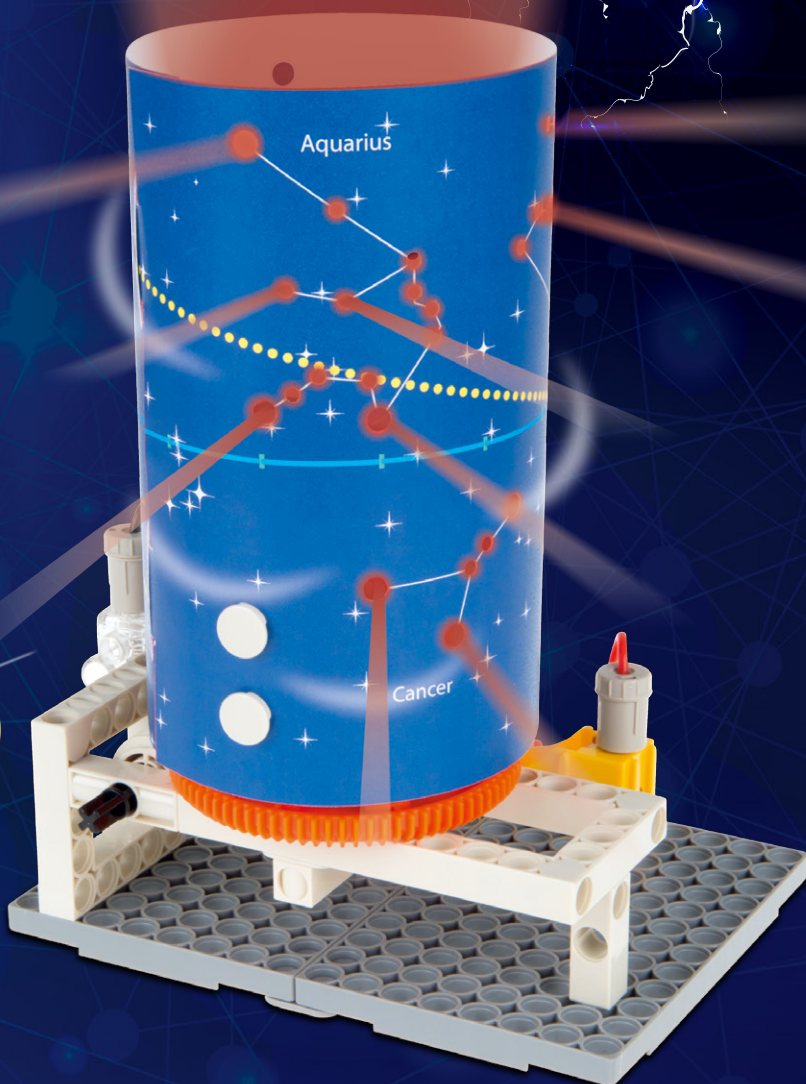




ELECTRICITY

DISCOVERY 2.0

EXPERIMENTS



7059R

110 PCS

Lab4Kids

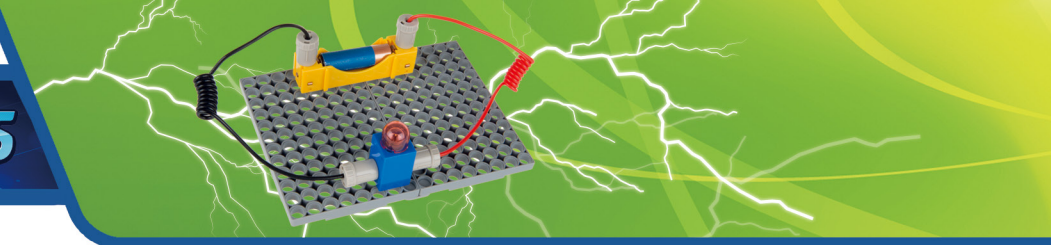
8+



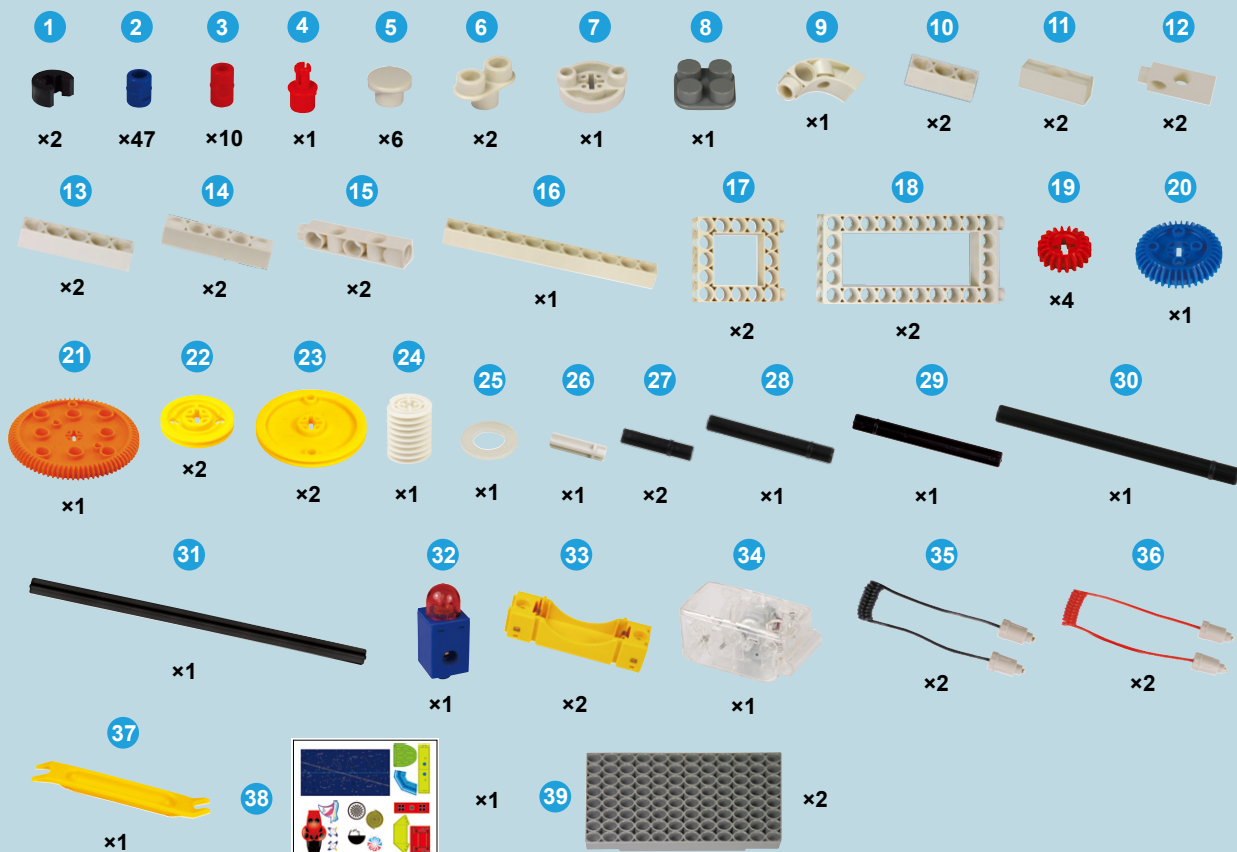
14

**MODELS
TO BUILD**

***INSPIRE CREATIVITY THROUGH
THE MAGIC OF SCIENCE***



Komponentförteckning:



Komponentförteckning:

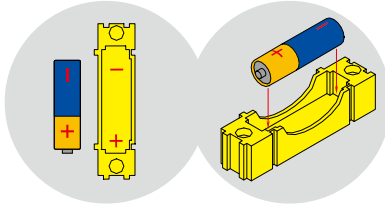
Nr.	Beskrivning	Antal
1	Axellås	2
2	Lös koppling	47
3	Blockkoppling	10
4	Axel kort	1
5	Knapp	6
6	Övergång	2
7	Axel/Blockkoppling	1
8	Baskoppling	1
9	Böjt block	1
10	3-håligt block	2
11	3-håligt block med hål i ändarna	2
12	Dubbelhåligt block (3 hål)	2
13	5-håligt block	2
14	5 håligt block med hål i ändarna	2
15	Dubbelhåligt block (5 hål)	2
16	11-håligt block	1
17	Kvadratisk ram	2
18	Ram	2
19	Kugghjul 20T (röd)	4
20	Kugghjul 40T (blå)	1

Nr.	Beskrivning	Antal
21	Kugghjul 80T (orange)	1
22	Remskiva small	2
23	Remskiva large	2
24	Snäckskruv	1
25	Bricka	1
26	Drivaxel	1
27	Axel 35 mm	2
28	Axel 60 mm	1
29	Axel 70 mm	1
30	Axel 100 mm	1
31	Axel 150 mm	1
32	Lamphållare	1
33	Batterihållare med säkring	2
34	Motor	1
35	Anslutningssladd svart	2
36	Anslutningssladd röd	2
37	Verktyg	1
38	Skuren papp	1
39	Basplatta	2

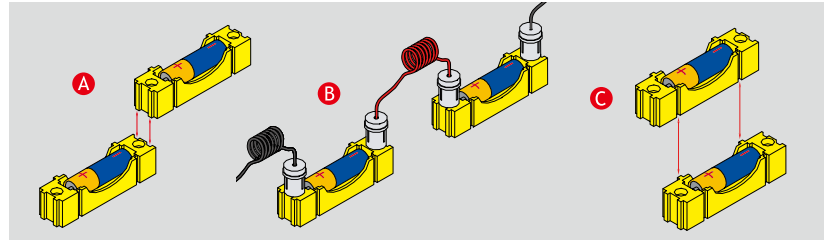
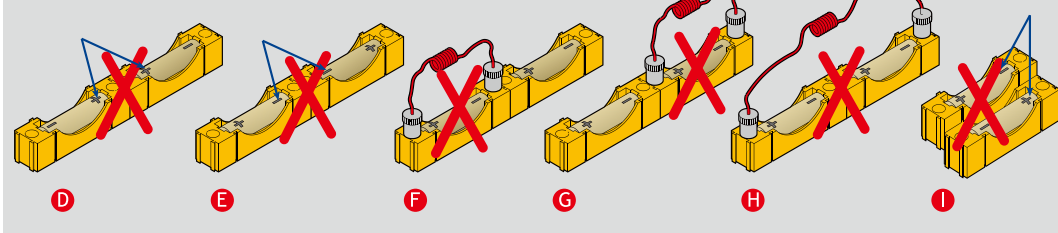
>>> MONTERINGSANVISNINGAR

Montering 1**Sätta i batteriet**

Var noga med att vända batteripolerna (+ och -) åt rätt håll när AA-batteriet sätts i hållaren.

**Koppla ihop batterihållare**

- 1) När batterihållarna kopplas ihop som i figur A och B är batterierna SERIEKOPPLADE.
- 2) När batterihållarna kopplas ihop som i figur C är batterierna PARALLELLKOPPLADE.

**Nedanstående kopplingar får aldrig göras!****⚠ WARNING!****Undvik kortslutning**

Elektriciteten i ett batteri skapas genom en kemisk reaktion.

När en elektrisk krets sluts kommer en elektrisk ström att gå genom kretsen. Om det inte finns något motstånd i kretsen (det vill säga ingen komponent som använder elektriciteten) uppstår en så kallad kortslutning. Vid en kortslutning kommer den elektriska strömmen att gå igenom kretsen med maximal energi, eftersom det inte finns tillräckligt stort motstånd.

Energien som passerar genom kretsen omvandlas till värme, som kan skada kretsen och till och med utgöra brandfara.

Batteriet kommer att förbrukas väldigt fort eftersom så mycket av dess energi går åt på en gång.

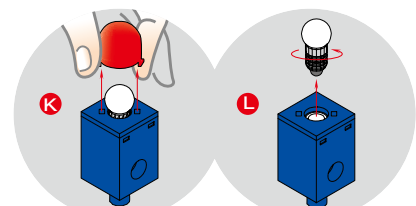
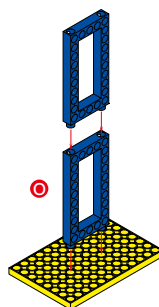
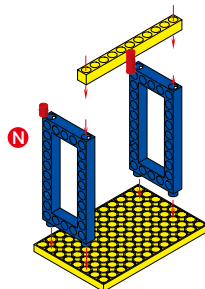
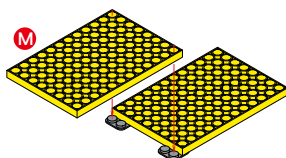
Bilderna F till I visar några typiska kortslutningar.

Byta glödlampa

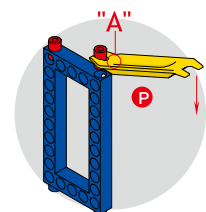
- 1) Tryck försiktigt ihop lampglaset och lyft av det som figur K visar.
- 2) Skruva ur den trasiga lampan och skruva i en ny. Se figur L.
- 3) Sätt tillbaka lampglaset på samma sätt som det togs bort.

**OBS!**

Lampan kan lossna under transport. Kontrollera att lampan sitter ordentligt fast i hållaren så att strömmen leds korrekt.

Montering 2**Sätt fast ramar och block på basplattan.****Ta loss en koppling**

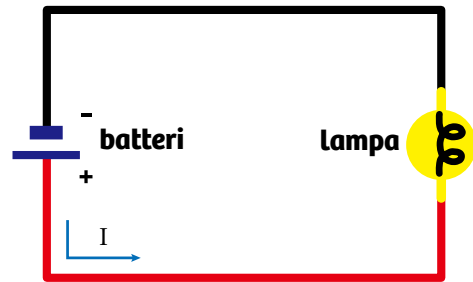
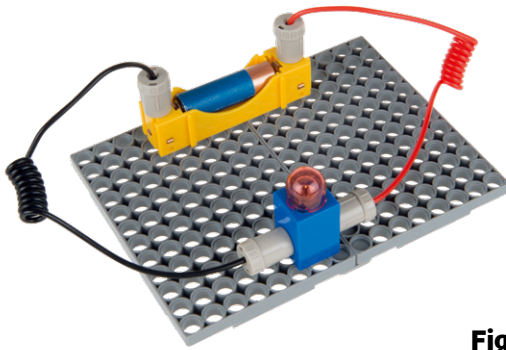
Använd sidan märkt med "A" på verktyget för att ta loss en koppling. Se figur P.



EXPERIMENT 1

Låt lampan lysa

Här får du lära dig att bygga en enkel krets med batterihållare, lampa och anslutningssladdar.



Figur 8: Lampan lyser

- 1) Från batteriet får man den elektriska strömmen och spänningen som kretsen behöver. Batteriet kan även kallas energikälla.
- 2) Lampan är den enhet i kretsen som använder energi från batteriet.
- 3) Batteriet och lampan kopplas samman av anslutningssladdar.
- 4) Koppla samman batteriet och lampan med hjälp av en röd och en svart anslutningssladd.
- 5) Lyser lampan?
- 6) Förutom ljus avger lampan värme. Känn försiktigt på lampan för att se om den är varm.

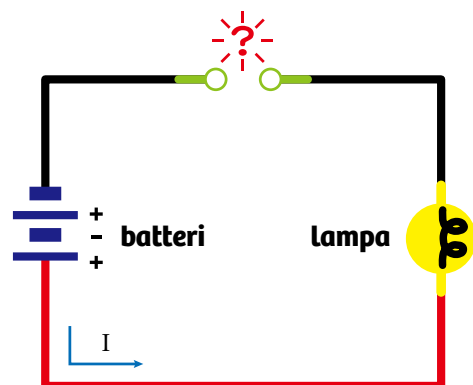
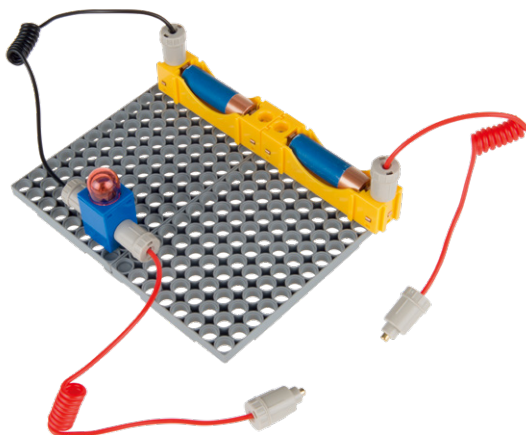


Varning! Känn inte på glödlampor hemma. De kan bli mycket varma. Risk för brännskador!

EXPERIMENT 2

Testa ledningsförmåga

Föremål som leder ström kallas ledare. Föremål som inte leder ström kallas isolatorer.



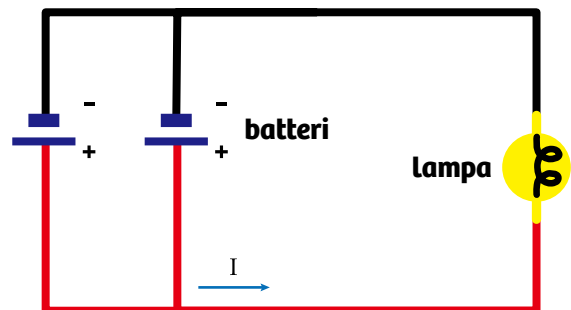
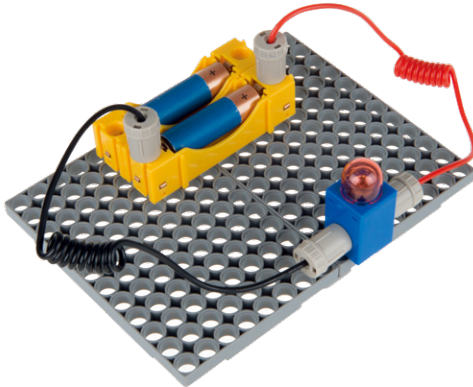
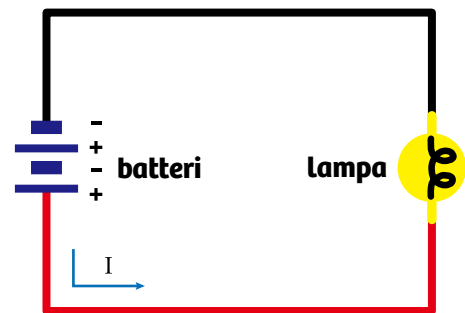
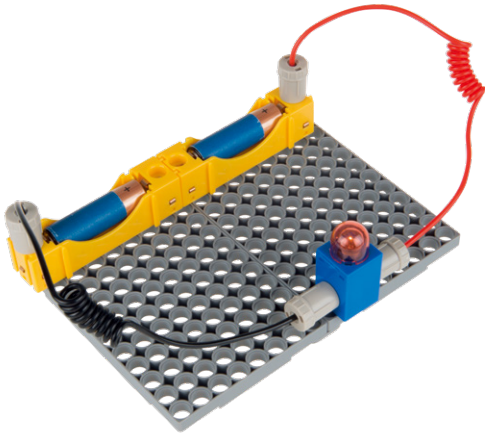
Testa om olika saker är ledare eller isolatorer genom att sätta dem mellan anslutningssladdarna. Exempel på föremål att testa kan vara en sked, ett mynt, en penna mm.

>>> 6 EXPERIMENT

EXPERIMENT 3

Seriekoppla och parallellkoppla batterier.

I vilken krets lyser lampan starkast? Koppla ihop en krets i taget och jämför.



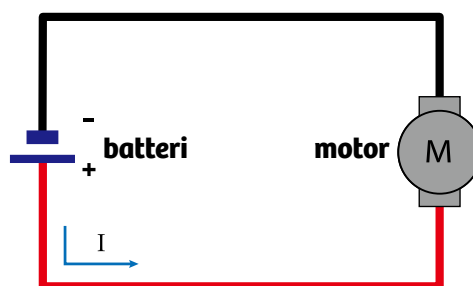
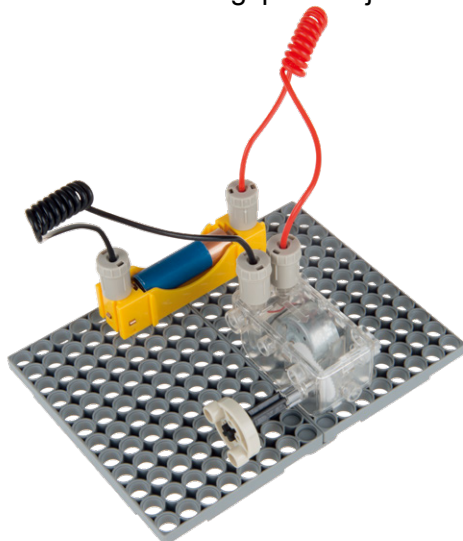
När man seriekopplar batterier så adderas spänningen på de båda batterierna. I det här fallet är det två 1,5 V batterier som seriekopplas. Den totala spänningen i kretsen blir då $1,5 + 1,5 \text{ V} = 3 \text{ V}$. De två batterierna kommer att räcka lika länge som ett ensamt batteri hade räckt.

Om man istället parallellkopplar batterierna så kommer spänningen att vara oförändrad. När vi använder två parallellkopplade 1,5 V batterier kommer spänningen i kretsen ändå att vara 1,5 V. De två batterierna kommer istället att räcka ungefär dubbelt så länge som ett ensamt batteri hade räckt.

EXPERIMENT 4

Strömmens riktning och motorns rotationsriktning.

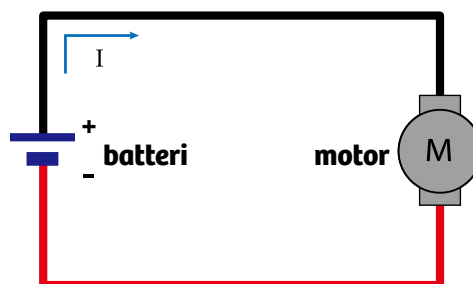
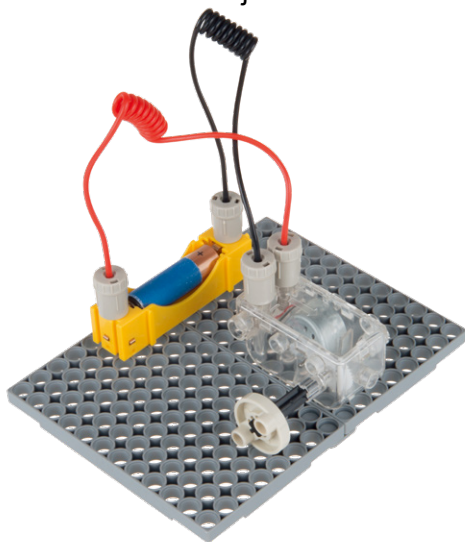
När motorn snurrar omvandlas elektrisk energi från batterierna till magnetisk energi i motorn, och sedan till rörelseenergi på drivhjulet.



Drivhjulet roterar: ☐ Medurs

☐ Moturs

Byt plats på de båda anslutningssladdarna på batteriet (eller på motorn).
Åt vilket håll roterar drivhjulet nu?



Drivhjulet roterar: ☐ Medurs

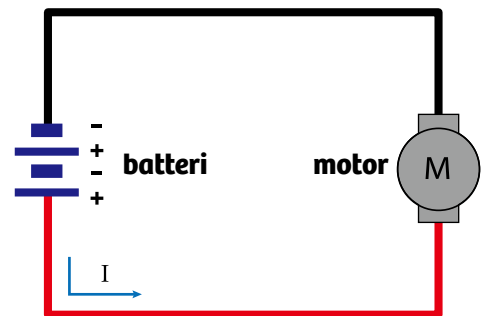
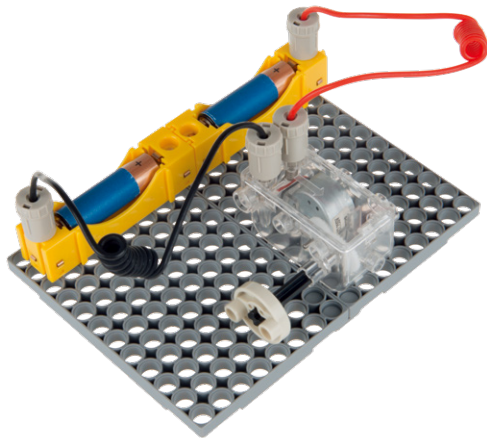
☐ Moturs

>>> 6 EXPERIMENT

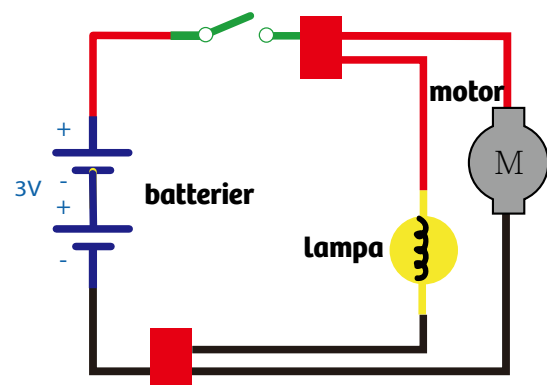
EXPERIMENT 5

Jämför experiment 4 (1,5 V) med experiment 5 (3 V).

Vilken motor snurrar fortast? Varför är det så?

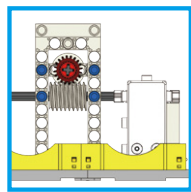
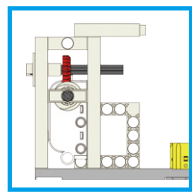
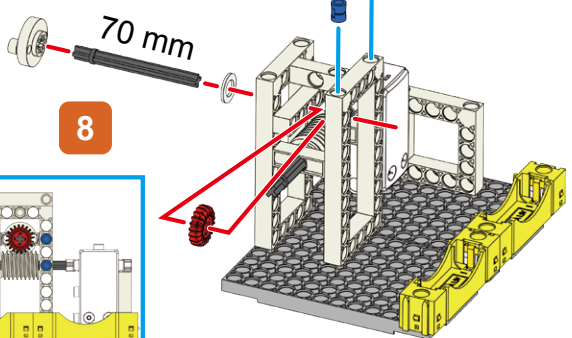
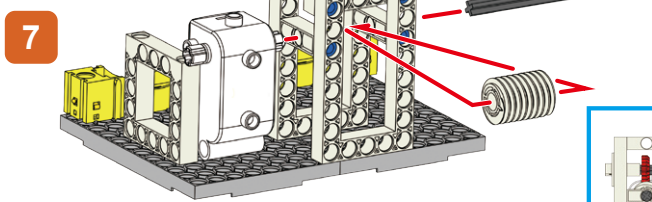
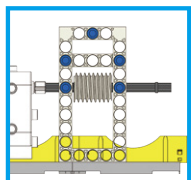
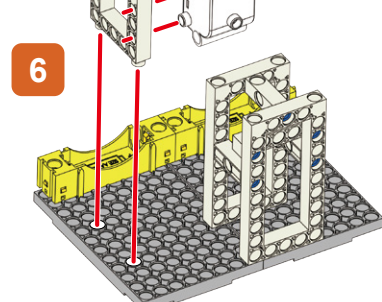
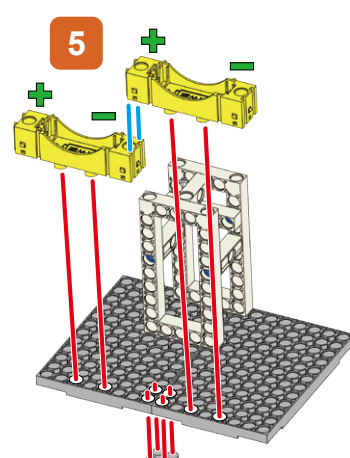
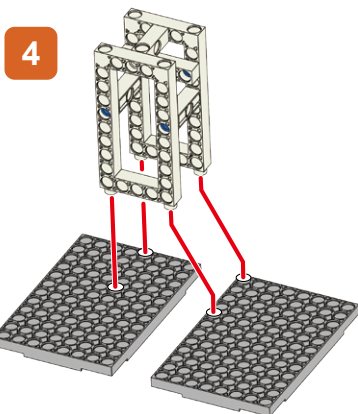
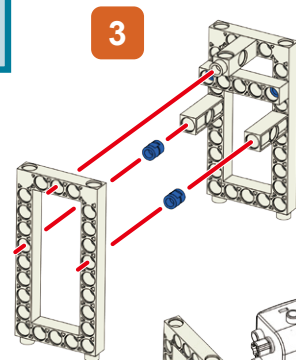
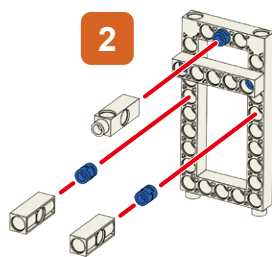
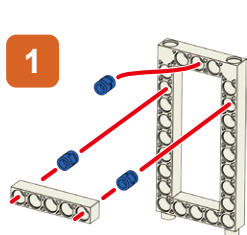
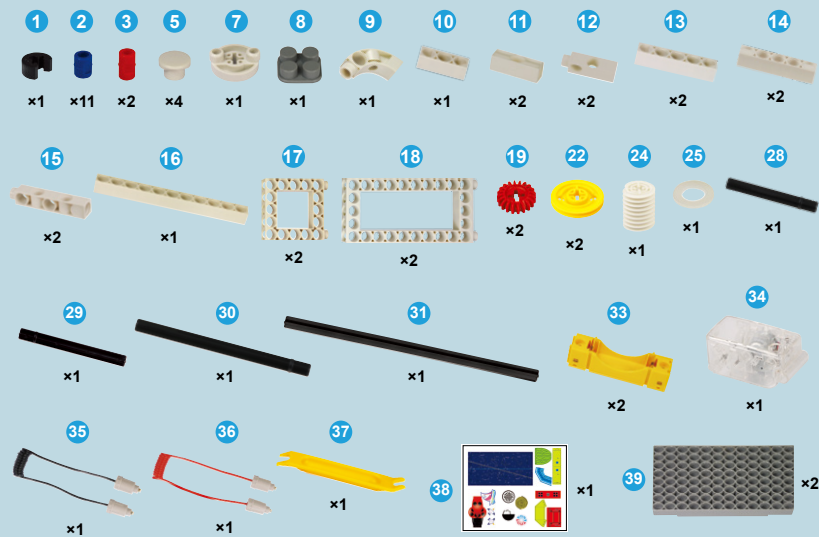
**EXPERIMENT 6**

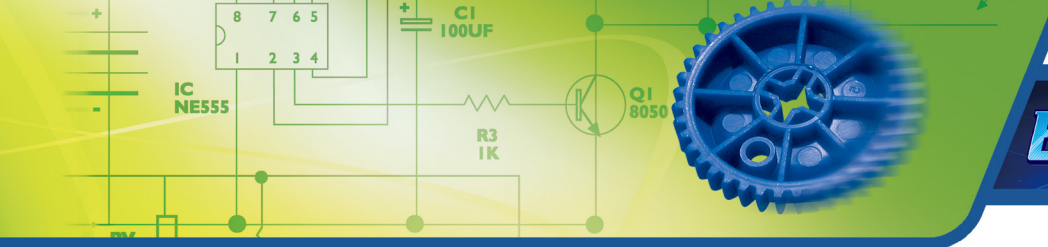
Experiment 6 visar hur lampan och motorn kan parallellkopplas.



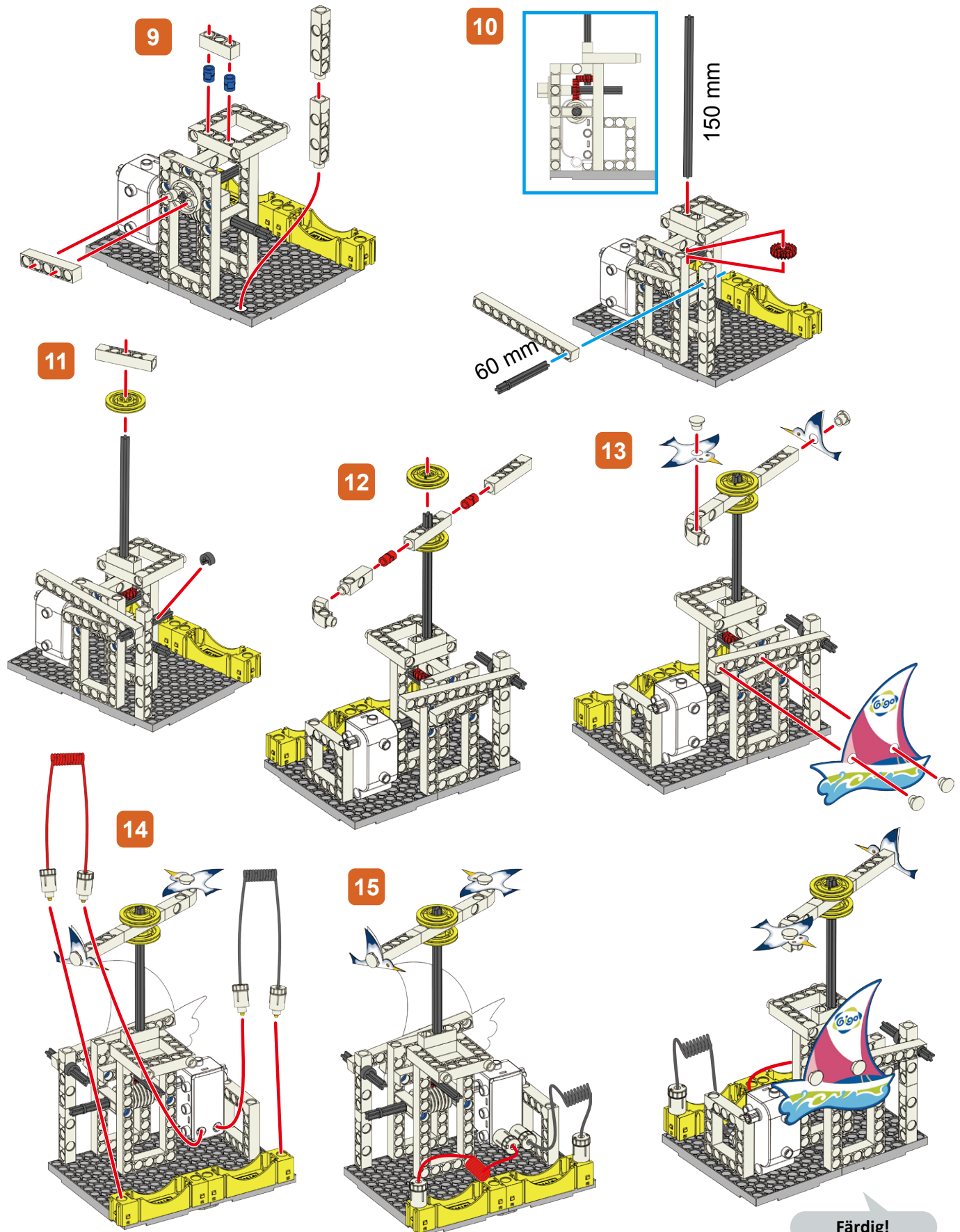
Jämför motorns hastighet i detta experiment med hastigheten från experiment 5.

Komponenter



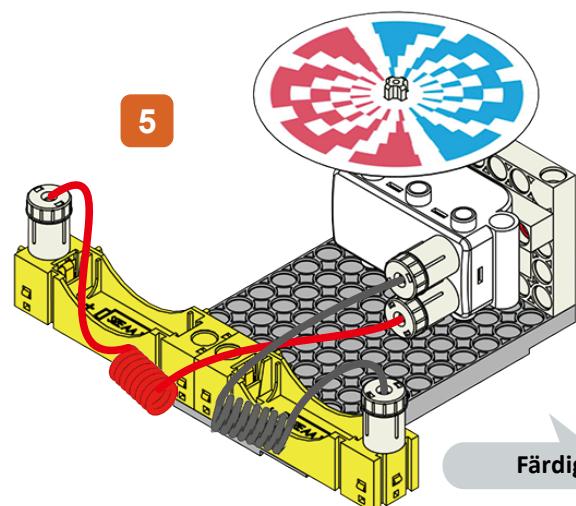
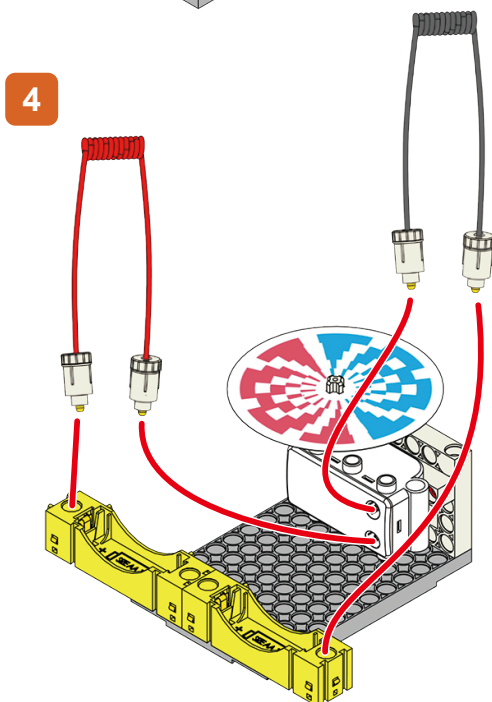
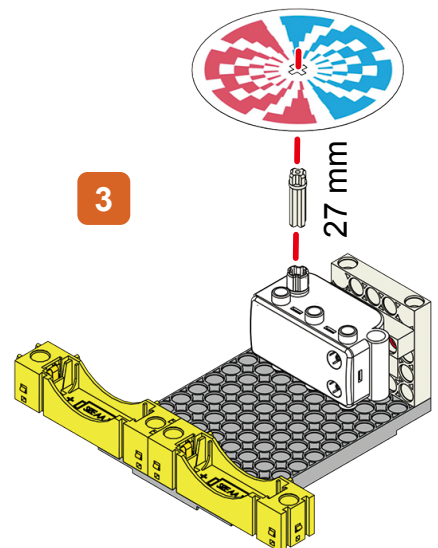
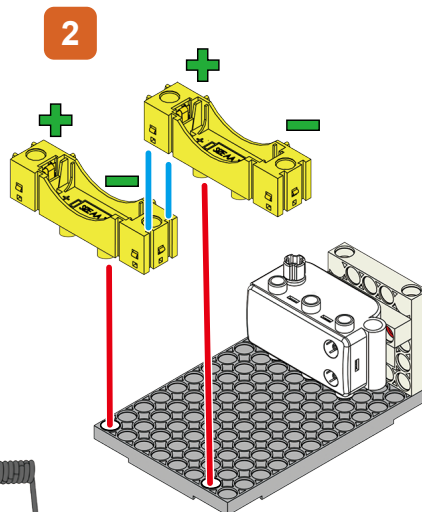
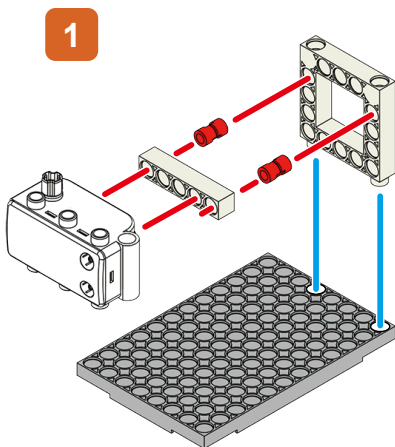
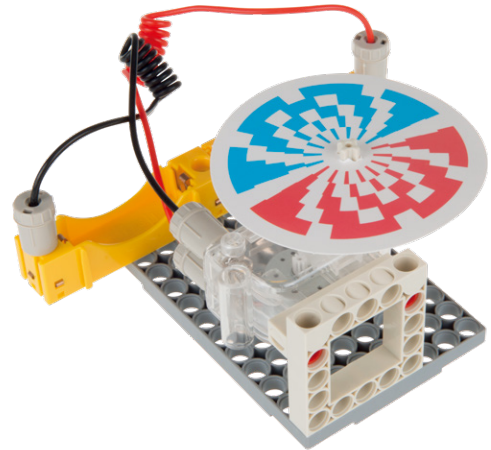
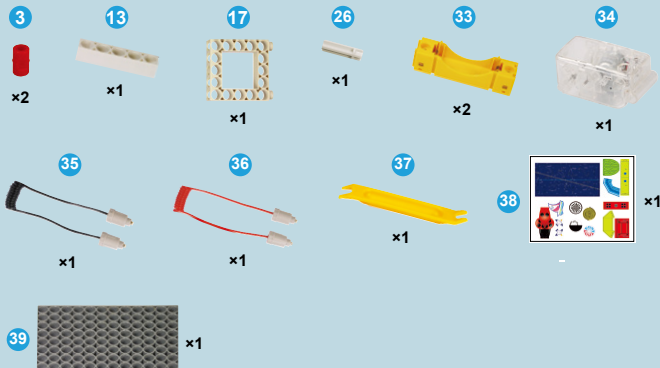


Modell 1 Fågelträdgård

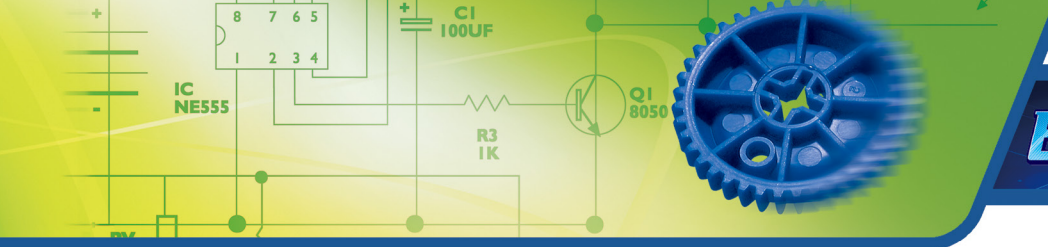


Färdig!

Komponenter

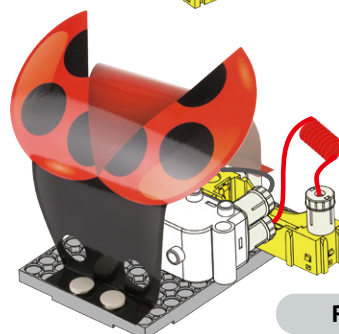
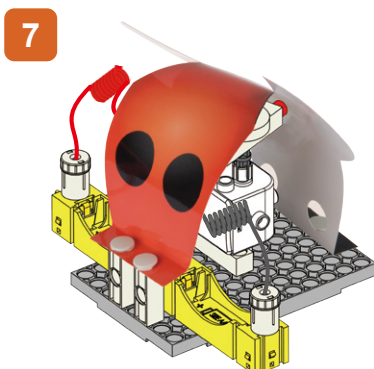
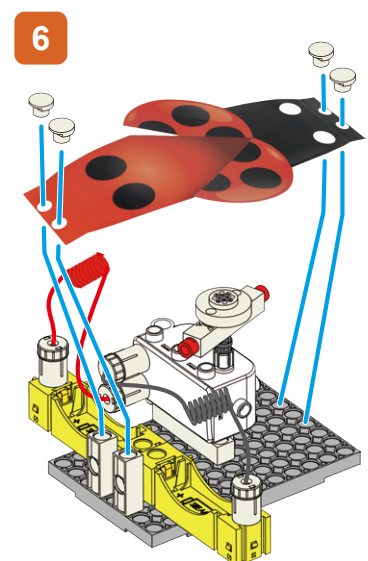
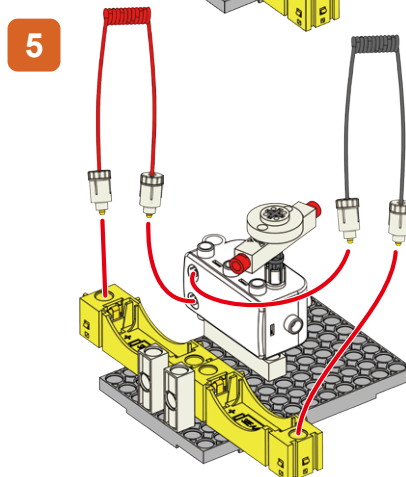
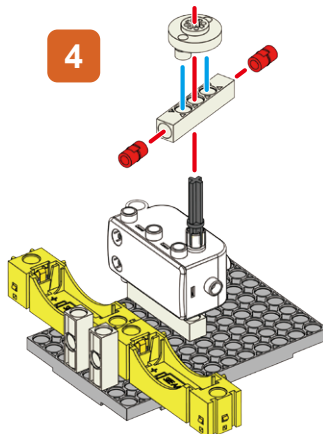
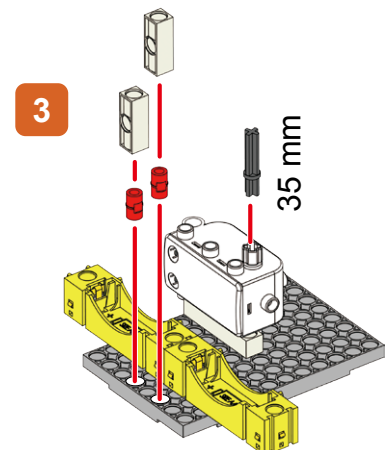
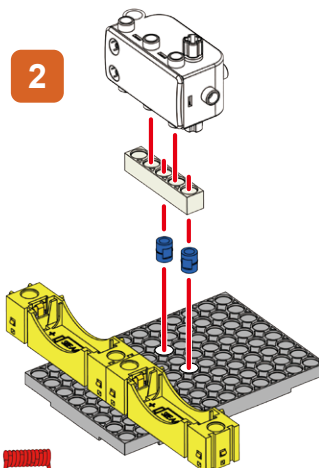
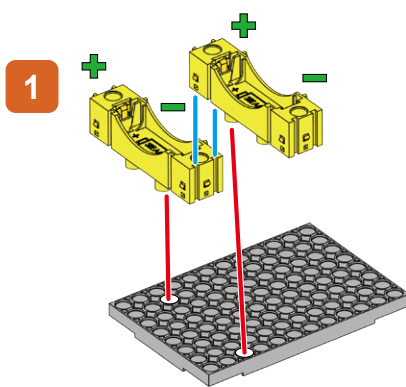
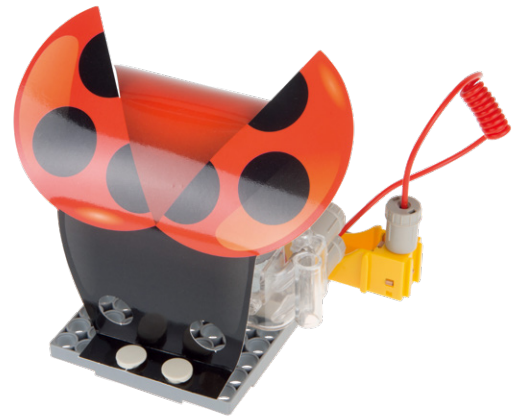
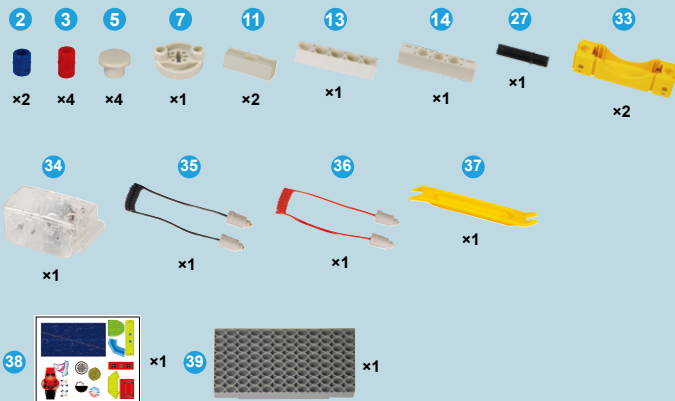


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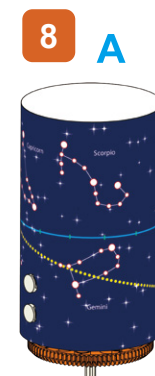
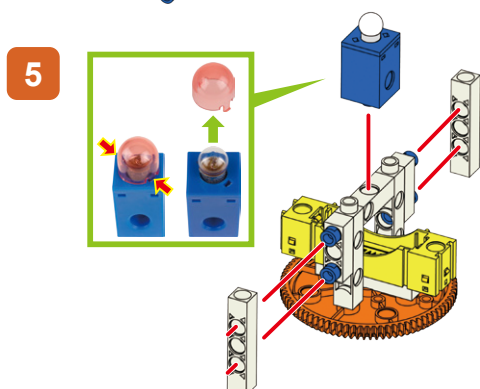
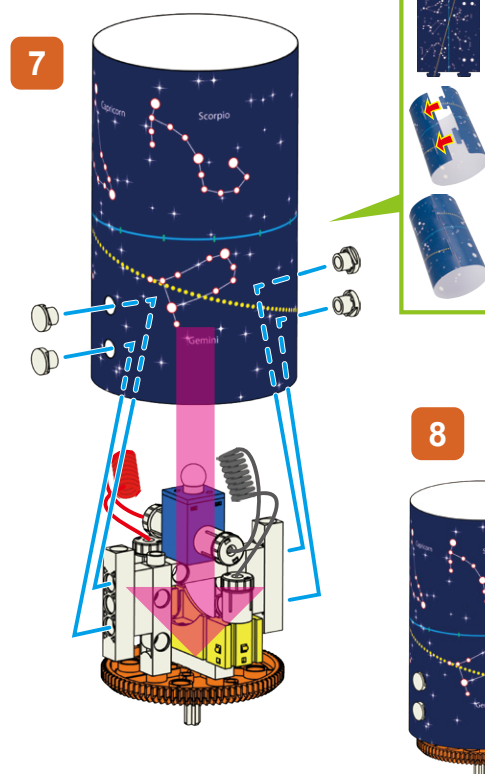
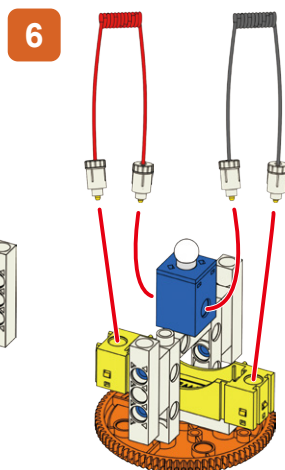
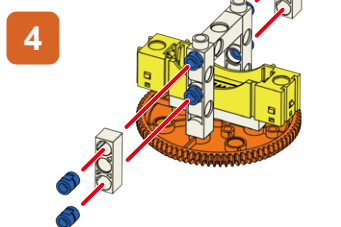
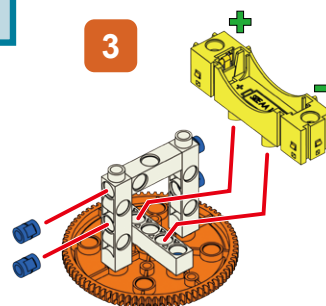
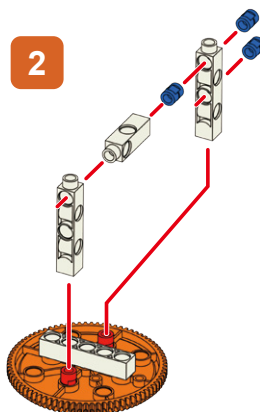
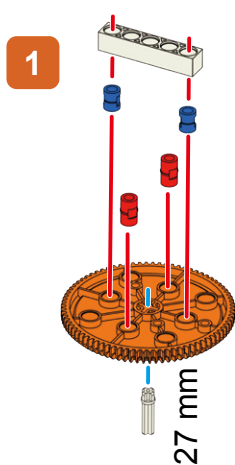
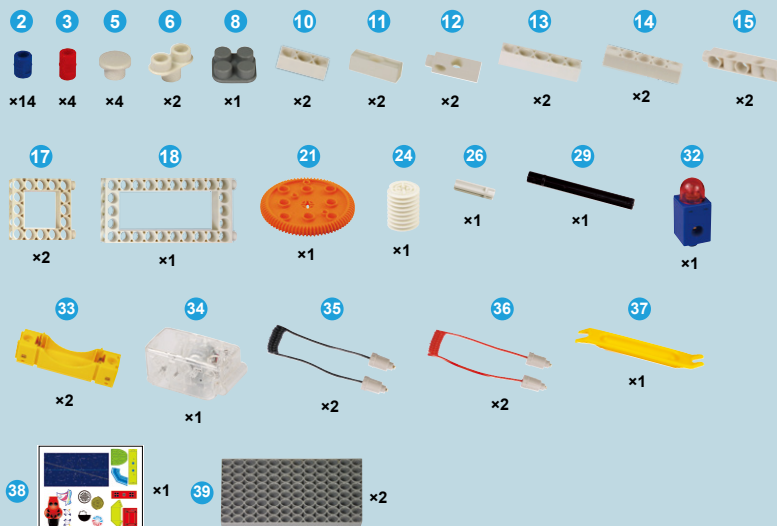
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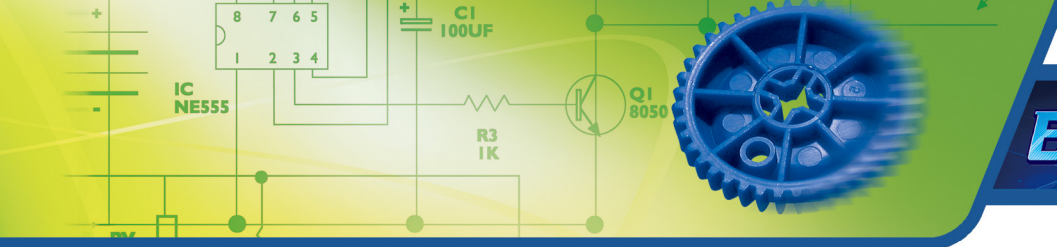
Komponenter



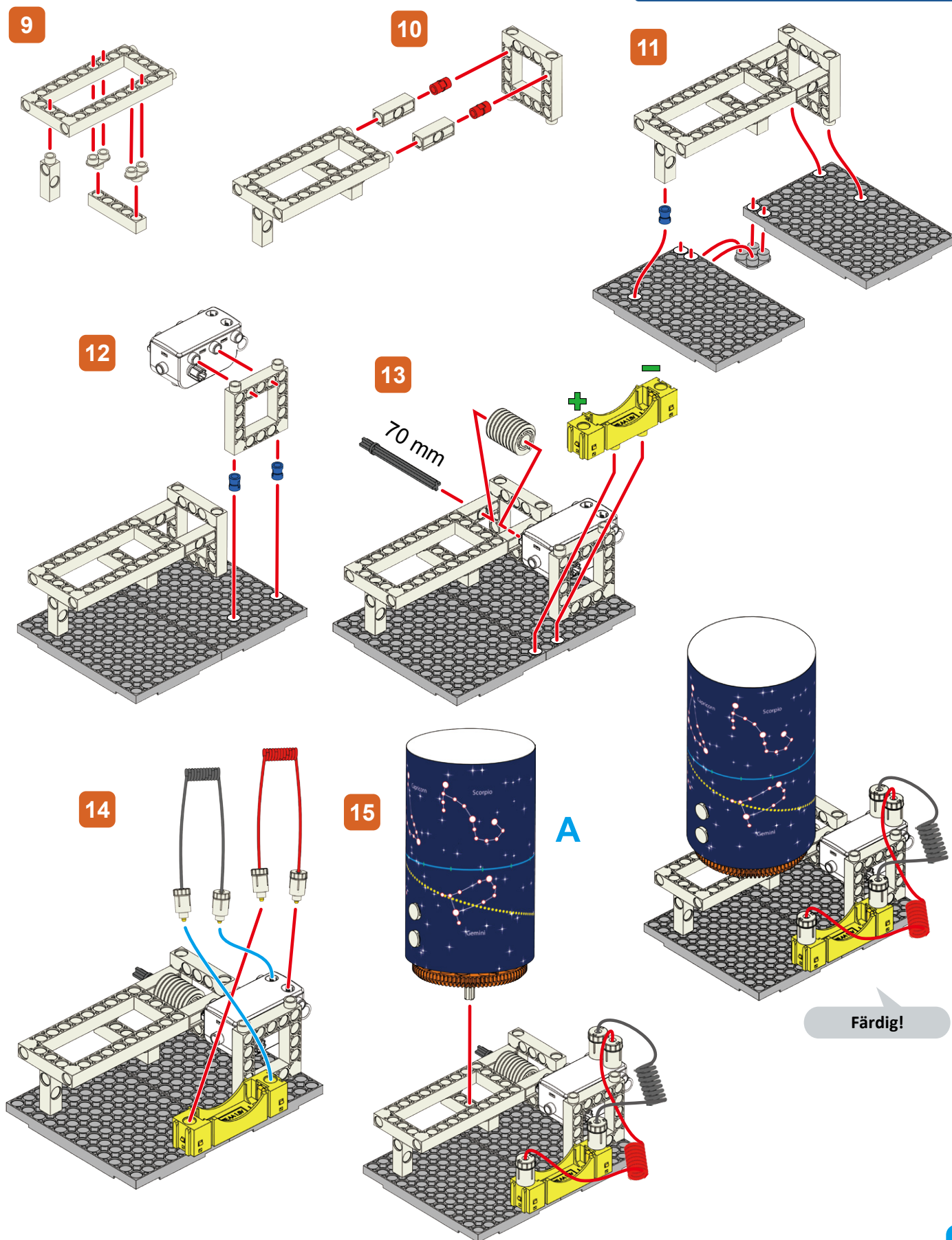
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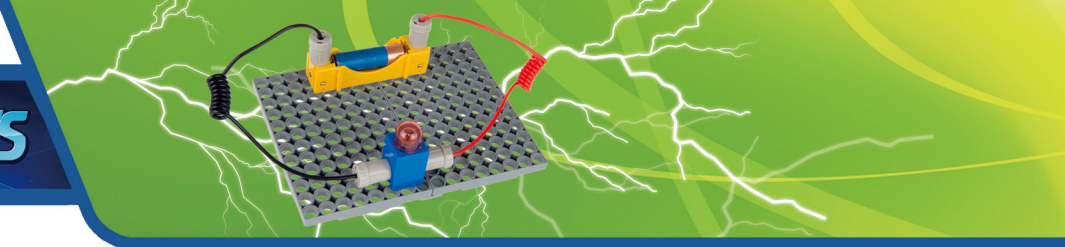
Komponenter





Modell 4 Stjärntecken

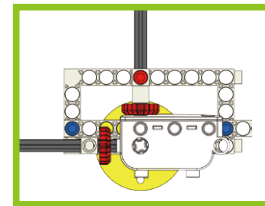
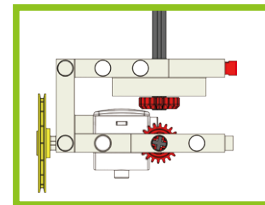
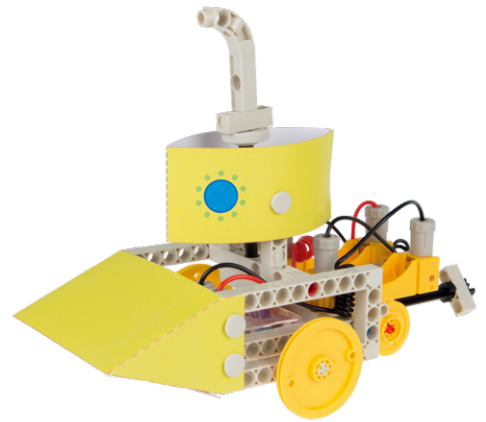
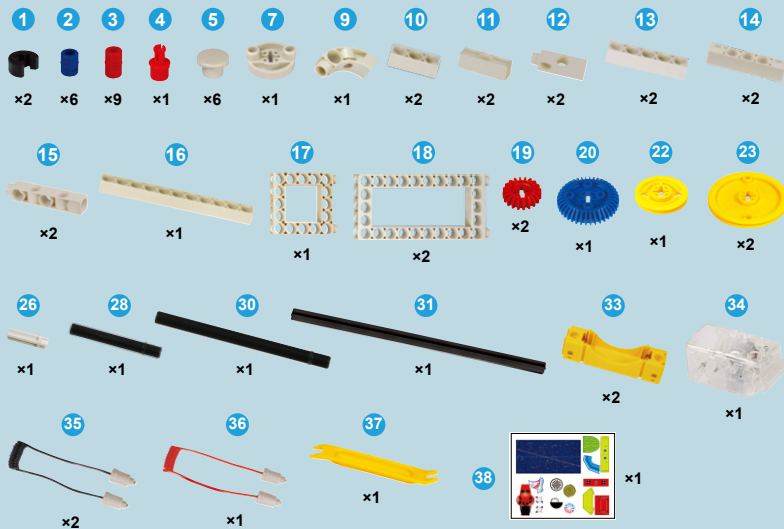




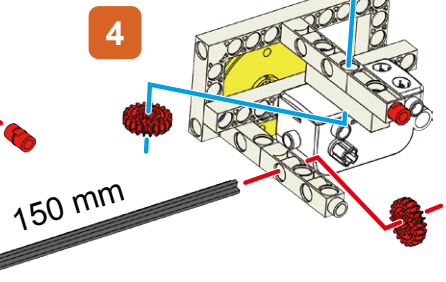
Ubåt med sökarljus

Modell 5

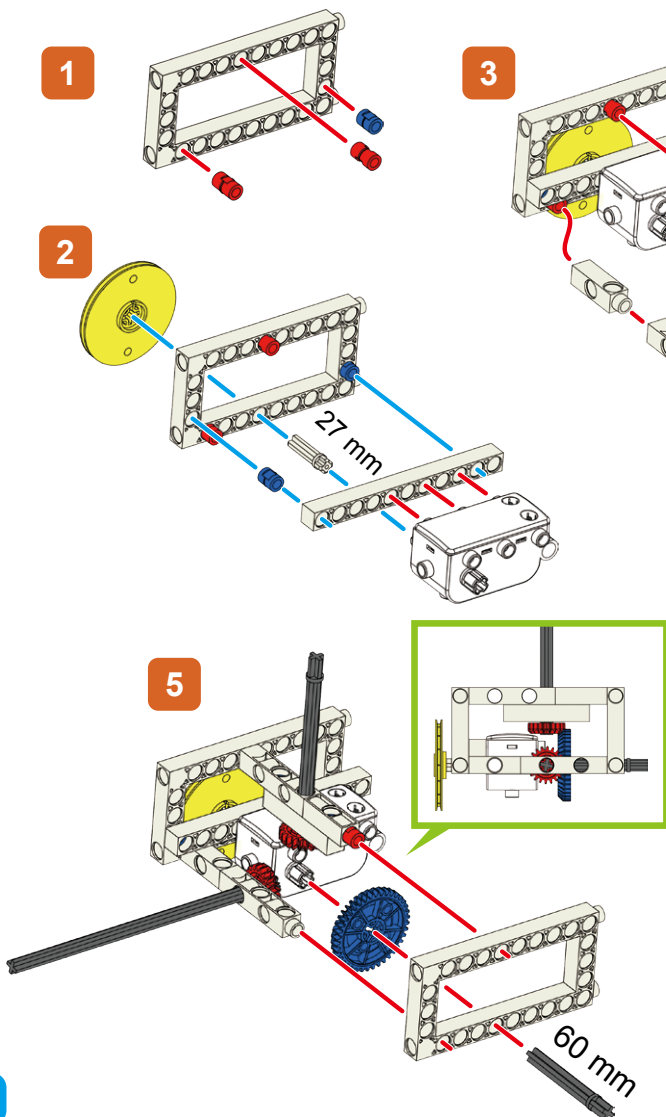
Komponenter

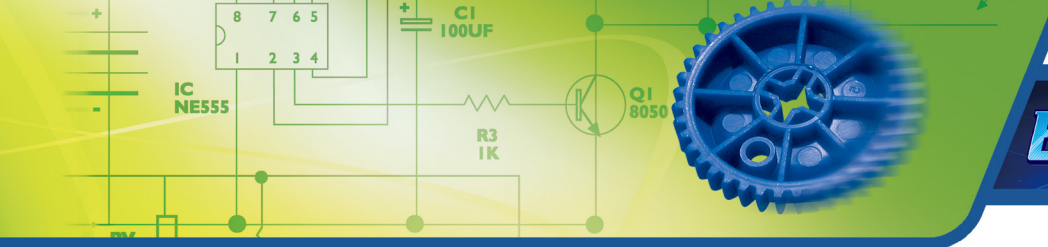


100 mm

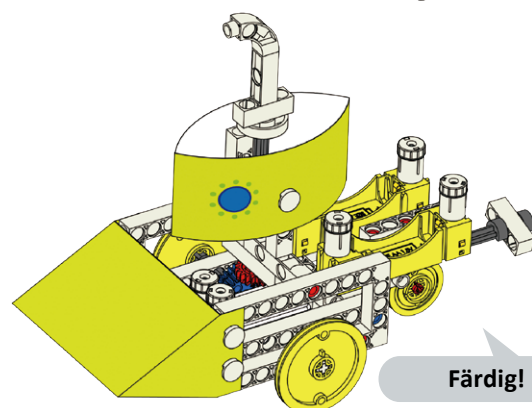
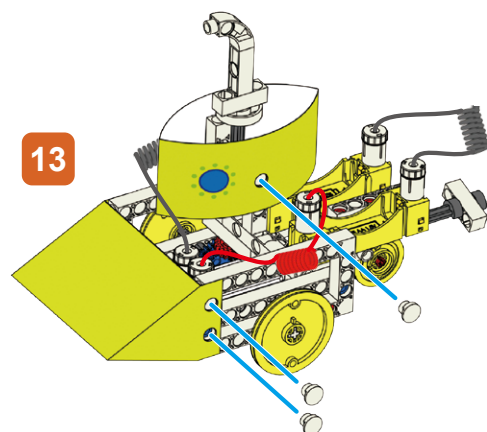
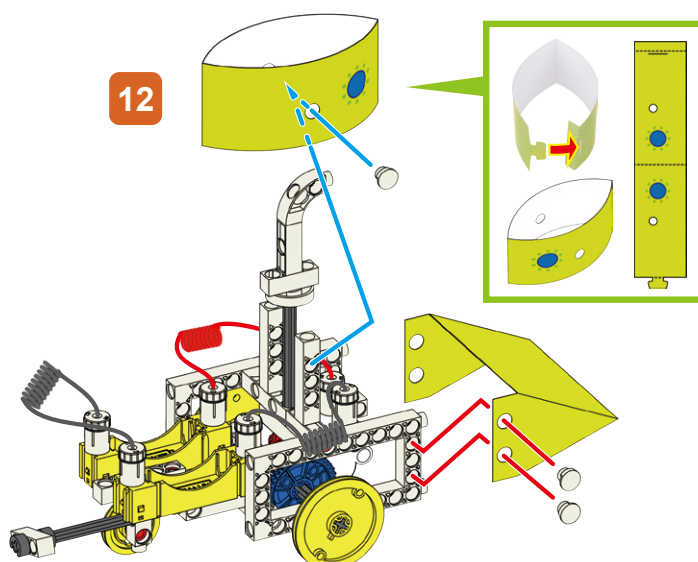
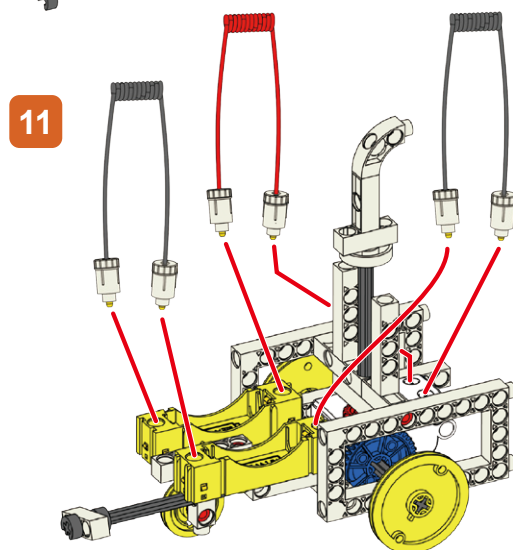
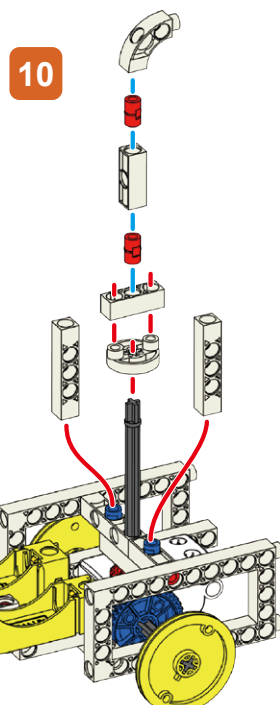
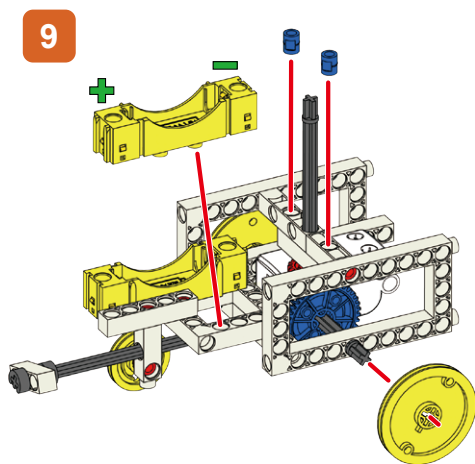
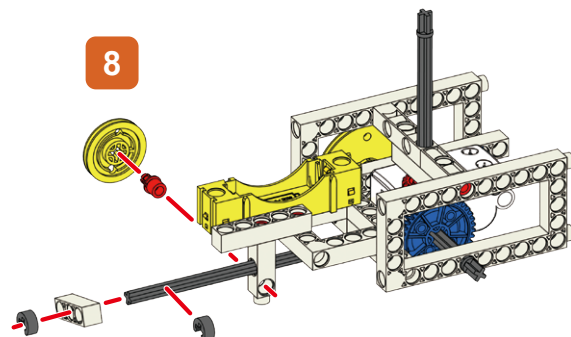
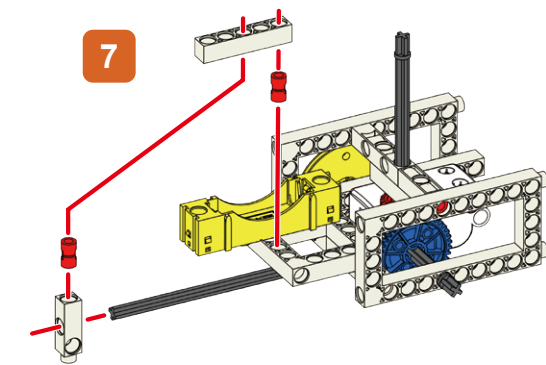


150 mm



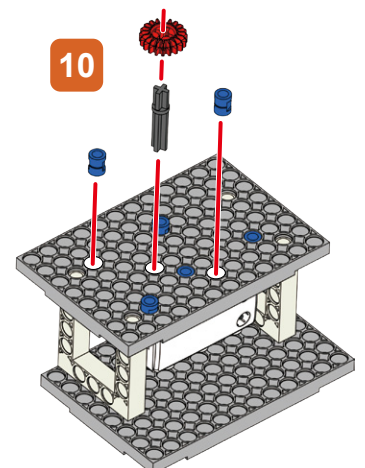
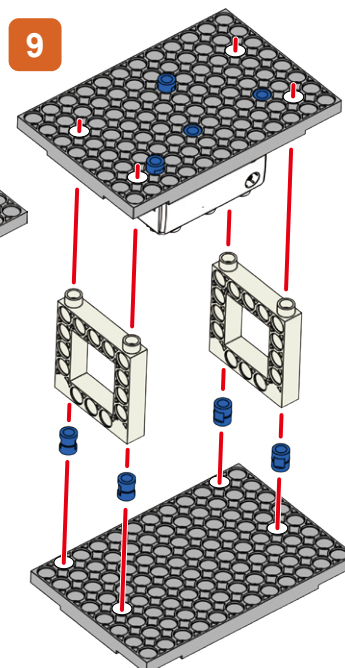
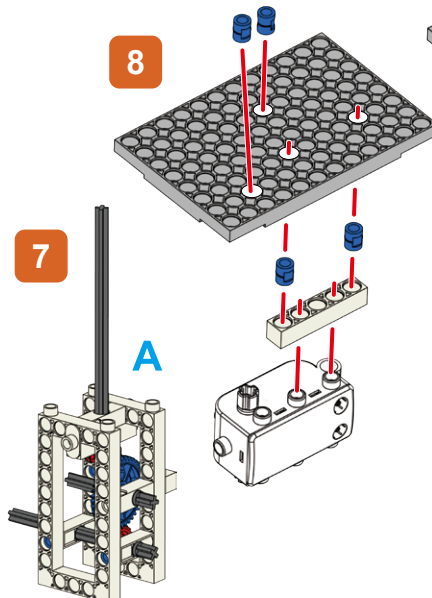
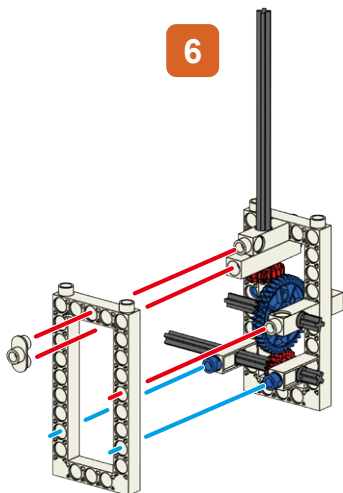
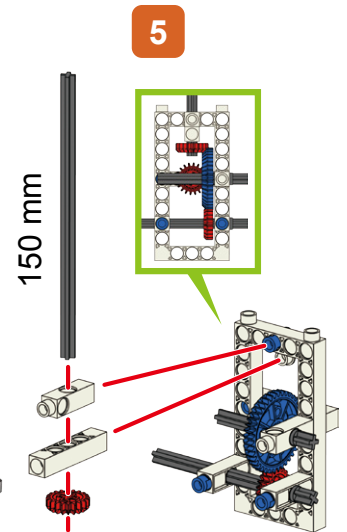
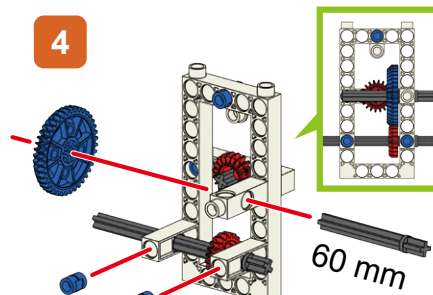
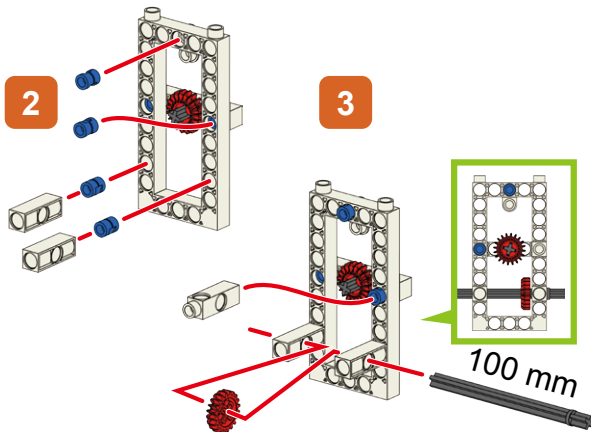
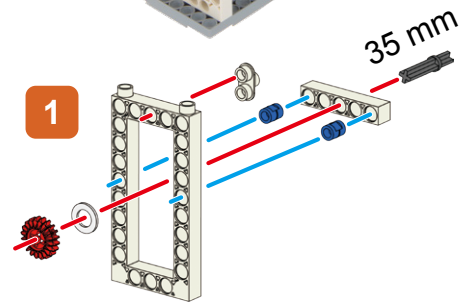
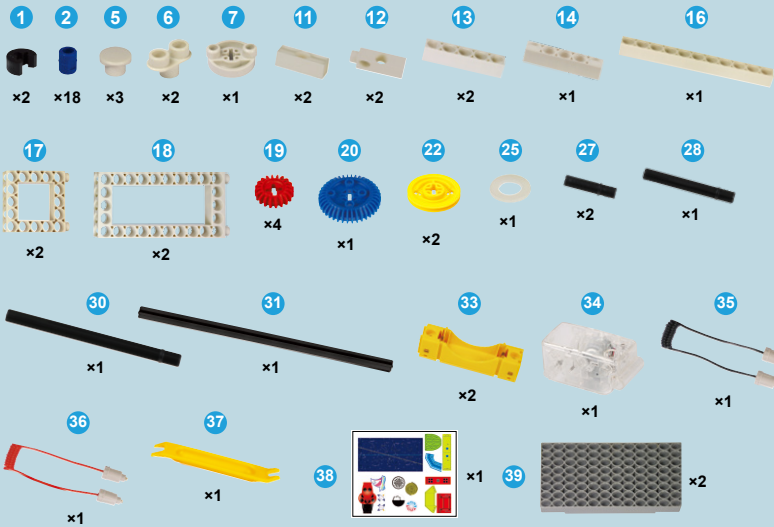


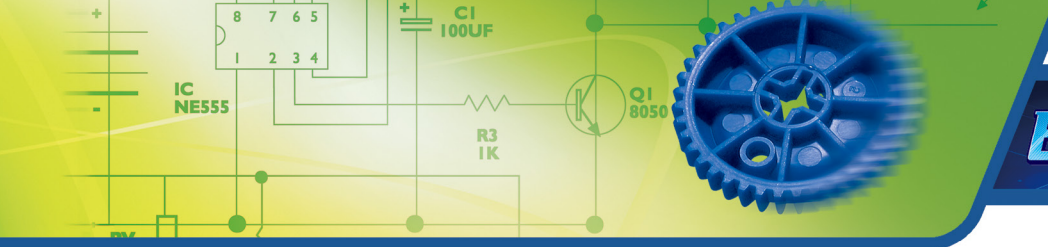
Modell 5 Ubåt med sökarljus



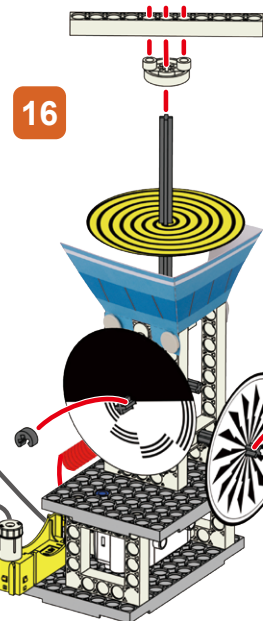
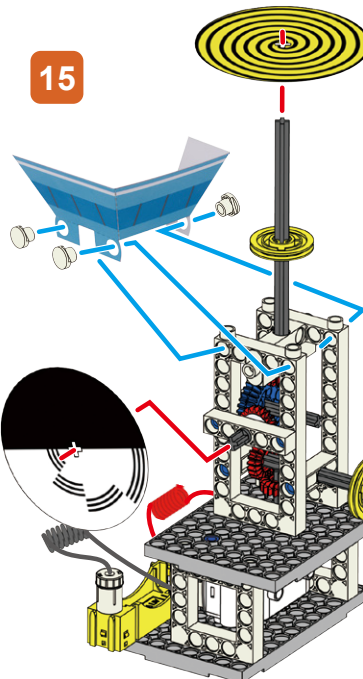
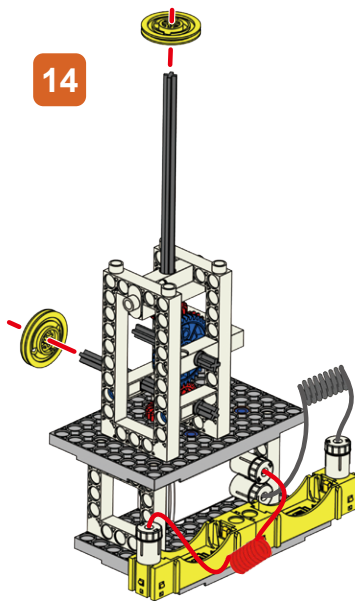
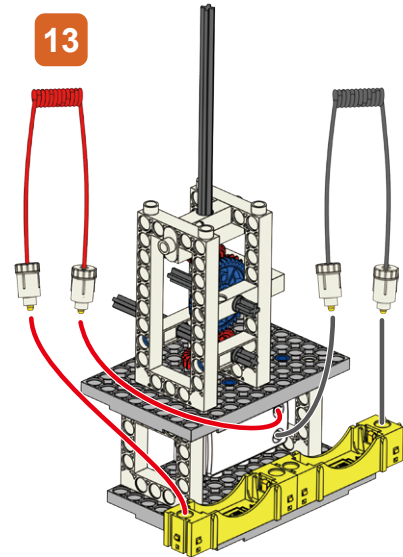
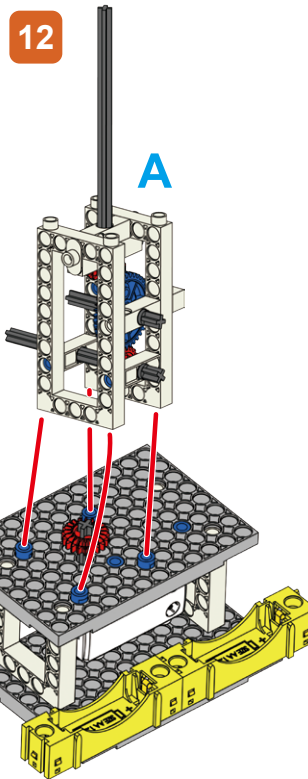
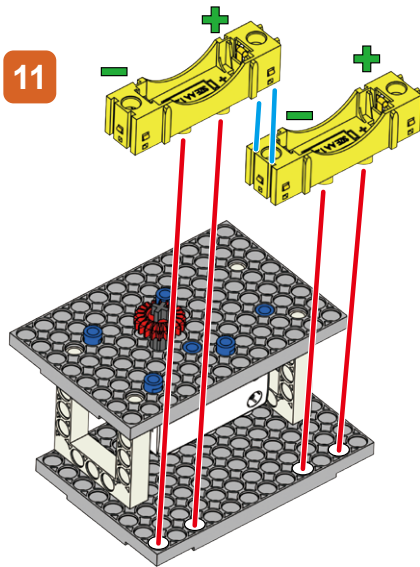
Färdig!

Komponenten



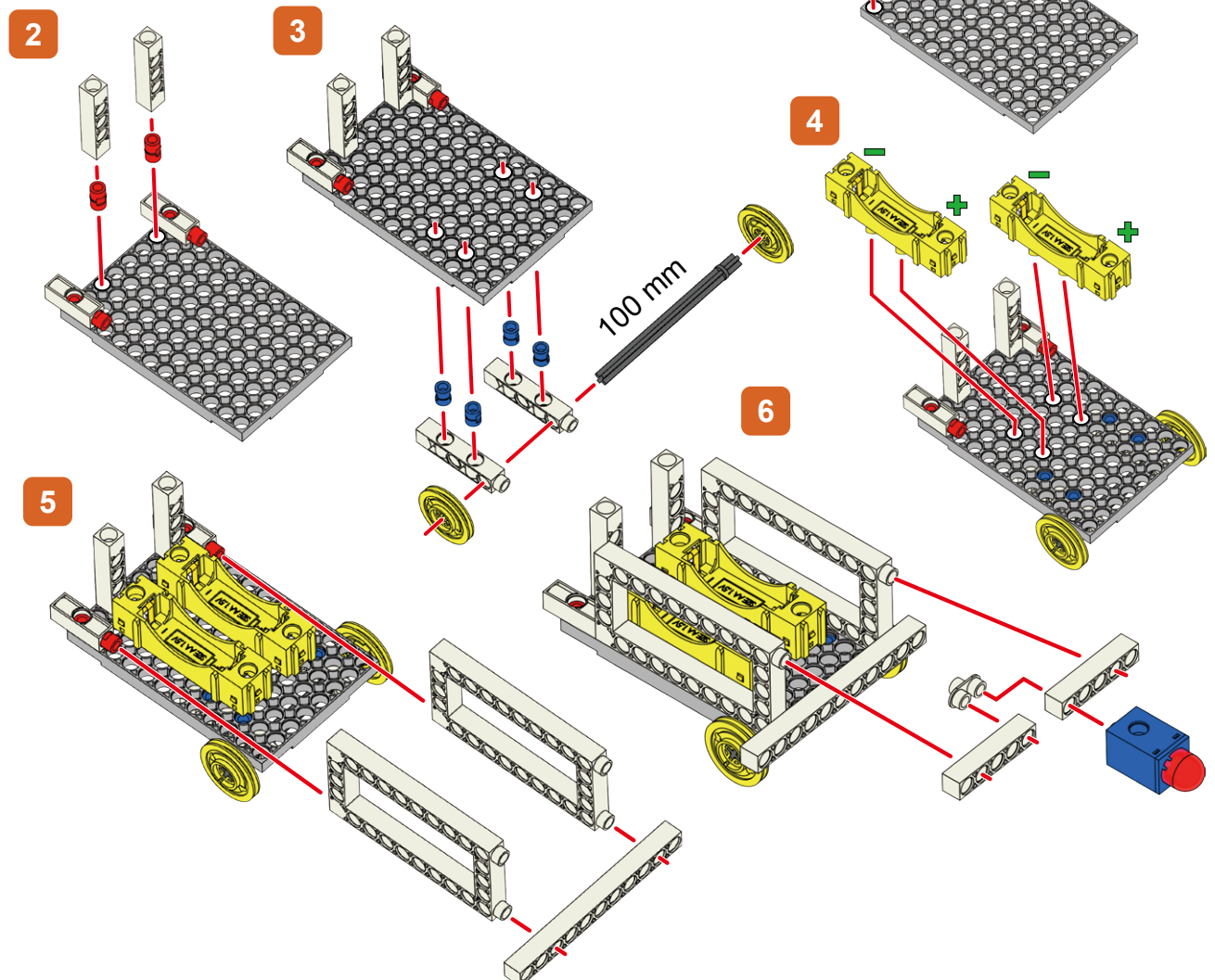
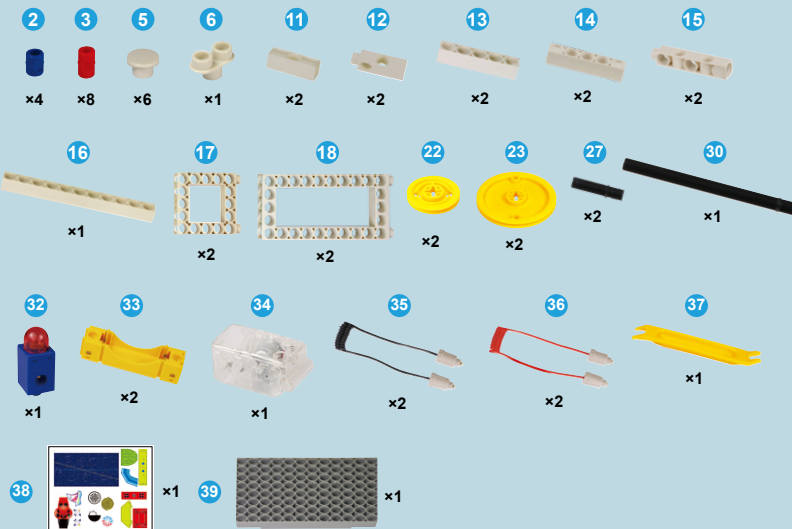


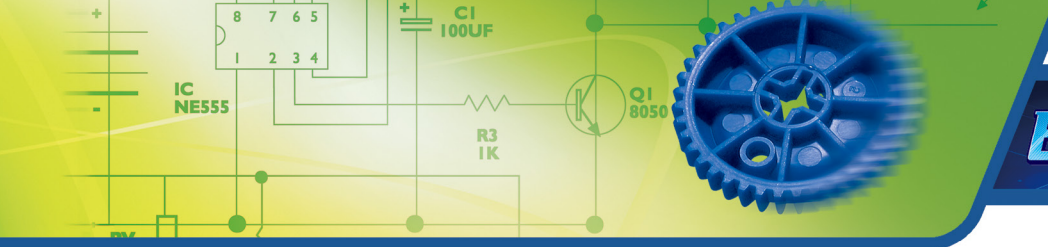
Modell 6 Radarsignaltorn



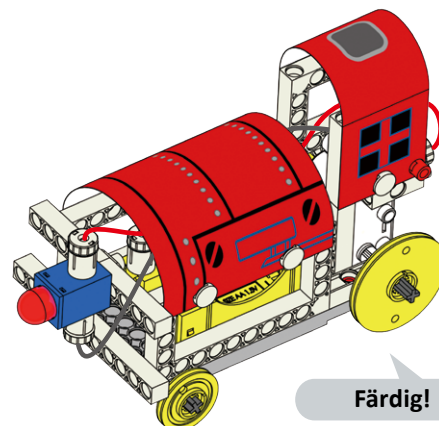
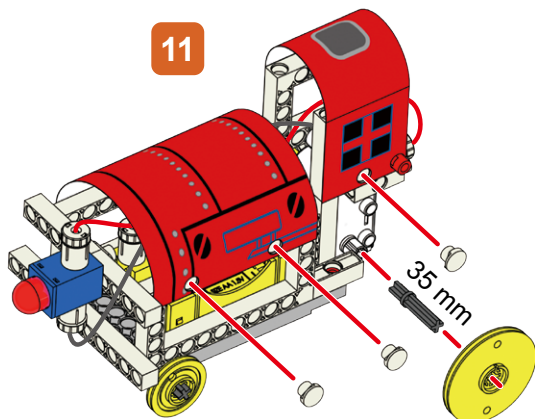
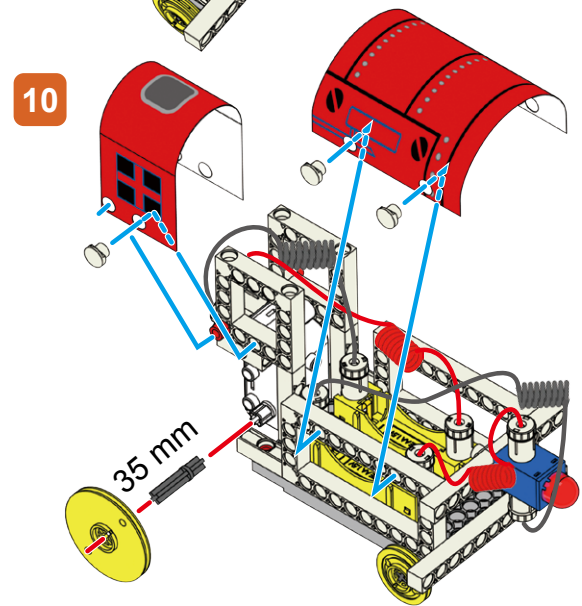
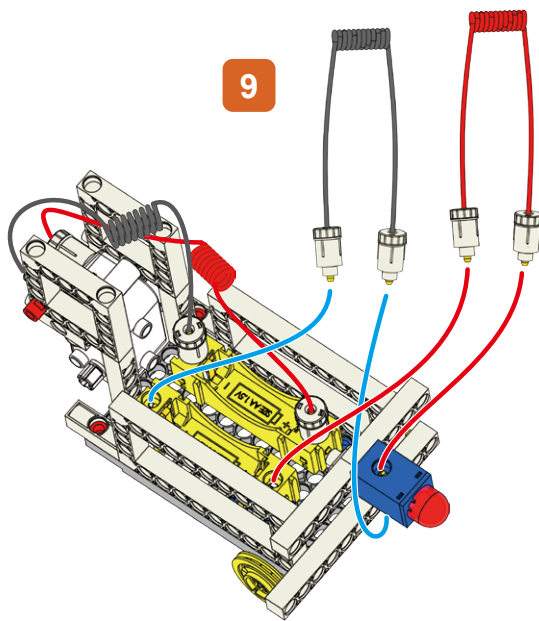
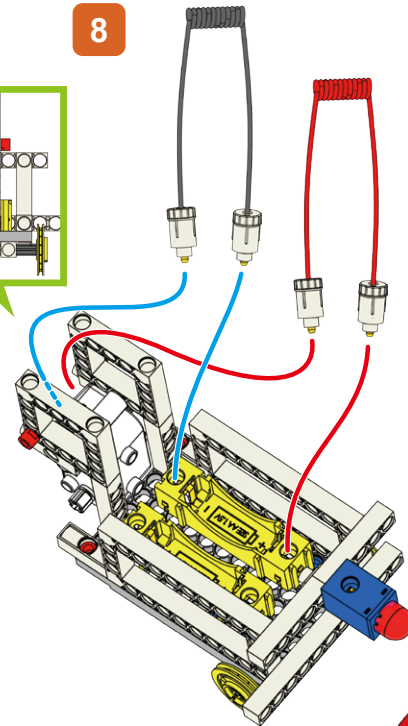
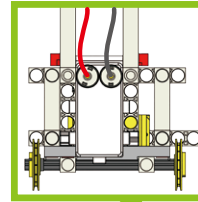
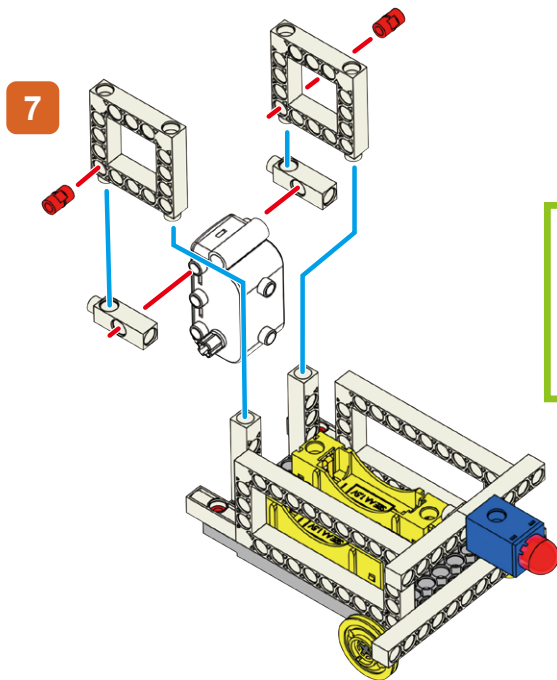
Färdig!

Komponenter



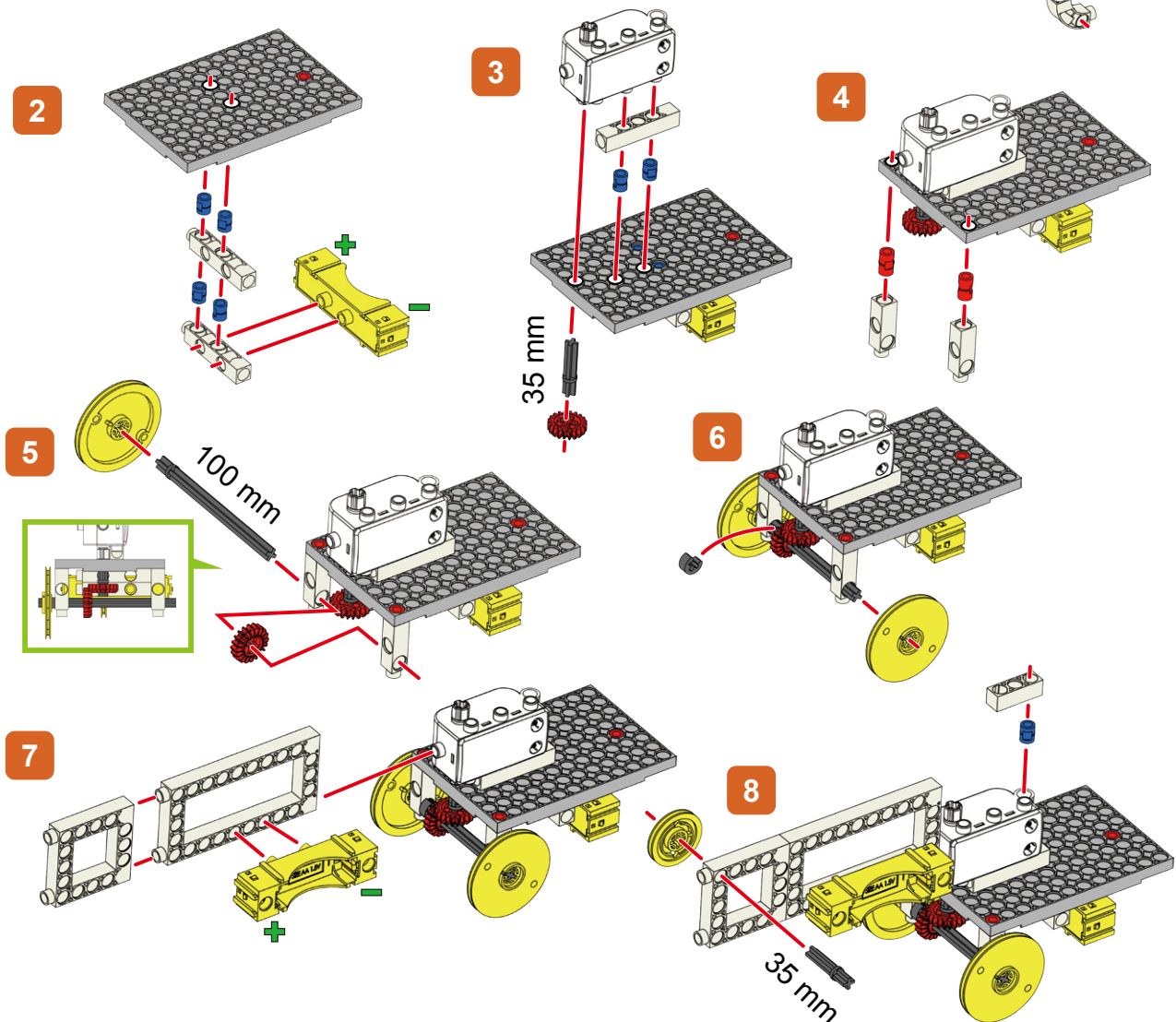
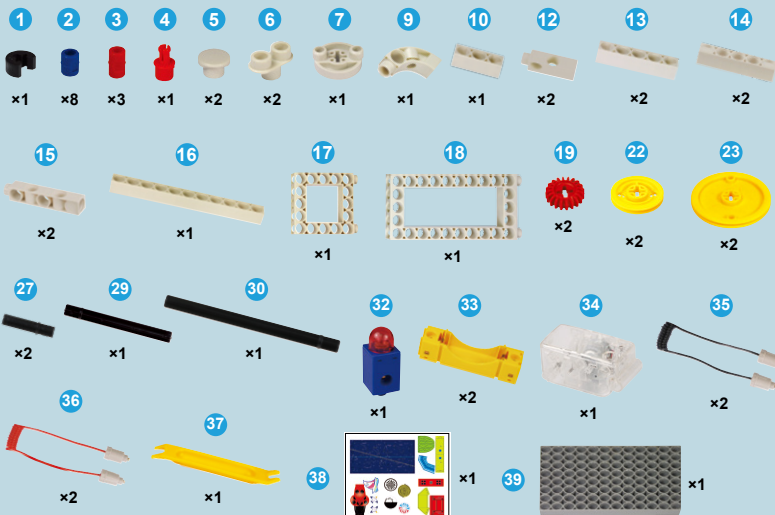


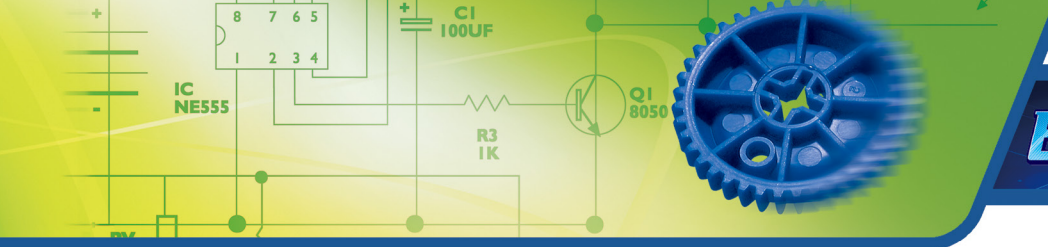
Modell 7 Tåg



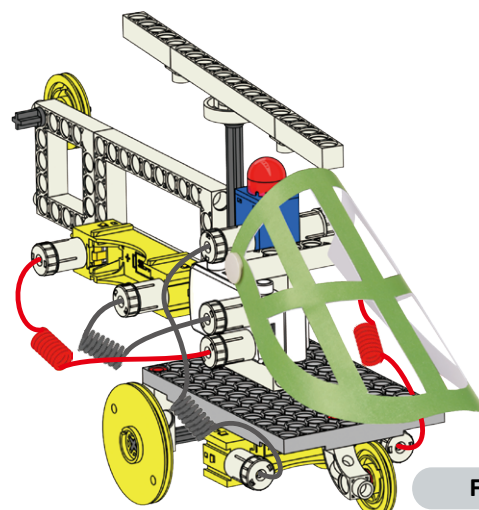
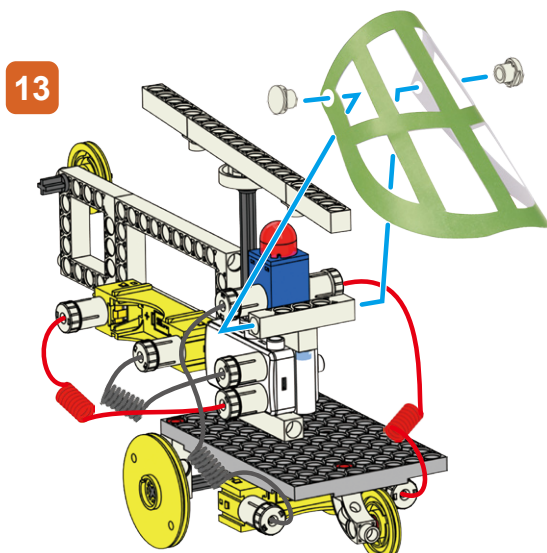
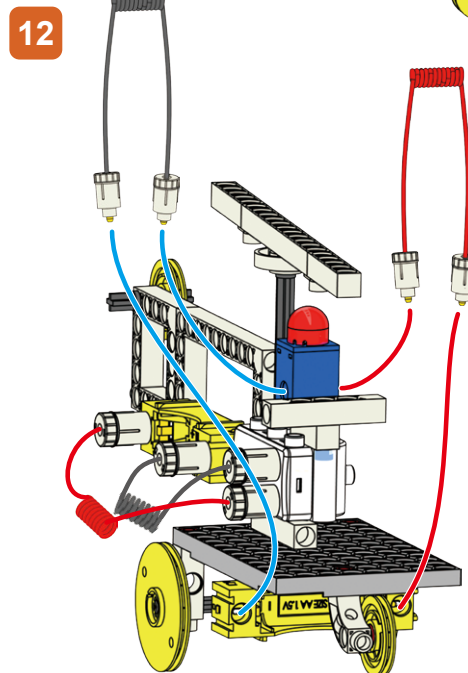
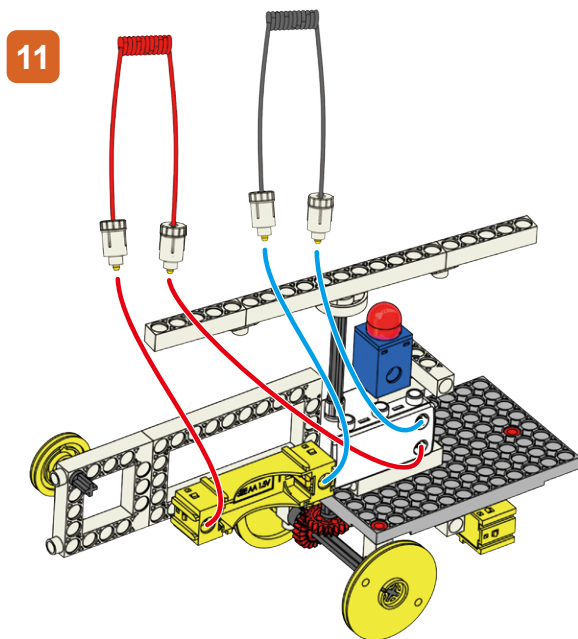
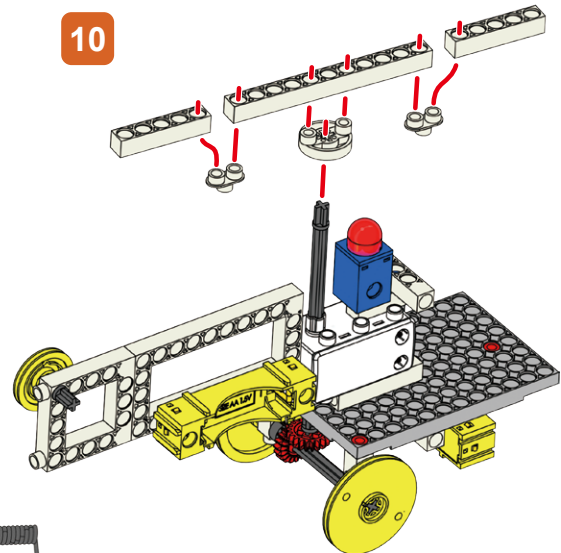
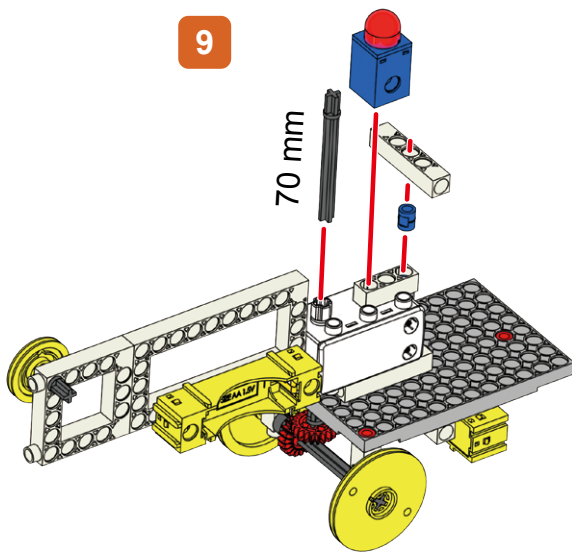
Färdig!

Komponenten





Modell 8 Helikopter



Färdig!

EXPERIMENTS



ELECTRICITY & MAGNETISM
#7065
10 Models to build
137 PCS



RC CUSTOM CARS
#7407
10 Models to build
260 PCS



CROSSBOWS AND CATAPULTS
#7406
10 Models to build
110 PCS



ORNITHOPTER
#7405
4 Models to build
49 PCS



MINI GYRO
#7395
20 Models to build
88 PCS



GECKOBOT
#7409
7 Models to build
176 PCS



SOLAR POWER 2.0
#7303
10 Models to build
120 PCS



WATER POWER
#7323
15 Models to build
165 PCS



WIND TURBINE
#7400
5 Models to build
77 PCS



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