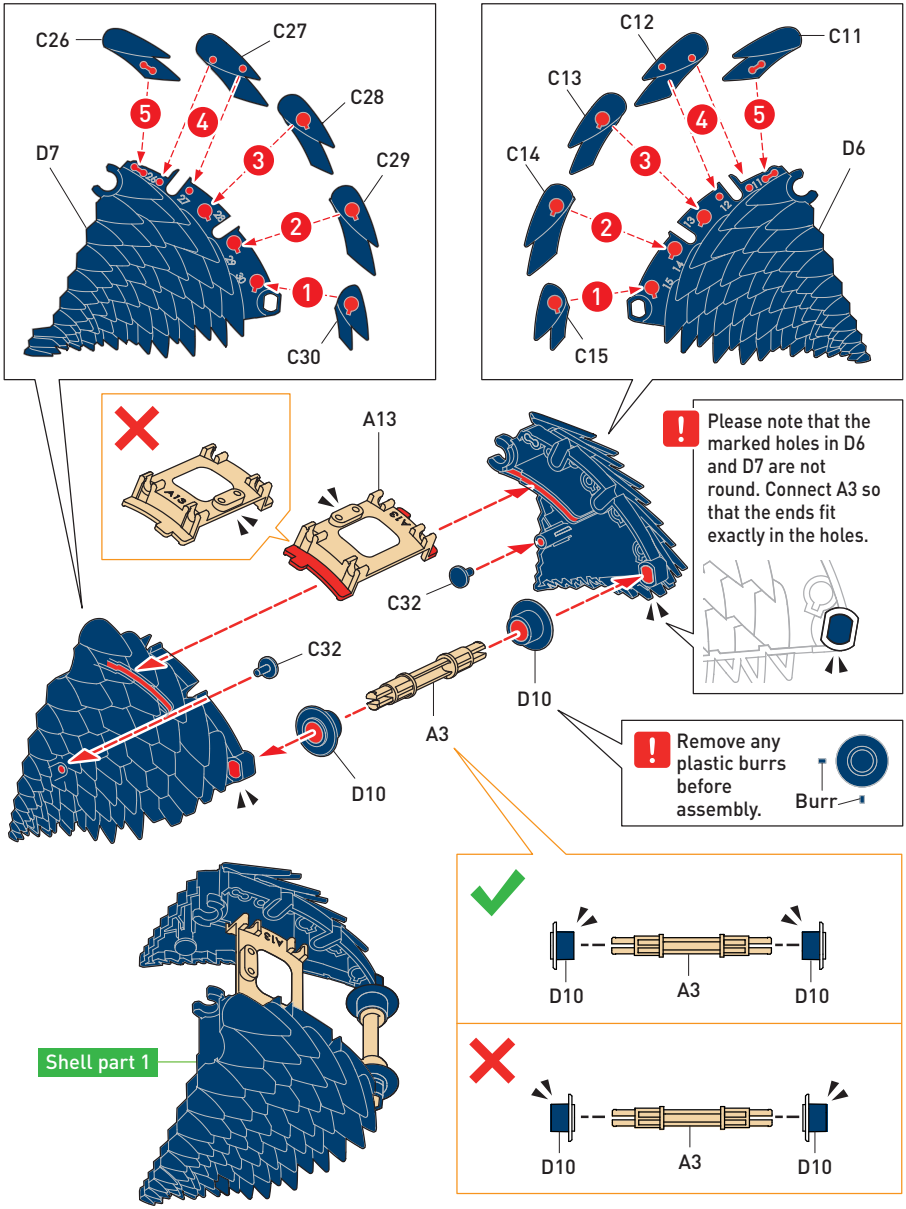
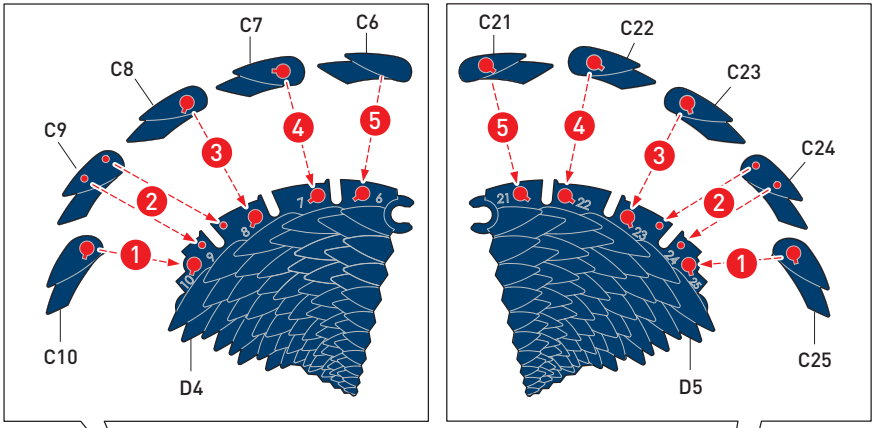

A26
A21
20

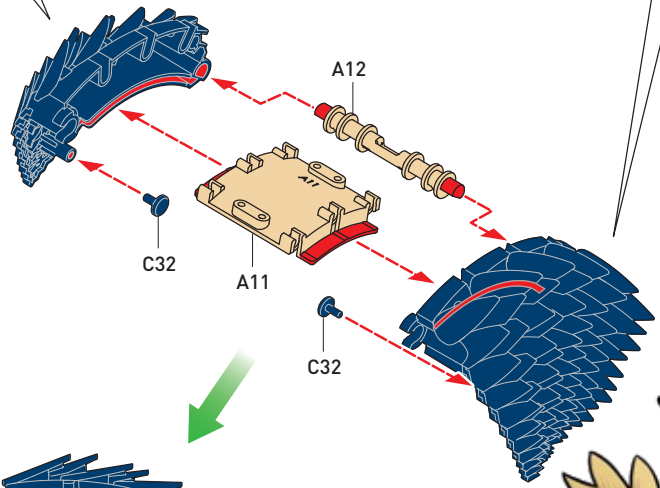

B11
A9
P8
21

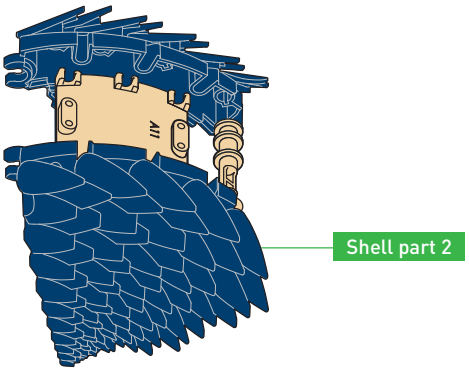

Remove the part!
B2
180°
B2
Remove the part!
22


C26
C27
C28
C29
C30
D7
C12
C11
C13
C14
C15
D6
A13
C32
D10
A3
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.
Burr
Shell part 1

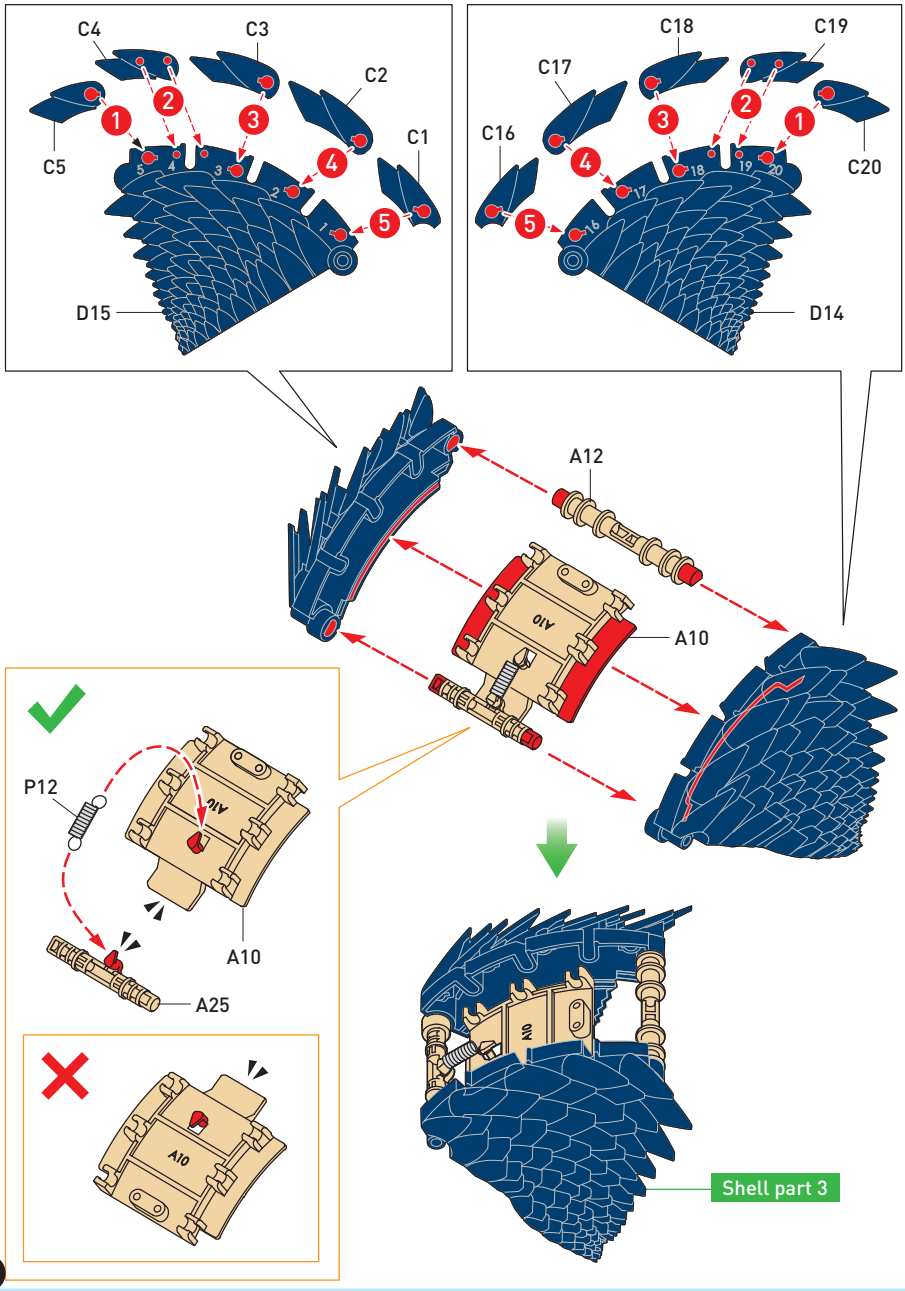
1

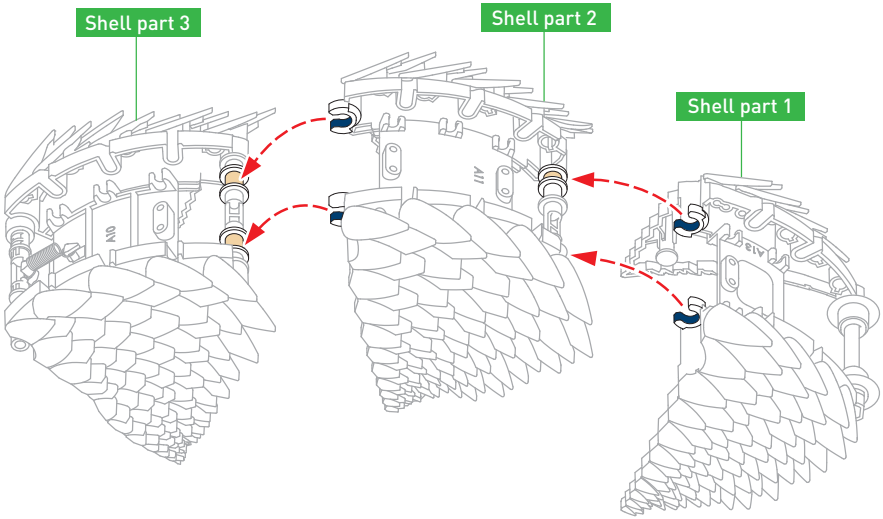

C7
C6
C8
C9
C10
D4
C21
C22
C23
C24
C25
D5


A12
C32
A11
C32


Shell part 2

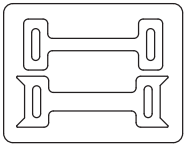
2


C4
C3
C2
C1
C5
D15
C18
C19
C17
C16
C20
D14
A12
A10
P12
A25
Shell part 3
3



4

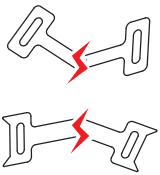
P18



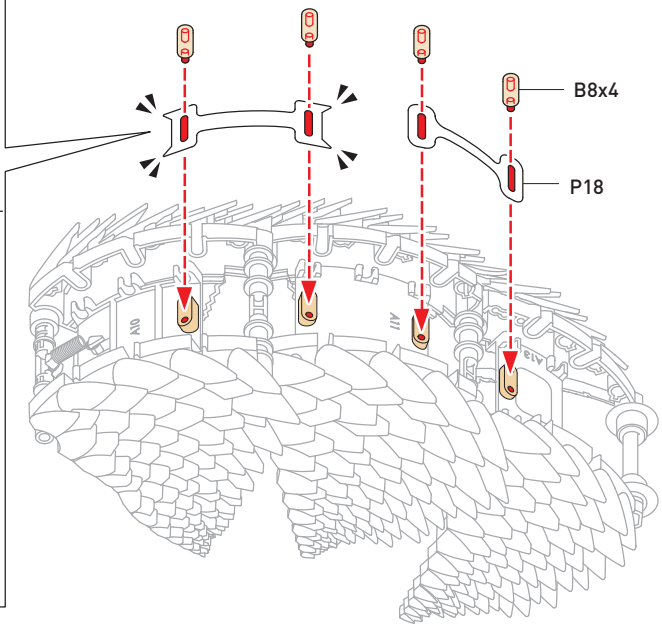
Carefully remove the plastic strips.

Careful!

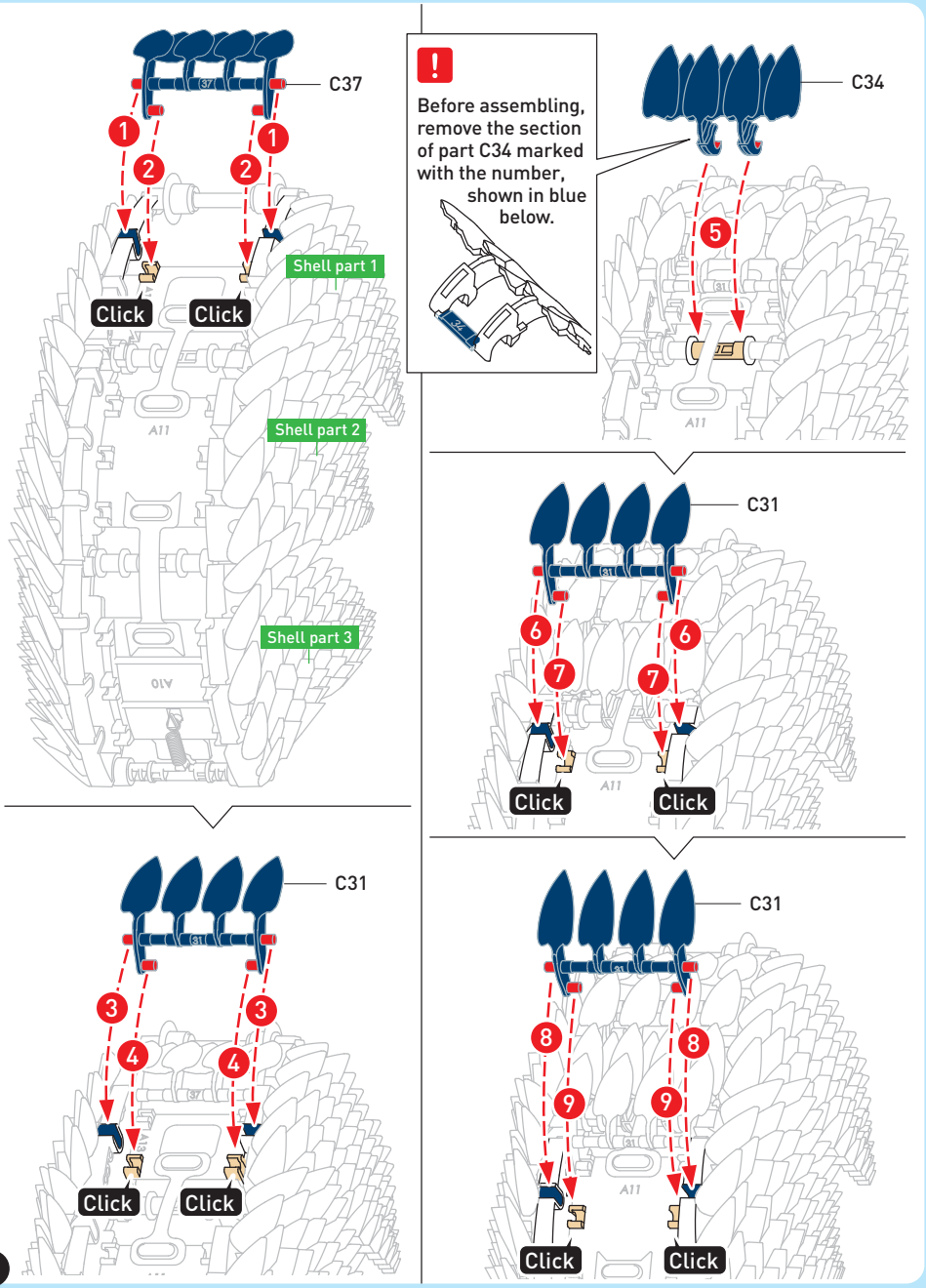
Make sure that the plastic strips are not folded or creased. Folded strips can lead to malfunctions.

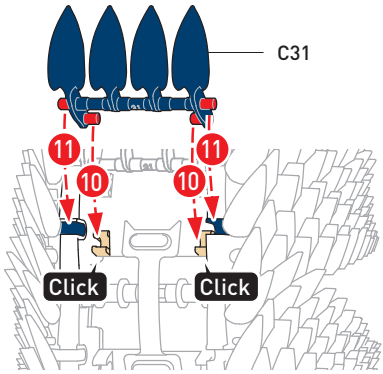


The two strips are different. Pay attention to the correct positioning.

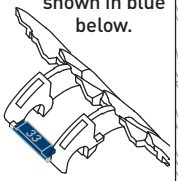


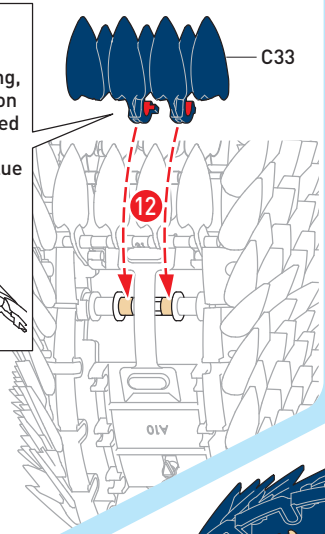
5


C37
1
2
1
2
Click
Click
Shell part 1
Shell part 2
Shell part 3
A11
A10
Before assembling, remove the section of part C34 marked with the number, shown in blue below.
C34
5
C31
6
7
6
7
Click
Click
C31
3
4
3
4
Click
Click
C31
8
9
8
9
Click
Click
6



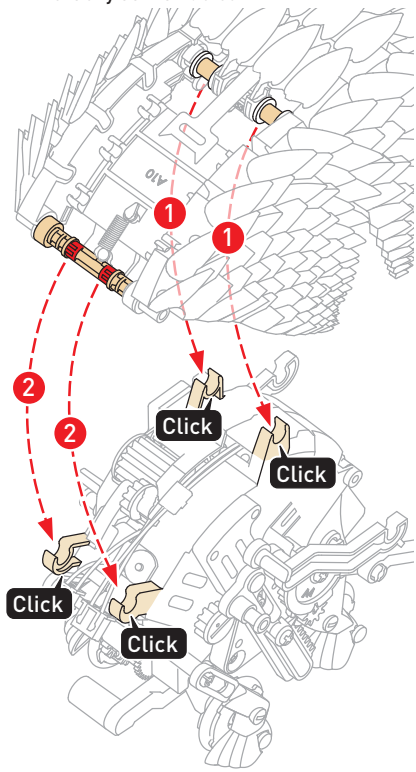
Before assembling, remove the section of part C33 marked with the number, shown in blue below.

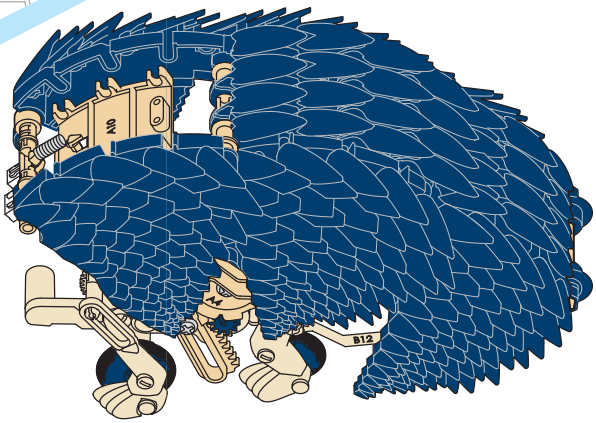




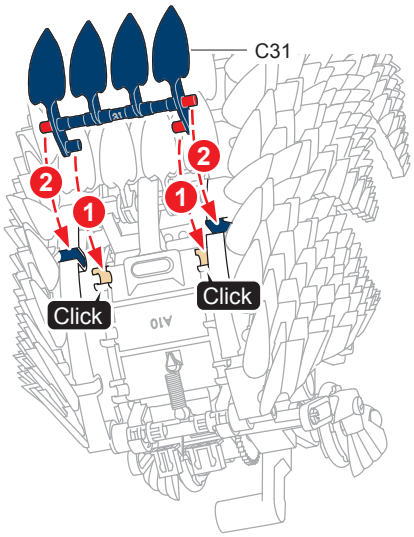
6

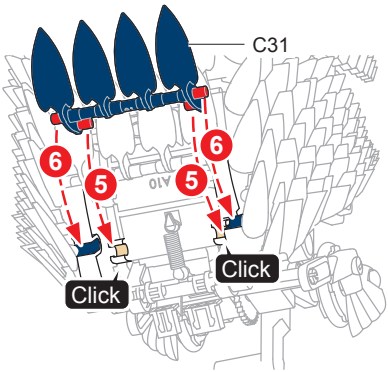
Be careful to do this step exactly as instructed.

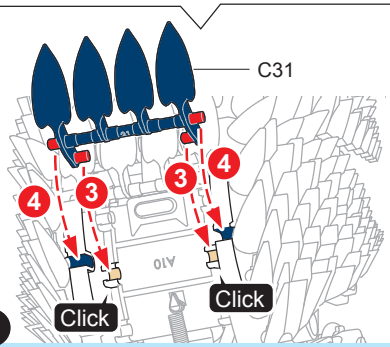


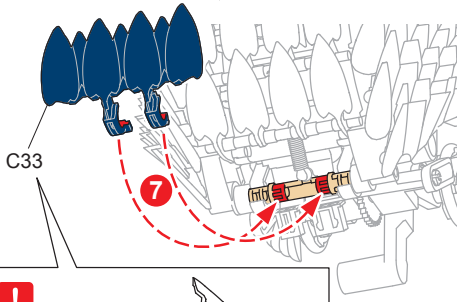


7



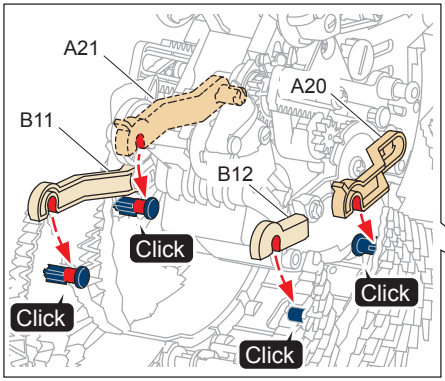


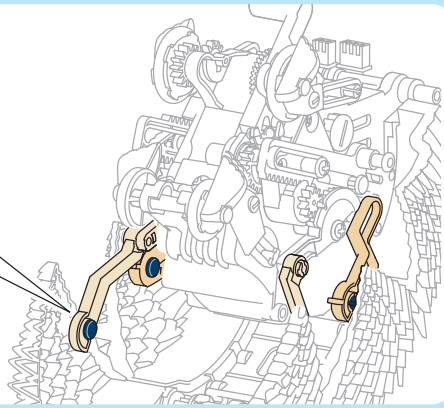




Before assembling, remove the section of part C33 marked with the number, shown in blue here.

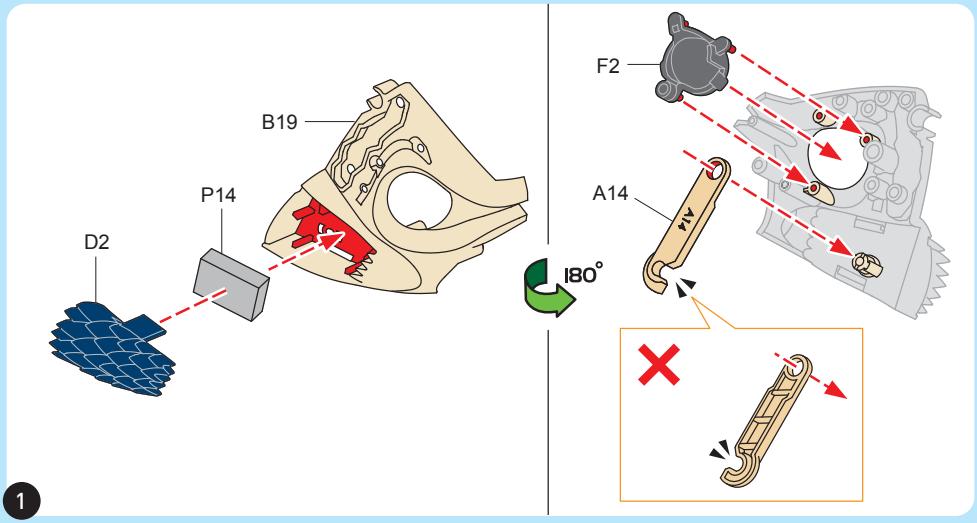
8



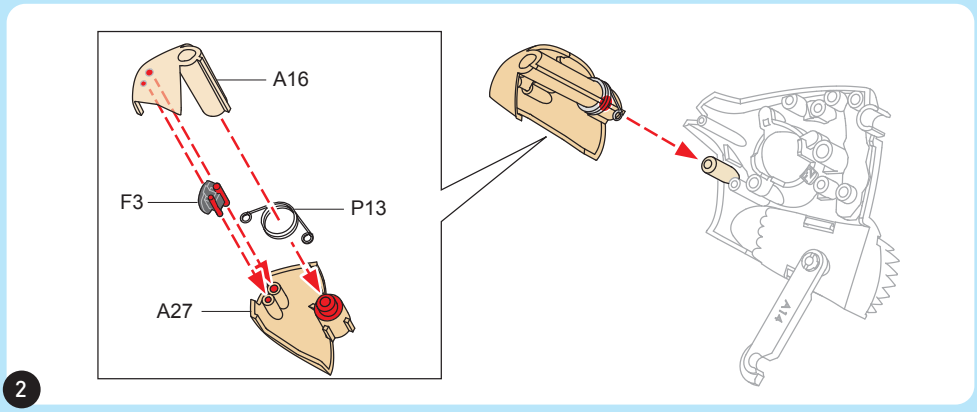


9

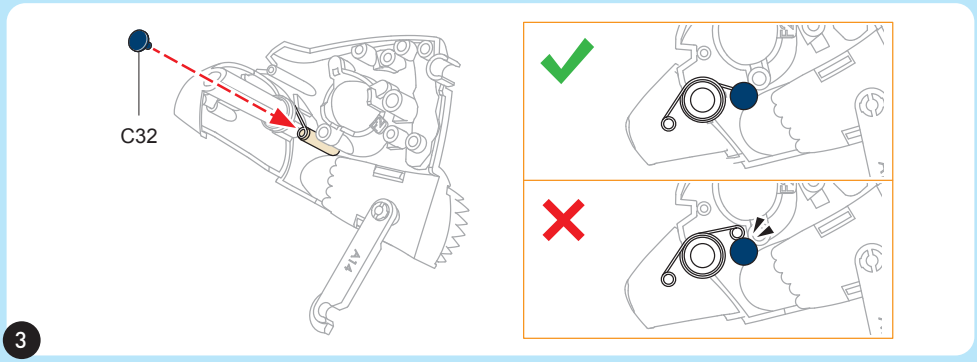
HEAD



1



2



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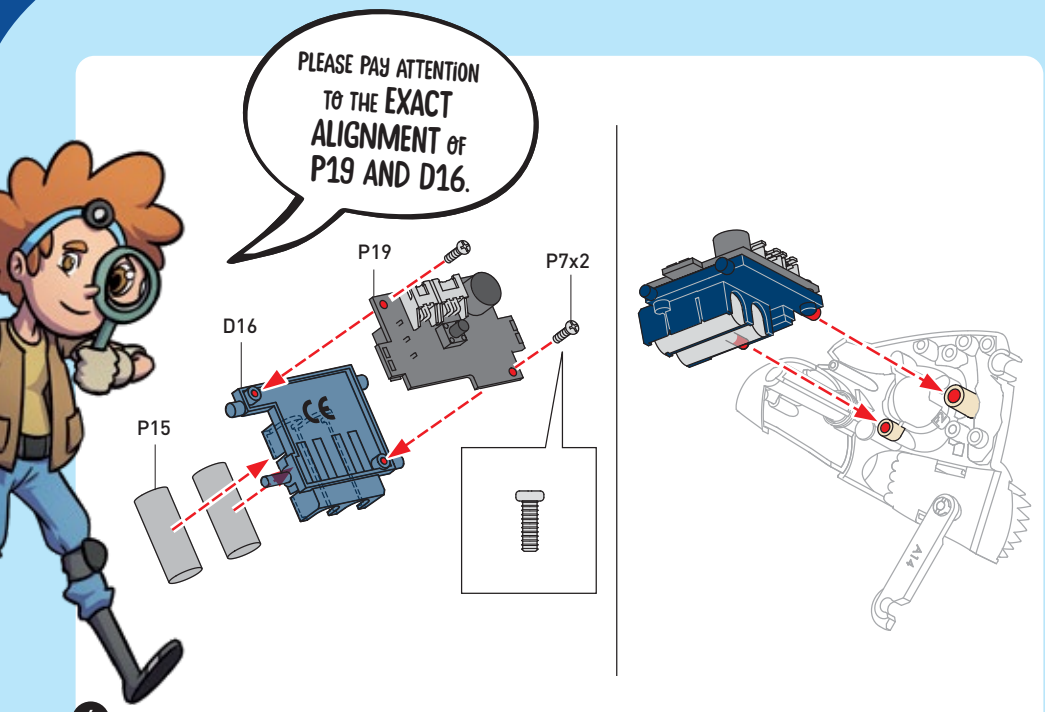
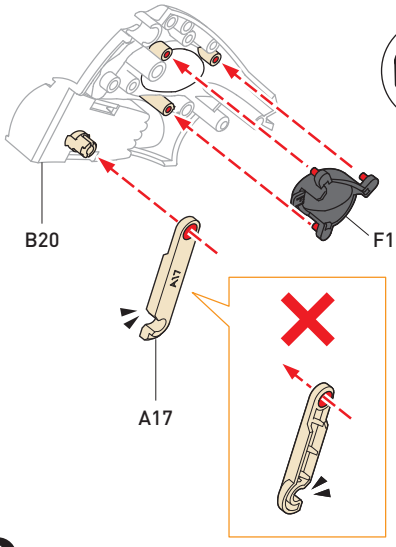
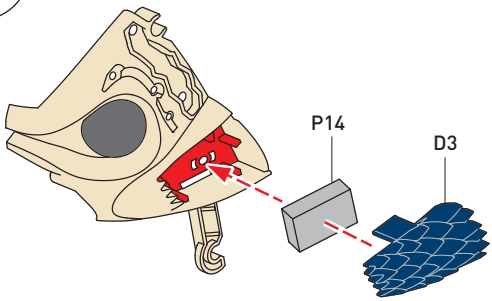

PLEASE PAY ATTENTION TO THE EXACT ALIGNMENT OF P19 AND D16.
P19
P7x2
D16
P15

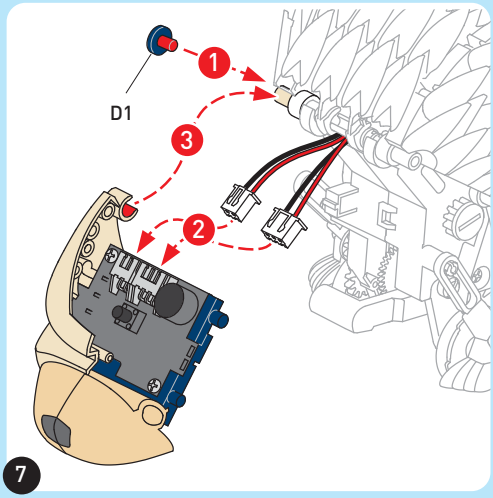
4


B20
F1
A17
180°

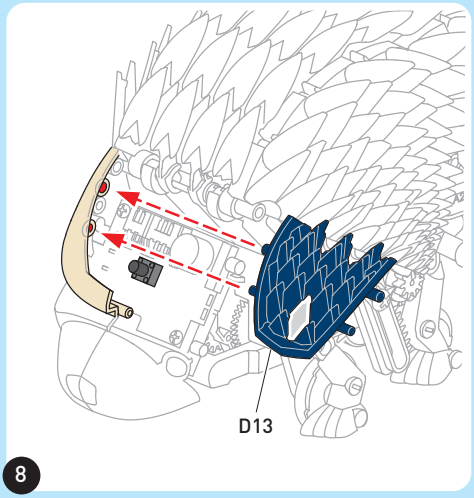
5


P14
D3

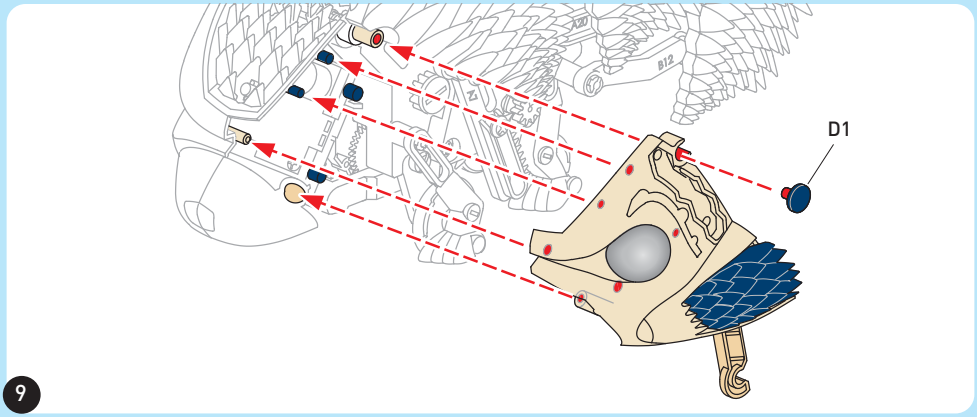
6



7



8



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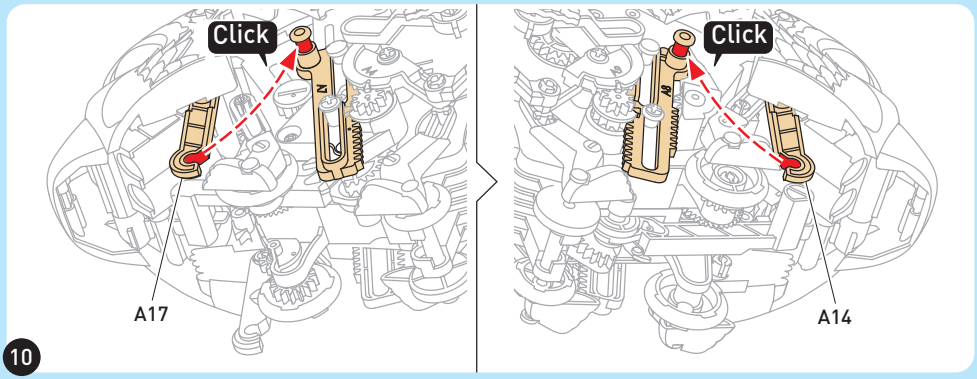
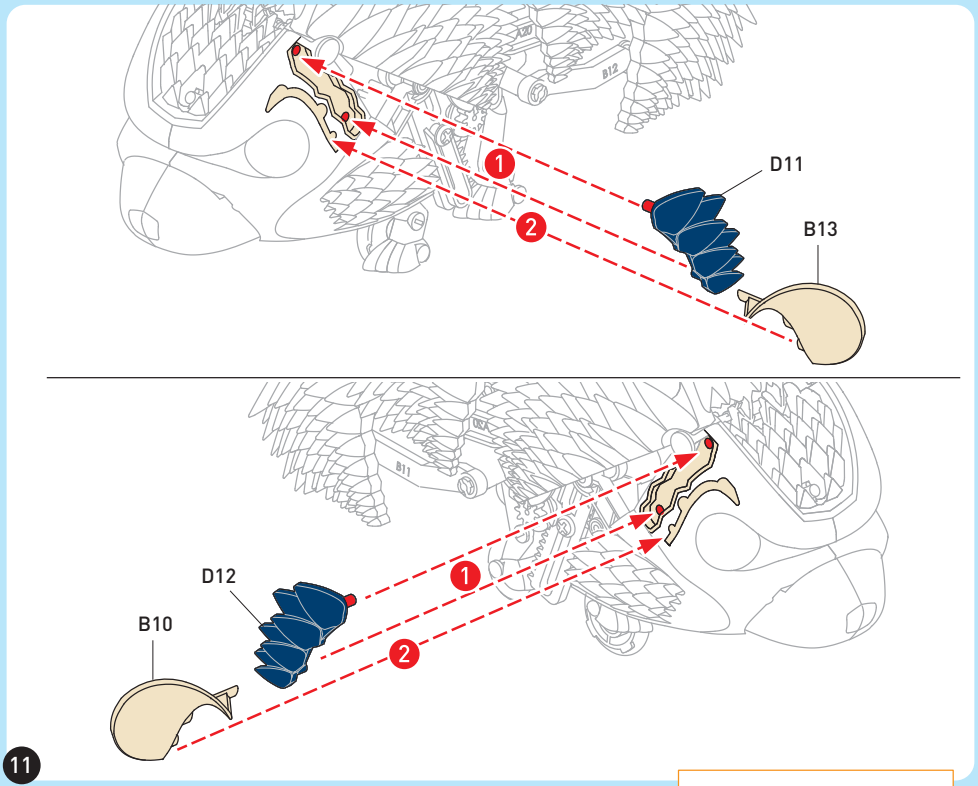
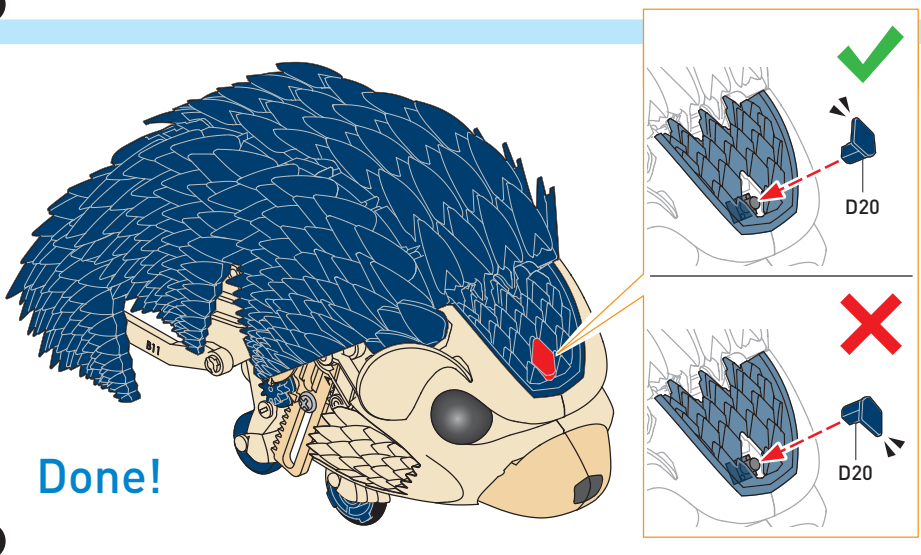


10



11

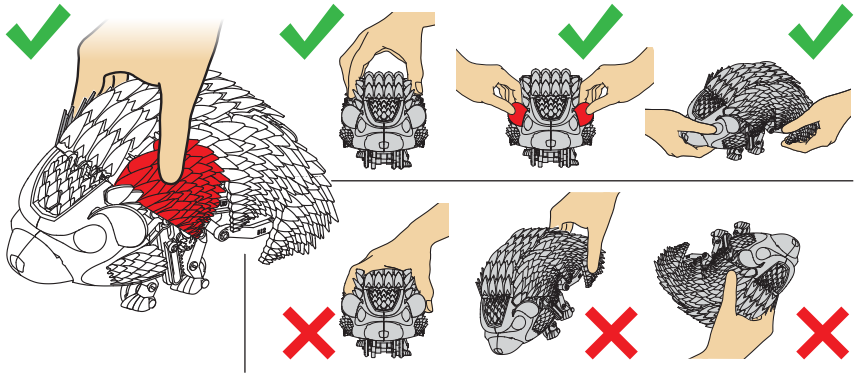


12

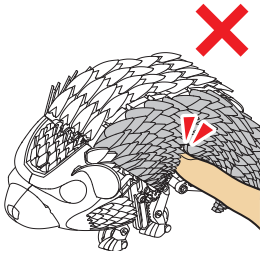
Appropriate care and handling

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

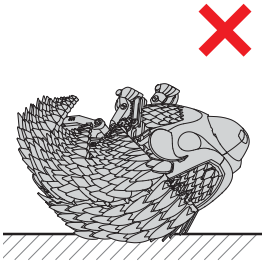
When you pick up the hedgehog, hold it as shown in the pictures.



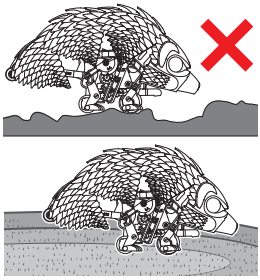
To avoid injury, never put your finger in the moving parts of the hedgehog. If the hedgehog curls up, it could trap your finger.



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.

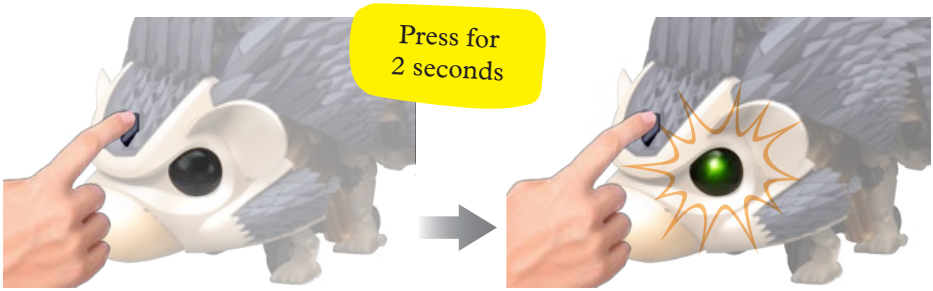


The hedgehog works best on smooth surfaces. Your hedgehog robot will only be able to perform some of its functions (if any at all) on carpets or uneven floors.



1. Power on and standby mode

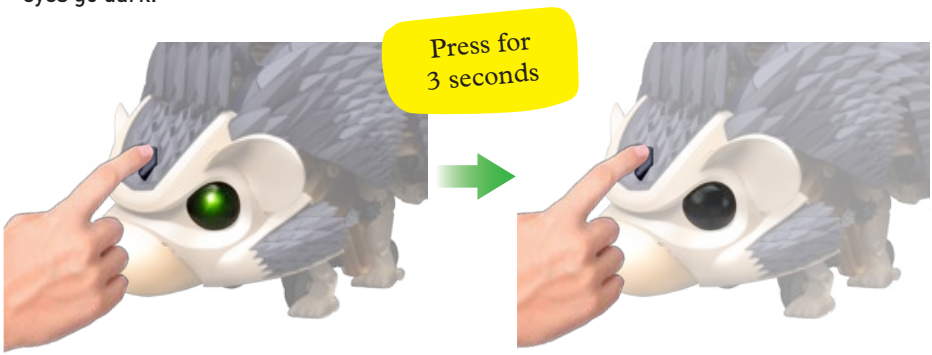
To turn your robotic hedgehog on, simply hold down the button on its forehead for two seconds. The hedgehog's eyes will then start to flash green. Now it is in standby mode and waiting for your next move.



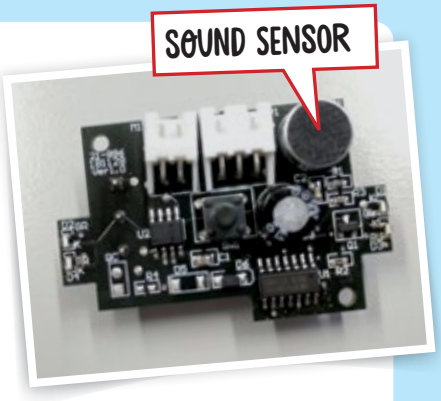
The hedgehog is a little impatient. If you leave it waiting, it stamps its feet to remind you that it's waiting. If you let it wait for more than 60 seconds, it will automatically switch off again.

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.

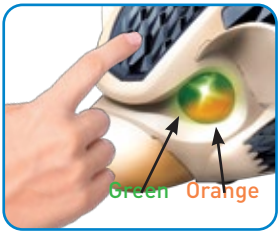
Always make sure you clap close to its head where the sound sensor is located. If you're too far away or clapping too softly, the robot might not hear your commands properly.

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.

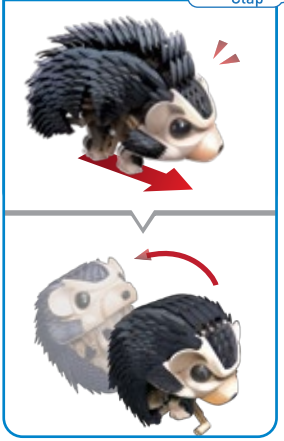


In mode 1, the robot can accept the following commands:

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

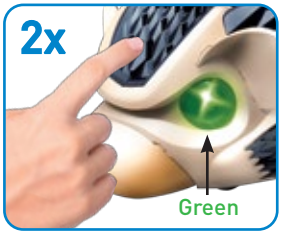
TIP!

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:



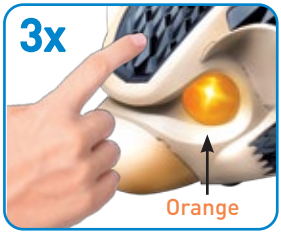
Command: 1 x, 2 x, 3 x, 4 x, or 5 x claps

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!
VROOM
BANG
BANG
BANG
VROOM
VROOM
BSCH
CLANK
MADE IT! WOOHOO!
ANOTHER TRIUMPH FOR SCIENCE!
I FEAR WE HAVE A NEW PROBLEM ...
WE GOT IT BACK! YOU DID GREAT NUNA!

HAGGAGA! GAGGAGAGA! GAAAAAAA!
GAAAAAAAAA!
THESE ALIENS DON'T LOOK VERY HAPPY ...
NUNA! CATCH!
GAAA!
IT'S WORKING! RUN! RUN!
HURRY! EVERYONE IN THE SHIP. LET'S GET OUT OF HERE!
A BRILLIANT PLAN.
GAAAAAAA!
PHEW, THAT WAS CLOSE, BUT WE HAVE THIS AMAZING ROBOT!
SHOULD I GO BACK?
ALAS, I DON'T THINK WE WILL BE MAKING ANY DIPLOMATIC RELATIONS WITH THIS ALIEN SPECIES.
GAAA!
AFTER A BRIEF BUT PRECISE EVALUATION OF THE SITUATION: NO.
THEN OFF TO THE NEXT ADVENTURE!

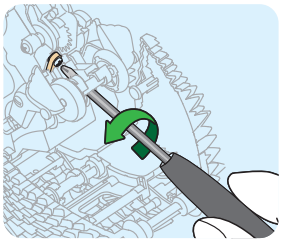
Replacing the batteries with the body stretched out

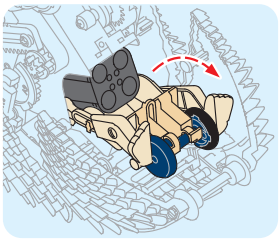
Changing the batteries when the body is stretched out is in general a little easier. If you want to change the batteries while the body is stretched out, proceed as follows:

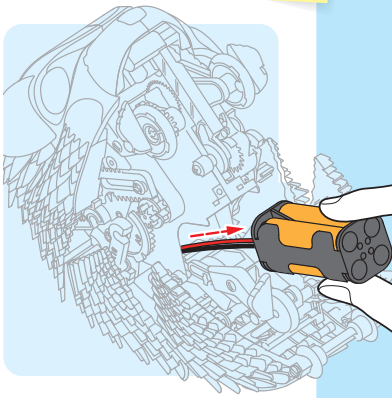
- Loosen the screw on the robot's underside (between the hind legs).
- Open the battery compartment cover by folding the flap and the back legs backward.
- Pull out the battery compartment and change the batteries.

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.



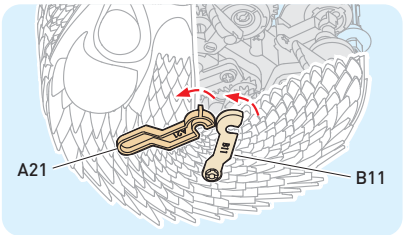




Replacing the batteries with the body curled up

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

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.

REAL HEDGEHOGS

Hedgehogs are fascinating animals that are found in many parts of the word, 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?

Close up of Velcro

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.

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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

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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

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Printed in Taiwan / Imprimé en Taiwan

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620500-03-020525