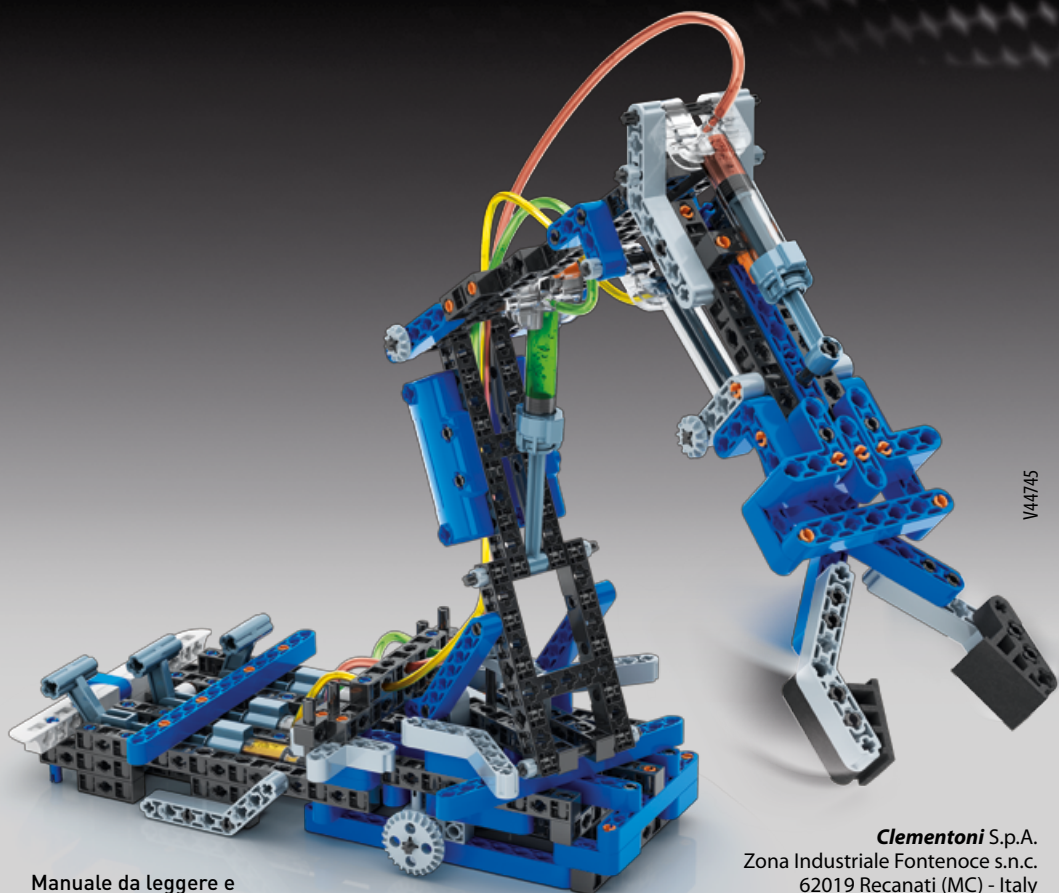


1

scienza
gioco &

TECNOLOGICA

Laboratorio di **MECCANICA** MACCHINARI IDRAULICI



V44745

Manuale da leggere e
conservare per future
referenze.

Clementoni S.p.A.
Zona Industriale Fontenoce s.n.c.
62019 Recanati (MC) - Italy
Tel.: +39 071 75811
www.clementoni.com



Assistenza clienti



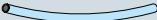





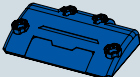











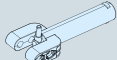



















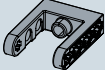


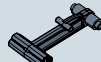

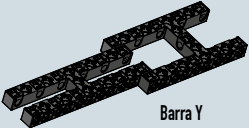


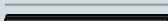
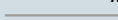
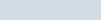



Tel. 02.82.52.52

Email - assistenza@clementoni.it



Clementoni

ELENCO DEI PEZZI

	Barra doppia 15 fori	pz. 4		Anello corto	pz. 12		Tubicino	pz. 3
	Barra doppia 11 fori	pz. 4		Vite senza fine	pz. 1		Elastico	pz. 1
	Barra doppia 9 fori	pz. 4		Gabbia portasatelliti	pz. 1		Pannello B	pz. 2
	Barra doppia 7 fori	pz. 6		Ruota 32 denti	pz. 1		Pannello E sx	pz. 1
	Barra doppia 5 fori	pz. 6		Ruota 24 denti	pz. 1		Pannello E dx	pz. 1
	Barra doppia 3 fori	pz. 6		Ruota 12 denti	pz. 9		Barra pinza morbida	pz. 2
	Barra singola 15 fori	pz. 4		Chiodino corto doppio	pz. 48		Tubo cilindro idraulico	pz. 3
	Barra singola 13 fori	pz. 4		Chiodino corto singolo	pz. 16		Gommino cilindro idraulico	pz. 3
	Barra singola 9 fori	pz. 4		Chiodino corto libero	pz. 48		Stelo cilindro idraulico	pz. 3
	Barra singola 7 fori	pz. 8		Chiodino lungo singolo	pz. 16		Cappuccio cilindro idraulico	pz. 3
	Barra singola 5 fori	pz. 8		Chiodino lungo libero	pz. 16		Tubo pompa idraulica	pz. 3
	Barra singola 3 fori	pz. 8		Barra con chiodini	pz. 2		Gommino pompa idraulica	pz. 3
	Modulo ad angolo alto	pz. 8		Barra con perni	pz. 6		Stelo pompa idraulica	pz. 3
	Modulo ad angolo basso	pz. 8		Modulo di trasmissione	pz. 1		Cappuccio pompa idraulica	pz. 3
	Barra a 4 fori	pz. 4					Leva pompa idraulica	pz. 3
	Barra T	pz. 4					Barra Y	pz. 2
	Barra ad angolo	pz. 8						
	Astina 7 L. cm. 9,9	pz. 1						
	Astina 6 L. cm. 11,7	pz. 1						
	Astina 5 L. cm. 8,1	pz. 1						
	Astina 4 L. cm. 7,2	pz. 1						
	Astina 3 L. cm. 5,4	pz. 5						
	Astina 2 L. cm. 3,6	pz. 2						
	Astina 1 L. cm. 2,7	pz. 1						

N.B.: far eseguire da un adulto la rimozione dei pezzi dai supporti in plastica. Eventuali residui pungenti devono essere smaltiti prontamente.



FATTI AIUTARE DA UN ADULTO!





I mezzi pesanti da lavoro, come gli escavatori, sono un classico esempio di **macchinari idraulici**.

Si tratta di macchine o utensili che sfruttano la potenza generata da **fluidi** (ad esempio olii idraulici) per compiere un lavoro.

I fluidi vengono fatti scorrere da un punto all'altro della macchina all'interno di tubi flessibili e snodi.

Sotto il controllo dell'operatore, le **pompe idrauliche** generano il flusso, trasmettendo il liquido ai **cilindri idraulici** che ne convertono la pressione del fluido in movimento meccanico. L'energia in movimento meccanico.

Il braccio idraulico che andremo a costruire in questo manuale è uno strumento che permette la manipolazione di oggetti sfruttando le proprietà dei fluidi.

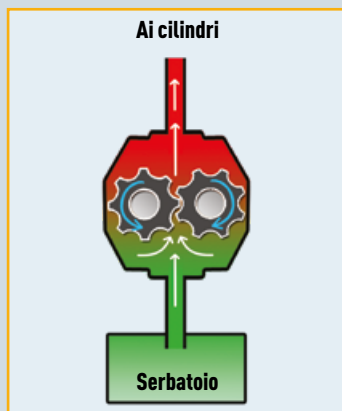
Bracci idraulici capaci di sollevare, spostare e ruotare oggetti molto pesanti venivano utilizzati anche nelle industrie automobilistiche, lungo la catena di montaggio. Oggi sono stati sostituiti da bracci robotici, costruiti con motori estremamente potenti e precisi.



La pompa idraulica

La **pompa** è una macchina in grado di spostare materiale fluido (olio o acqua) grazie ad un movimento meccanico.

Un esempio di **pompa idraulica** è la pompa ad ingranaggi. Il funzionamento è molto semplice: le due ruote dentate accoppiate, tramite rotazione, spingono il liquido nello spazio tra i denti, spostandolo di conseguenza dal serbatoio fino ai cilindri idraulici.

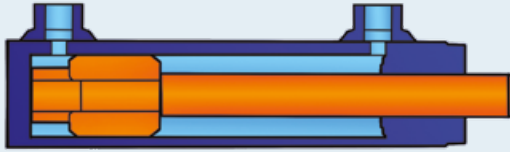


Il cilindro idraulico

Il cilindro idraulico è un attuttore che sfrutta la pressione del fluido idraulico per compiere uno spostamento.

È costituito da due componenti meccaniche:

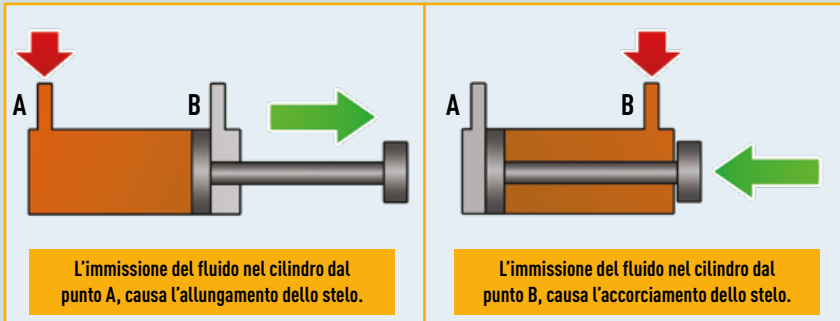
- **Cilindro:** il corpo cilindrico vuoto che viene riempito dal fluido idraulico.
- **Pistone o stelo:** la parte mobile che fuoriesce dal cilindro.



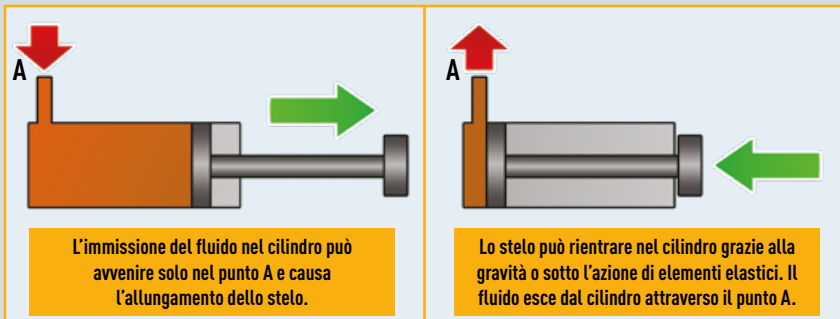
Come funziona? La pressione esercitata dal fluido idraulico, immesso nella cavità del cilindro sotto l'azione della pompa, causa l'allungamento o l'accorciamento del pistone (o stelo).

Il cilindro idraulico può essere a singolo effetto o a doppio effetto.

IL CILINDRO IDRAULICO A DOPPIO EFFETTO



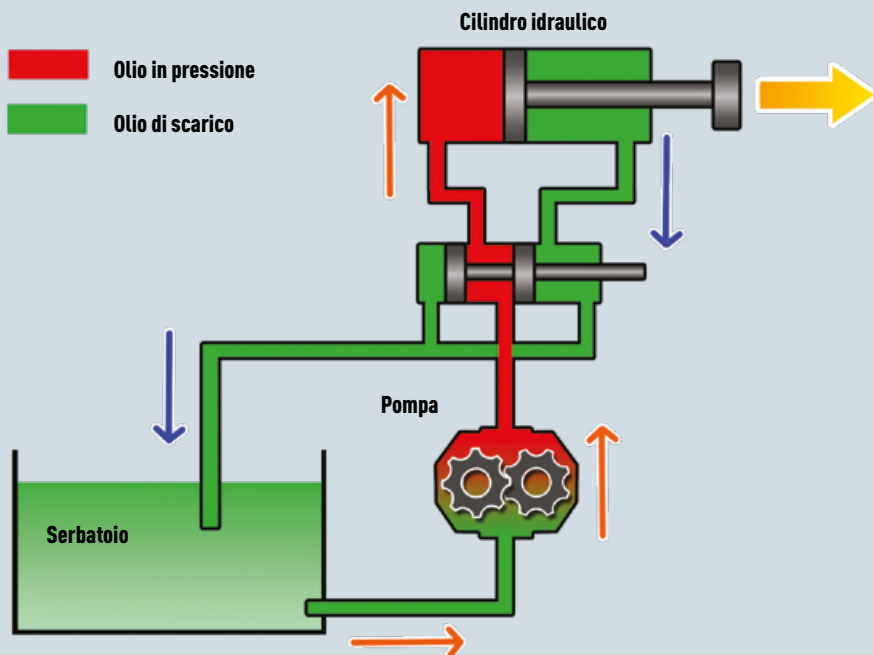
IL CILINDRO IDRAULICO A SINGOLO EFFETTO



Il circuito idraulico

Per connettere la pompa al cilindro idraulico, bisogna realizzare un **circuito idraulico** utilizzando tubi flessibili o rigidi, nei quali scorre il fluido.

La **pressione del fluido**, generata dalla pompa, aziona lo stelo del cilindro e mette in movimento la **trasmissione idraulica**.



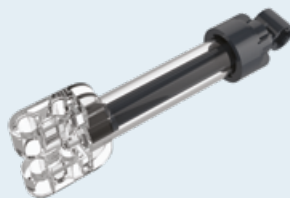
Nel nostro **braccio idraulico**, andremo a realizzare 3 circuiti idraulici per controllare 3 diversi movimenti del braccio.

Pompa idraulica



La nostra pompa idraulica si attiva tramite un meccanismo a leva che spinge il liquido nel cilindro idraulico

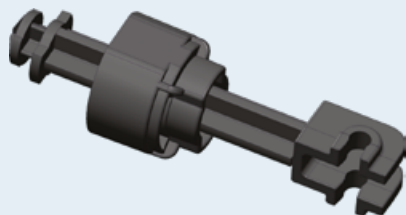
Cilindro idraulico



Come per il cilindro a singolo effetto, il nostro attuatore ha una sola via d'accesso per il liquido

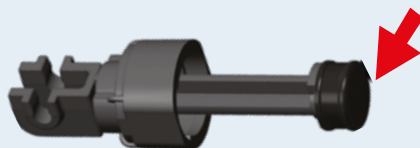
ASSEMBLAGGIO DELLA POMPA IDRAULICA

1



Inserisci lo stelo nel cappuccio

2



Applica il gommino. L'interno del gommino della pompa idraulica è ovalizzato per alloggiare la testa dello stelo. Assicurati di applicarlo nel verso corretto.



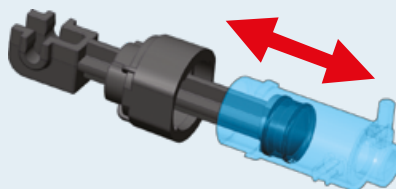
3

ATTENZIONE!

Per il corretto funzionamento della pompa si consiglia di oliare il gommino. Utilizza del comune olio alimentare che puoi facilmente reperire in casa e applicalo servendoti di un bicchierino come indicato qui al lato.

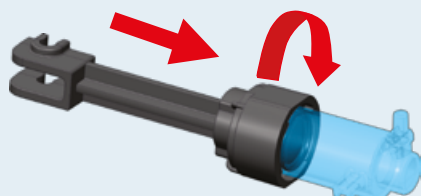


4



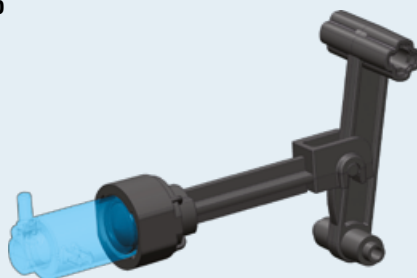
Inserisci lo stelo nel cilindro

5



Spingi il cappuccio sopra il cilindro e poi ruotalo per bloccarlo in posizione.

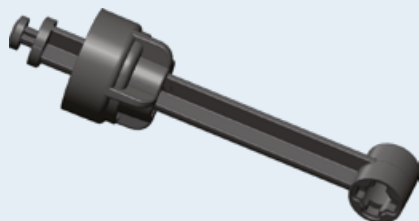
6



Fissa la leva allo stelo

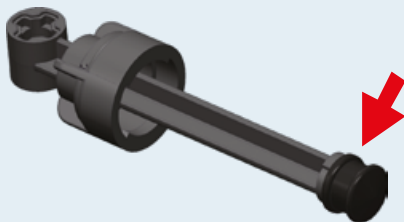
ASSEMBLAGGIO DEL CILINDRO IDRAULICO

1



Inserisci lo stelo nel cappuccio

2



Applica il gommino

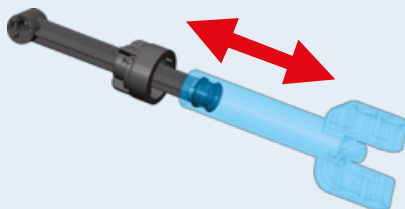
3

ATTENZIONE!

Per il corretto funzionamento della pompa si consiglia di oliare il gommino. Utilizza del comune olio alimentare che puoi facilmente reperire in casa e applicalo servendoti di un bicchierino come indicato qui al lato.

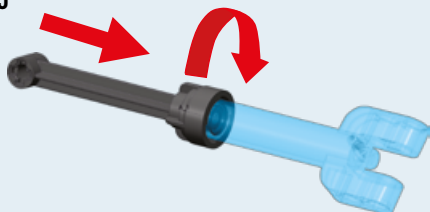


4



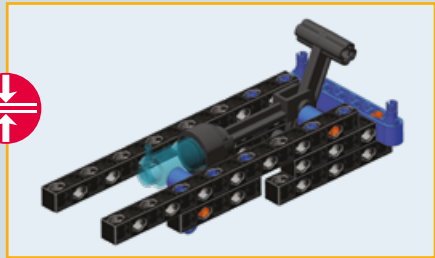
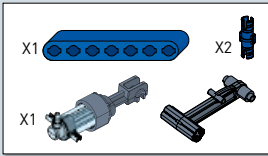
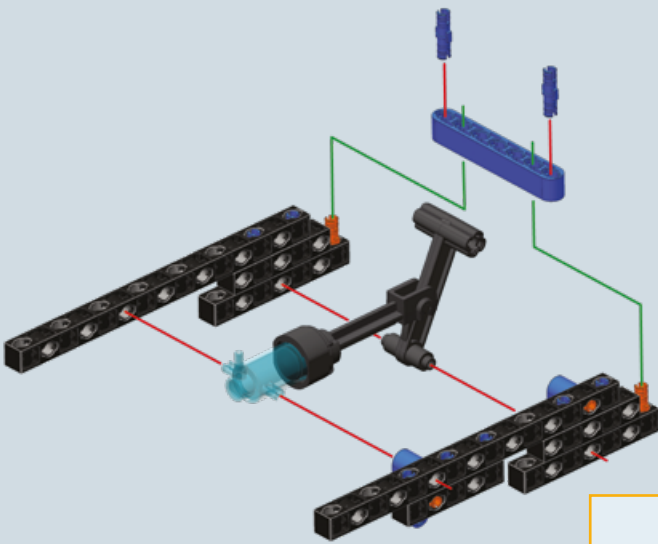
Dopo aver oliato il gommino inserisci lo stelo nel cilindro trasparente e fallo scorrere avanti e indietro, in modo da lubrificare le pareti del cilindro.

5

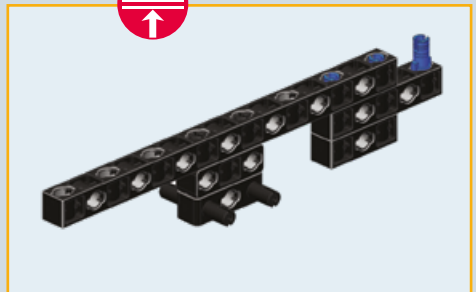
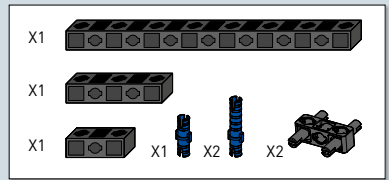
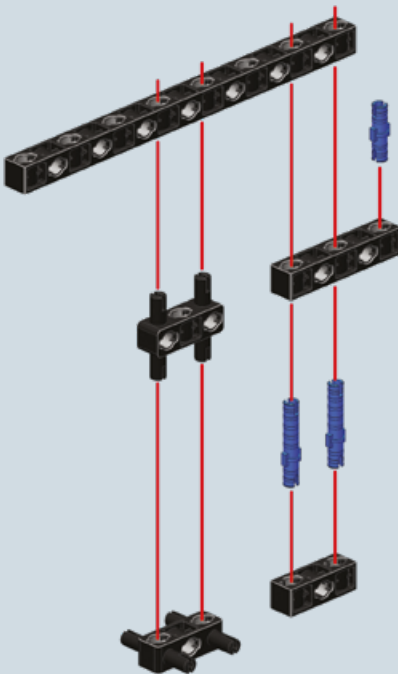


Spingi il cappuccio sopra il cilindro e poi ruotalo per bloccarlo in posizione.

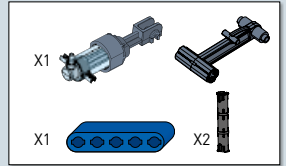
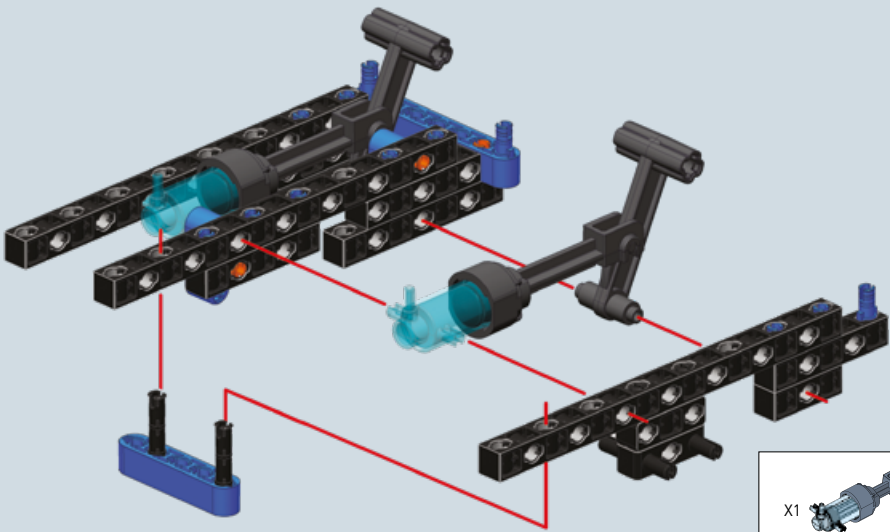
4



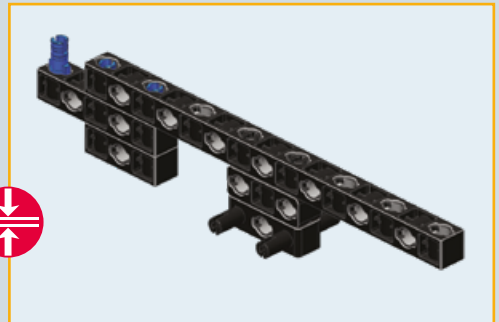
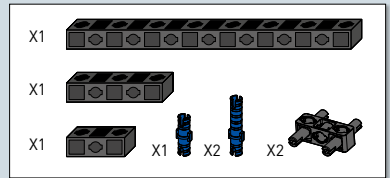
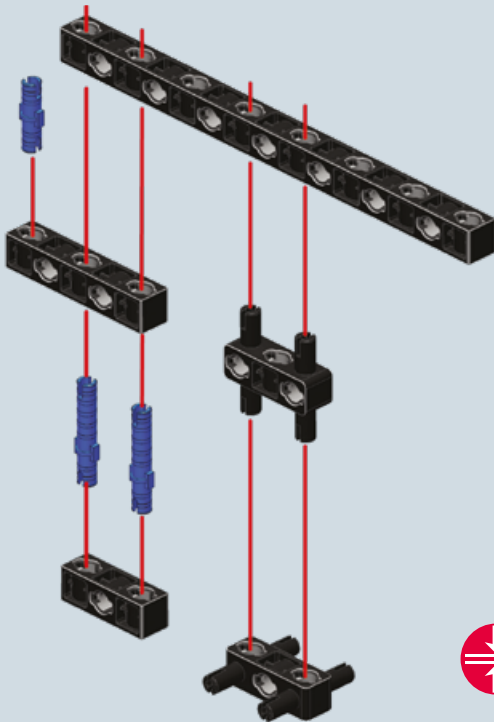
5



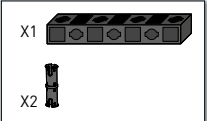
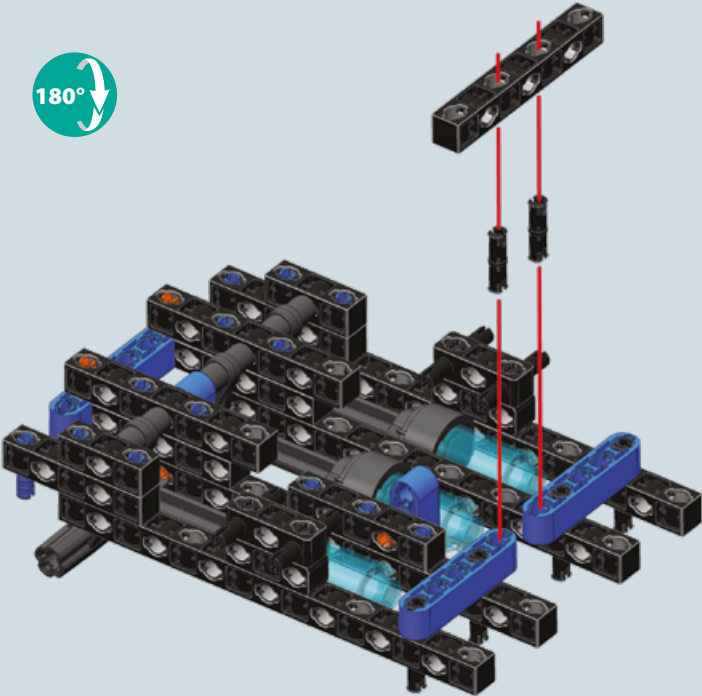
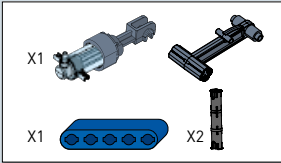
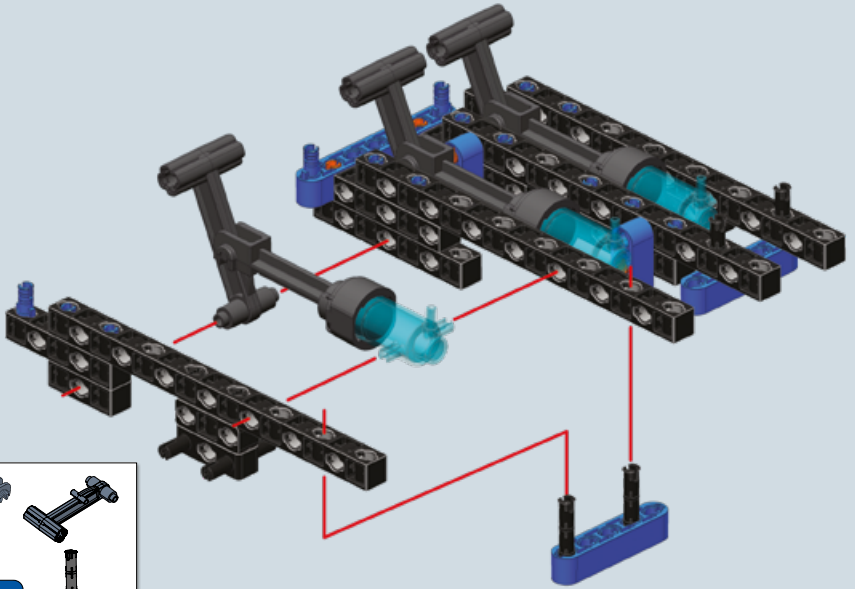
6



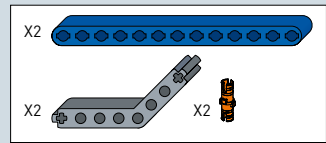
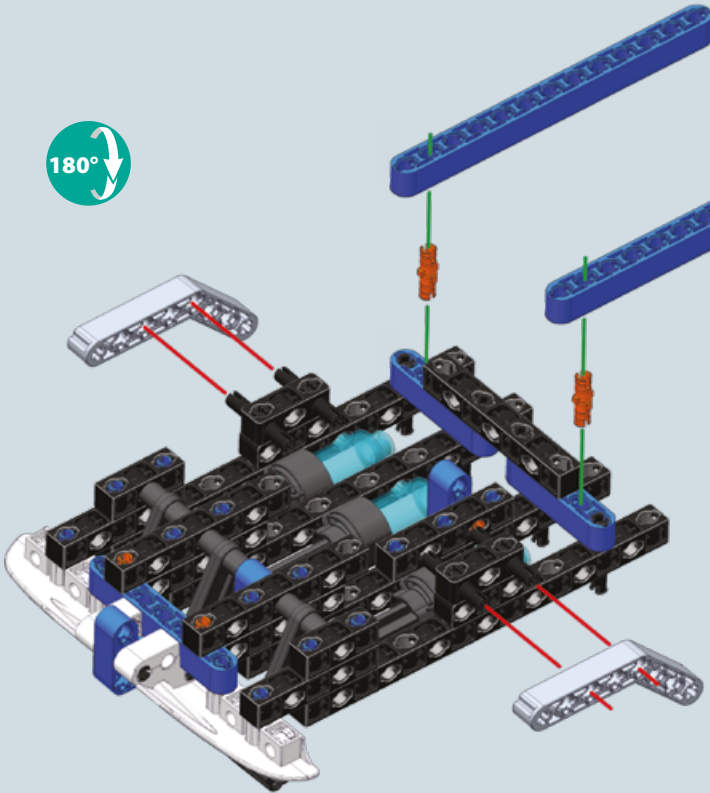
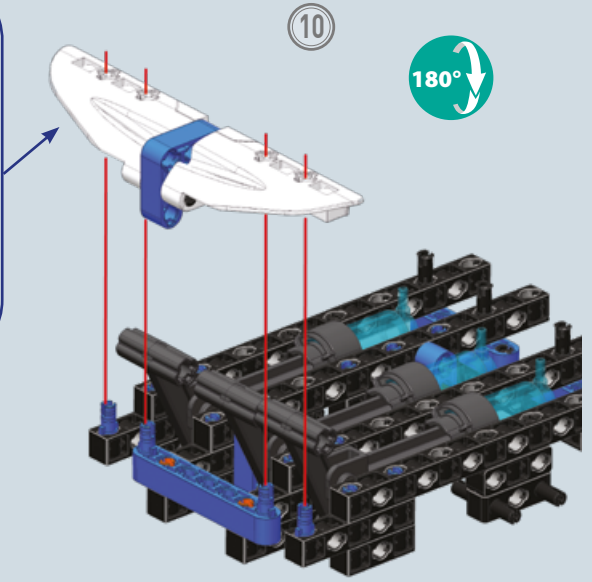
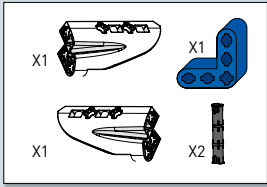
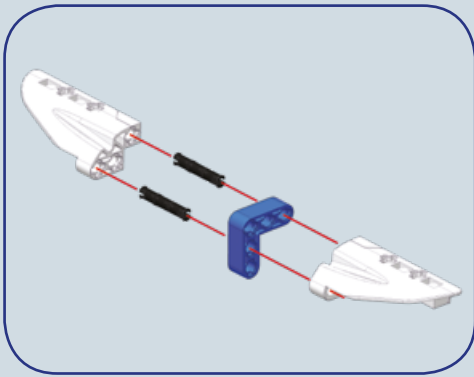
7



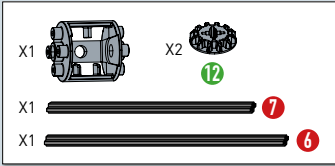
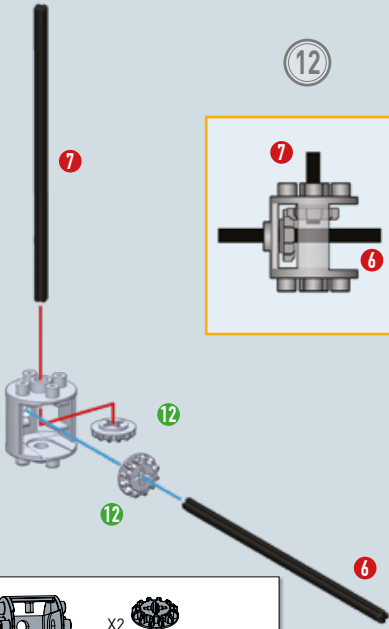
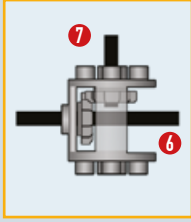
8



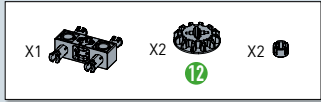
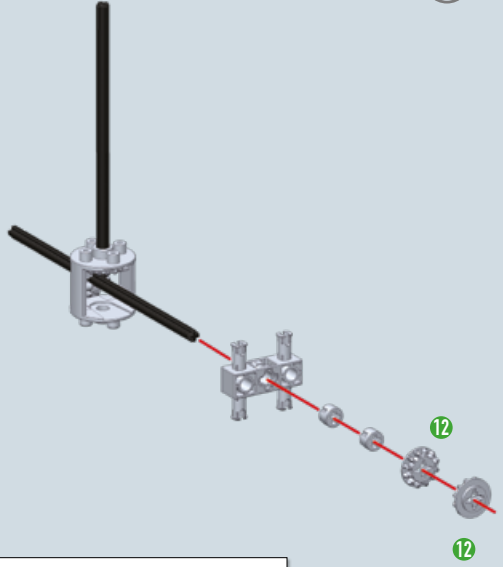
9



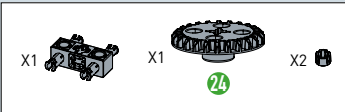
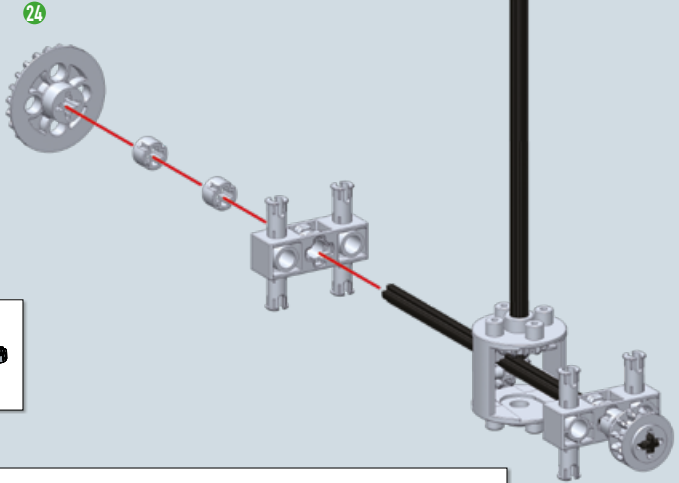
12



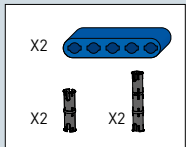
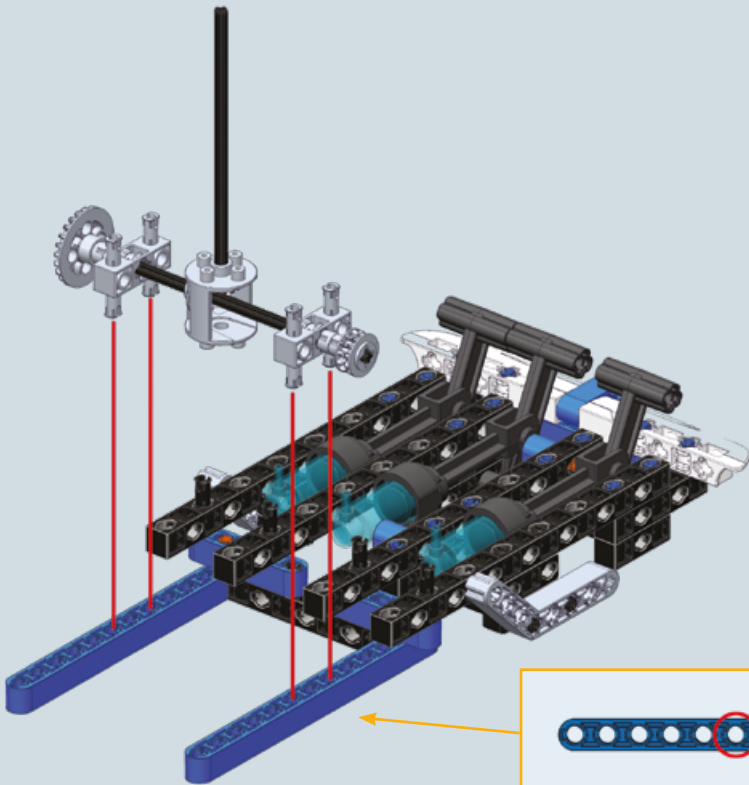
13



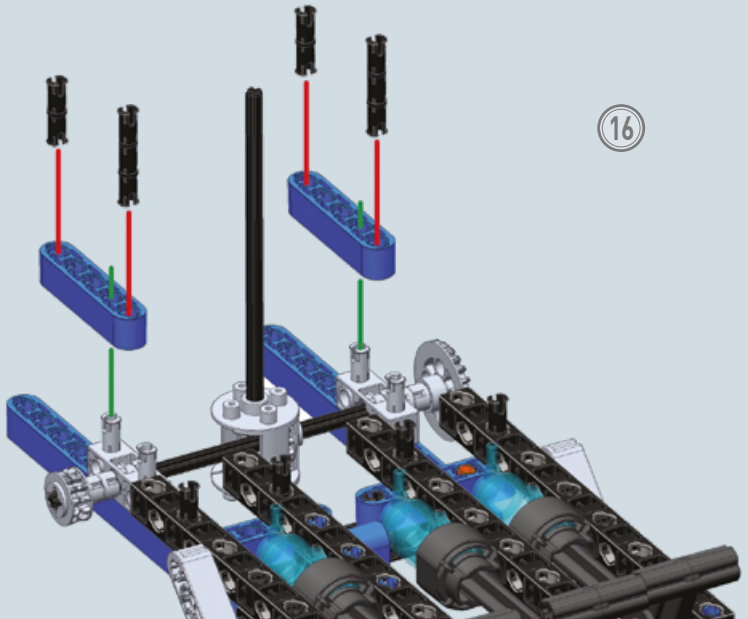
14

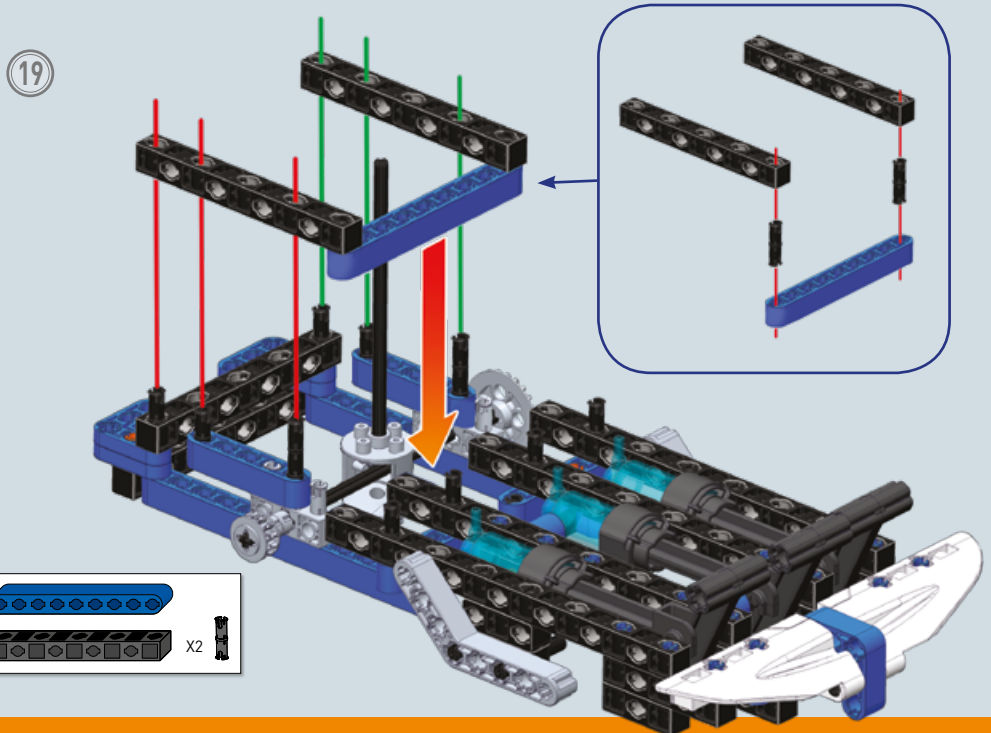
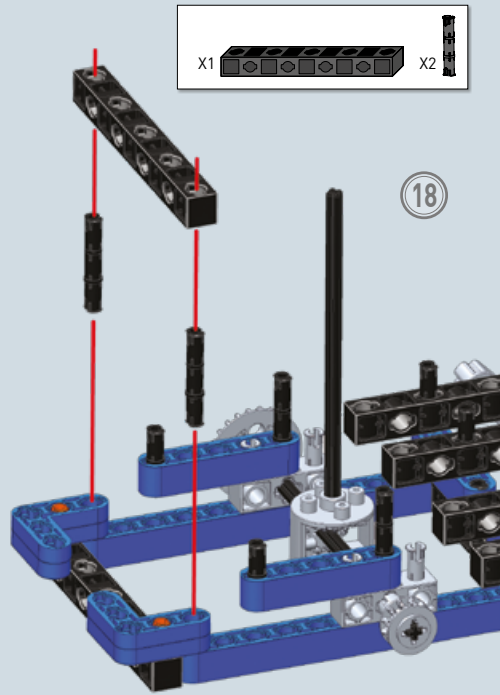
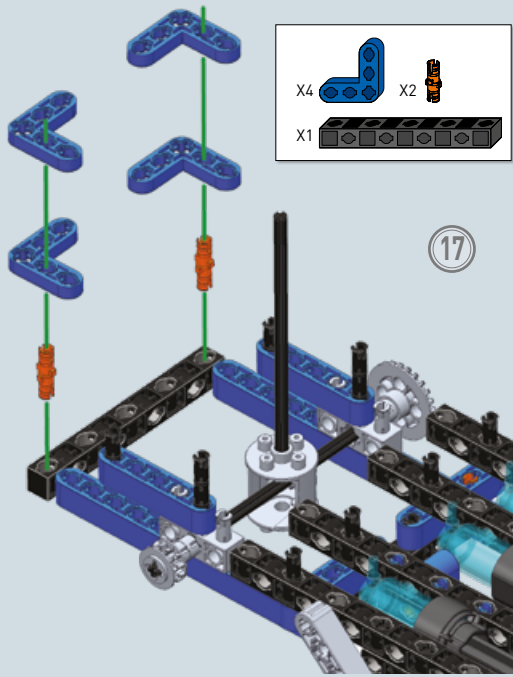


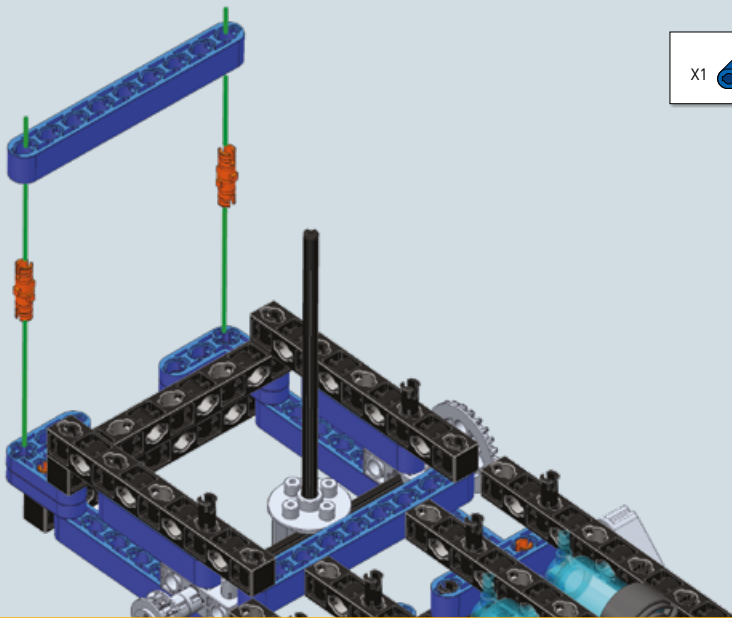
15





16

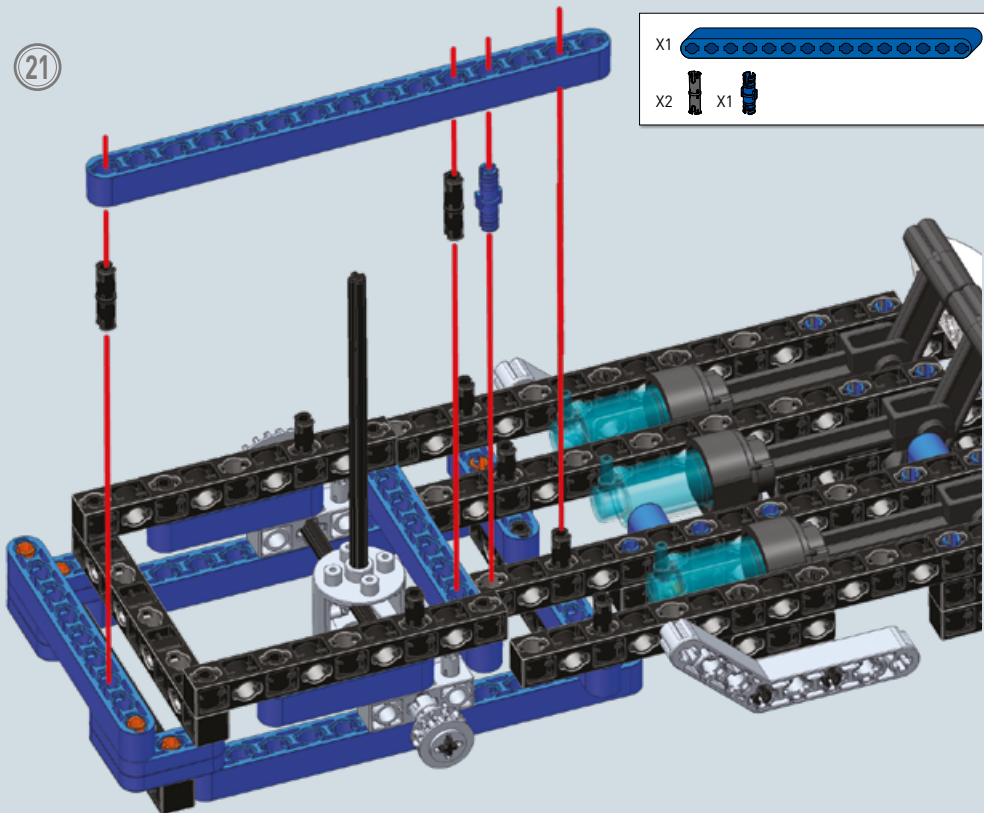









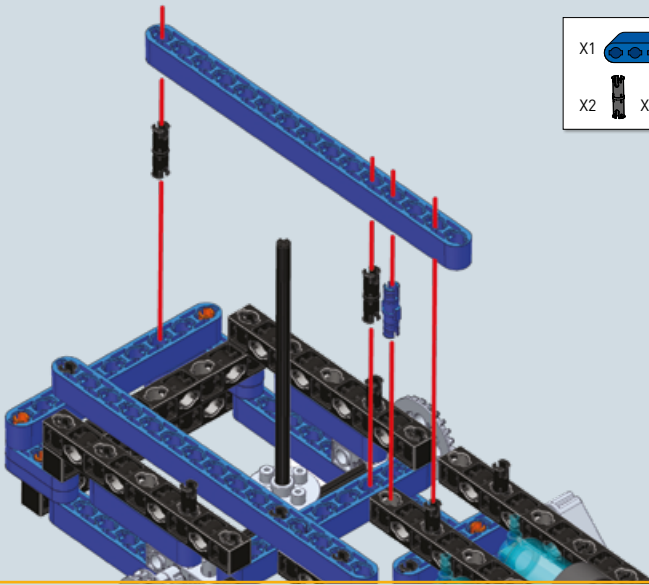
X1  X2 

20



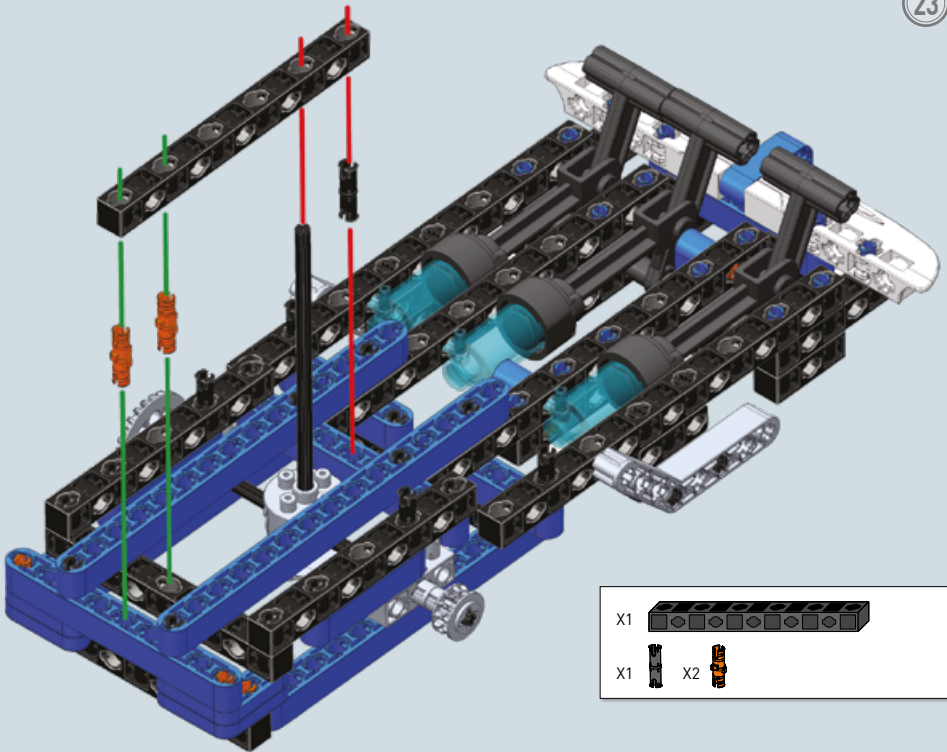
X1 
 X2  X1 

21



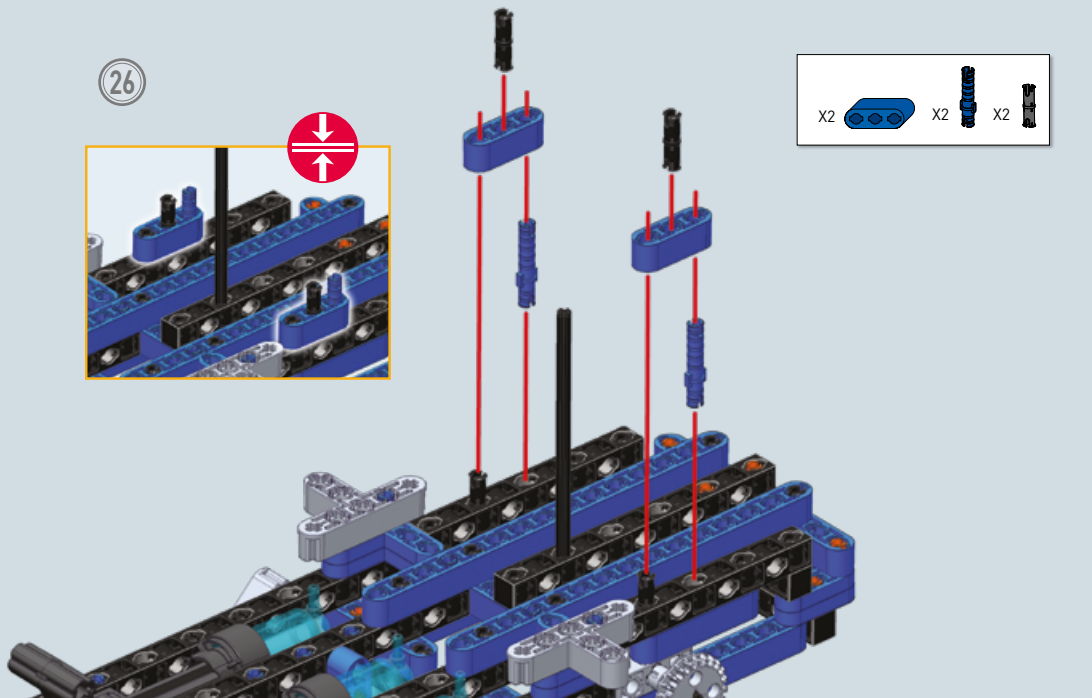
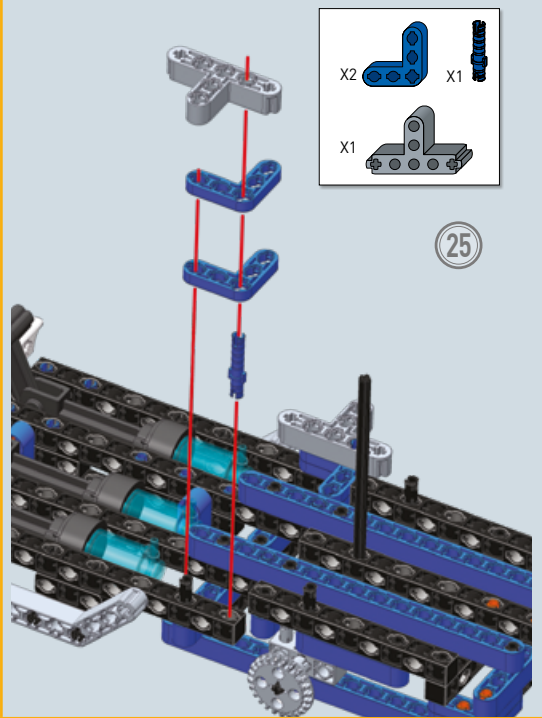
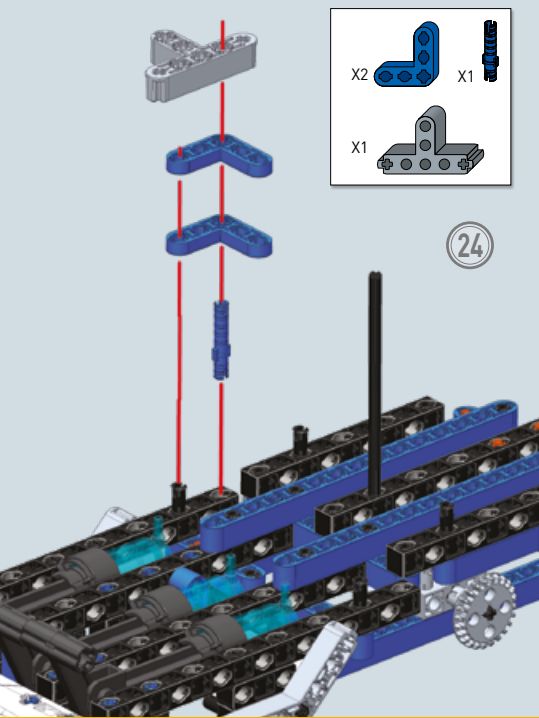
X1	
X2	
X1	

22

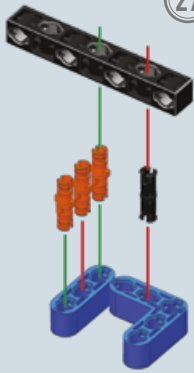


X1	
X1	
X2	

23

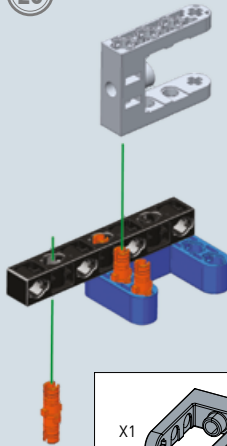


27



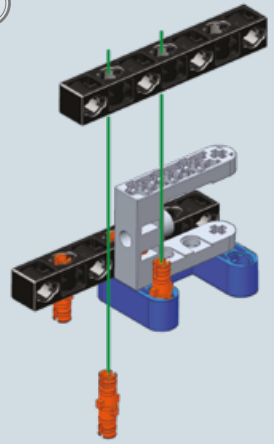
- X1
- X1
- X1 X3 X1

28



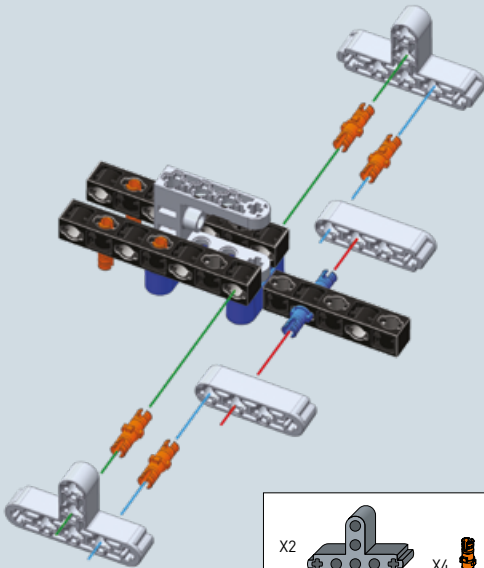
- X1
- X1

29



- X1
- X1

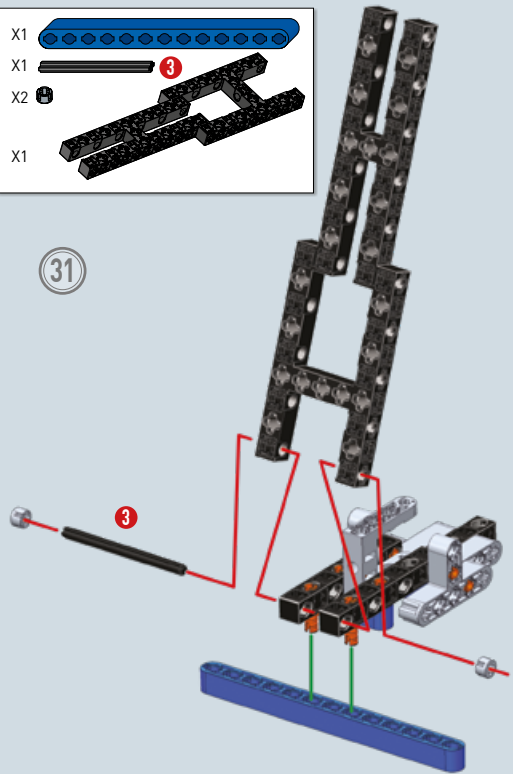
30



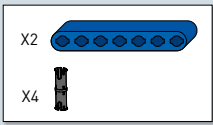
- X2
- X4
- X2
- X1
- X1

- X1
- X1
- X2
- X1

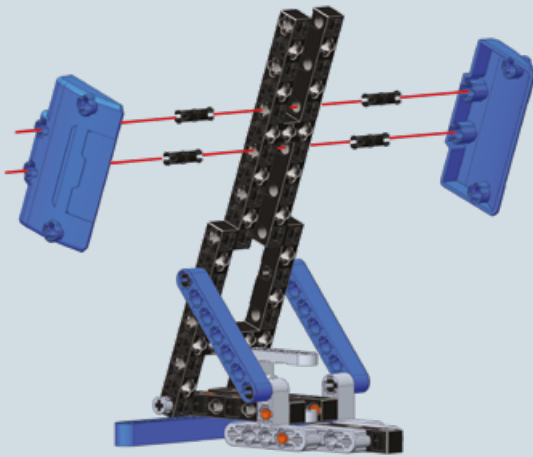
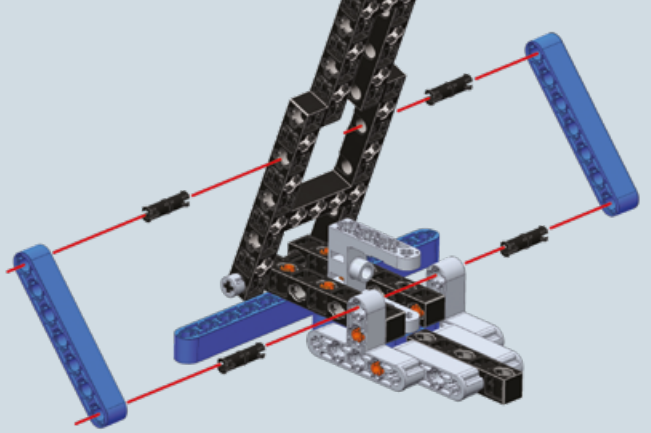
31



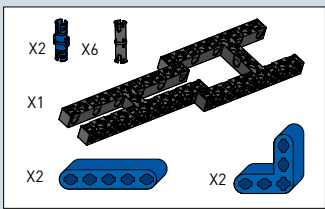
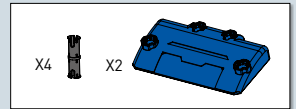
- 1:1



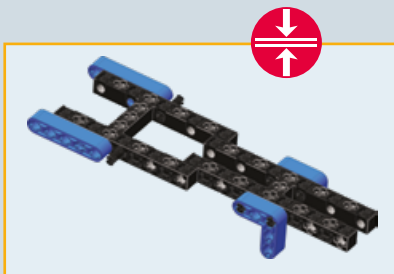
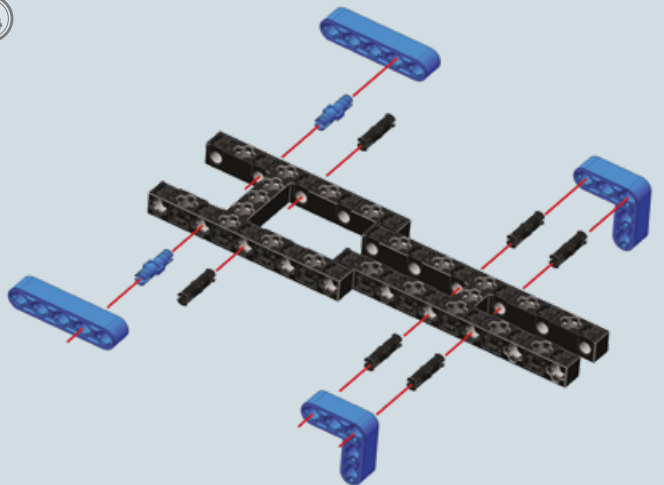
32



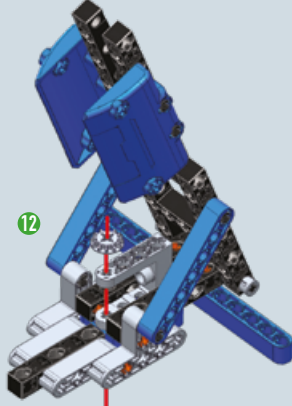
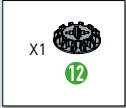
33



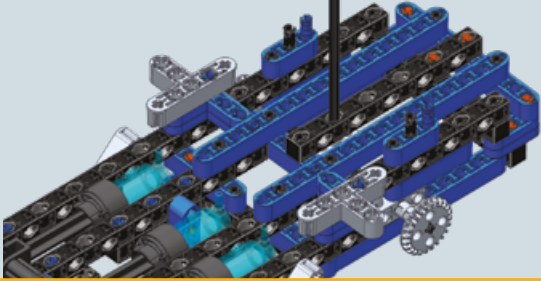
34



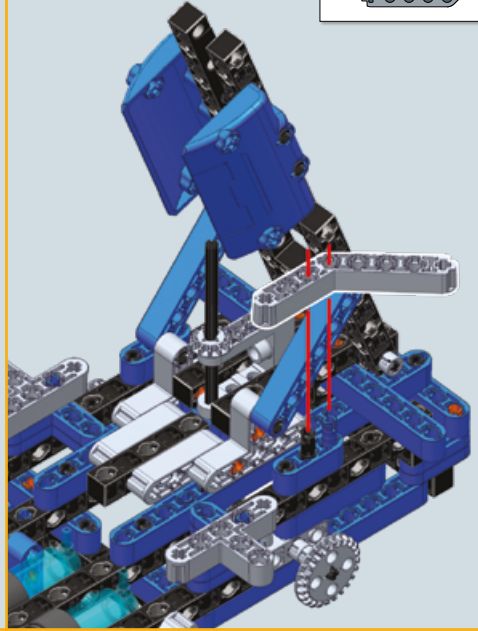
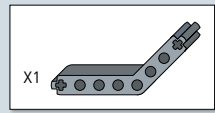
35



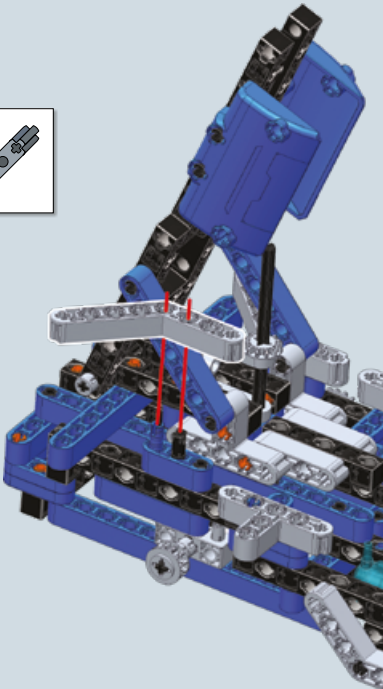
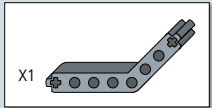
12



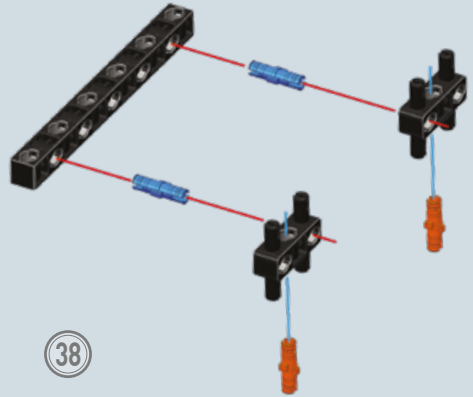
36

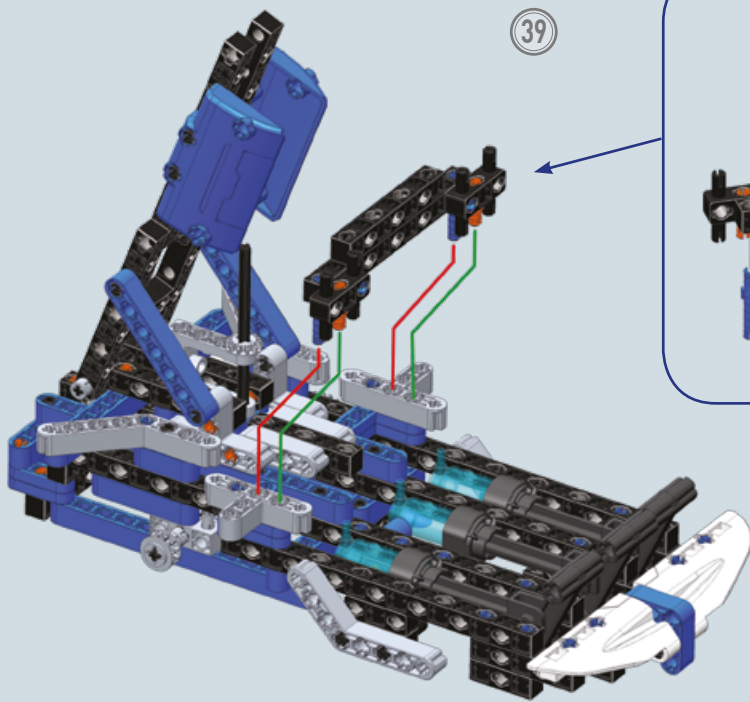


37

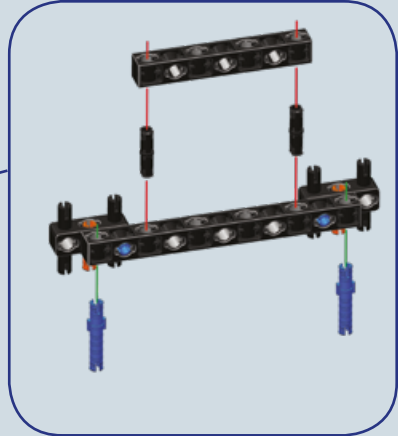


38

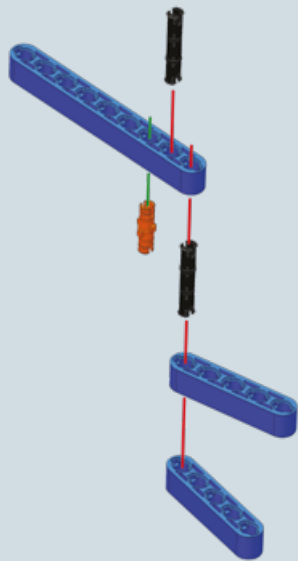




39

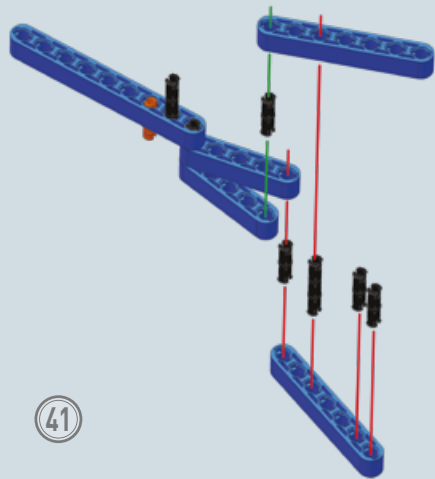


- X1
- X2
- X2



40

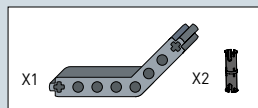
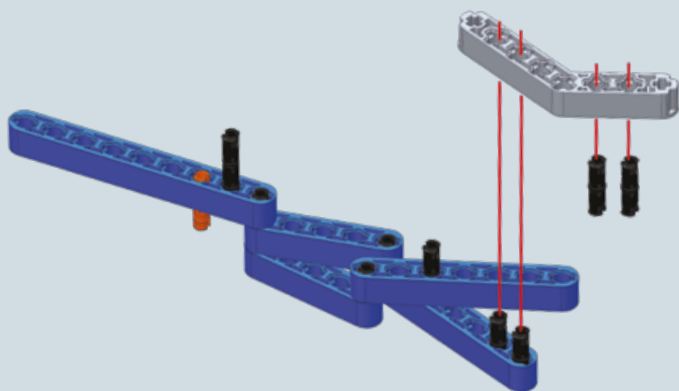
- X1
- X2
- X1
- X2



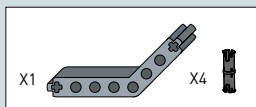
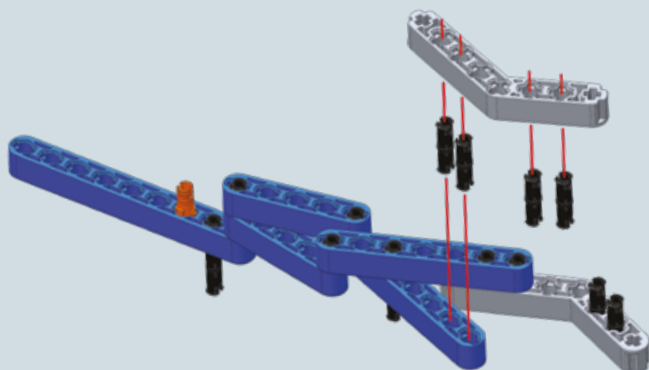
41

- X2
- X4
- X1

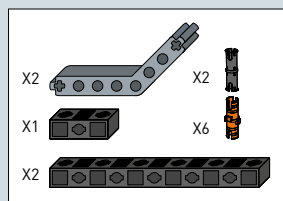
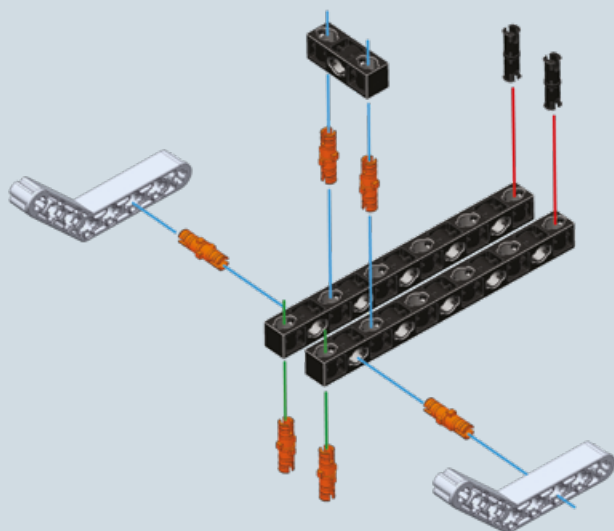
42



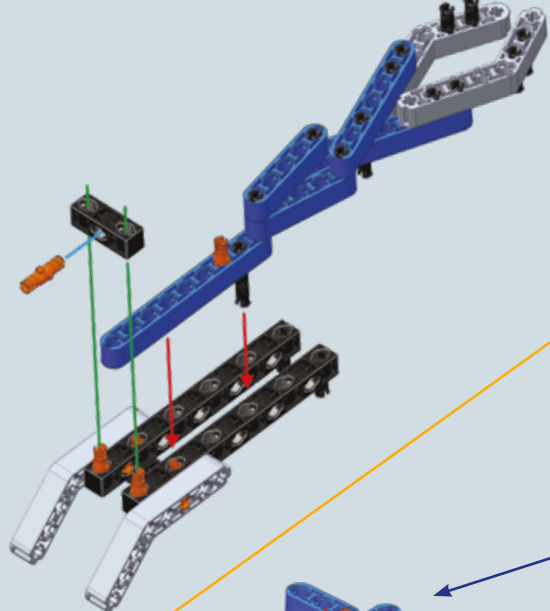
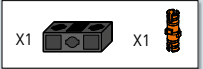
43



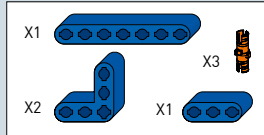
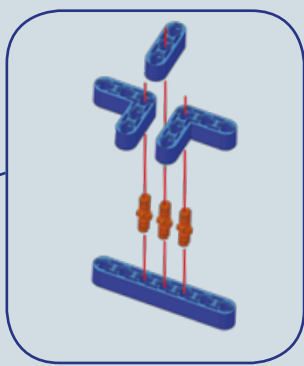
44



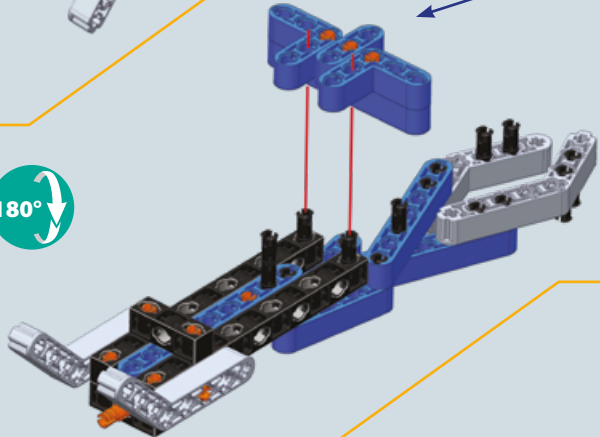
45



46

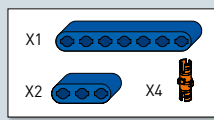
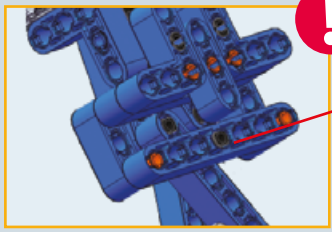
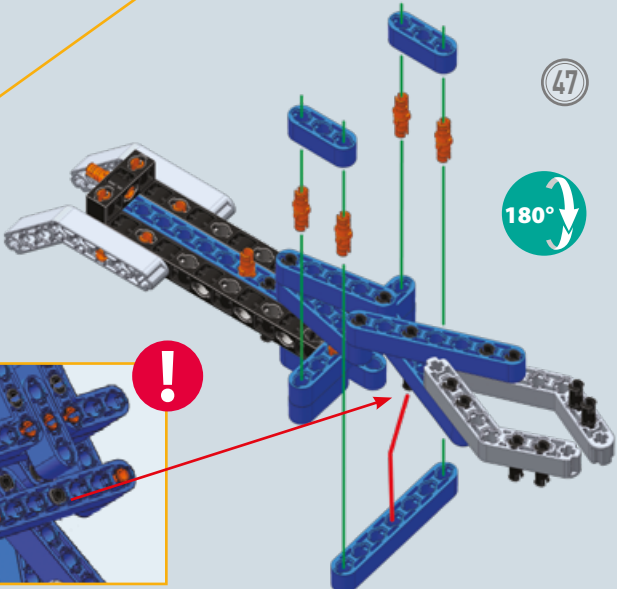


180°

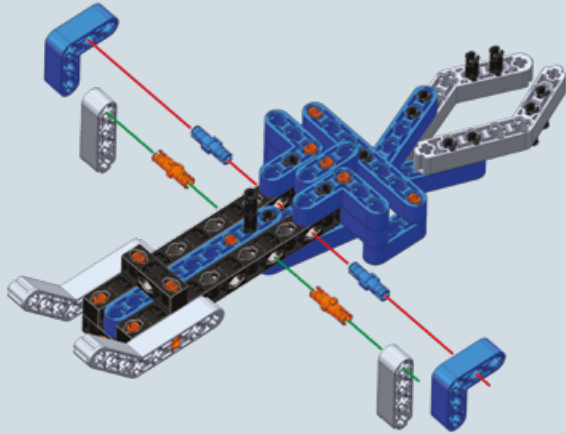
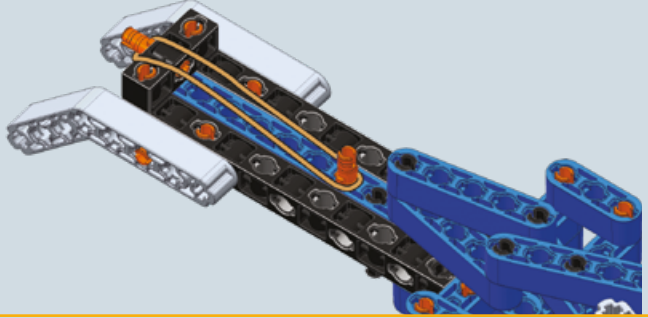
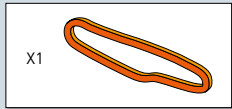


47

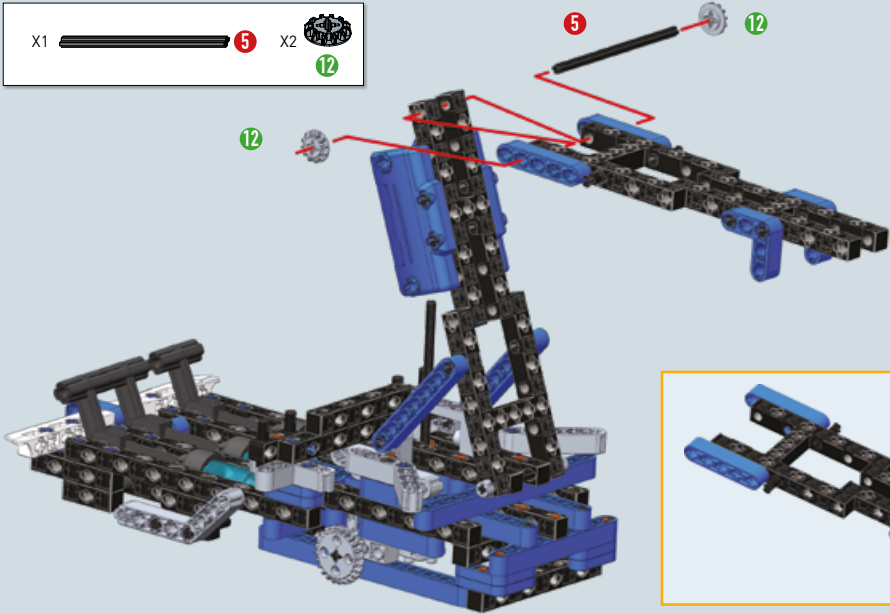
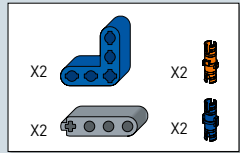
180°



48



49

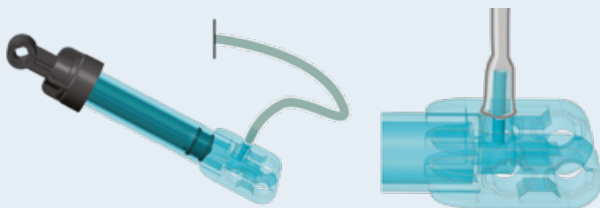


50

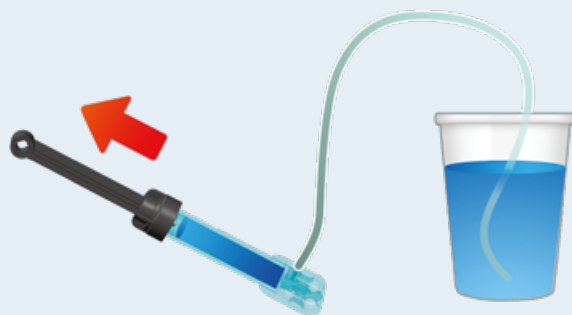


Fatti aiutare da un adulto!

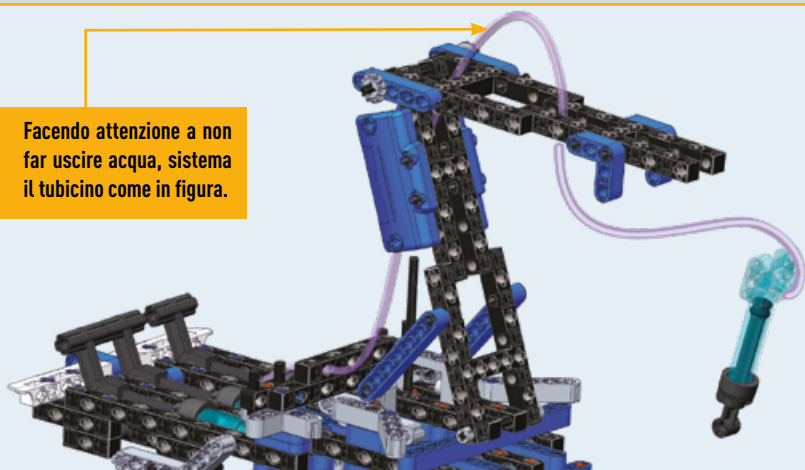
1. Connetti il tubicino trasparente al cilindro idraulico come nell'immagine a fianco. Spingi bene in fondo il tubicino in modo da incastrarlo saldamente.



2. Riempi un bicchiere d'acqua e immergi completamente il tubicino. Aspira l'acqua allungando lo stelo del cilindro. Ripeti la manovra 2 o 3 volte fino a riempire la cavità del cilindro lasciando meno aria possibile.



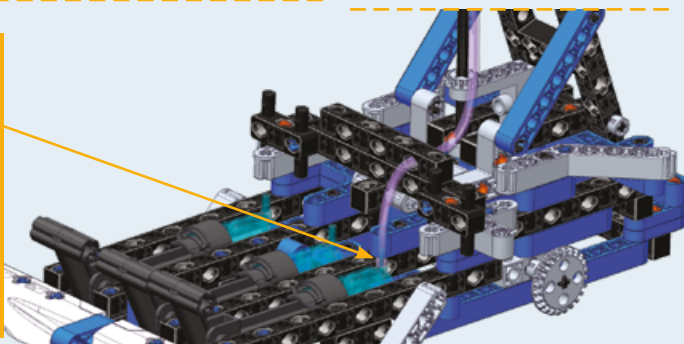
3. Facendo attenzione a non far uscire acqua, sistema il tubicino come in figura.



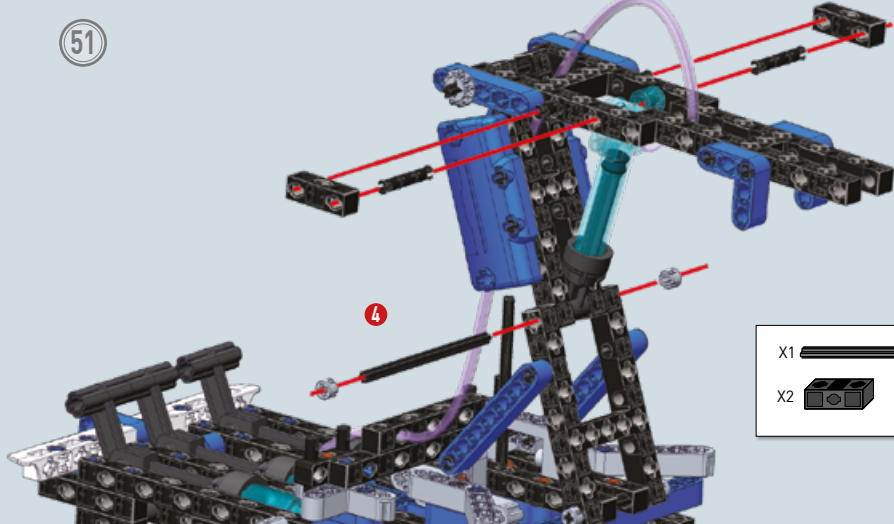
4. Spingi la leva della pompa idraulica in posizione:







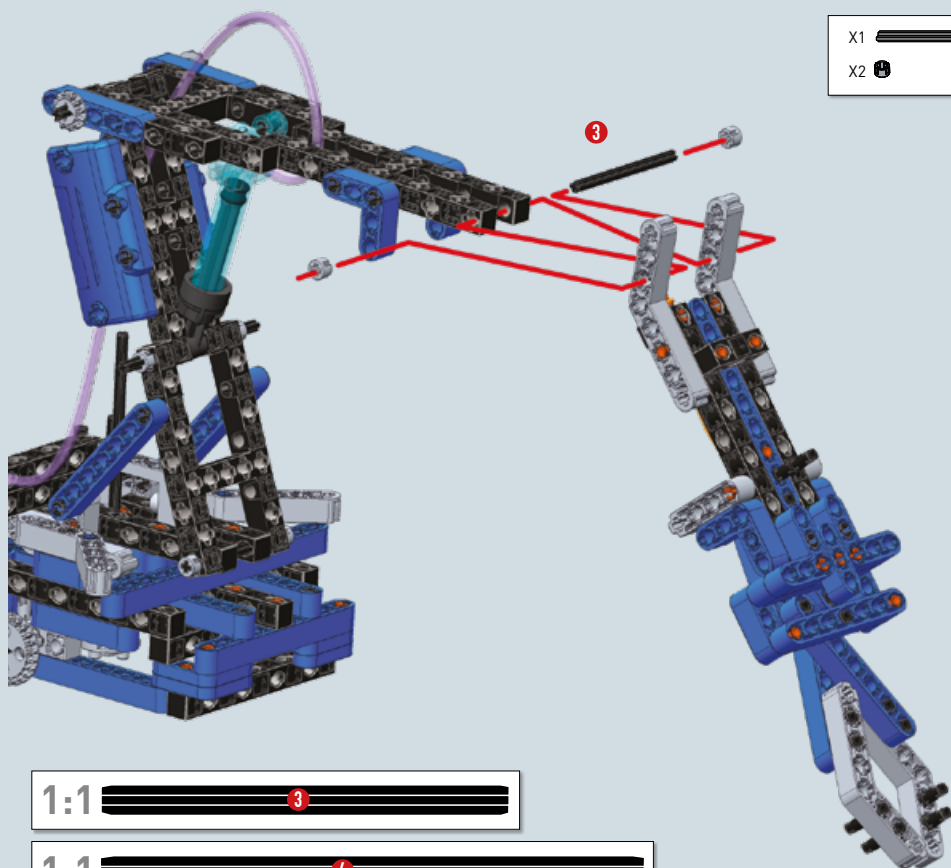
5. Poi collega il tubicino come in figura, spingendolo bene in fondo per incastrarlo saldamente.





51



X1		4	
X2		X2	



X1		3
X2		

52

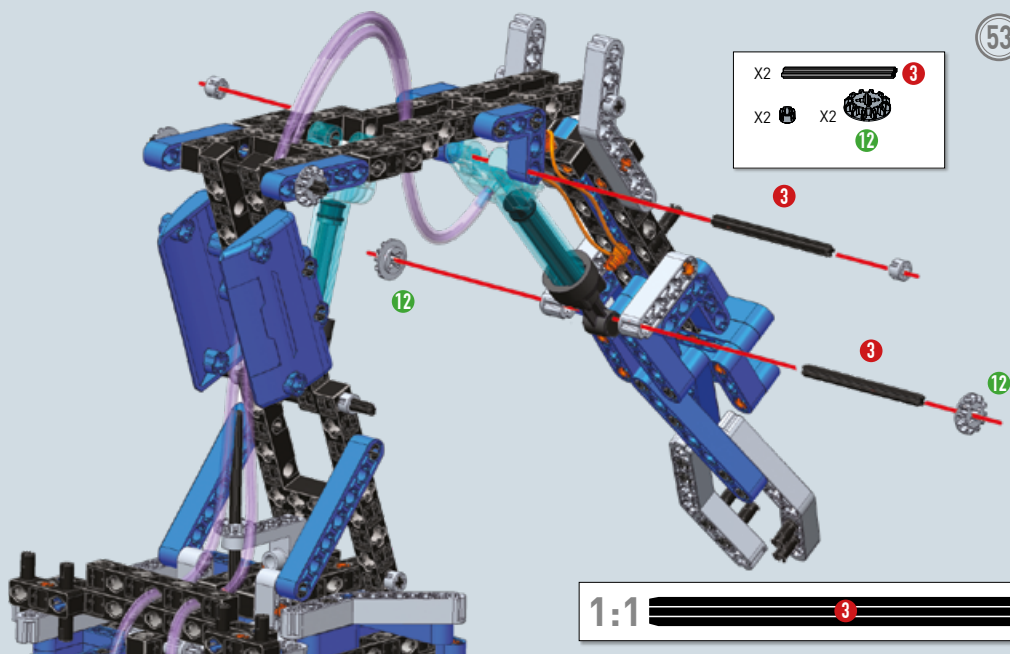
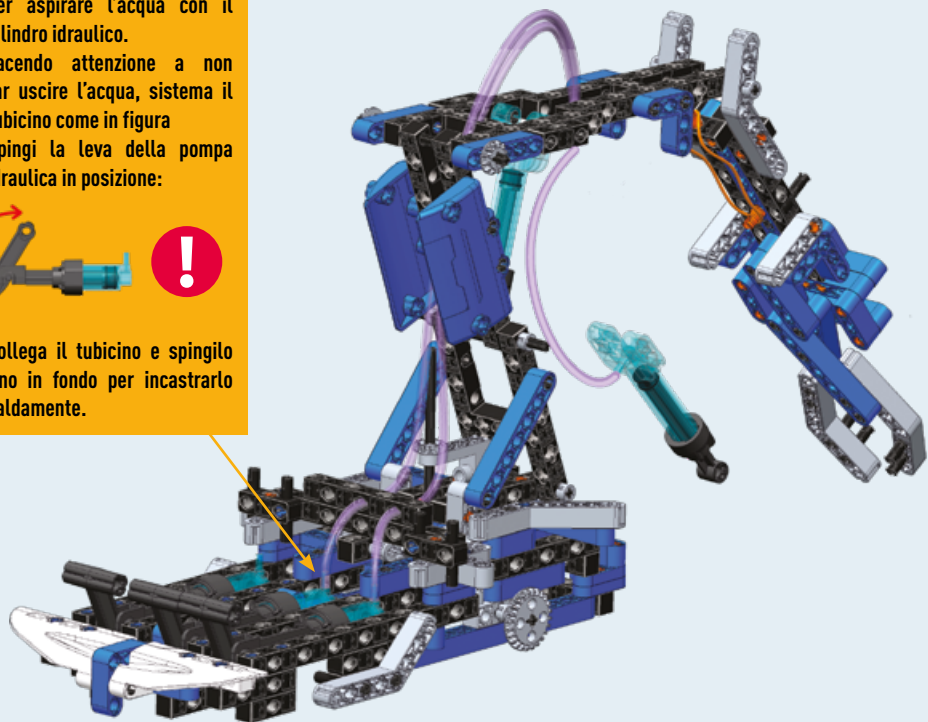
1:1		3
-----	---	---

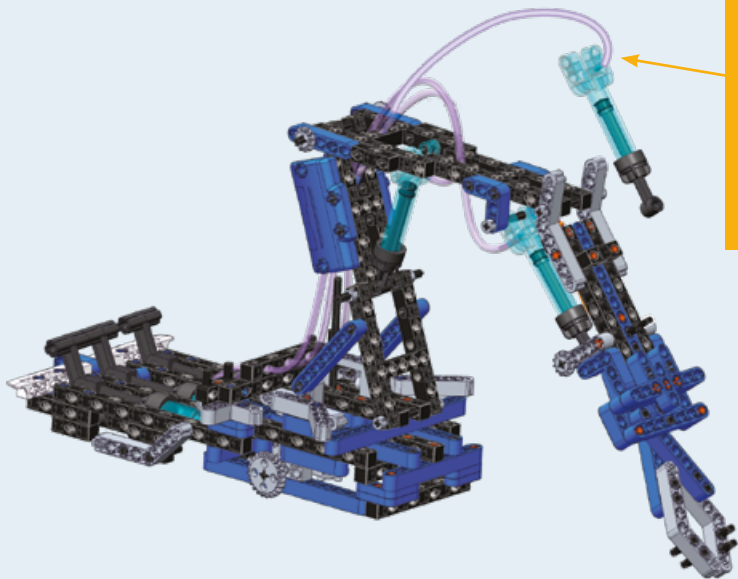
1:1		4
-----	---	---

1. Ripeti i passaggi a pagina 26 per aspirare l'acqua con il cilindro idraulico.
2. Facendo attenzione a non far uscire l'acqua, sistema il tubicino come in figura
3. Spingi la leva della pompa idraulica in posizione:



1. Collega il tubicino e spingilo fino in fondo per incastrarlo saldamente.



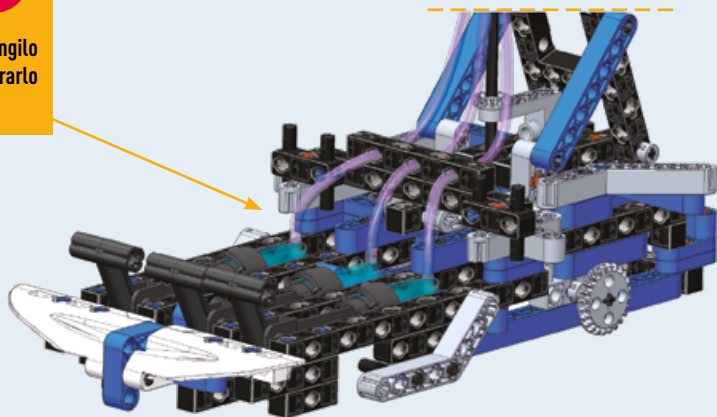


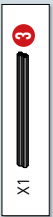
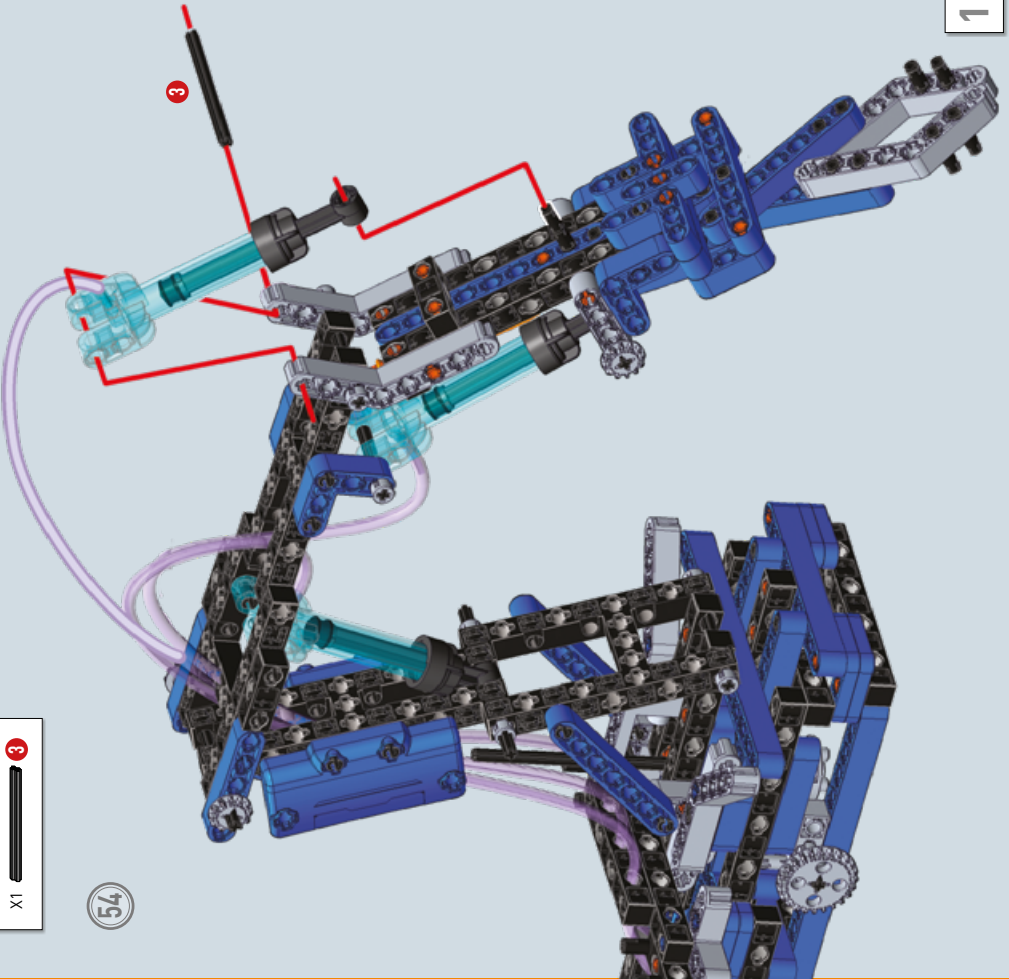
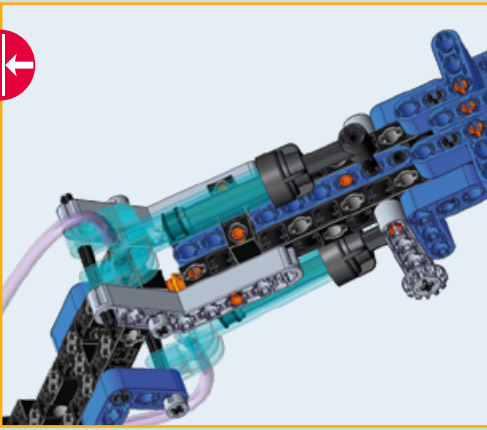
1. Ripeti i passaggi a pagina 26 per aspirare l'acqua con il cilindro idraulico.
2. Facendo attenzione a non far uscire l'acqua, sistema il tubicino come in figura.

2. Spingi la leva della pompa idraulica in posizione:



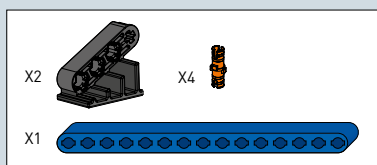
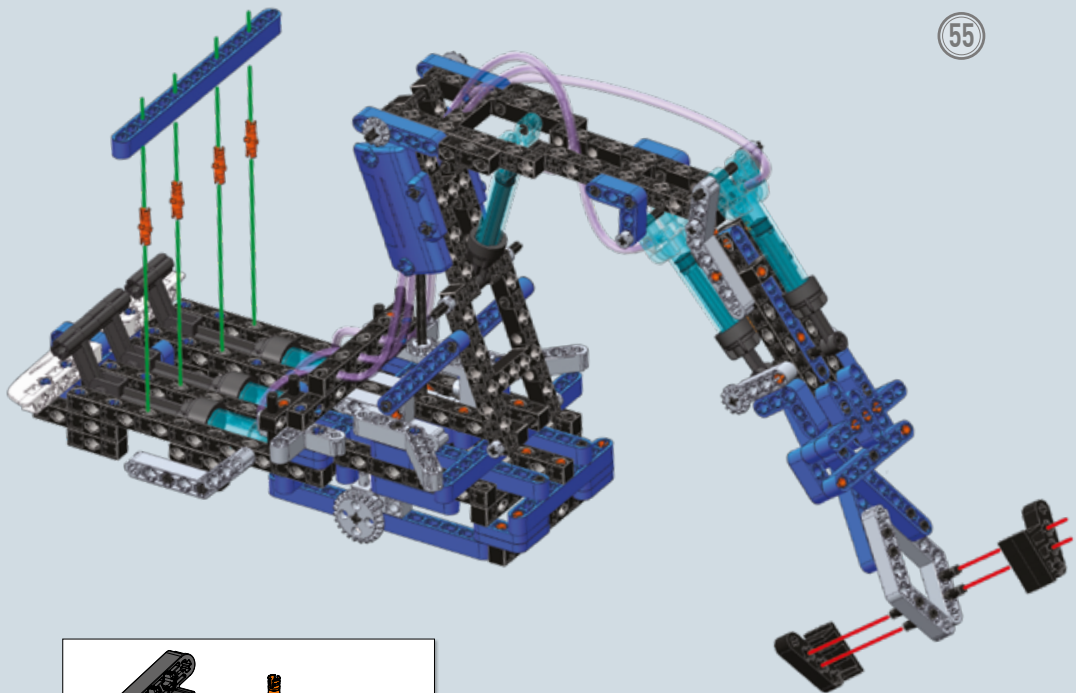
3. Collega il tubicino e spingilo fino in fondo per incastrarlo saldamente.



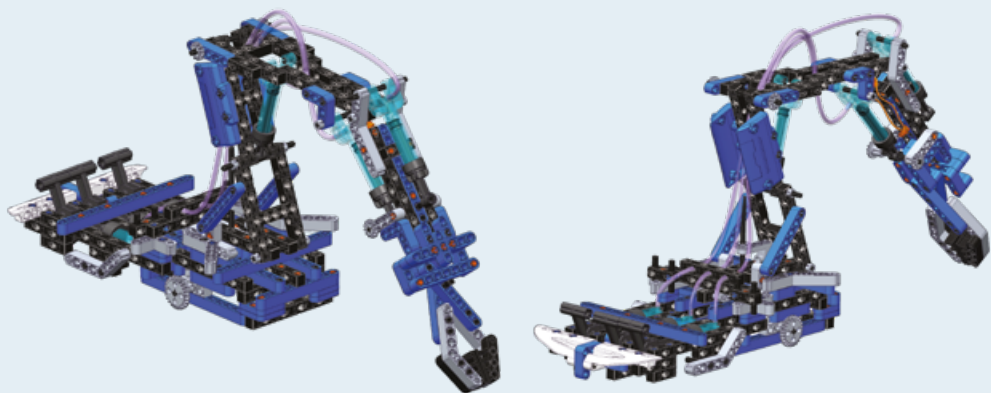


54





Modello finale



SCARICA L'APP GRATUITA PER REALIZZARE I 20 FANTASTICI MODELLI



APP compatibile con dispositivi
ANDROID®, APPLE® e AMAZON®

Scarica su
App Store

Apple e il logo Apple sono marchi
di Apple Inc., registrati negli Stati Uniti
e in altri Paesi. App Store è un marchio
di servizio di Apple Inc.

DISPONIBILE SU
Google Play

Google Play e il logo di Google Play
sono marchi di Google Inc.

disponibile su
amazon appstore

Amazon e tutti i loghi correlati
sono marchi di Amazon.com,
Inc. o delle sue affiliate

**NON COMPATIBILE con
sistemi operativi WINDOWS®**

LE ANIMAZIONI INTERATTIVE TI GUIDERANNO NELL'ASSEMBLAGGIO IN MANIERA SEMPLICE E VELOCE



LE ISTRUZIONI DI TUTTI I MODELLI E DELLE APPLICAZIONI TECNICHE
SONO SCARICABILI ANCHE IN FORMATO DIGITALE SUL SITO
www.laboratoriodimeccanica.clementoni.com

 **Clementoni®**