

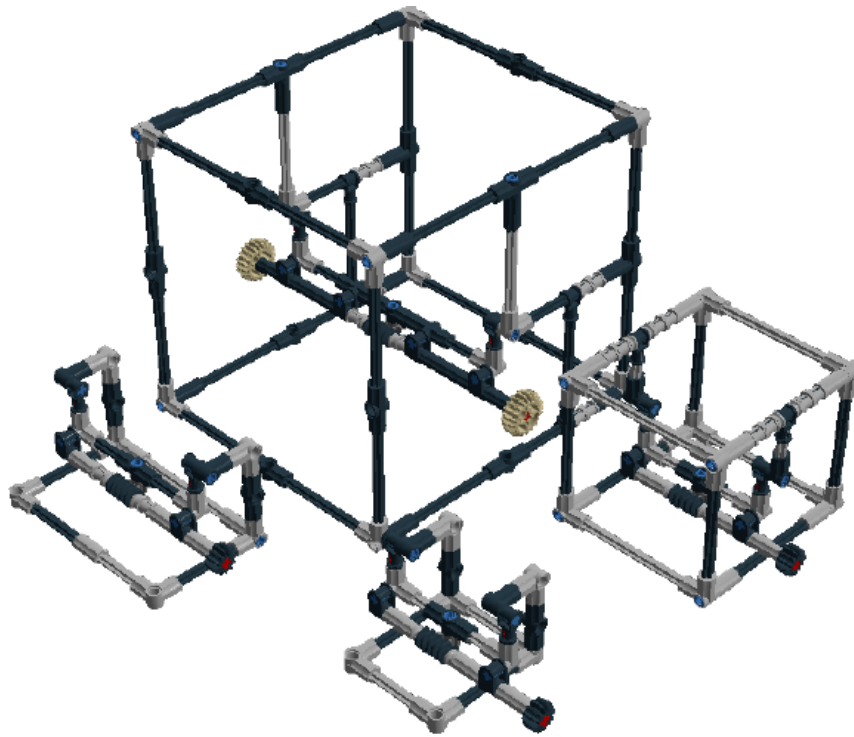
# IMp: The customizable LEGO® Pinned Insect Manipulator

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## Supplement 1: Annotated building instructions

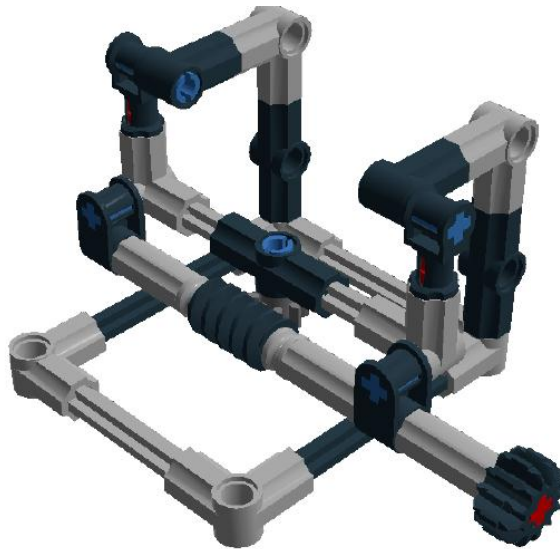


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## Building instructions<sup>1</sup> for the Micro-IMP

Number of bricks = 48



Brick assortment for the Micro-IMP  
(for correct purchase codes see page 70-73)

2 x		4211573 1/2 BUSH - Medium Stone Grey	7 x		4142865 2M CROSS AXLE W. GROOVE - Bright Red	3 x		4211815 CROSS AXLE 3M - Medium Stone Grey
8 x		4225927 CONNECTOR PEG/CROSS AXLE - Bright Blue	3 x		4512360 CROSS AXLE, EXTENSION, 2M - Medium Stone Grey	2 x		4107081 CATCH W. CROSS HOLE - Black
3 x		4211639 CROSS AXLE 5M - Medium Stone Grey	2 x		653626 CROSS BLOCK 90° - Black	2 x		4107085 ANGLE ELEMENT, 0 DEGREES [1] - Black
2 x		370626 CROSS AXLE 6M - Black	3 x		4107783 ANGLE ELEMENT, 180 DEGREES [2] - Black	8 x		4211670 ANGLE ELEMENT, 90 DEGREES [8] - Medium Stone Grey
1 x		4514559 GEAR WHEEL T=8, M=1 - Dark Stone Grey	1 x		4177431 DOUBLE CONICAL WHEEL Z12 1M - Black	1 x		471626 WORM - Black

<sup>1</sup> As generated by LEGO® digital designer 4.3.8

Step 1 of 25

1 x



Step 2 of 25

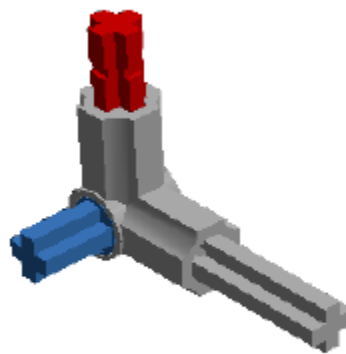
1 x



1 x



1 x



Step 3 of 25

1 x



1 x



1 x

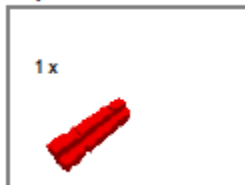




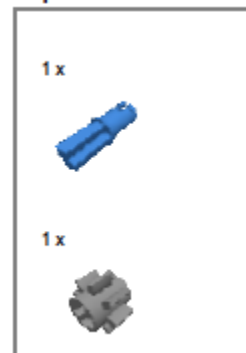
Step 4 of 25



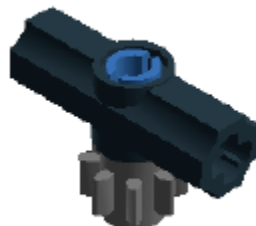
Step 5 of 25



Step 6 of 25



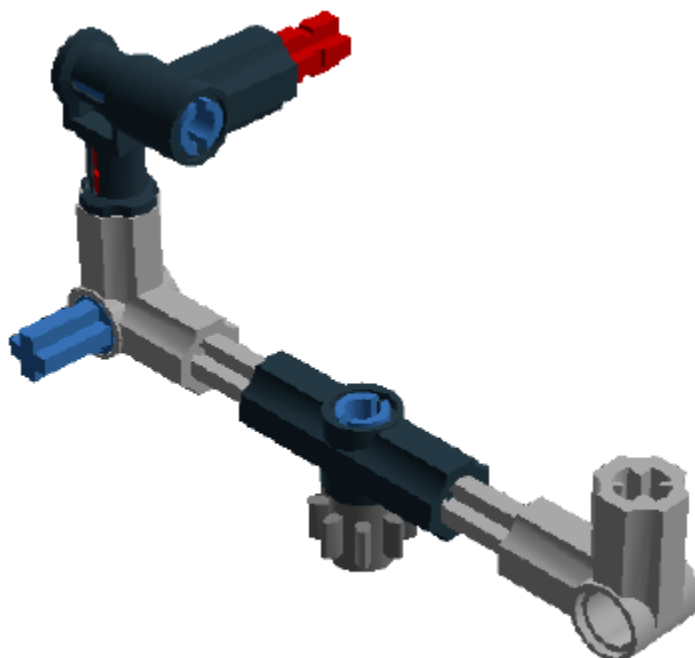
Step 7 of 25



Step 8 of 25



Step 9 of 25

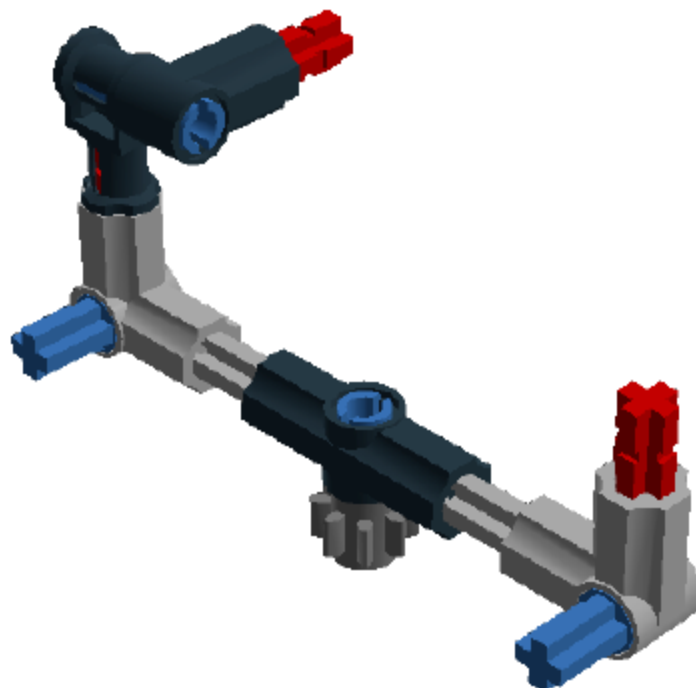


Step 10 of 25

1 x



1 x



Step 11 of 25

1 x

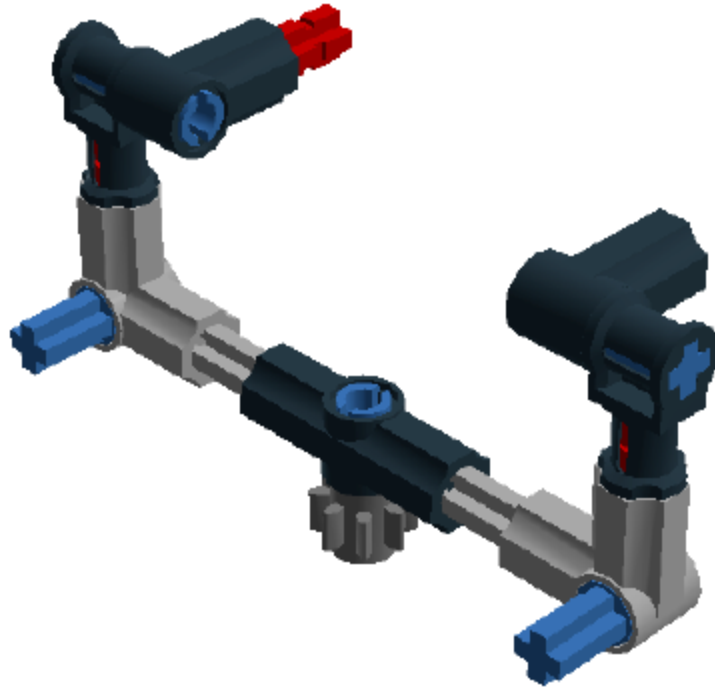


1 x

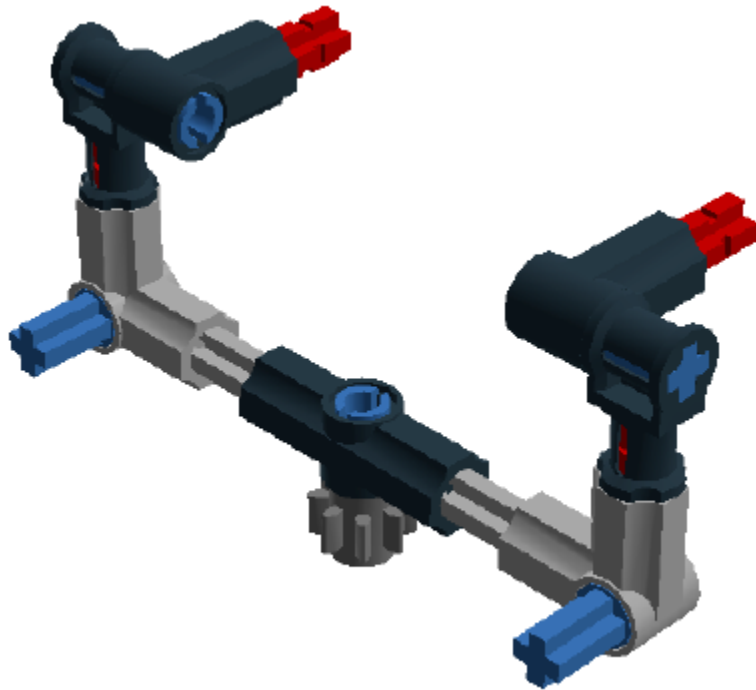


1 x






Step 12 of 25



Step 13 of 25

1 x



Step 14 of 25

1 x



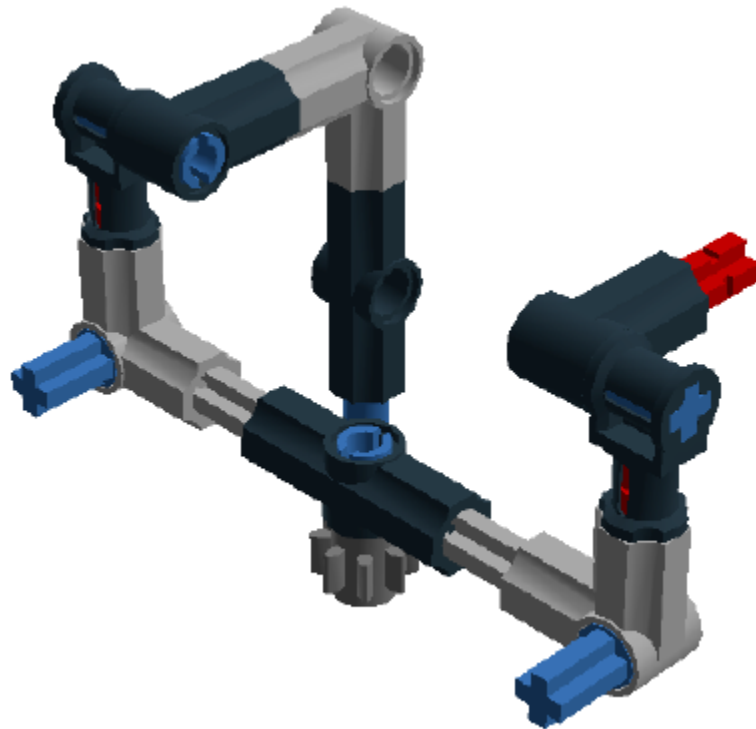
1 x



1 x



1 x



Step 15 of 25

Step 16 of 25

1 x



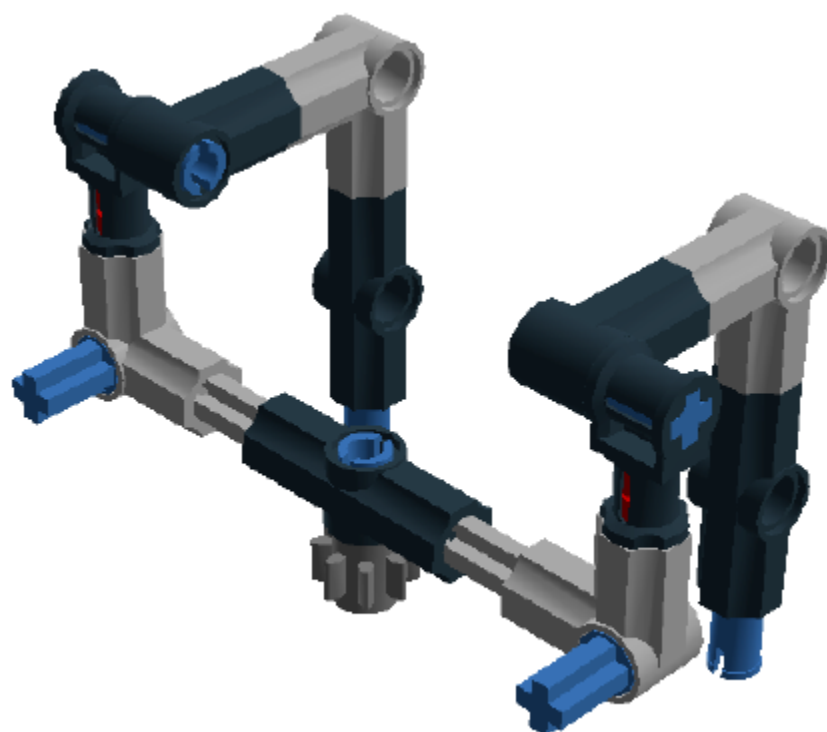
1 x



1 x



1 x



Step 17 of 25

Step 18 of 25

1 x



1 x



2 x



Step 19 of 25

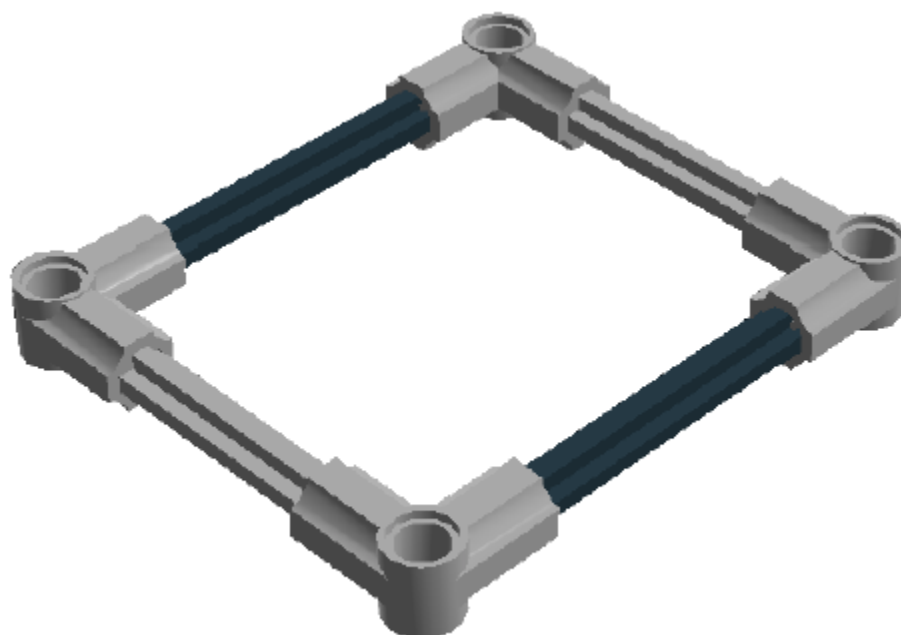
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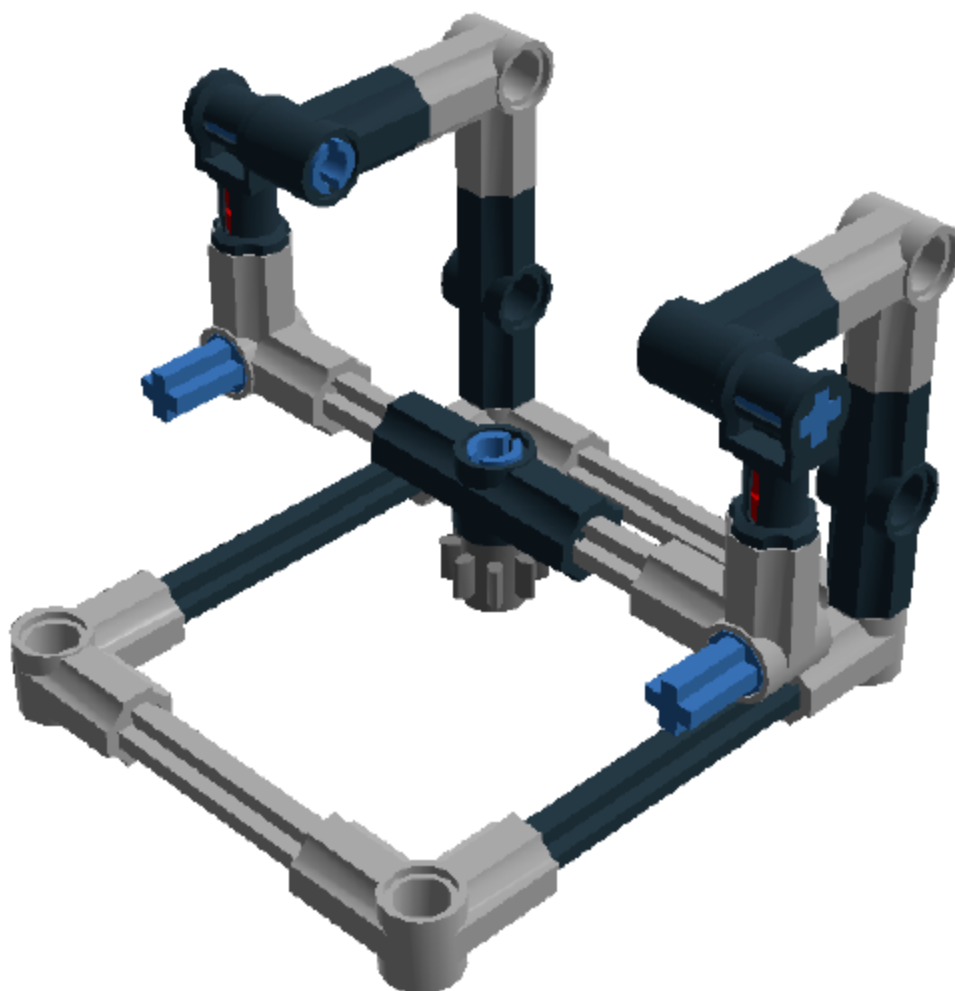
1 x



2 x



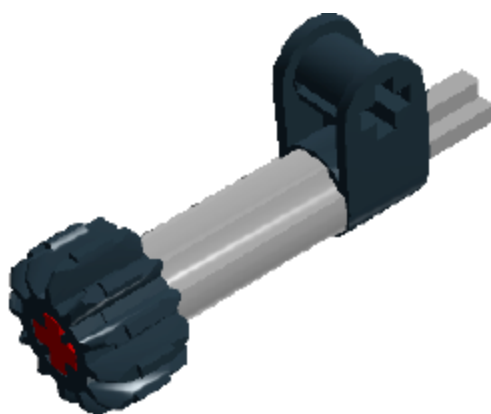
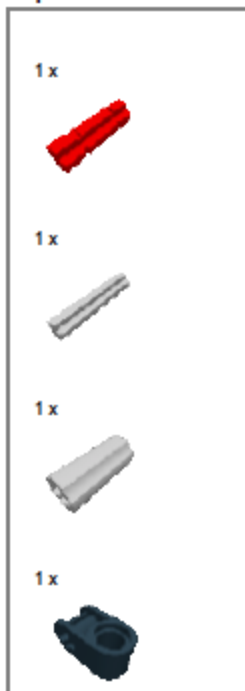
Step 20 of 25



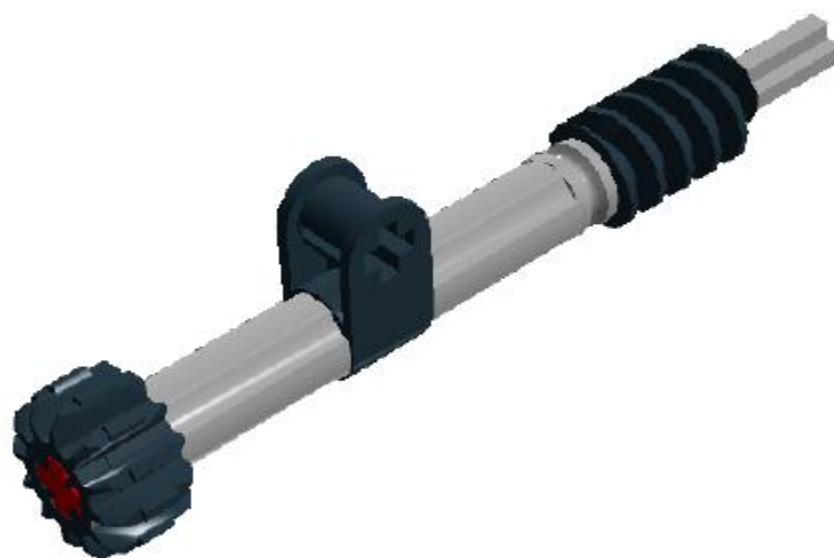
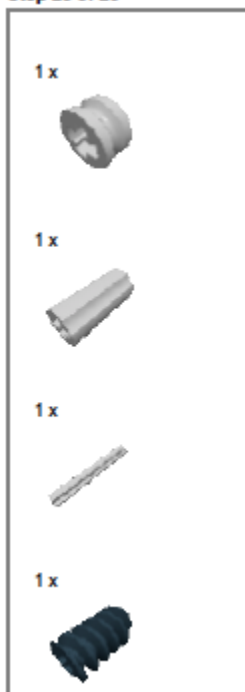
Step 21 of 25



Step 22 of 25



Step 23 of 25



Step 24 of 25

1 x



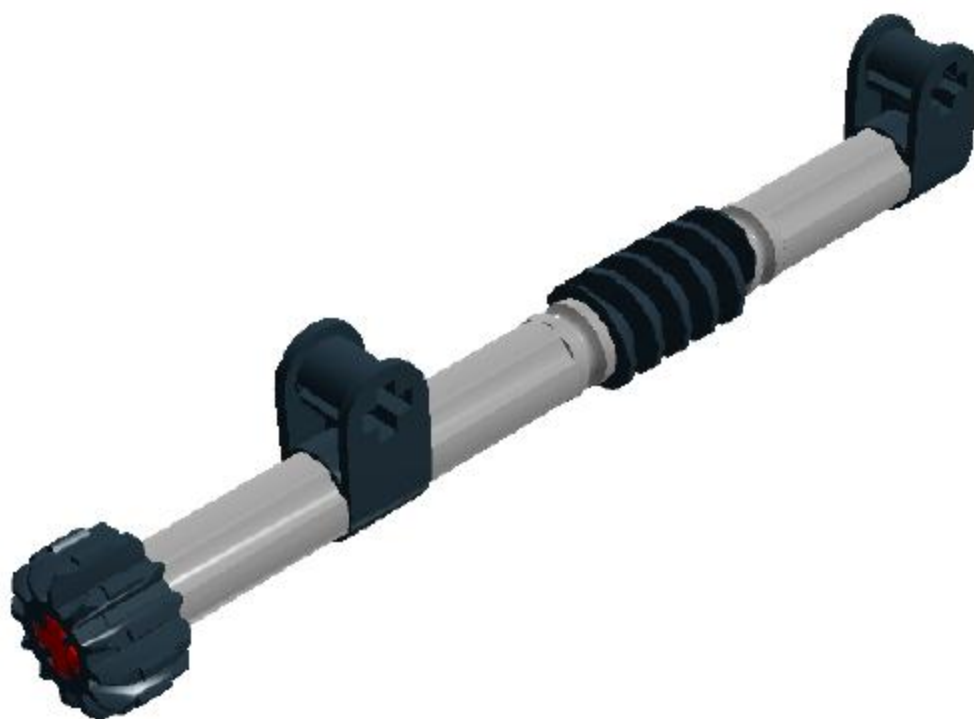
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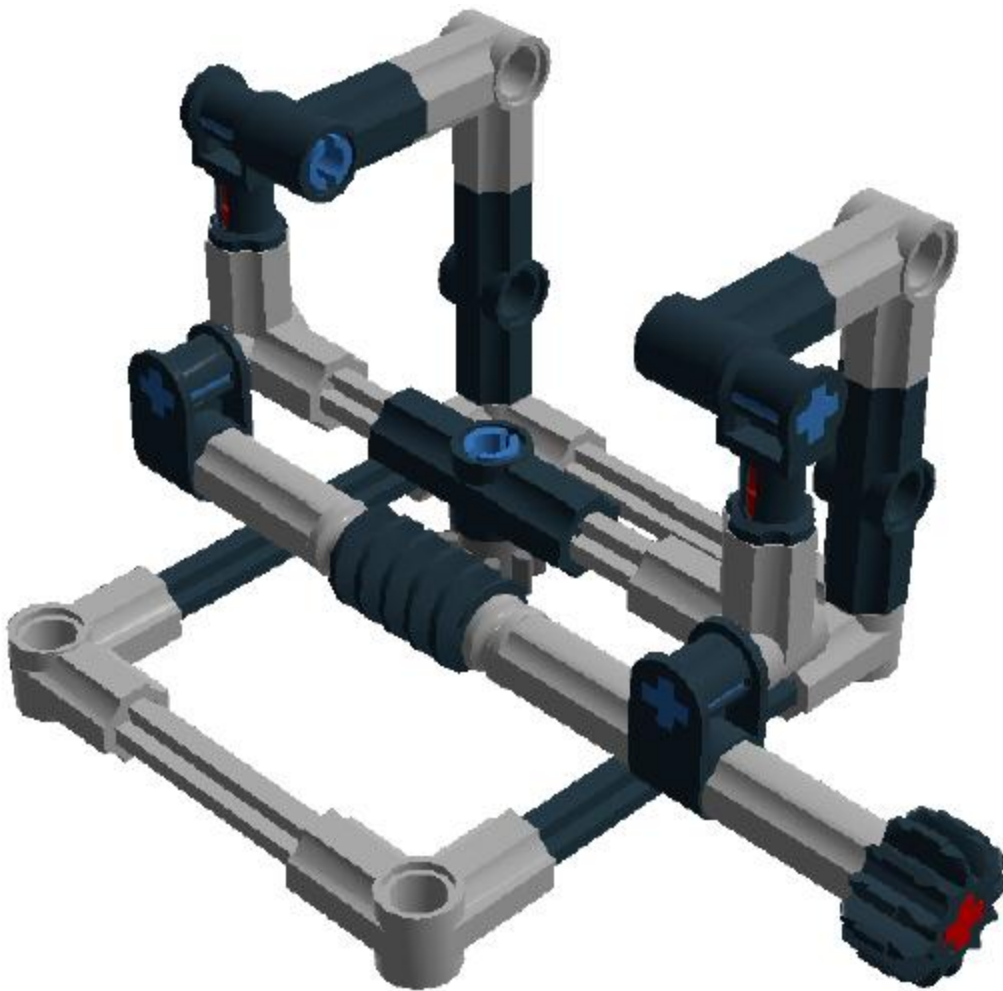


1 x



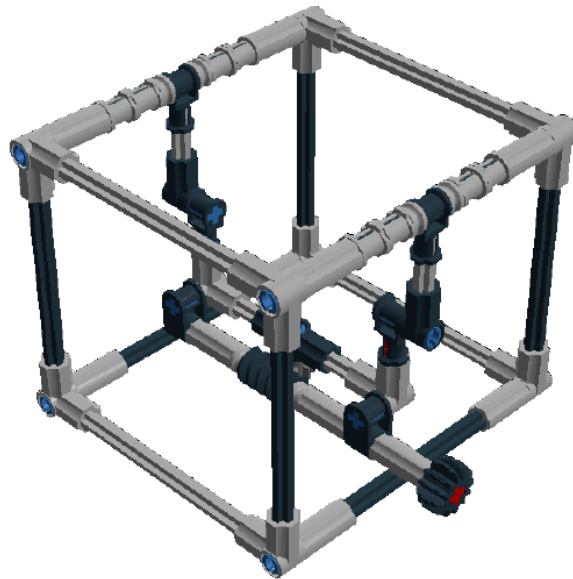
1 x





## Building instructions<sup>2</sup> for the IMp

Number of bricks = 82



Brick assortment for the IMp  
(for correct purchase codes see page 70-73)

6 x		4211573 1/2 BUSH - Medium Stone Grey	3 x		4142865 2M CROSS AXLE W. GROOVE - Bright Red	5 x		4211815 CROSS AXLE 3M - Medium Stone Grey
14 x		4225927 CONNECTOR PEG/CROSS AXLE - Bright Blue	8 x		4211622 BUSH FOR CROSS AXLE - Medium Stone Grey	11 x		4512360 CROSS AXLE, EXTENSION, 2M - Medium Stone Grey
4 x		4107081 CATCH W. CROSS HOLE - Black	1 x		4211639 CROSS AXLE 5M - Medium Stone Grey	2 x		653626 CROSS BLOCK 90° - Black
2 x		4107085 ANGLE ELEMENT, 0 DEGREES [1] - Black	8 x		370726 CROSS AXLE 8M - Black	1 x		4107783 ANGLE ELEMENT, 180 DEGREES [2] - Black
4 x		4535768 CROSS AXLE 9M - Medium Stone Grey	10 x		4211670 ANGLE ELEMENT, 90 DEGREES [6] - Medium Stone Grey	1 x		4514559 GEAR WHEEL T=8, M=1 - Dark Stone Grey
1 x		4177431 DOUBLE CONICAL WHEEL Z12 1M - Black	1 x		471626 WORM - Black			

<sup>2</sup> As generated by LEGO® digital designer 4.3.8

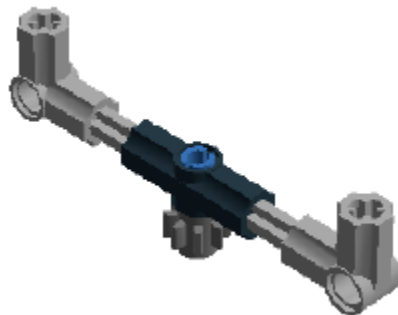
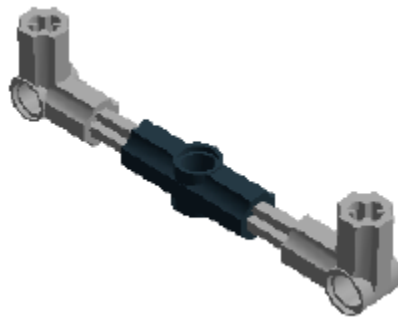
**Step 1 of 37**



**Step 2 of 37**



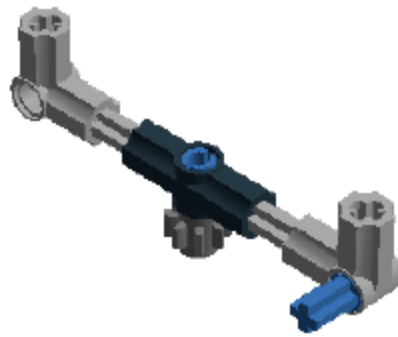
**Step 3 of 37**



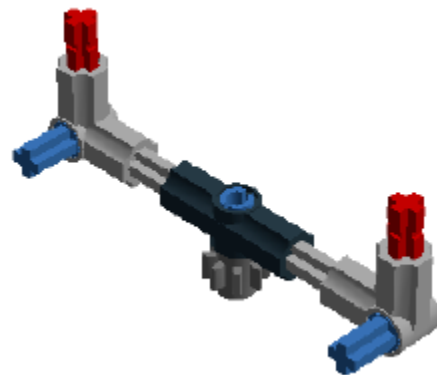
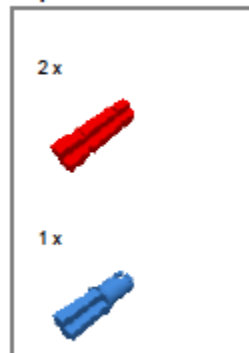
**Step 4 of 37**



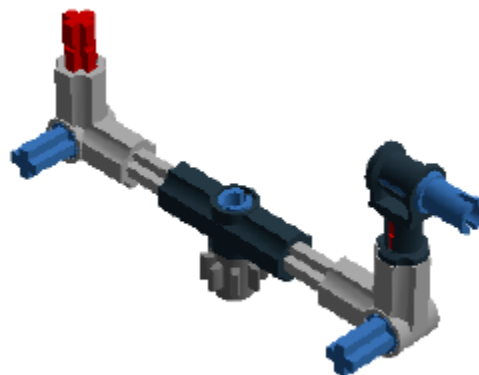
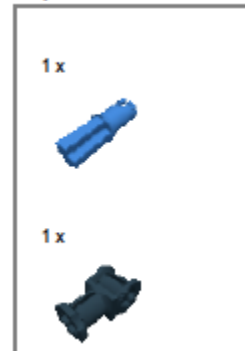
Step 5 of 37



Step 6 of 37



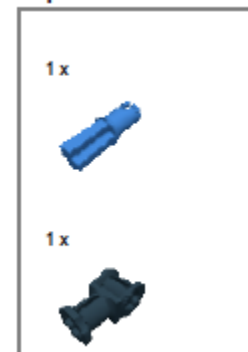
Step 7 of 37

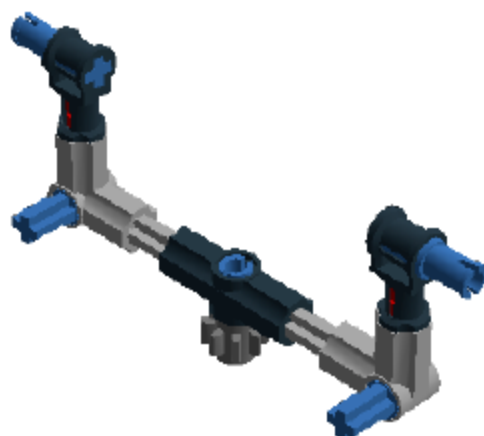


Step 8 of 37



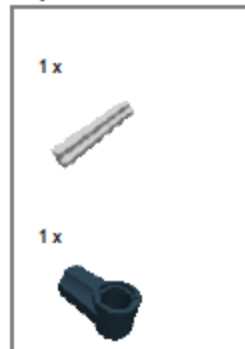
Step 9 of 37



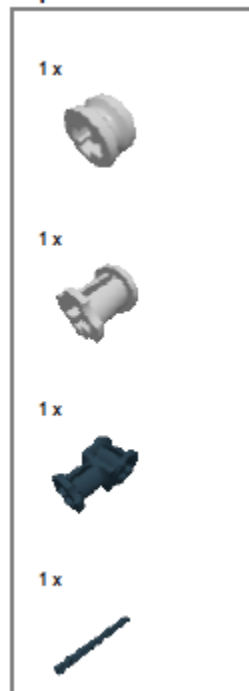


Step 10 of 37

Step 11 of 37



Step 12 of 37



Step 13 of 37

1 x



1 x



1 x



1 x



Step 14 of 37

1 x

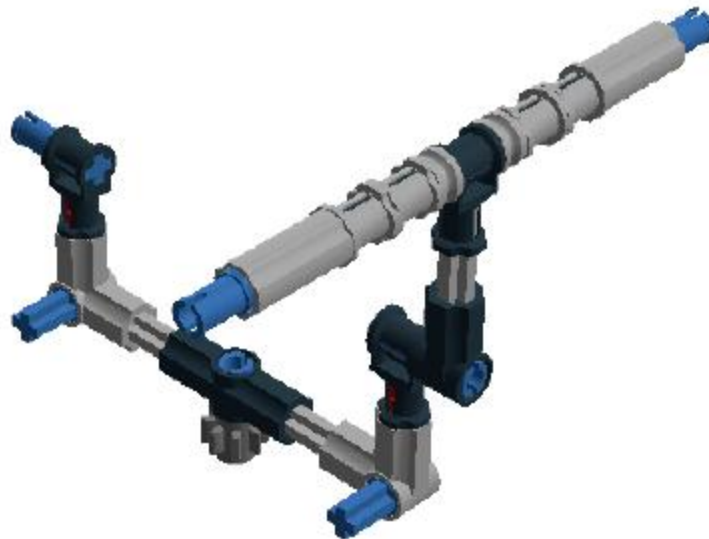


2 x



1 x



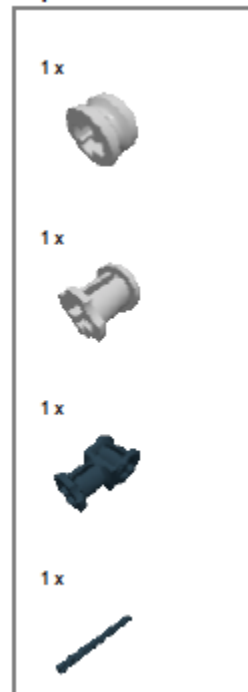


Step 15 of 37

Step 16 of 37



Step 17 of 37



Step 18 of 37

1 x



1 x



1 x



1 x



Step 19 of 37

1 x



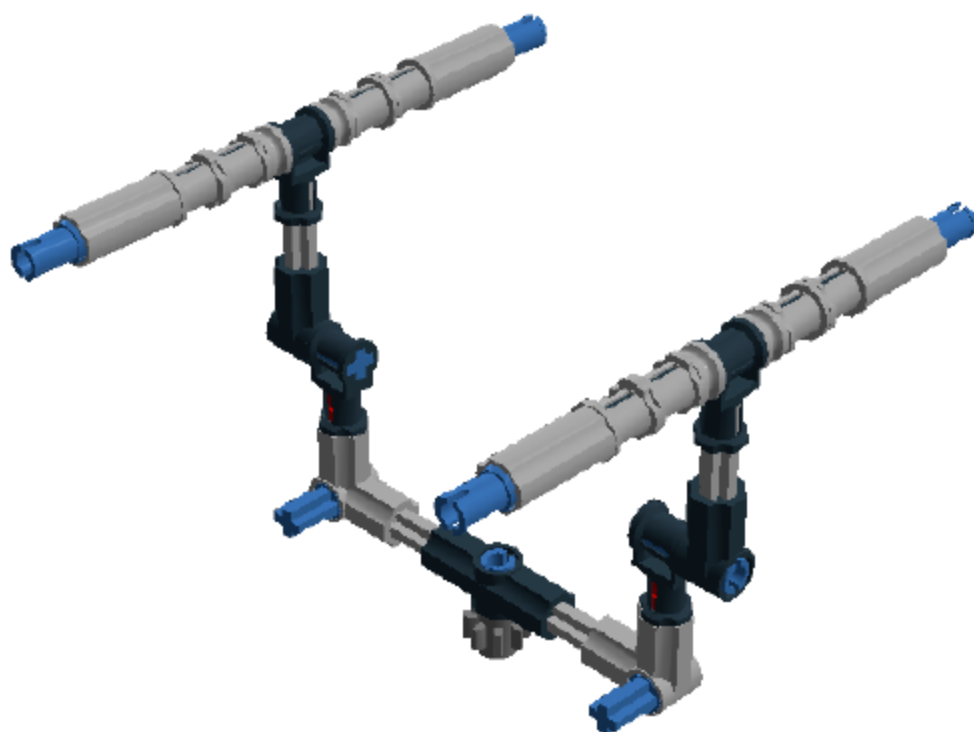
2 x



1 x



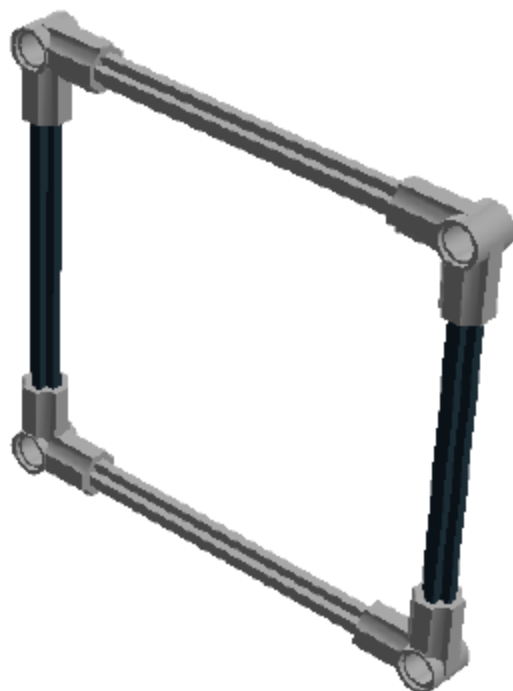
Step 20 of 37



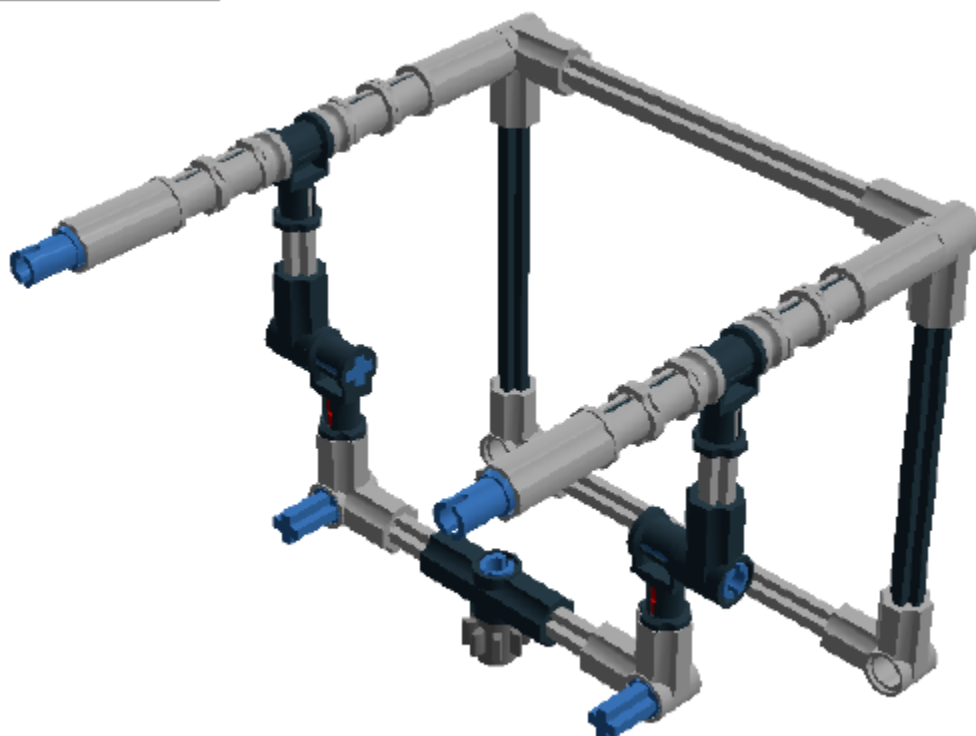
Step 21 of 37



Step 22 of 37



Step 23 of 37



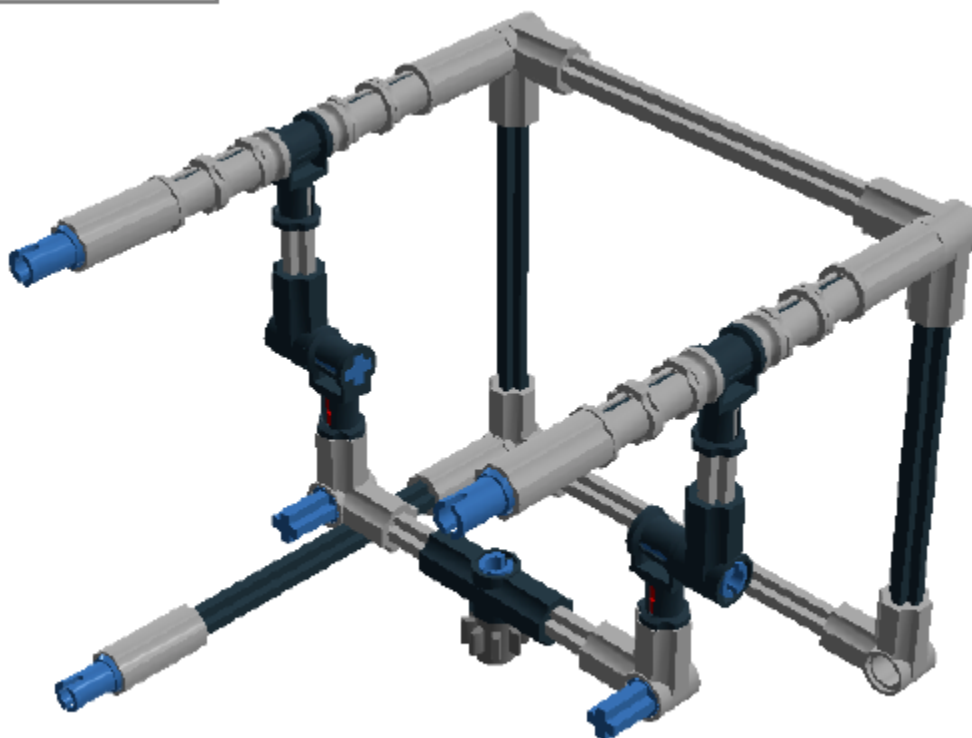
Step 24 of 37



Step 25 of 37



Step 26 of 37



Step 28 of 37

2 x



1 x



1 x

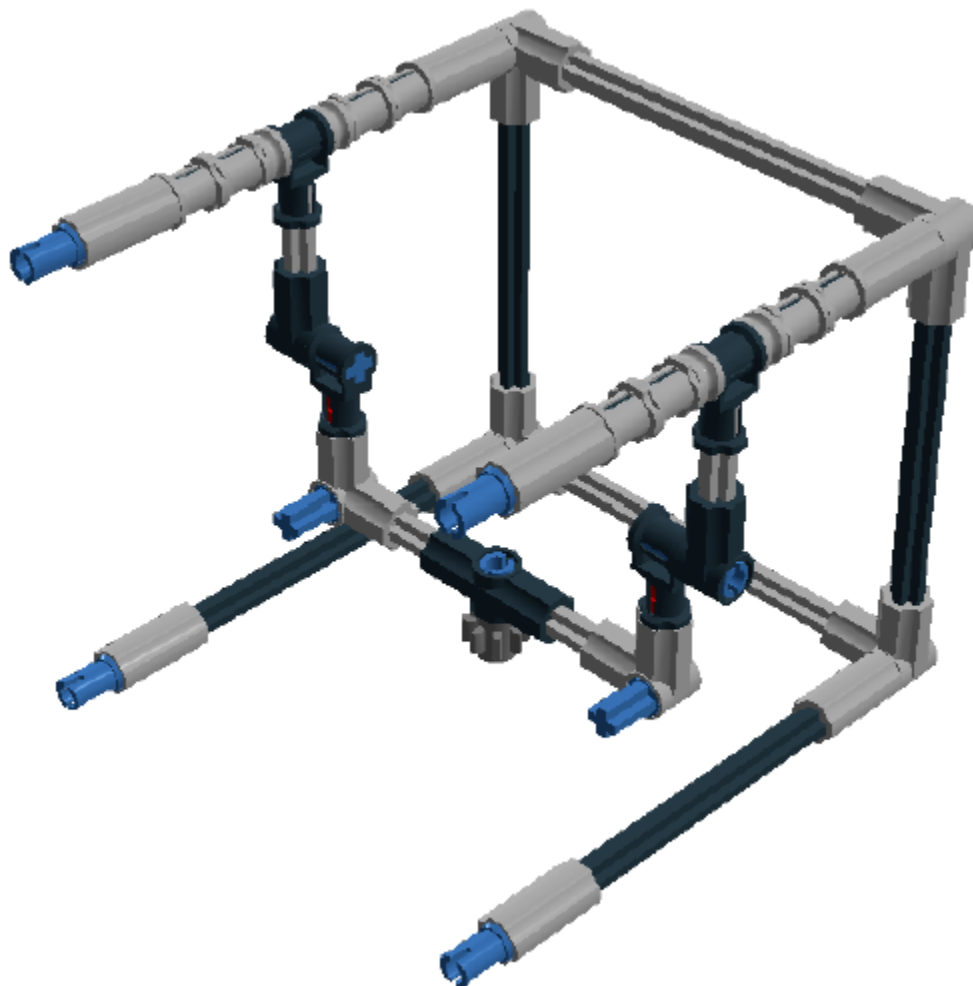


Step 27 of 37

1 x



Step 29 of 37



Step 31 of 37

1 x



1 x



1 x



1 x



Step 30 of 37

1 x



Step 32 of 37

1 x



1 x



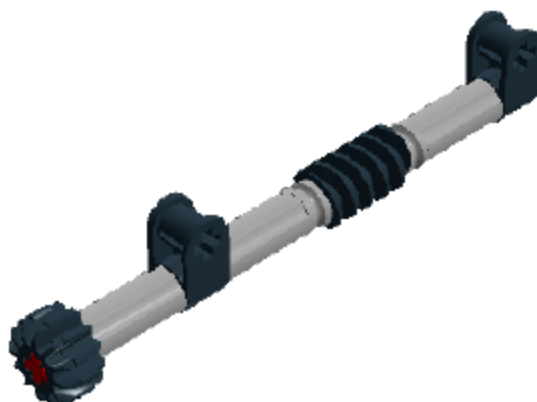
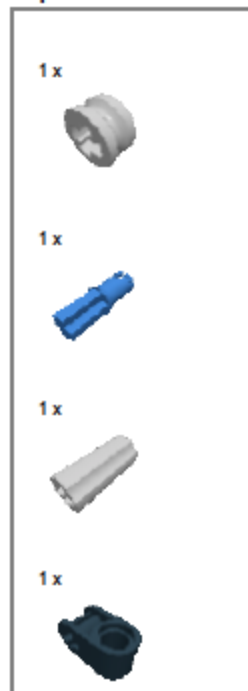
1 x



1 x

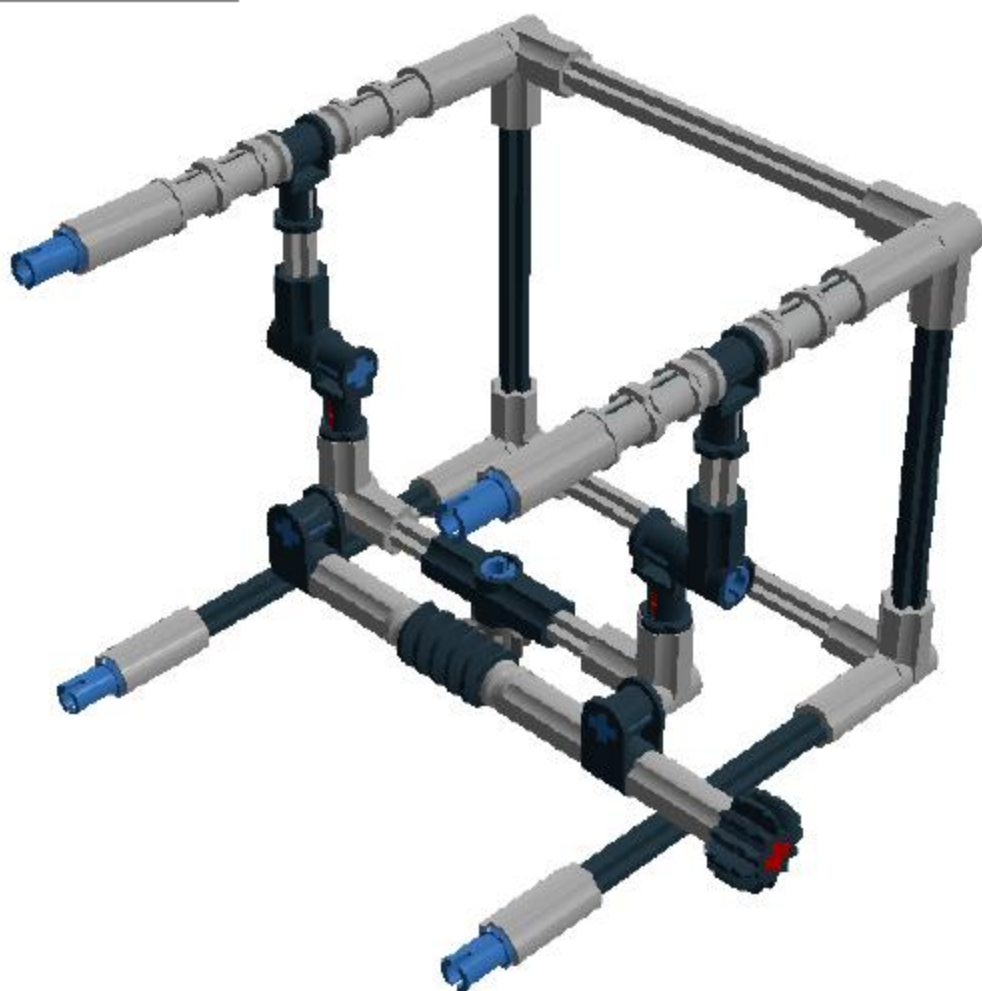


Step 33 of 37



Step 34 of 37

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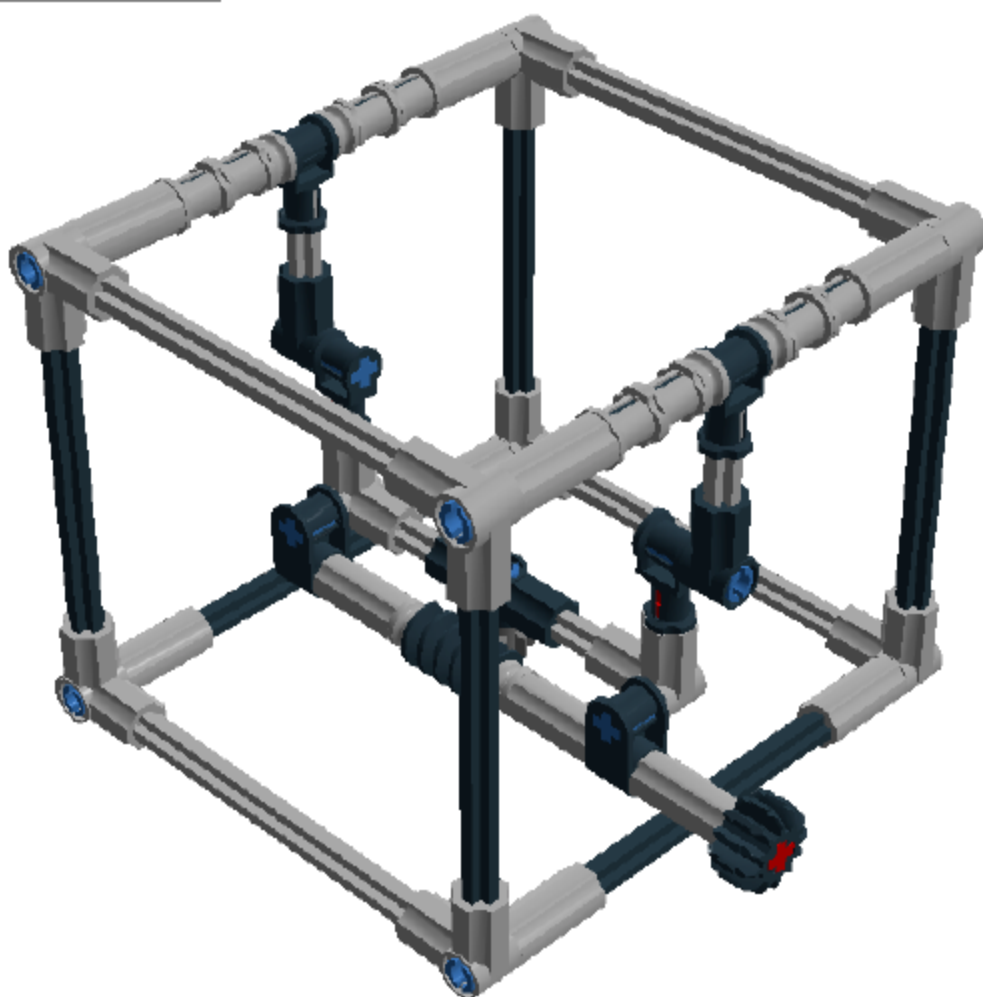


Step 35 of 37



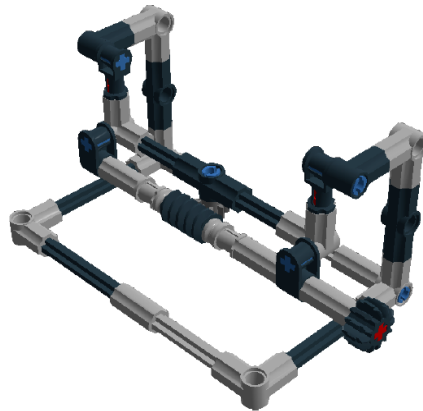
Step 36 of 37





## Building instructions<sup>3</sup> for the Open-IMp

Number of bricks = 56



Brick assortment for the Open-IMp  
(for correct purchase codes see page 70-73)

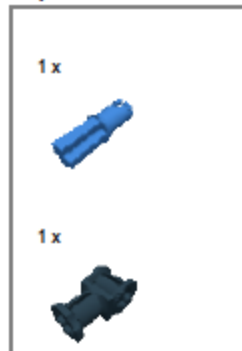
2 x  4211573 1/2 BUSH - Medium Stone Grey	9 x  4142865 2M CROSS AXLE W. GROOVE - Bright Red	1 x  4211815 CROSS AXLE 3M - Medium Stone Grey
8 x  4225927 CONNECTOR PEG/CROSS AXLE - Bright Blue	2 x  4211622 BUSH FOR CROSS AXLE - Medium Stone Grey	2 x  370526 CROSS AXLE 4M - Black
6 x  4512360 CROSS AXLE, EXTENSION, 2M - Medium Stone Grey	2 x  4107081 CATCH W. CROSS HOLE - Black	1 x  4211639 CROSS AXLE 5M - Medium Stone Grey
2 x  653626 CROSS BLOCK 90° - Black	2 x  4107085 ANGLE ELEMENT, 0 DEGREES [1] - Black	3 x  370626 CROSS AXLE 6M - Black
1 x  4211805 CROSS AXLE 7M - Medium Stone Grey	3 x  4107783 ANGLE ELEMENT, 180 DEGREES [2] - Black	1 x  4535768 CROSS AXLE 9M - Medium Stone Grey
8 x  4211670 ANGLE ELEMENT, 90 DEGREES [6] - Medium Stone Grey	1 x  4514559 GEAR WHEEL T=8, M=1 - Dark Stone Grey	1 x  4177431 DOUBLE CONICAL WHEEL Z12 1M - Black
1 x  471626 WORM - Black		

<sup>3</sup> As generated by LEGO® digital designer 4.3.8

Step 1 of 27



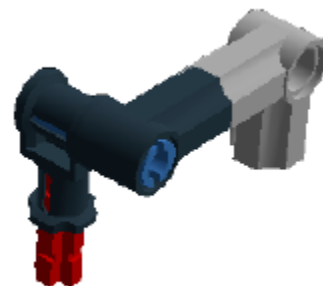
Step 2 of 27



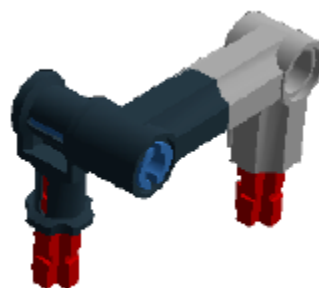
Step 3 of 27



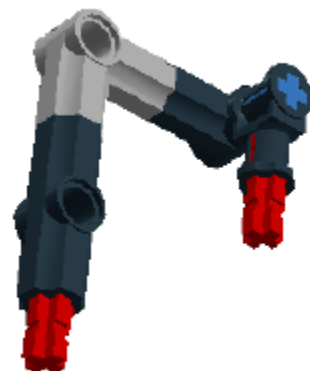
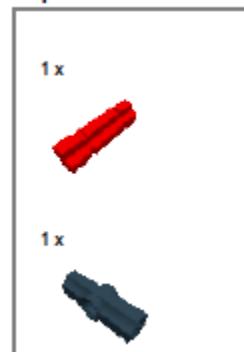
Step 4 of 27



Step 5 of 27



Step 6 of 27



Step 7 of 27

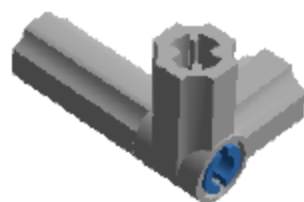
1 x



1 x



1 x



Step 8 of 27

1 x



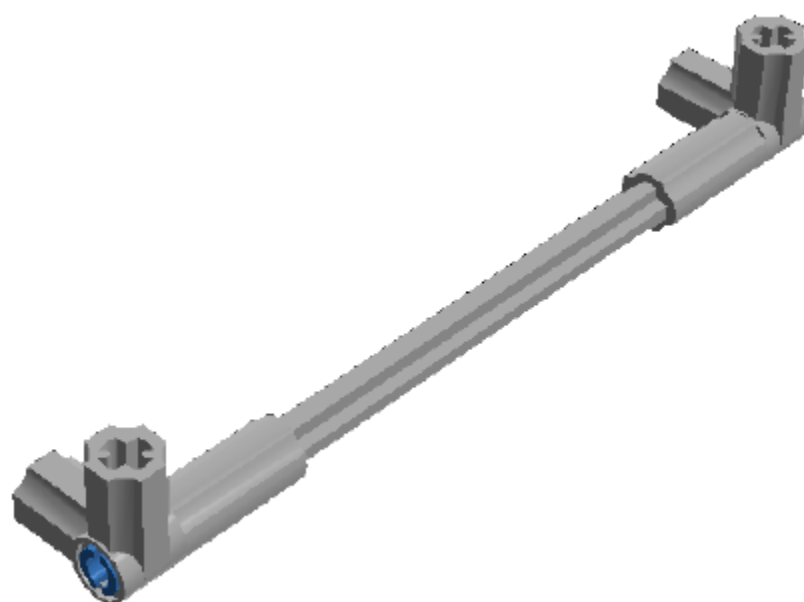
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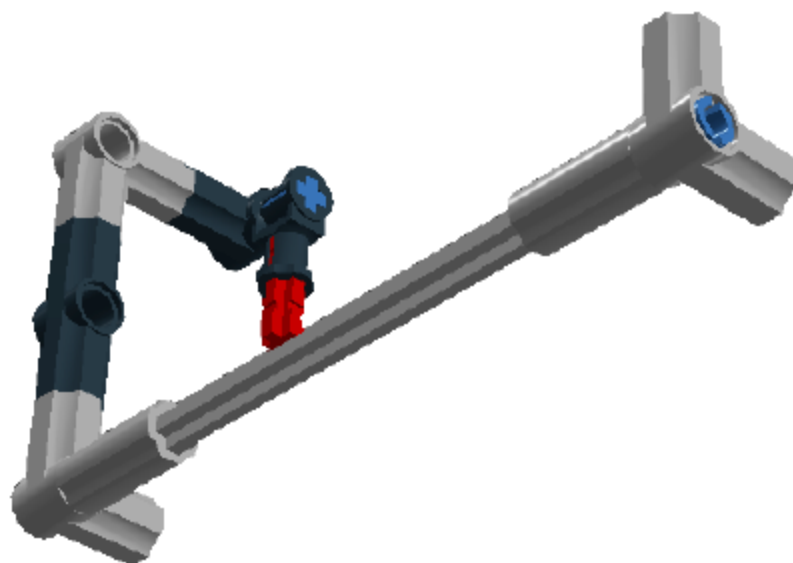


1 x



1 x





Step 9 of 27

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Step 10 of 27

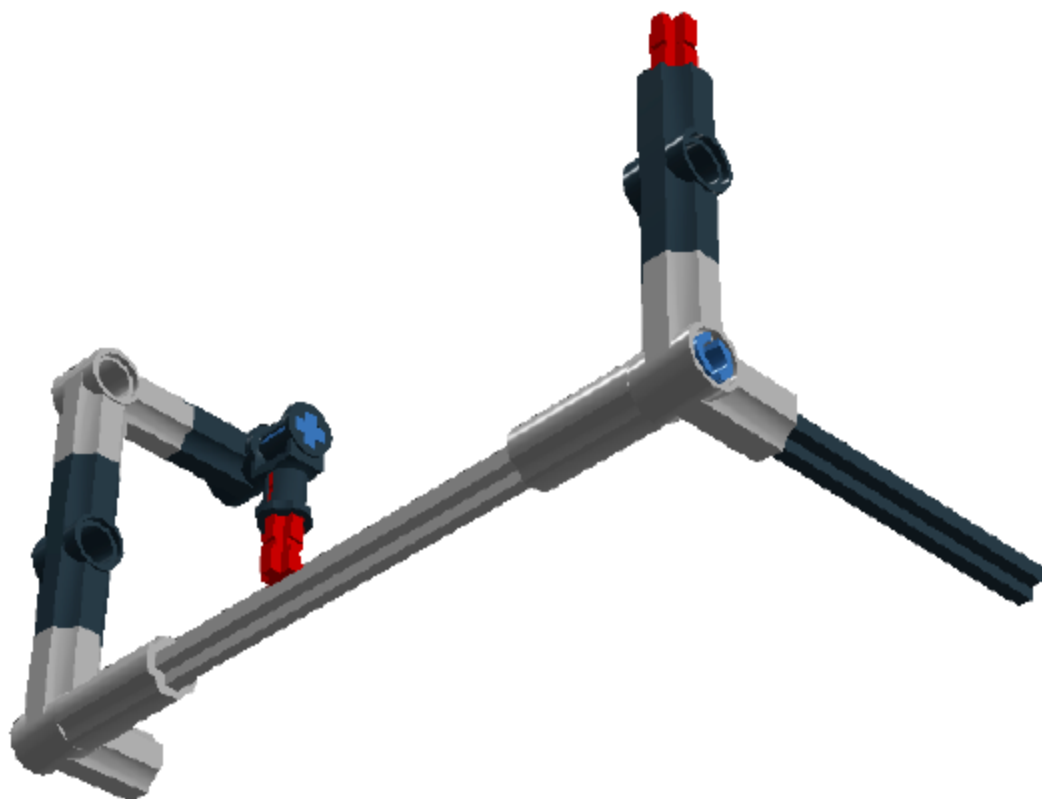
2 x



1 x



1 x

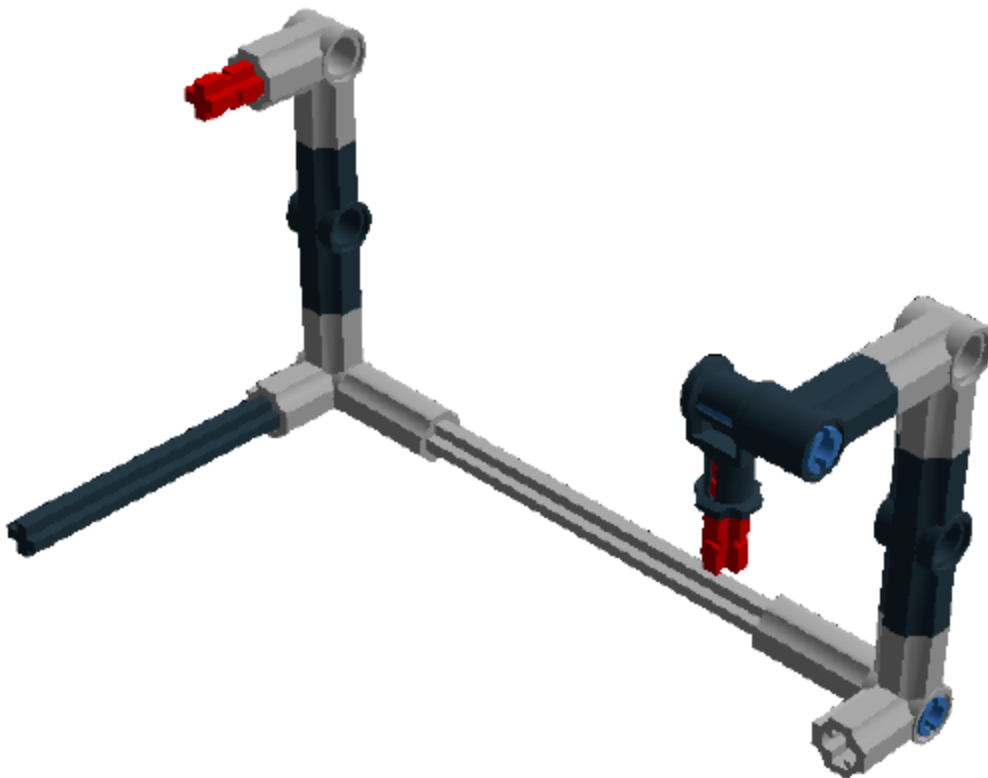


Step 11 of 27

1 x



1 x



Step 12 of 27

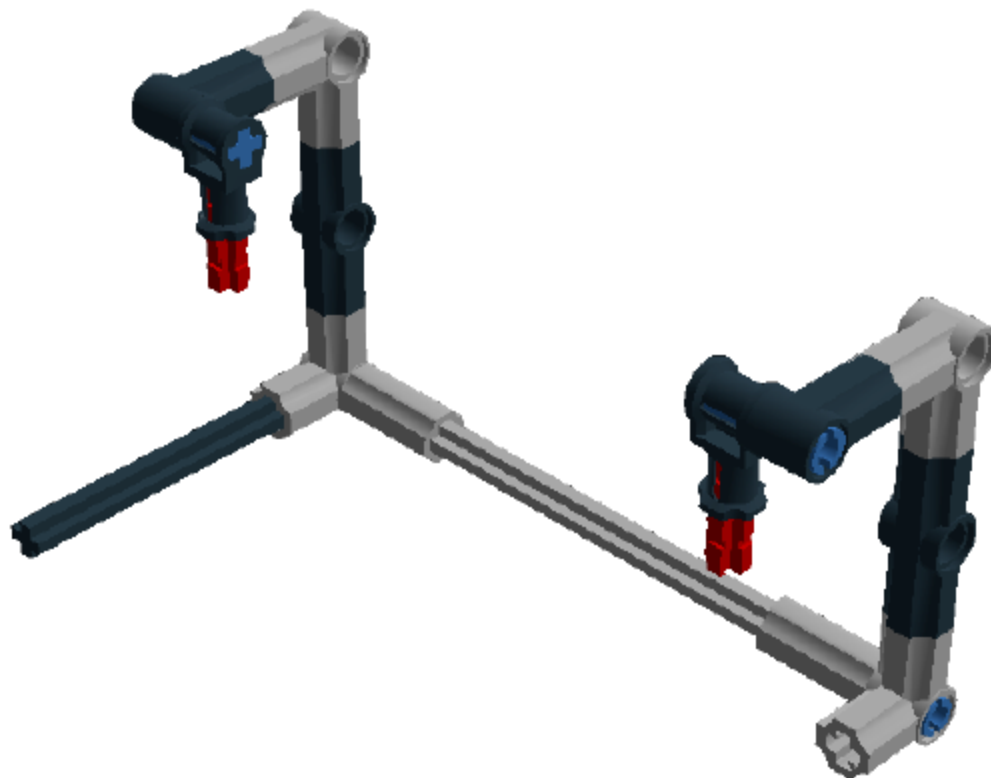


Step 13 of 27



Step 14 of 27

1 x

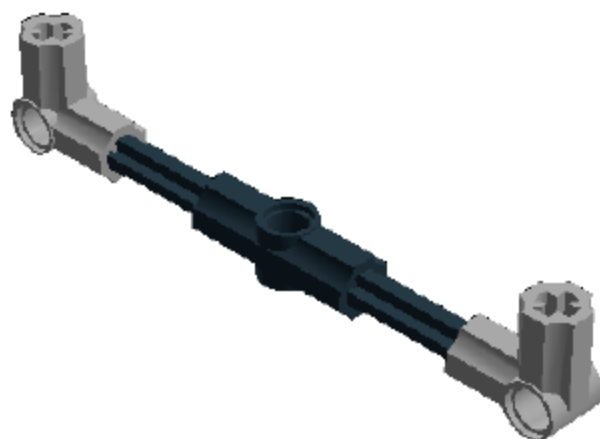
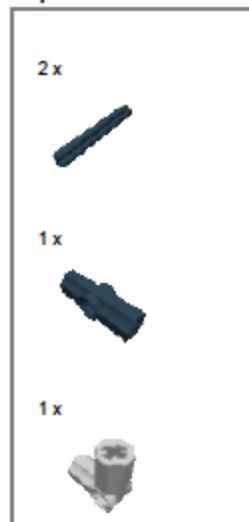


Step 15 of 27

1 x



Step 16 of 27



Step 17 of 27

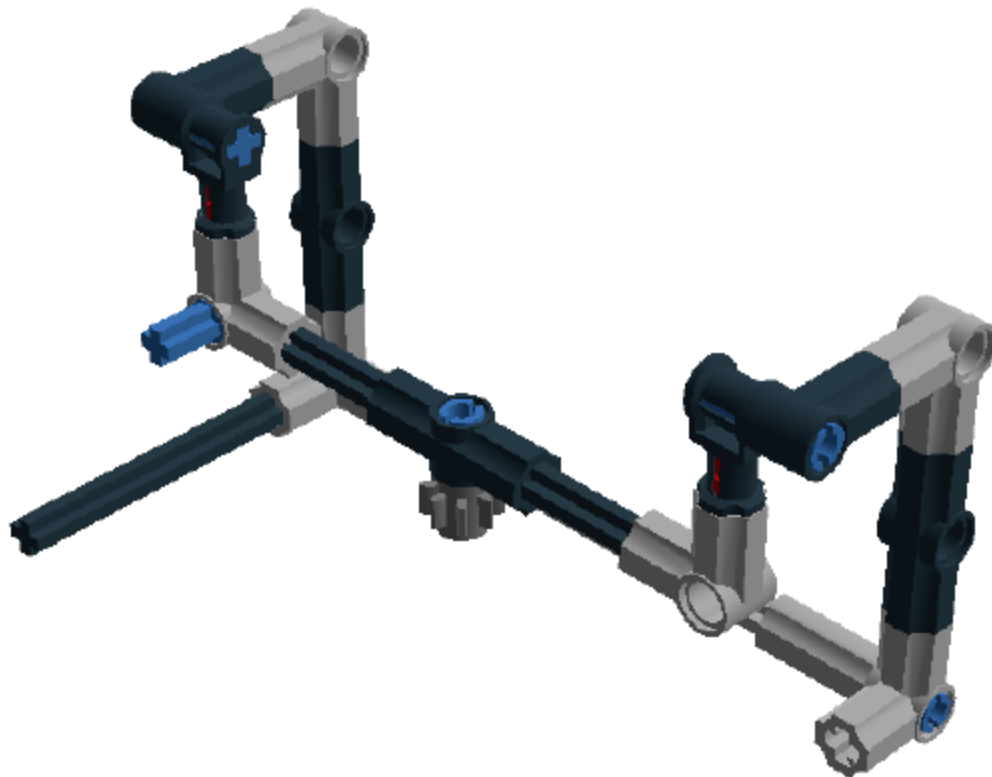


Step 18 of 27

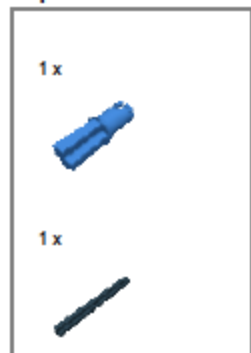
2 x



1 x



Step 19 of 27



Step 20 of 27



Step 21 of 27

1 x



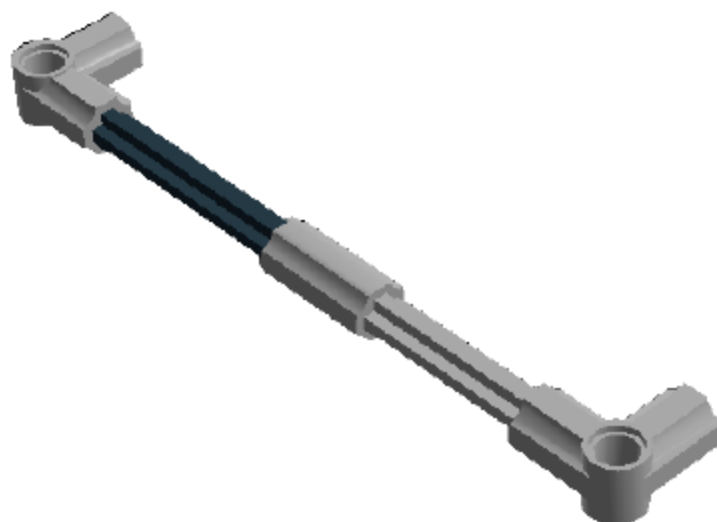
1 x



1 x

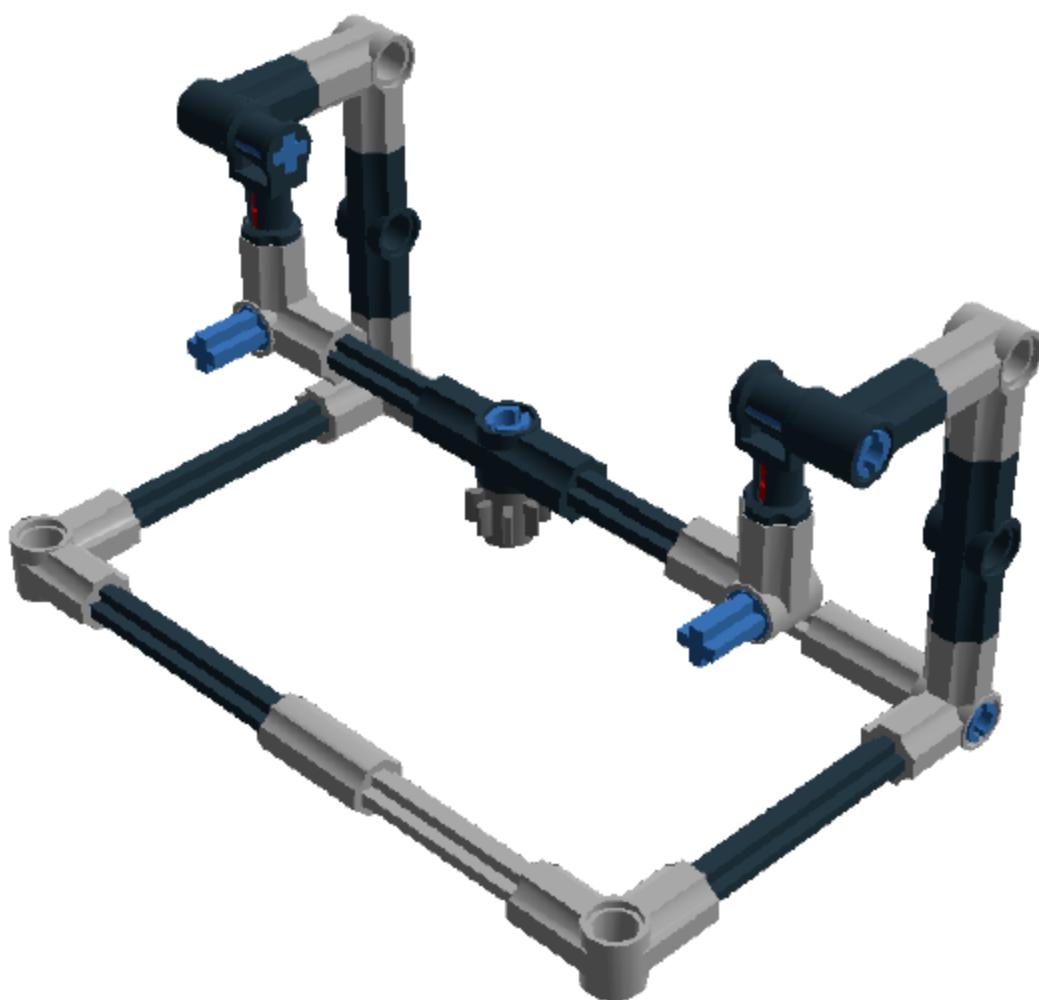


1 x



Step 22 of 27

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Step 23 of 27

1 x



1 x



1 x



1 x



Step 24 of 27

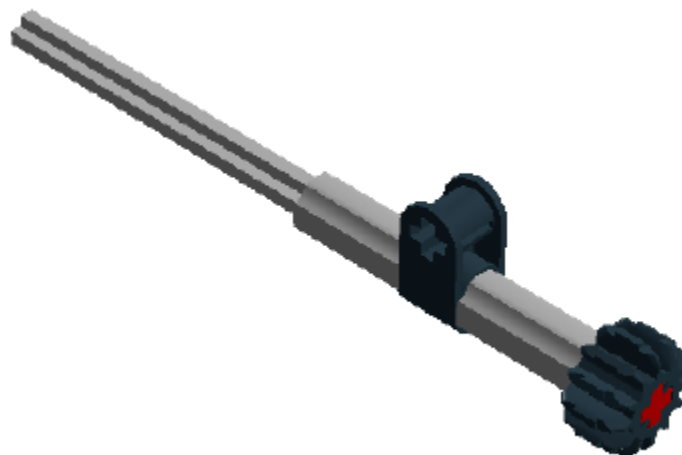
1 x



1 x



1 x



Step 25 of 27

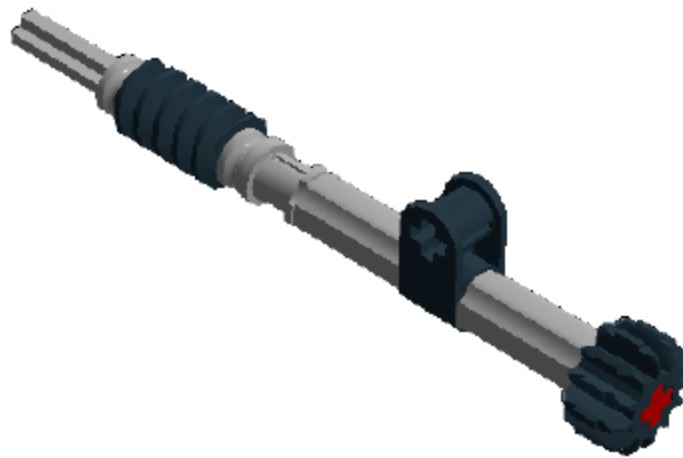
2 x



1 x



1 x



Step 26 of 27

1 x



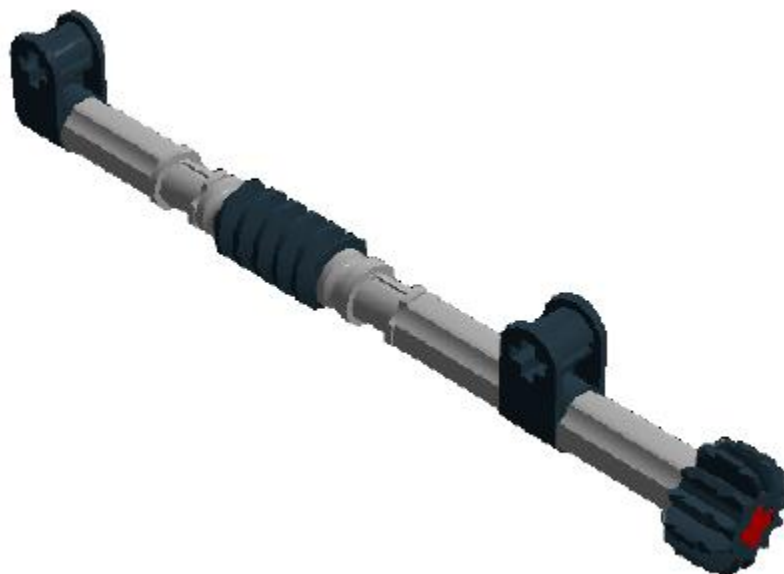
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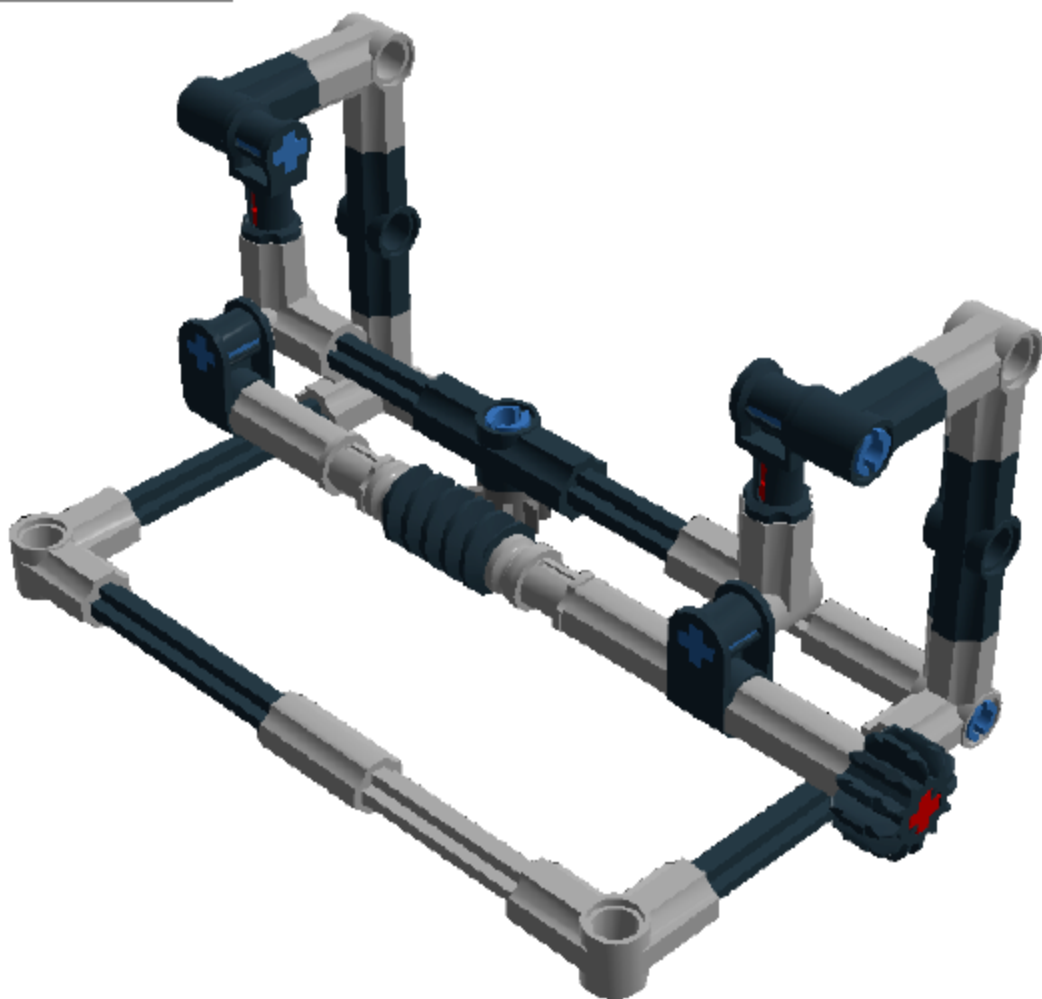
1 x



1 x

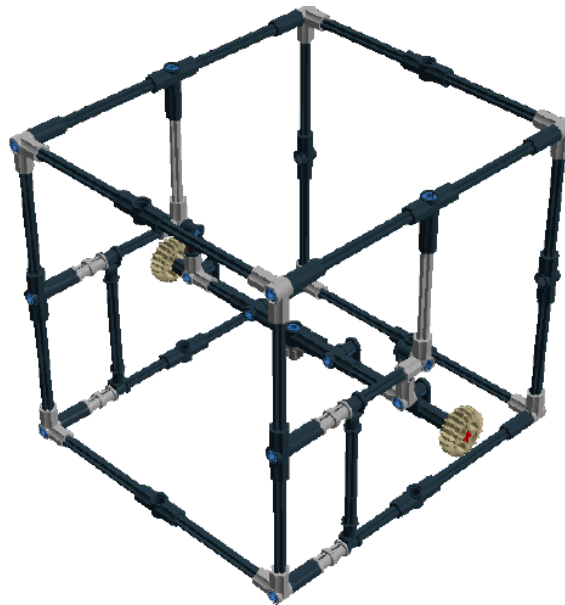


Step 27 of 27



## Building instructions<sup>4</sup> for the Giant-Imp

Number of bricks = 132

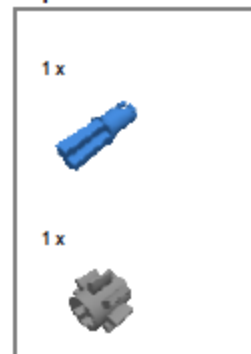


Brick assortment for the Giant-Imp  
(for correct purchase codes see page 70-73)

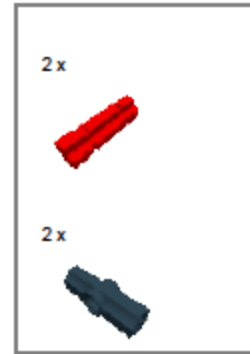
2 x		4211573 1/2 BUSH - Medium Stone Grey	8 x		4142885 2M CROSS AXLE W. GROOVE - Bright Red	2 x		4211815 CROSS AXLE 3M - Medium Stone Grey
18 x		4225927 CONNECTOR PEG/CROSS AXLE - Bright Blue	10 x		4211822 BUSH FOR CROSS AXLE - Medium Stone Grey	2 x		370526 CROSS AXLE 4M - Black
18 x		4512363 CROSS AXLE, EXTENSION, 2M - Black	6 x		4107081 CATCH W. CROSS HOLE - Black	4 x		653626 CROSS BLOCK 90° - Black
2 x		4211805 CROSS AXLE 7M - Medium Stone Grey	28 x		370726 CROSS AXLE 8M - Black	15 x		4107783 ANGLE ELEMENT, 180 DEGREES [2] - Black
1 x		4535768 CROSS AXLE 9M - Medium Stone Grey	12 x		4211870 ANGLE ELEMENT, 90 DEGREES [6] - Medium Stone Grey	1 x		4514559 GEAR WHEEL T=8, M=1 - Dark Stone Grey
1 x		471826 WORM - Black	2 x		4514555 DOUBLE CONICAL WHEEL Z20 1M - Brick Yellow			

<sup>4</sup> As generated by LEGO® digital designer 4.3.8

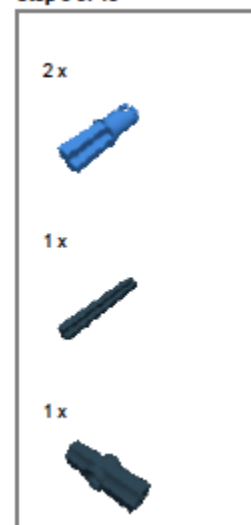
Step 1 of 48



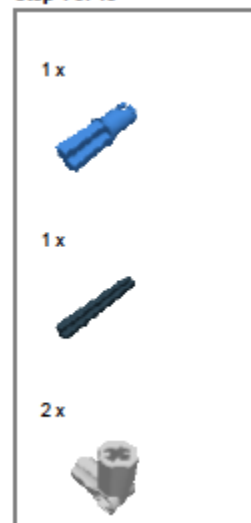
Step 2 of 48



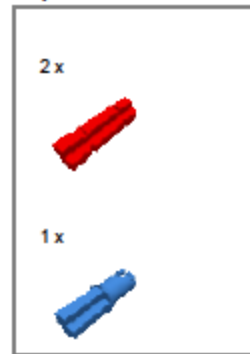
Step 3 of 48



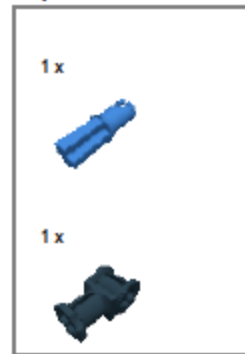
Step 4 of 48



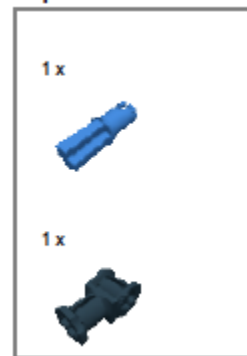
Step 5 of 48



Step 6 of 48



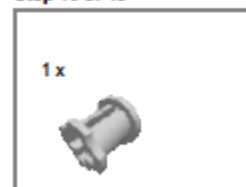
Step 8 of 48



Step 7 of 48



Step 10 of 48



Step 9 of 48



Step 11 of 48

1 x



1 x



1 x



1 x



Step 12 of 48

1 x



2 x



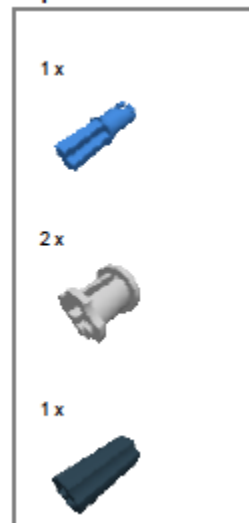
1 x



Step 13 of 48



Step 14 of 48



Step 15 of 48

1 x



1 x



1 x

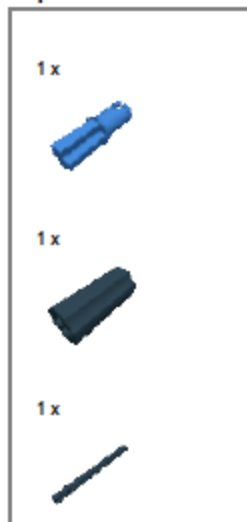


1 x

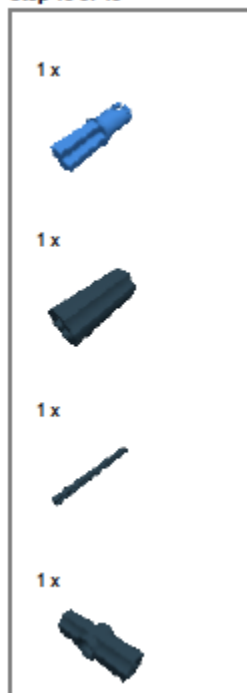


Step 16 of 48

Step 17 of 48



Step 18 of 48





Step 19 of 48

Step 20 of 48

1 x



2 x



1 x



Step 21 of 48

2 x



1 x



1 x



Step 22 of 48

1 x



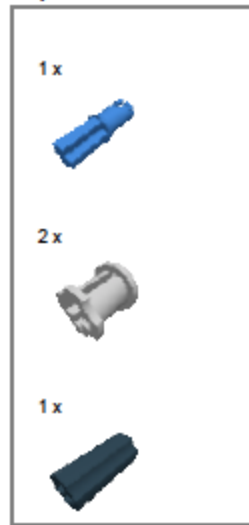
1 x



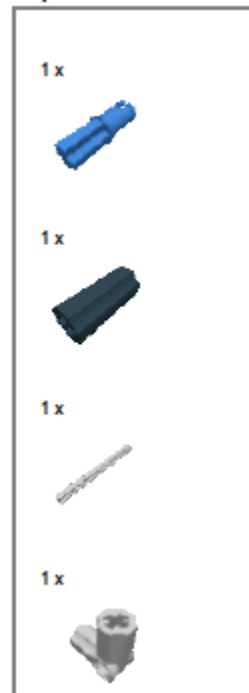
2 x



## Step 23 of 48



## Step 24 of 48



Step 25 of 48



Step 26 of 48



1 x



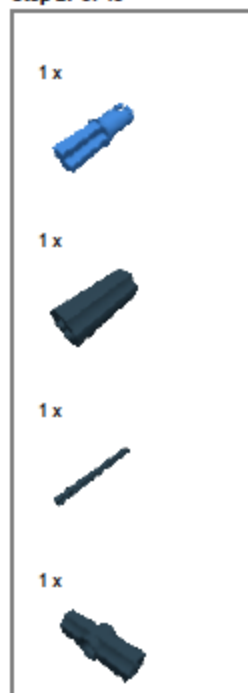
1 x

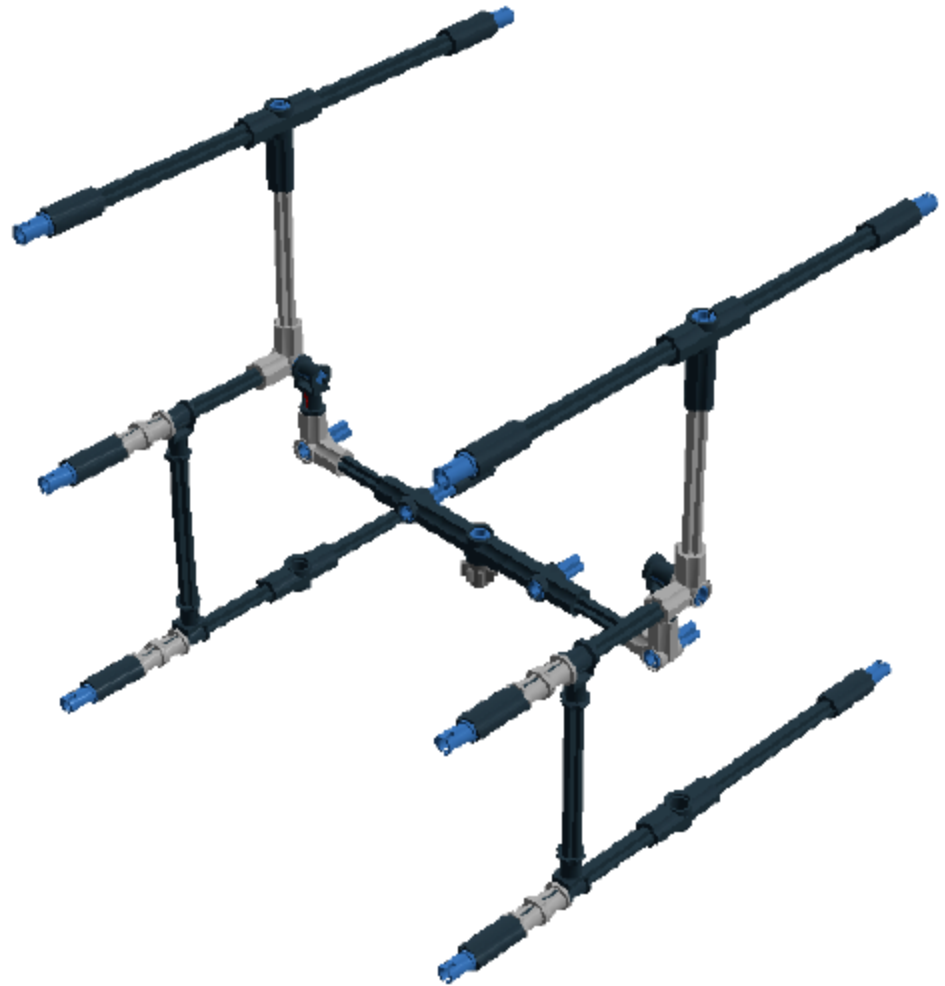


1 x



Step 27 of 48





Step 28 of 48

Step 29 of 48

1 x



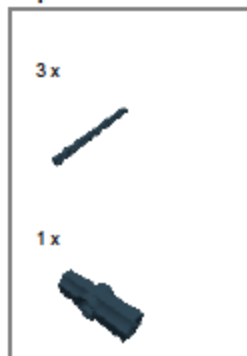
1 x



2 x



Step 30 of 48

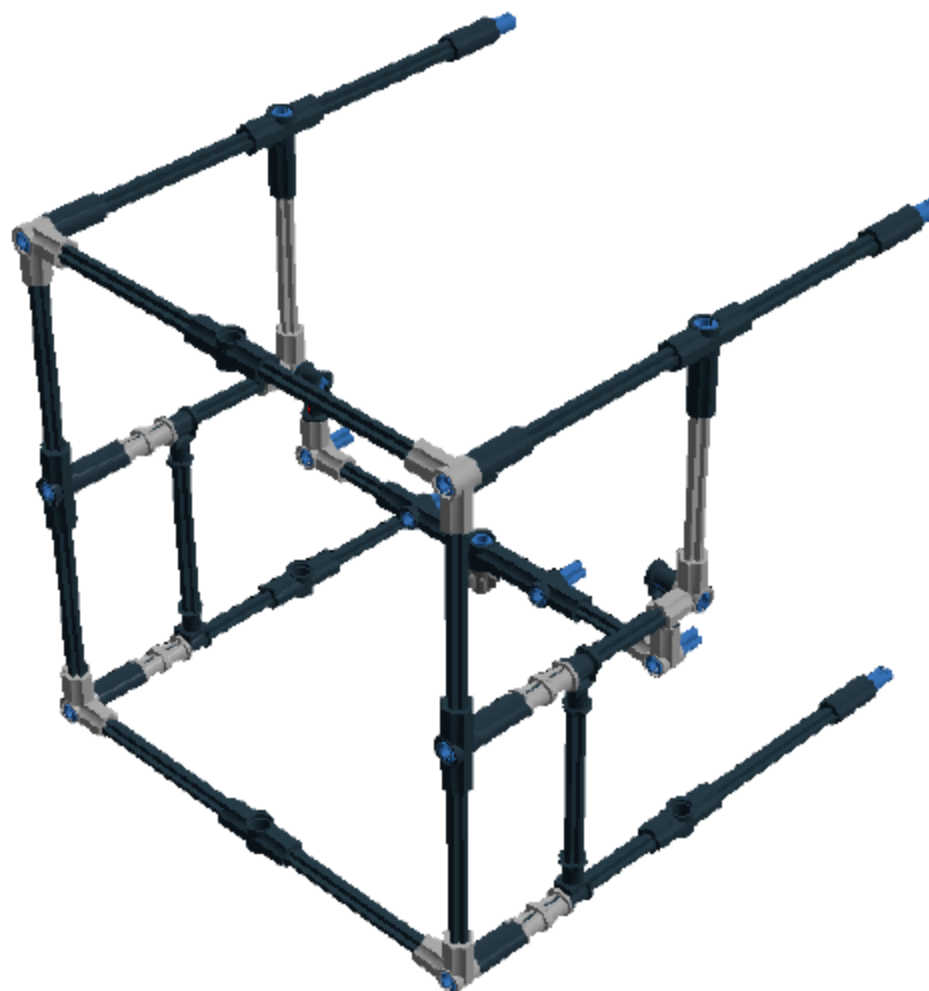


Step 31 of 48



Step 32 of 48





Step 33 of 48

Step 34 of 48

1 x



1 x



Step 35 of 48

1 x



Step 36 of 48

1 x



1 x



1 x



1 x



Step 37 of 48

1 x



1 x



1 x



Step 38 of 48

2 x



1 x



1 x



Step 39 of 48

1 x



1 x



1 x



1 x



Step 40 of 48

1 x



Step 41 of 48

1 x



1 x



1 x



1 x



Step 42 of 48

1 x





Step 43 of 48

Step 44 of 48

1 x



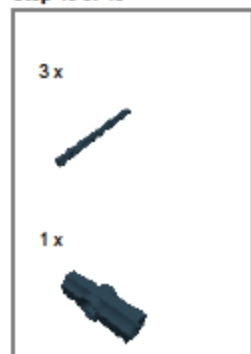
1 x



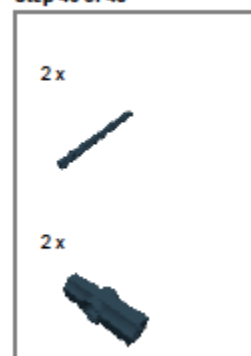
2 x



Step 45 of 48



Step 46 of 48



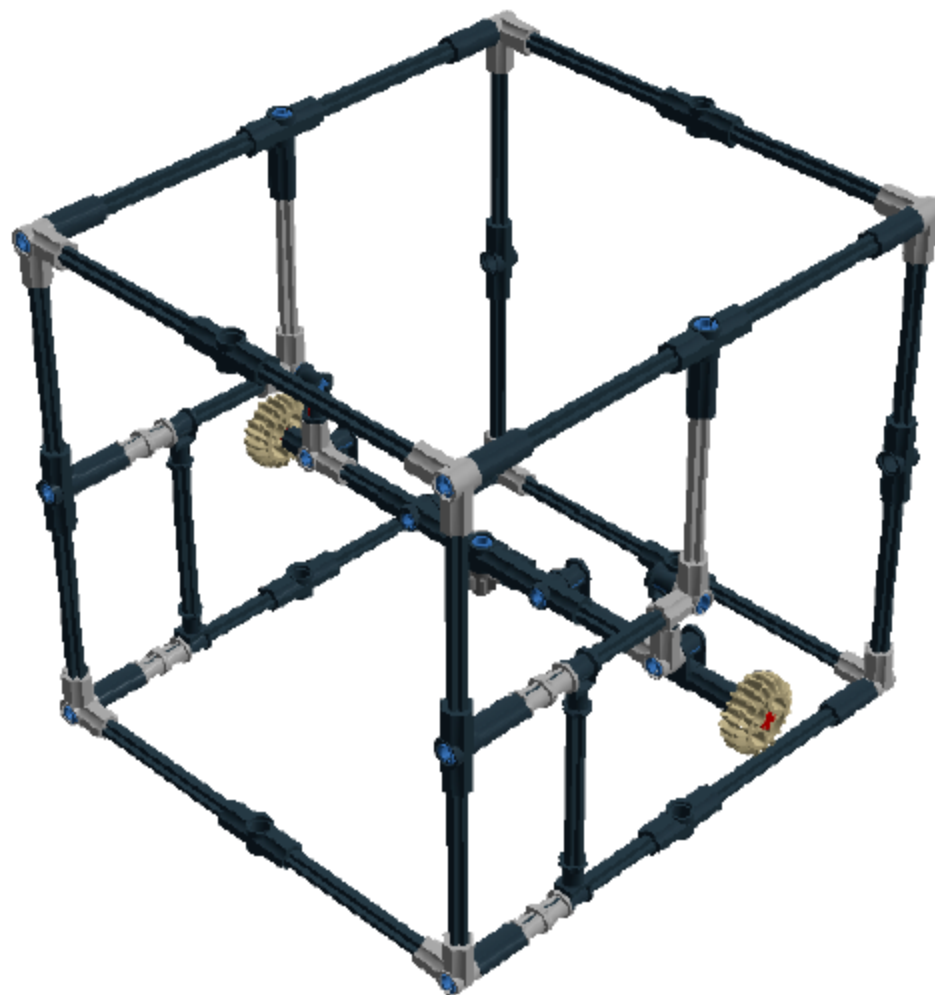
Step 47 of 48

2 x



2 x





Step 48 of 48

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### Brick parts with updated design and part IDs

Part IDs represent the same part but in different colours; this can be for aesthetic reasons or in case the part is out of stock on the website.

Image	Name	Design ID	Part IDs	Imp	Micro-	Open-	Giant-	Total
	1/2 Bush	32123	4110050 4203585 4206210 4211573 4239601 4260467 4278910	6	2	2	2	12
	Conn. Bush W. Fric./Cros sale	43093	4184170 4184171 4206482	14	8	8	18	48
	Cross Axle, Extension, 2M	59443	4512360 4512363 4513174 4516546 4519010 4531751 4654508 6084612 6084613	11	3	6	18	38
	Cross Axle 5M	32073	4114740 4141482 4166139 4211639	1	3	1		5
	Cross Axle 6M	3706	370626 4143263 4191526 4203604		2	3		5
	Angle Element, 180 Degrees [2]	32034	4107783 4107798 4107830 4125554 4207756 4210981 4211567 4234429 6024719	1	3	3	15	22
	Gear Wheel T=8, M=1	3647	364702 4120181 4211432 4514559	1	1	1	1	4

Image	Name	Design ID	Part IDs	Imp	Micro-	Open-	Giant-	Total
	Double Conical Wheel Z20 1M	32269	4141455 4177430 4205111 4211635 4514555				2	2
	2M Cross Axle W. Groove	32062	4109810 4142865 4163623	3	7	9	8	27
	Bush For Cross Axle	6590	4125313 4177421 4207525 4211622 4227155 4238814	8	0	2	10	20
	Cross Block 90°	6536	653601 653602 653626 4107078 4107766 4107799 4118881 4172101 4173600 4173601 4173658 4173659 4173661 4173663 4173665 4173666 4173667 4173668 4173669 4173670 4173987 4177420 4188298 4200936 4203896 4210851 4211775 4227273 4261453 4281196	2	2	2	4	10
	Cross Axle 7M	44294	4183835 4211805 4267859 4268663 4631800			1	2	3

Image	Name	Design ID	Part IDs	Imp	Micro-	Open-	Giant-	Total
	Cross Axle 9M	60485	4535768	4		1	1	6
	Double Conical Wheel Z12 1M	32270	4141454 4177431 4211634	1	1	1		3
	Cross Axle 3M	4519	451926 4143467 4186007 4211815	5	3	1	2	11
	Cross Axle 4M	3705	370526 4162390 4180062 4265797			2	2	4
	Catch W. Cross Hole	32039	4106469 4107081 4107800 4107801 4114233 4118897 4121616 4141419 4141420 4144128 4144294 4164128 4164357 4172048 4172110 4175548 4177427 4188140 4200926 4210669 4211553 4248903 4252466 4255607 4265704	4	2	2	6	14
	Worm	4716	471602 471626 4211510 6037533	1	1	1	1	4

Image	Name	Design ID	Part IDs	Imp	Micro-	Open-	Giant-	Total
	Angle Element, 0 Degrees [1]	32013	4106376	2	2	2		6
			4107066					
			4107085					
			4107797					
			4118981					
			4119033					
			4140452					
			4140503					
			4141431					
			4144292					
			4144297					
			4144298					
			4163695					
			4172041					
			4177425					
			4190216					
			4199244					
			4200272					
			4210658					
			4211550					
			4221573					
			4252464					
			4254606					
			4260023					
			4265621					
			4541306					
	Cross Axle 8M	3707	370726 4156302	8			28	36
	Angle Element, 90 Degrees [6]	32014	4106377	10	8	8	12	38
			4107069					
			4107767					
			4112205					
			4114231					
			4125195					
			4125366					
			4141424					
			4143353					
			4163263					
			4163609					
			4189131					
			4210671					
			4495414					
			4509886					
			4654049					
			6072968					