

回転型倒立振子の組み立て



部品リストと購入先

3万円を超えるくらい
(Arduino 含む)

LEGO 部品

2026/02/01 確認

部品番号	PartName	色	個数	単価	価格	
43093	Technic, Axle 1L with Pin with Friction Ridges	Blue	6	6	36	https://brickers.jp/products/43093-023
44294	Technic, Axle 7L	Yellow	1	23	23	https://brickers.jp/products/44294-024
60485	Technic, Axle 9L	Yellow	1	43	43	https://brickers.jp/products/60485-024
3737	Technic, Axle 10L	Black	3	113	339	https://brickers.jp/products/3737-026
3708	Technic, Axle 12L	Black	1	148	148	https://brickers.jp/products/3708-026
32034	Technic, Axle and Pin Connector Angled #2 - 180 degrees	Yellow	2	78	156	https://brickers.jp/products/32034-024
32014	Technic, Axle and Pin Connector Angled #6 - 90 degrees	Yellow	1	48	48	https://brickers.jp/products/32014-024
32039	Technic, Axle Connector with Axle Hole	Black	2	28	56	https://brickers.jp/products/32039-026
3713	Technic, Bush	Black	8	38	304	https://brickers.jp/products/3713-026
3713	Technic, Bush	Red	7	10	70	https://brickers.jp/products/3713-021
3713	Technic, Bush	Light Bluish Gray	6	13	78	https://brickers.jp/products/3713-194
32269	Technic, Gear 20 Tooth Double Bevel	Black	1	123	123	https://brickers.jp/products/32269-026
32525	Technic, Liftarm Thick 1 x 11	Light Bluish Gray	2	128	256	https://brickers.jp/products/32525-194
32525	Technic, Liftarm Thick 1 x 11	White	2	68	136	https://brickers.jp/products/32525-001
32278	Technic, Liftarm Thick 1 x 15	Light Bluish Gray	8	173	1,384	https://brickers.jp/products/32278-194
32316	Technic, Liftarm Thick 1 x 5	White	7	28	196	https://brickers.jp/products/32316-001
32140	Technic, Liftarm, Modified Bent Thick L-Shape 2 x 4	White	4	28	112	https://brickers.jp/products/32140-001
64178	Technic, Liftarm, Modified Frame Thick 5 x 11 Open Center	Light Bluish Gray	3	488	1,464	https://brickers.jp/products/64178-194
64179	Technic, Liftarm, Modified Frame Thick 5 x 7 Open Center	White	2	638	1,276	https://brickers.jp/products/64179-001
64179	Technic, Liftarm, Modified Frame Thick 5 x 7 Open Center	Light Bluish Gray	8	398	3,184	https://brickers.jp/products/64179-194
60484	Technic, Liftarm, Modified T-Shape Thick 3 x 3	White	4	108	432	https://brickers.jp/products/60484-001
6558	Technic, Pin 3L with Friction Ridges	Blue	16	10	160	https://brickers.jp/products/6558-023
32054	Technic, Pin 3L with Friction Ridges and Stop Bush	Red	4	12	48	https://brickers.jp/products/32054-021
48989	Technic, Pin Connector Perpendicular 3L with 4 Pins	Light Bluish Gray	2	28	56	https://brickers.jp/products/48989-194
2780	Technic, Pin with Short Friction Ridges	Black	79	6	474	https://brickers.jp/products/2780-026
				合計	10,602	

電子部品

2026/02/01 確認

Unit Roller485 (スリップリング付き)	1	8,316	8,316	https://www.switch-science.com/products/9924
12bit磁気式エンコーダAS5601	1	1,700	1,700	https://www.switch-science.com/products/3494
ACアダプタ 9V/1.3A	1	1,463	1,463	https://www.switch-science.com/products/1795
Grove Hub (M5Stack用拡張ハブユニット)	1	649	649	https://www.switch-science.com/products/5696
手元スイッチ	1	1,698	1,698	https://www.monotaro.com/p/4103/8103/
DCジャック付ケーブル (2.1Φ)	1	449	449	https://www.monotaro.com/p/6991/8795/
Arduino Mega2560 Rev3	1	7,980	7,980	https://akizukidenshi.com/catalog/g/g107381/
ピンヘッダ	1	35	35	https://akizukidenshi.com/catalog/g/g100167/
		合計	22,290	

その他

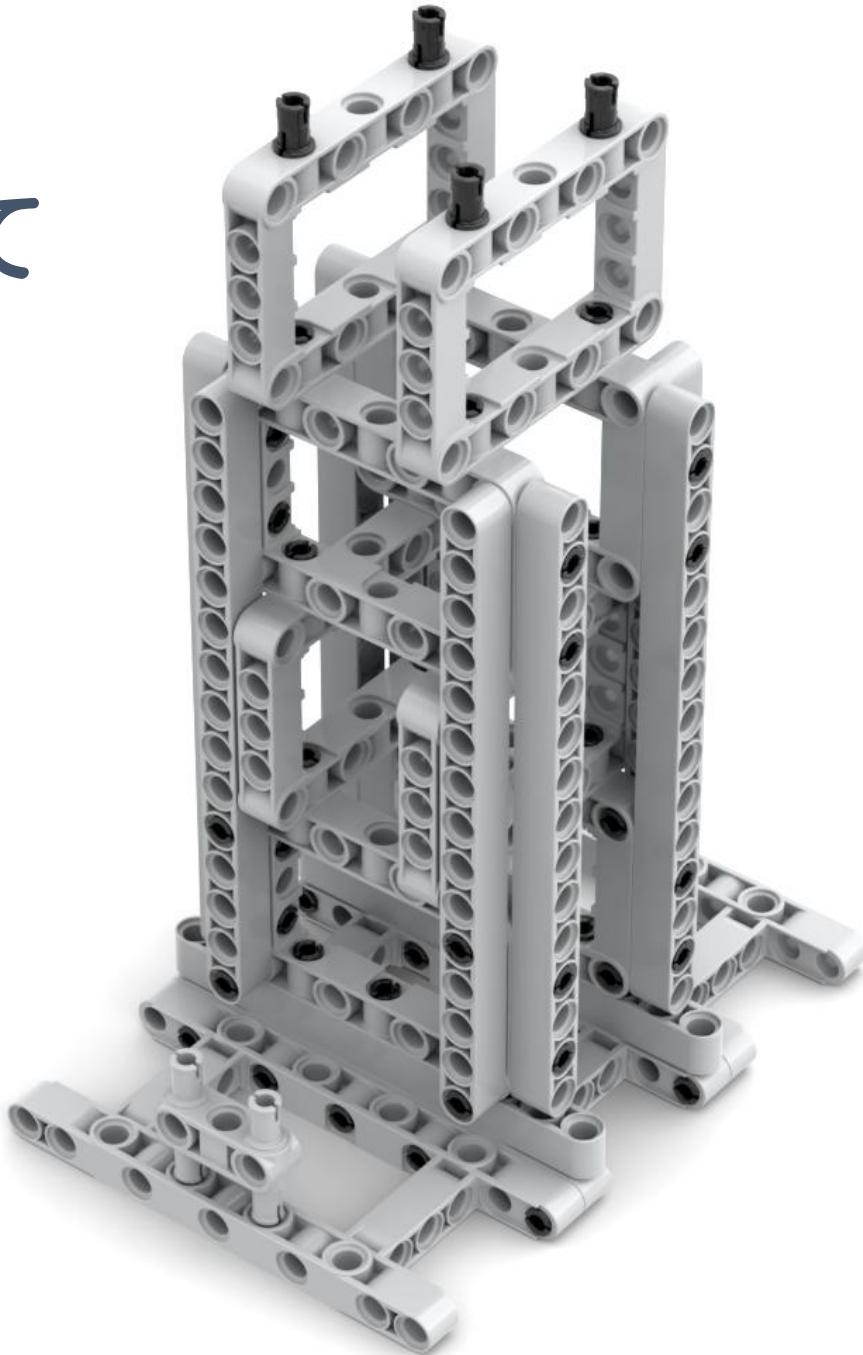
USBケーブル (PC側 : Type A, Mega側 : Type B)

適当な長さの Grove ケーブル

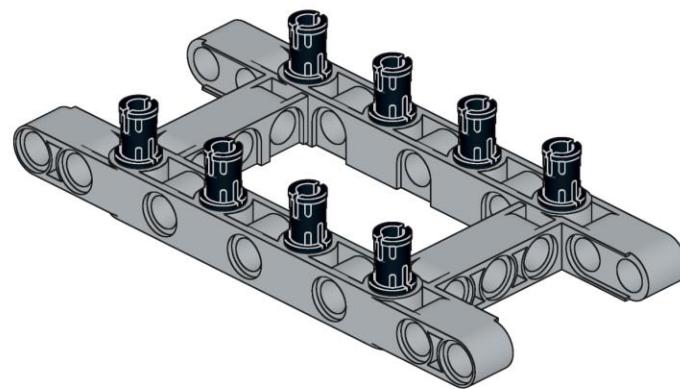
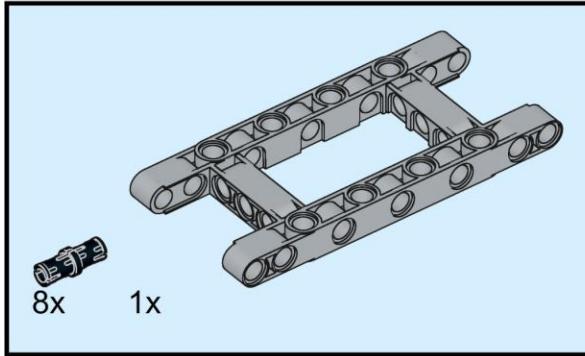
オス・メスジャンパ線 (赤, 黒, 黄, 白)

オス・オスジャンパ線 (赤, 黒, 黄, 白)

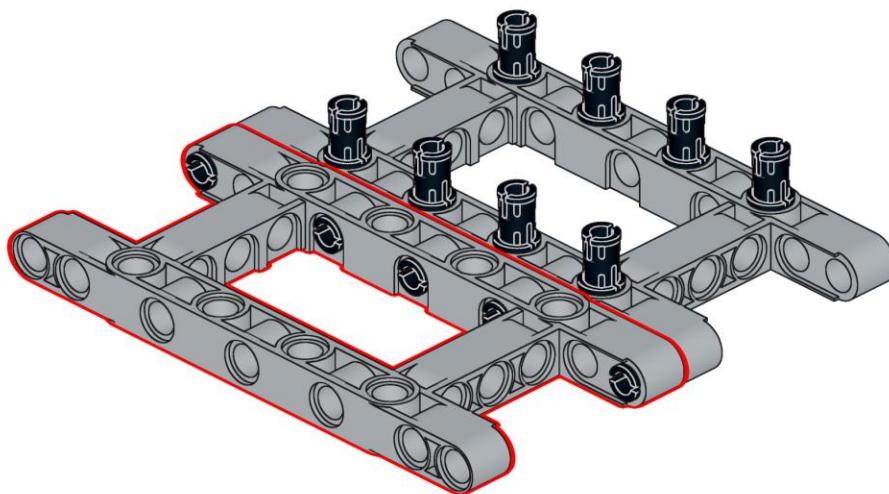
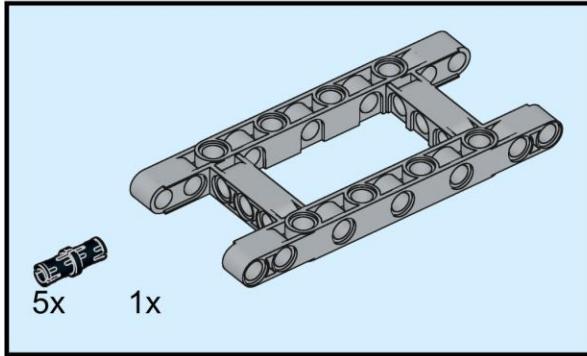
まずは、
土台の組み立て



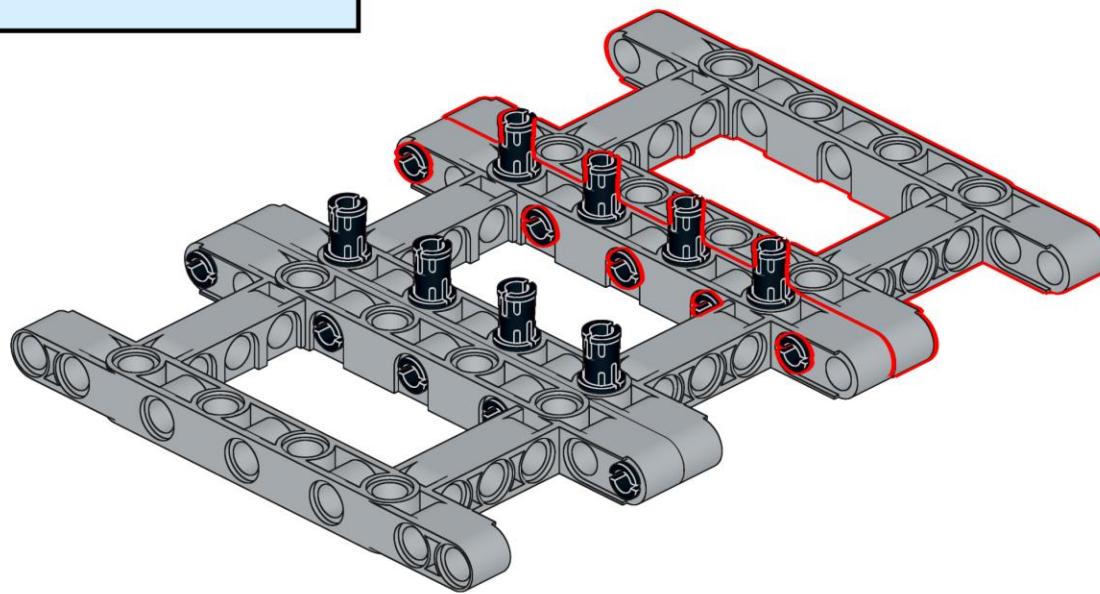
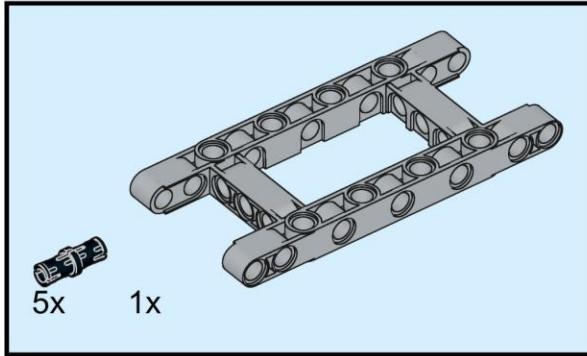
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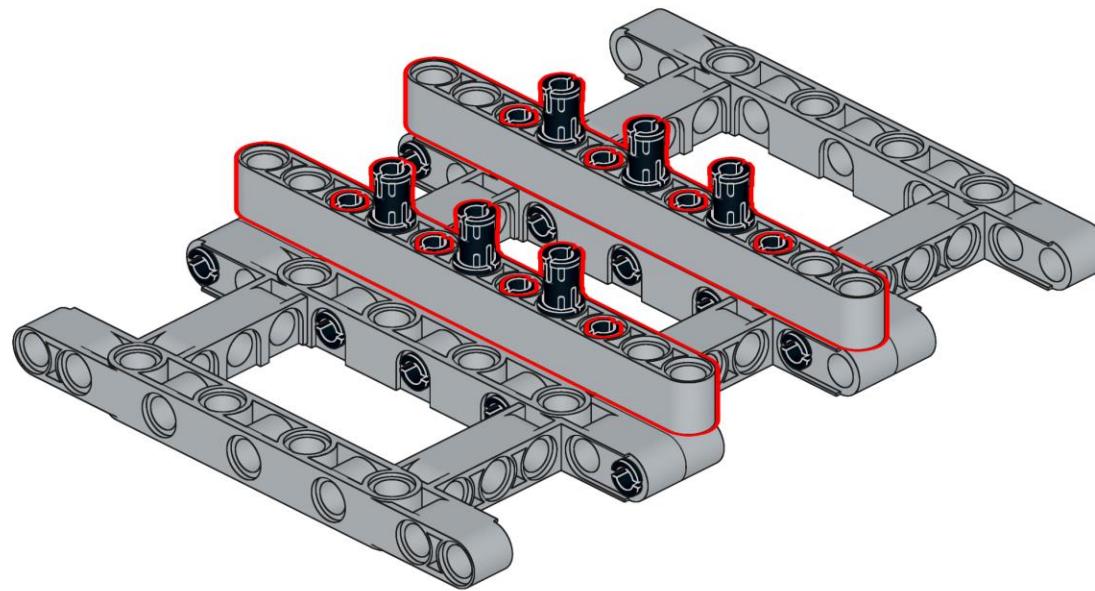
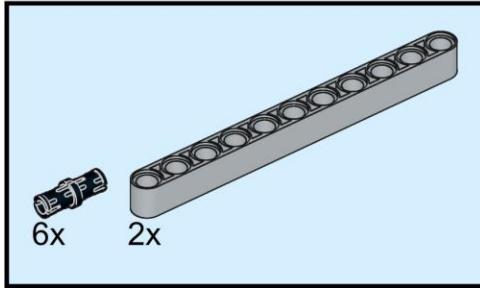
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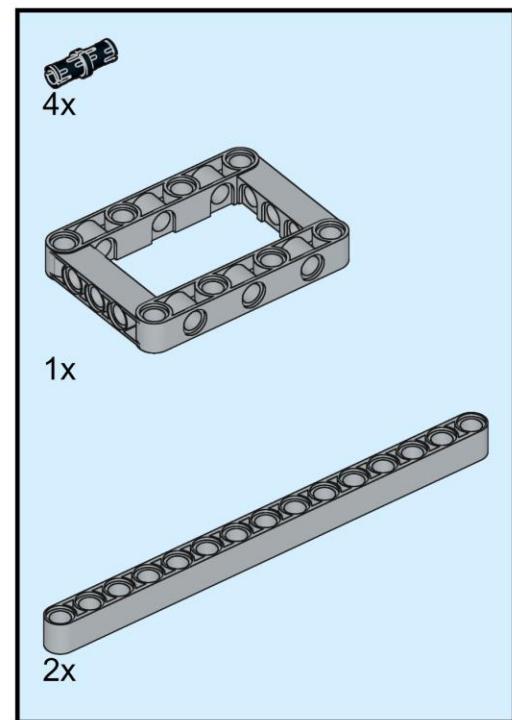
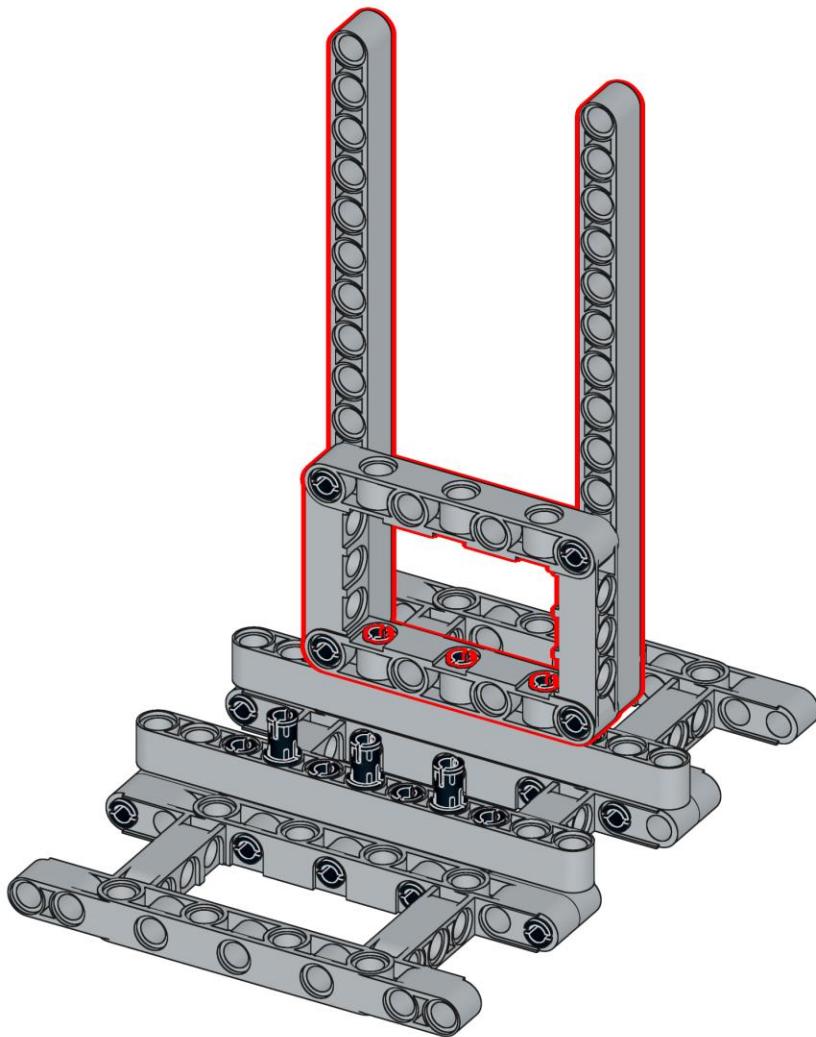
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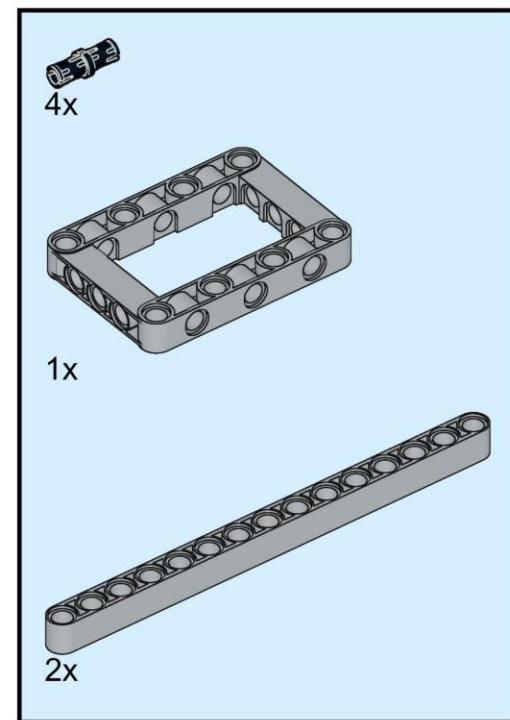
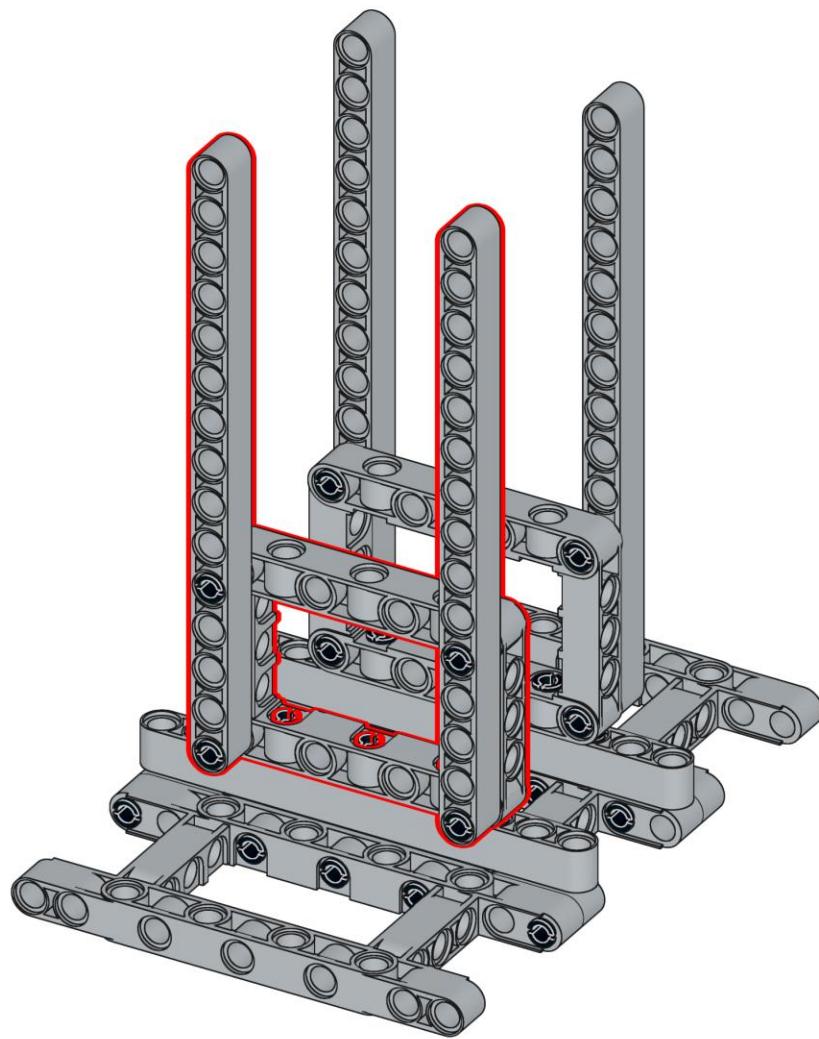
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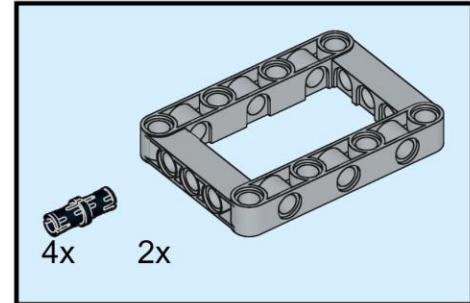
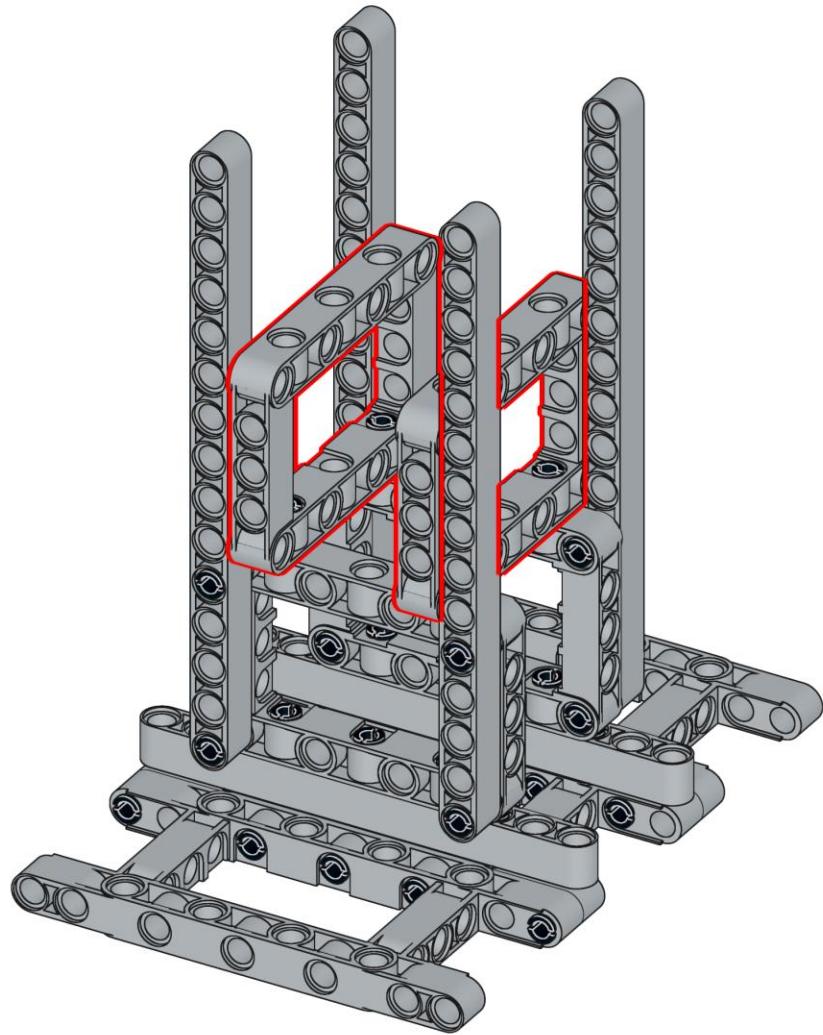
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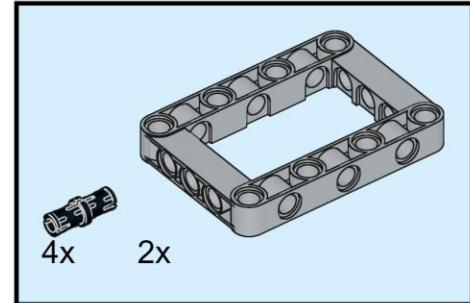
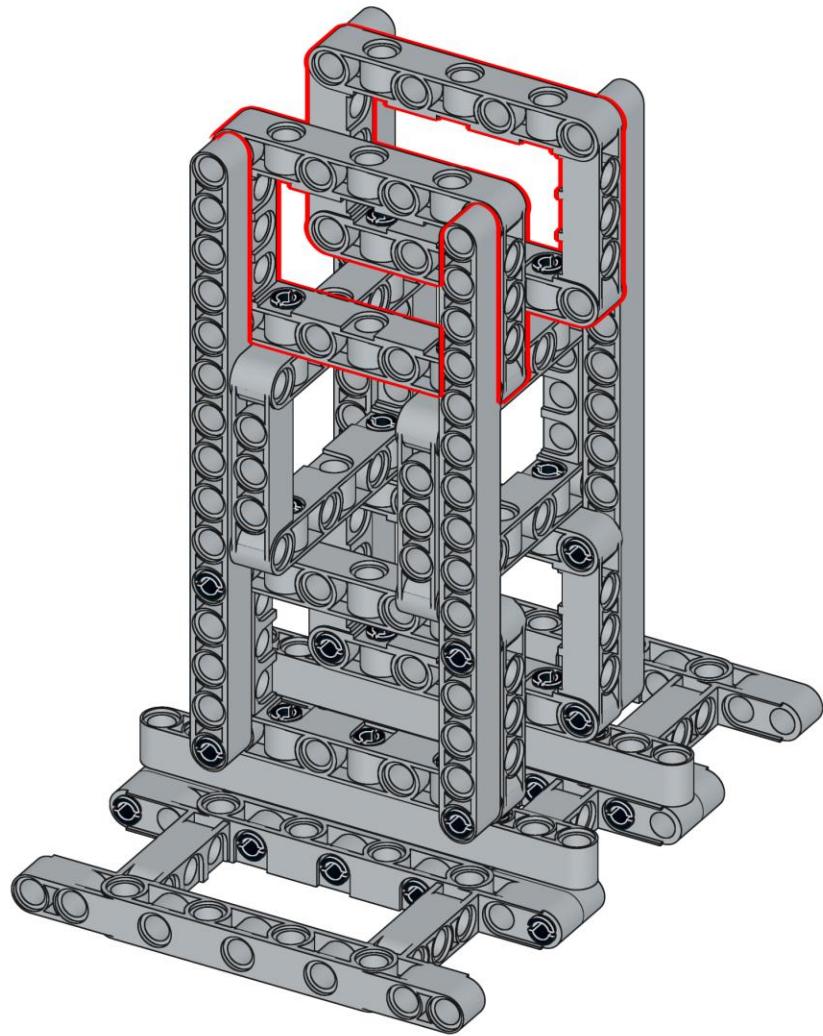
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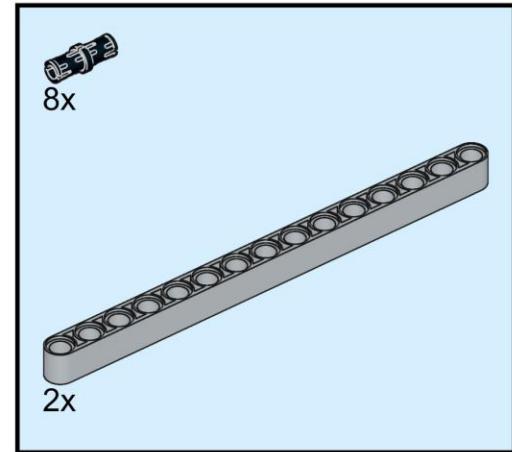
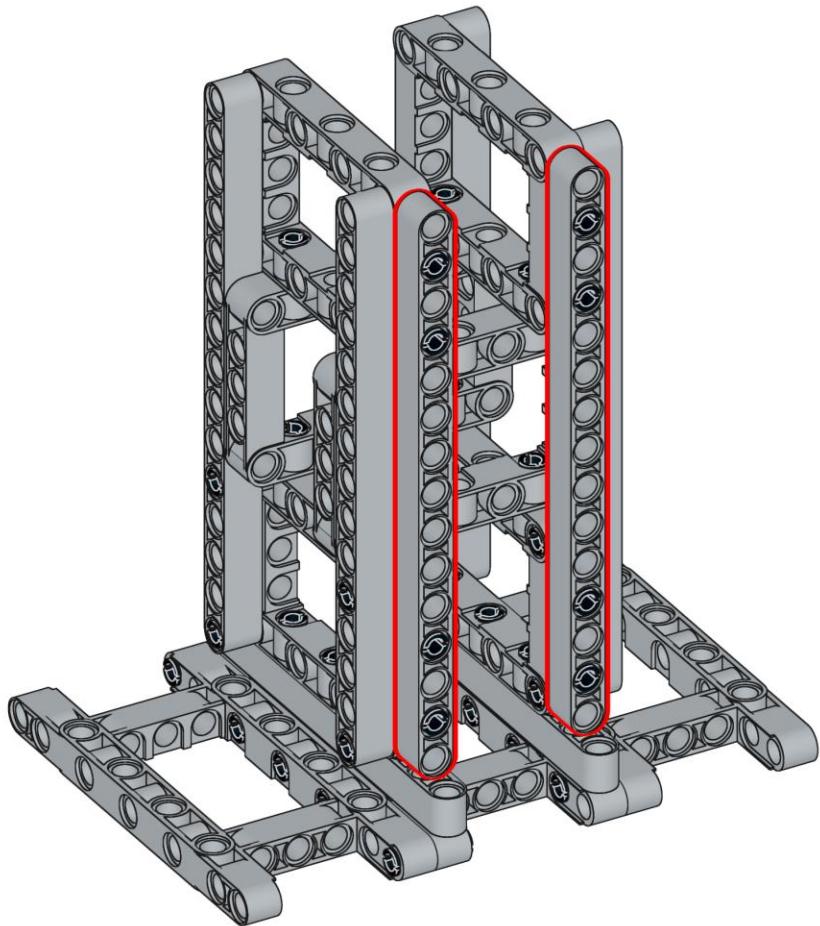
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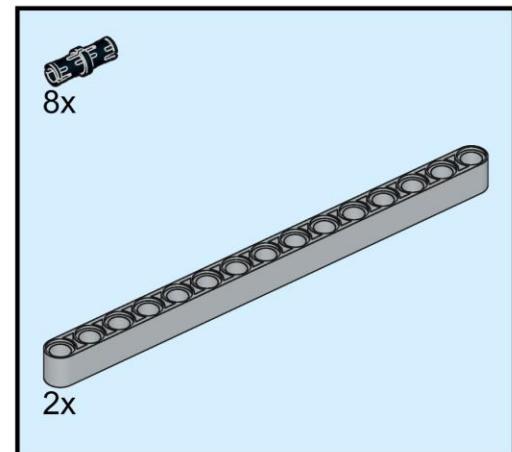
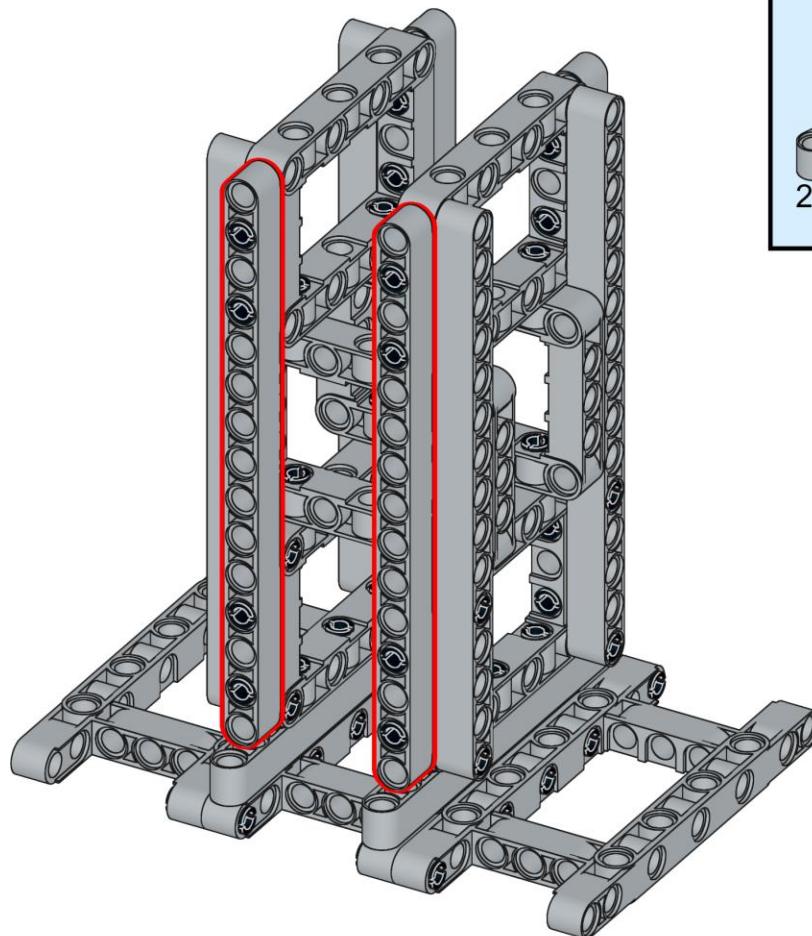
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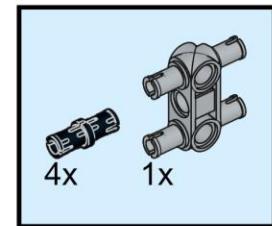
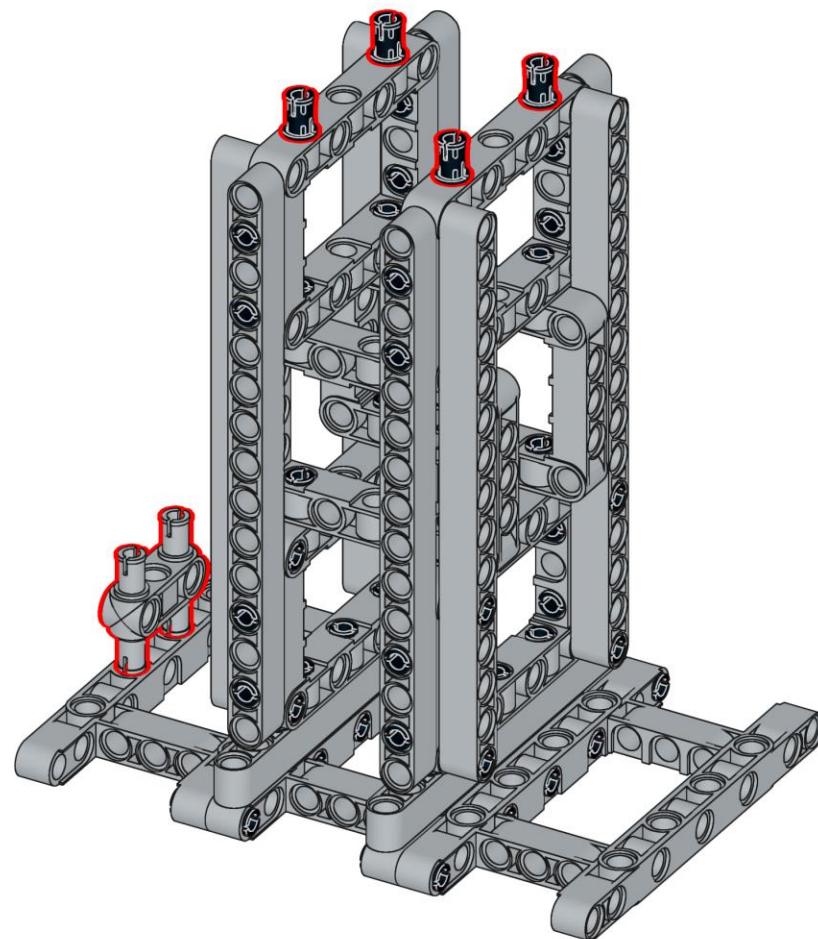
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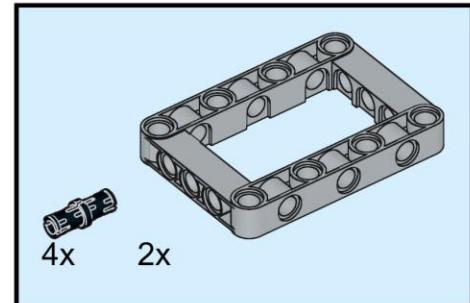
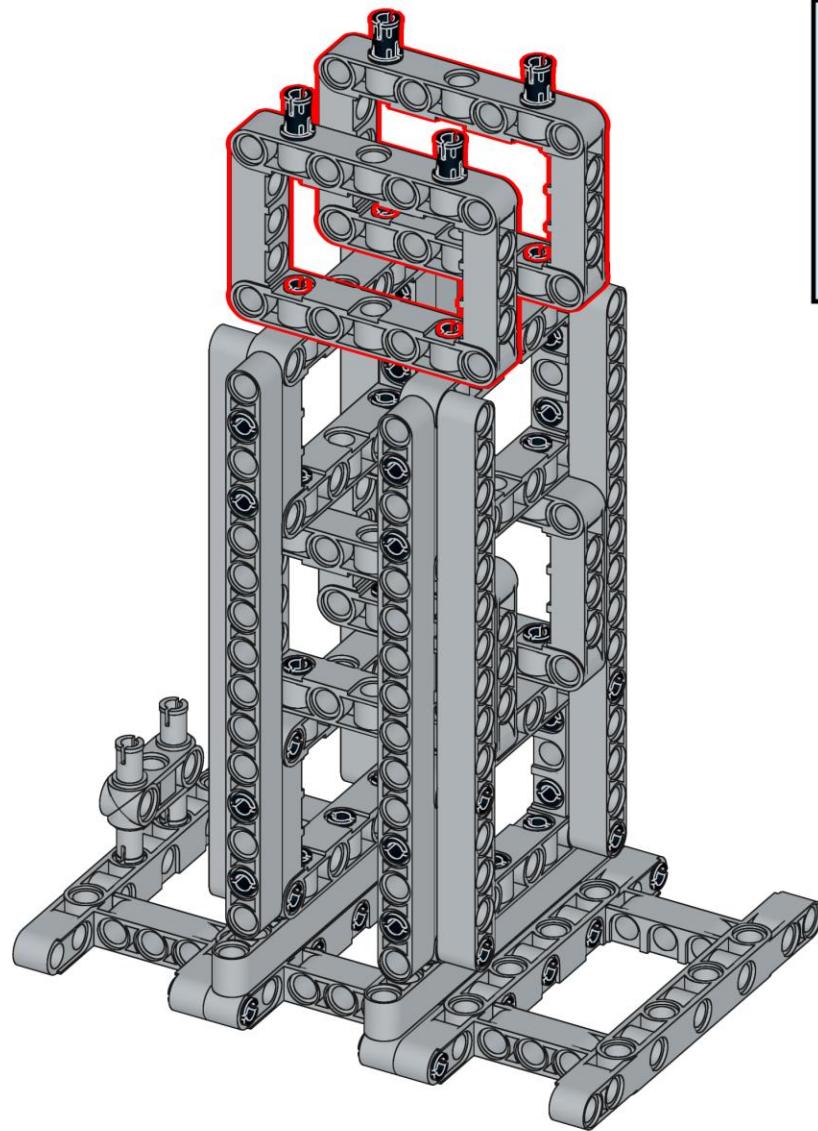
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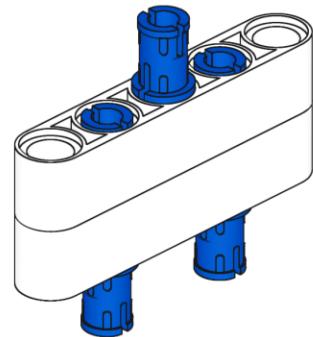
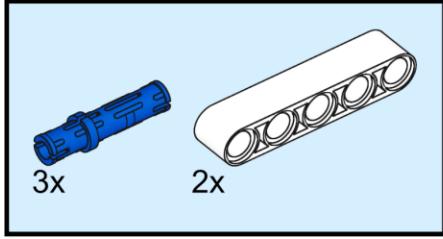
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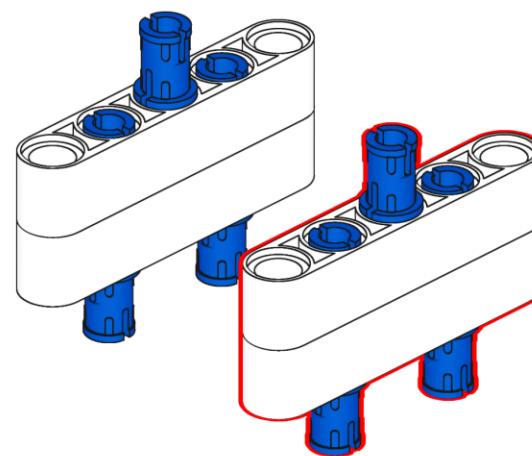
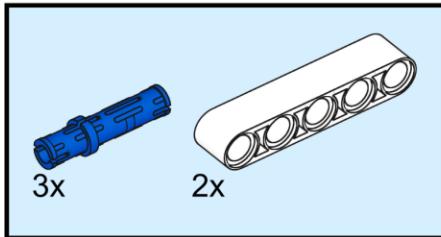
つぎに、
アームと振子の
組み立て



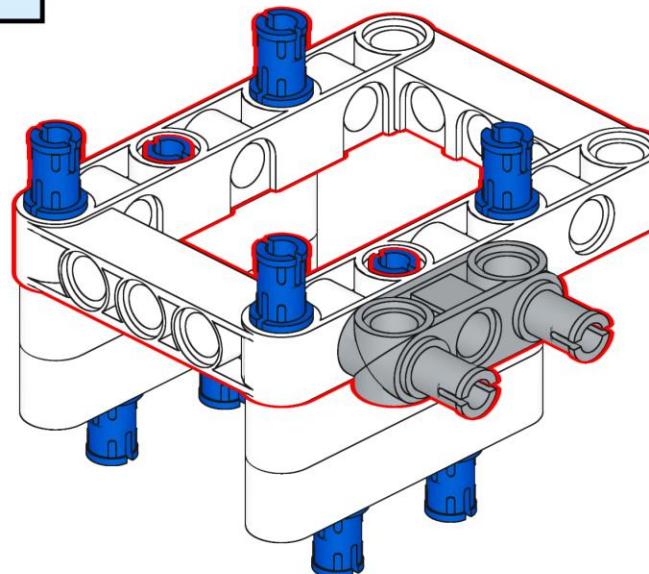
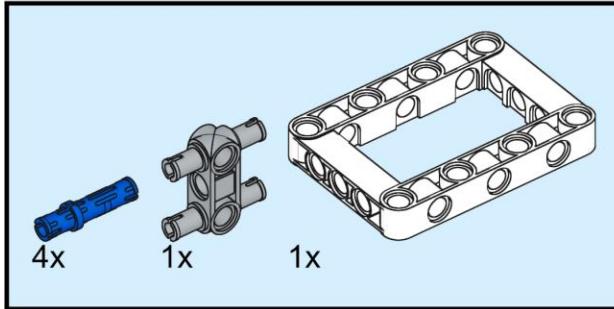
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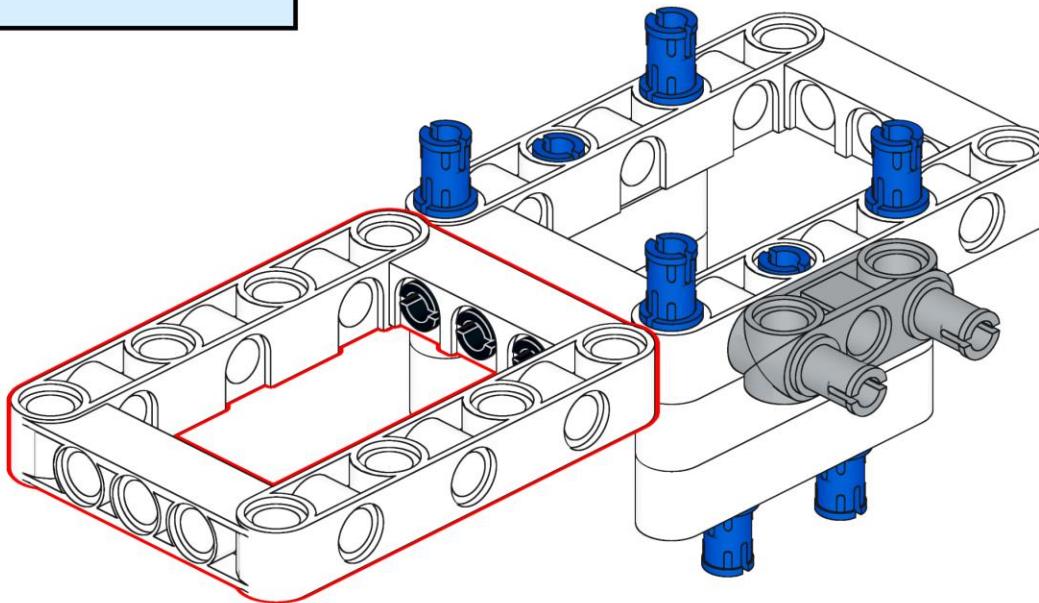
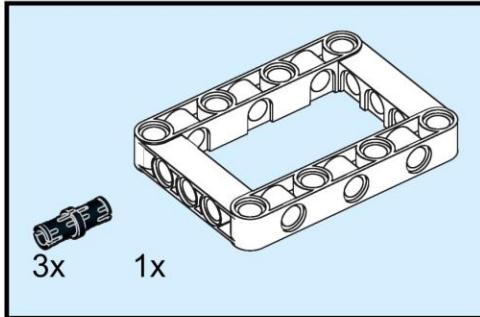
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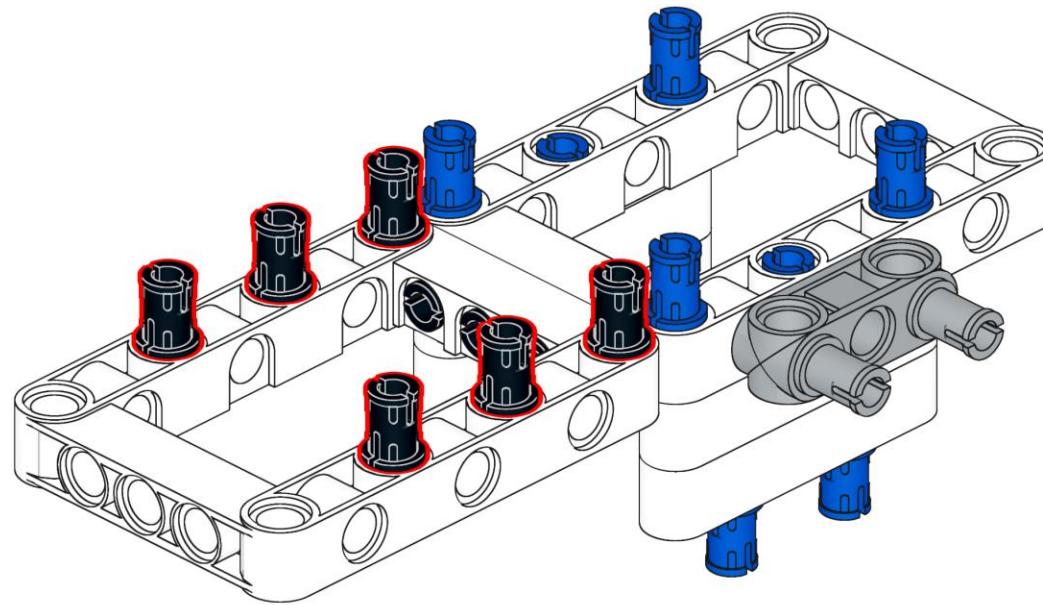
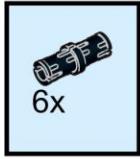
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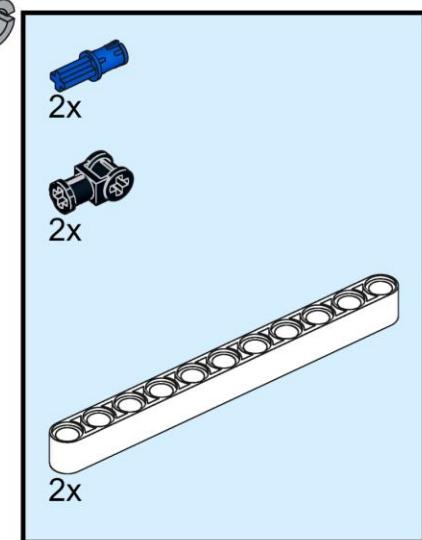
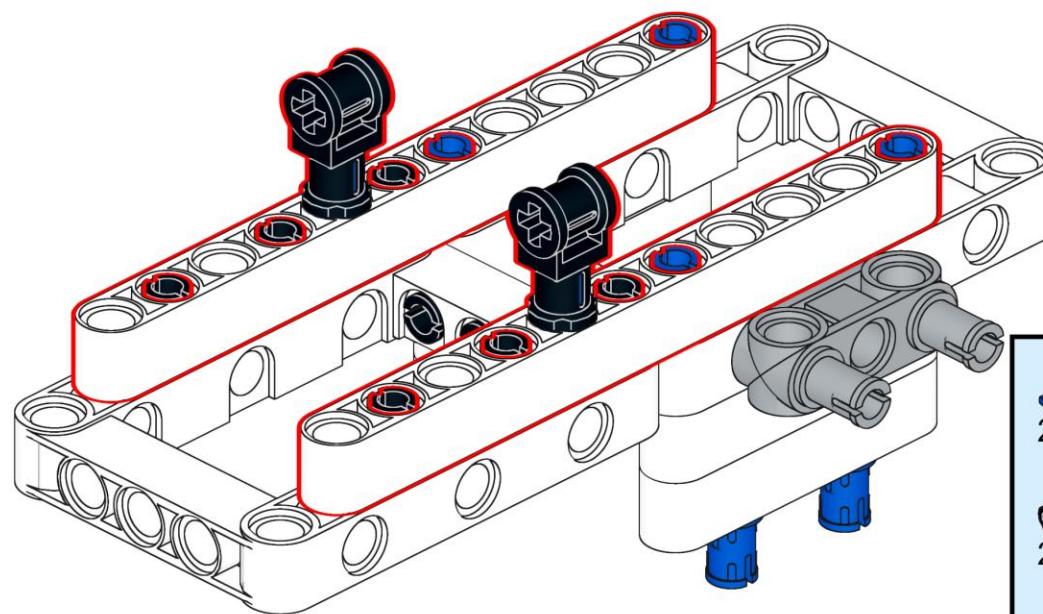
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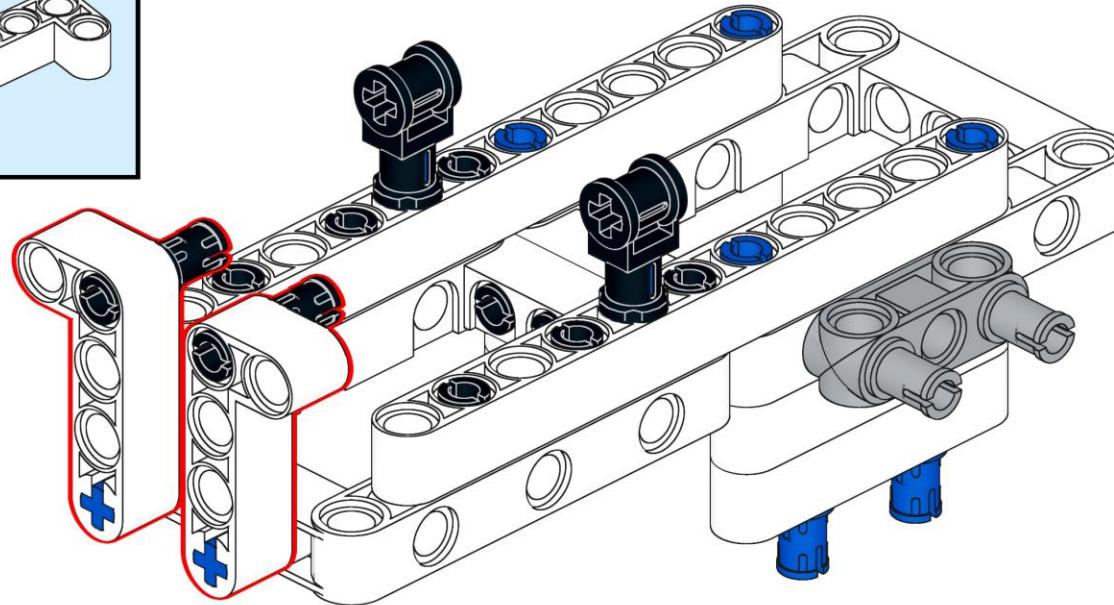
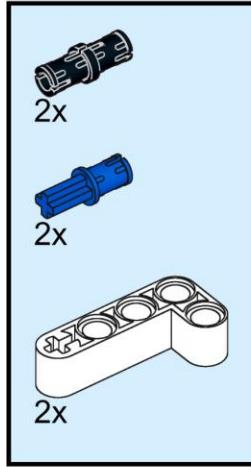
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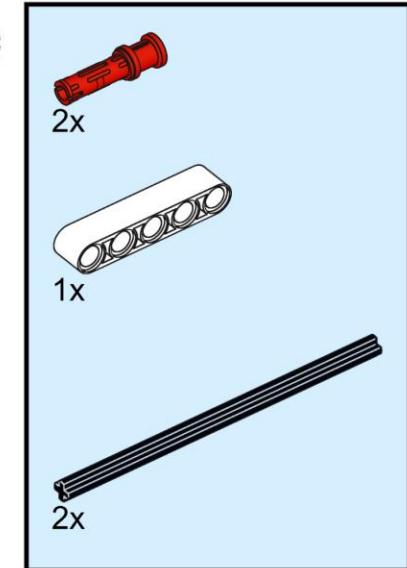
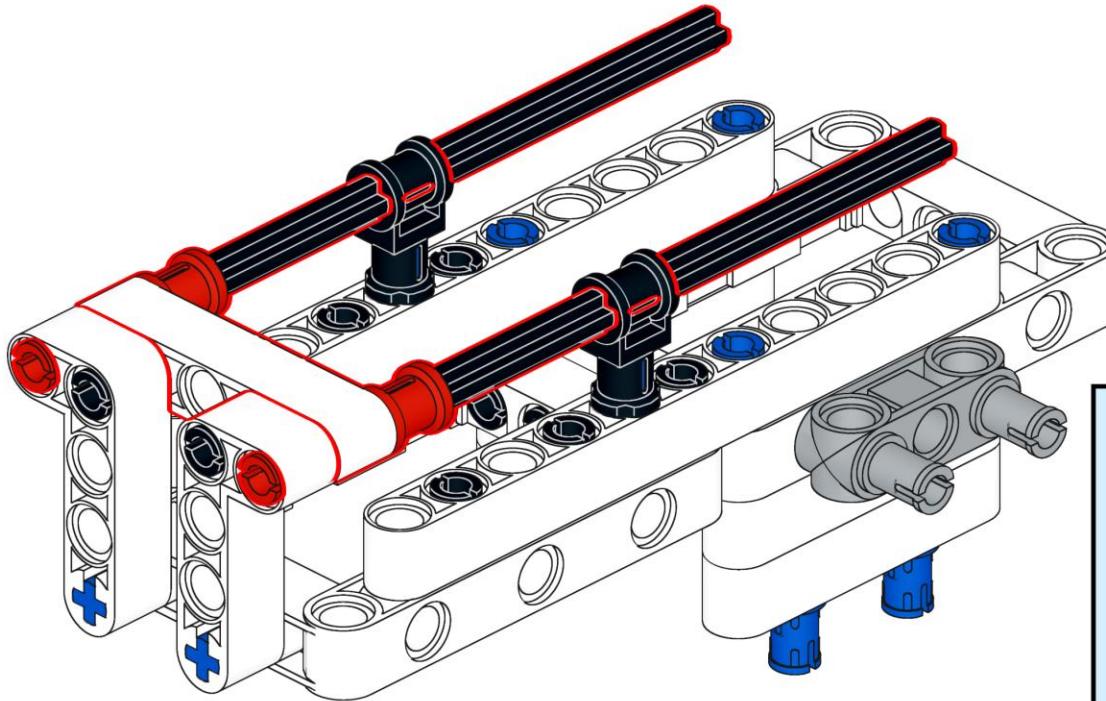
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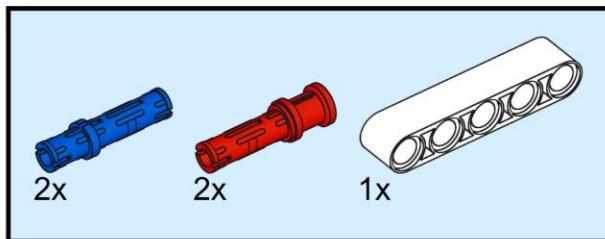
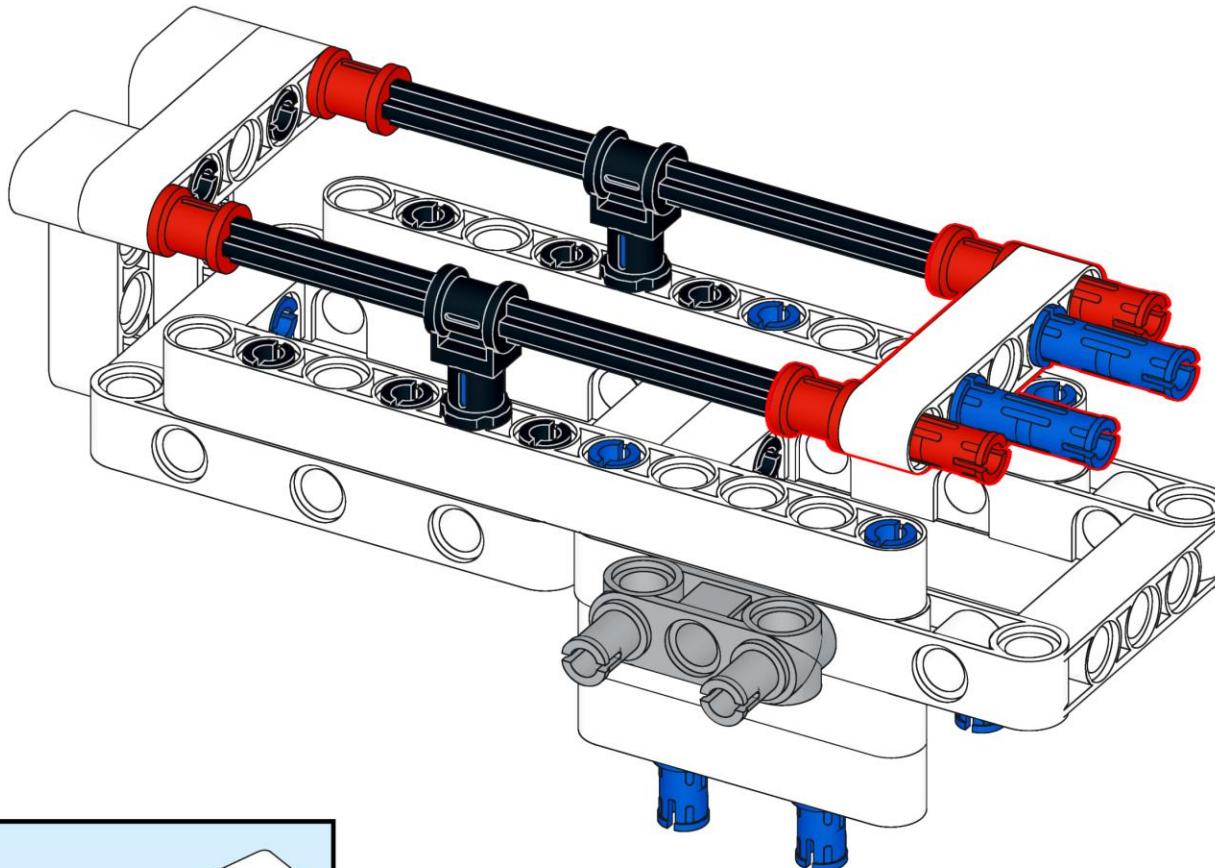
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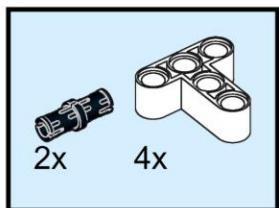
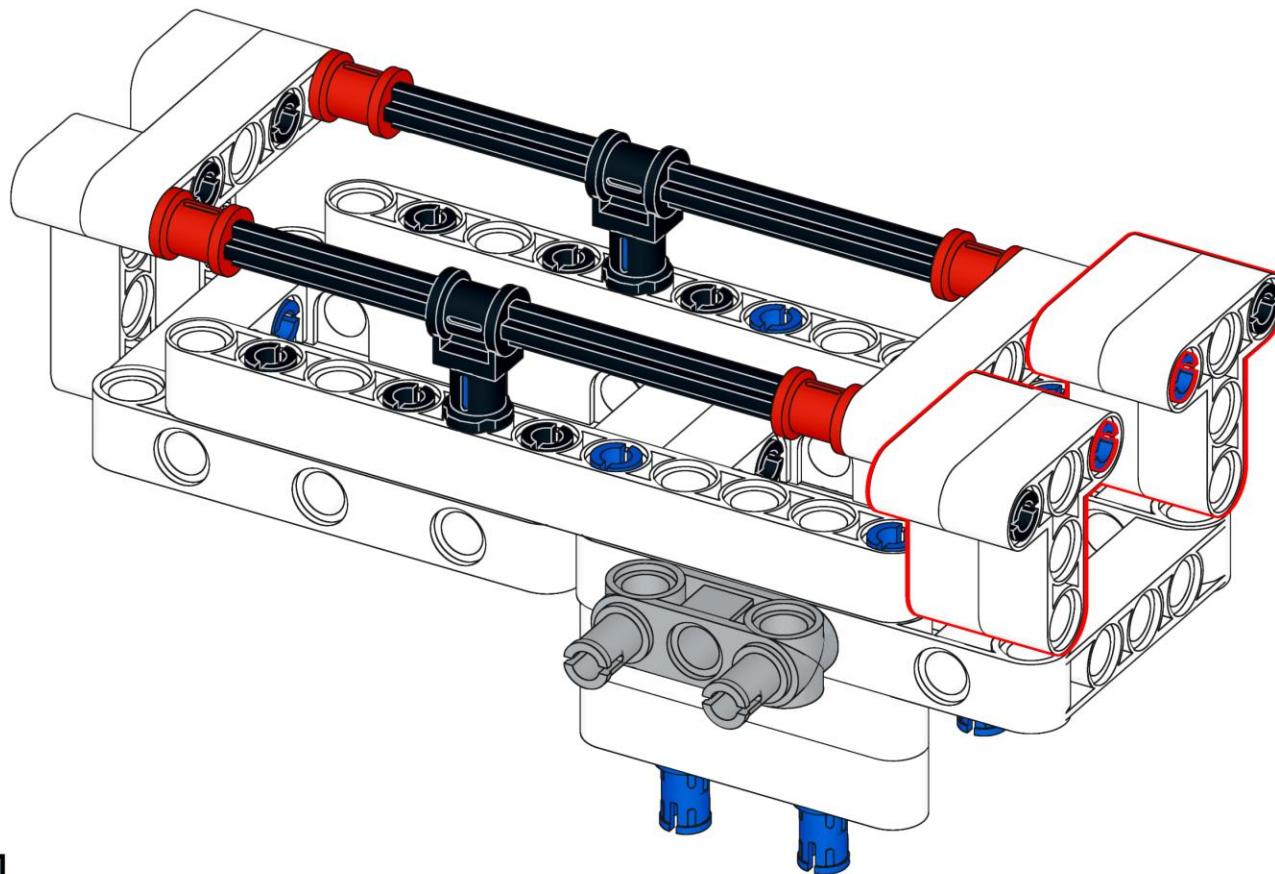
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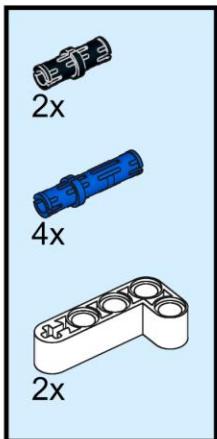
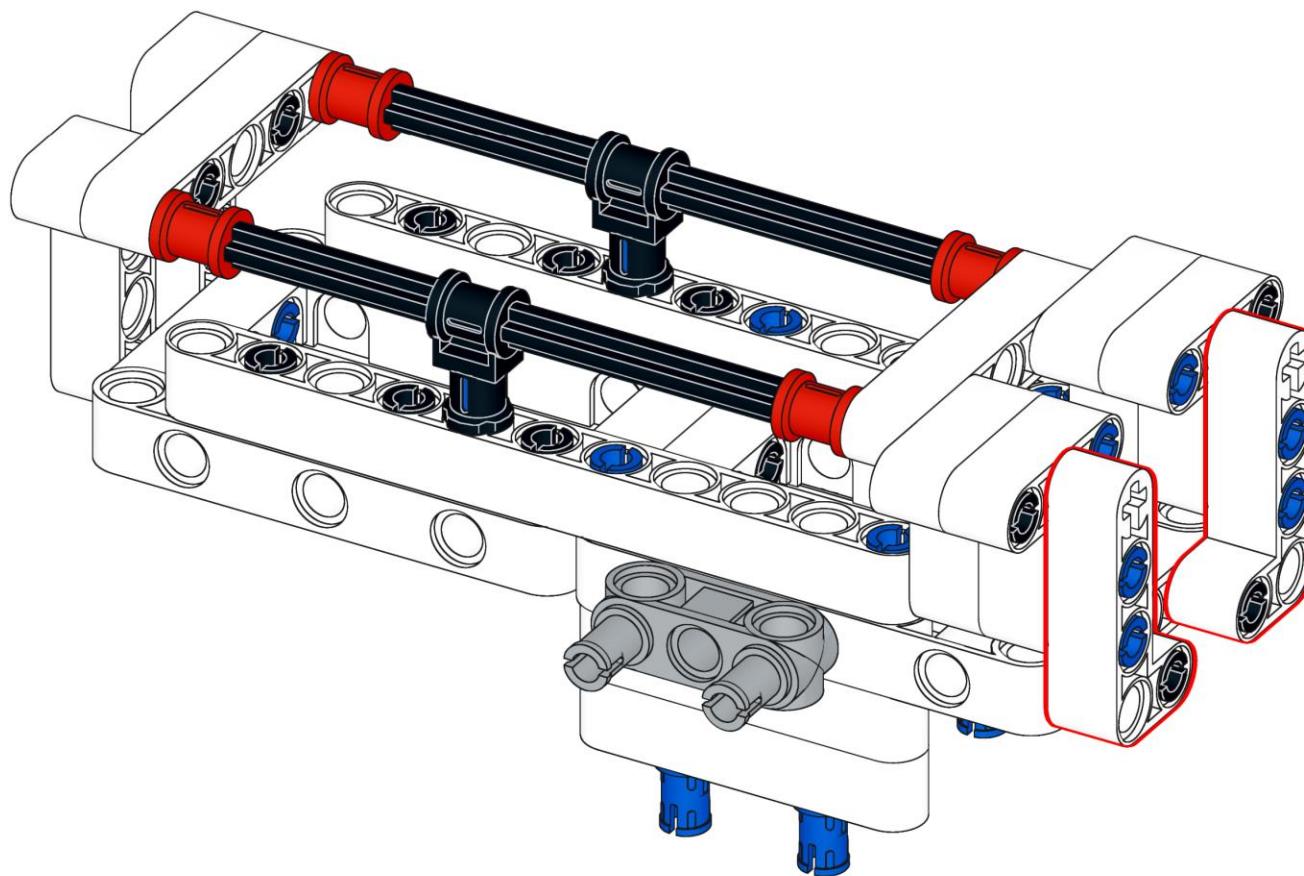
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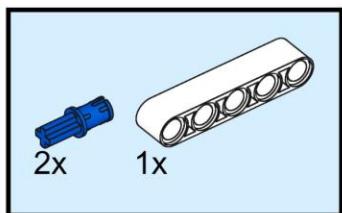
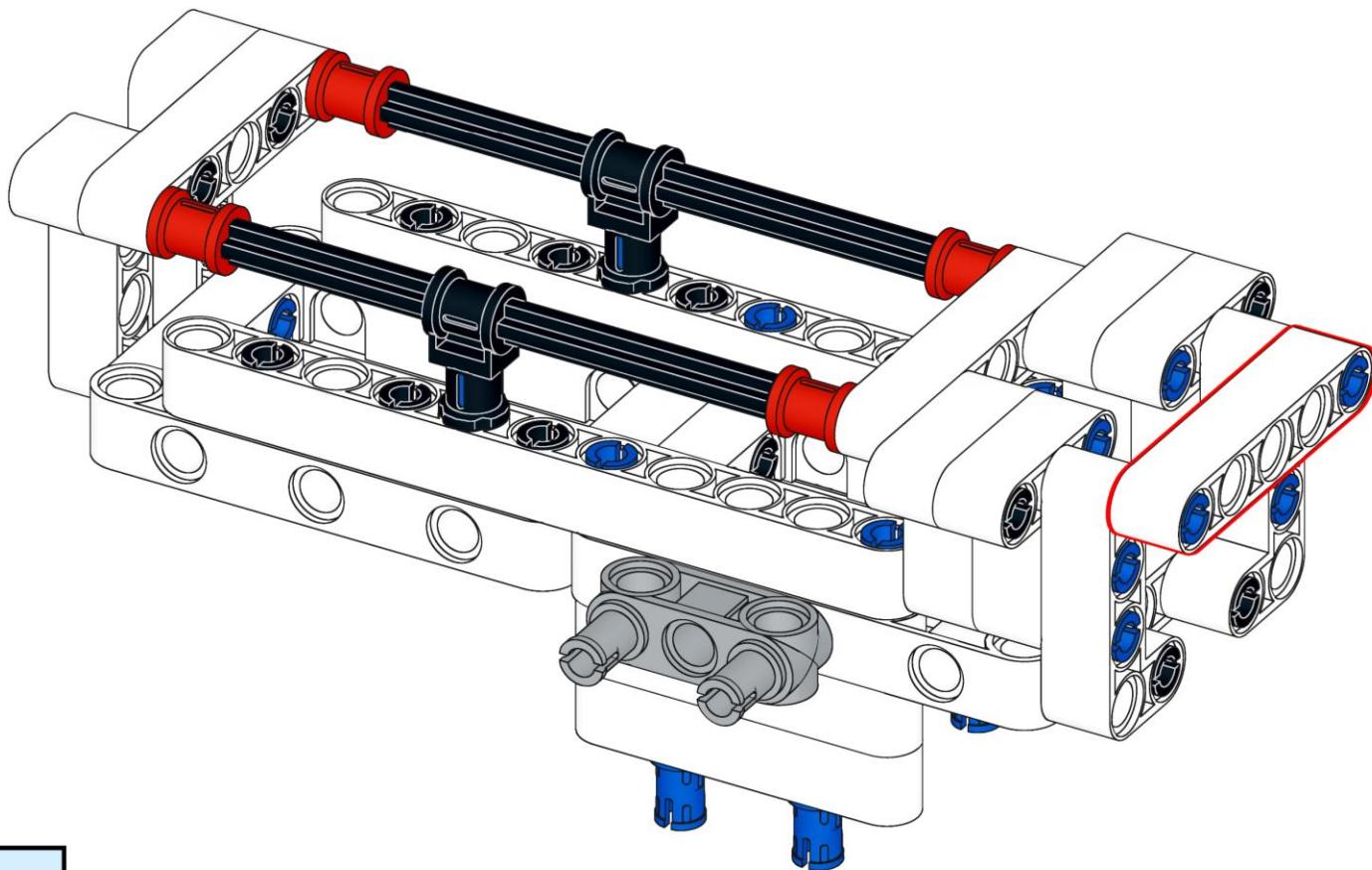
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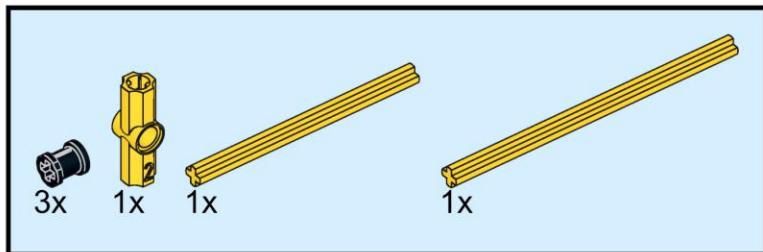
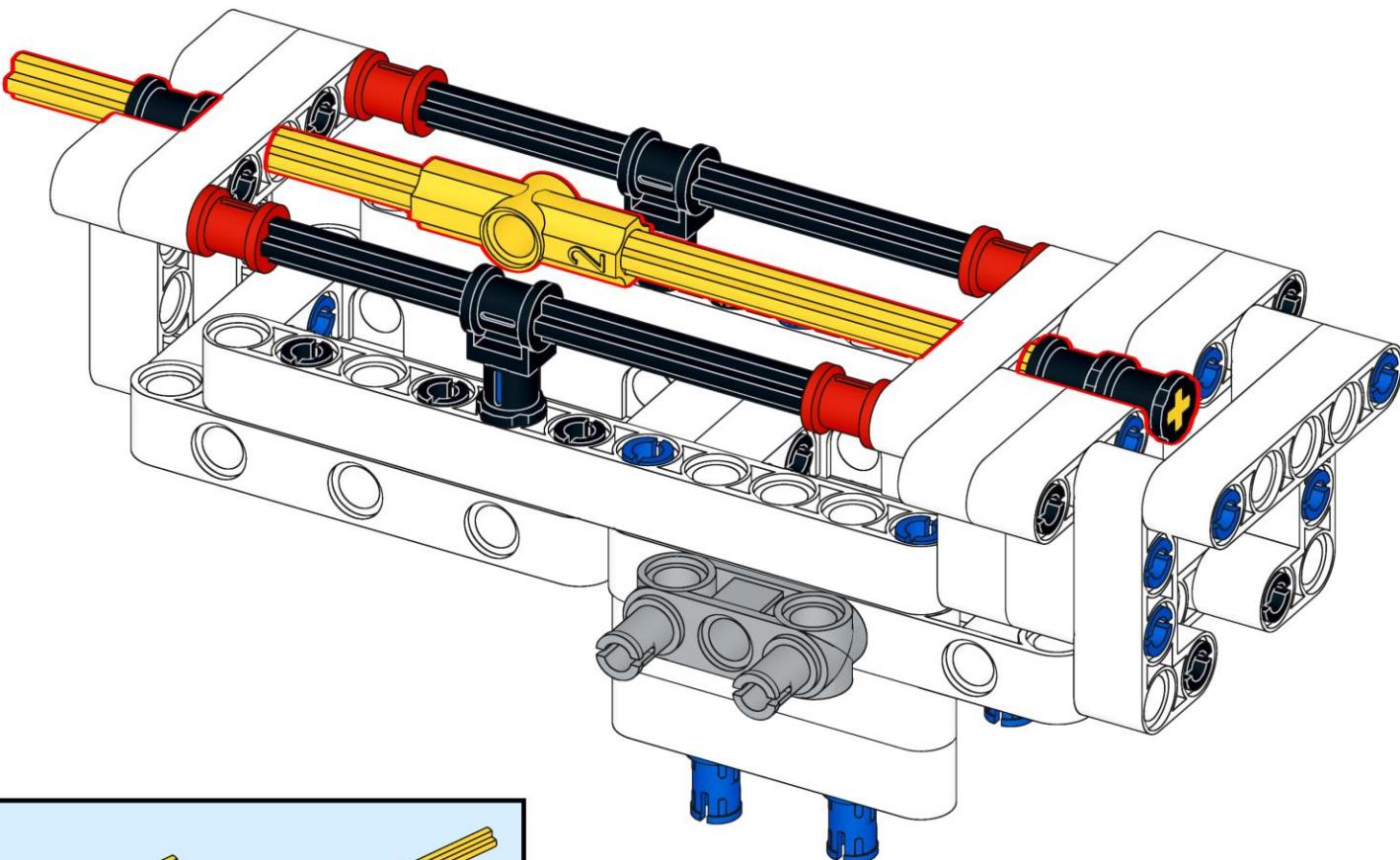
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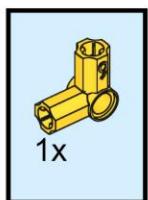
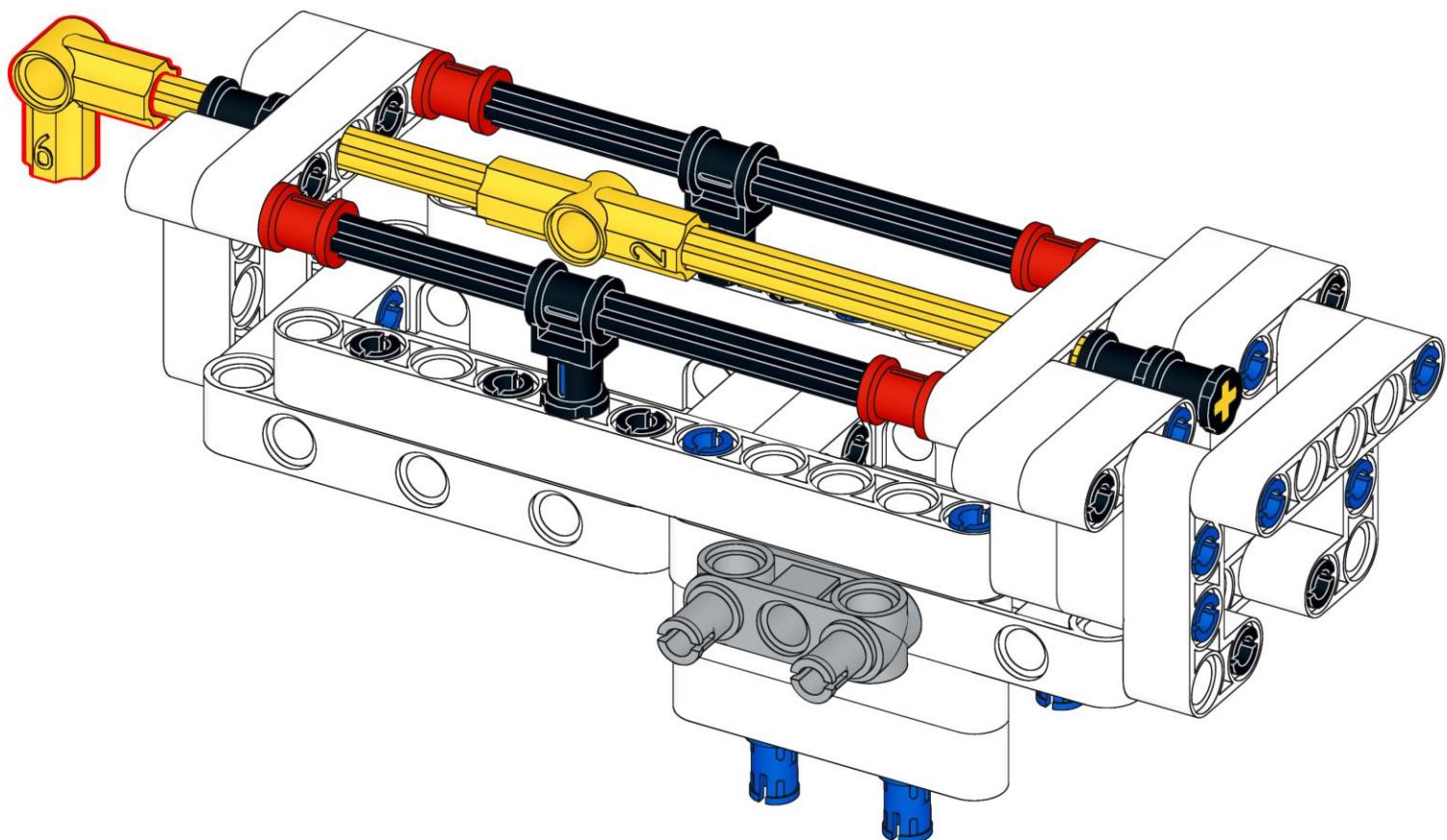
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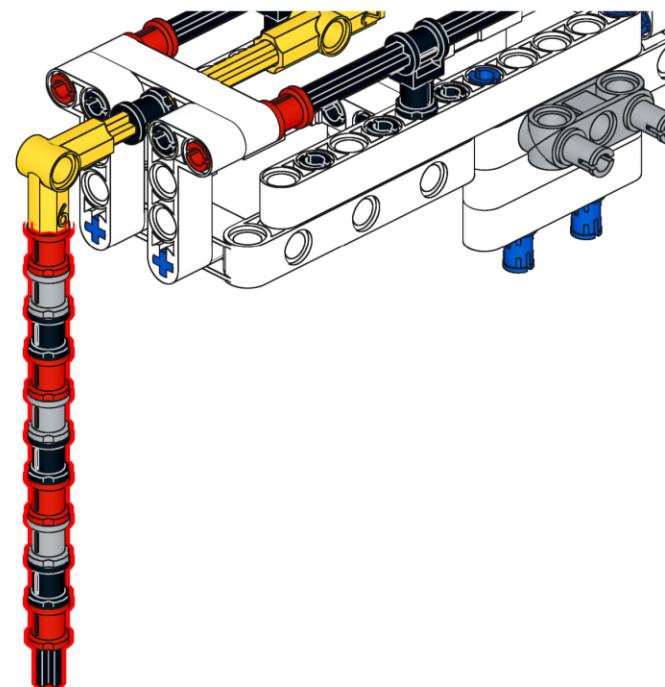
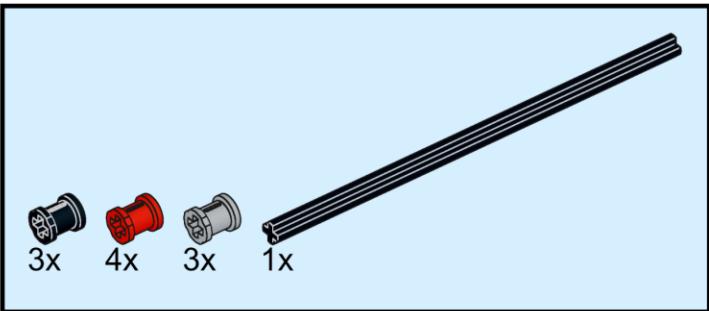


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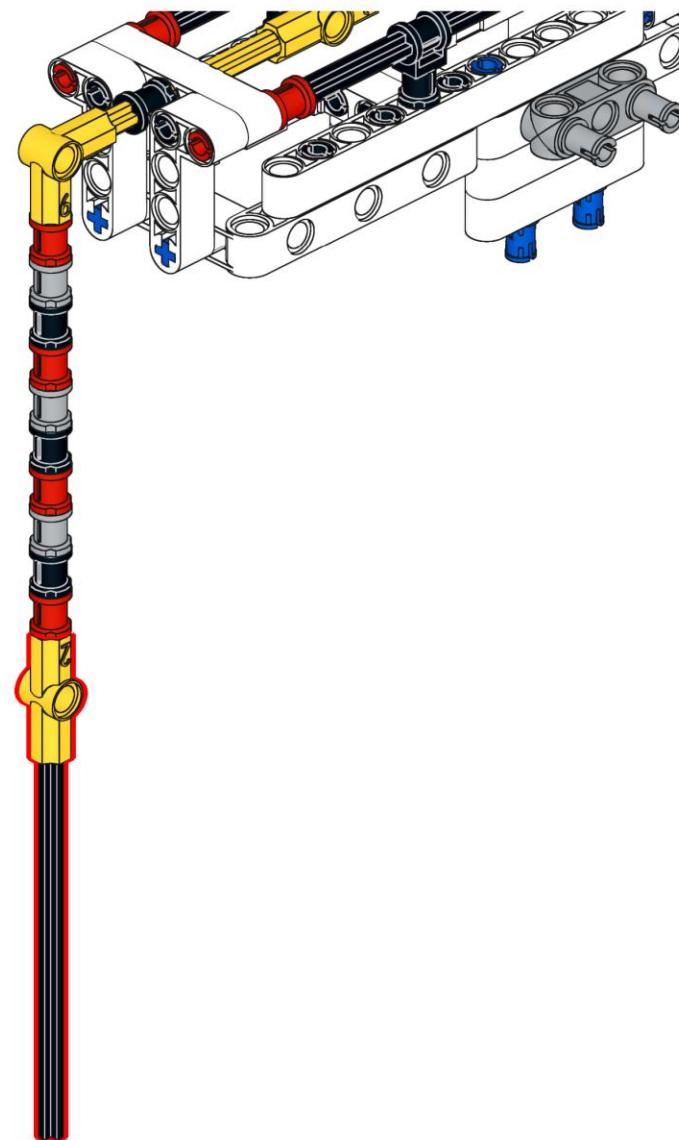
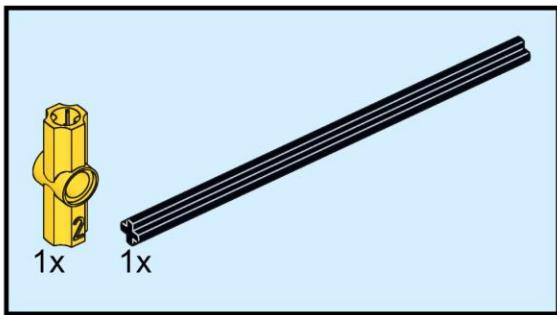


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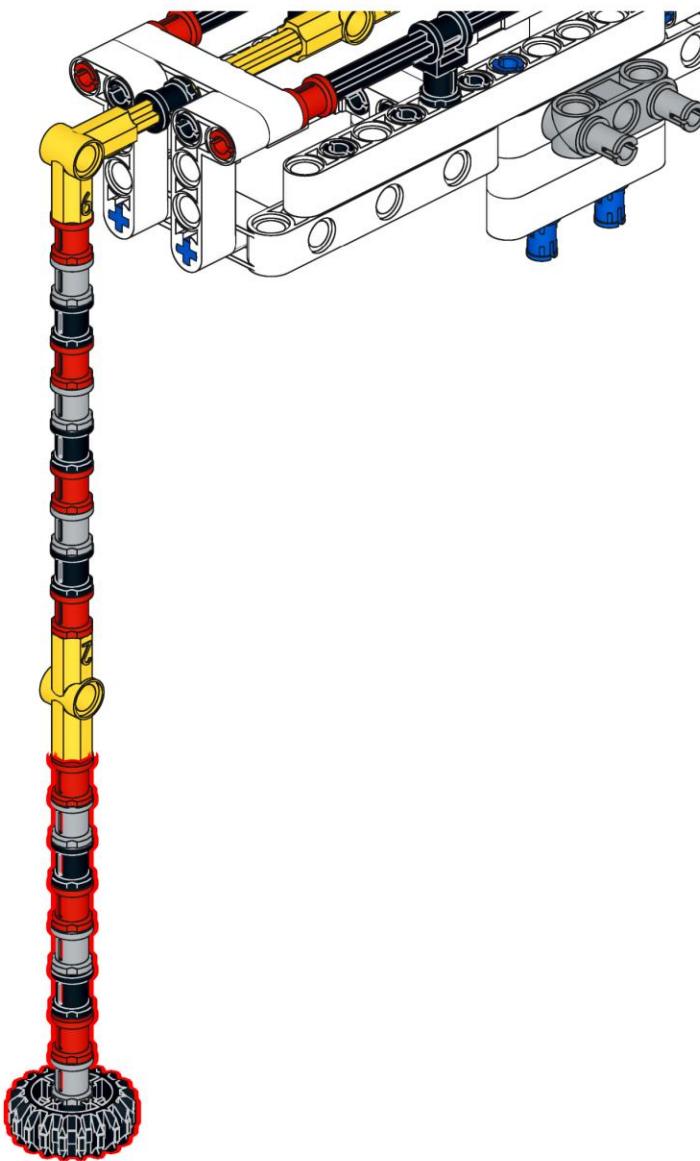
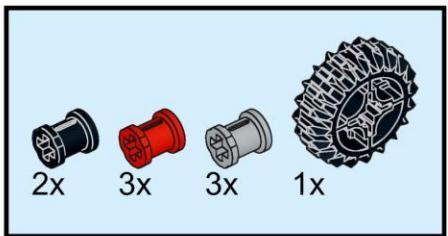
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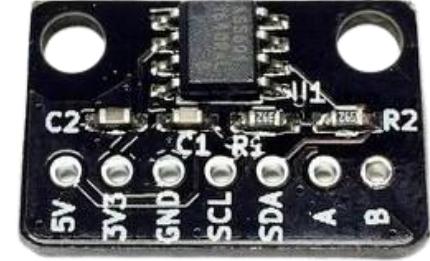
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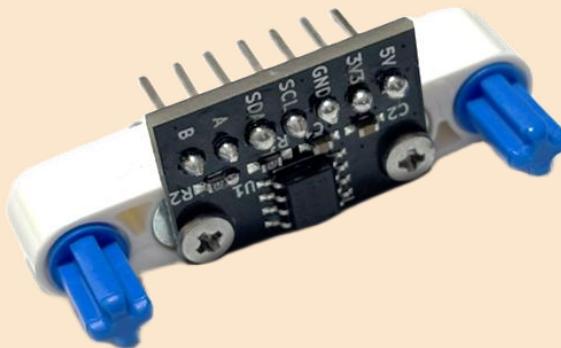
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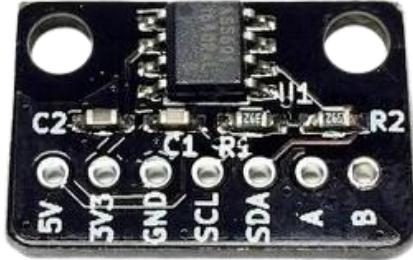


振子用エンコーダ AS5601 の取りつけ

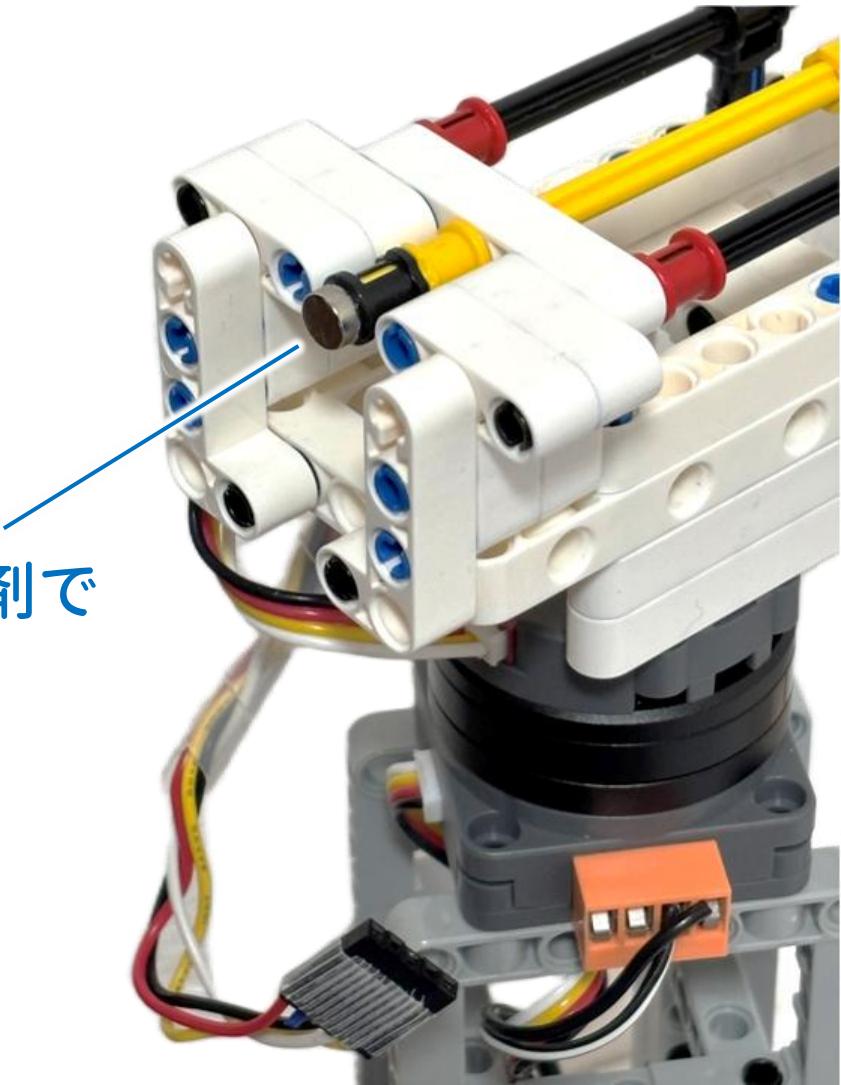


- M2 のネジ・ナット・ワッシャーで LEGO 部品に AS5601 を固定
- ピンヘッダ（別途必要）を基板にはんだ付け



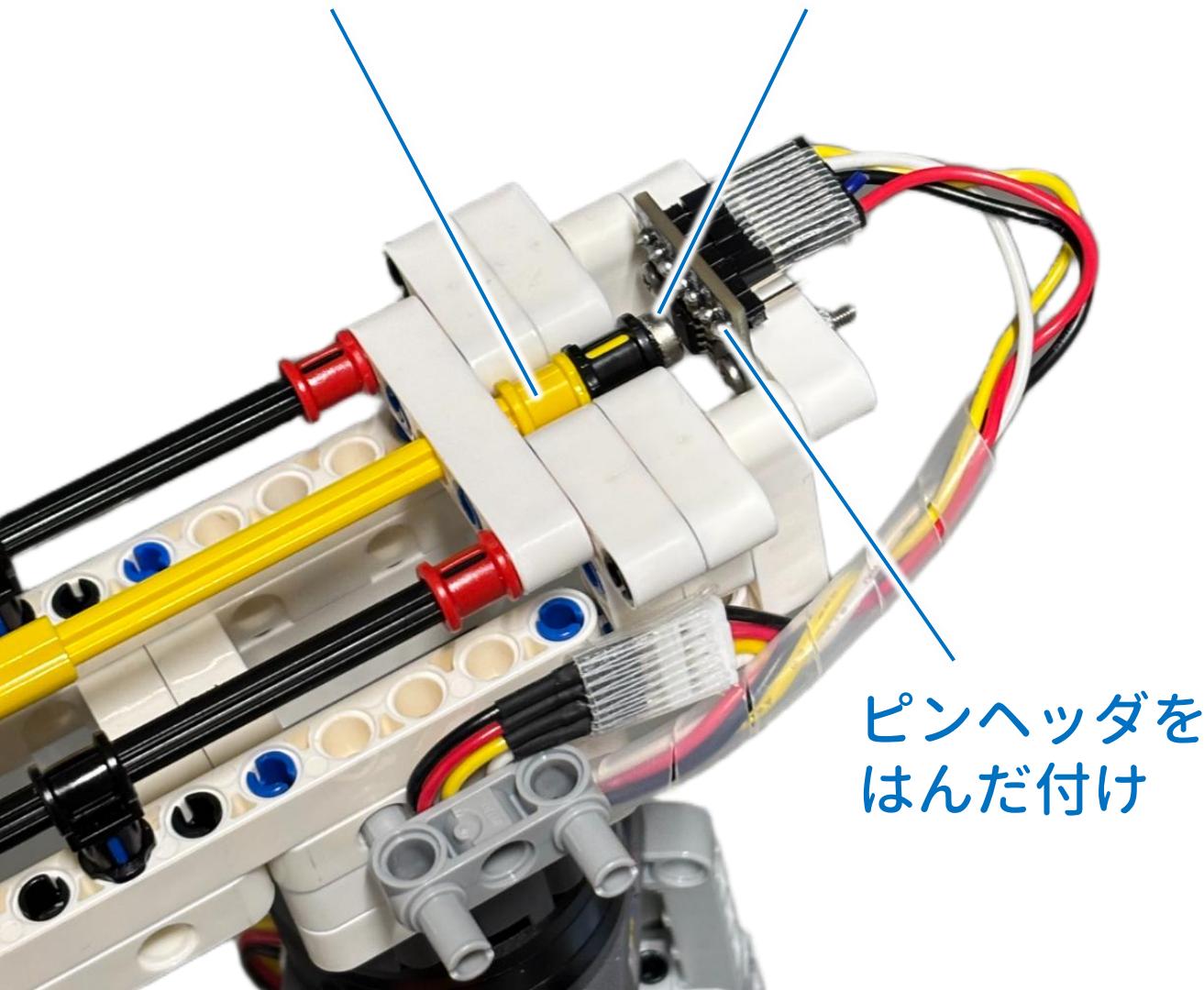


AS5601 付属の磁石を接着剤で
LEGO 部品 (3713) に固定

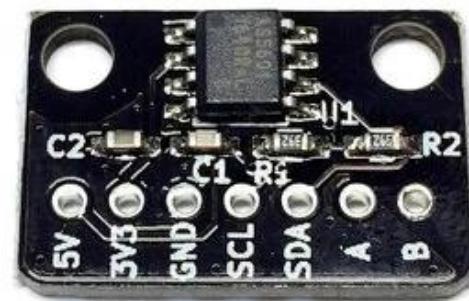


回転摩擦を軽減するため
に少しだけ LEGO 部品
32316 と 3713 の間に
隙間を空けておく

AS5601 付属の磁石を接着剤で
LEGO 部品 (3713) に固定



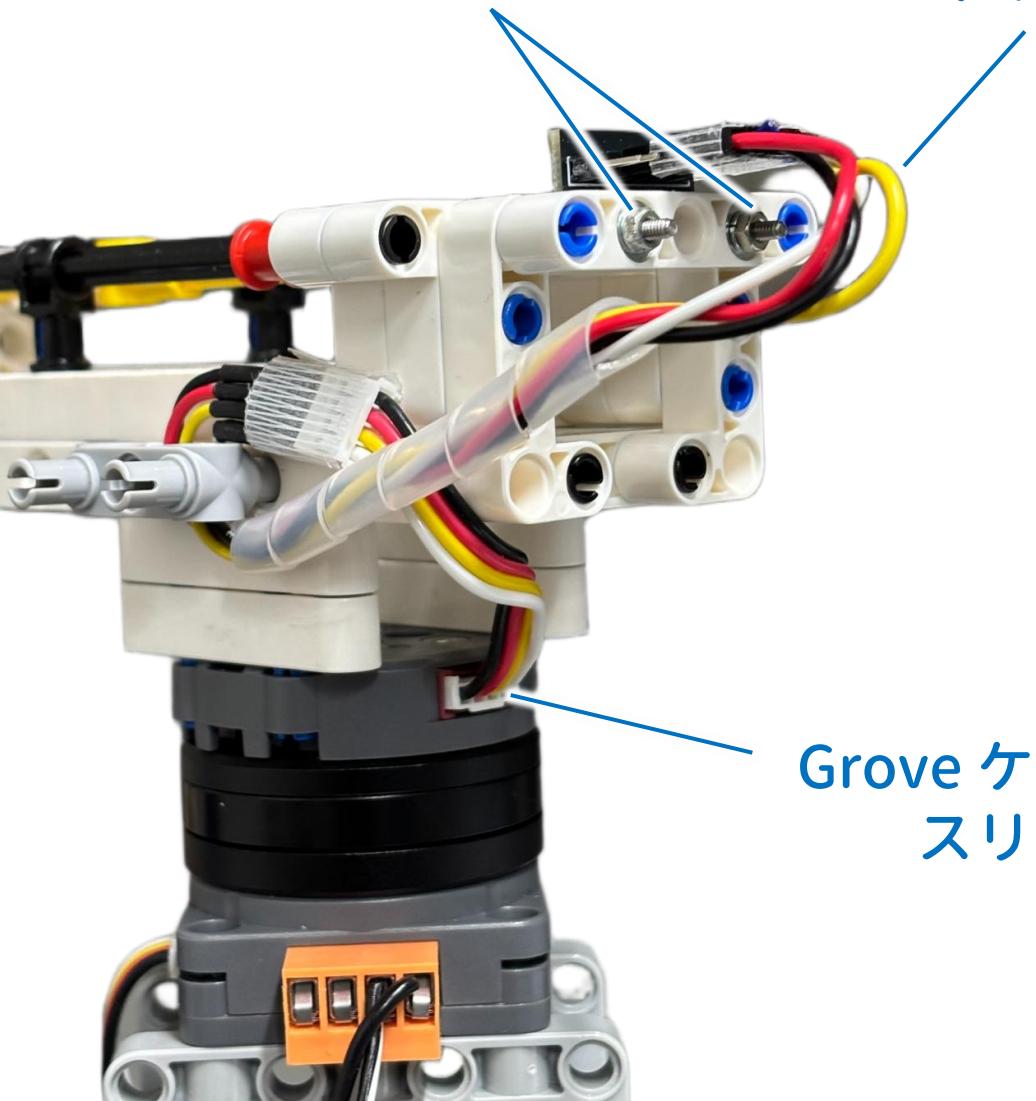
ピンヘッダを
はんだ付け



5V —
GND —
SCL —
SDA

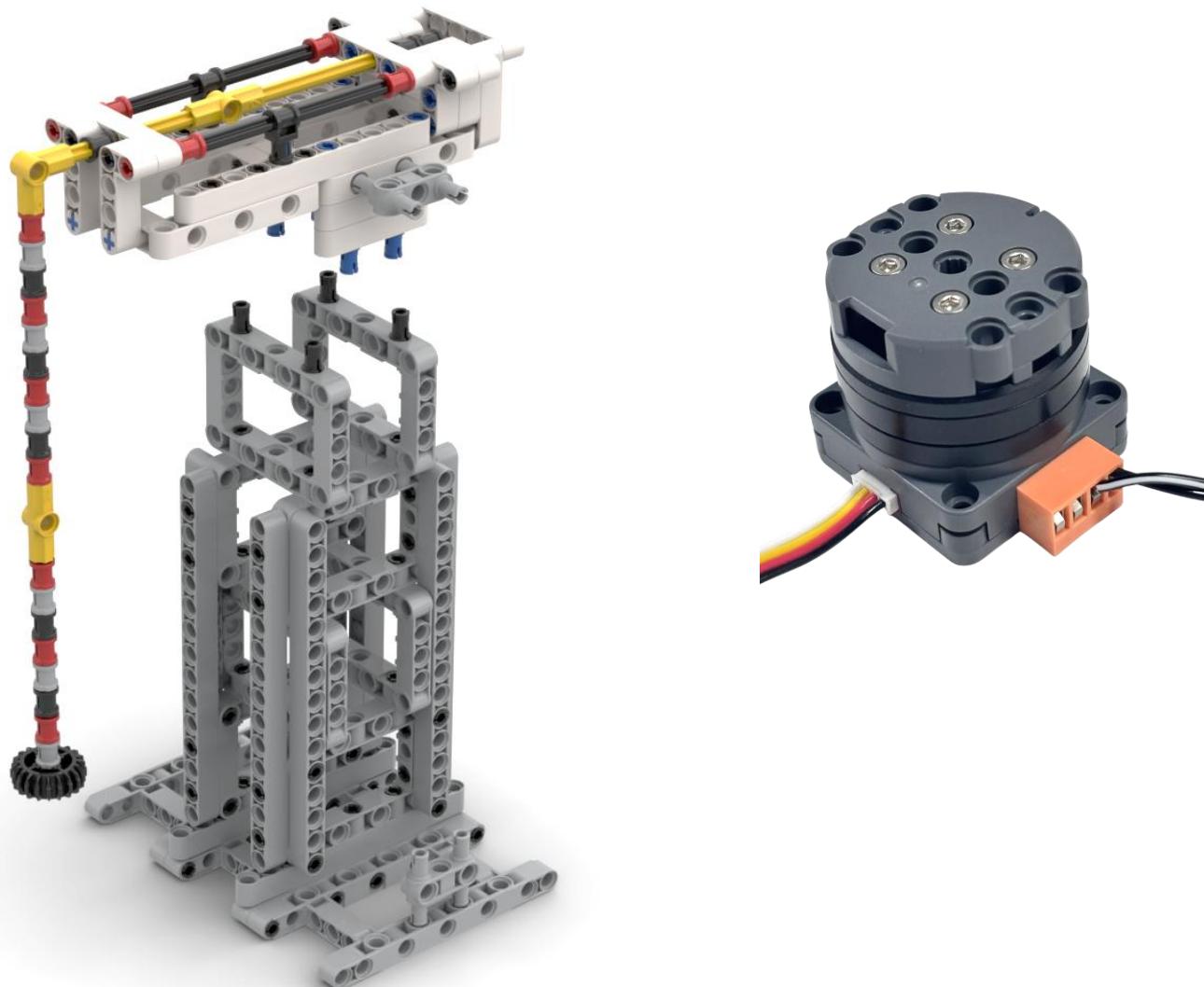
M2 のネジ類で
LEGO 部品に
AS5601 を固定

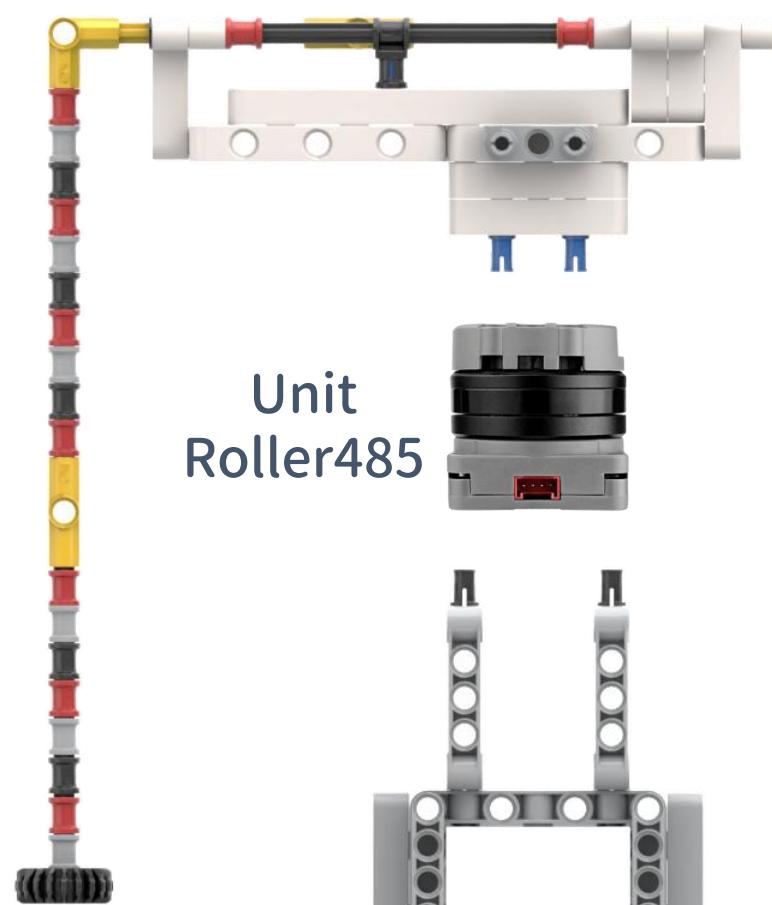
オスメスジャンパ線を介して
Grove ケーブルと AS5601 を接続
(オス側: Grove ケーブル
メス側: AS5601)



Grove ケーブルを Roller485 の
スリップリングに接続

Roller485 を介して 土台とアームを結合

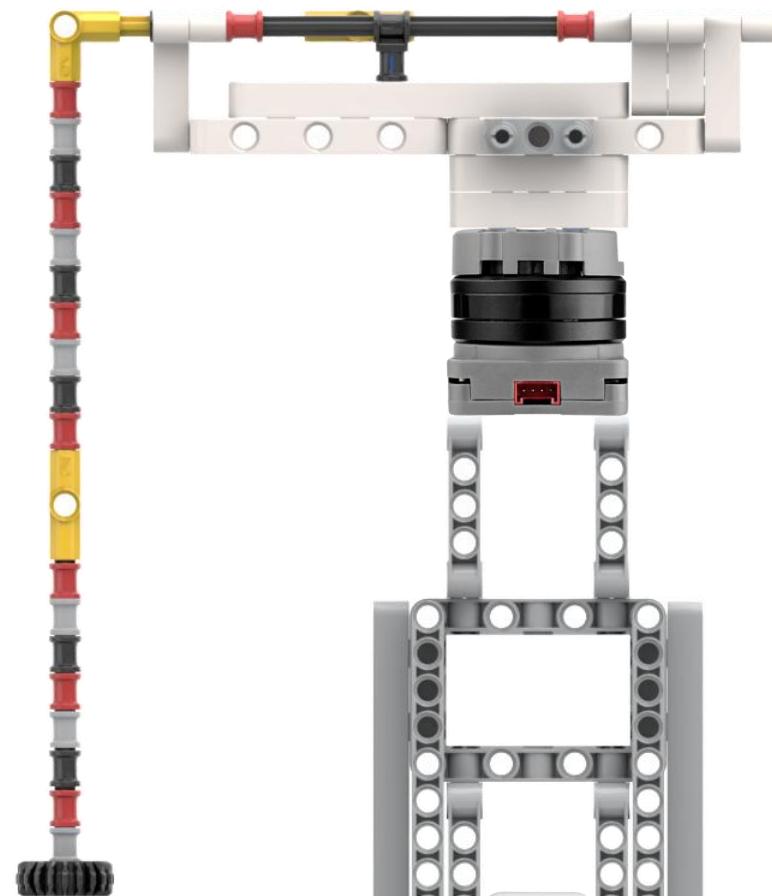




Unit
Roller485



Grove
Hub



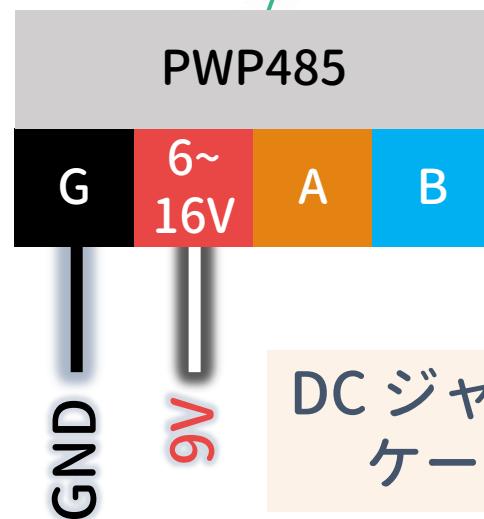
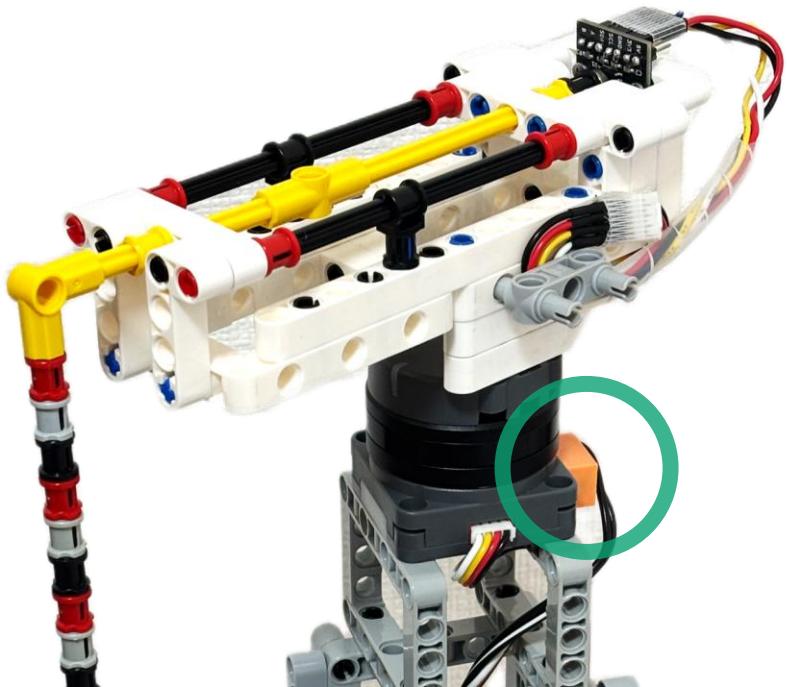
AS5601

Unit
Roller485

外部電源と接続

Grove Hub で
Grove ケーブルを延長

Arduino Mega 2560 との接続



AC アダプタ

エクスターナルで
実行する場合は
5V に接続しない

DC ジャック付
ケーブル

手元スイッチ

SCL

SDA

GND