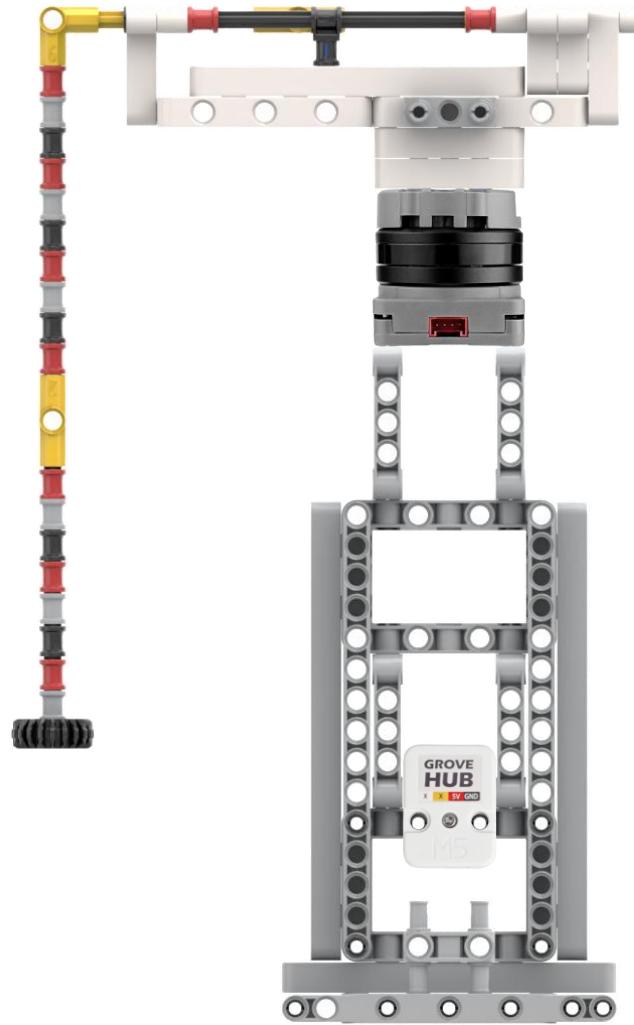


# 回転型倒立振子の組み立て



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

# 電子部品

2026/02/01 確認

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

## その他

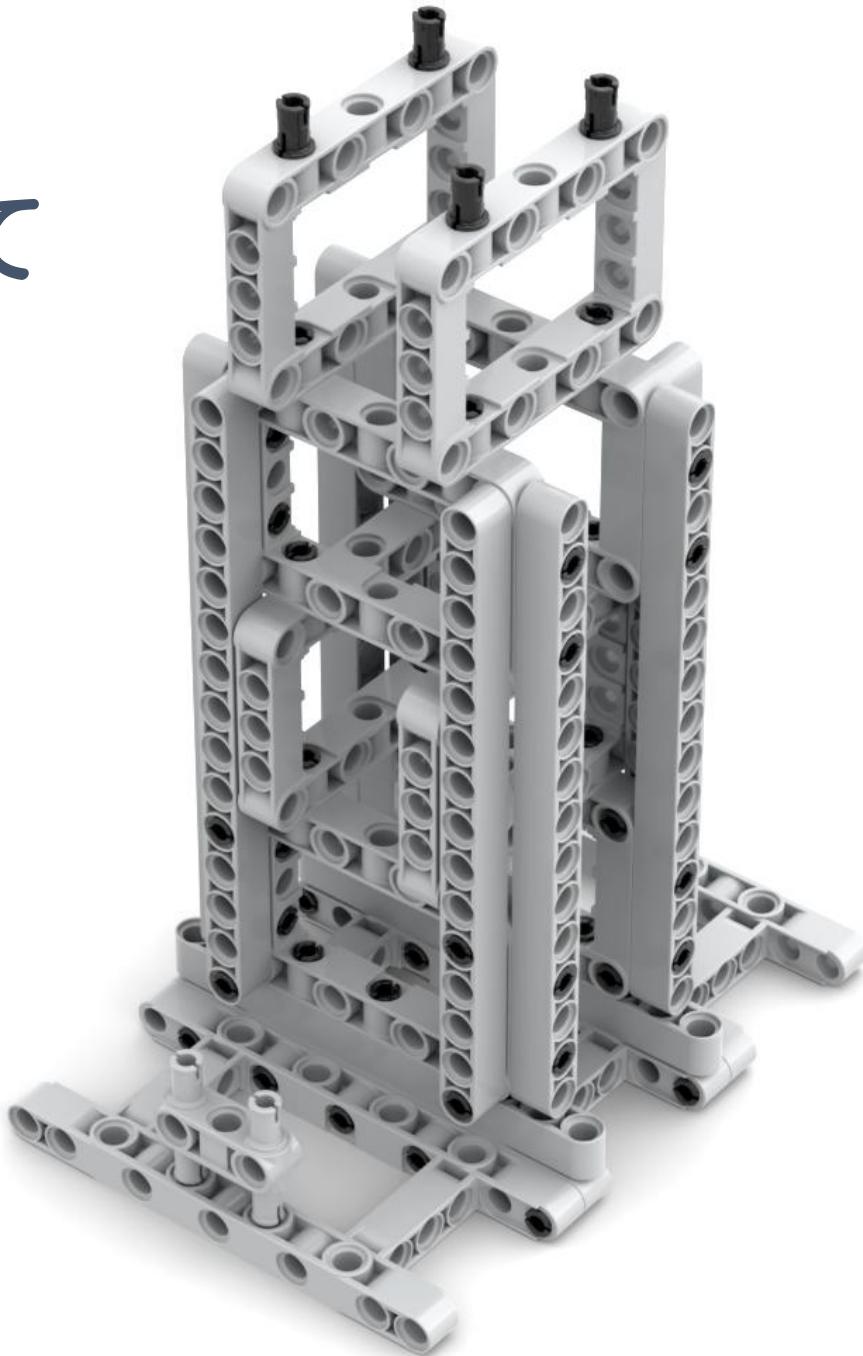
USBケーブル (PC側 : Type A, Mega側 : Type B)

適当な長さの Grove ケーブル

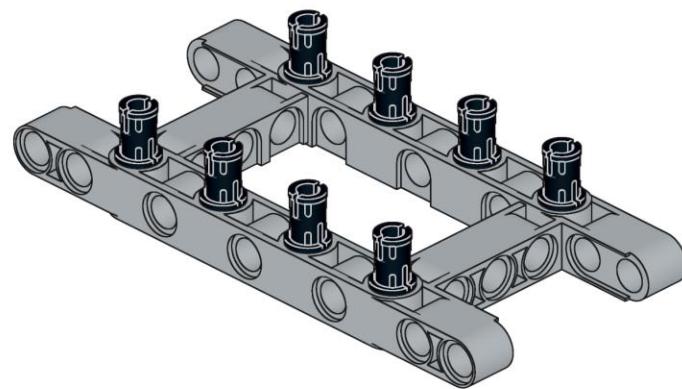
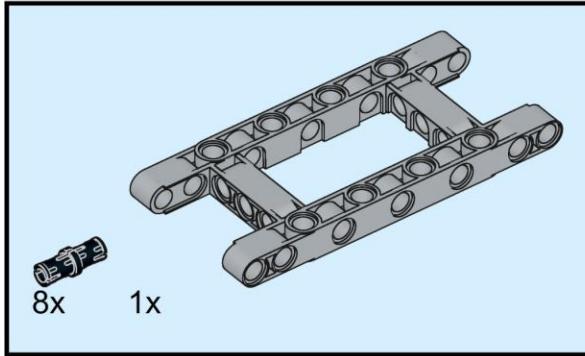
オス・メスジャンパ線 (赤, 黒, 黄, 白)

オス・オスジャンパ線 (赤, 黒, 黄, 白)

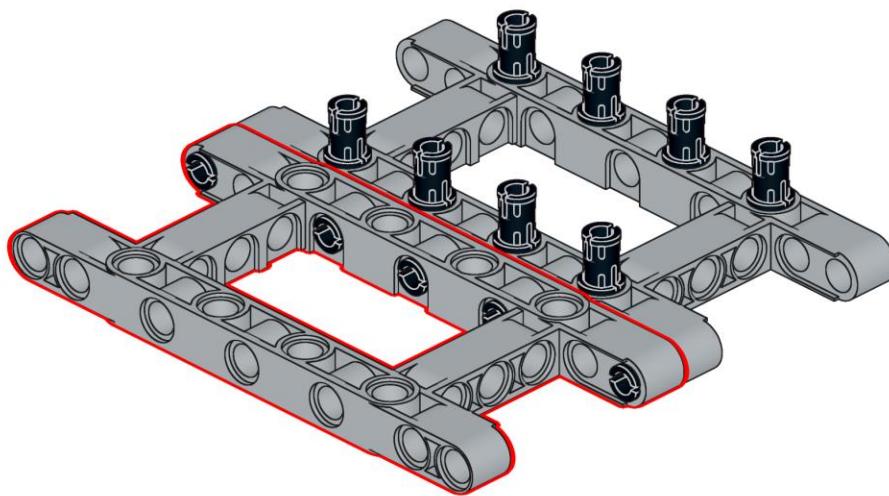
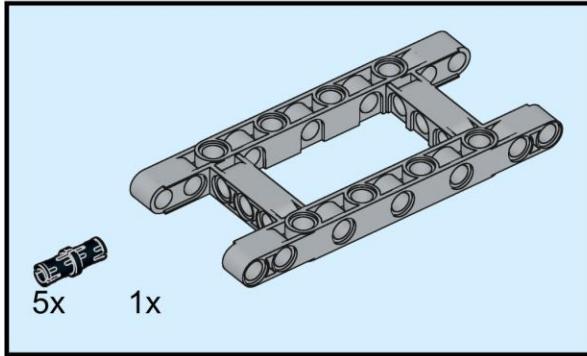
まずは、  
台座の組み立て



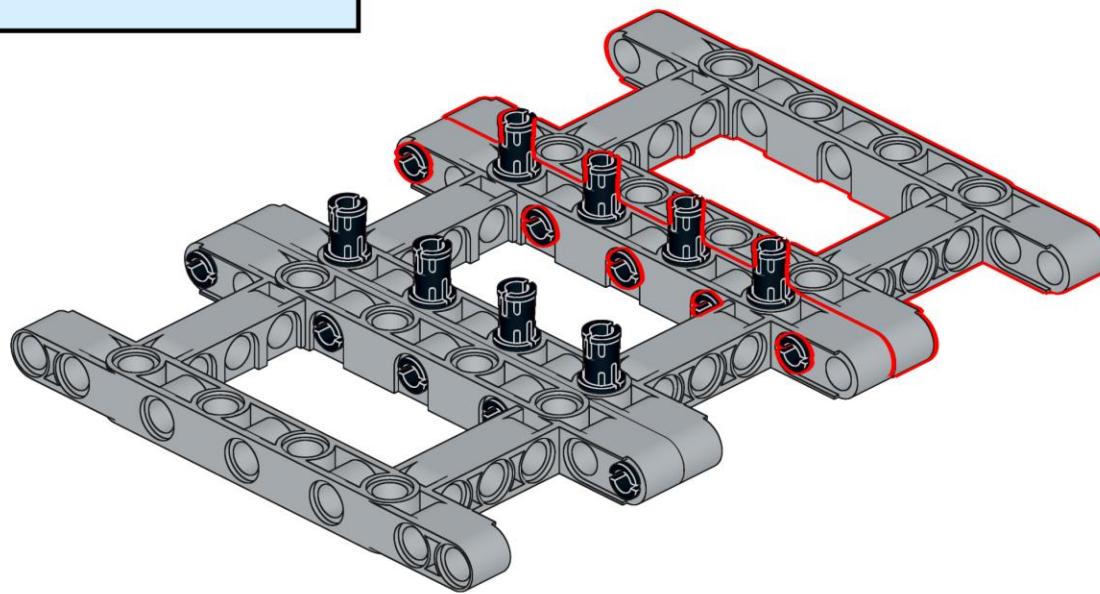
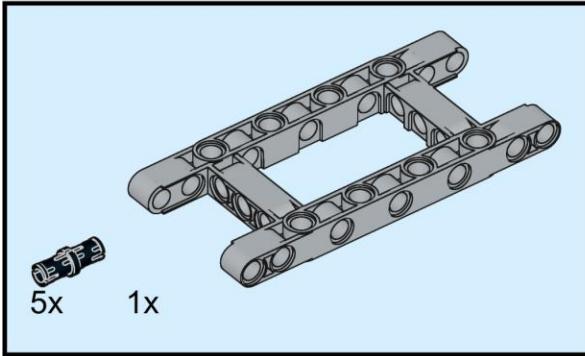
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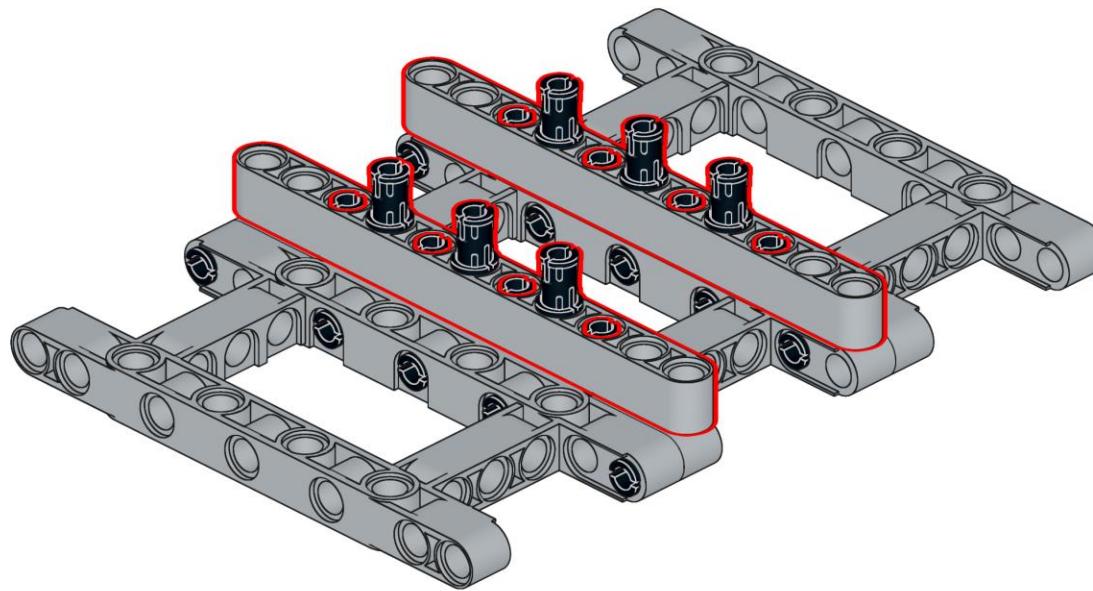
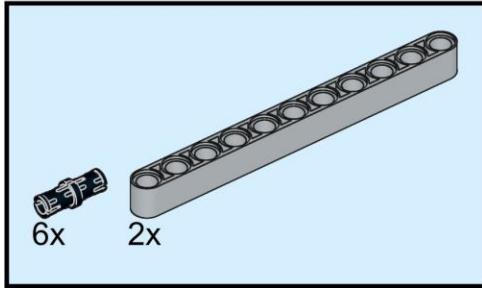
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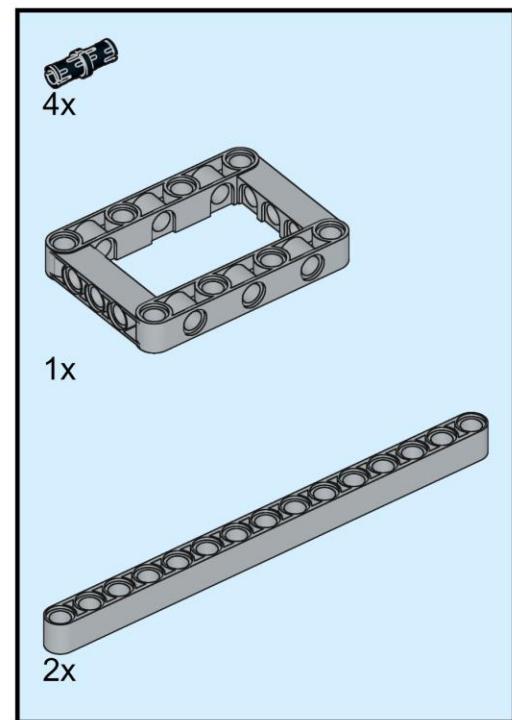
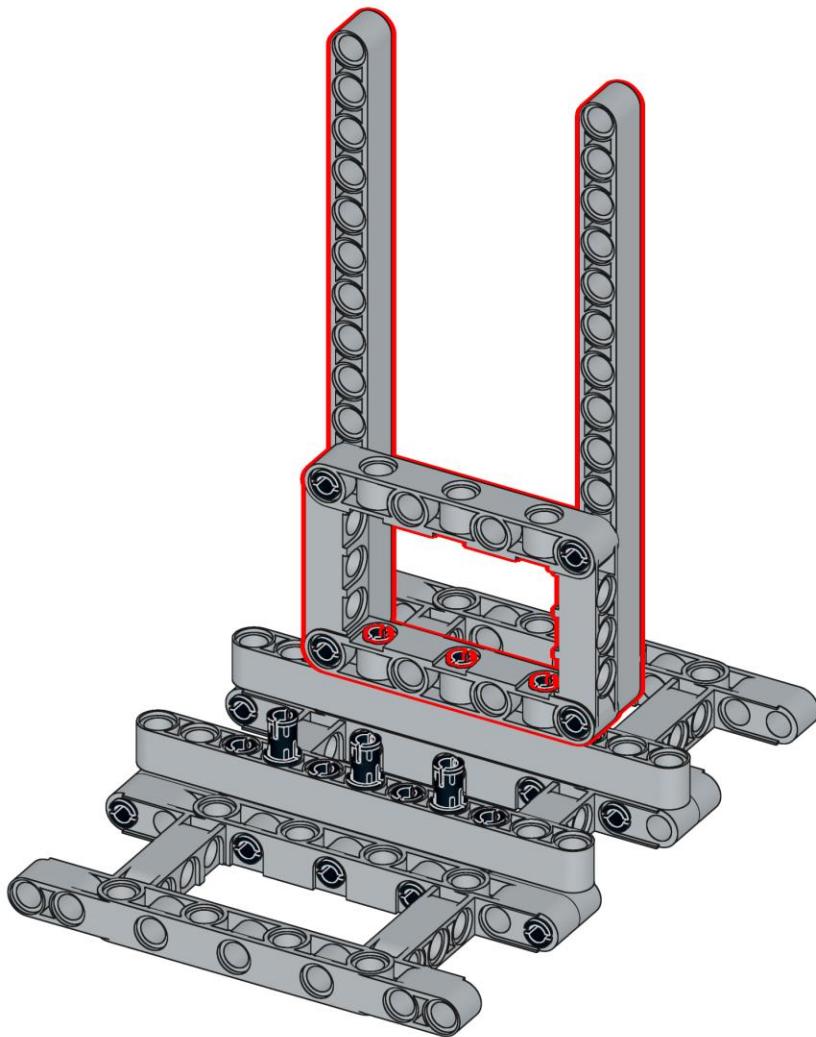
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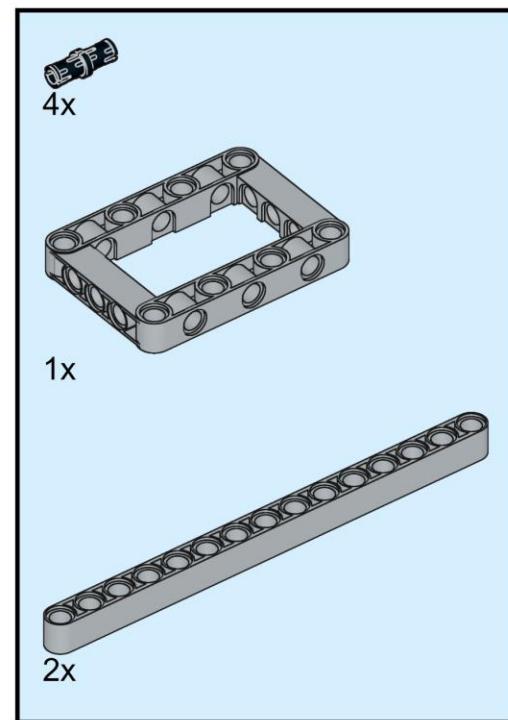
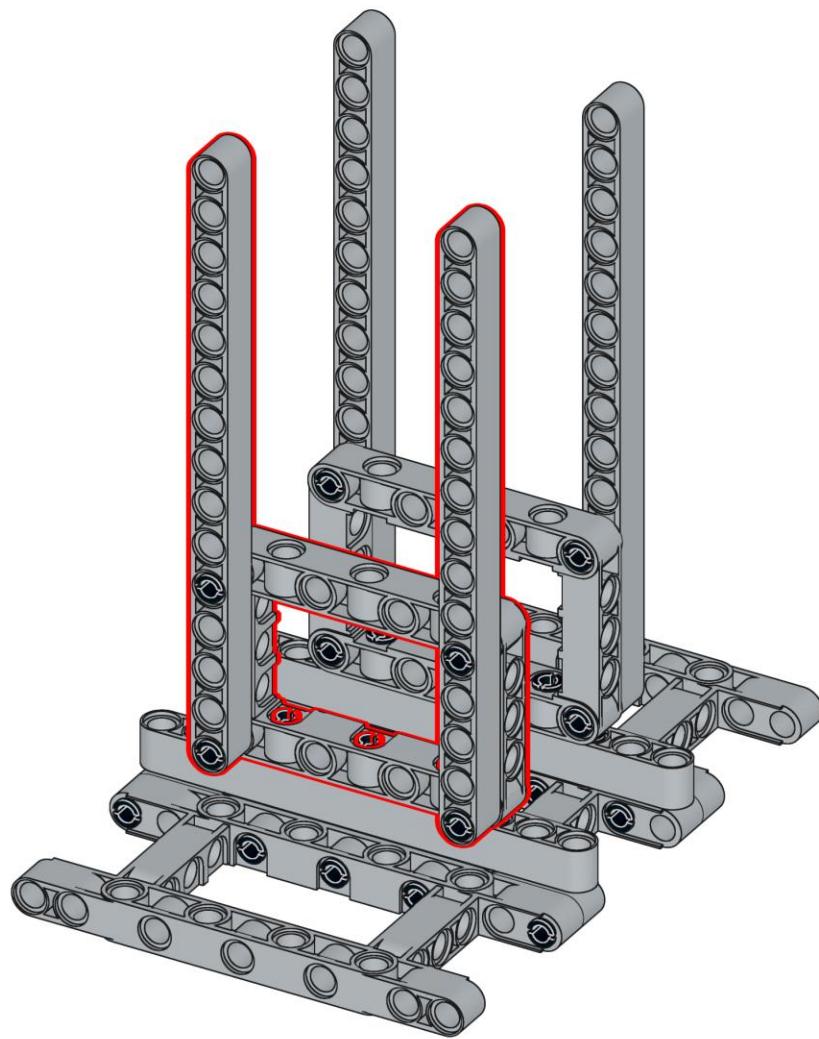
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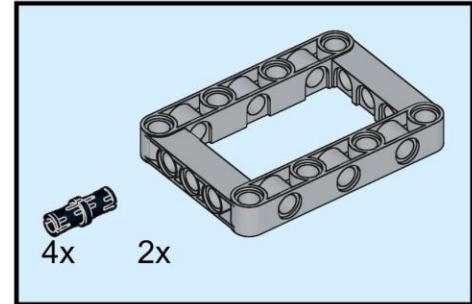
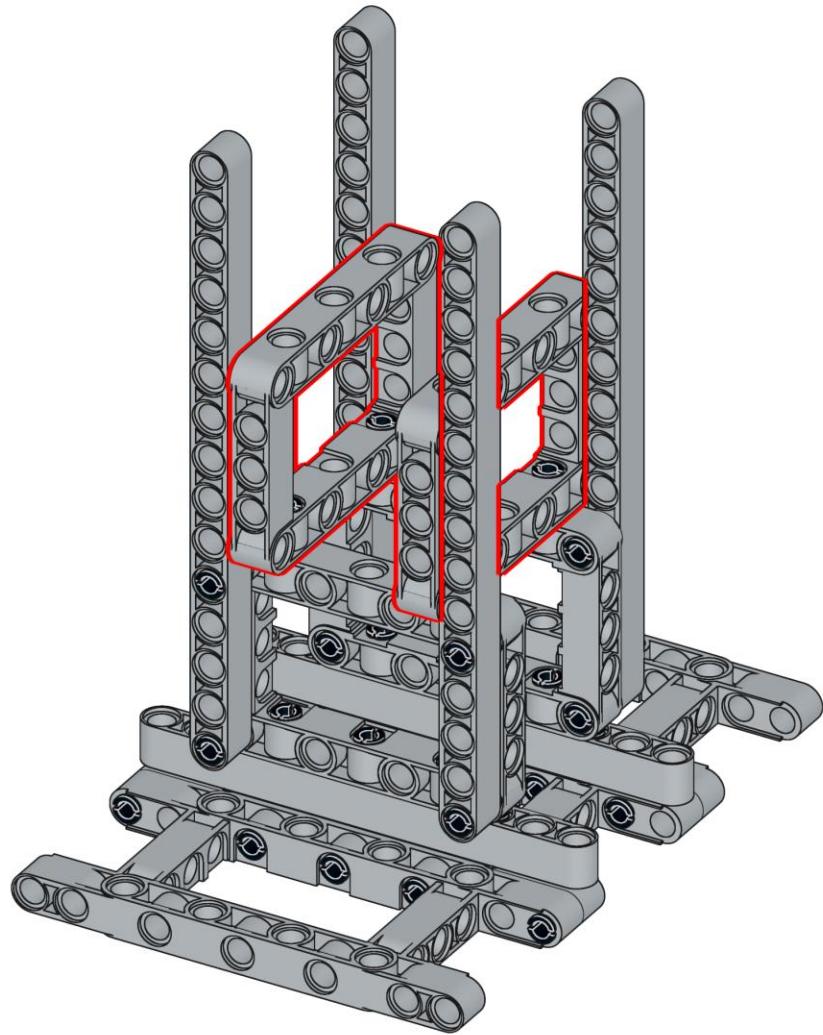
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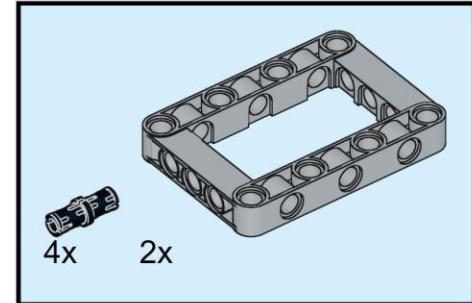
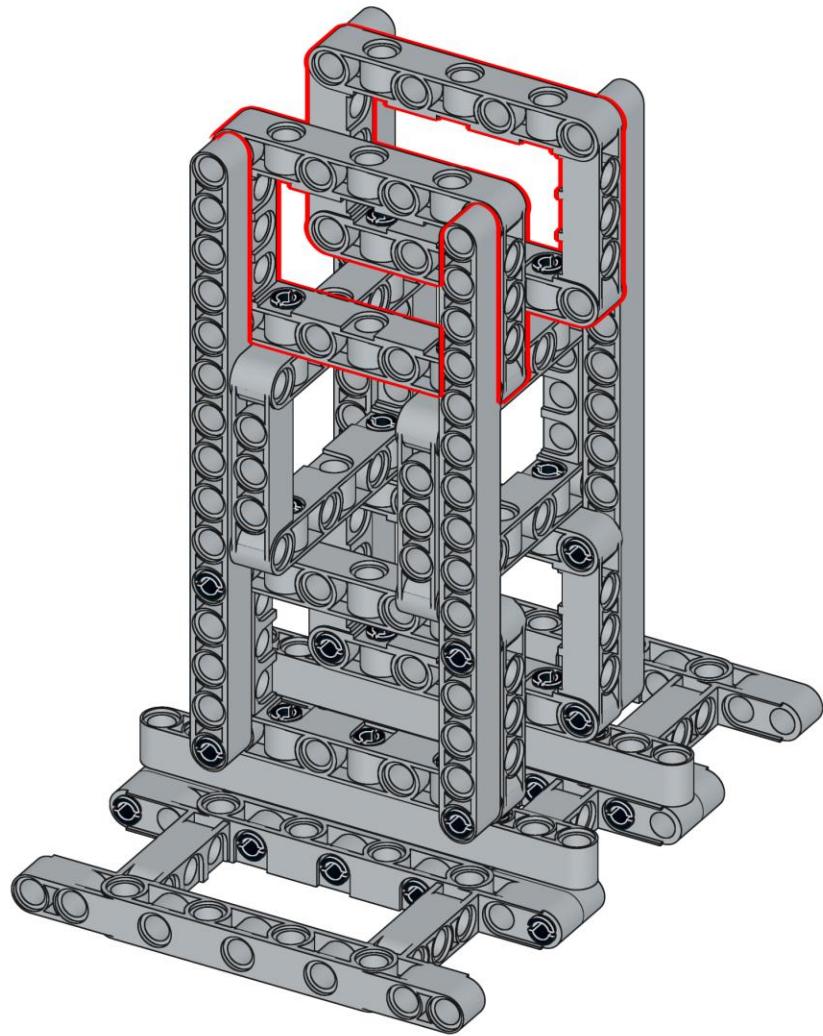
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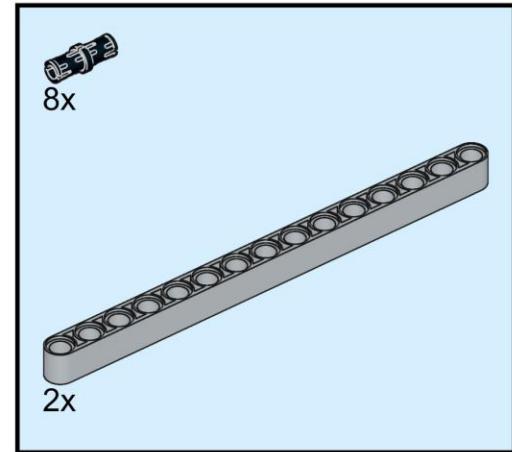
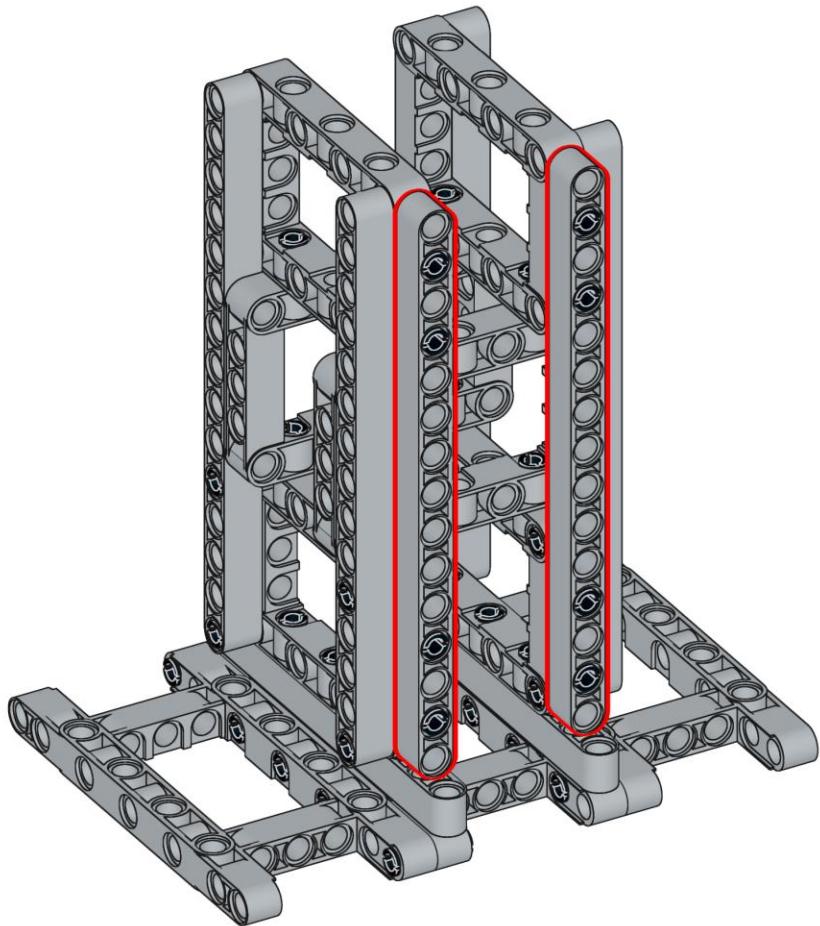
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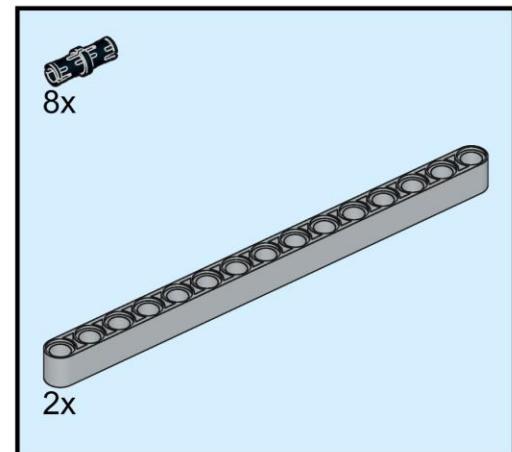
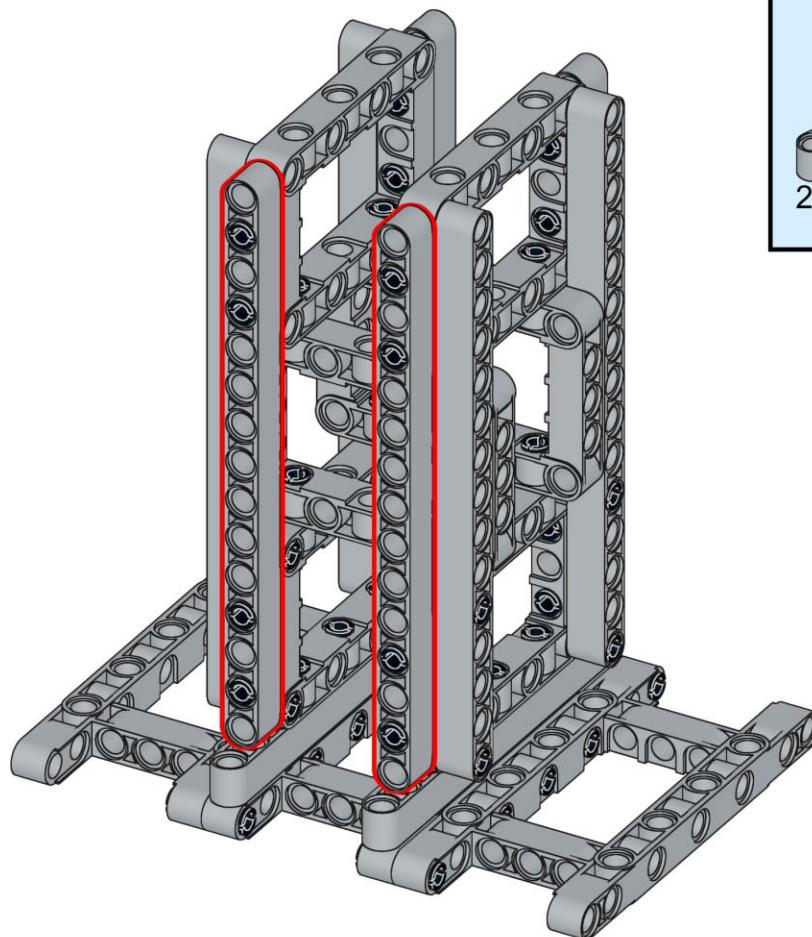
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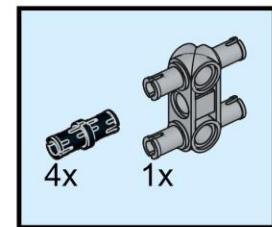
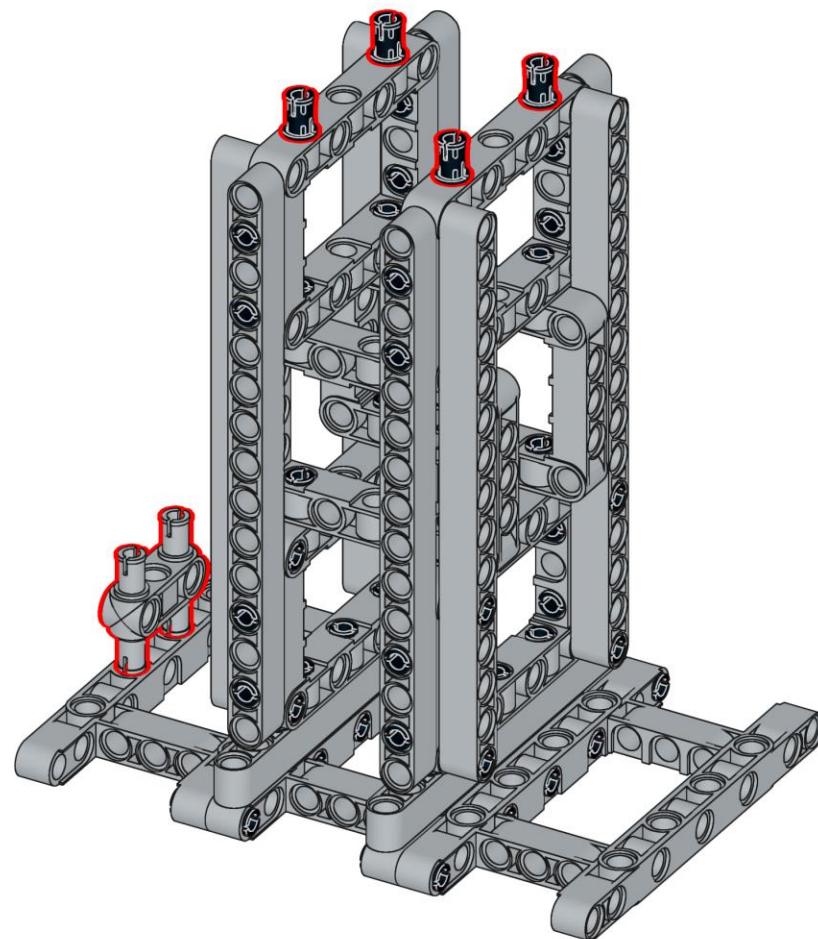
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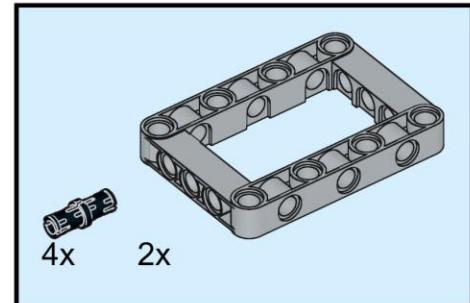
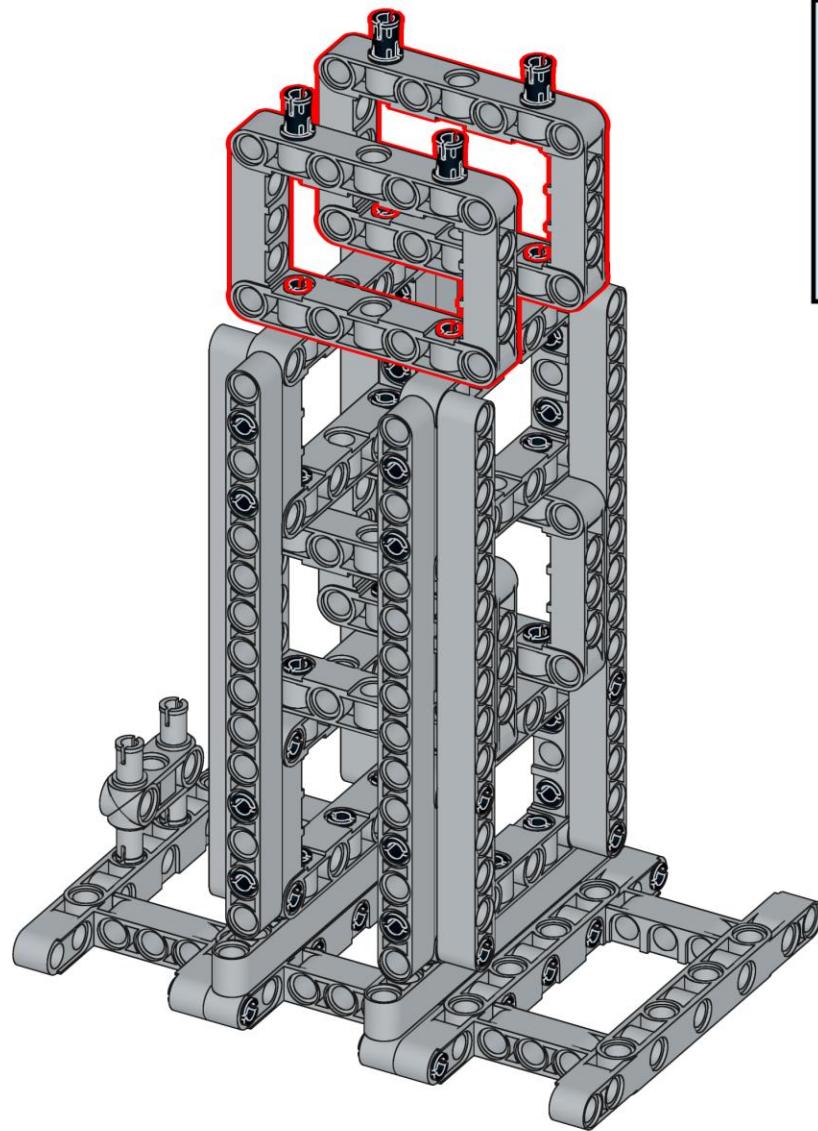
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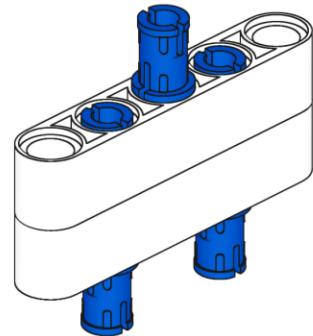
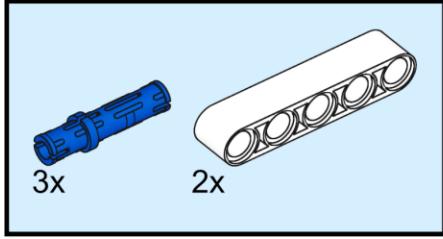
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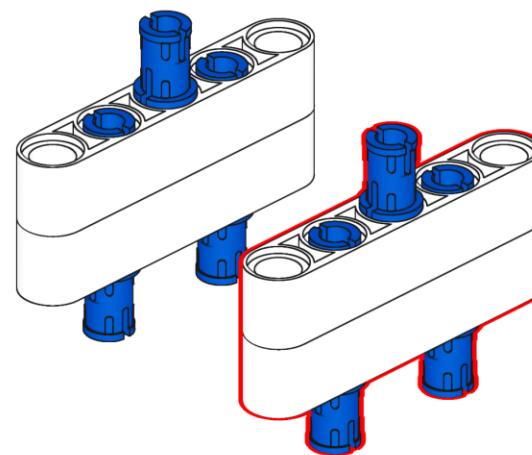
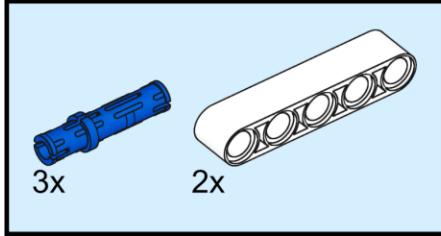
つぎに、  
アームと振子の  
組み立て



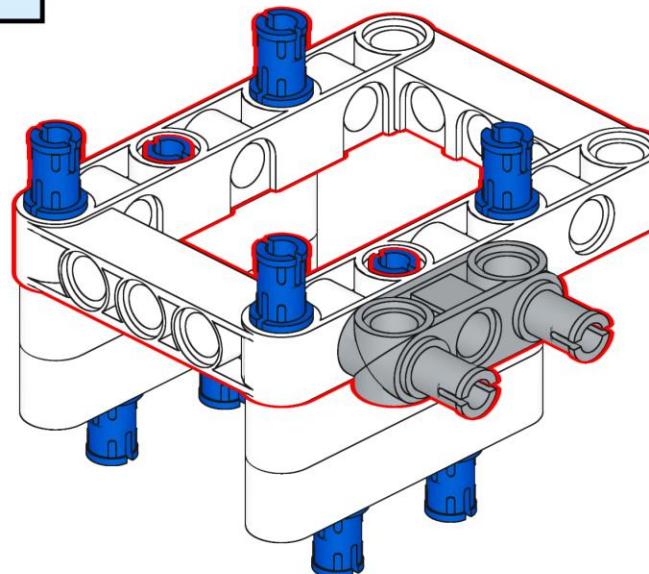
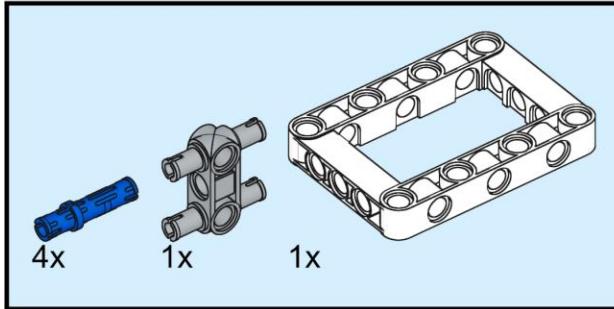
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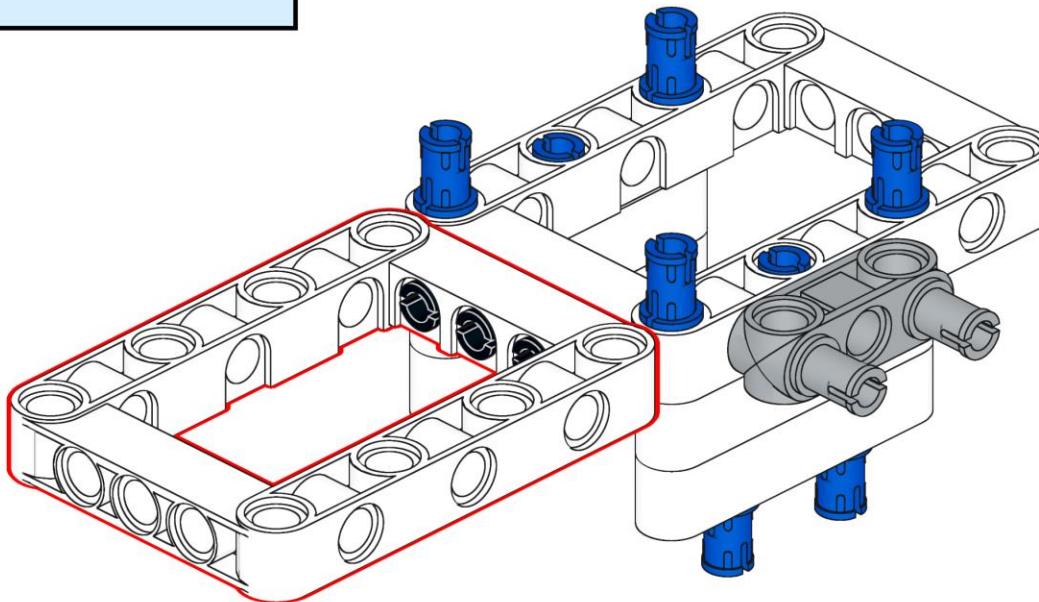
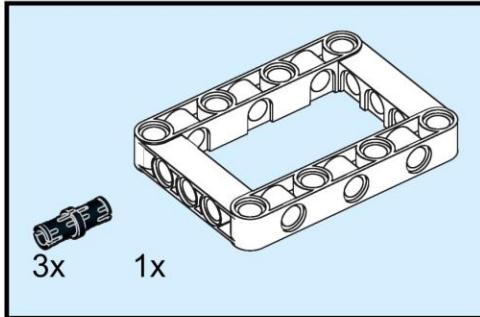
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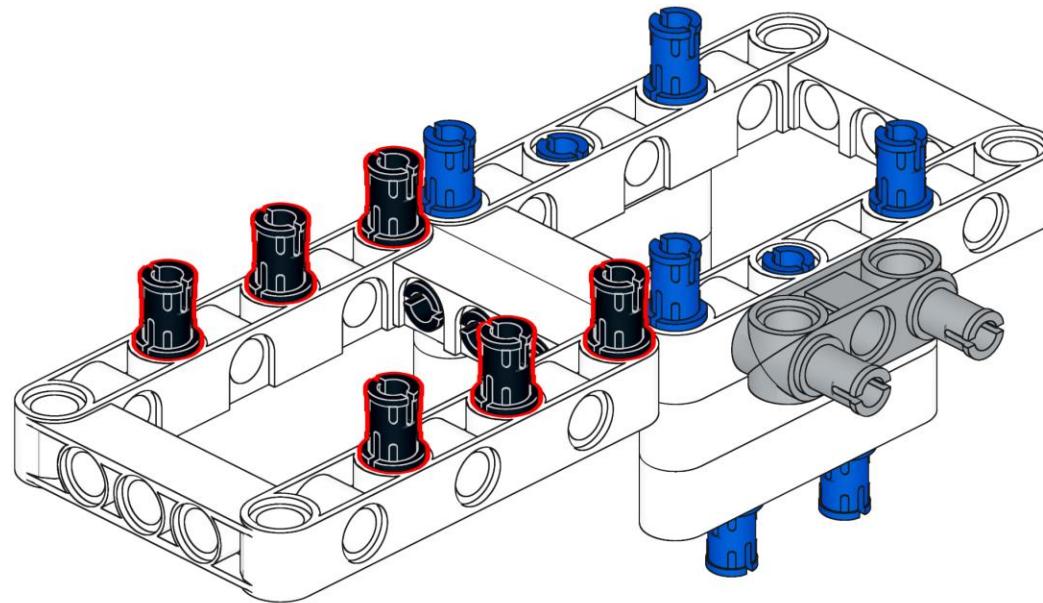
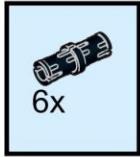
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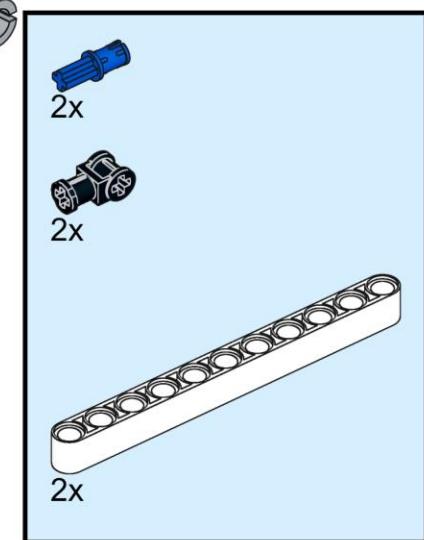
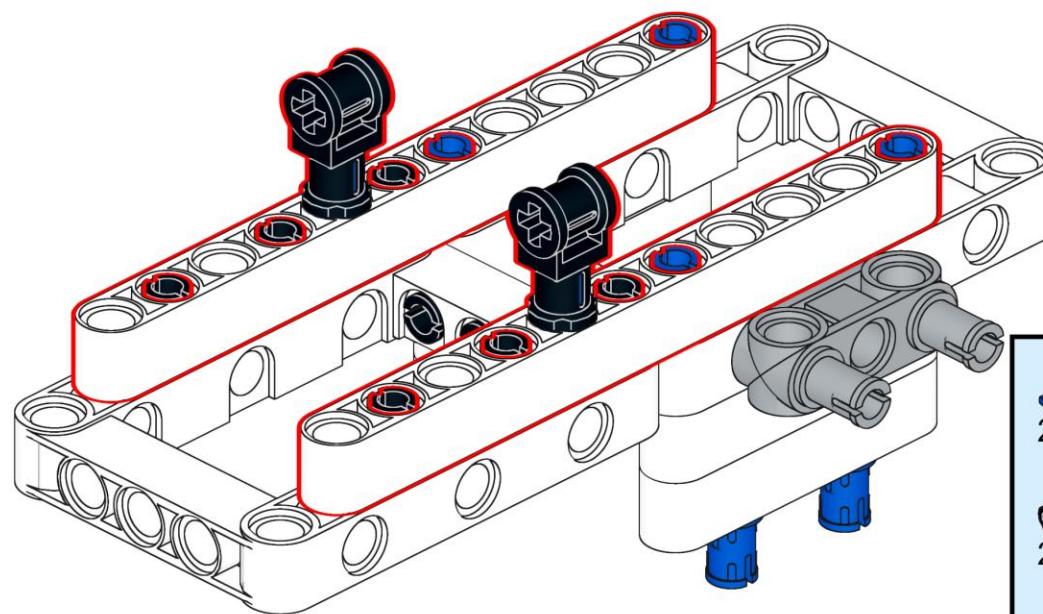
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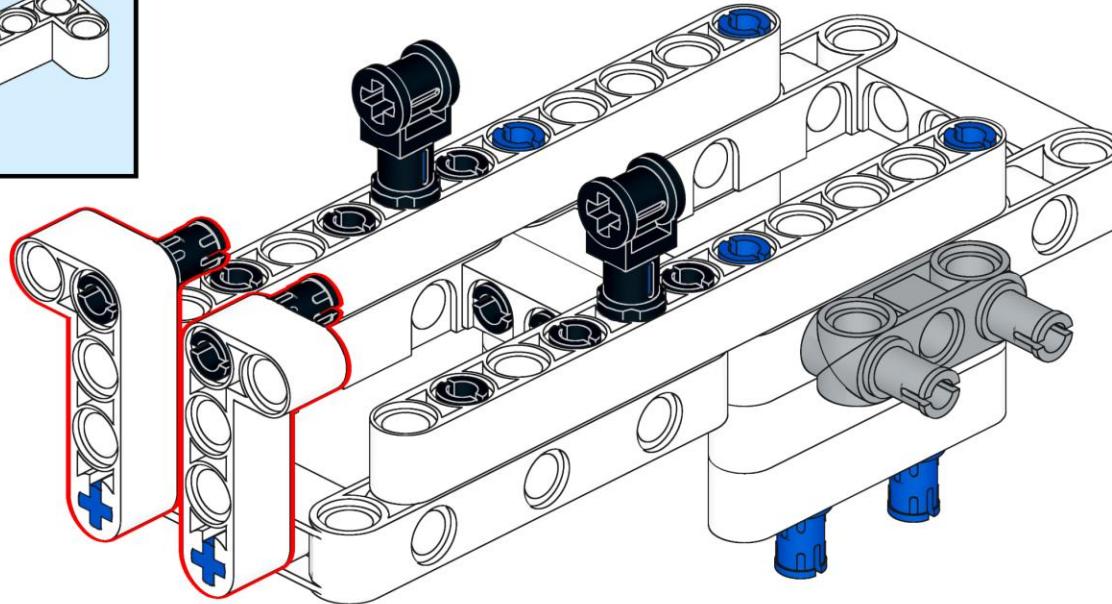
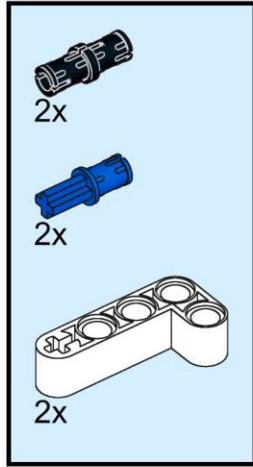
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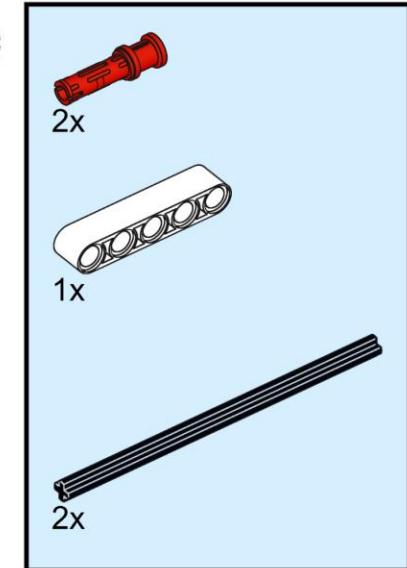
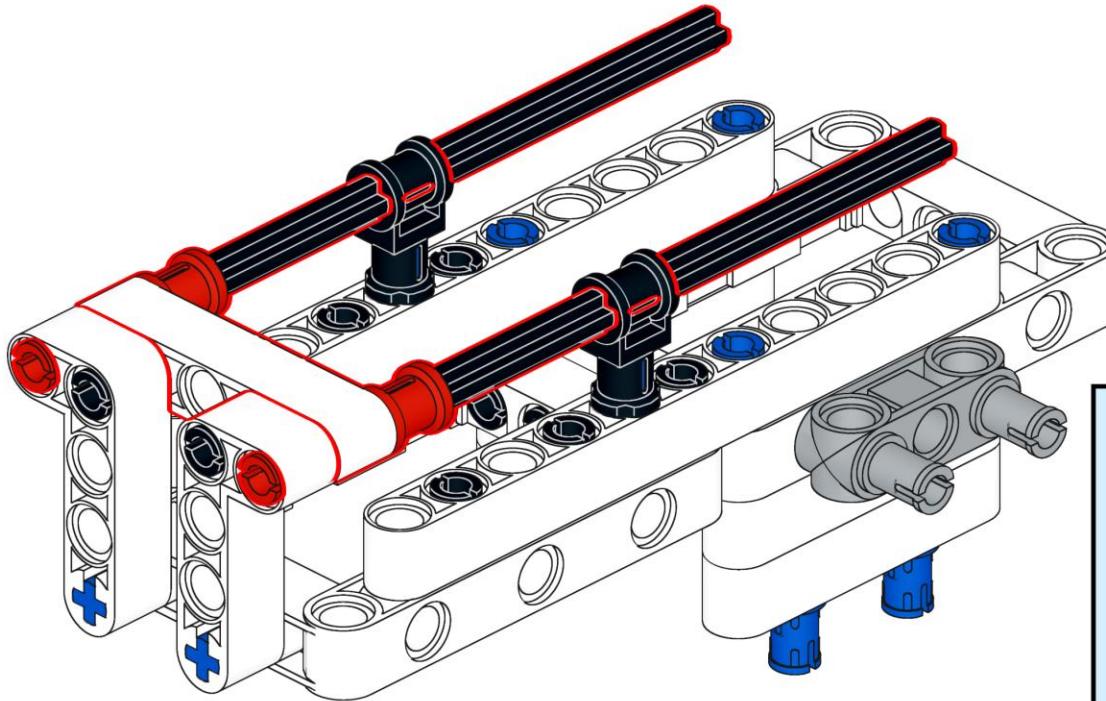
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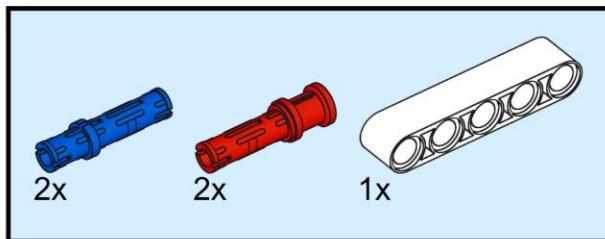
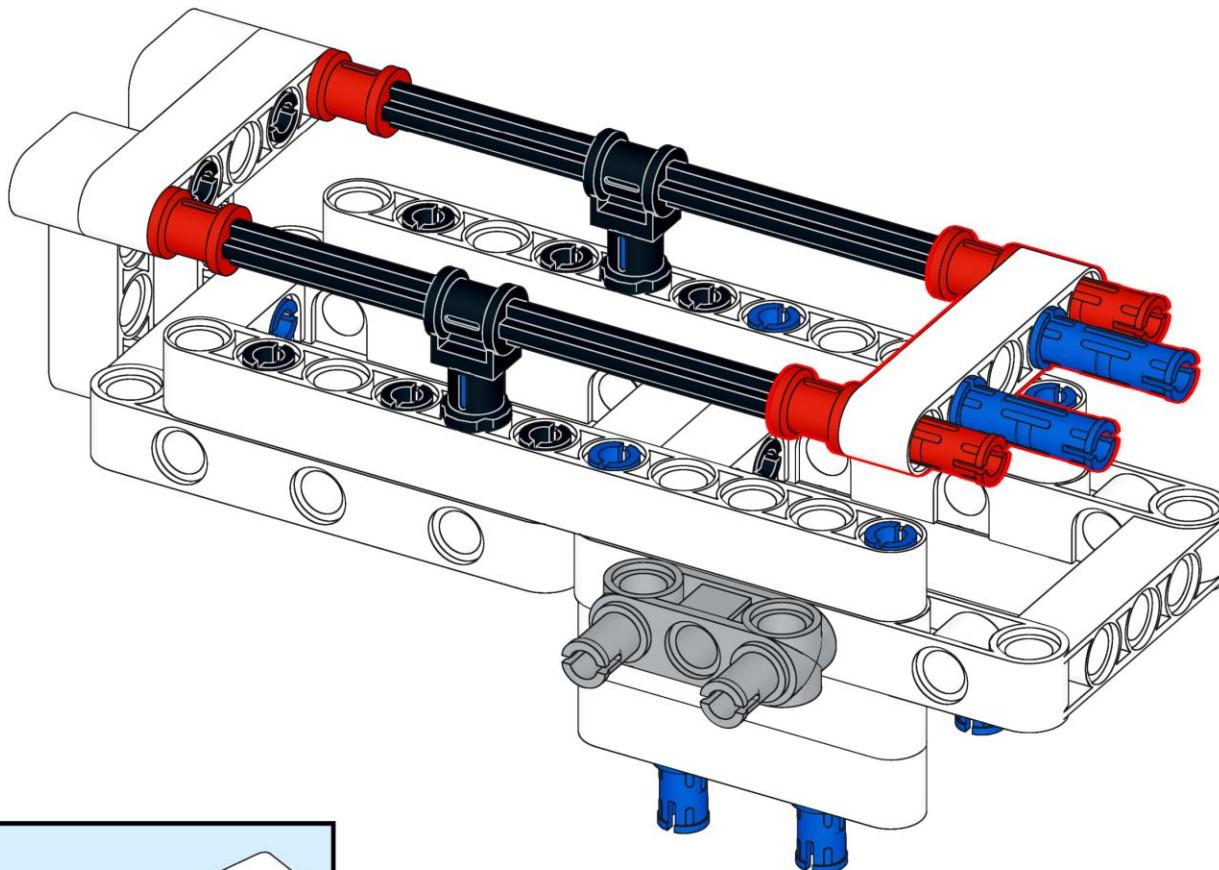
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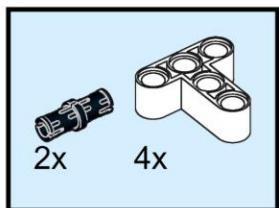
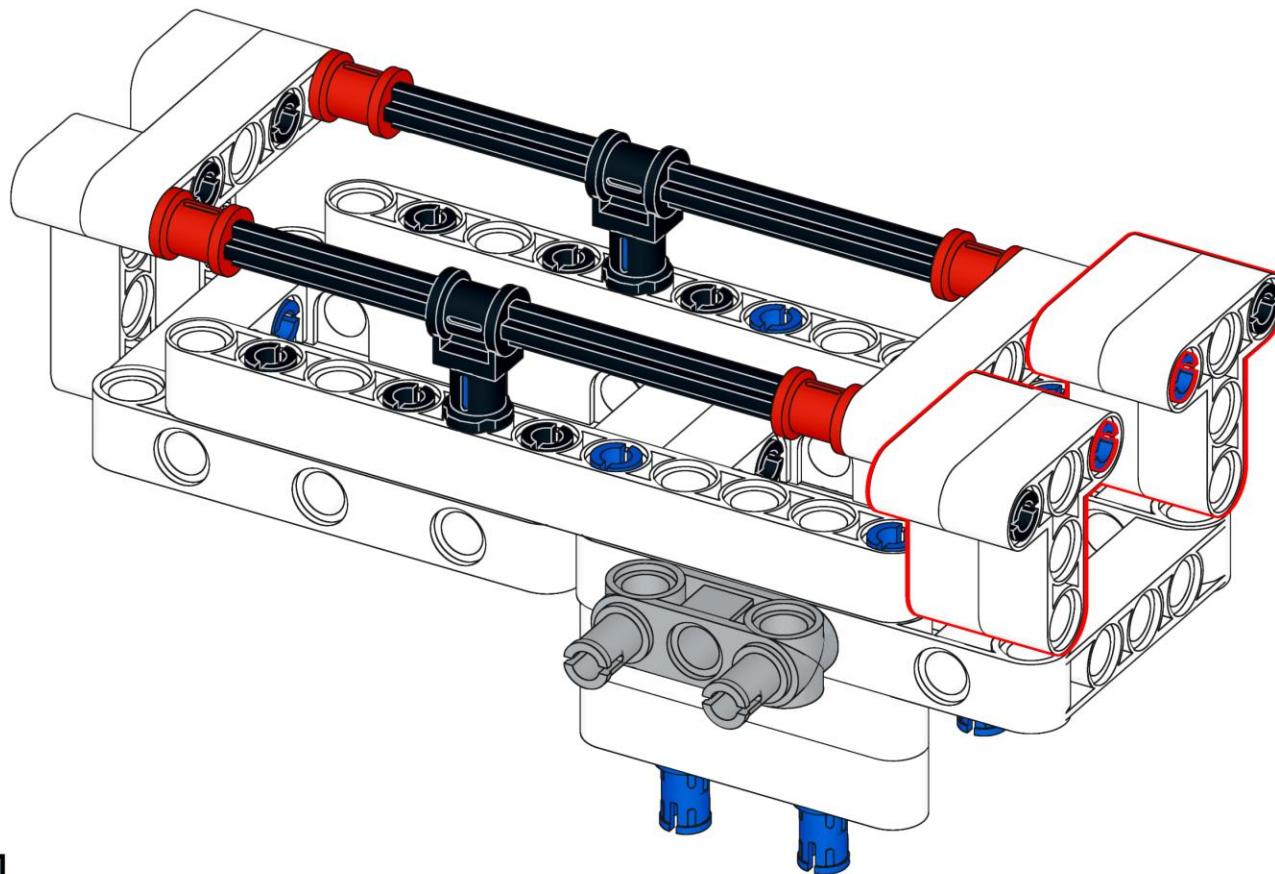
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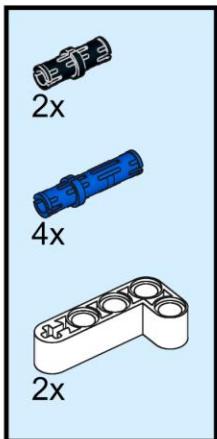
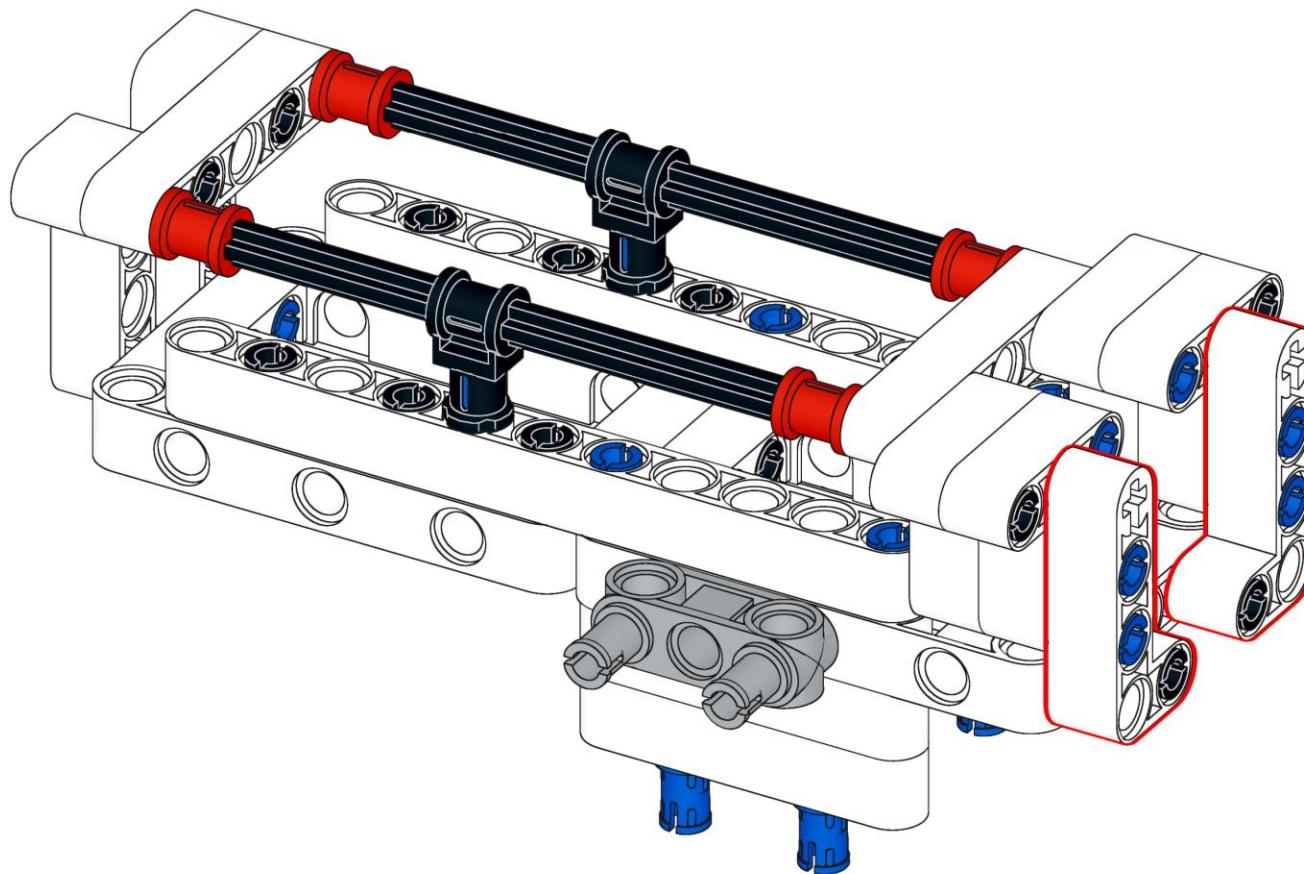
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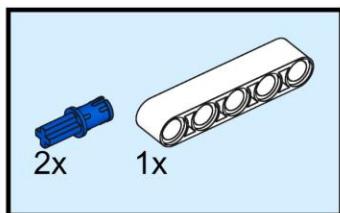
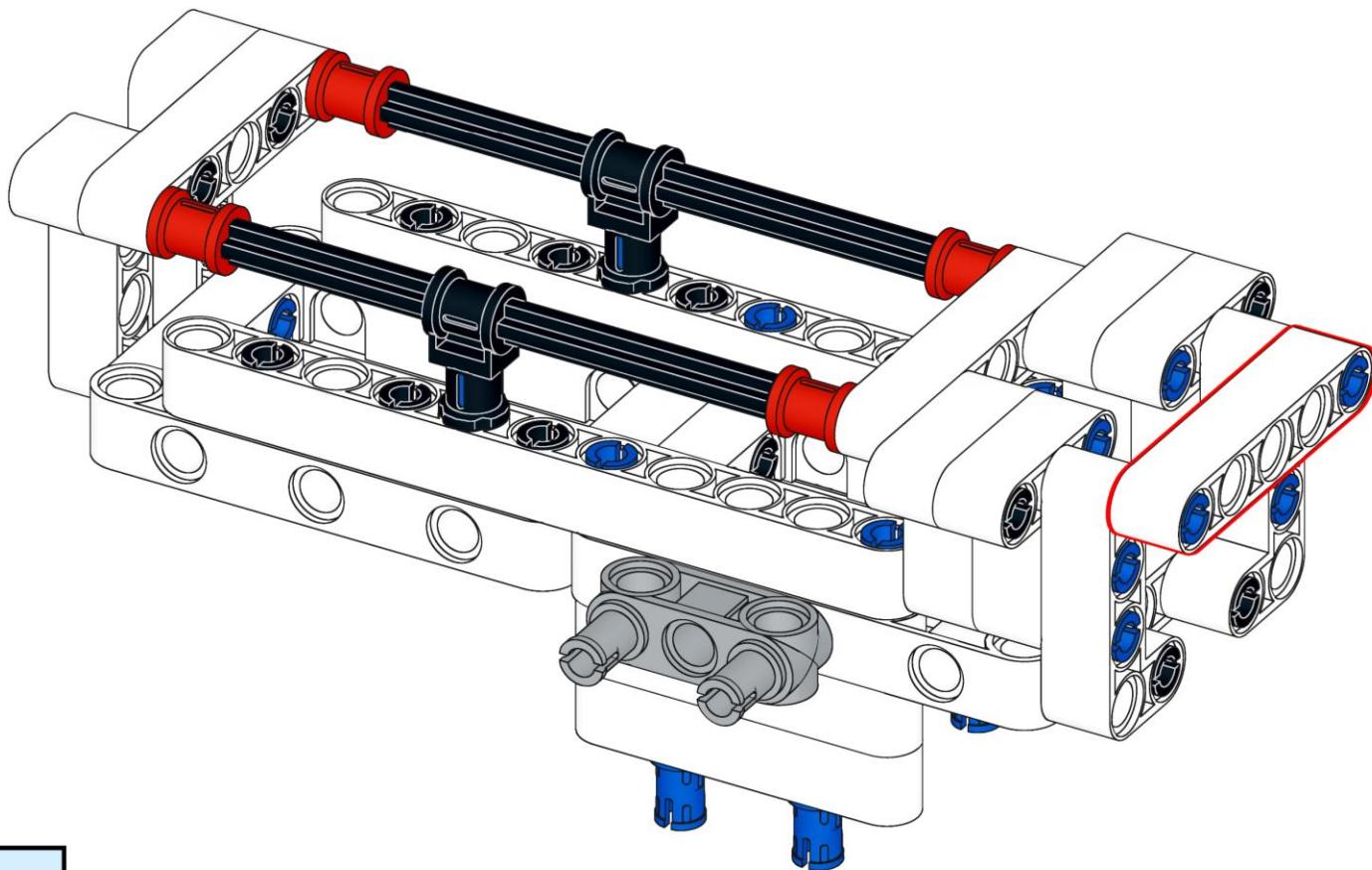
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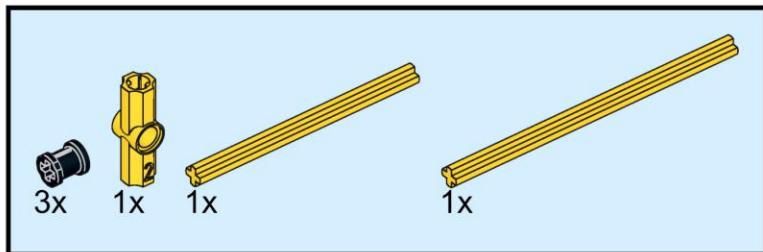
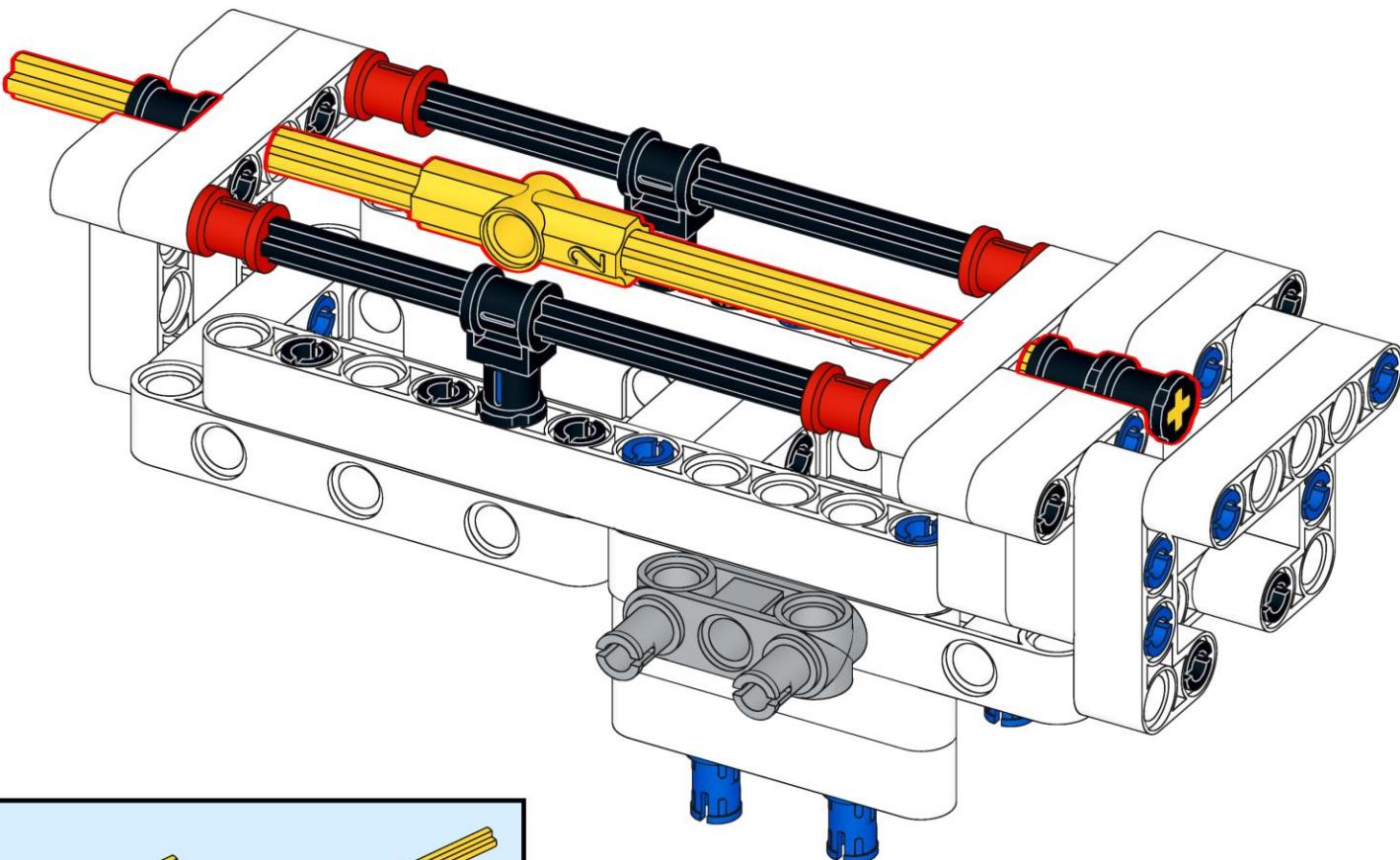
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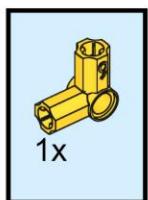
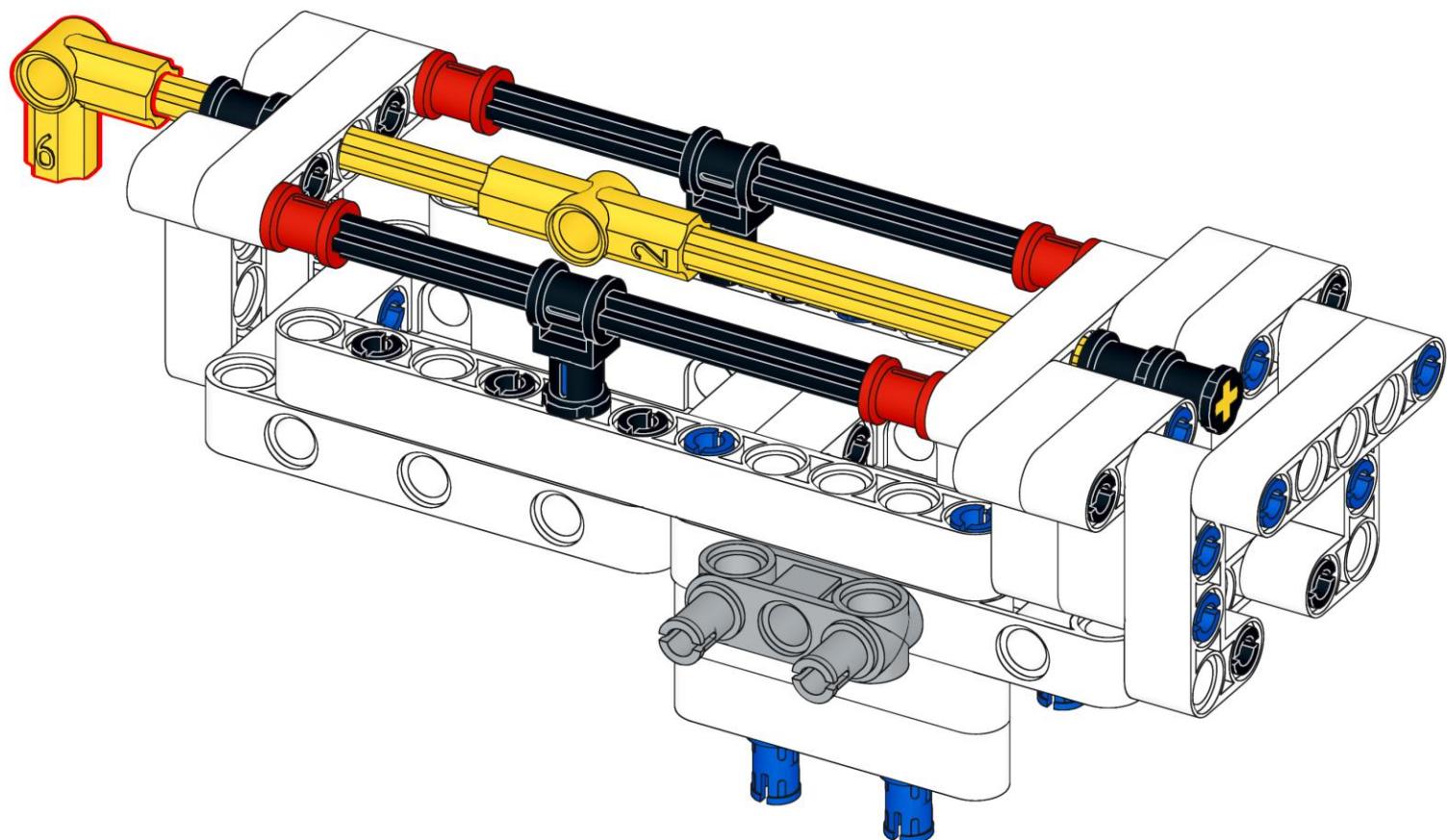
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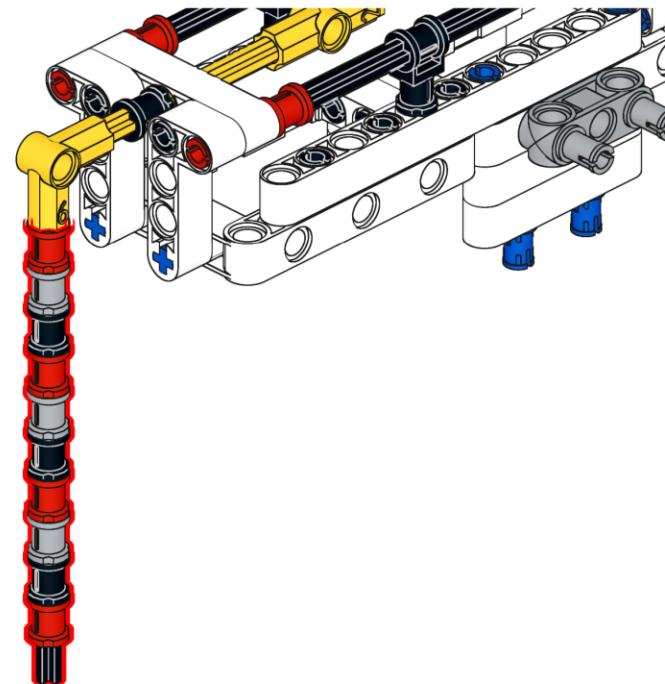
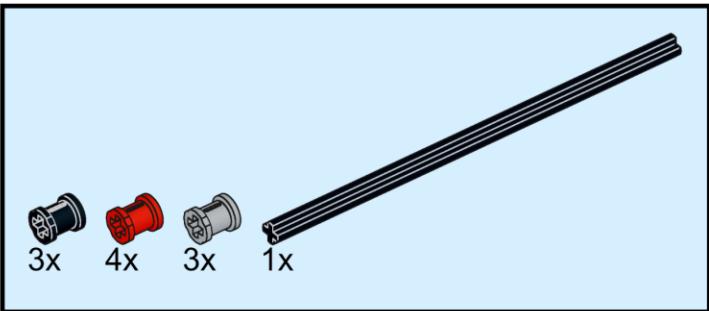


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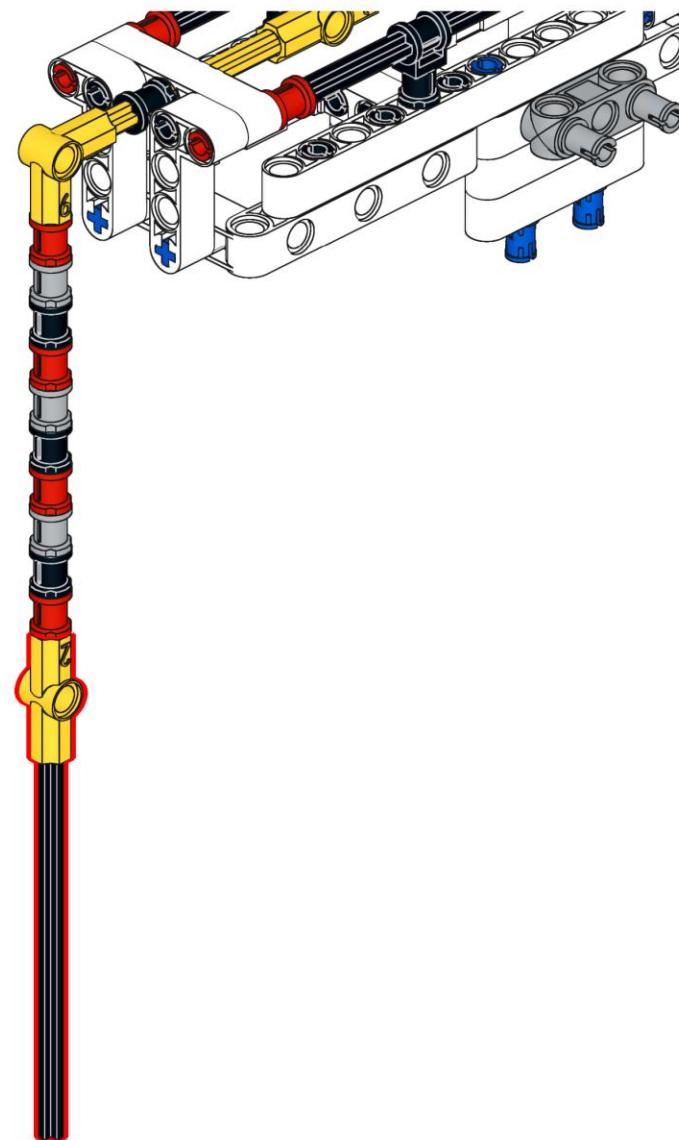
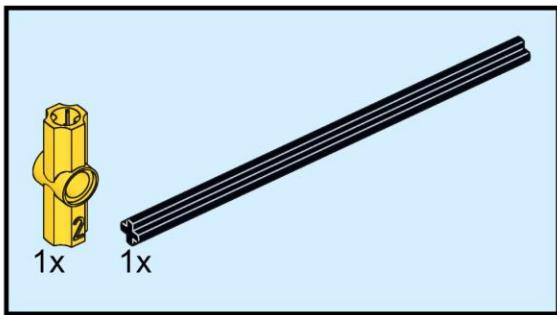


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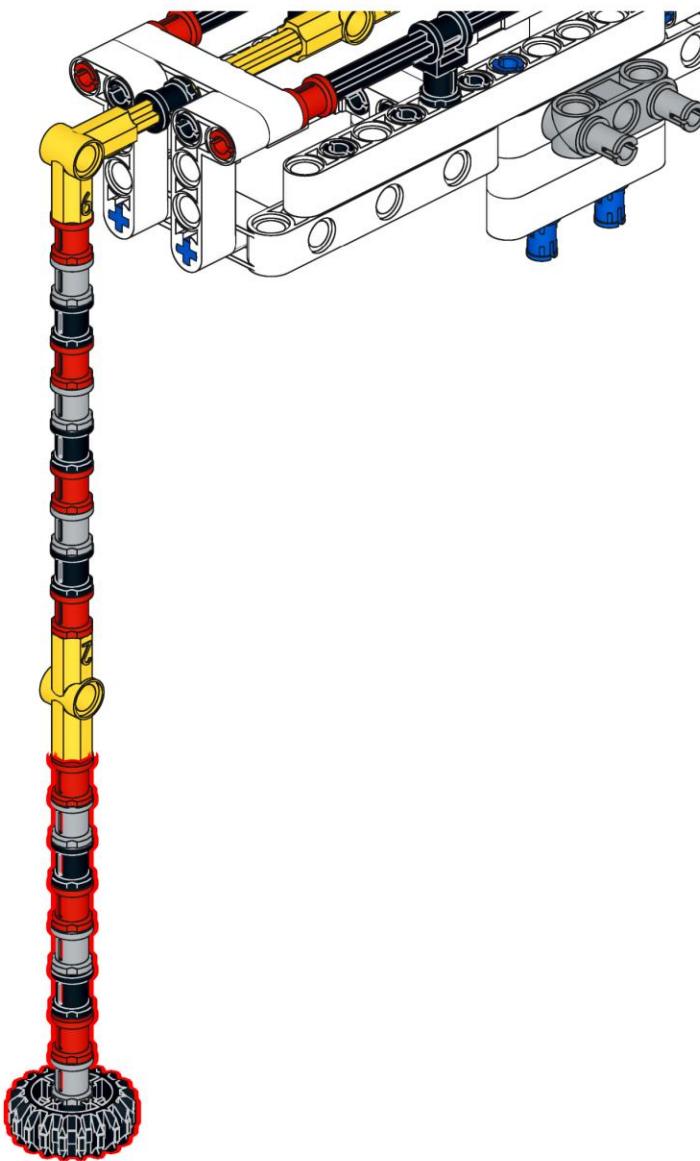
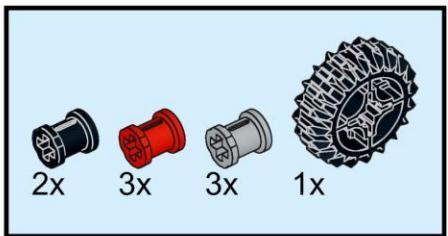
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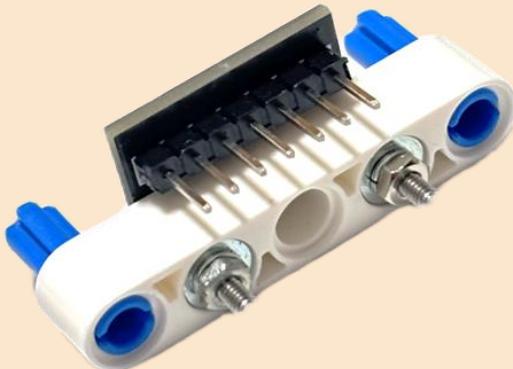
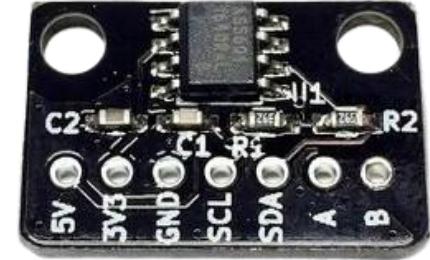
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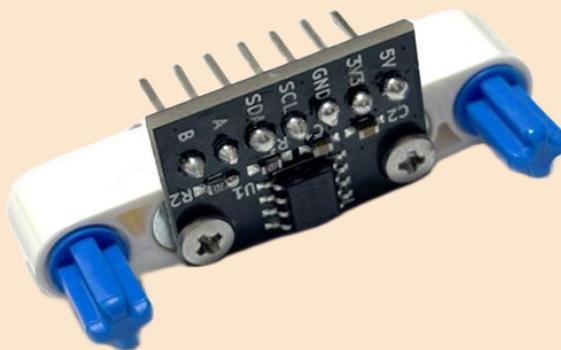
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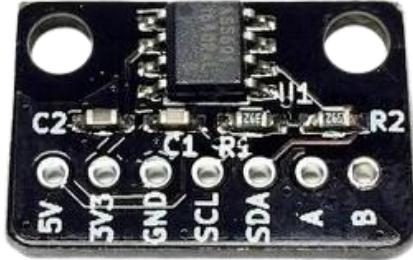


# 振子用エンコーダ AS5601 の取りつけ

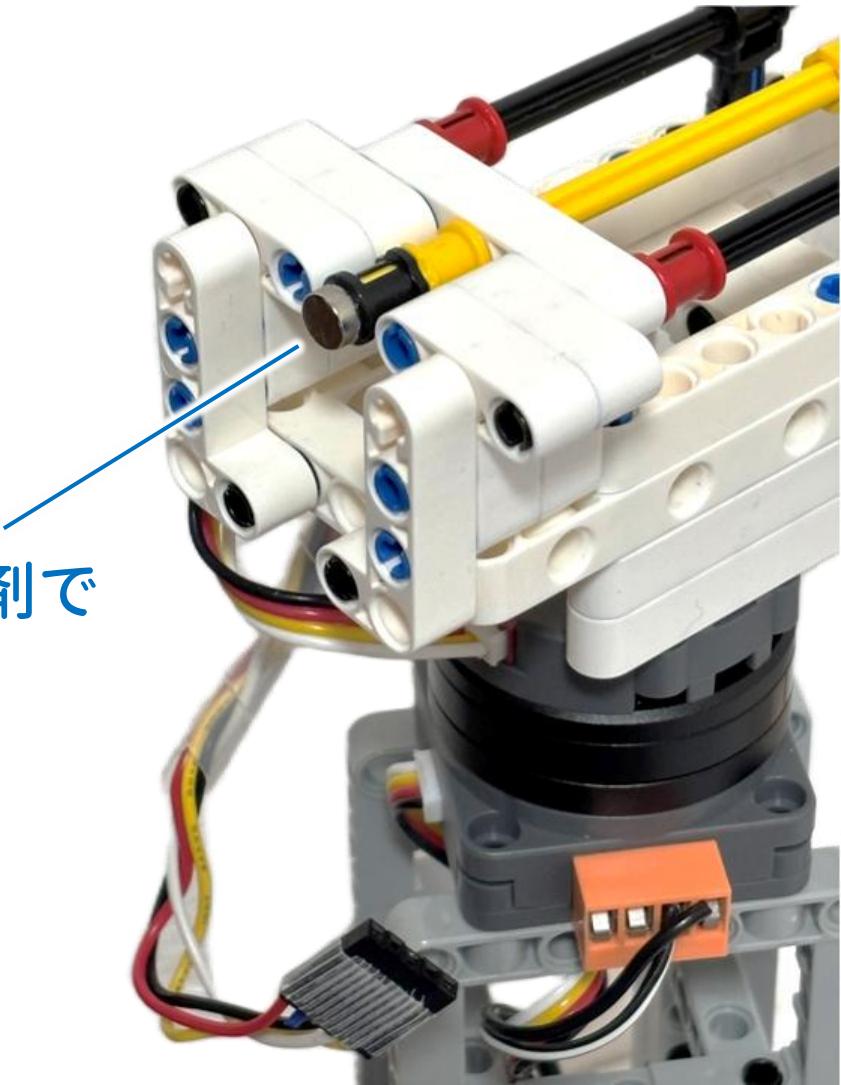


- M2 のネジ・ナット・ワッシャーで LEGO 部品に AS5601 を固定
- ピンヘッダ（別途必要）を基板にはんだ付け



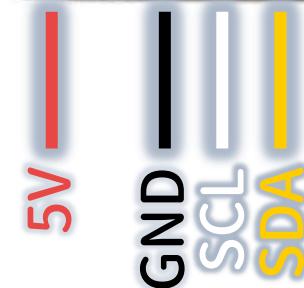
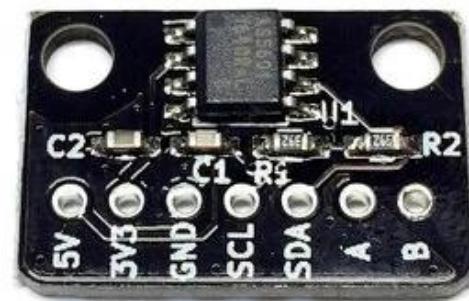
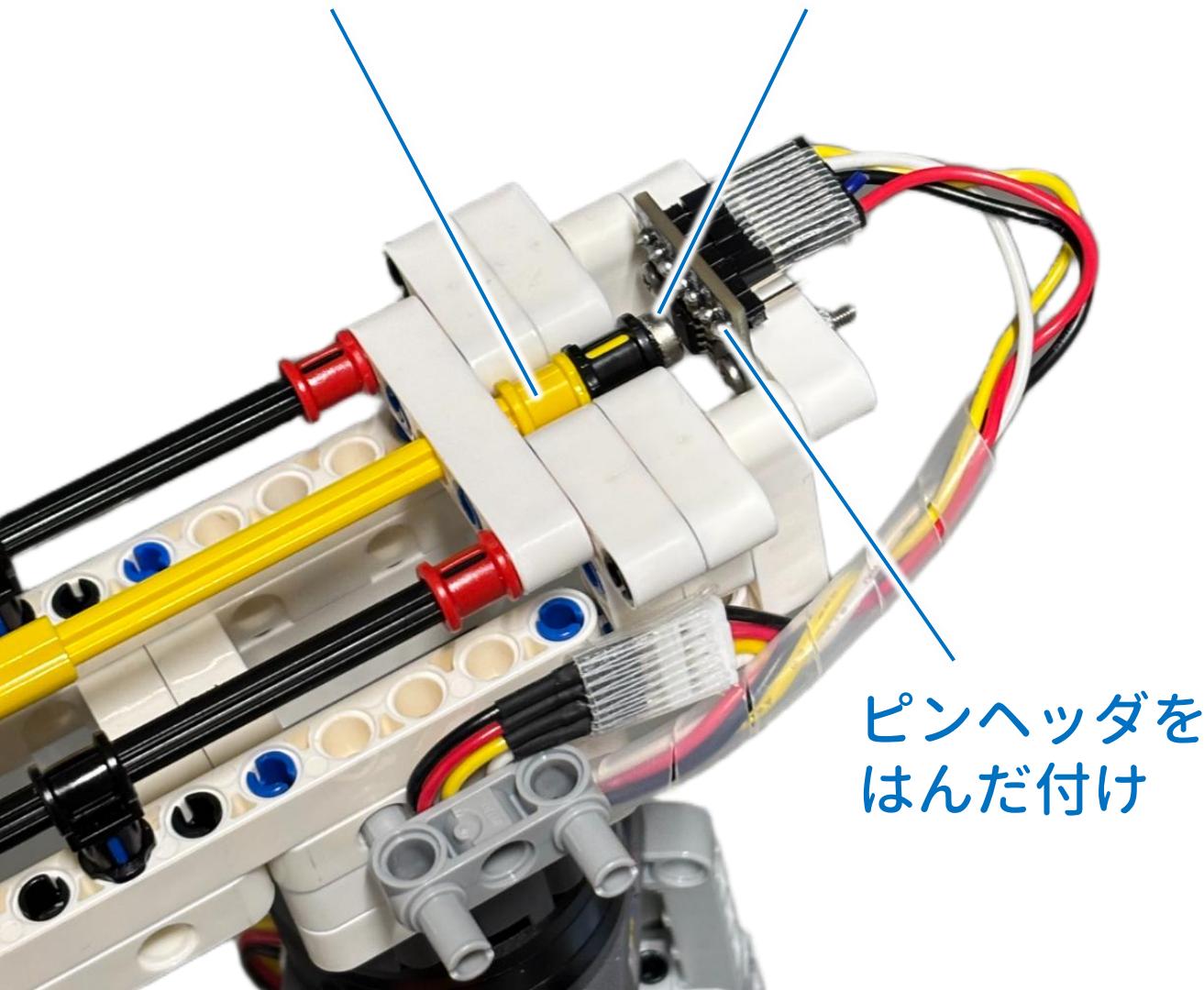


AS5601 付属の磁石を接着剤で  
LEGO 部品 (3713) に固定



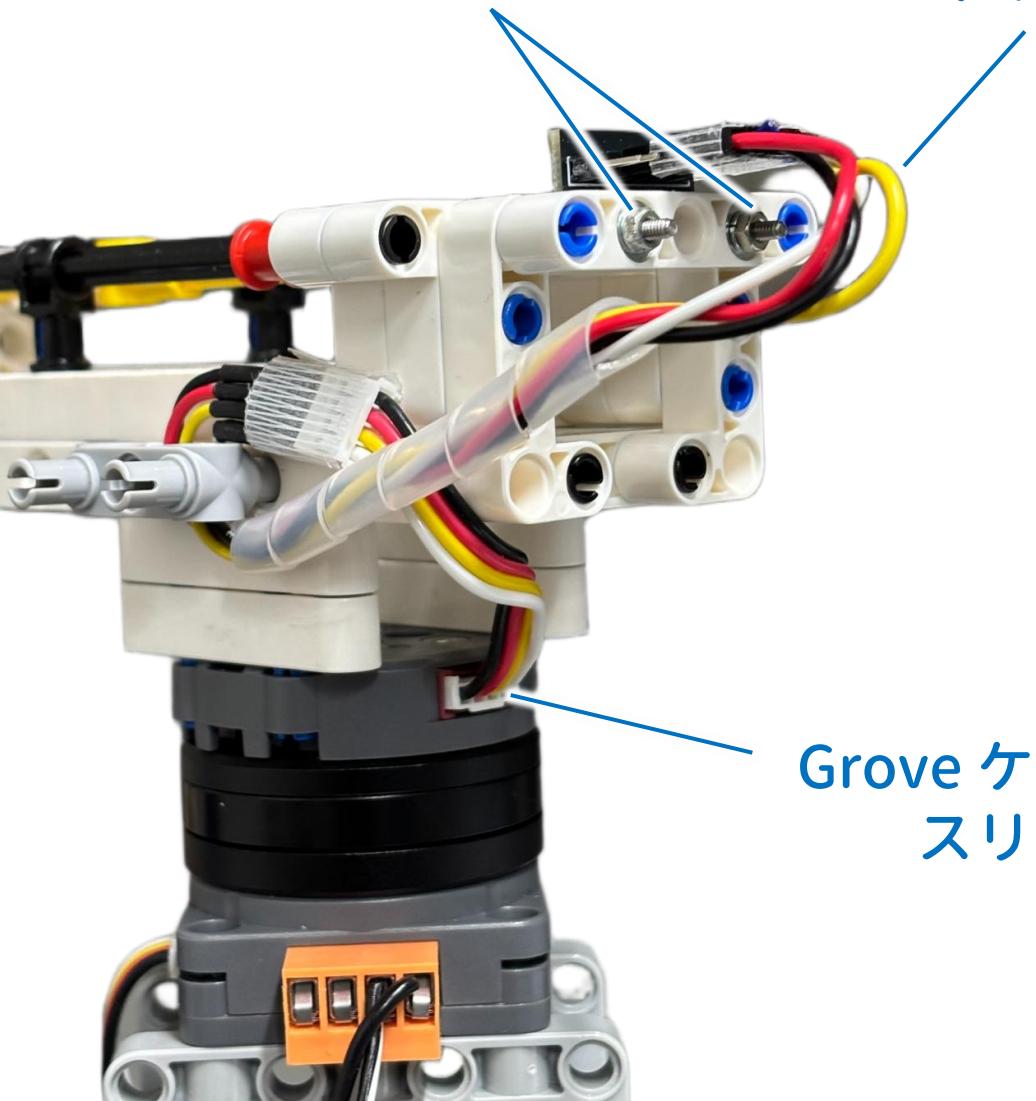
回転摩擦を軽減するため  
に少しだけ LEGO 部品  
32316 と 3713 の間に  
隙間を空けておく

AS5601 付属の磁石を接着剤で  
LEGO 部品 (3713) に固定



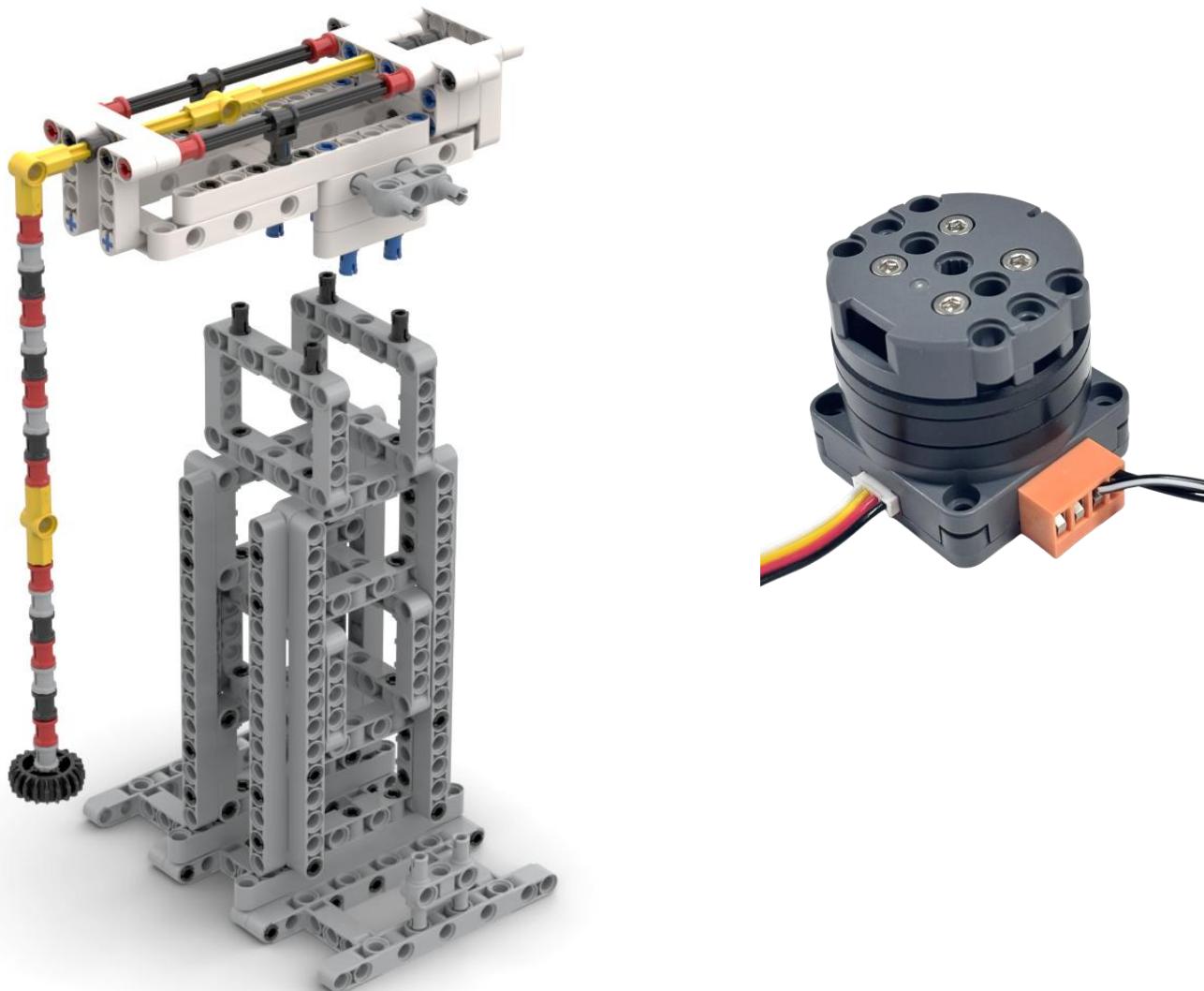
M2 のネジ類で  
LEGO 部品に  
AS5601 を固定

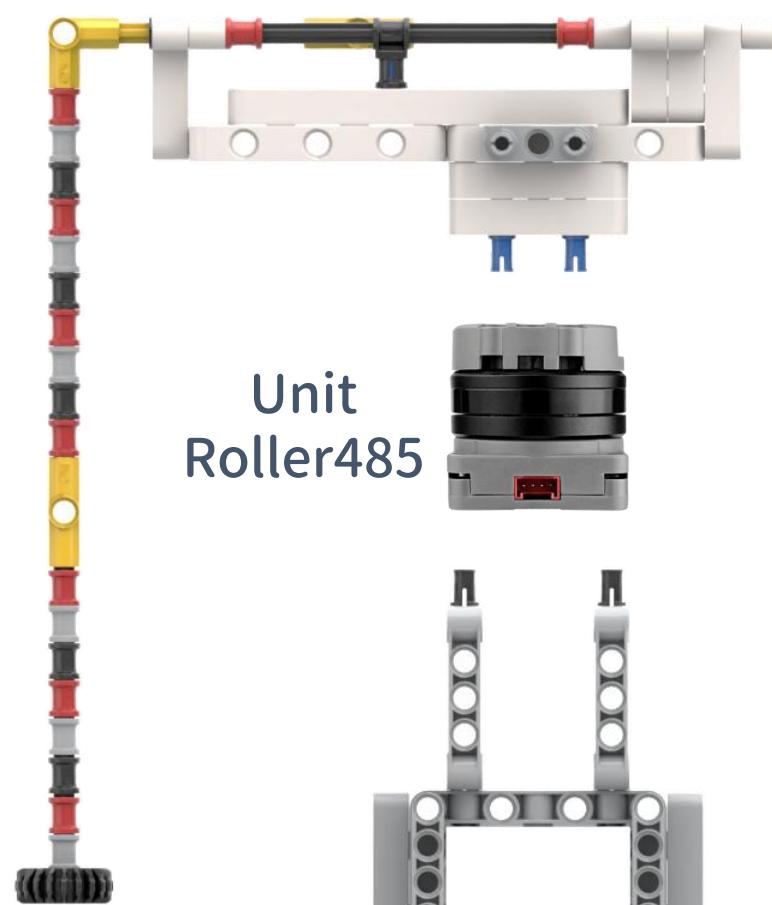
オスメスジャンパ線を介して  
Grove ケーブルと AS5601 を接続  
(オス側: Grove ケーブル  
メス側: AS5601)



Grove ケーブルを Roller485 の  
スリップリングに接続

# Roller485 を介して 台座とアームを結合

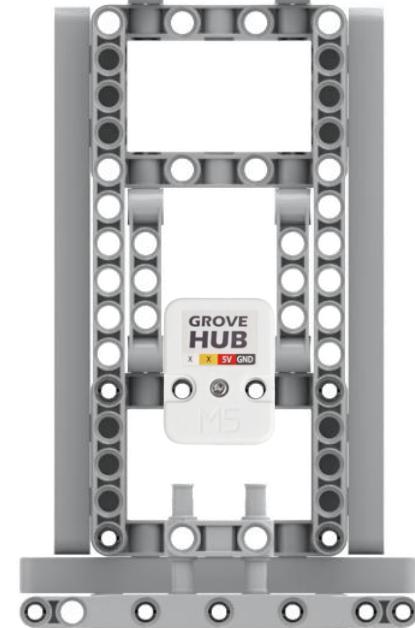
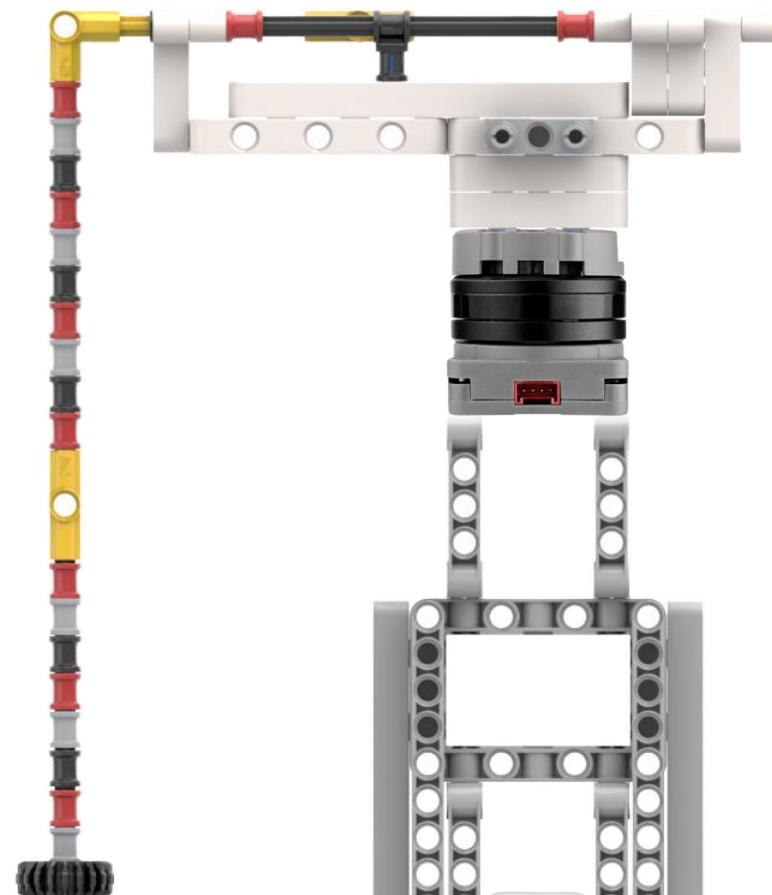




Unit  
Roller485



Grove  
Hub



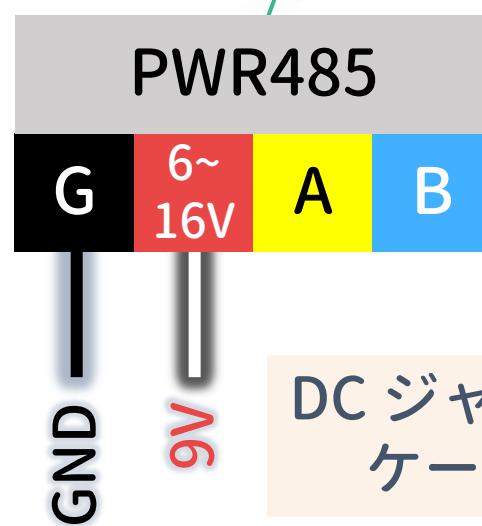
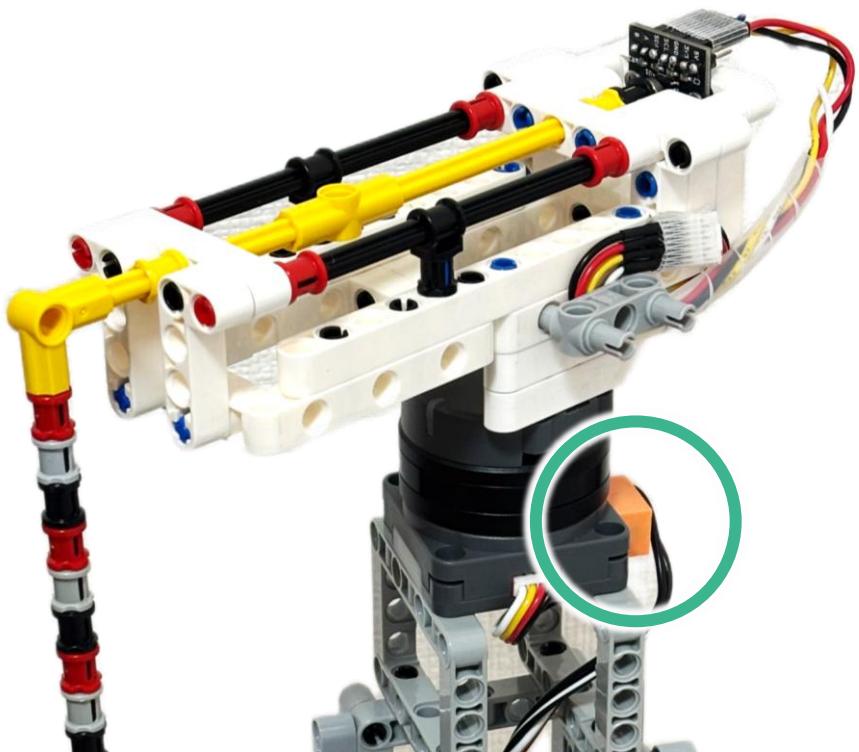
AS5601

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  
(9V/1.3A)



DC ジャック付  
ケーブル

手元スイッチ

エクスターナルで  
実行する場合は  
5V に接続しない

