

DamoB's Proton train – 1:110 scale



Introduction

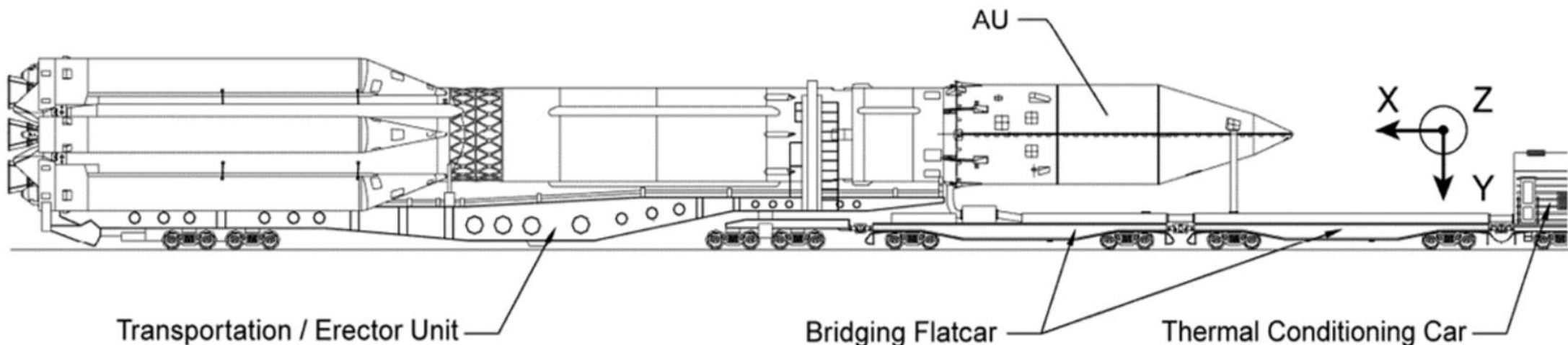
While waiting for some bricks to arrive I found myself with Stud.io open and some time on my hands. Nico Daams had shared an excellent version of his Soyuz launch platform which included the train which takes the Soyuz to its launch site. I already had an affinity for the Proton rocket and a bit of investigation told me that no one had yet modelled the train for the Proton, so I decided to take it on as a Stud.io side project, never intending for it to see the light of day in actual bricks. To cut a long story short, the side project rapidly changed into my focus and ended up with these instructions.

Baikonur has its own intra-site 1520mm gauge railway network, the largest industrial railway on the planet. The railway is used for all stages of launch preparation and all spacecraft are transported to the launchpads by special trains. The Proton train consists of five cars which are, from back to front: the transportation/erector unit; two bridging flatcars; a thermal conditioning car; and the engine.

Information on the trains has been hard to obtain but I started with the assumption that the flatcars were standard Russian design therefore 14.62m long. From there, there are a few scale drawings and a number of photos which allow the rest of the dimensions to be inferred and, when built in Stud.io with my Proton-M rocket attached (which I know to be the right size), it looked close enough for me to be happy that it was correct. The greatest challenge was the track which at the correct scale should be 1.73 studs wide as this is pretty much impossible to create in Lego and I didn't want to go with the standard Lego railway. I compromised at 2.5 studs.

This build is broken down into the five parts of the train and four pieces of track - the first piece of track covers both the transportation/erector and the first bridging flatcar.

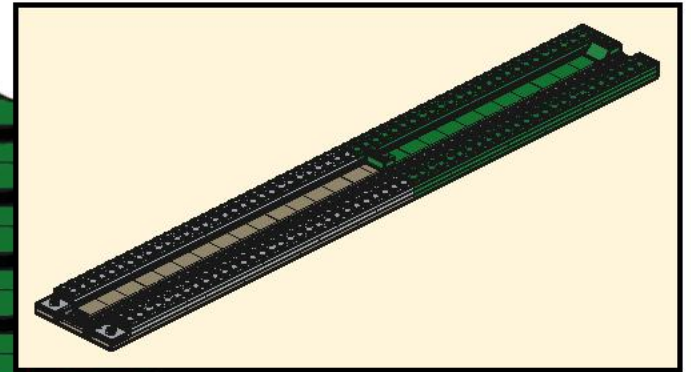
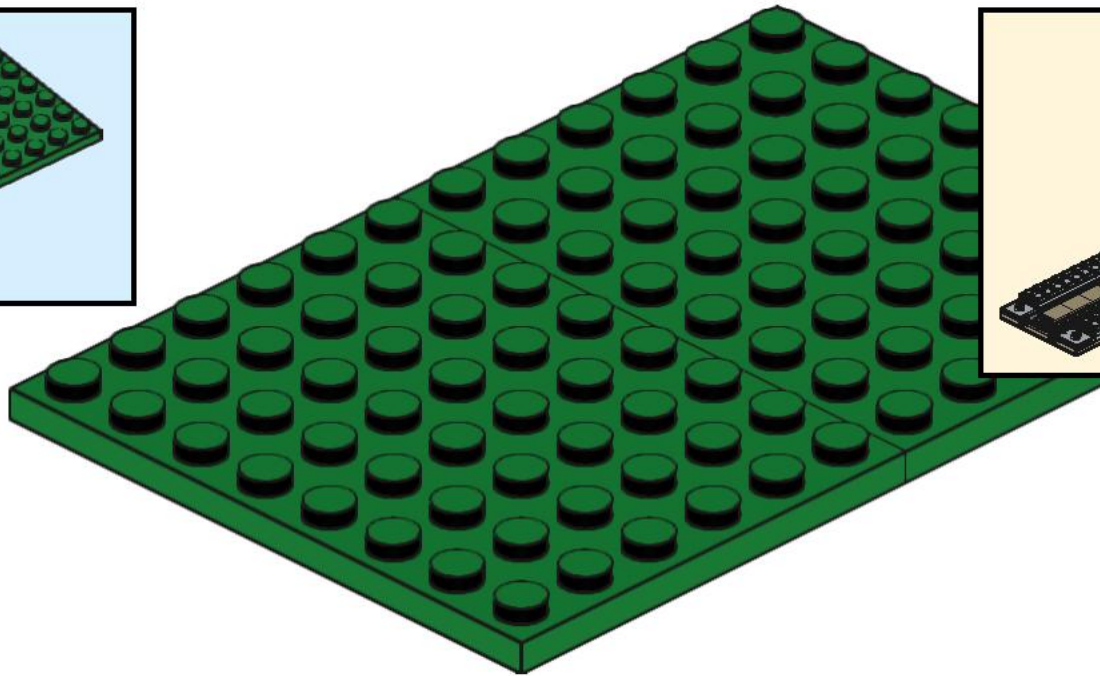
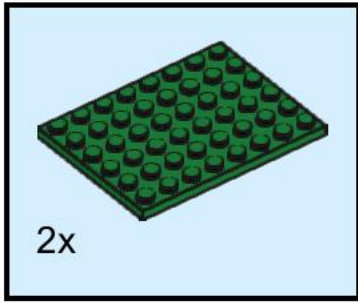
I hope you enjoy building it as much as I enjoyed designing it, and I'm looking forward to seeing some of them out in the wild!



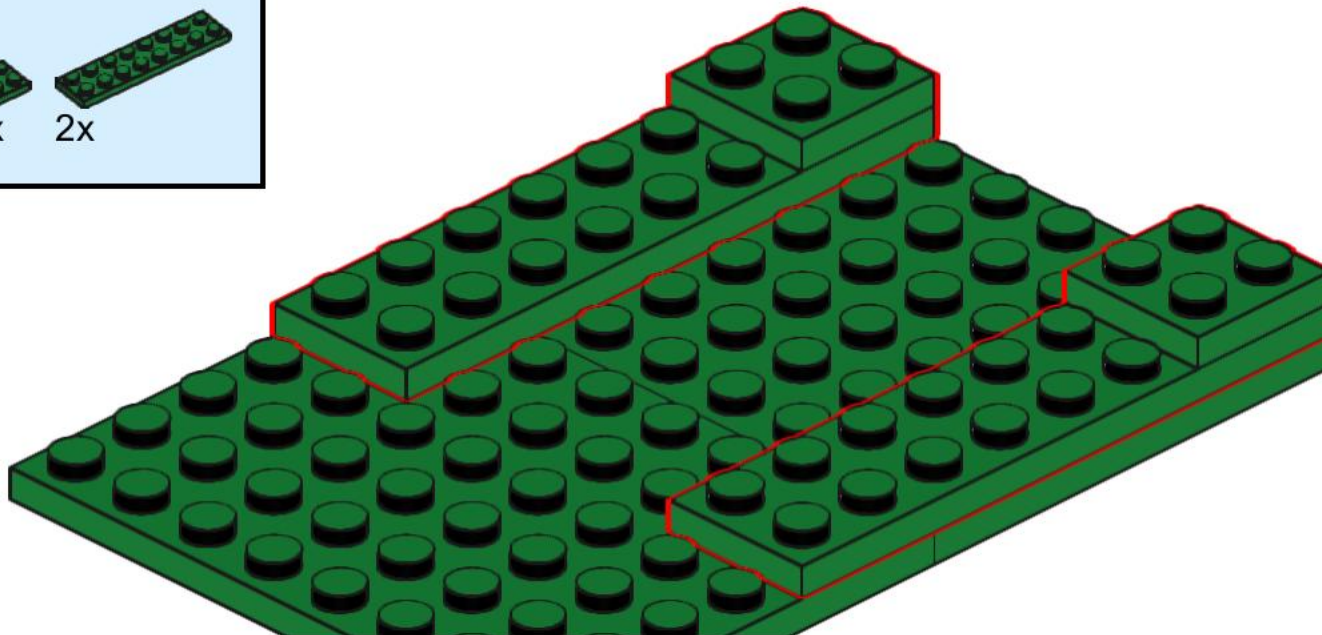
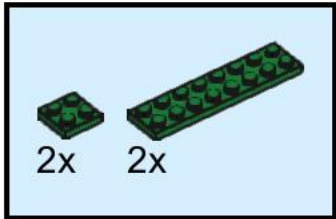
Transportation/erector unit and bridging flatcar 1



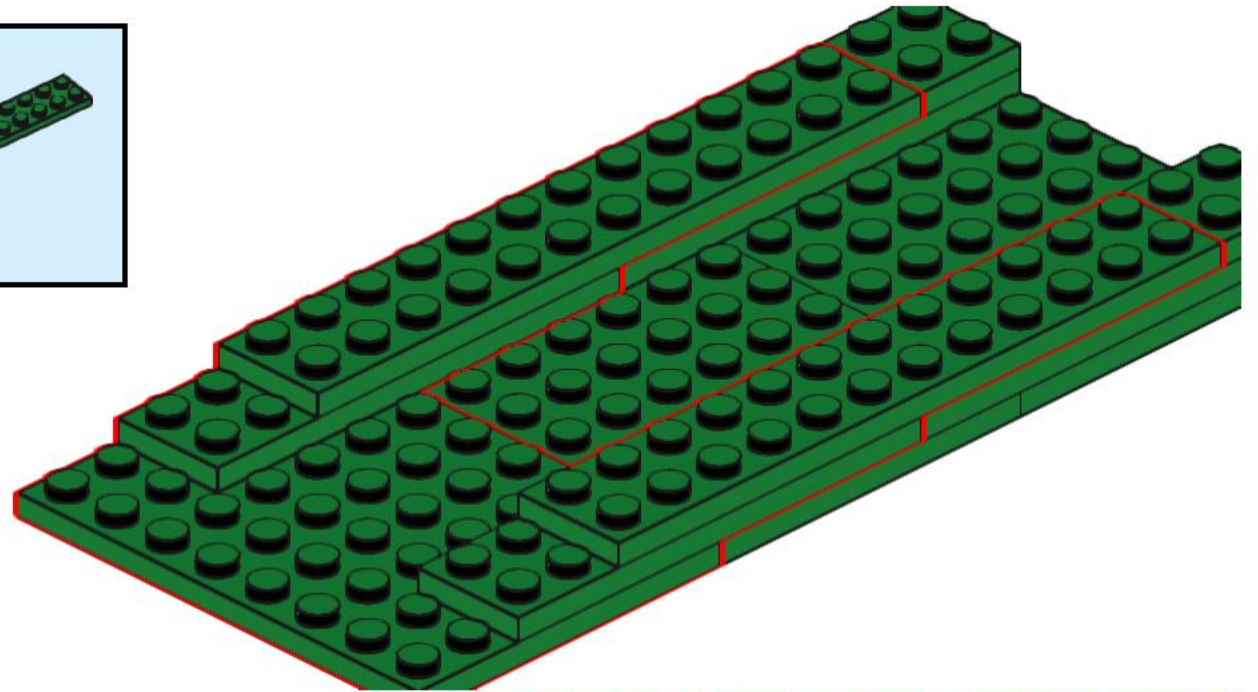
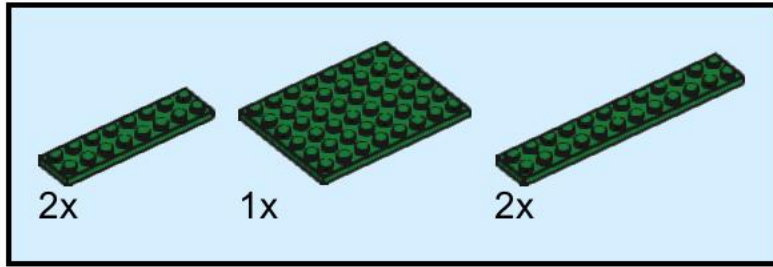
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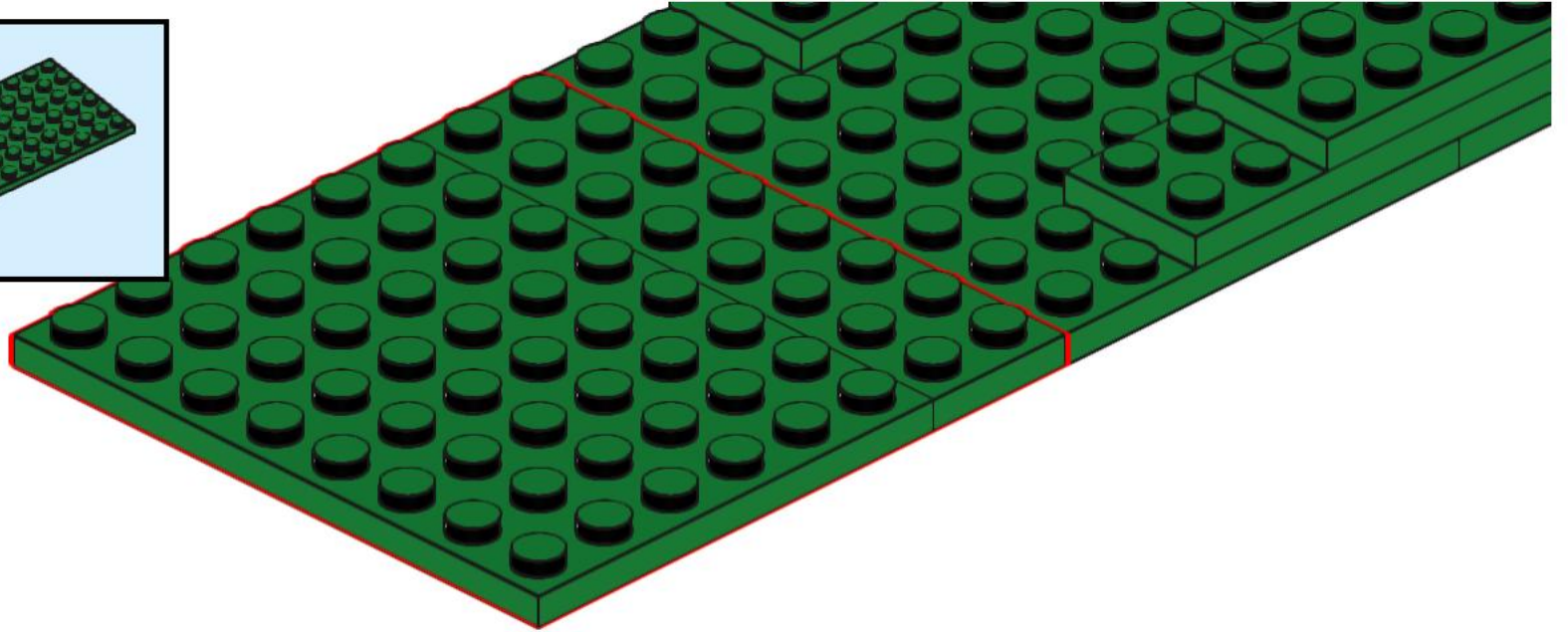
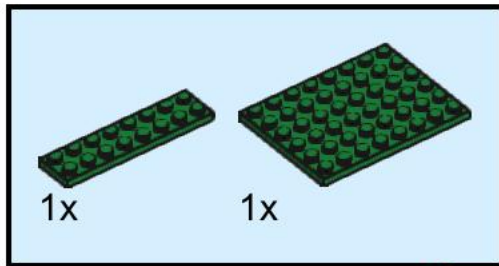
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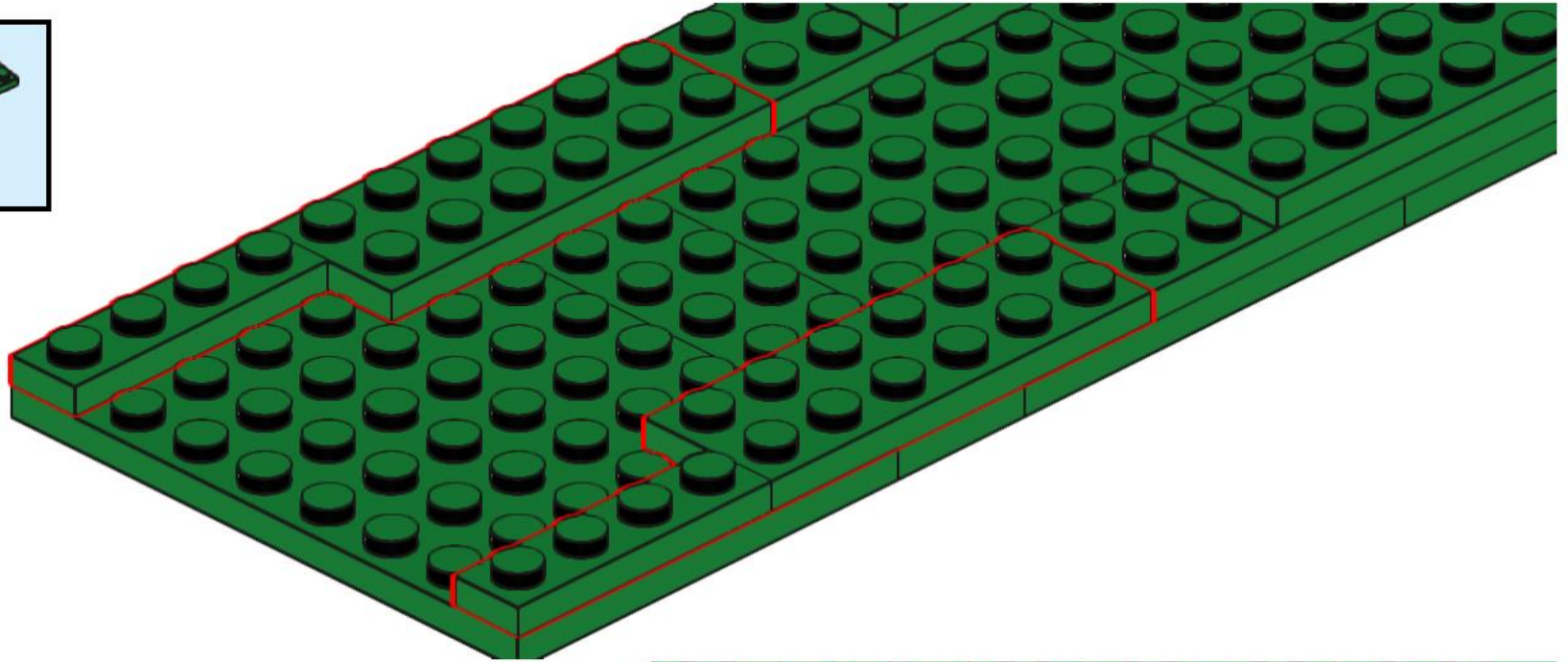
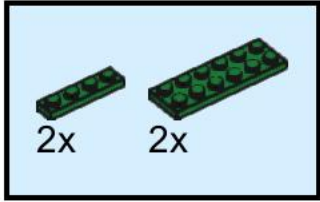
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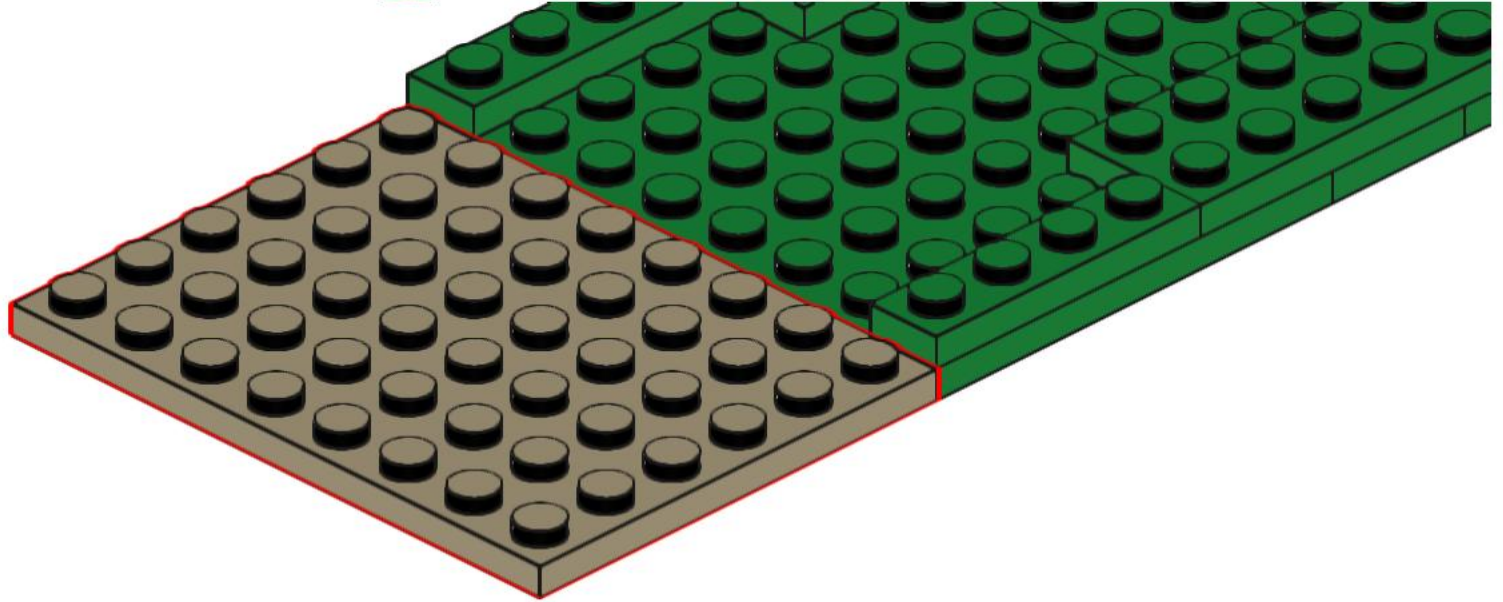
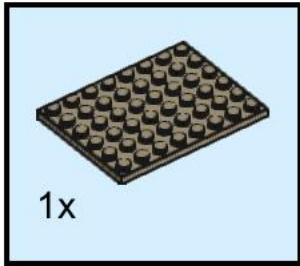
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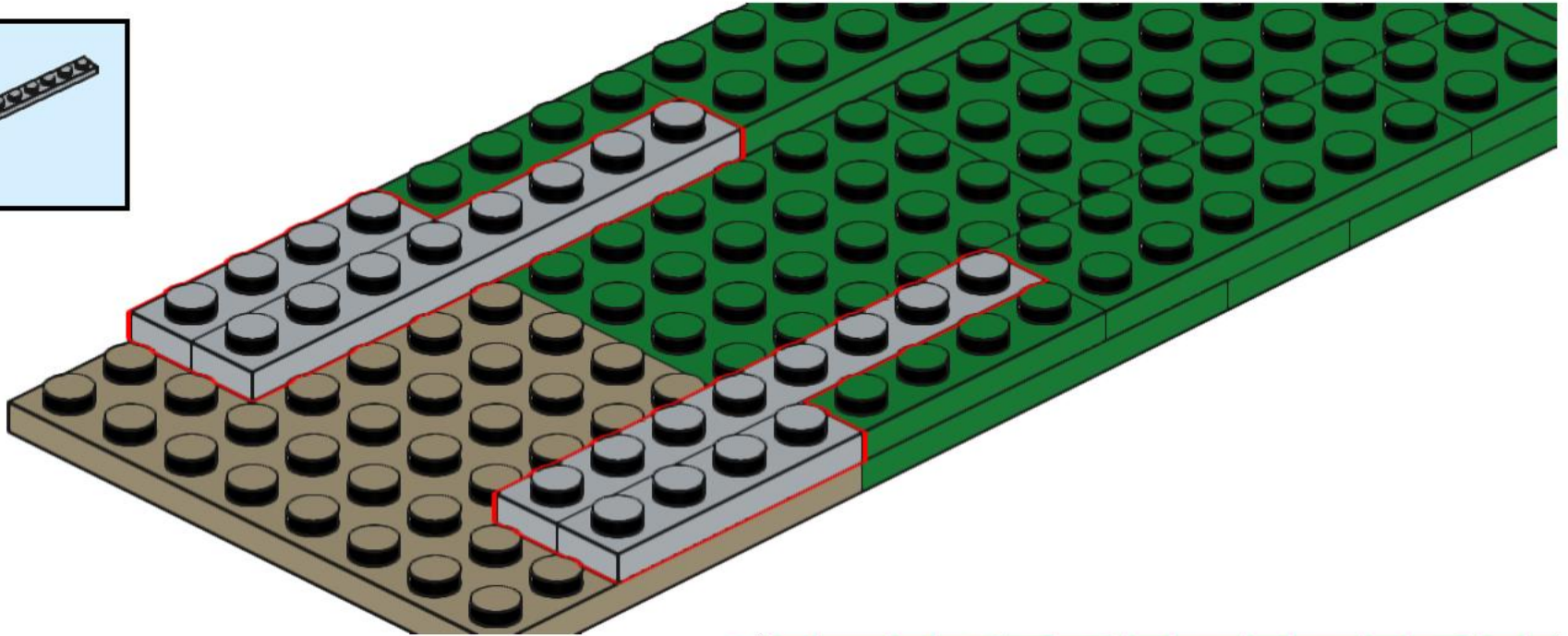
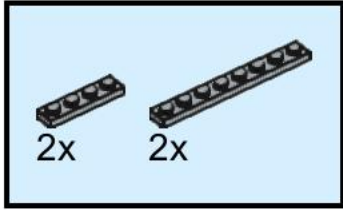
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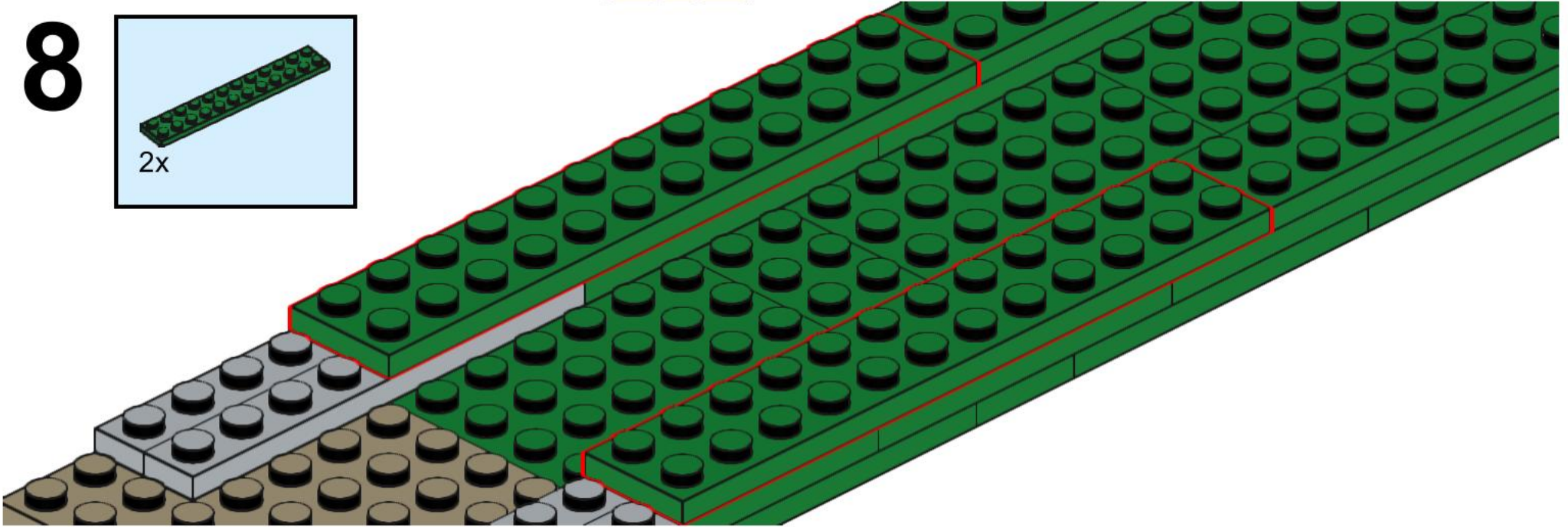
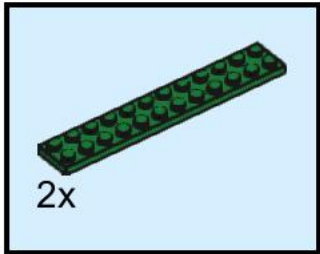
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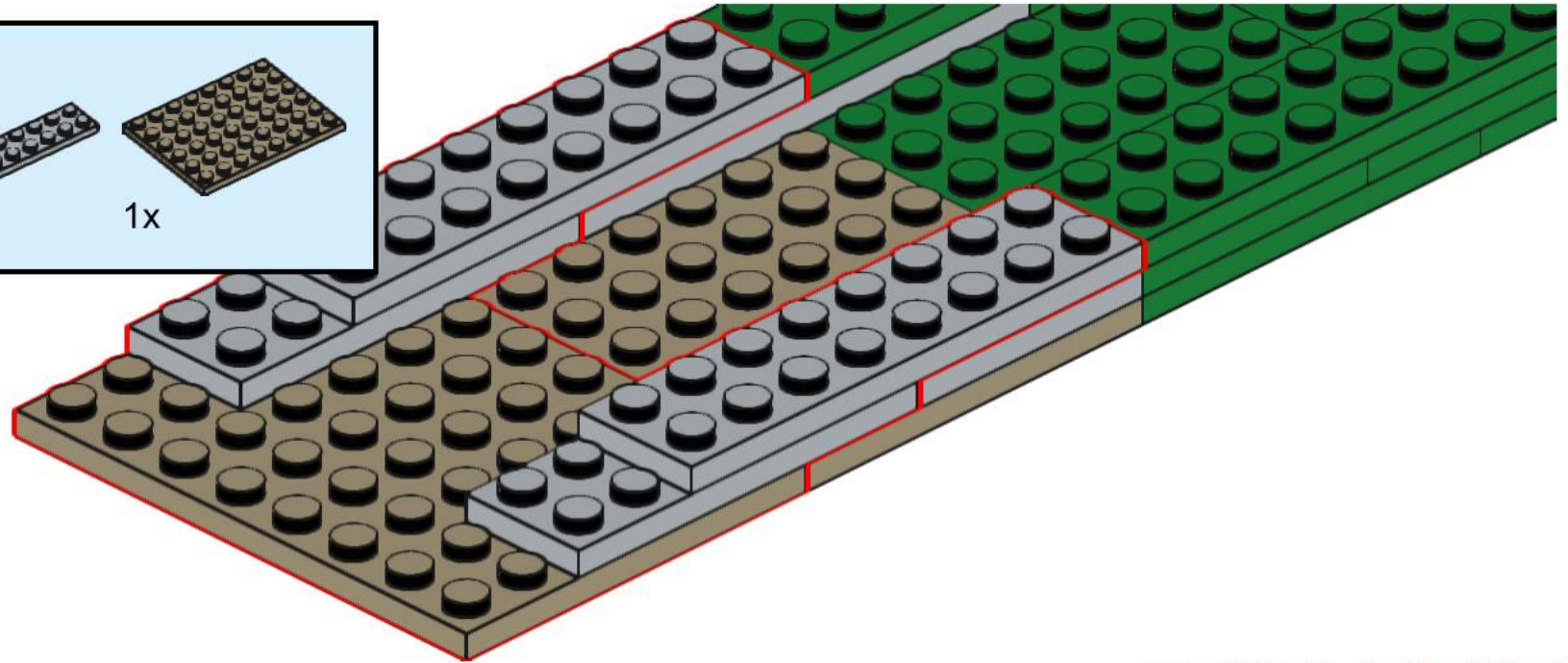
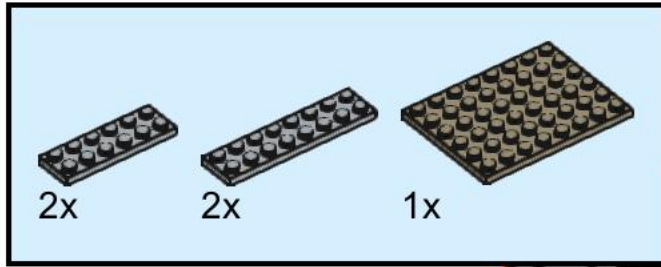
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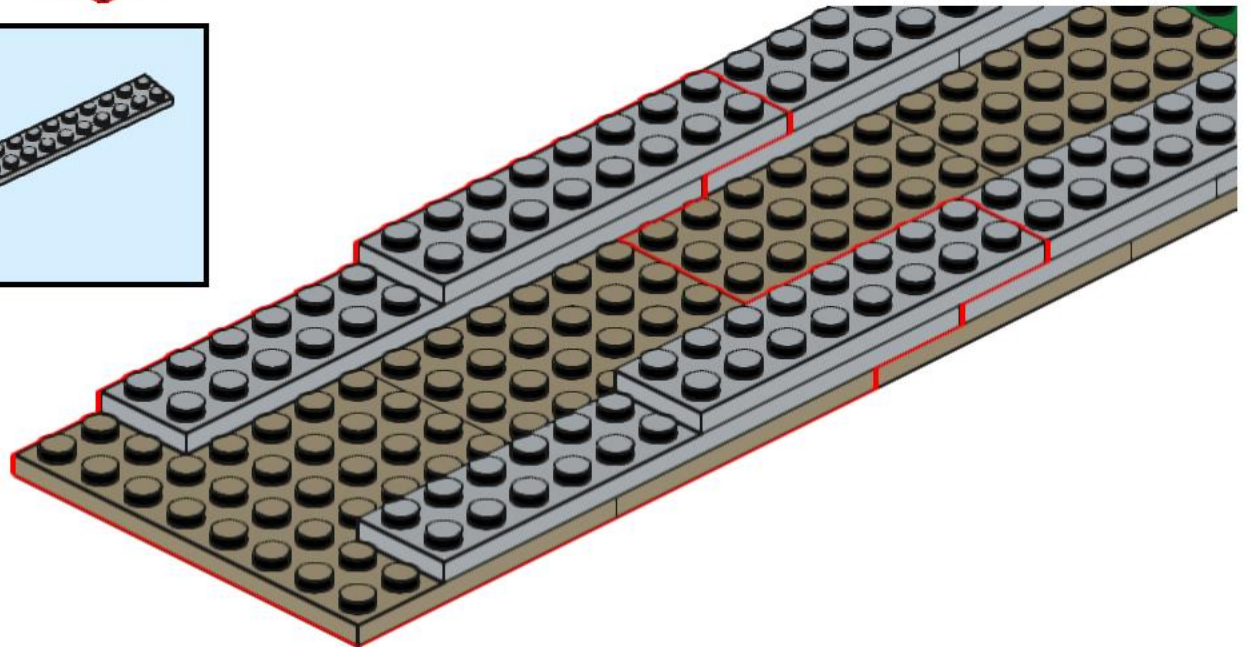
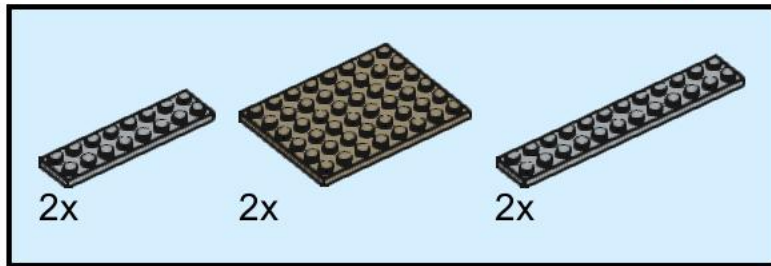
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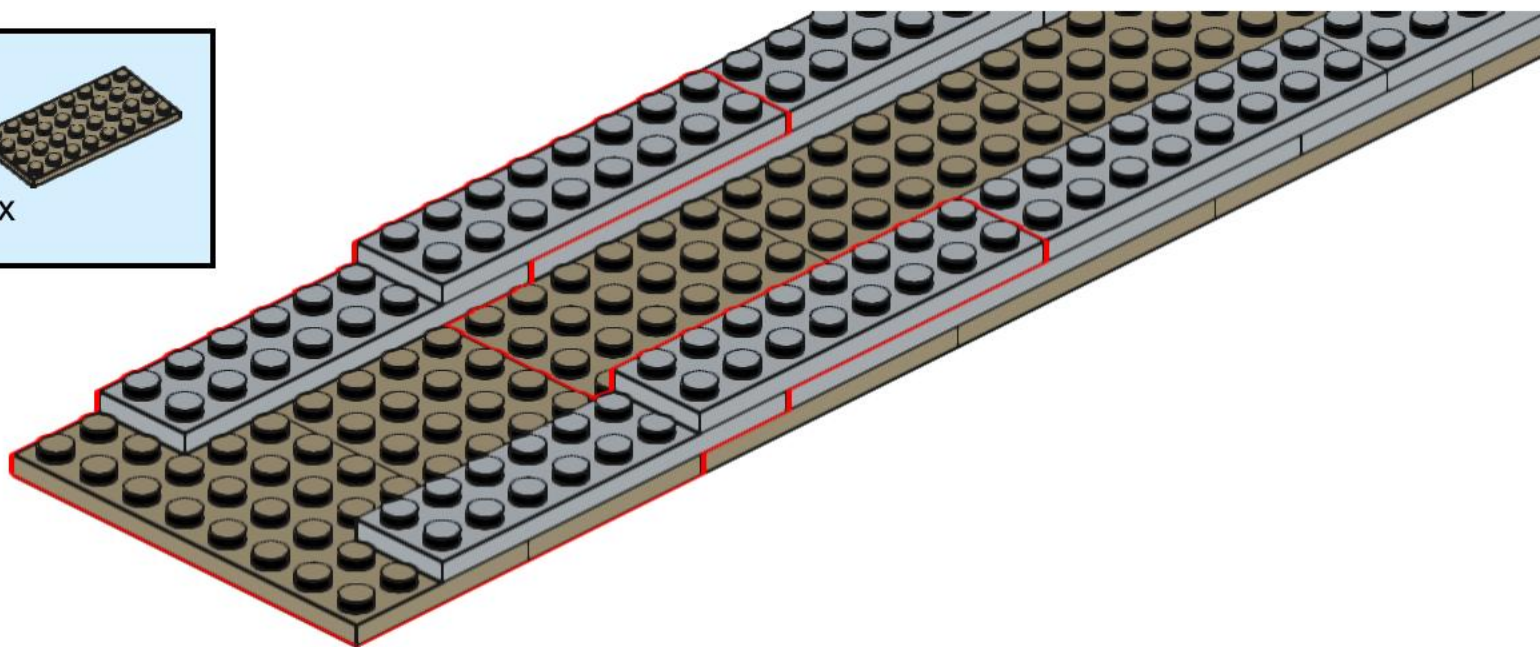
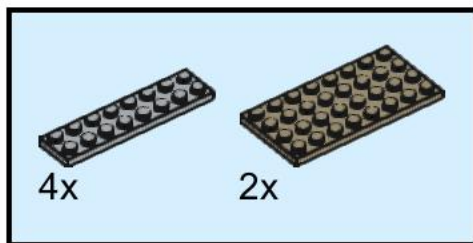
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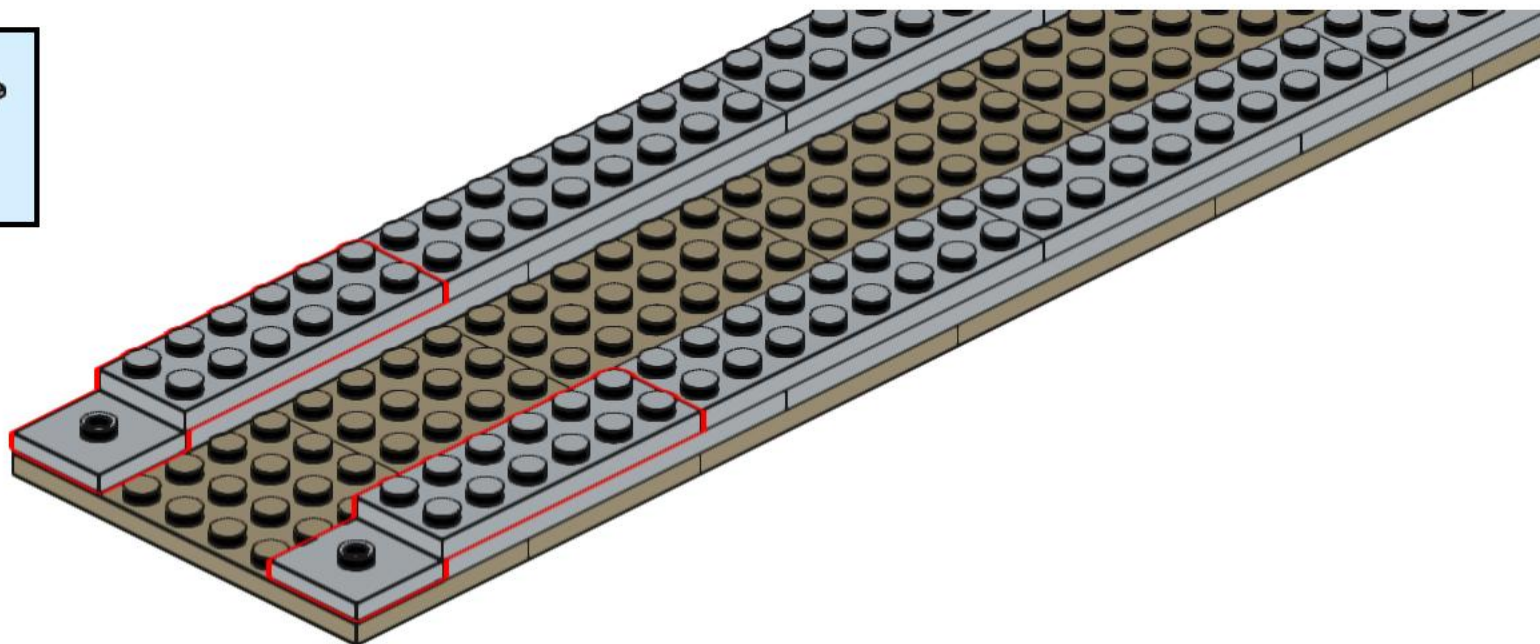
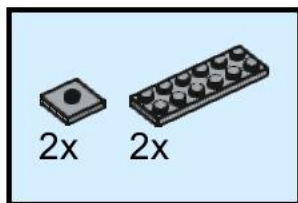
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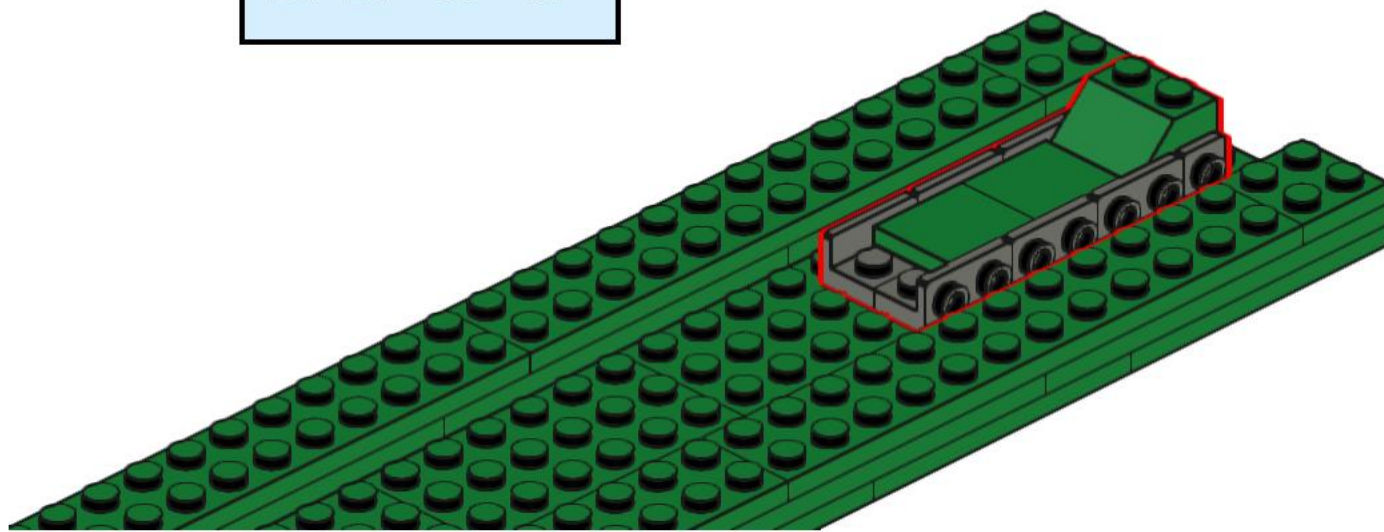
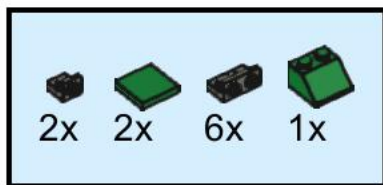
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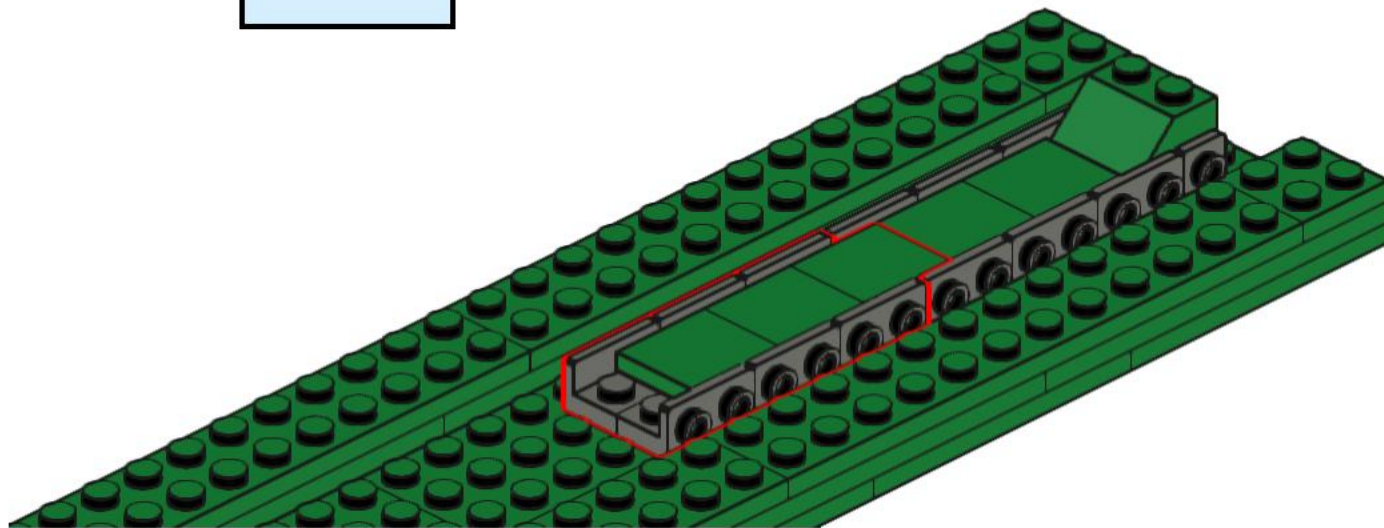
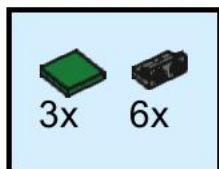
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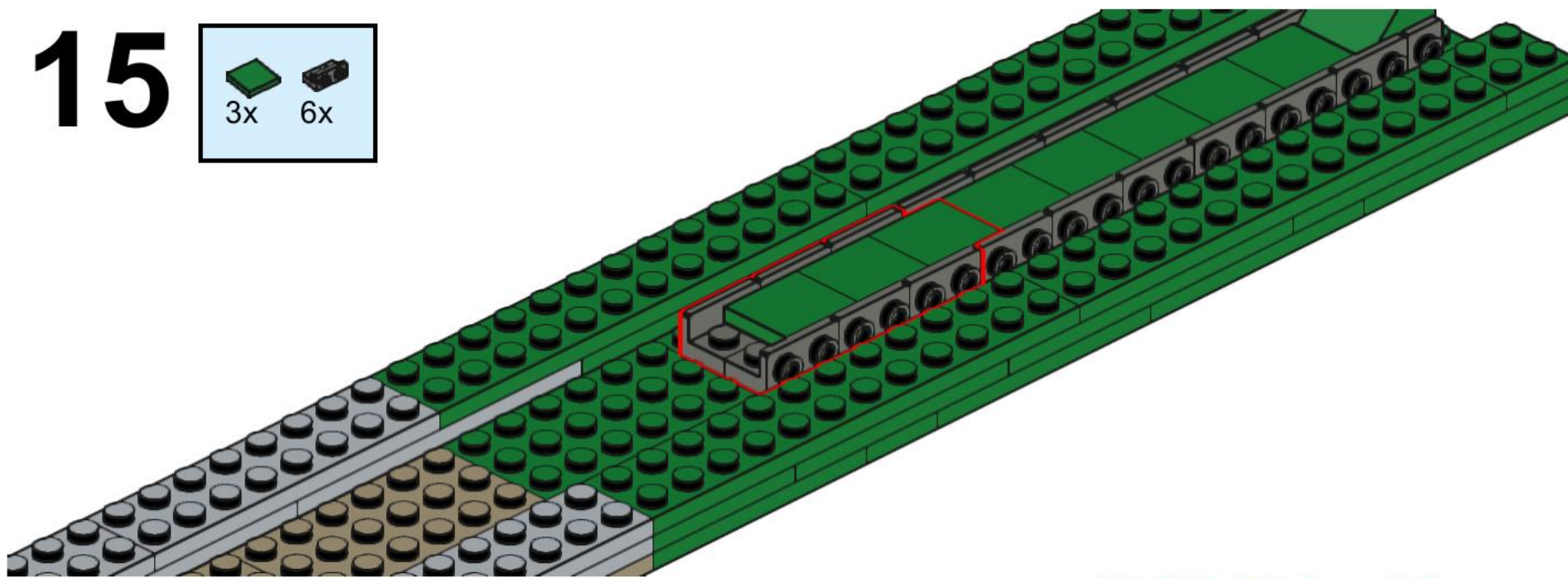
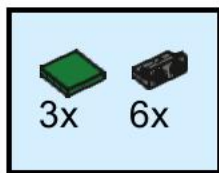
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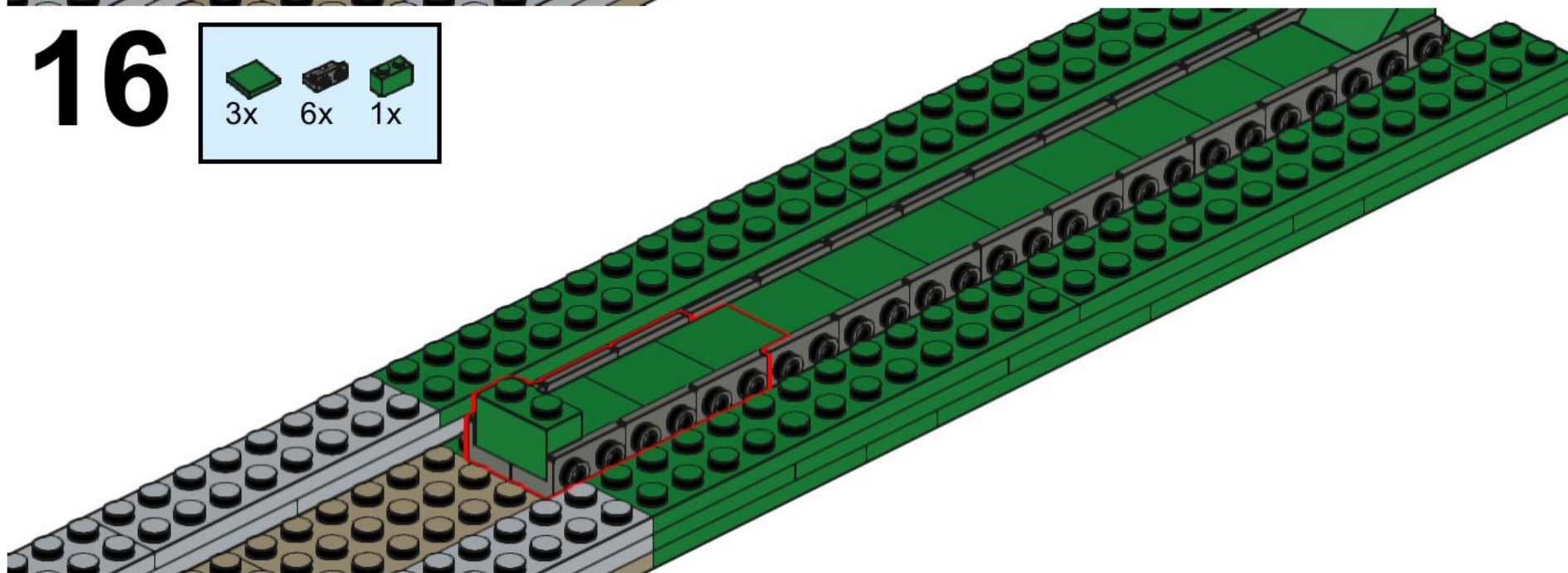
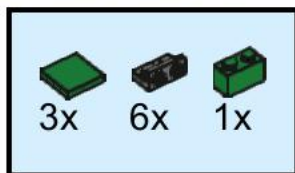
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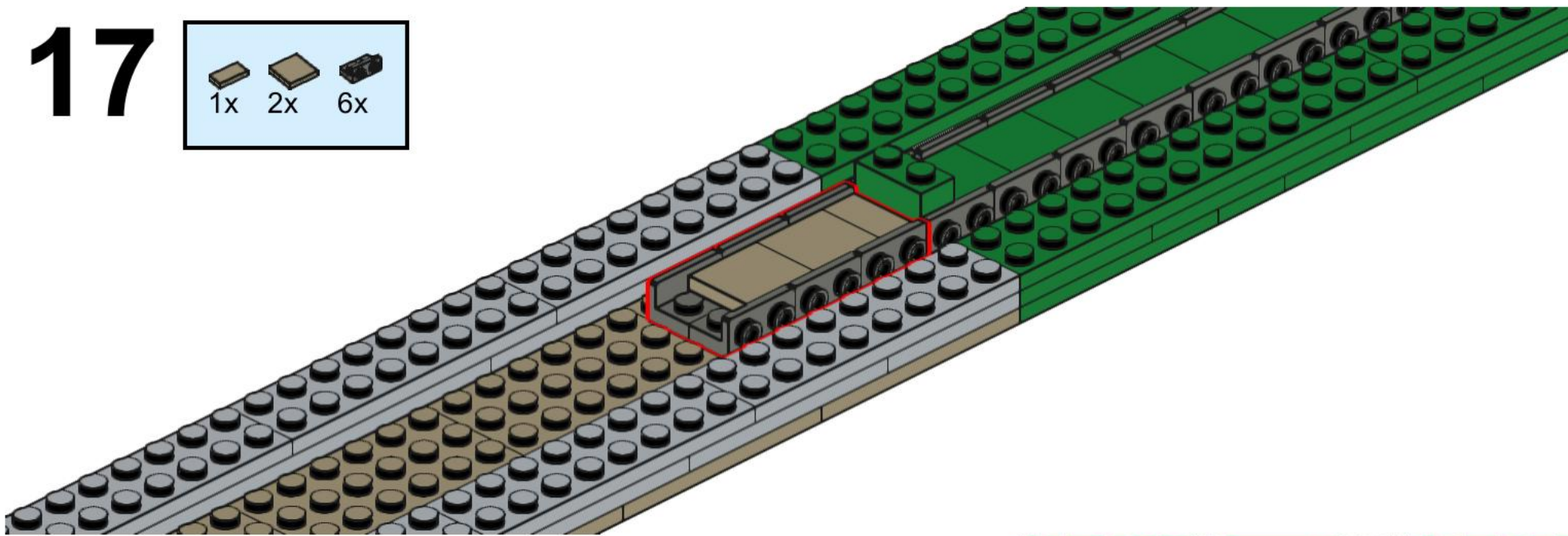
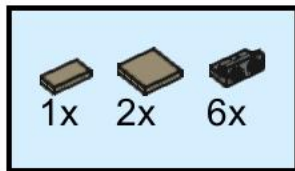
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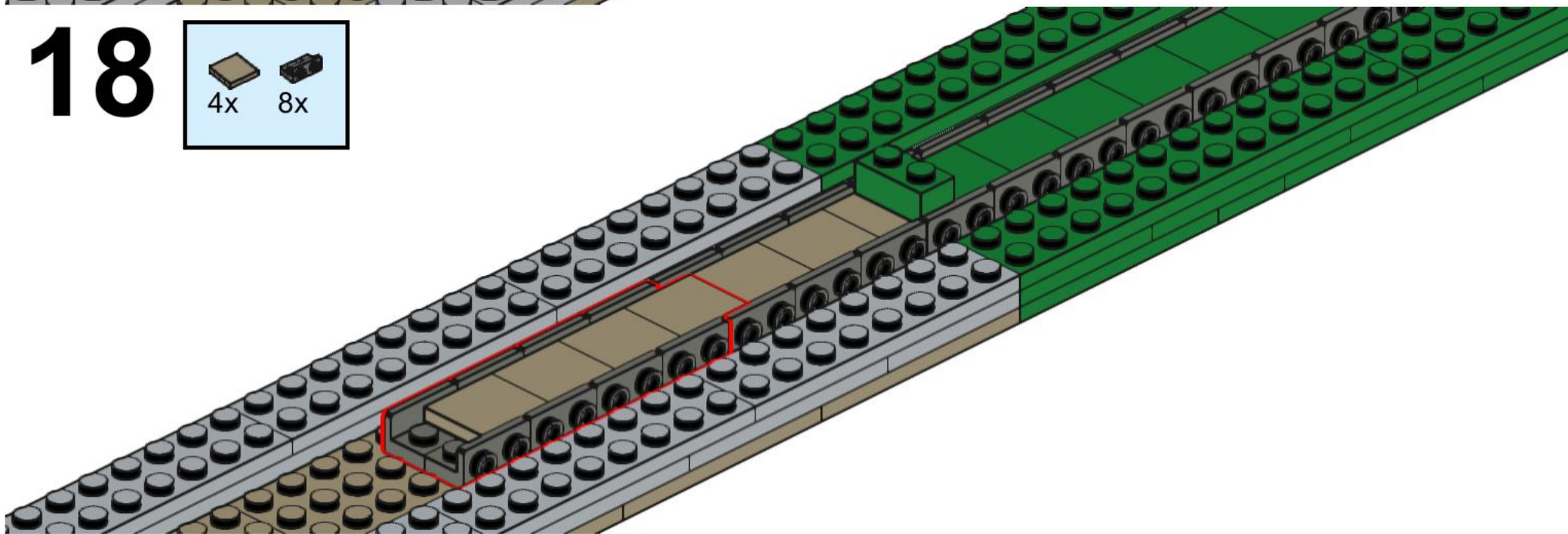
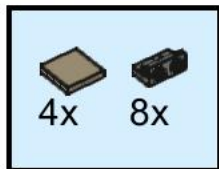
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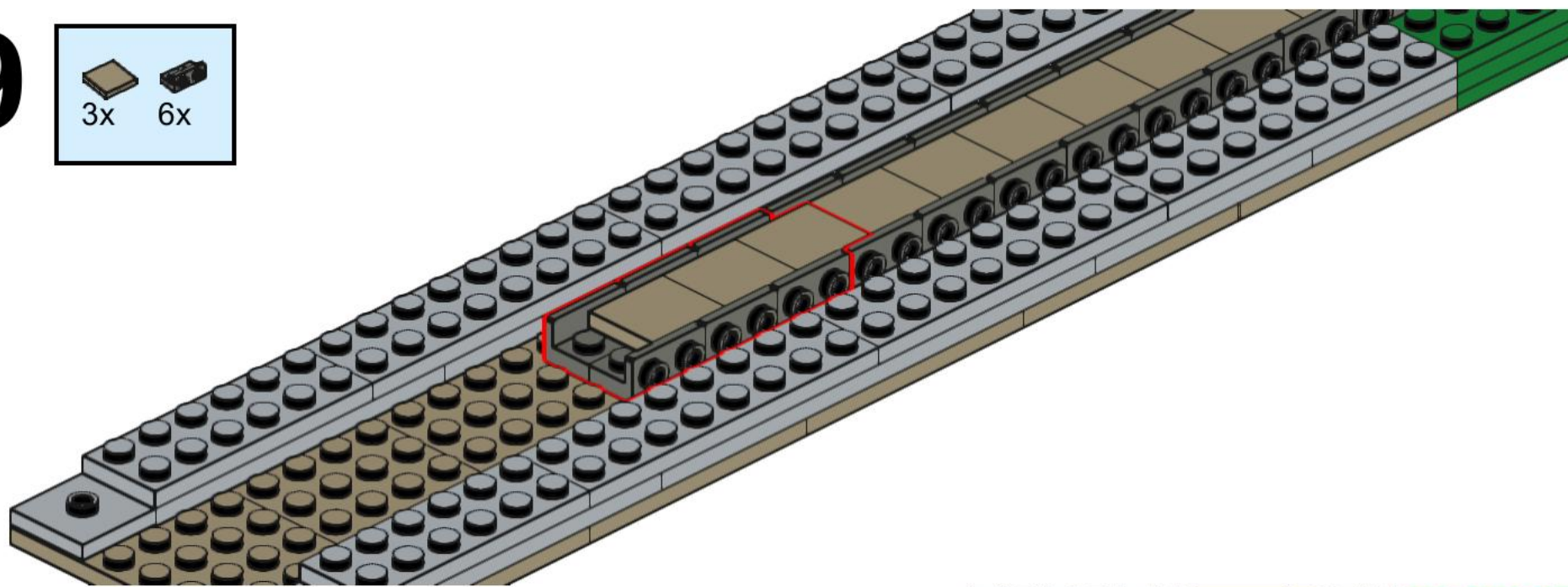
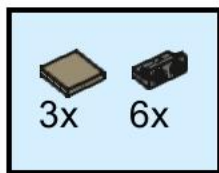
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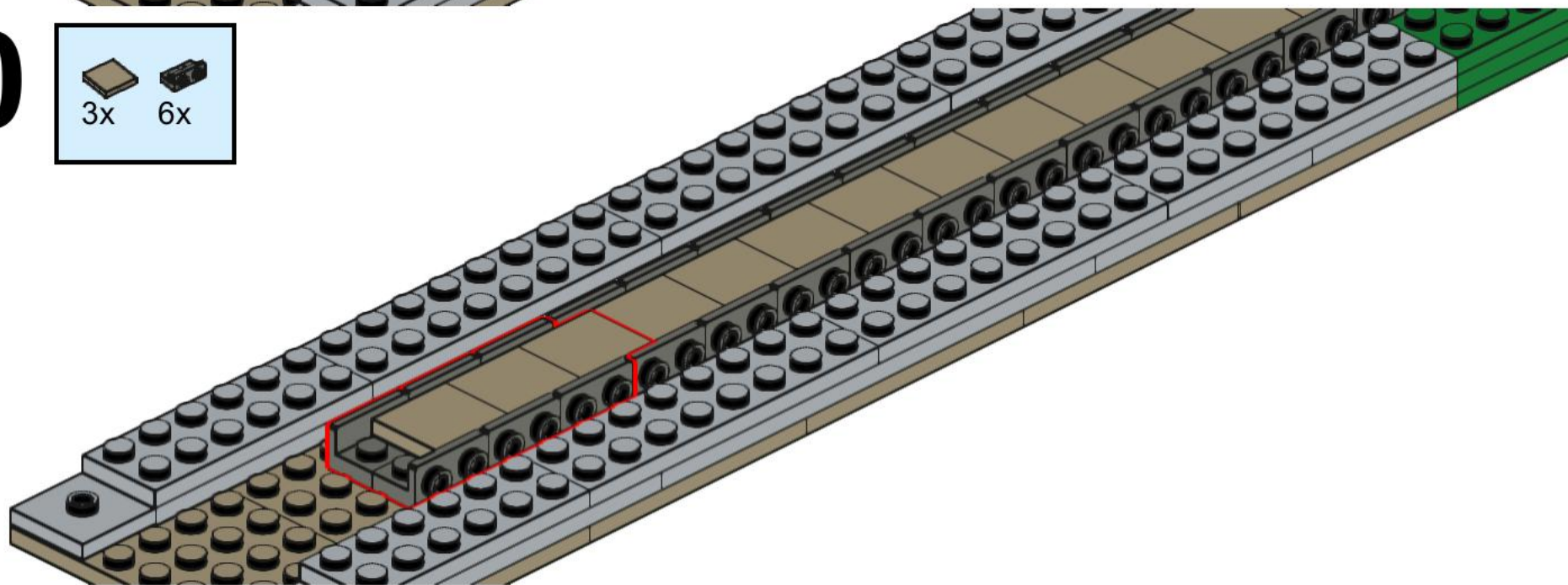
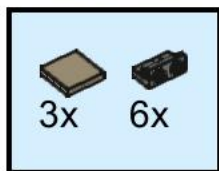
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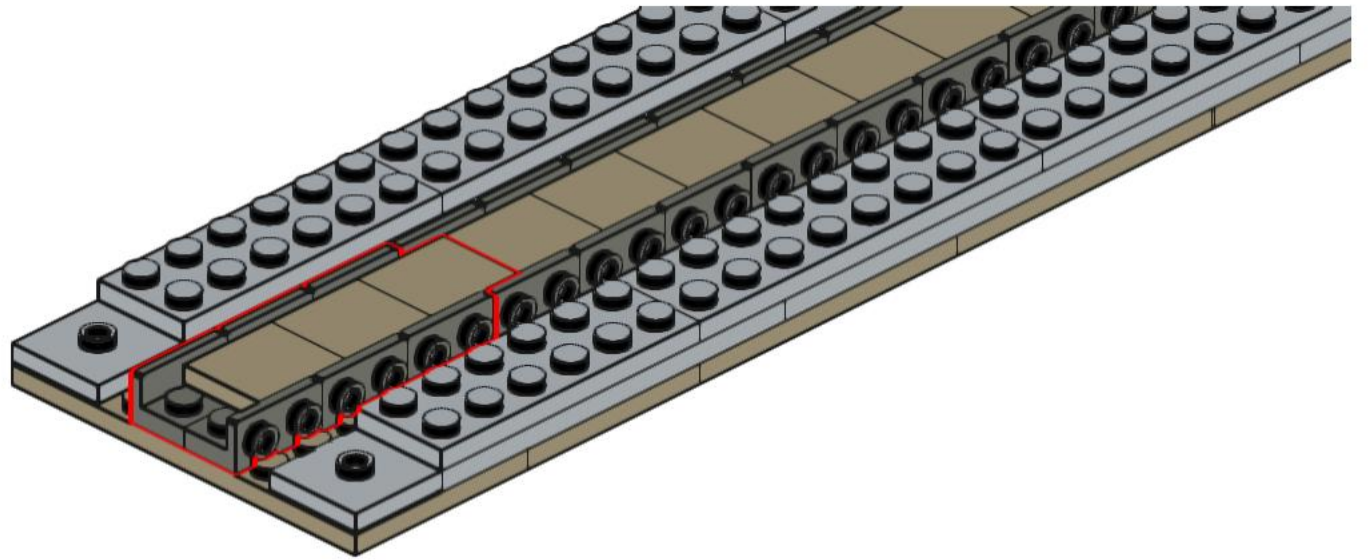
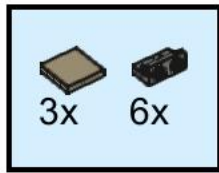
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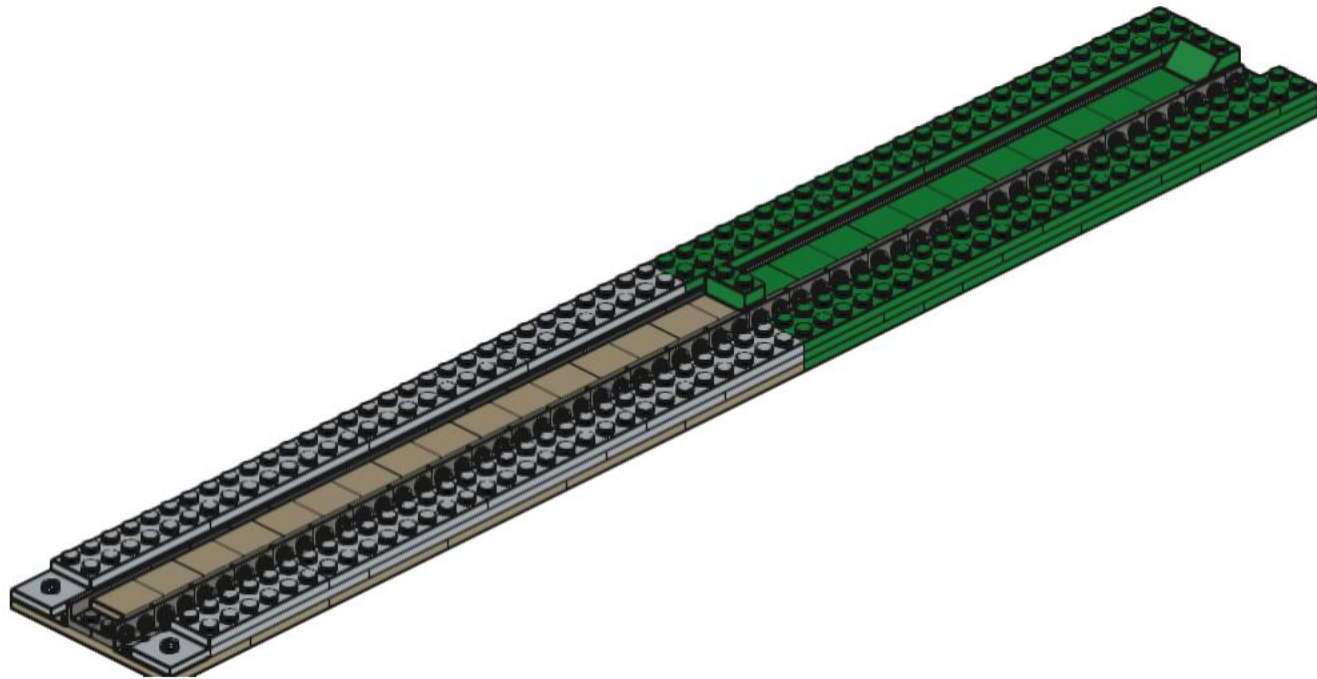
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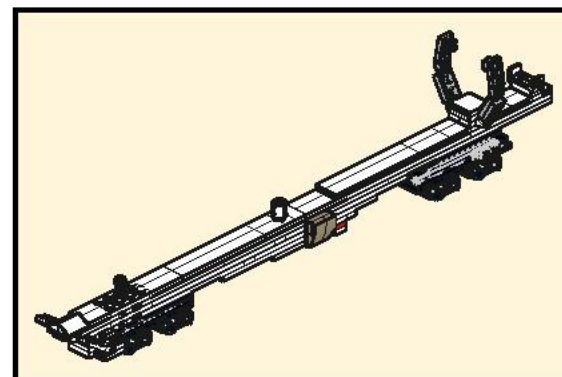
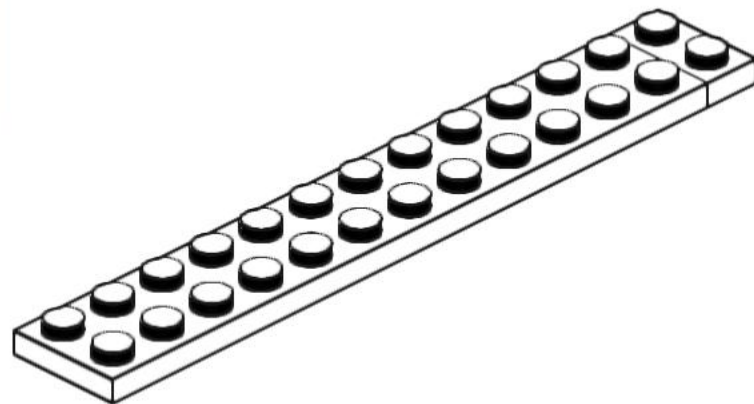
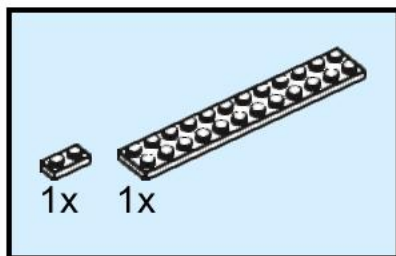
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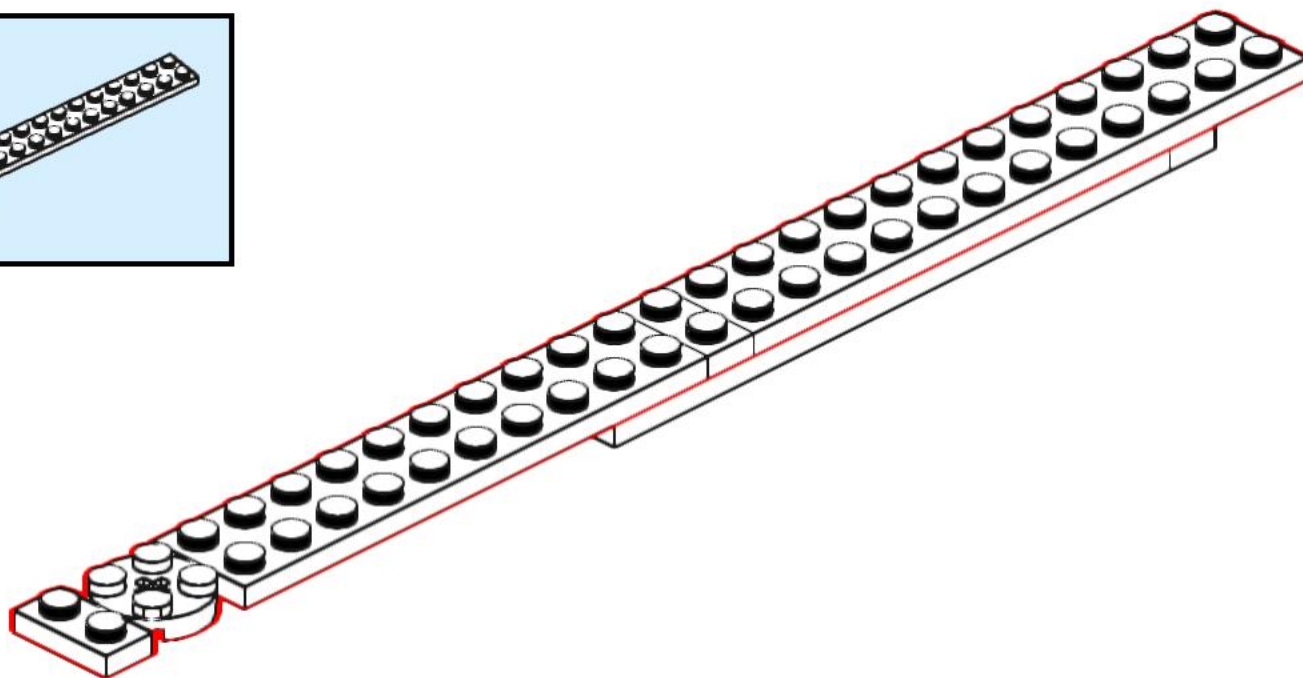
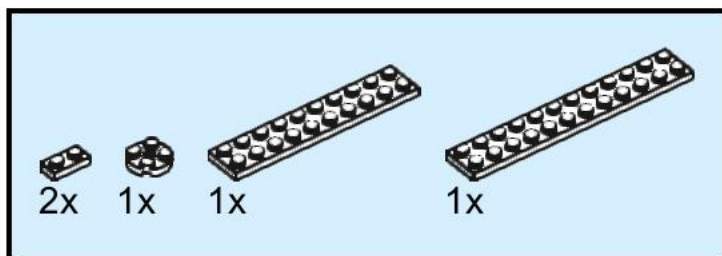
Transportation/erector unit



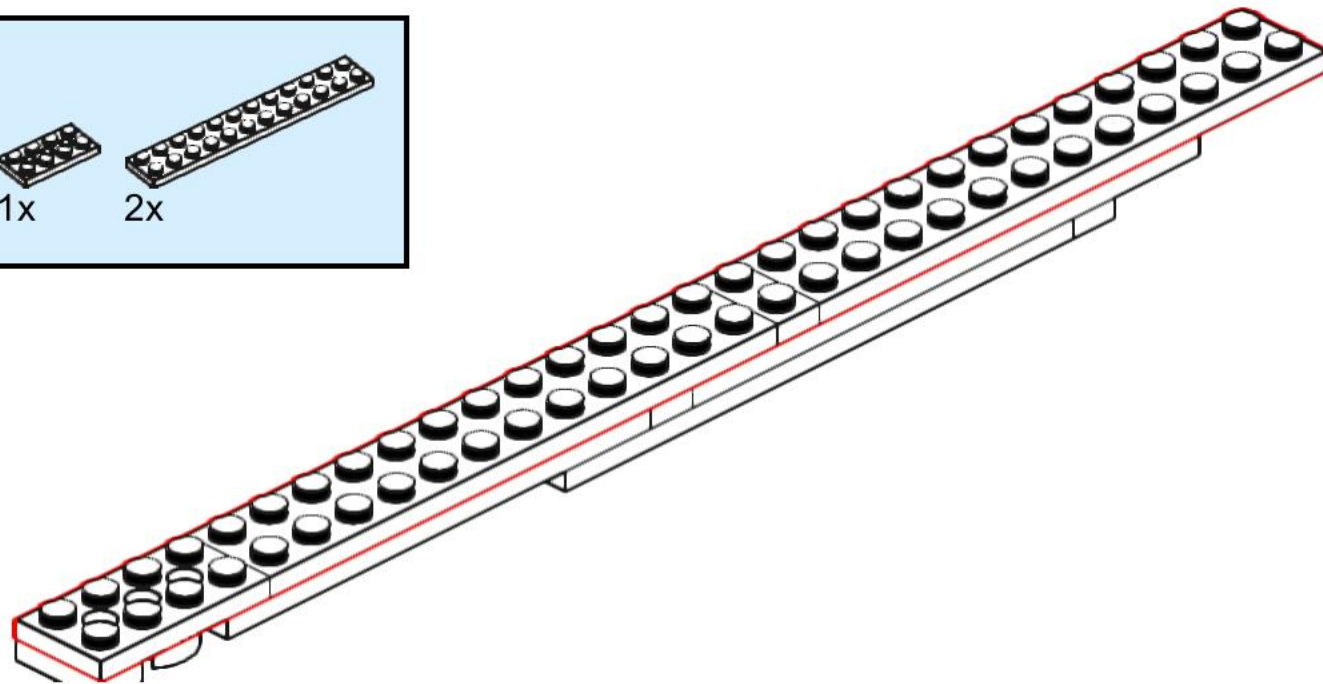
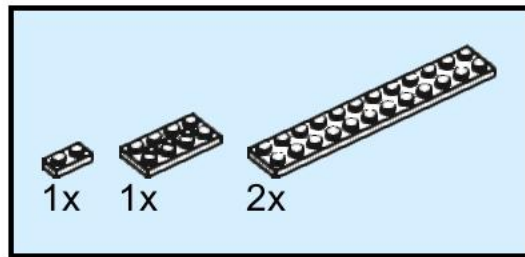
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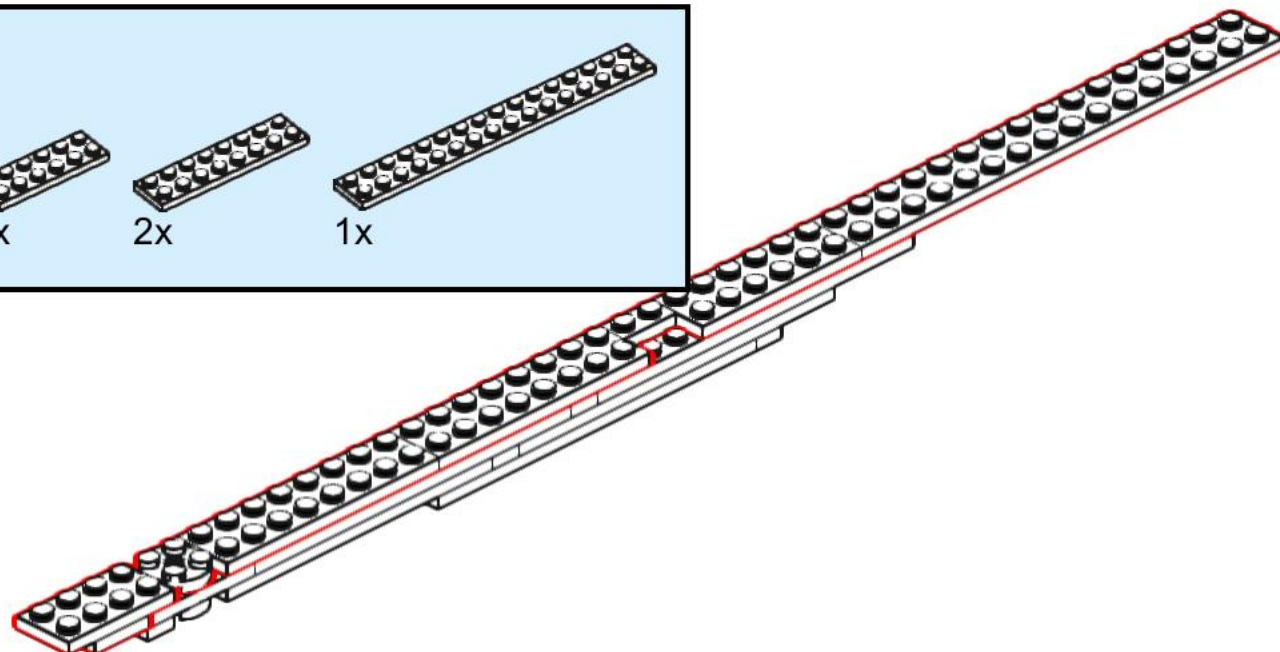
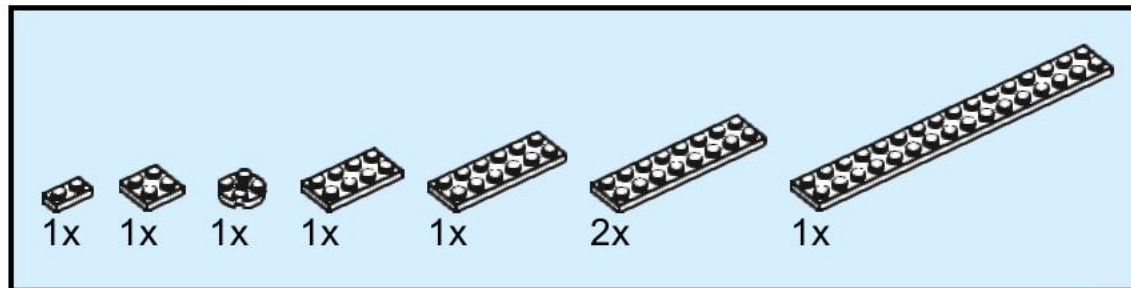
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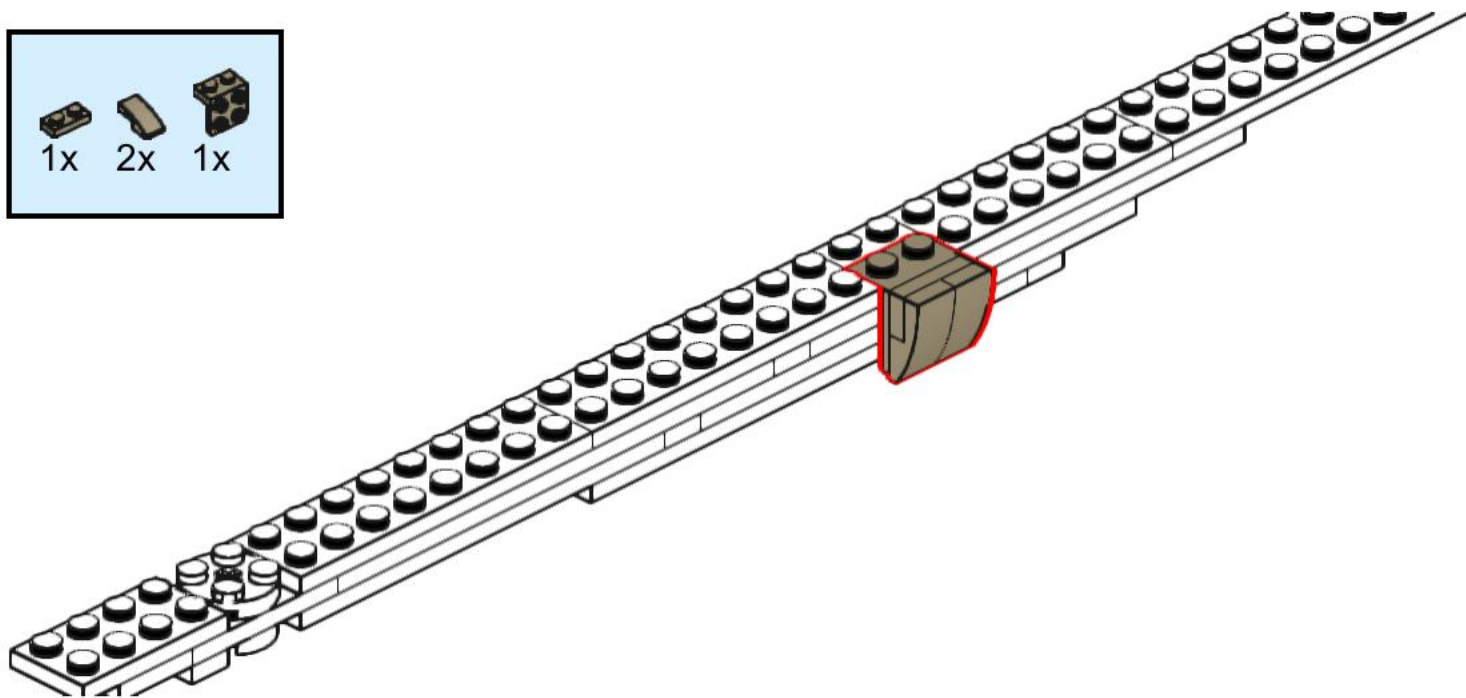
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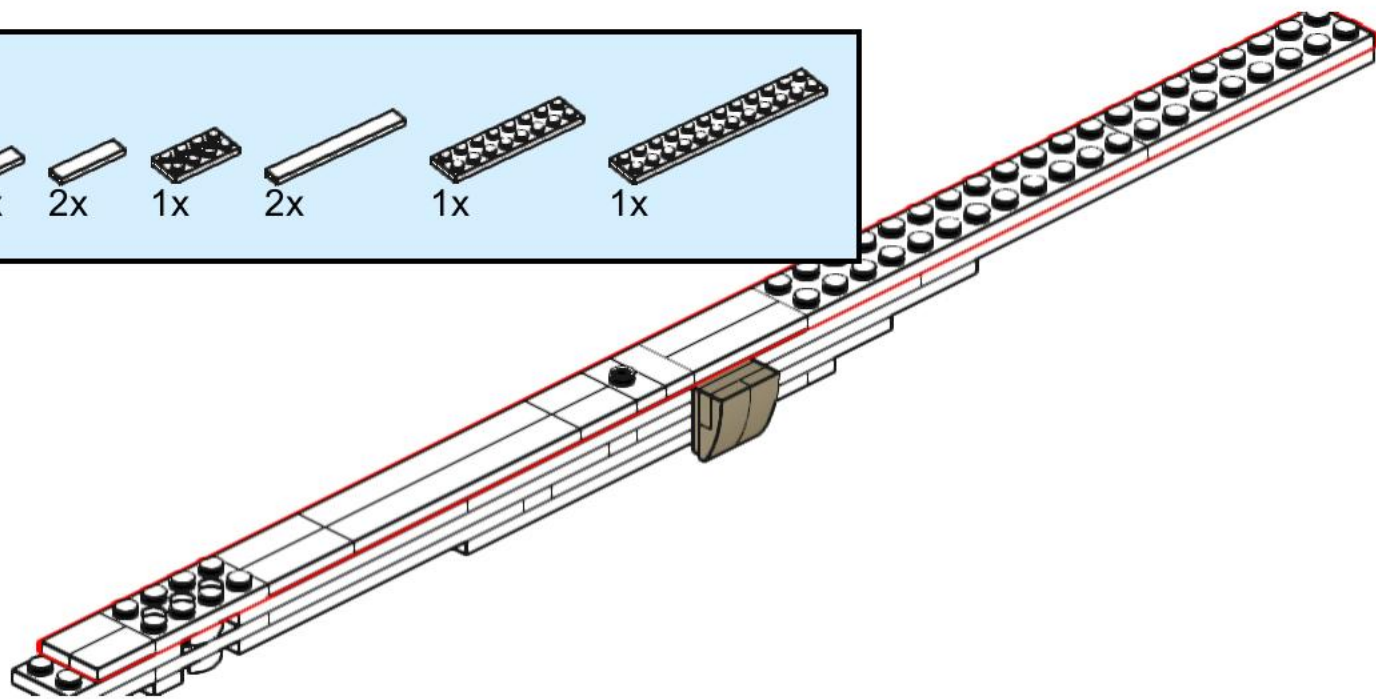
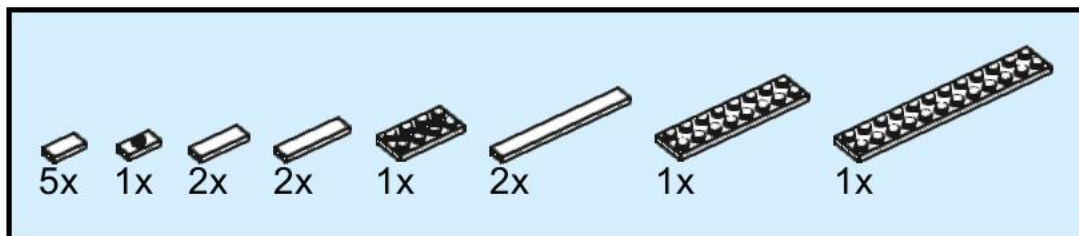
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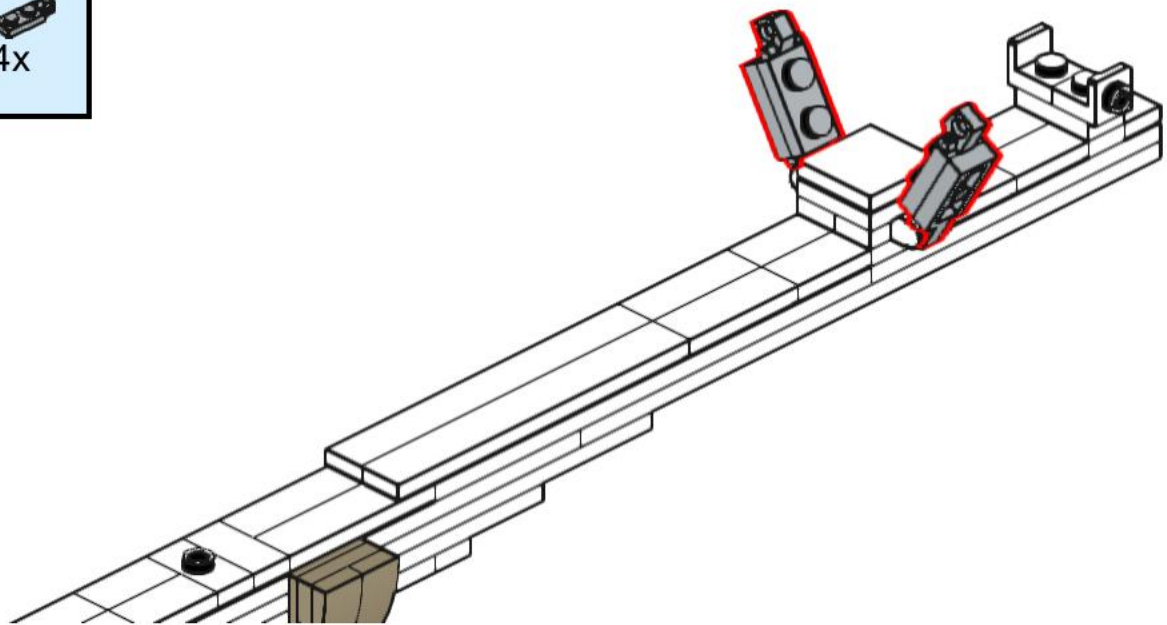
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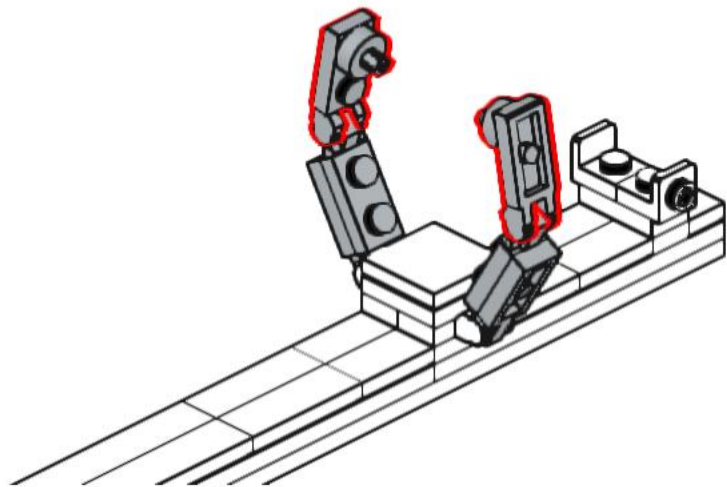
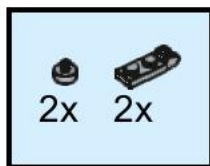
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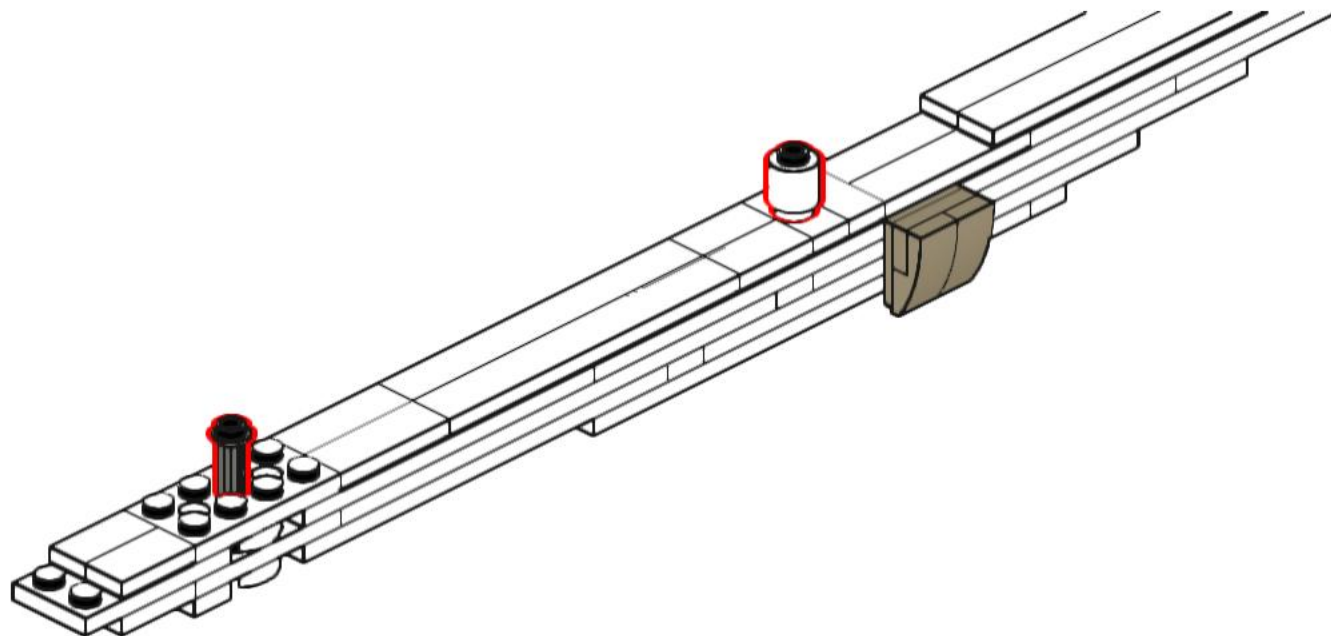
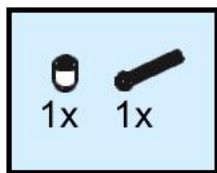
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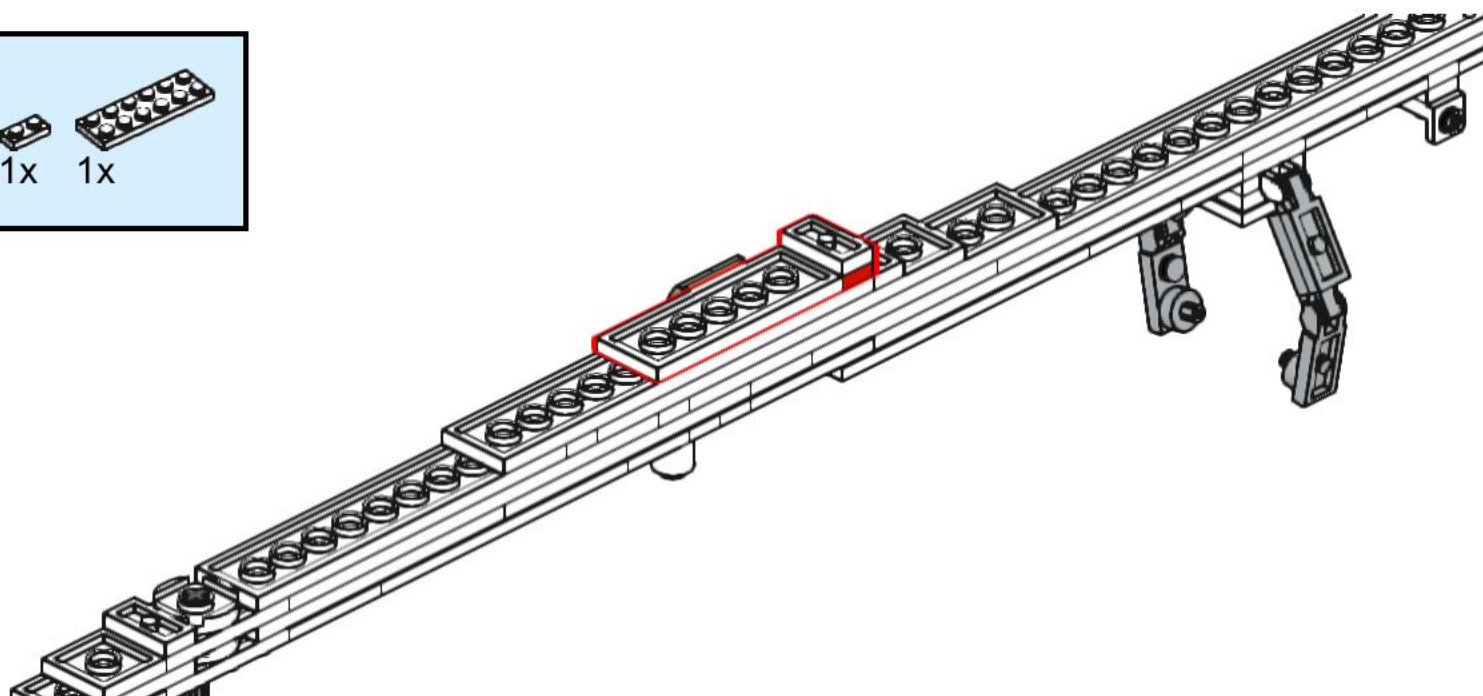
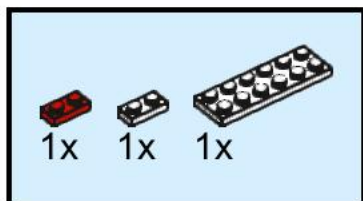
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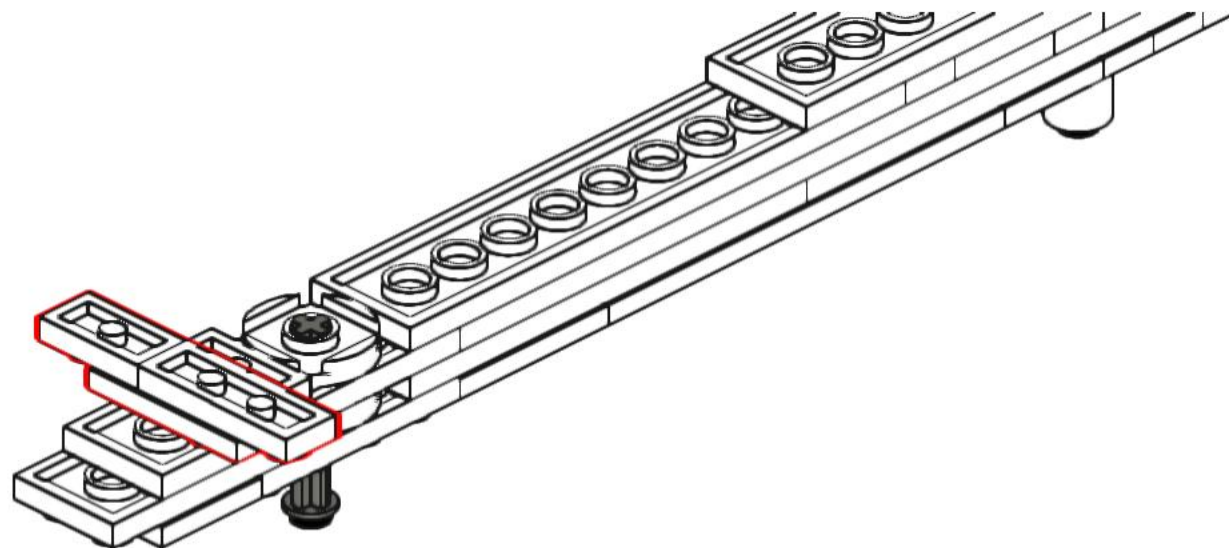
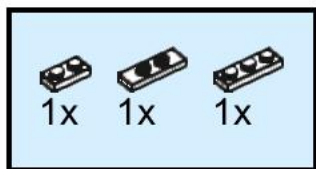
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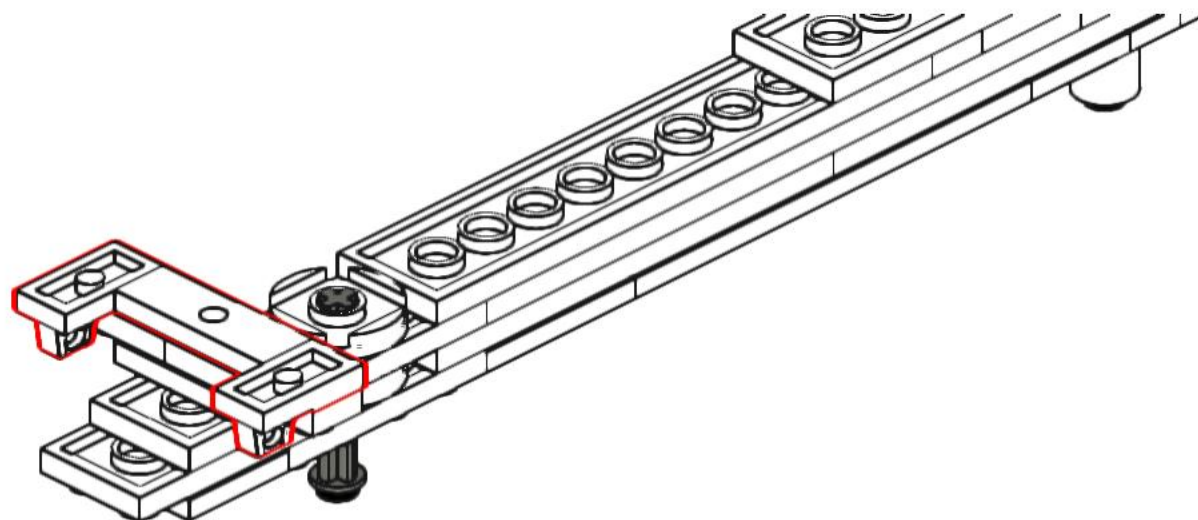
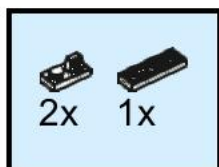
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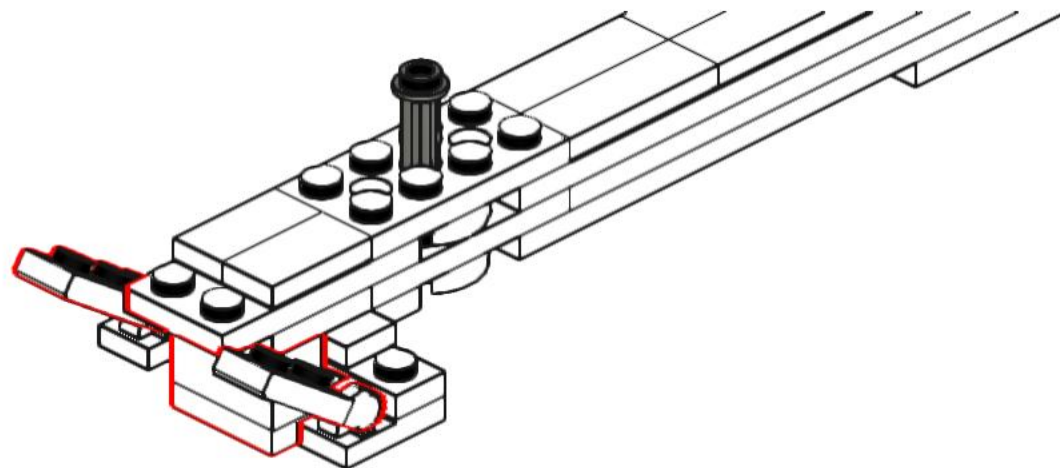
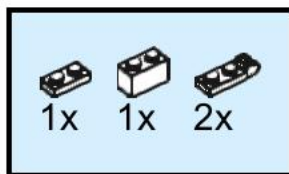
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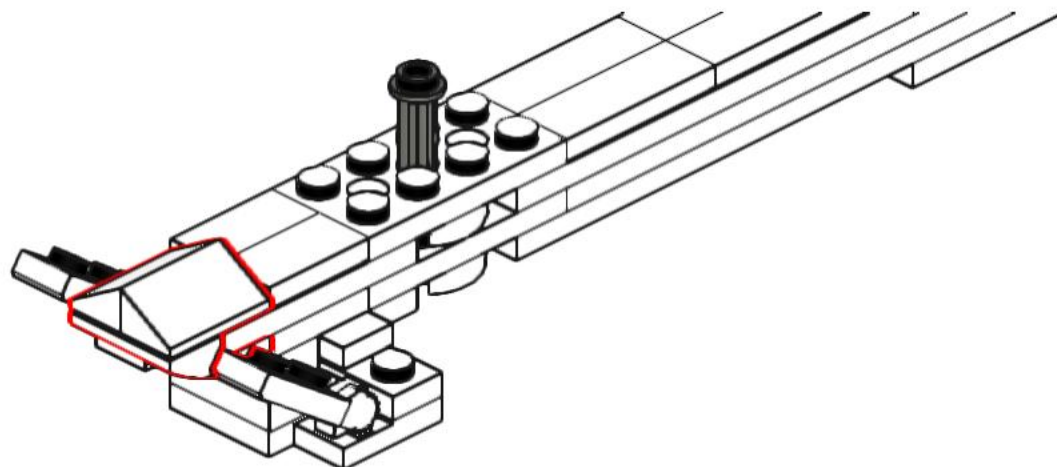
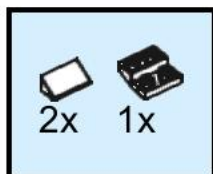
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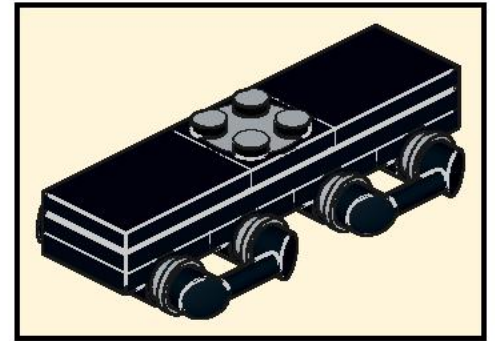
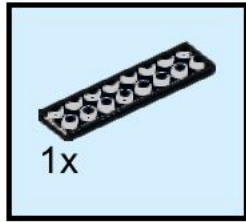
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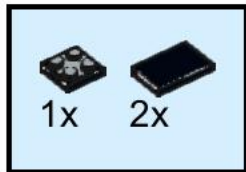
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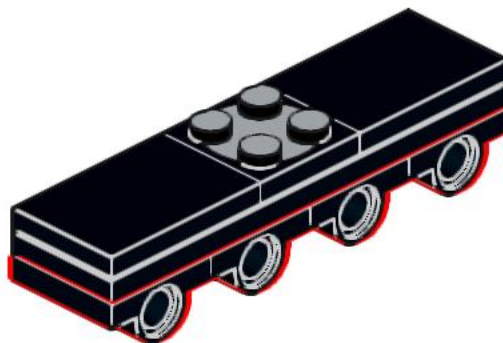
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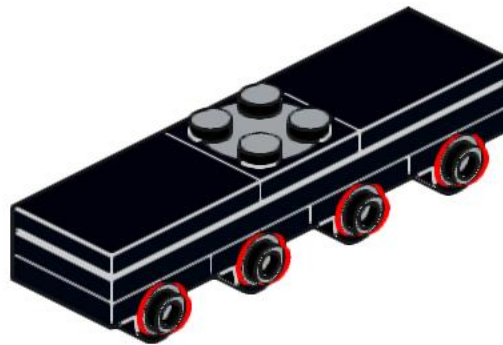
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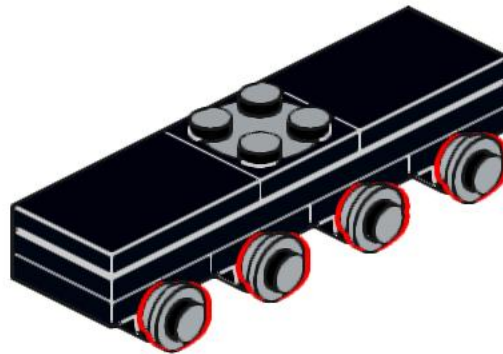
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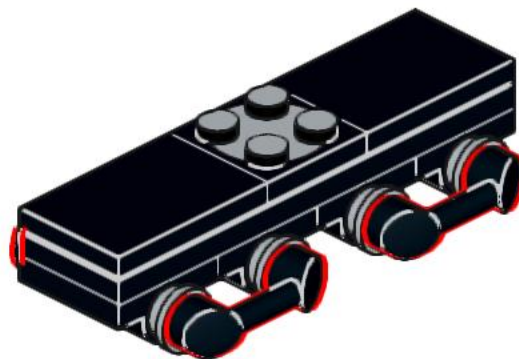
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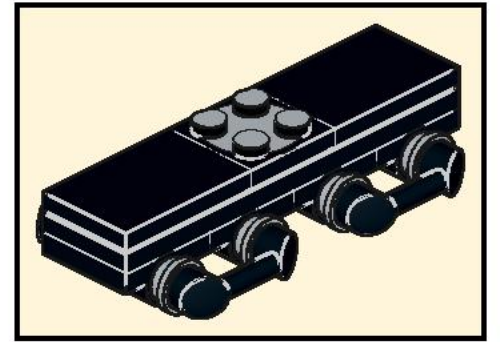
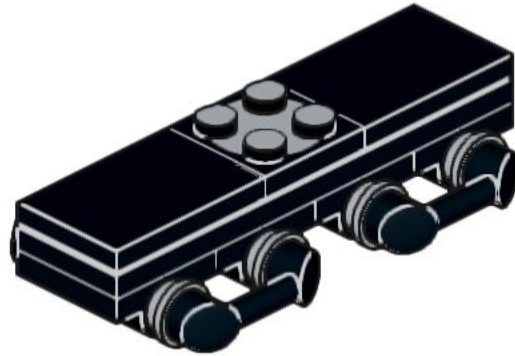
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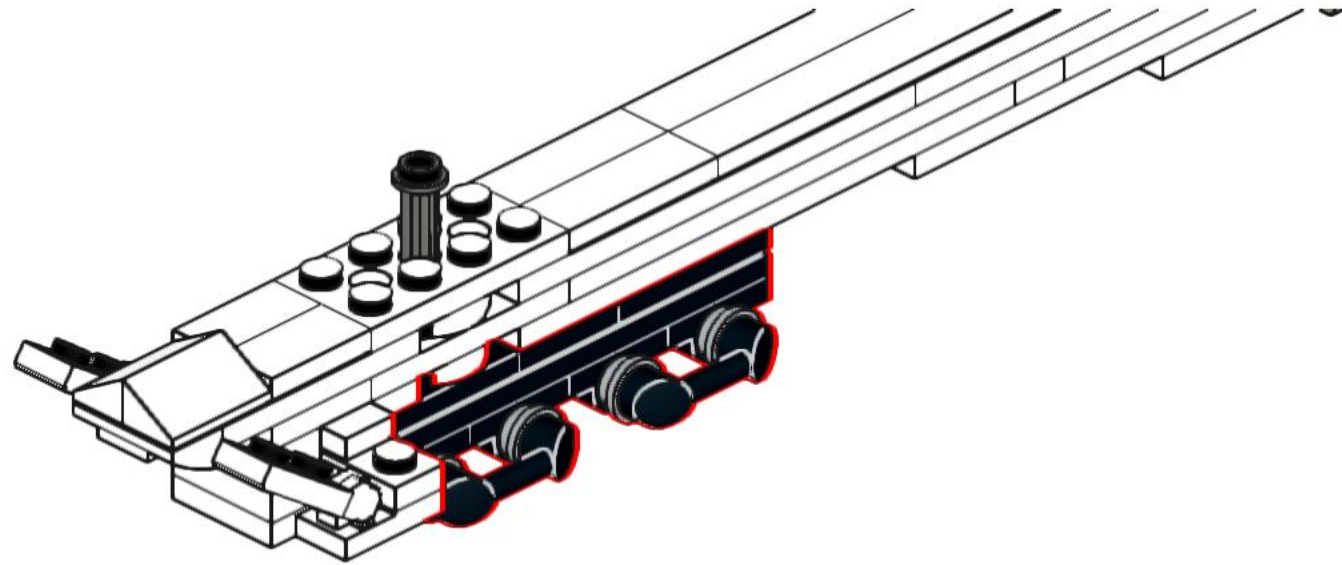
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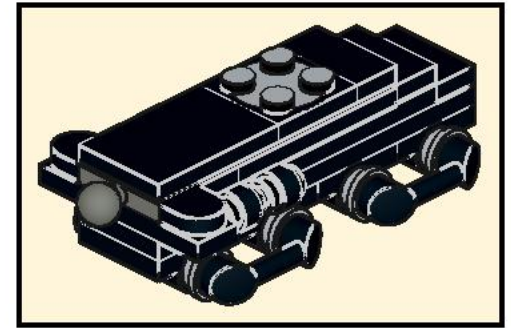
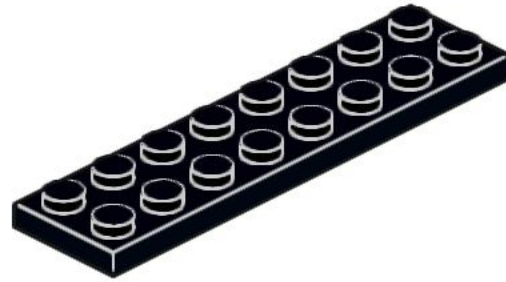
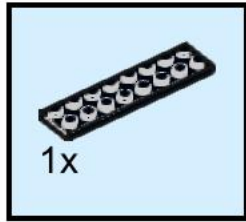
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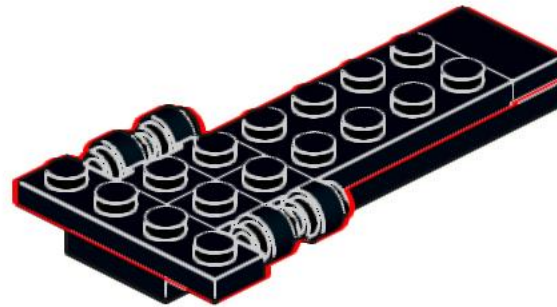
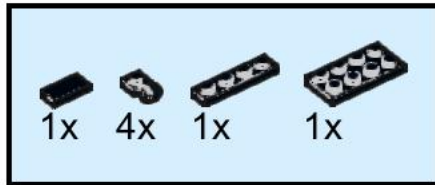
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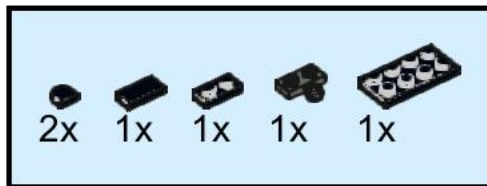
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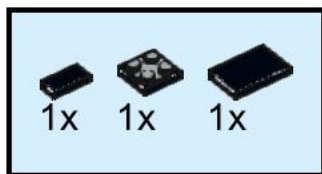
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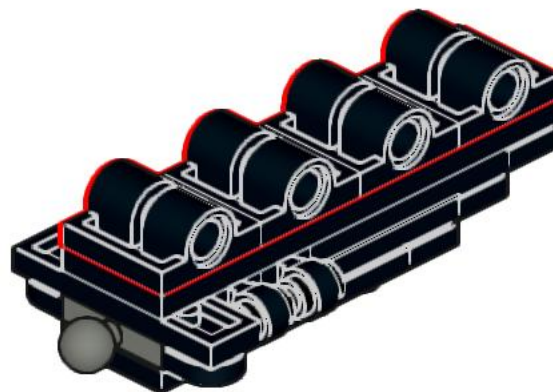
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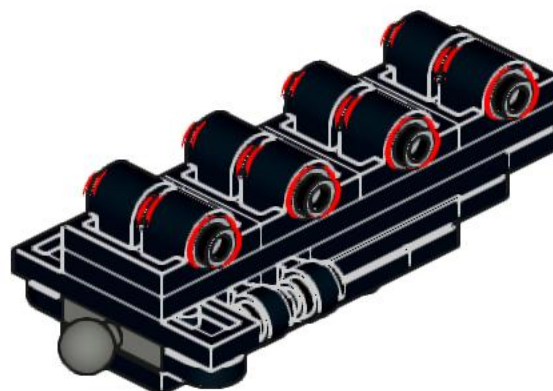
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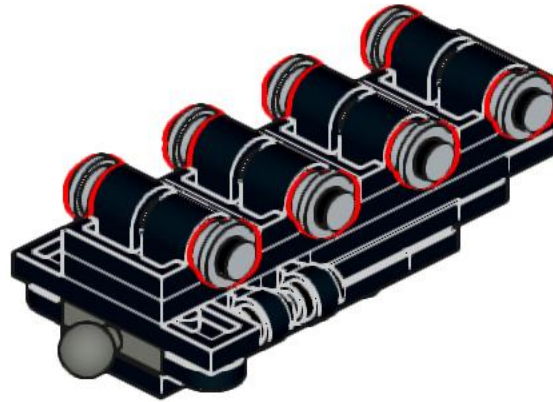
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52



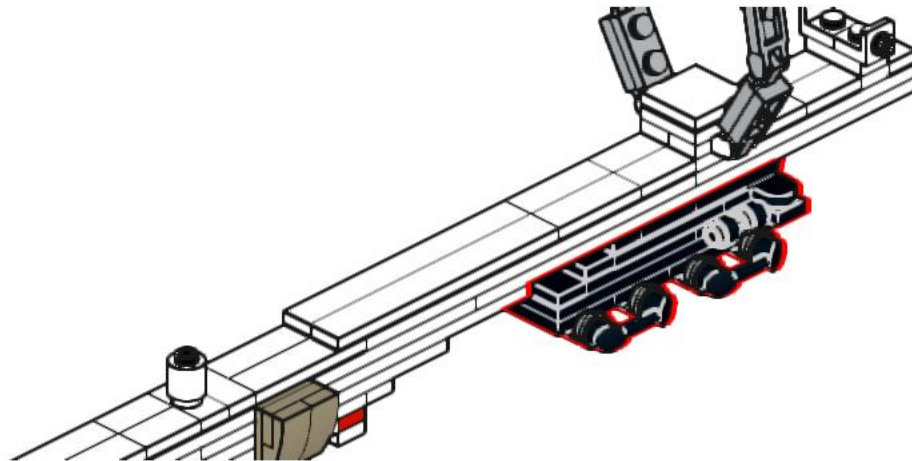
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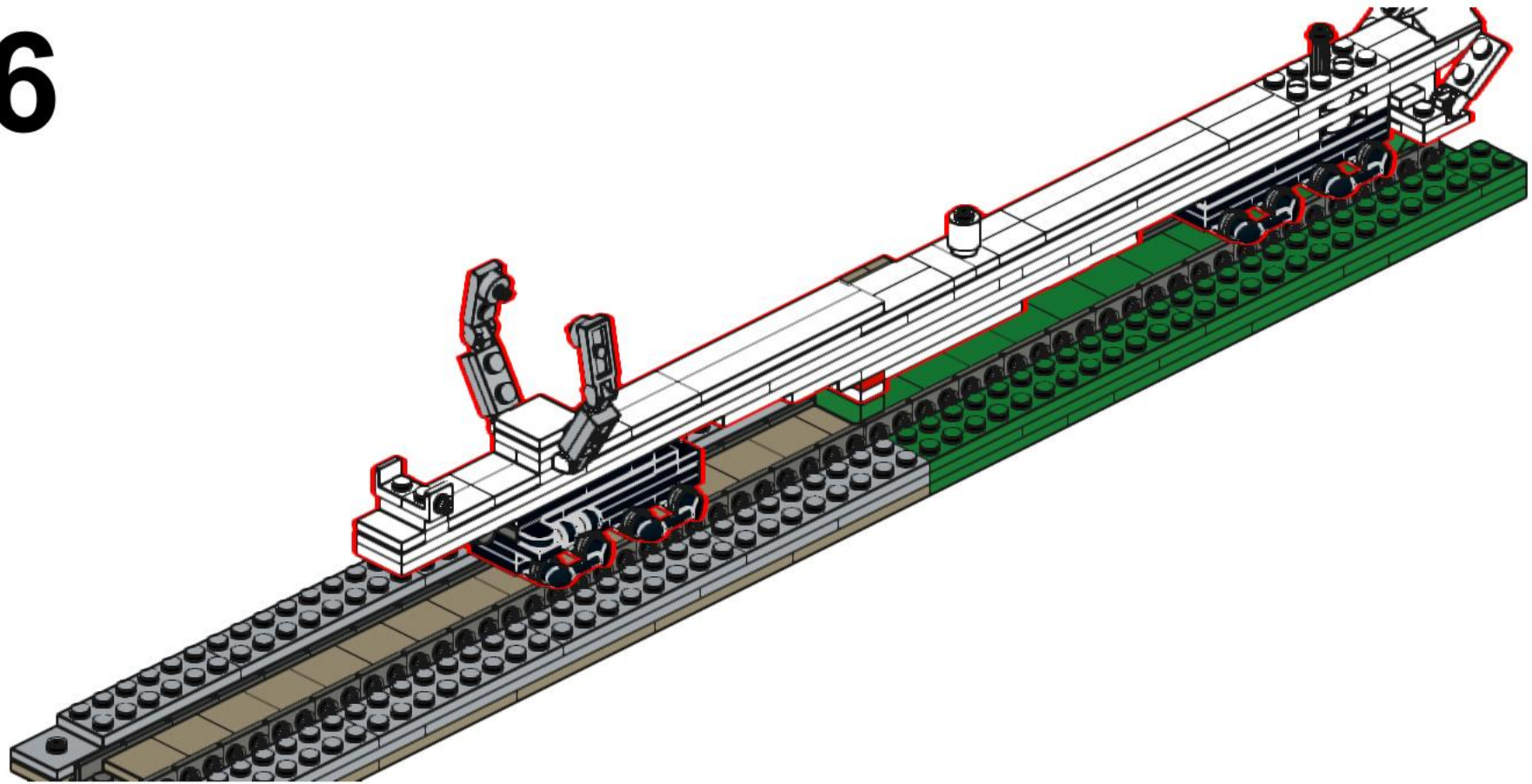
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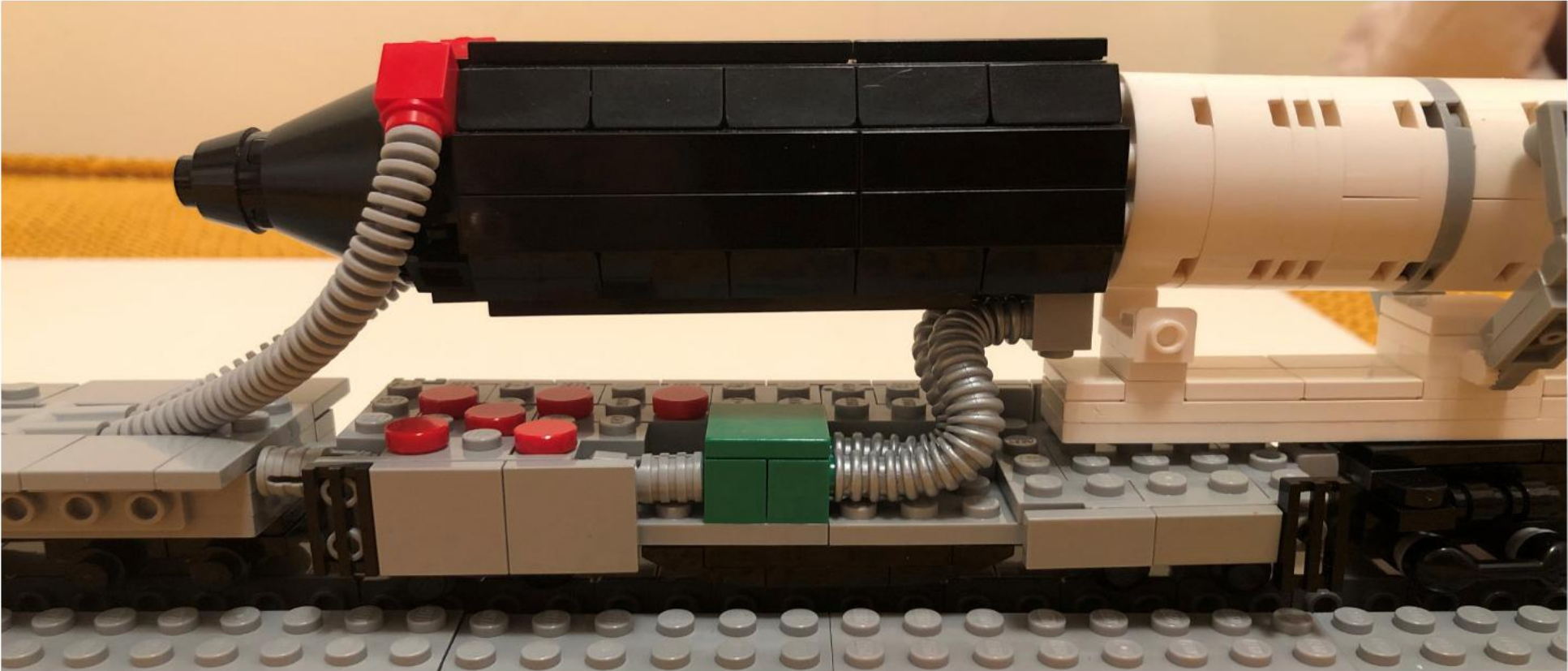
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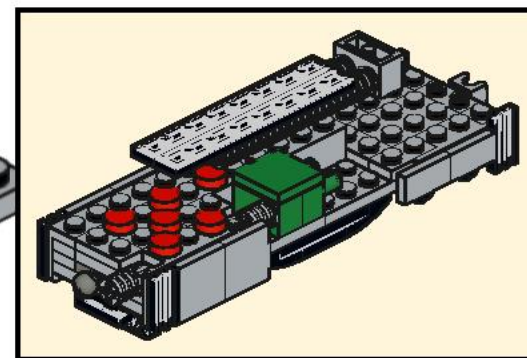
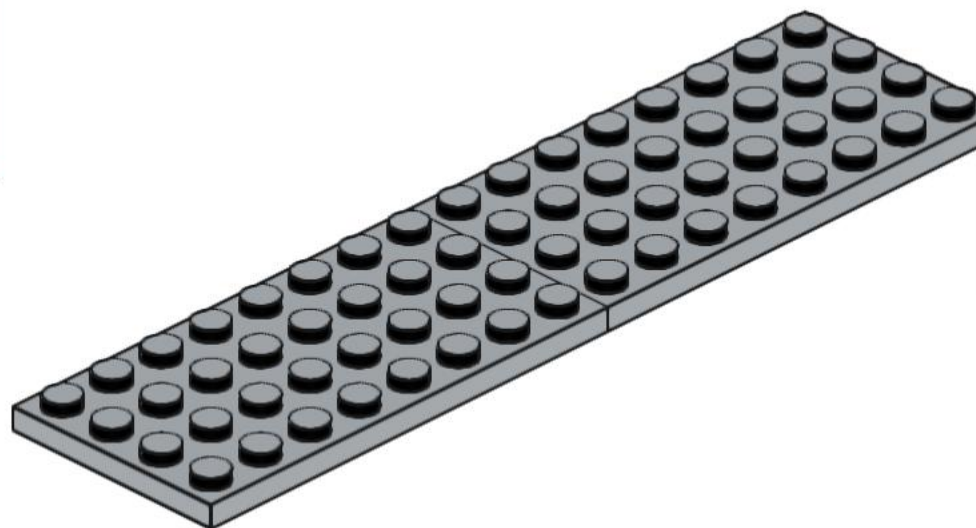
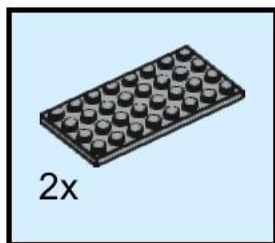
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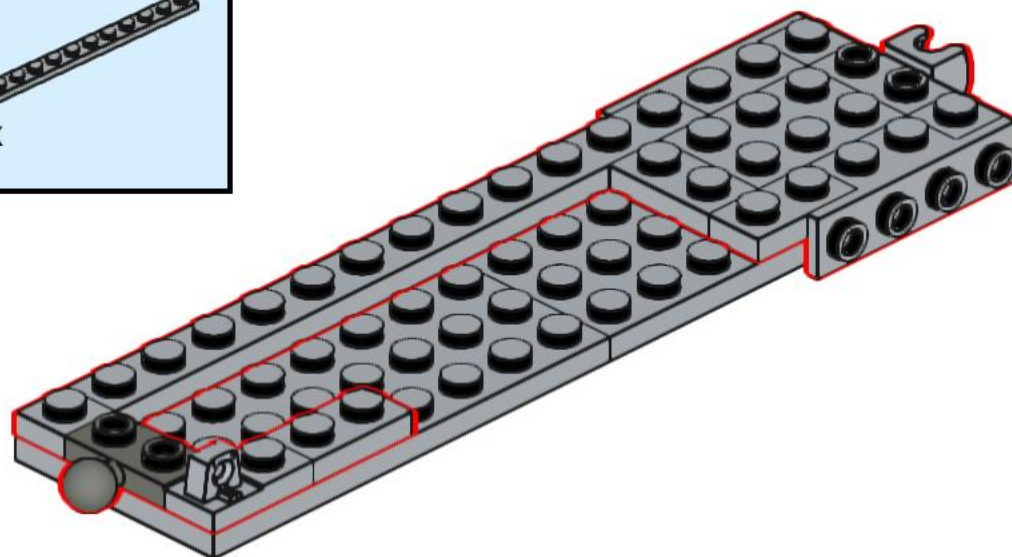
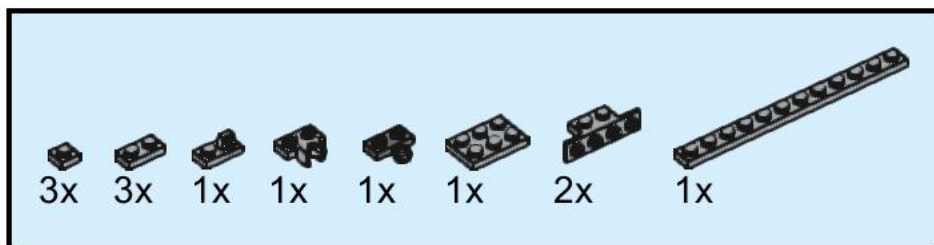
Bridging flatcar 1



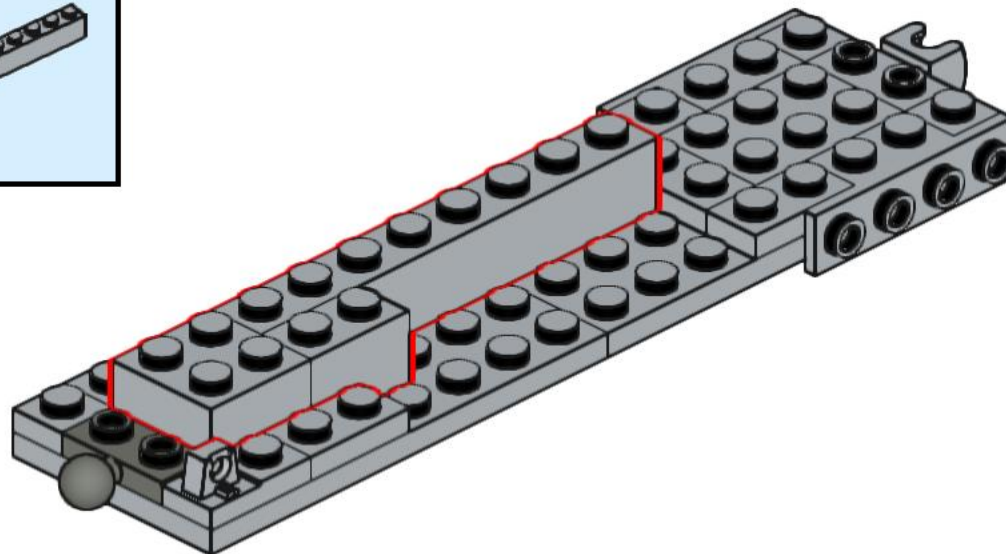
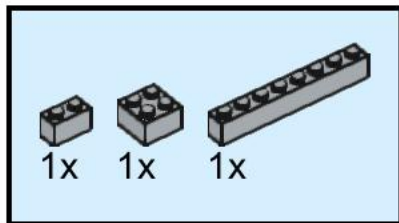
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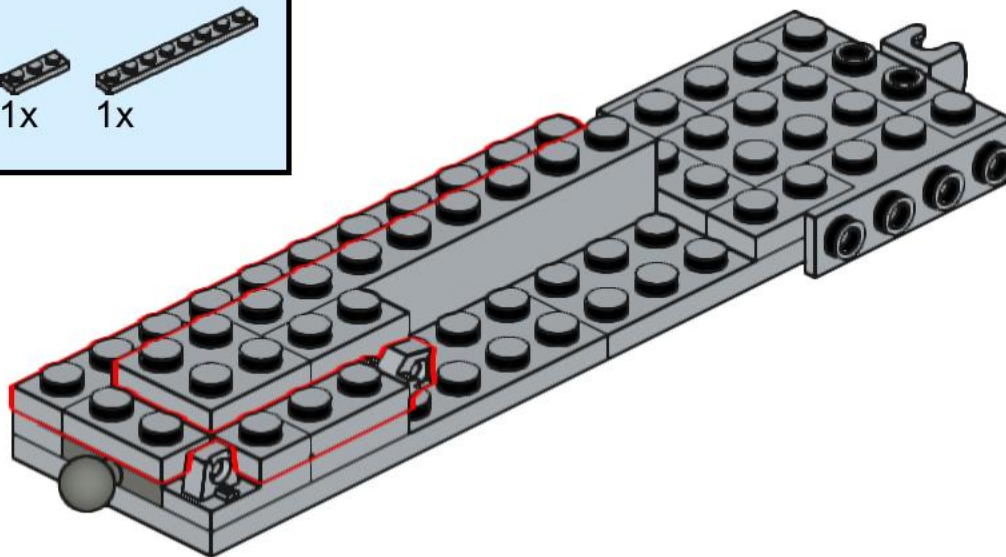
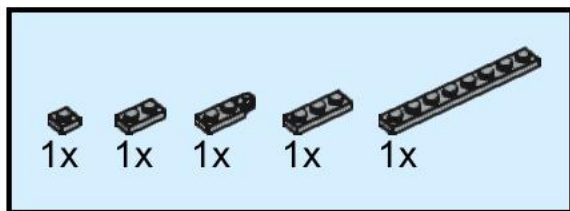
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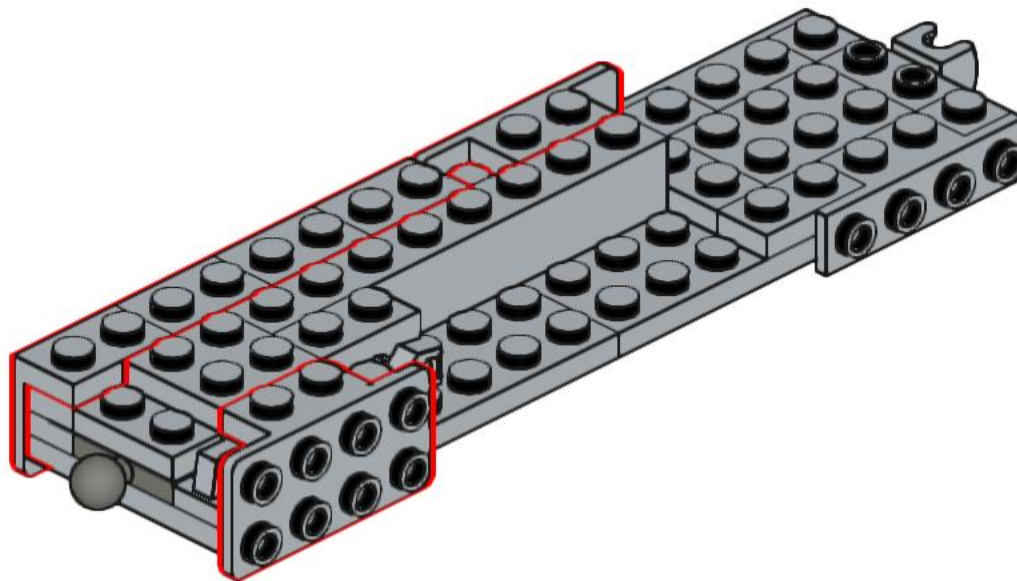
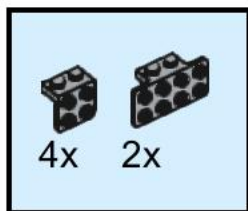
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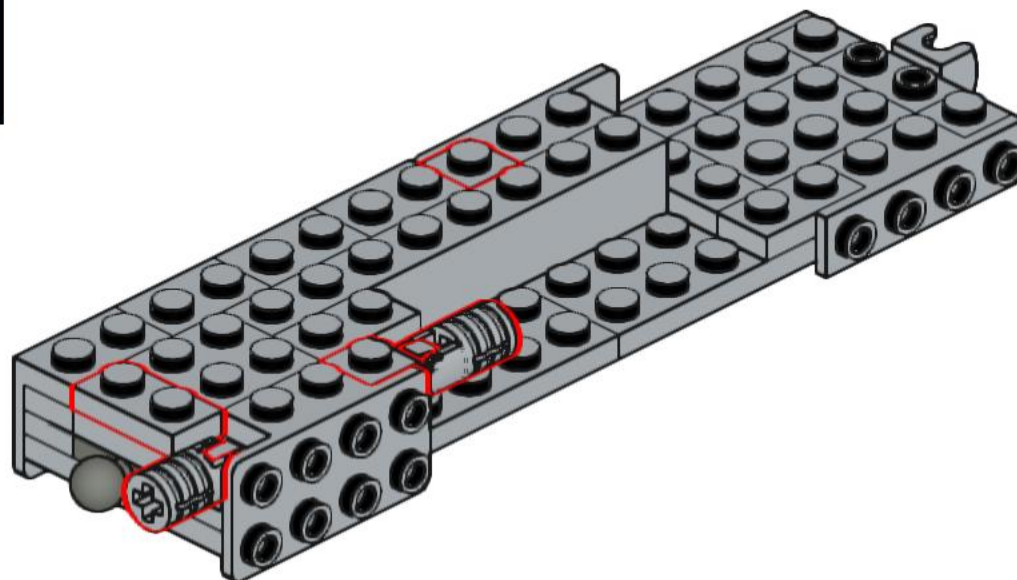
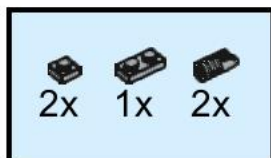
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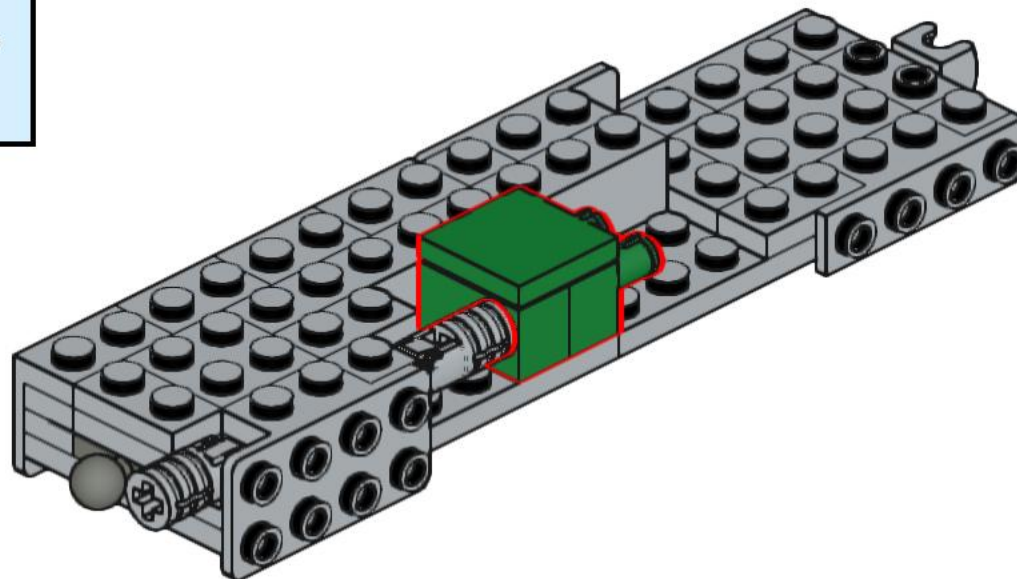
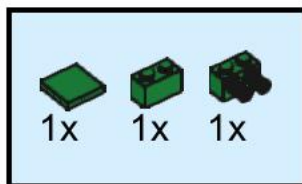
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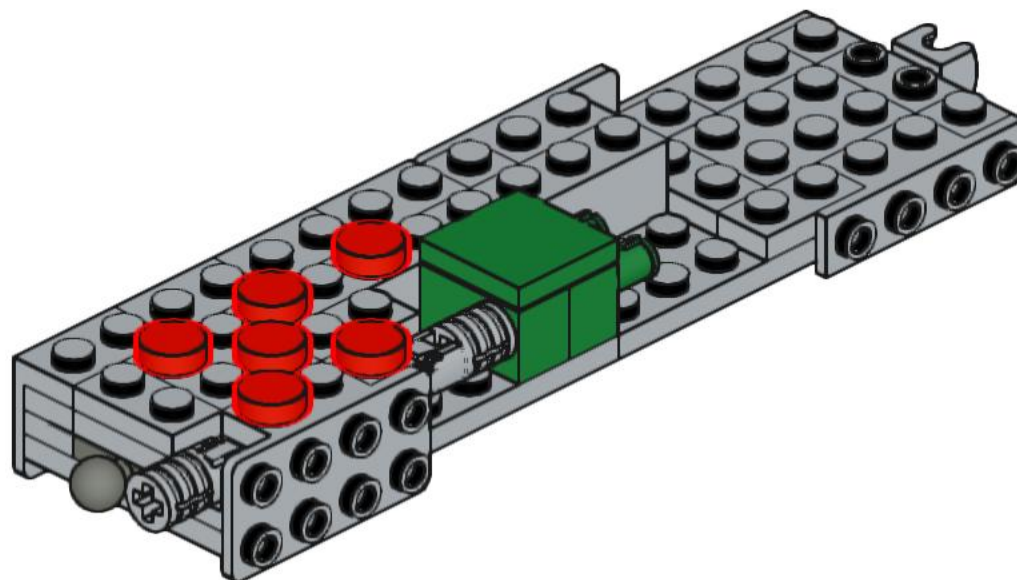
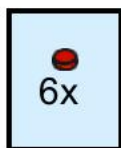
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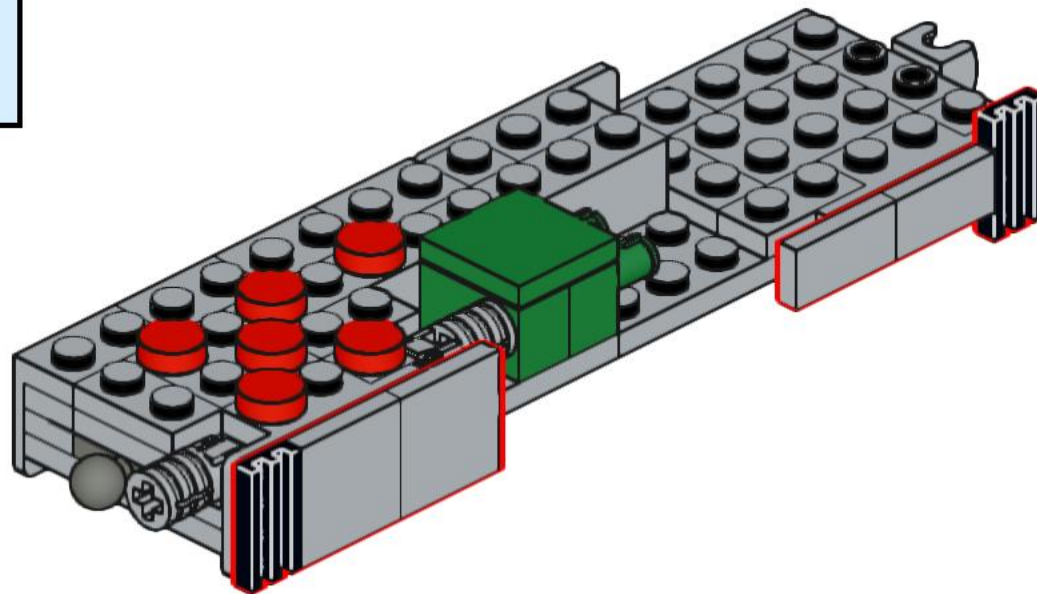
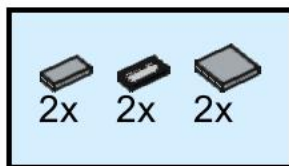
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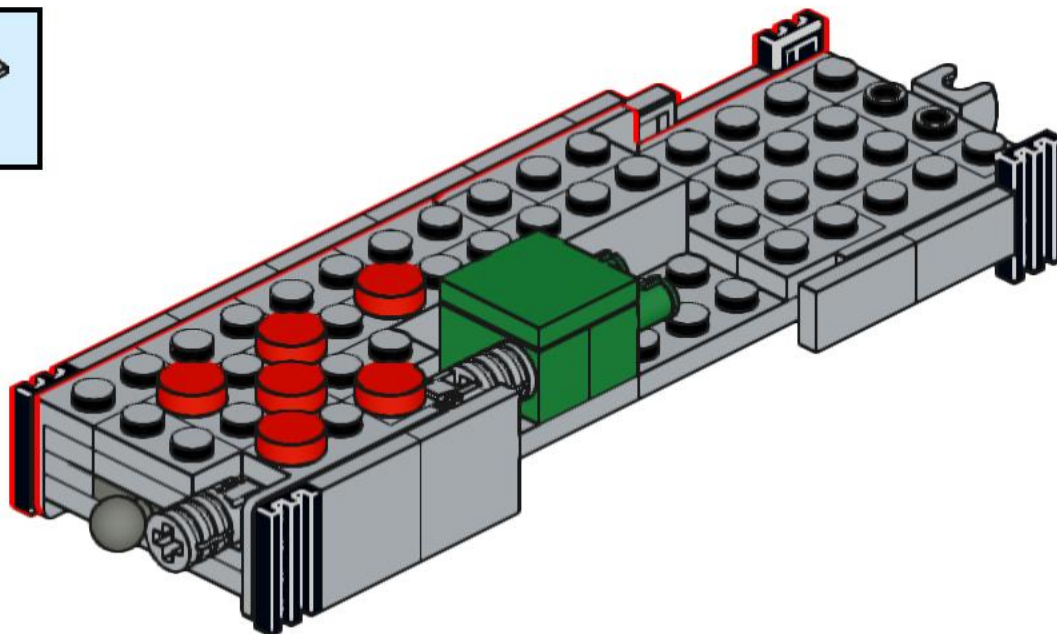
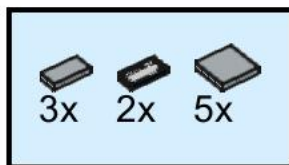
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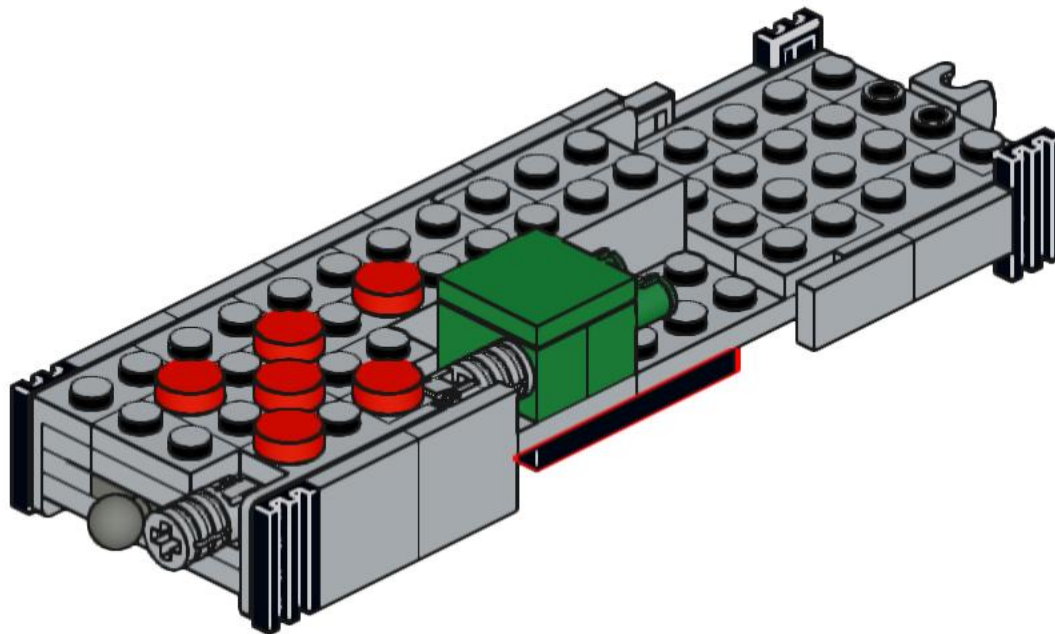
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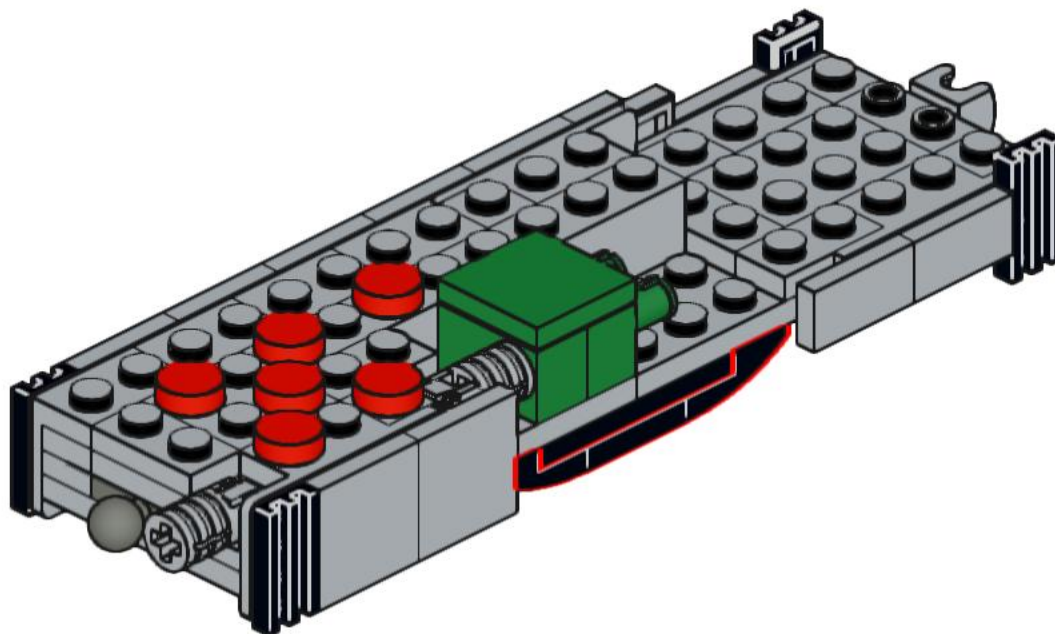
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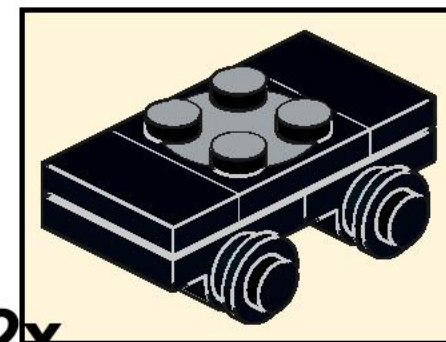
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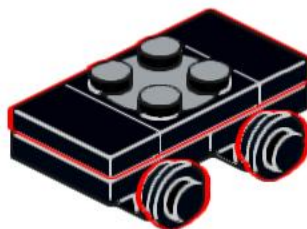
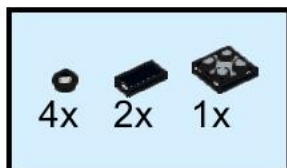


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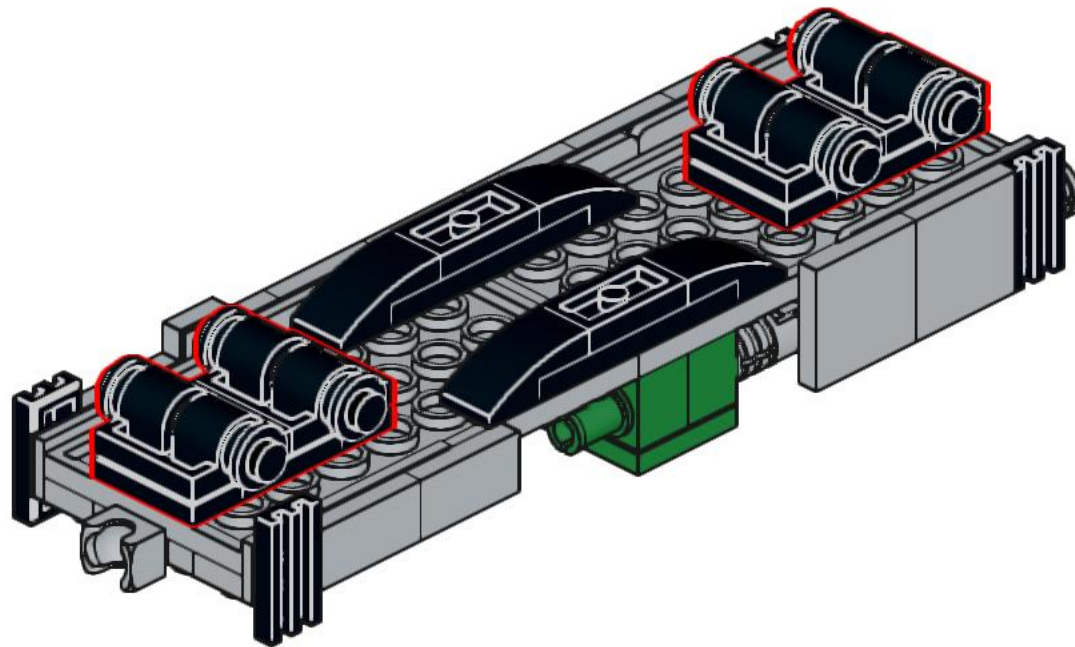


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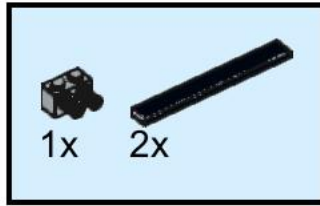
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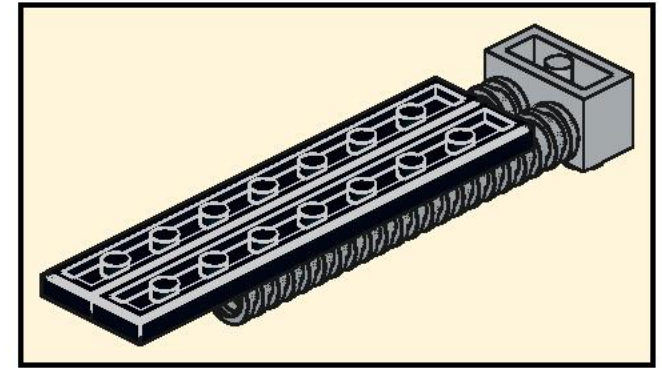
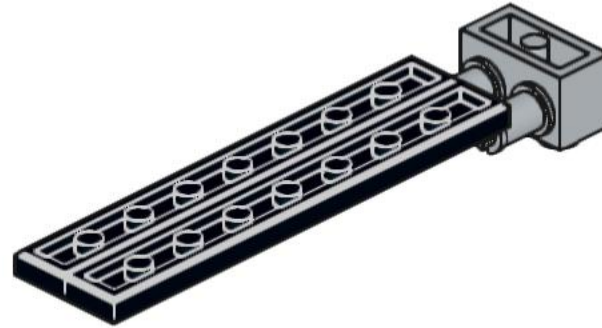
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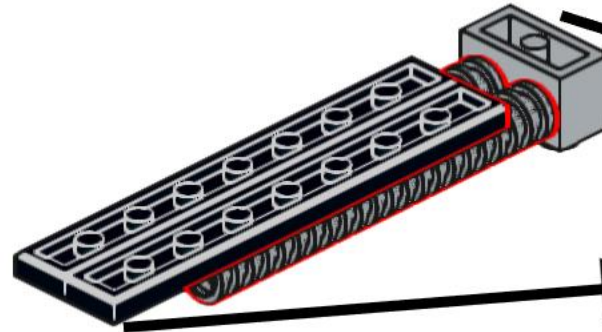
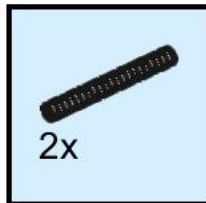
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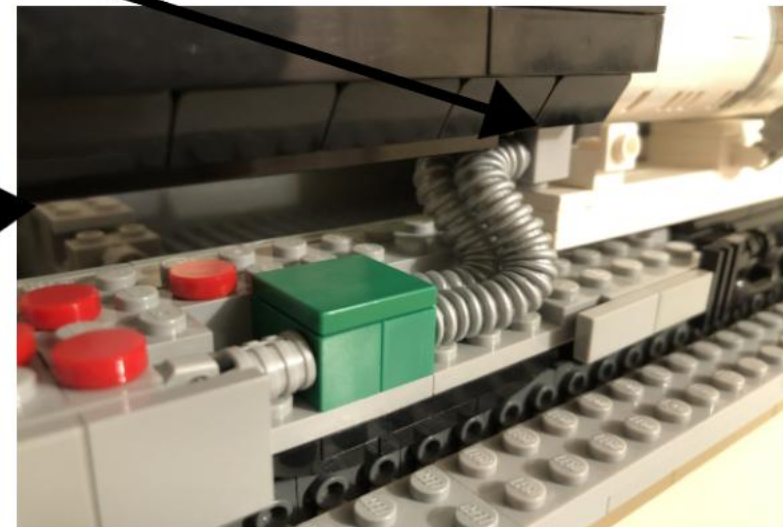
First amendment to Proton rocket fairing to allow thermal conditioning hoses to attach



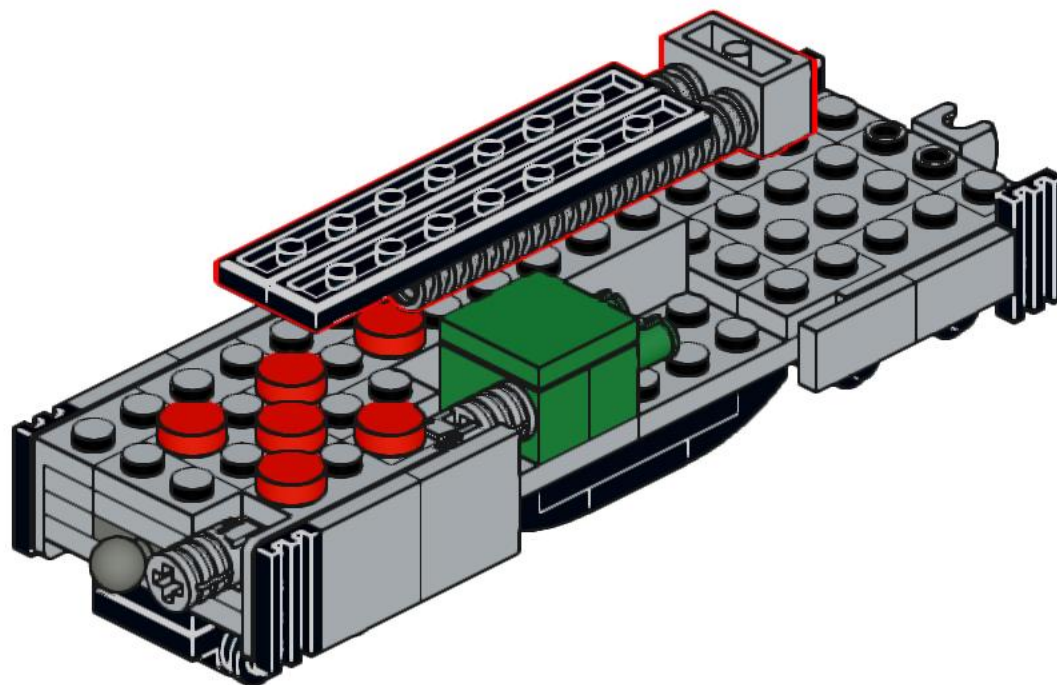
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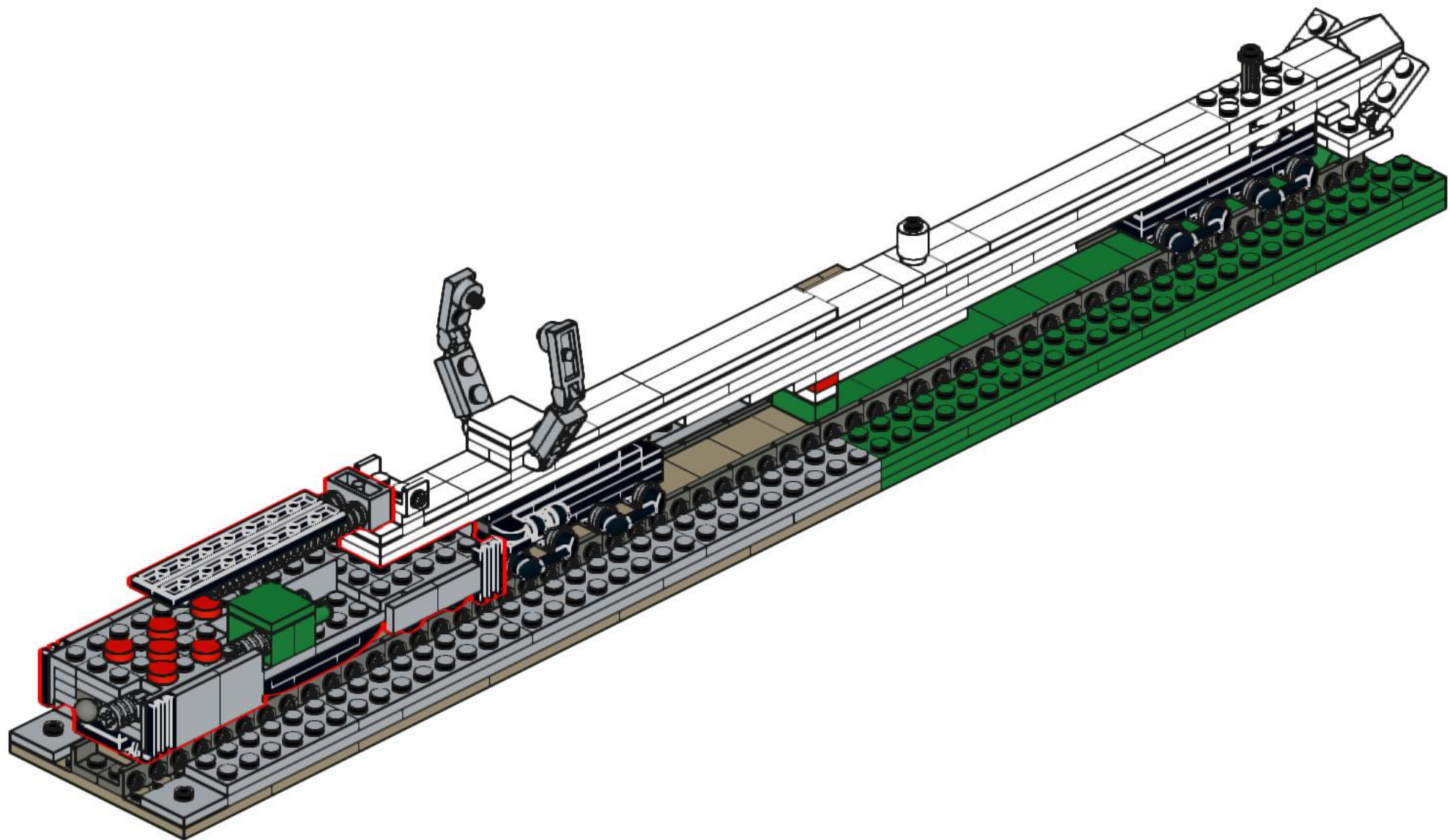
Hoses attach to pins on modified bricks



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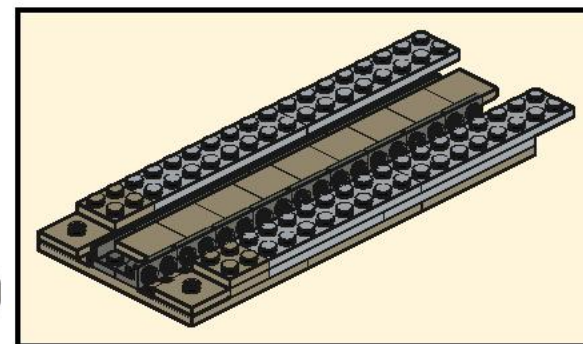
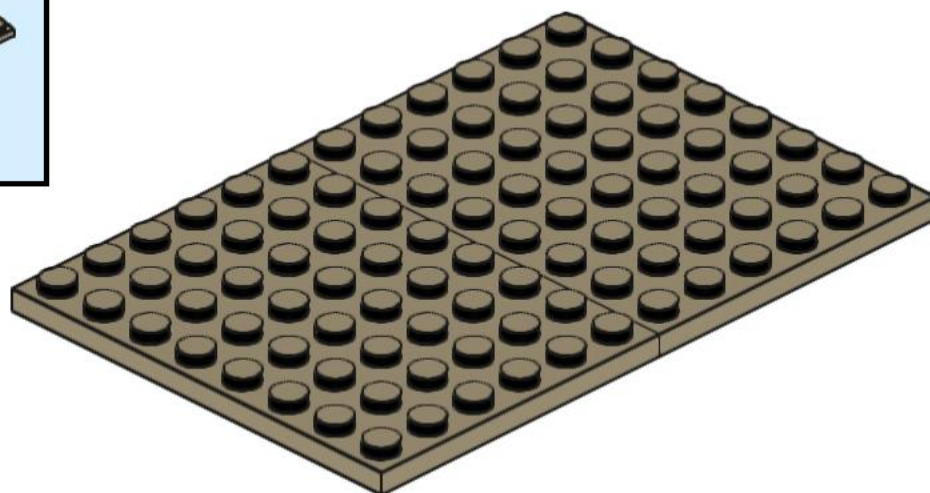
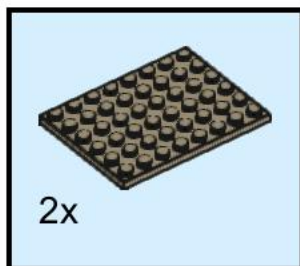
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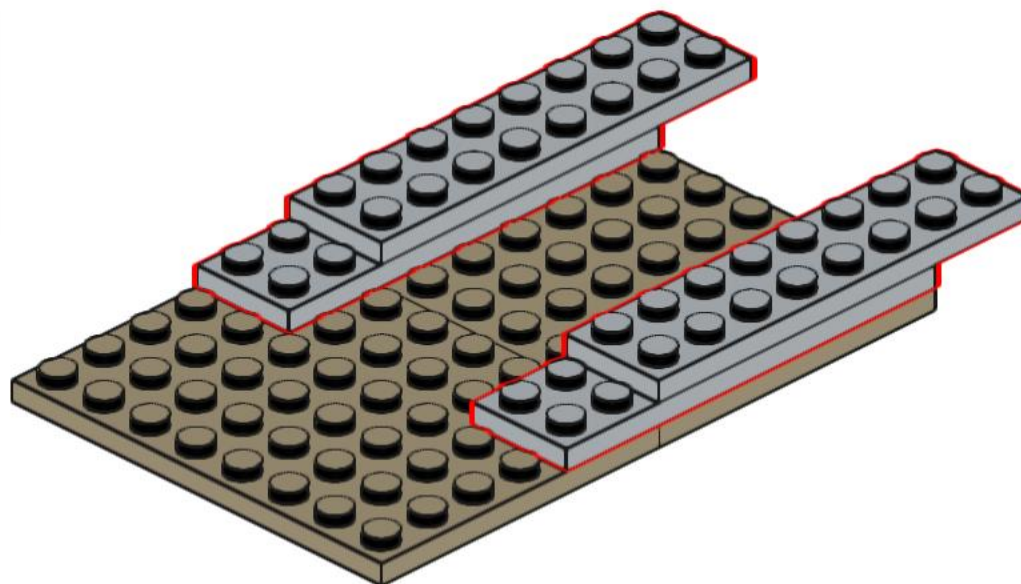
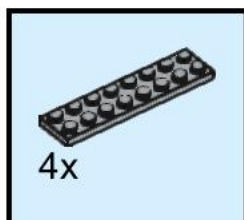
Bridging flatcar 2



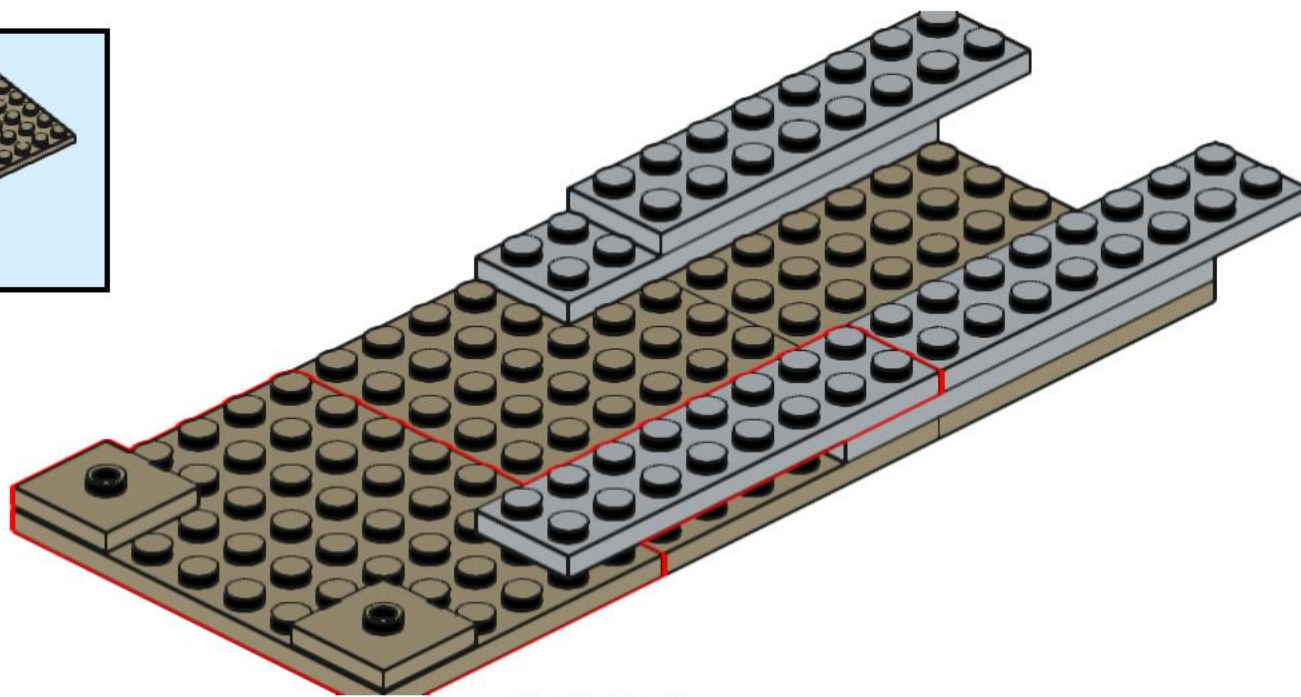
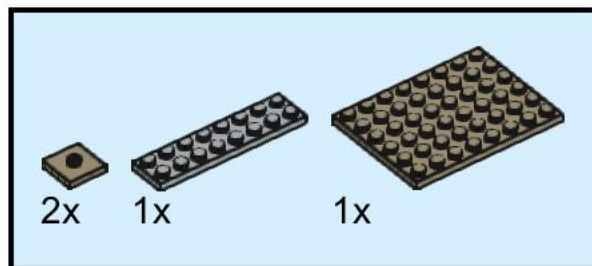
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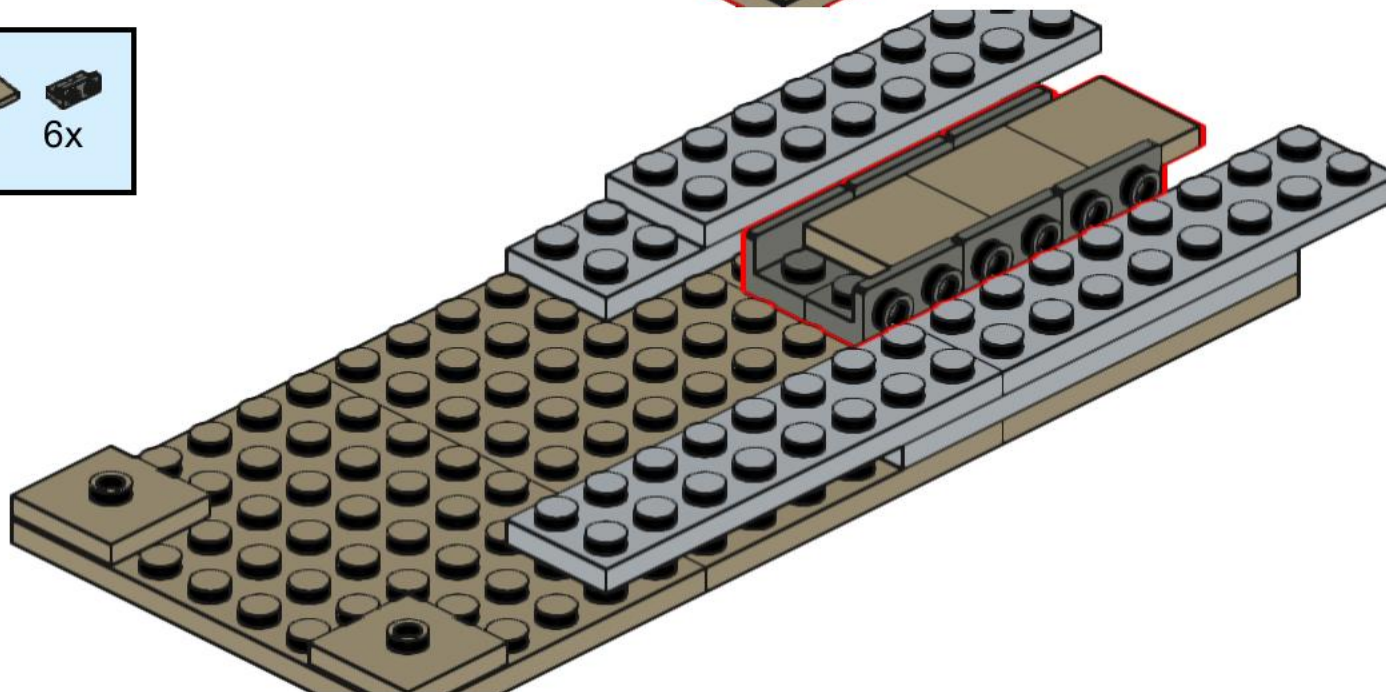
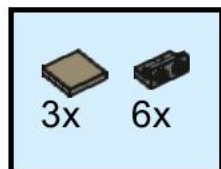
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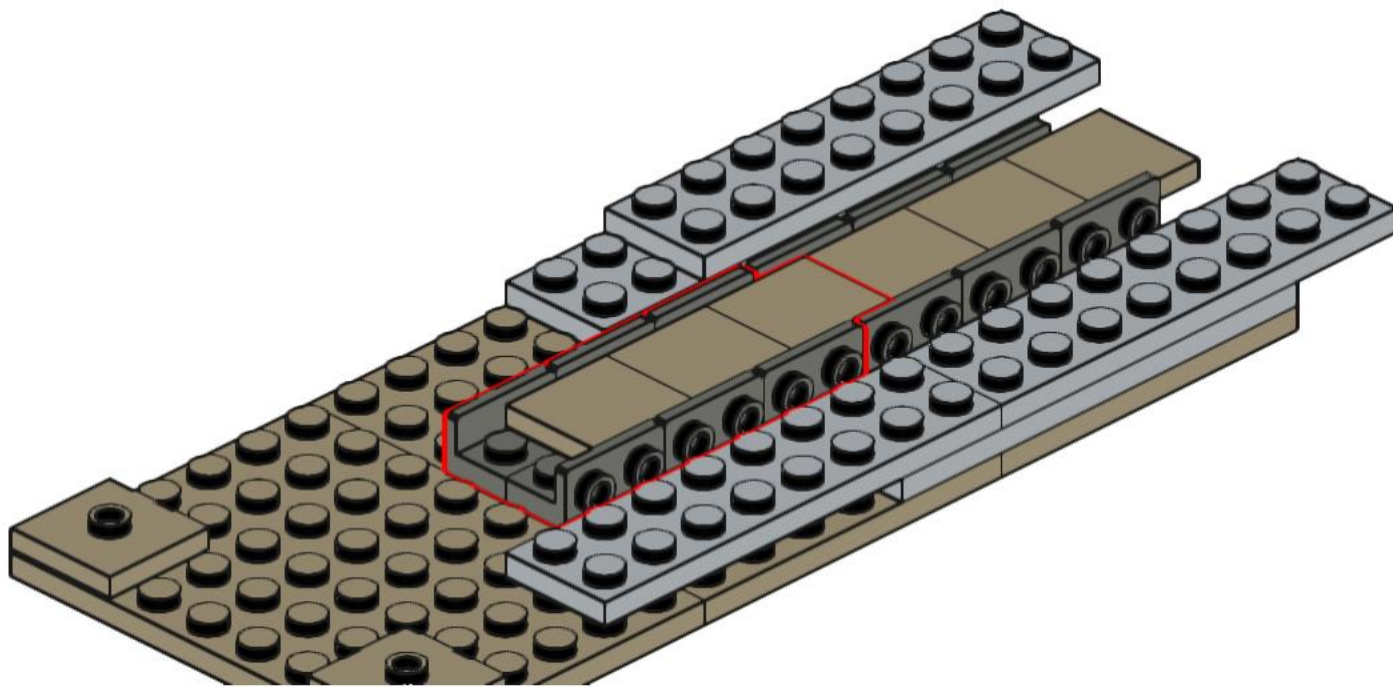
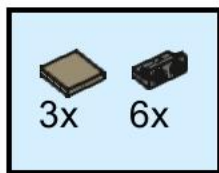
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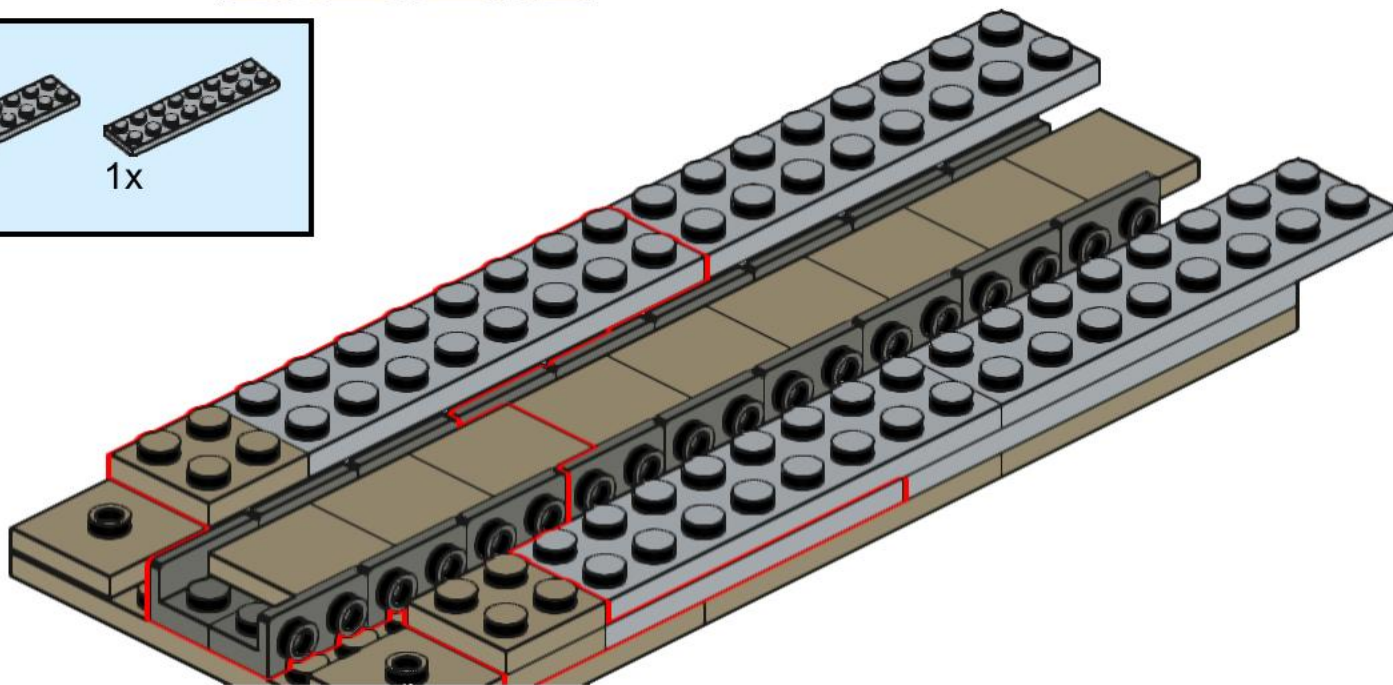
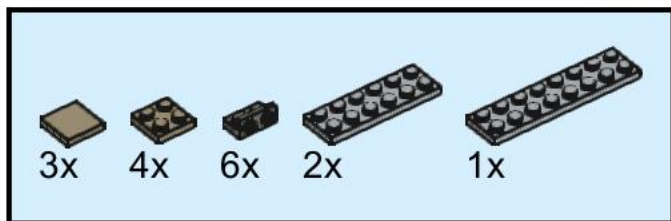
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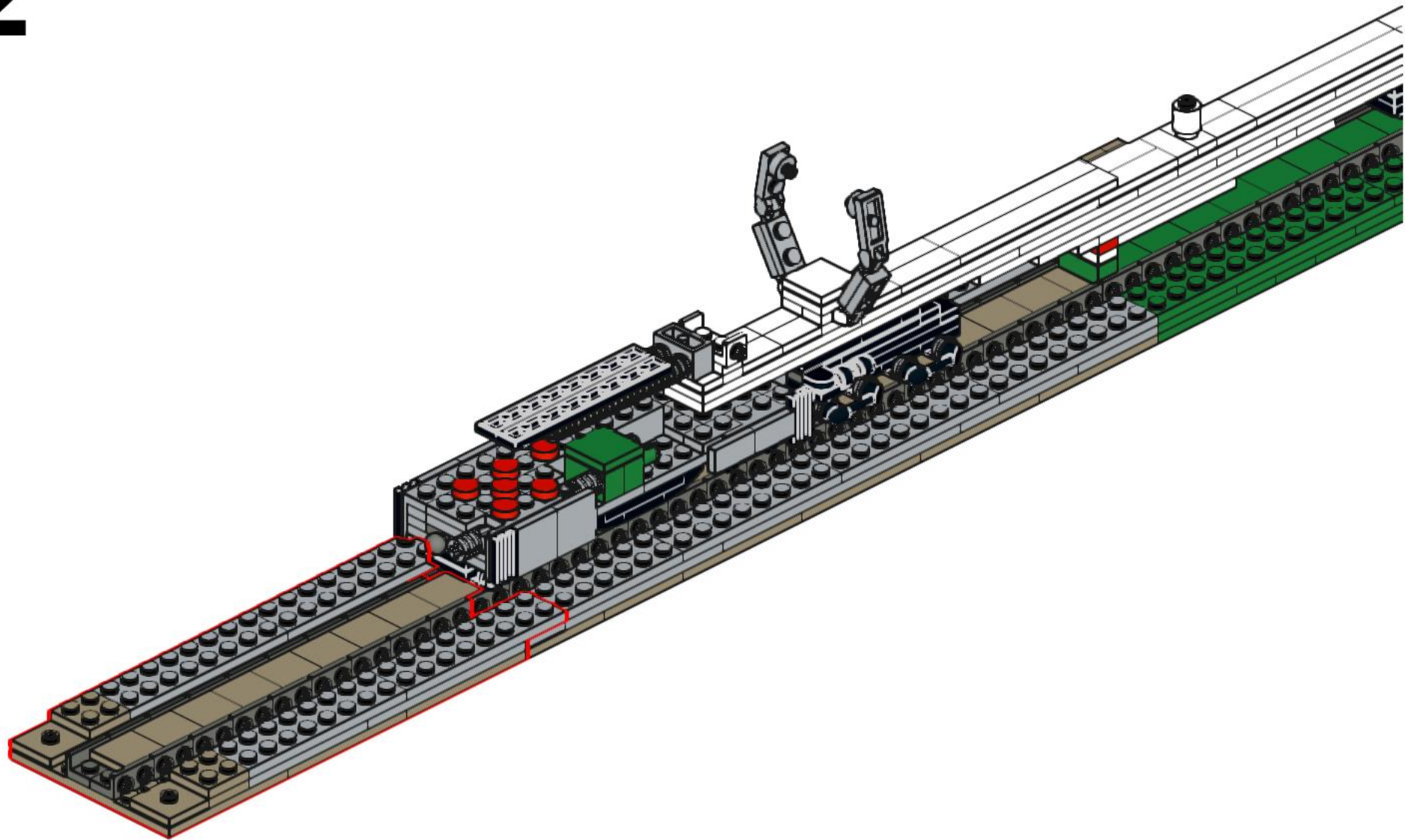
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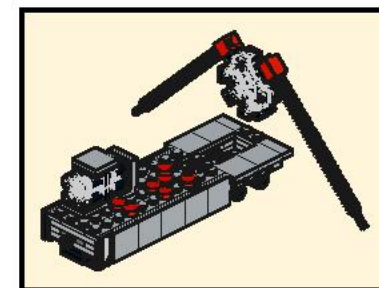
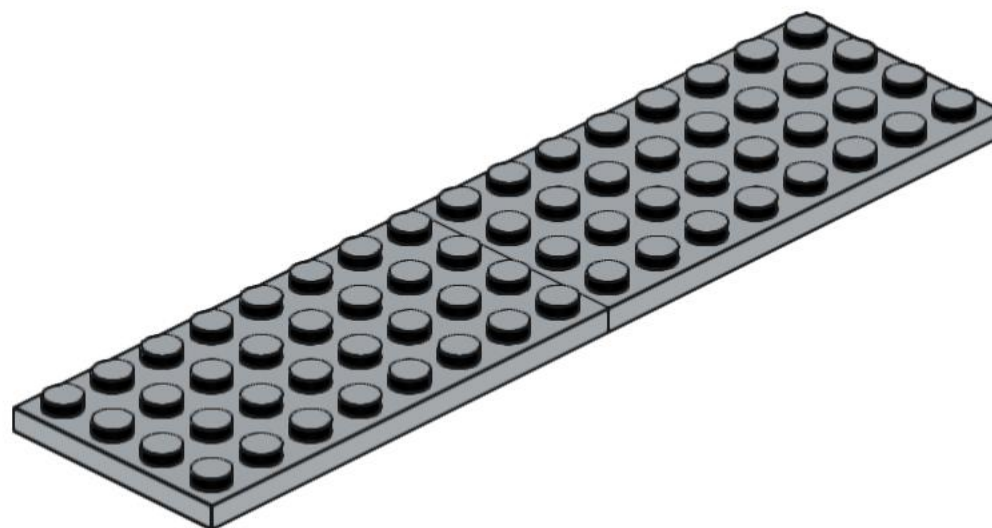
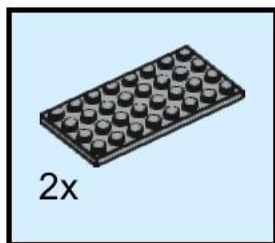
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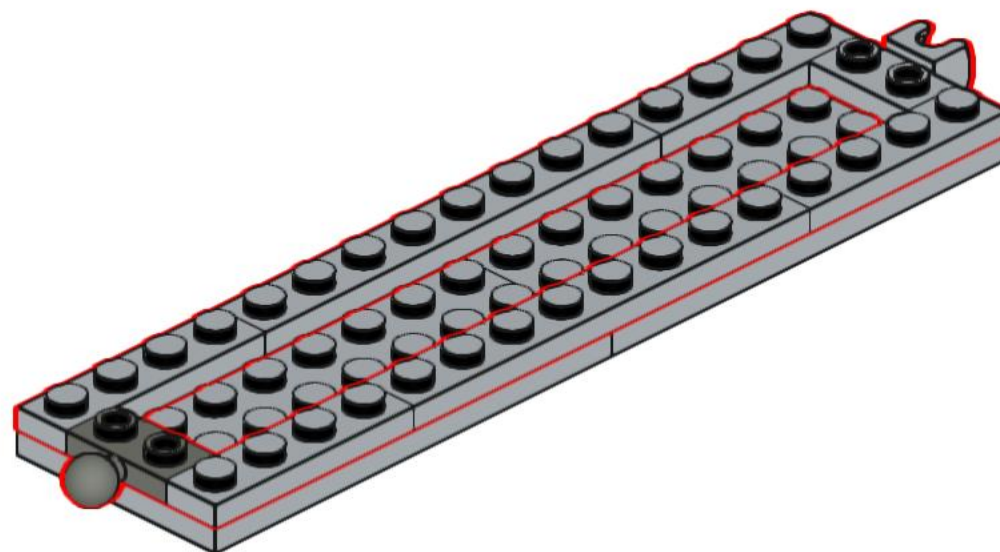
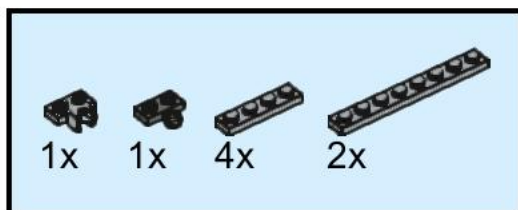
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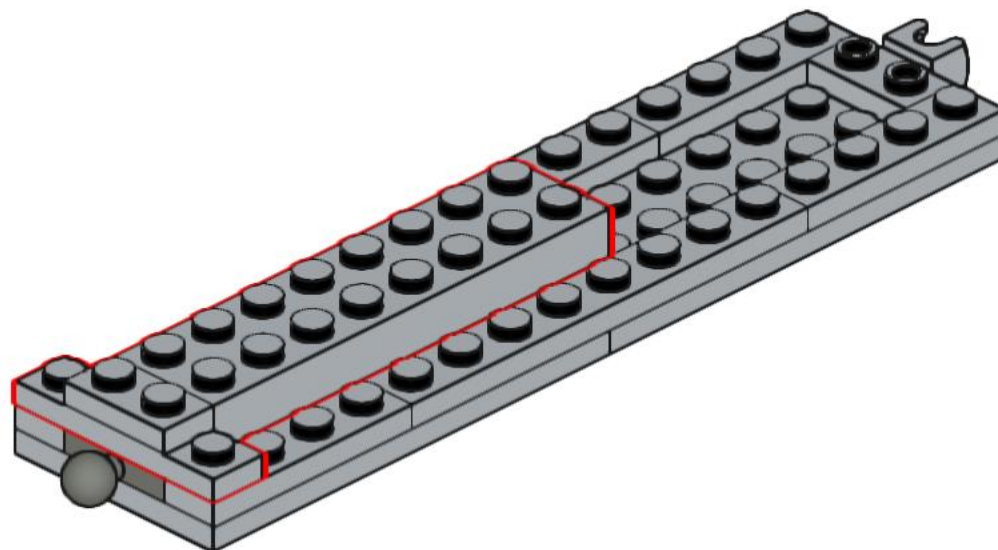
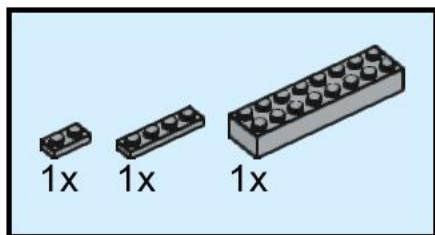
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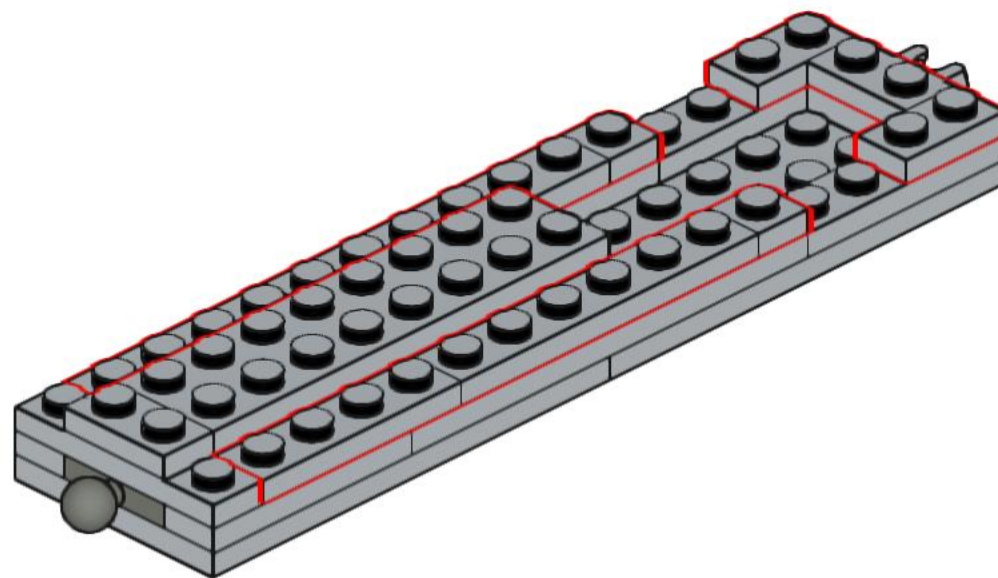
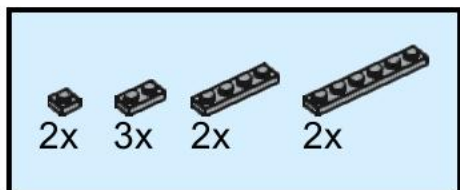
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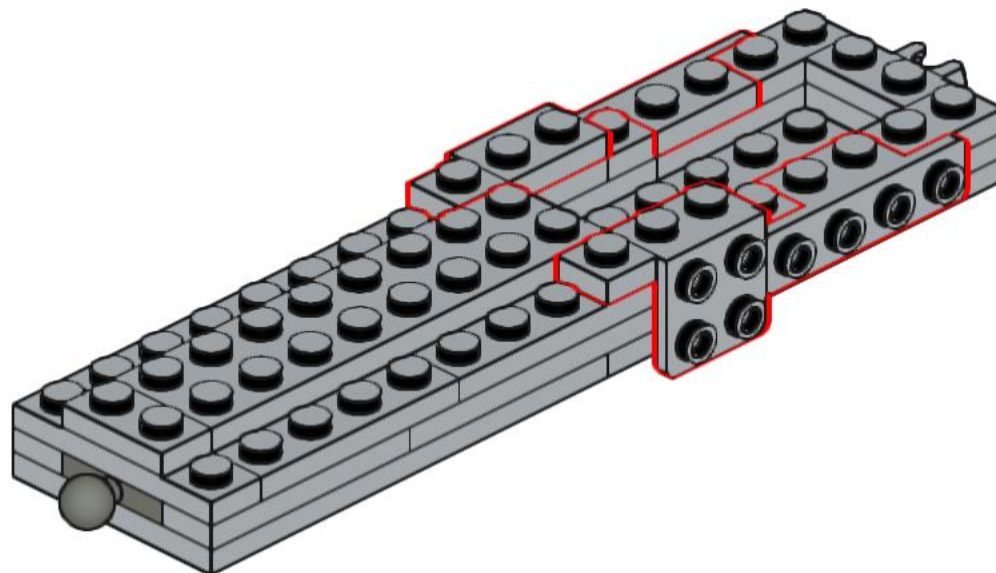
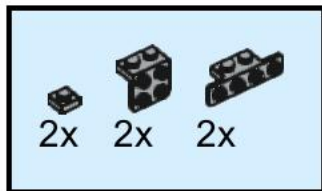
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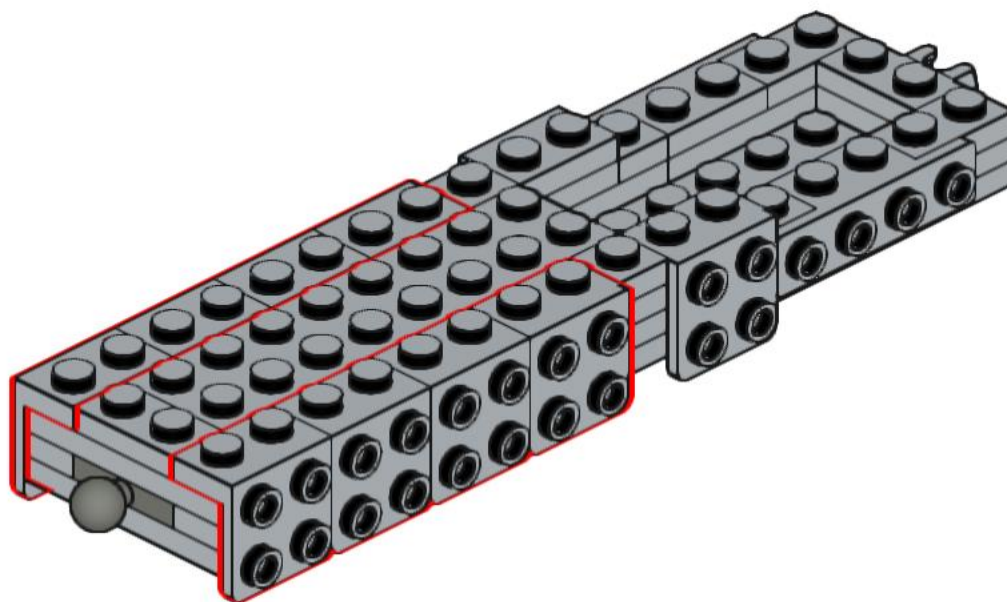
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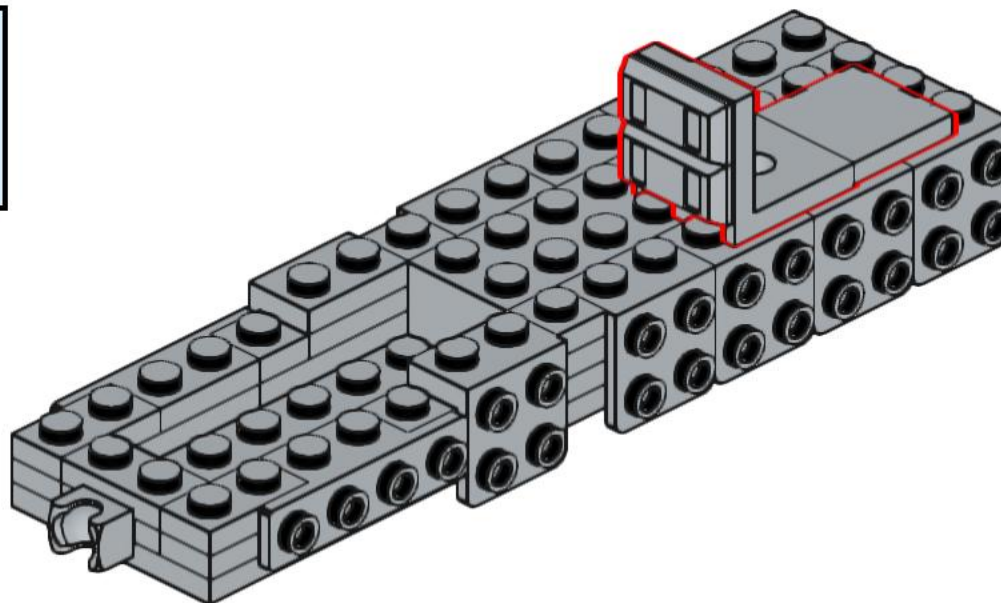
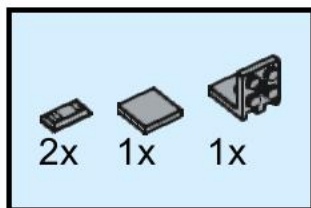
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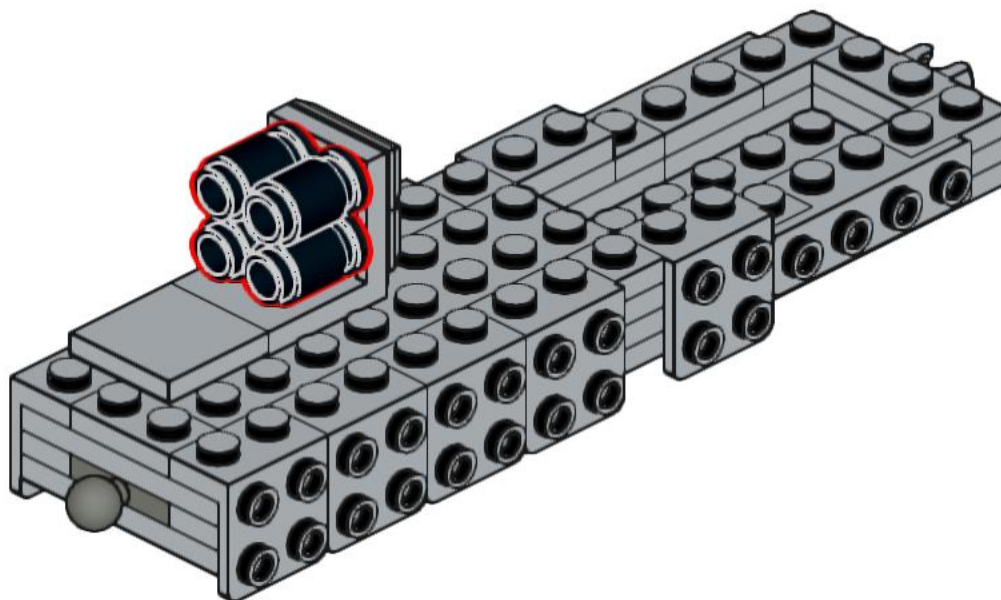
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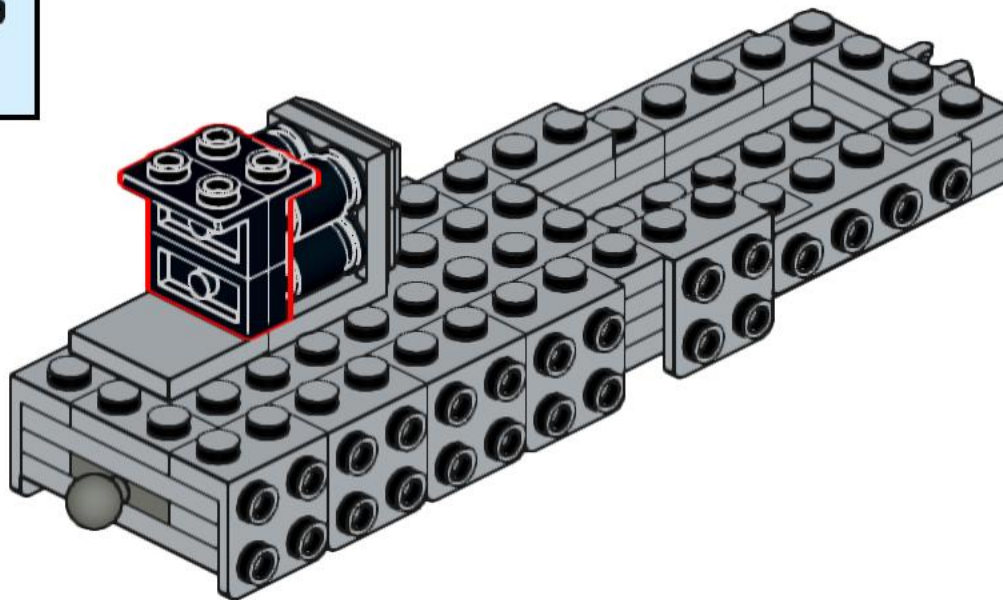
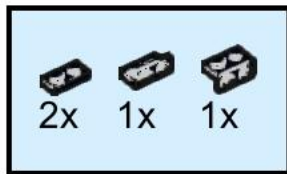
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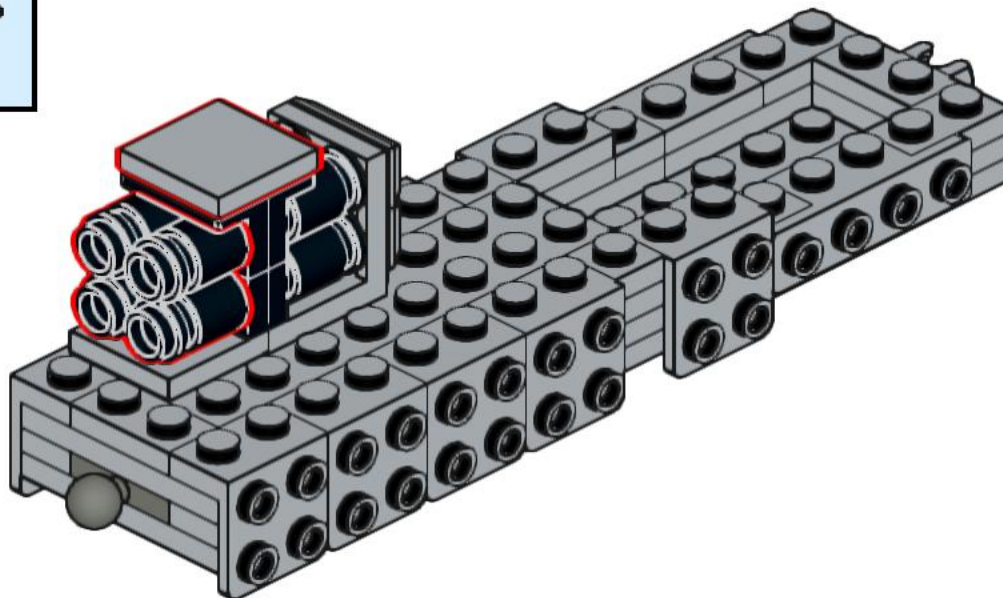
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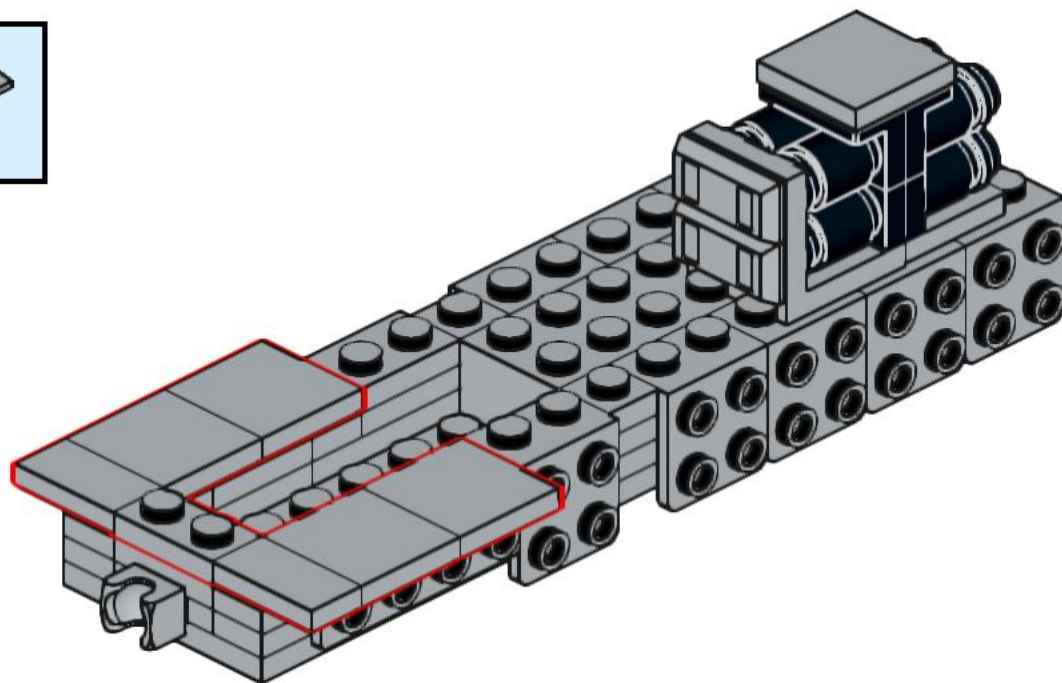
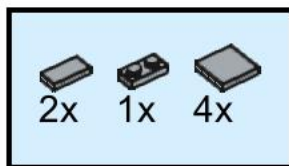
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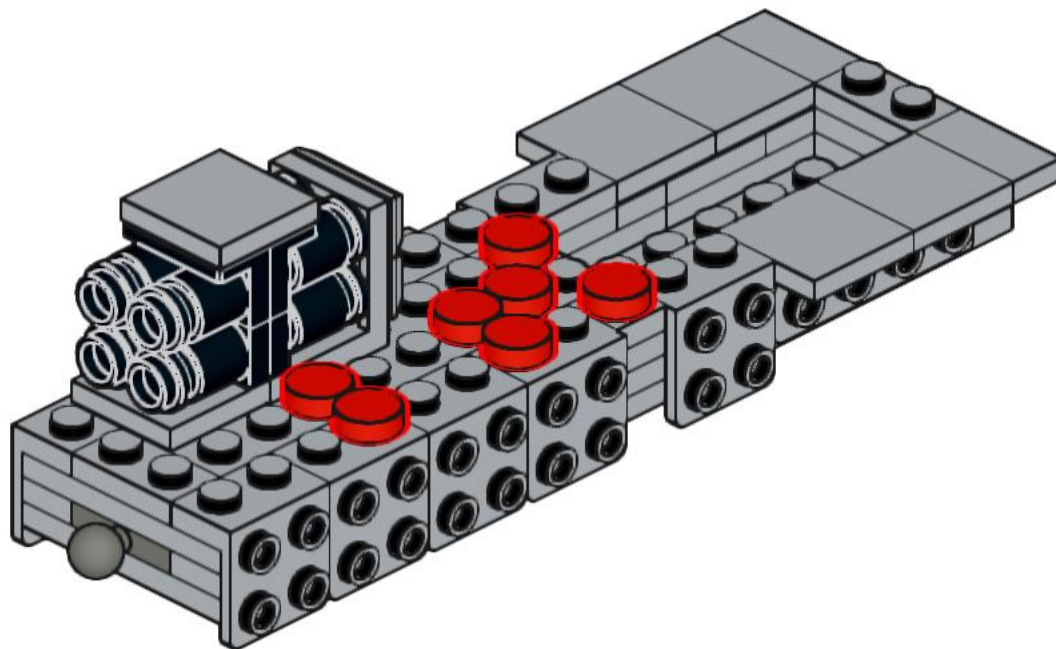
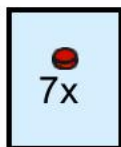
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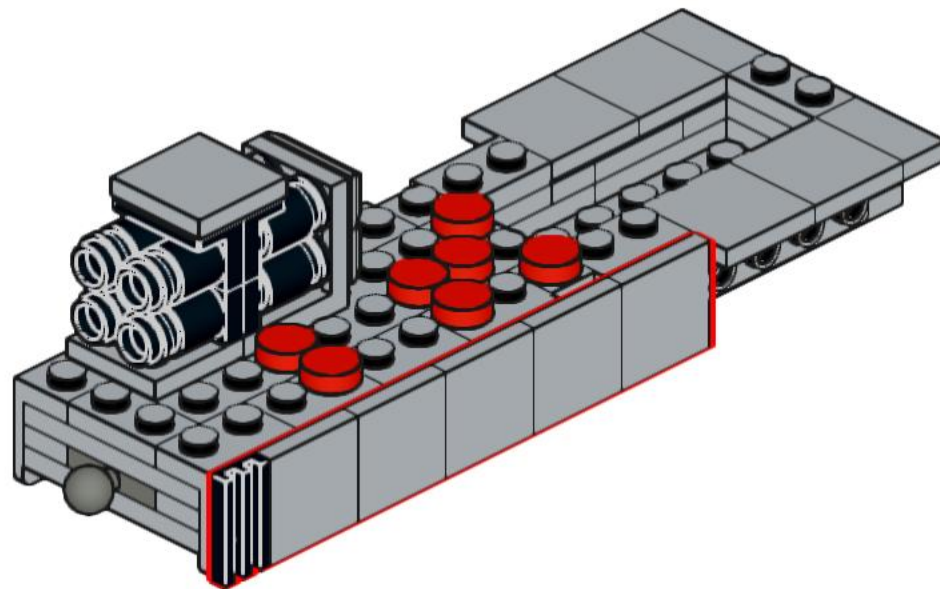
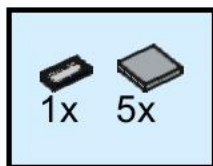
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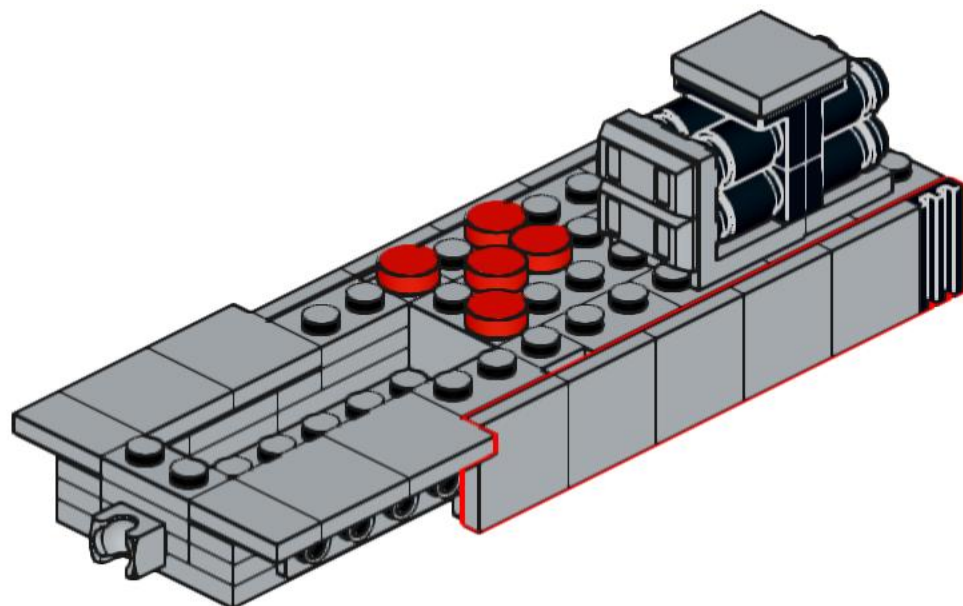
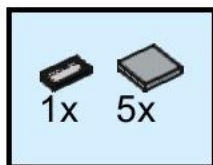
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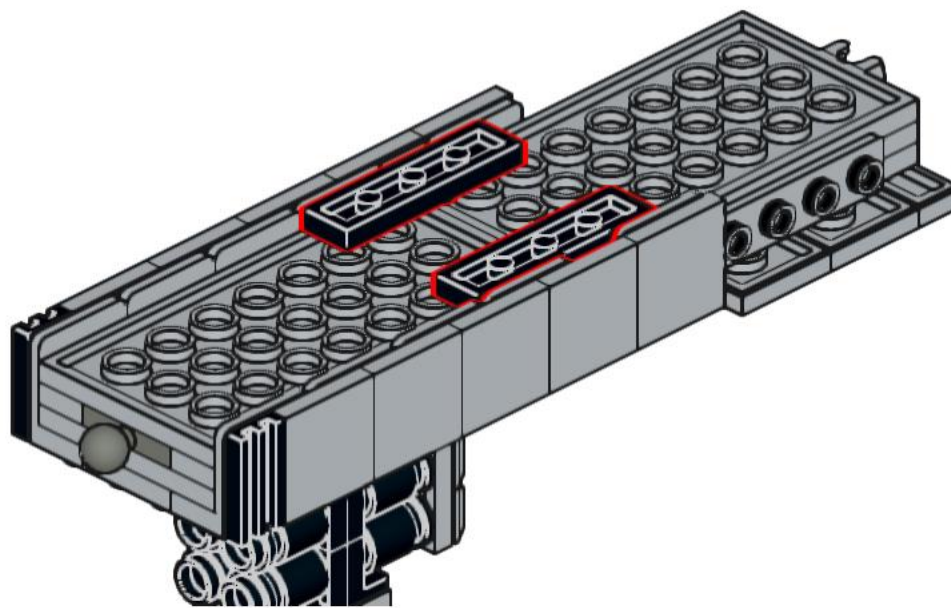
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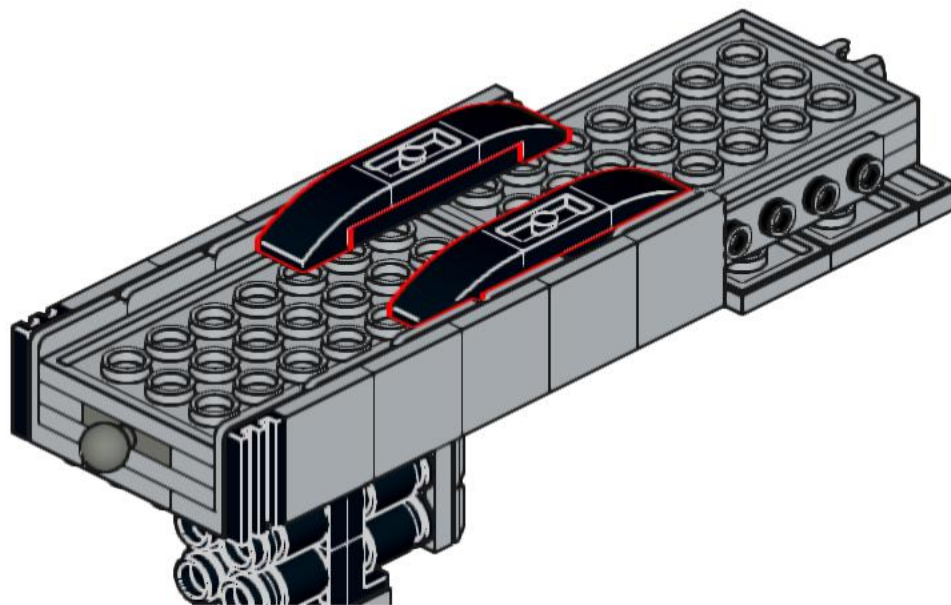
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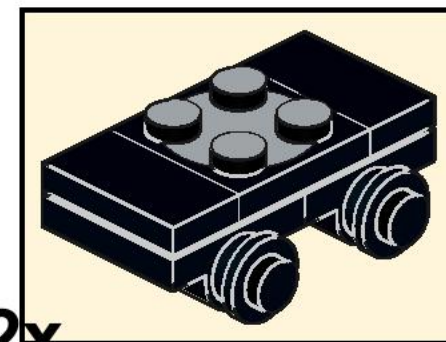
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98

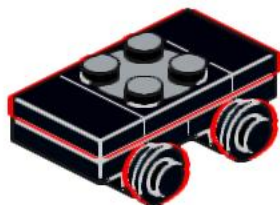
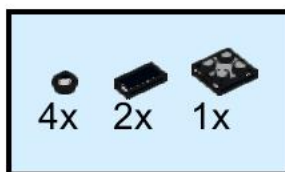


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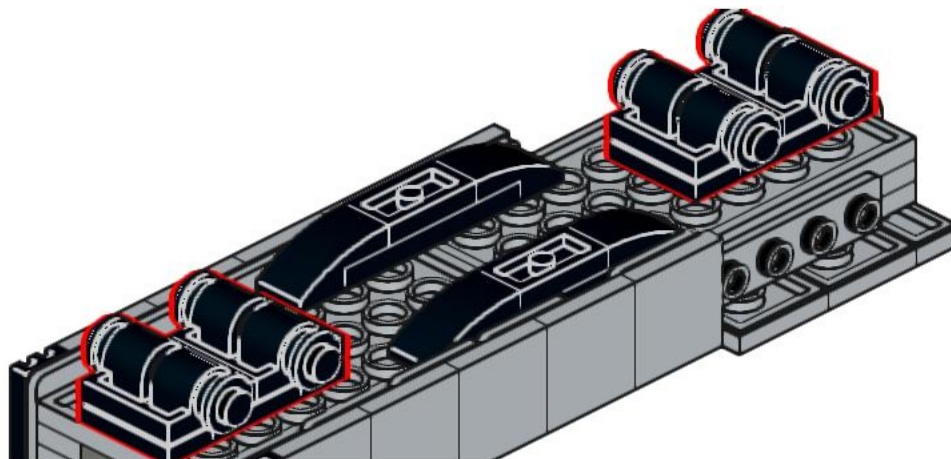


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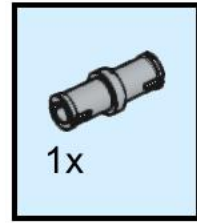
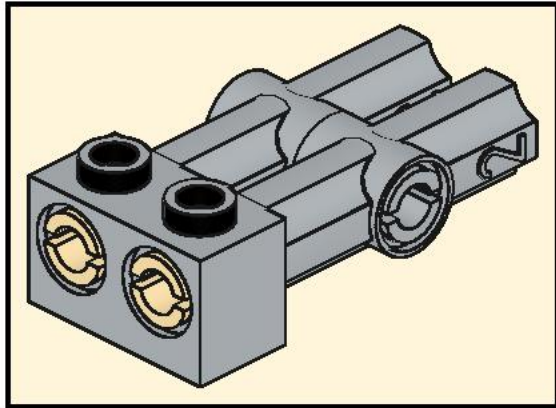
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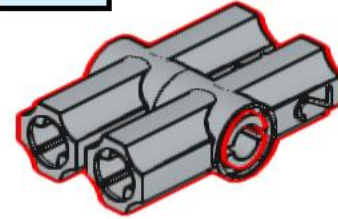
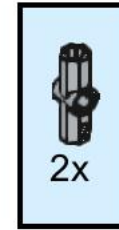
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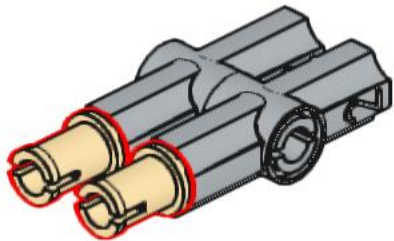
102



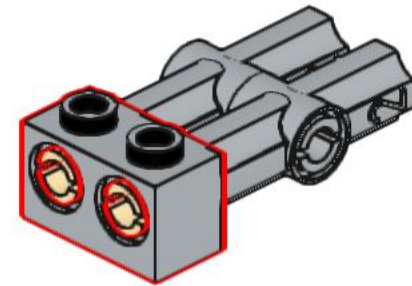
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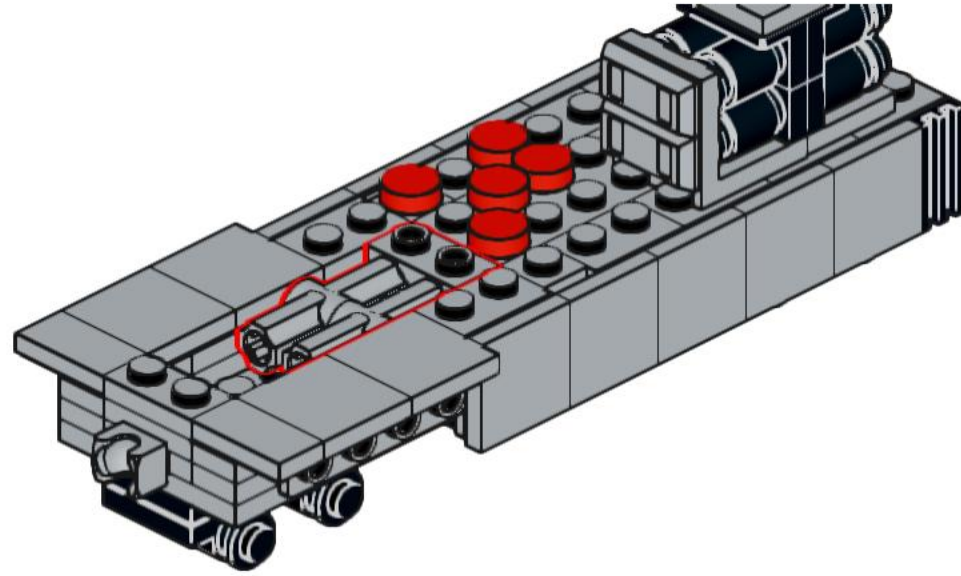
104



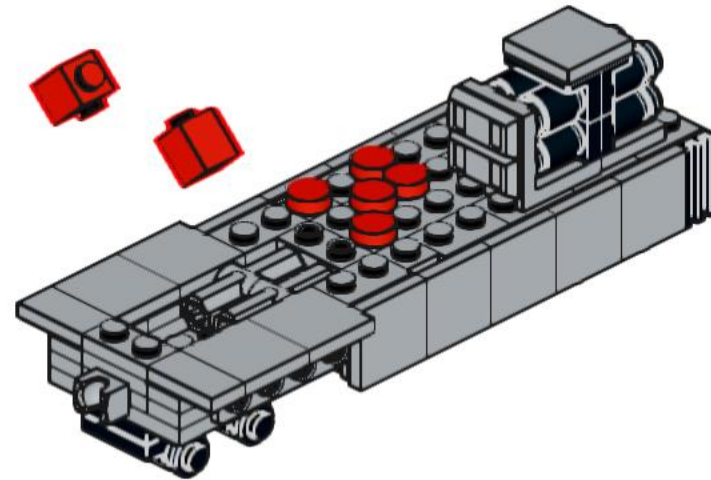
105



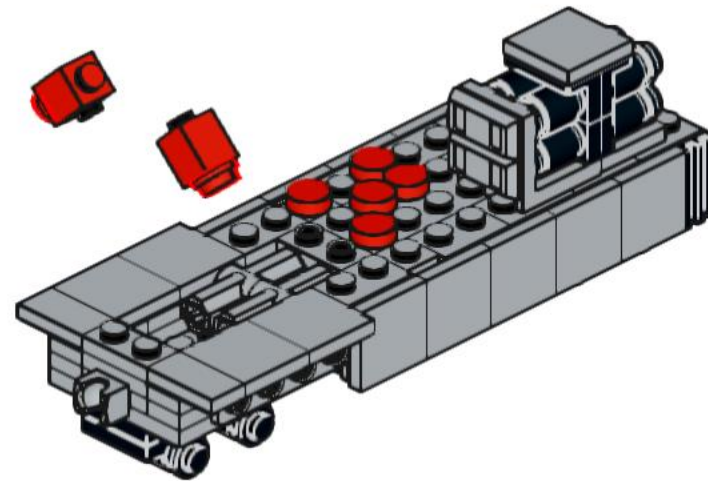
106



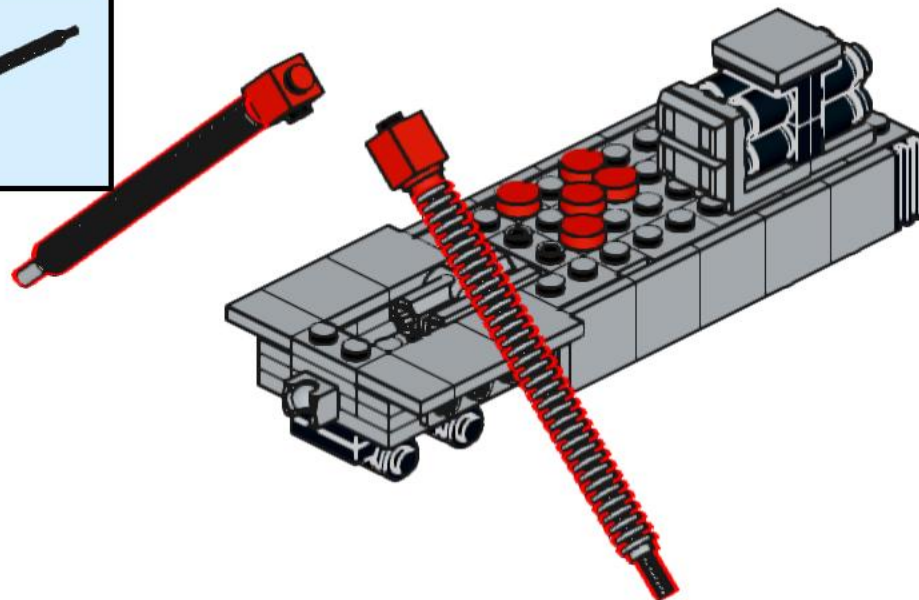
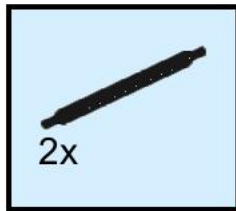
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108

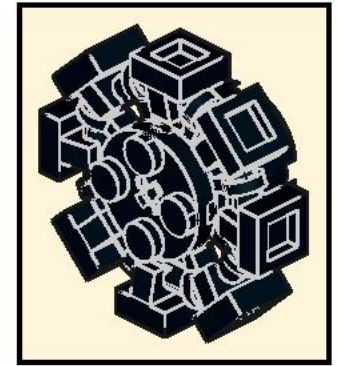


109

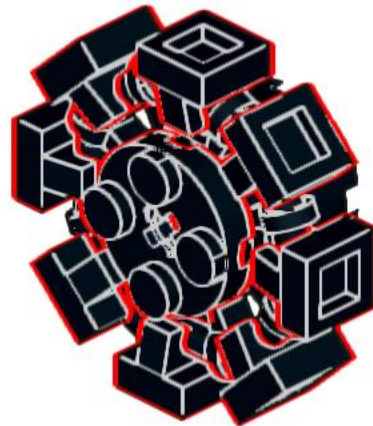


Second amendment to Proton rocket fairing

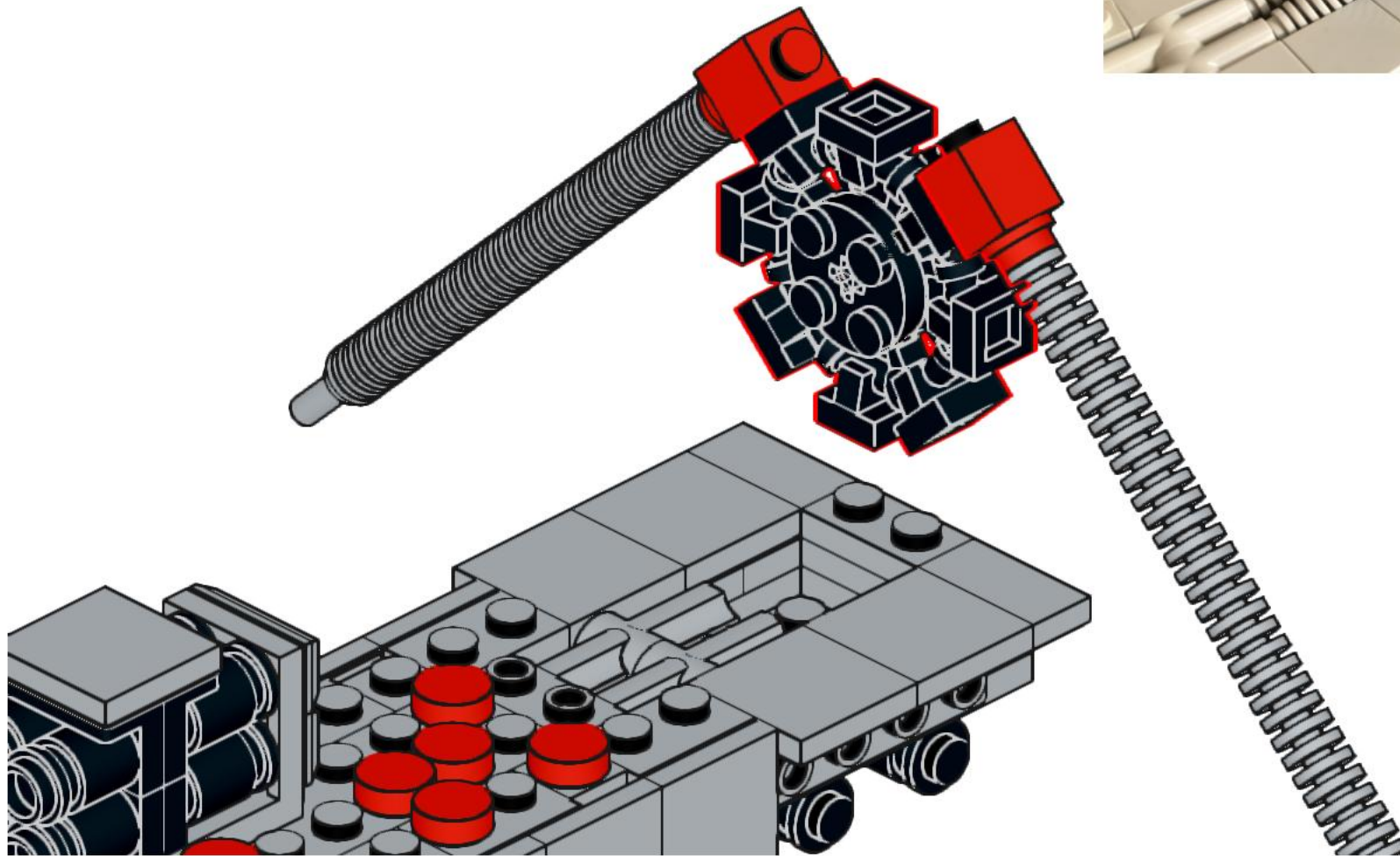
110



111



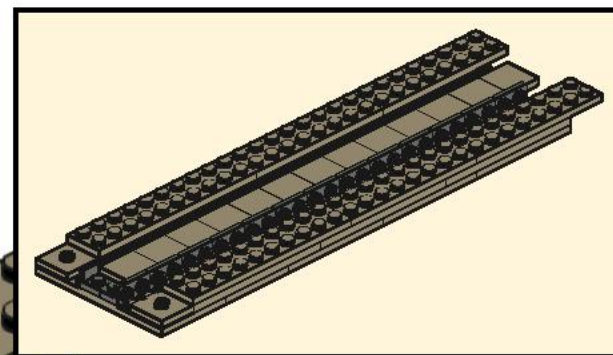
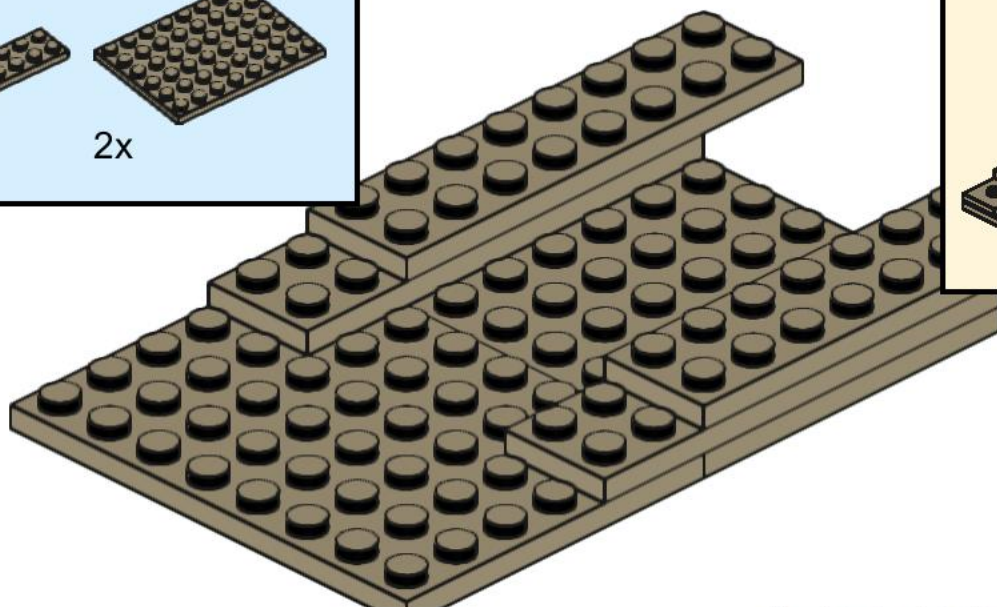
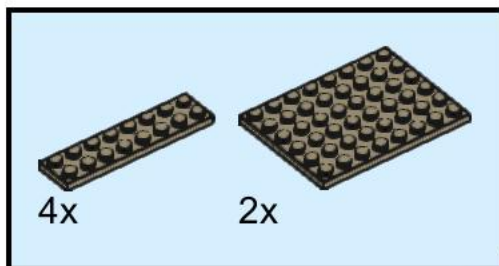
112



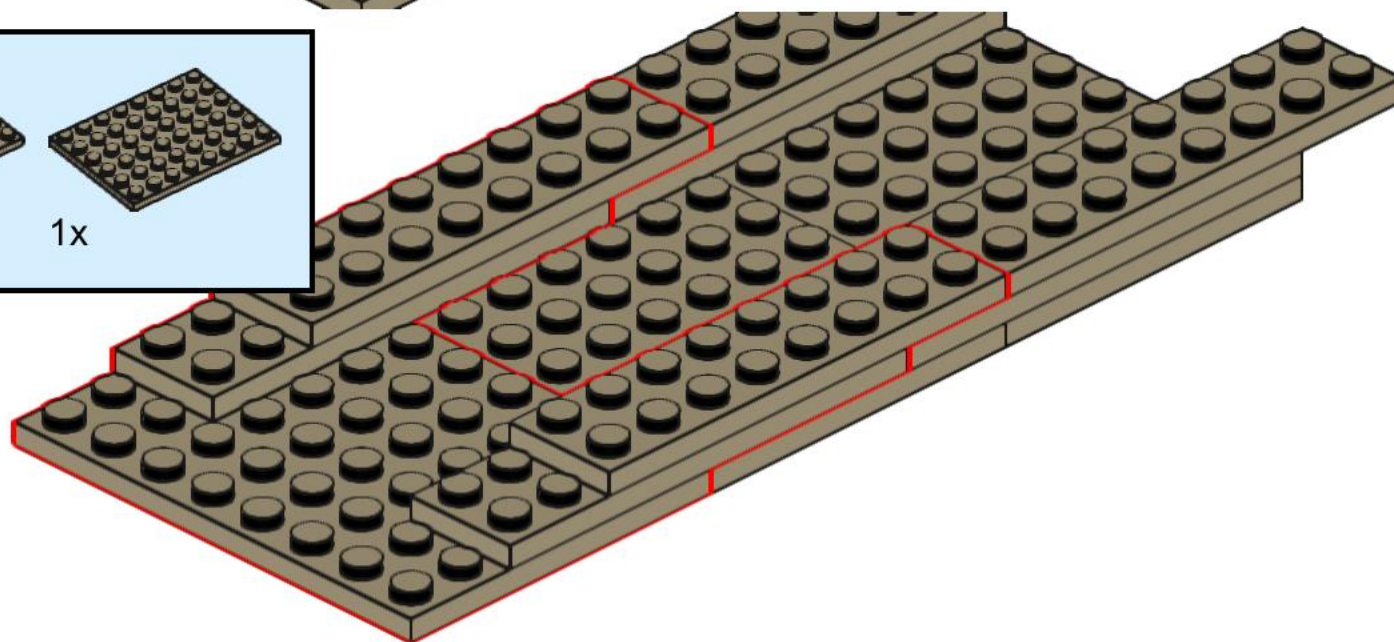
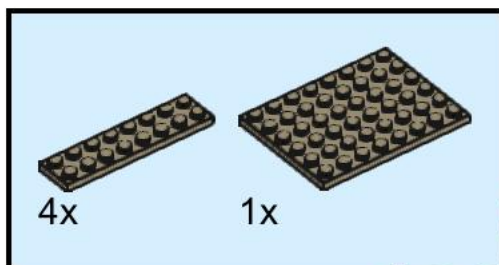
Thermal conditioning unit



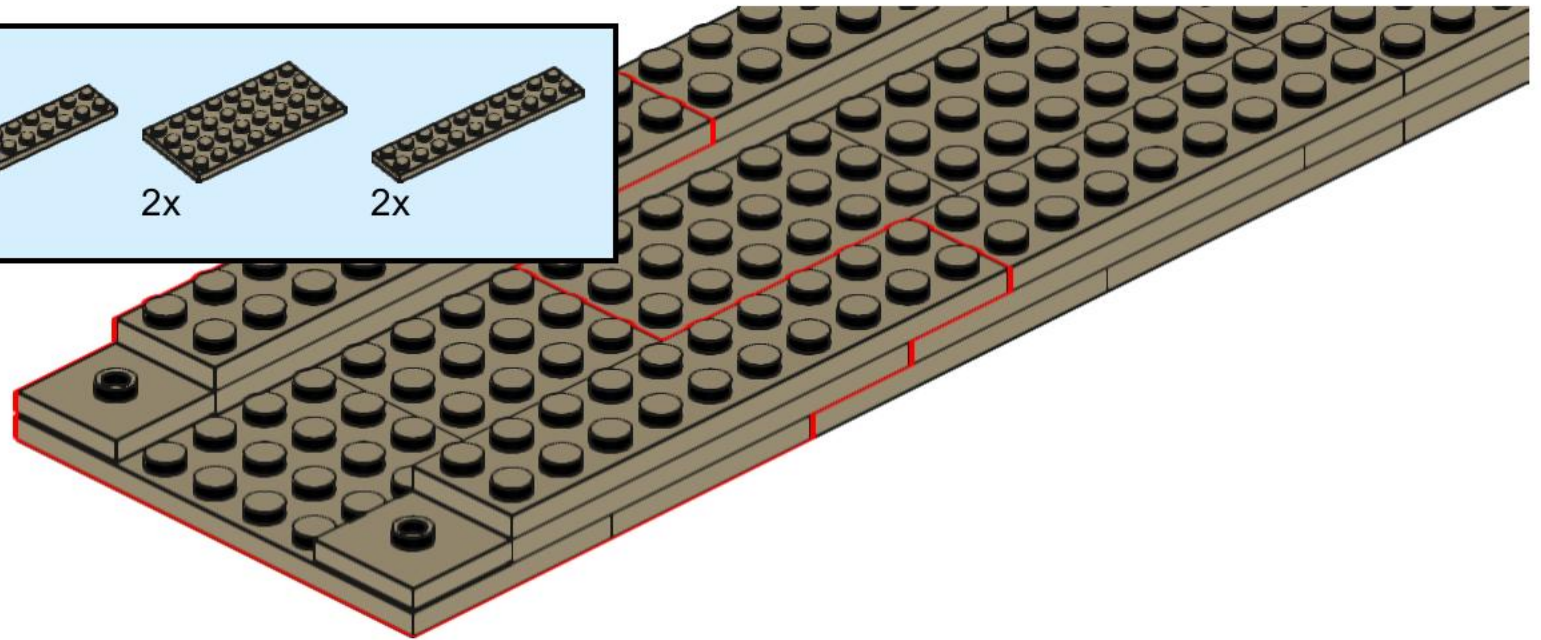
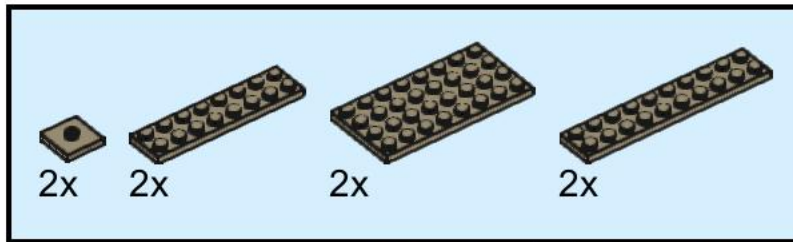
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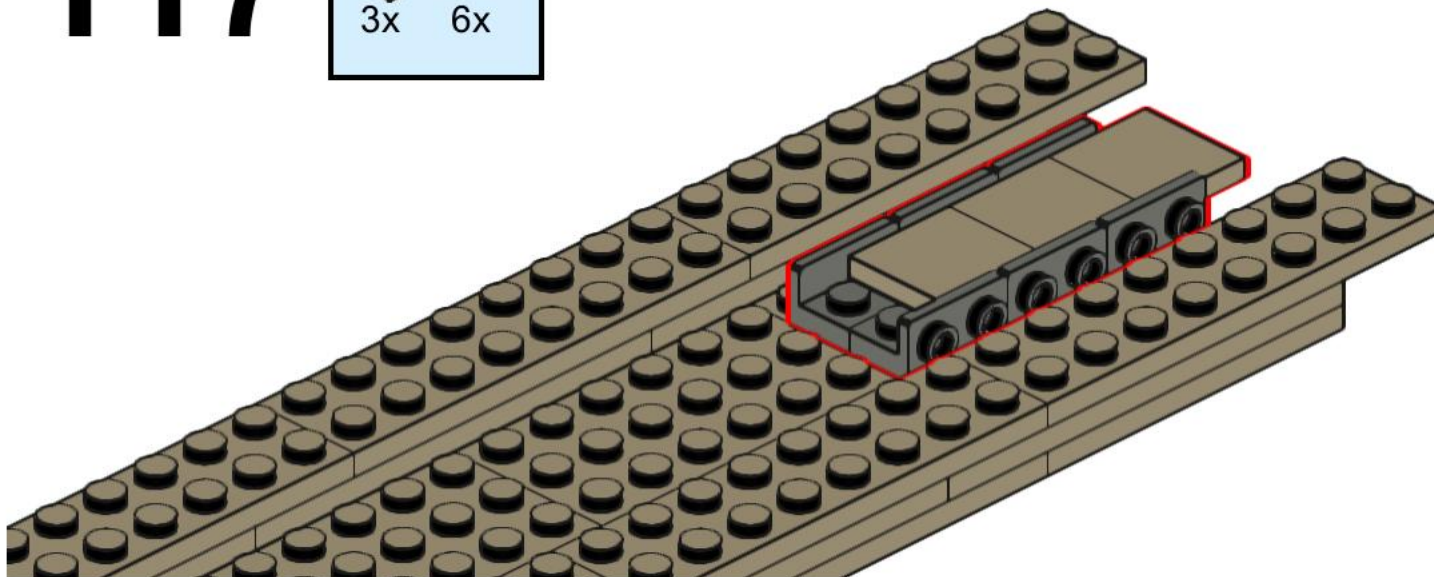
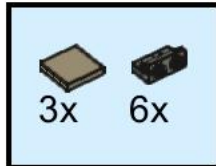
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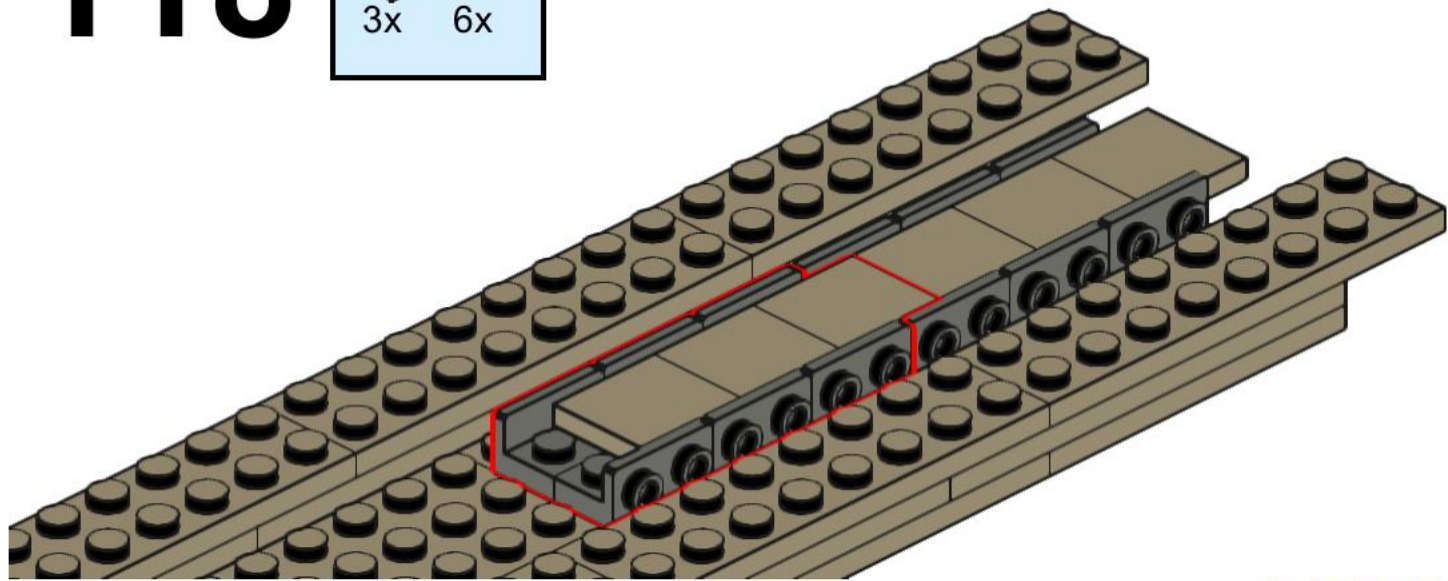
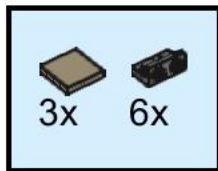
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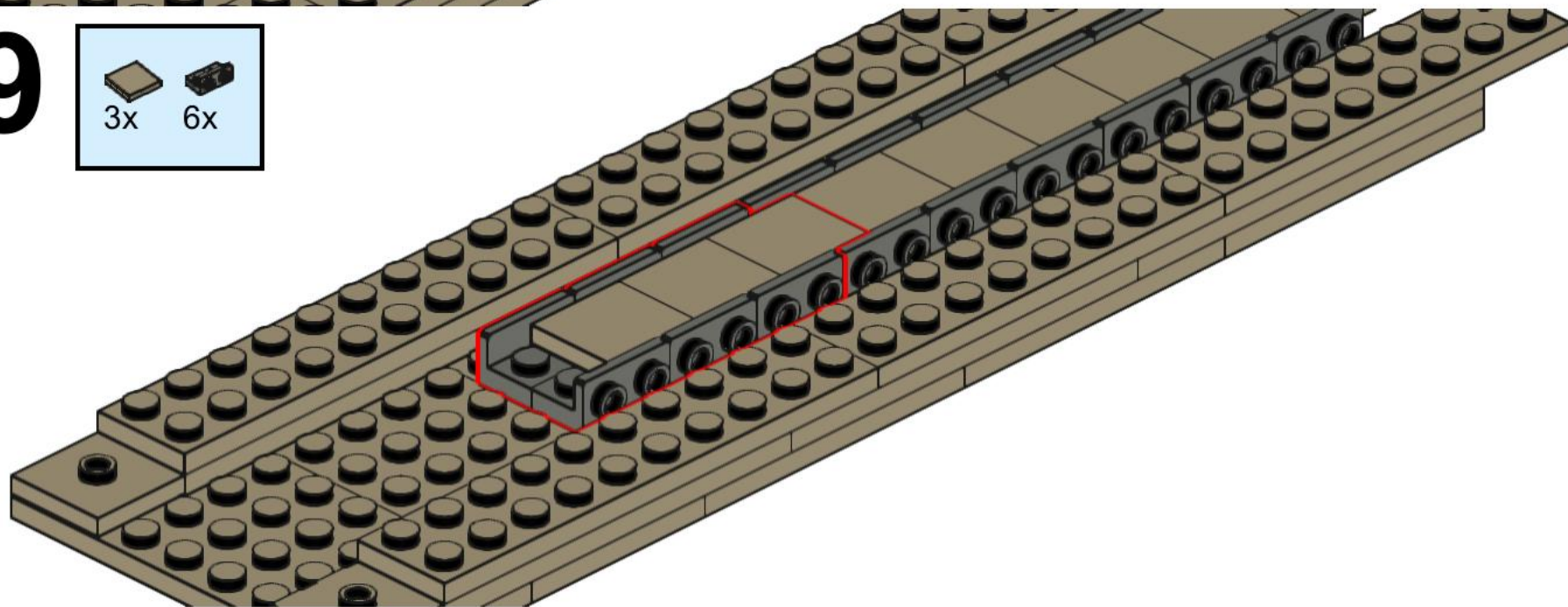
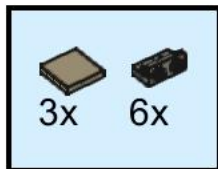
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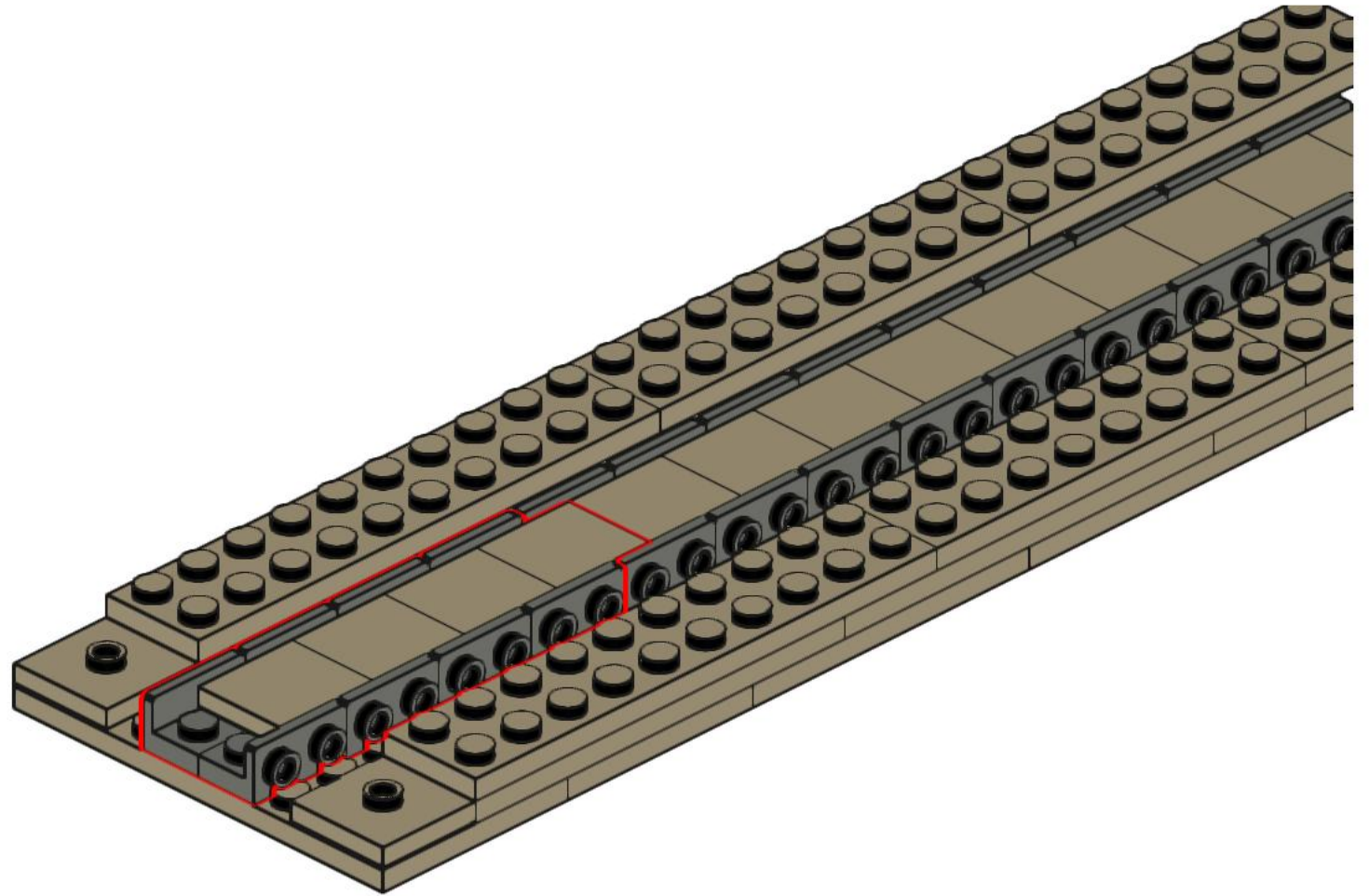
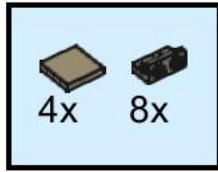
118



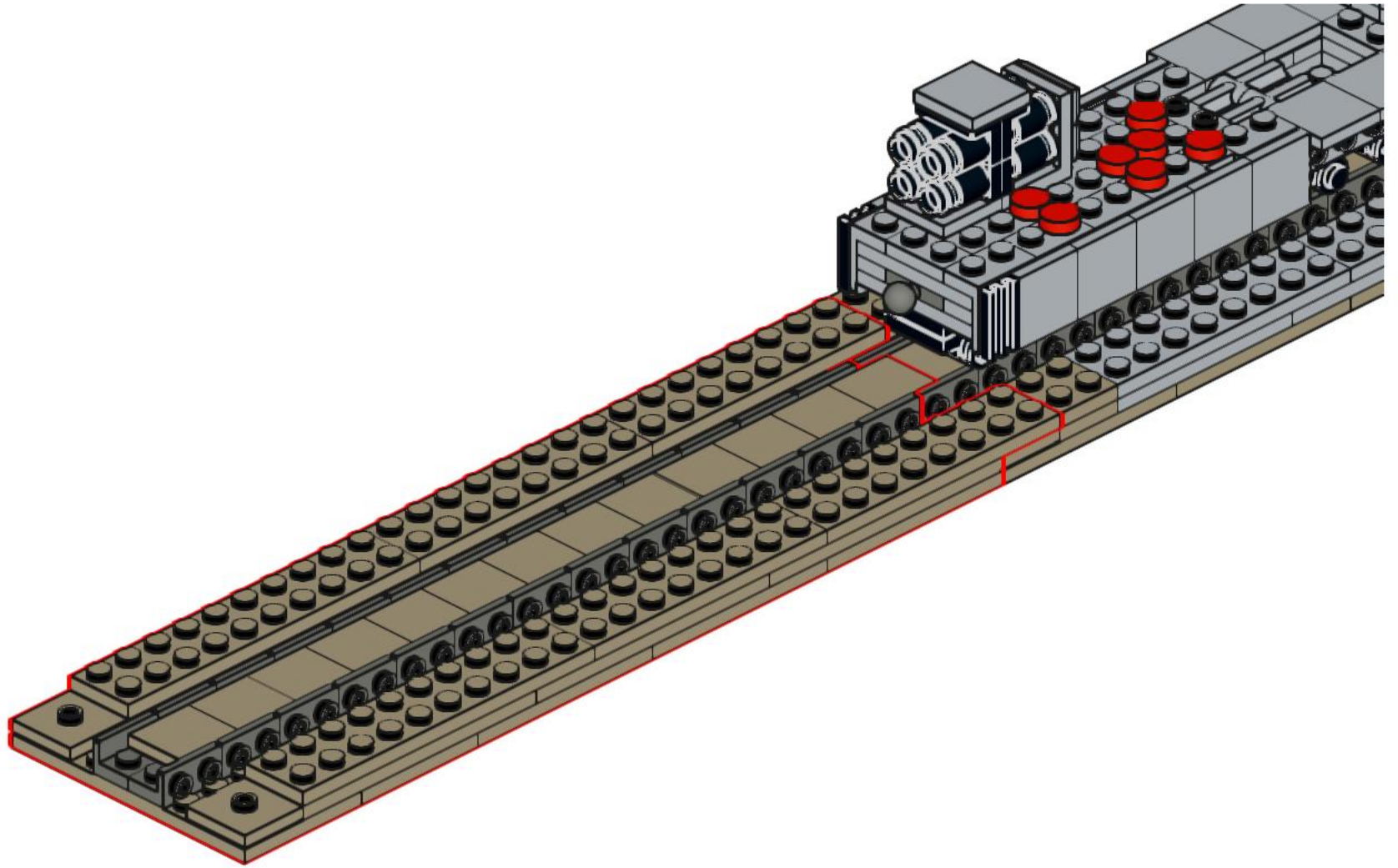
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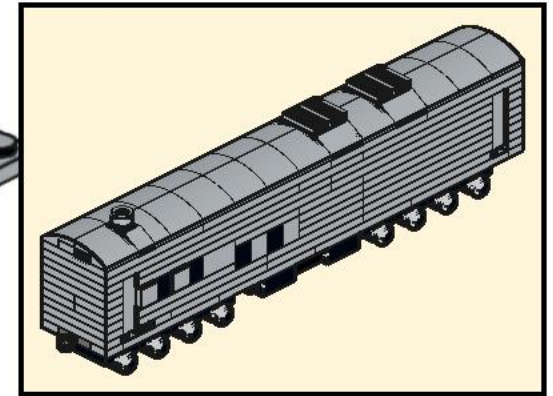
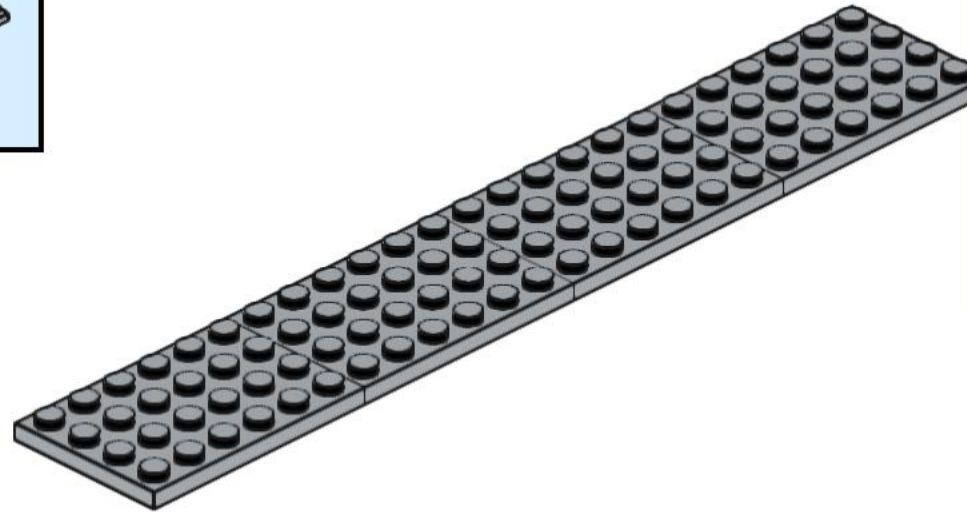
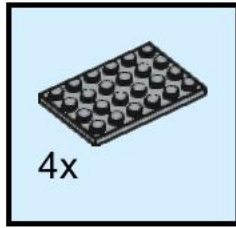
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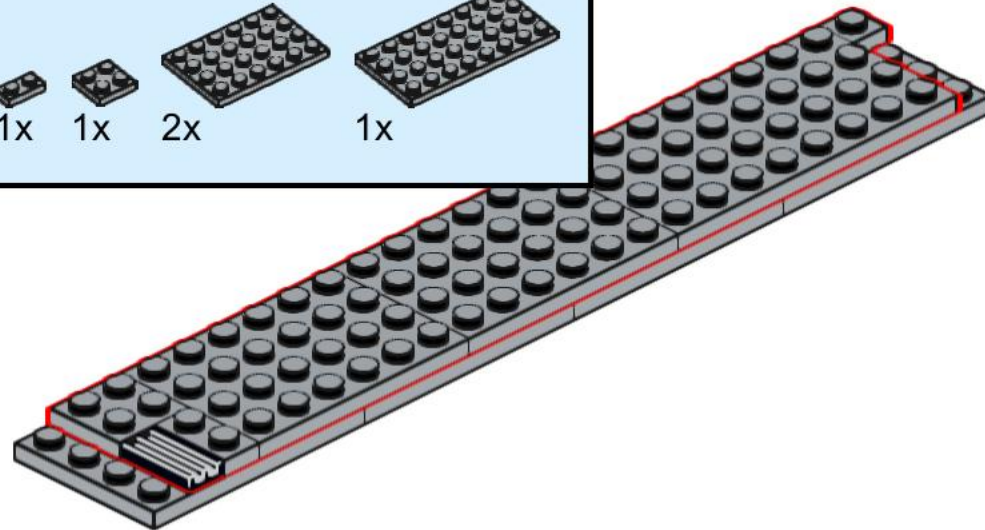
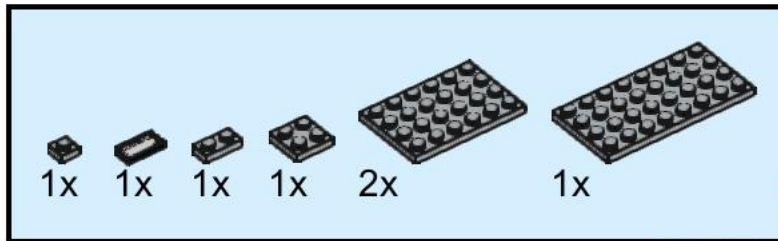
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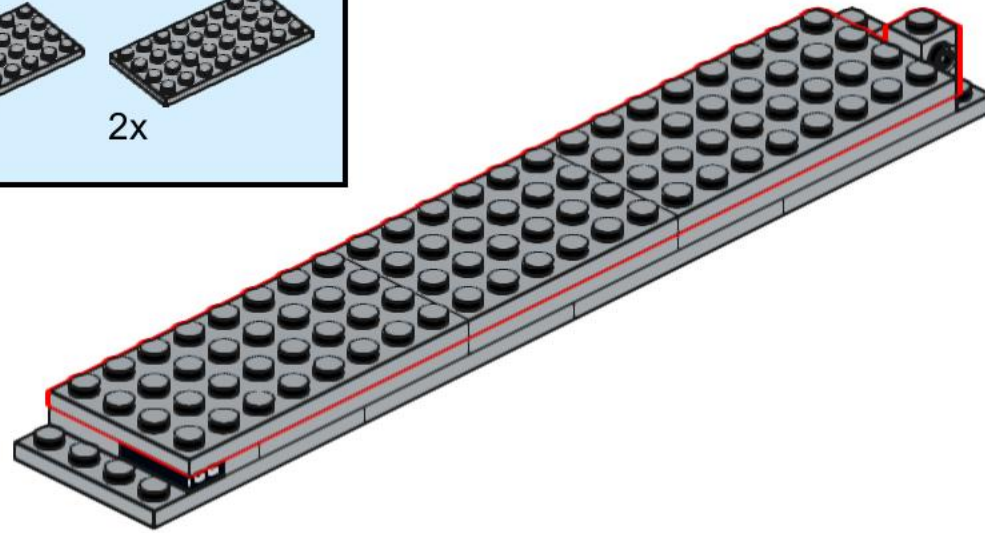
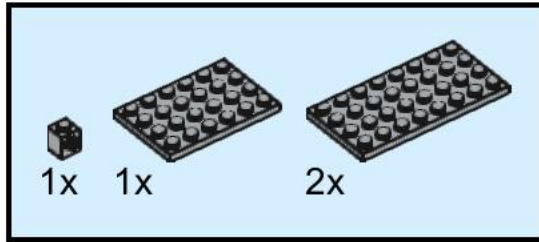
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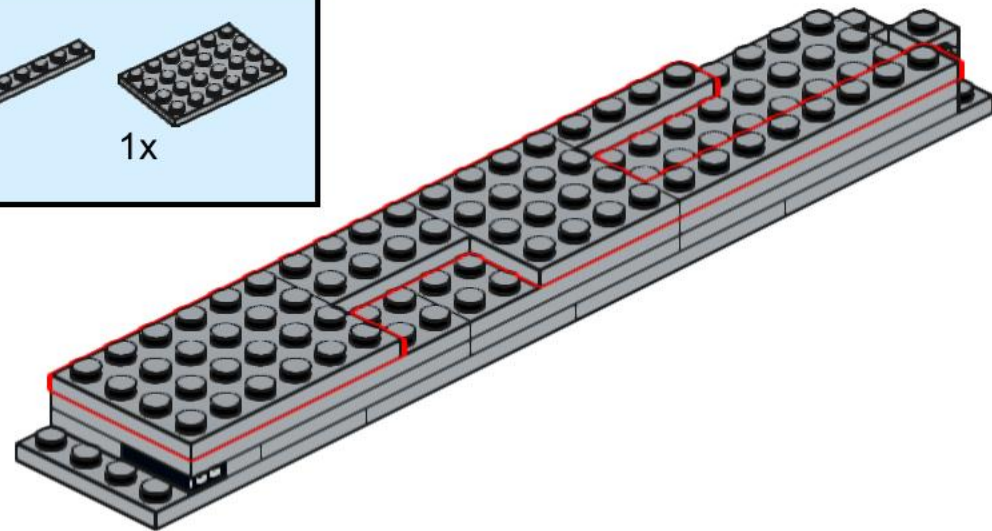
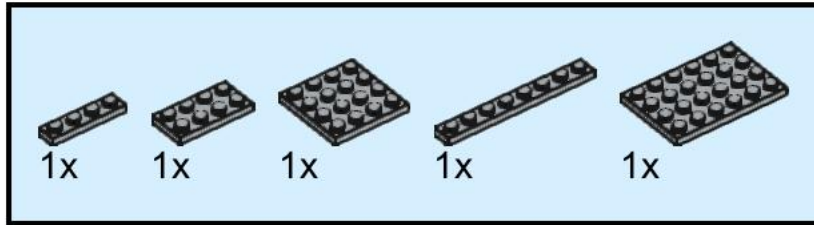
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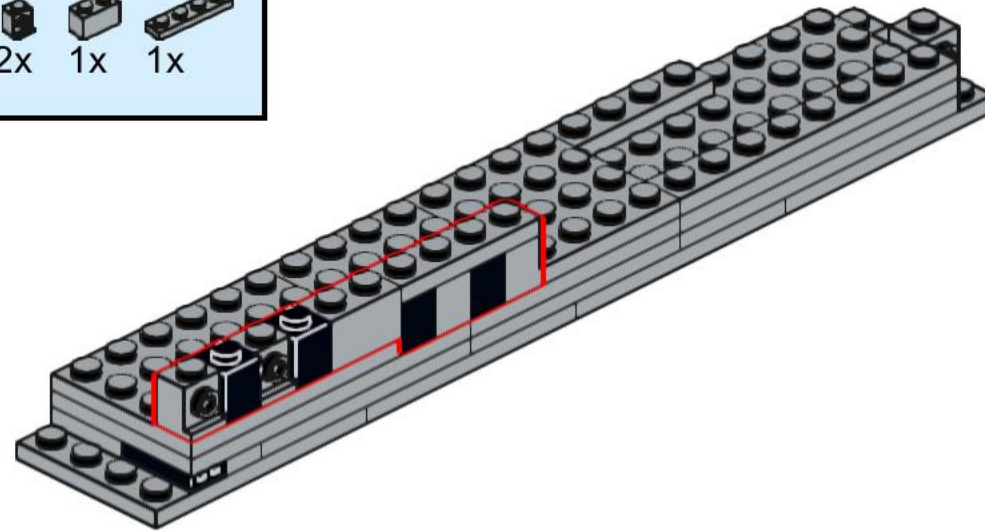
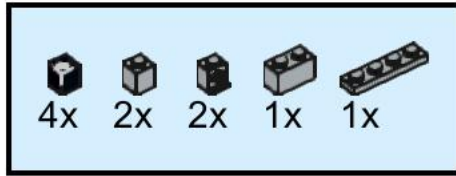
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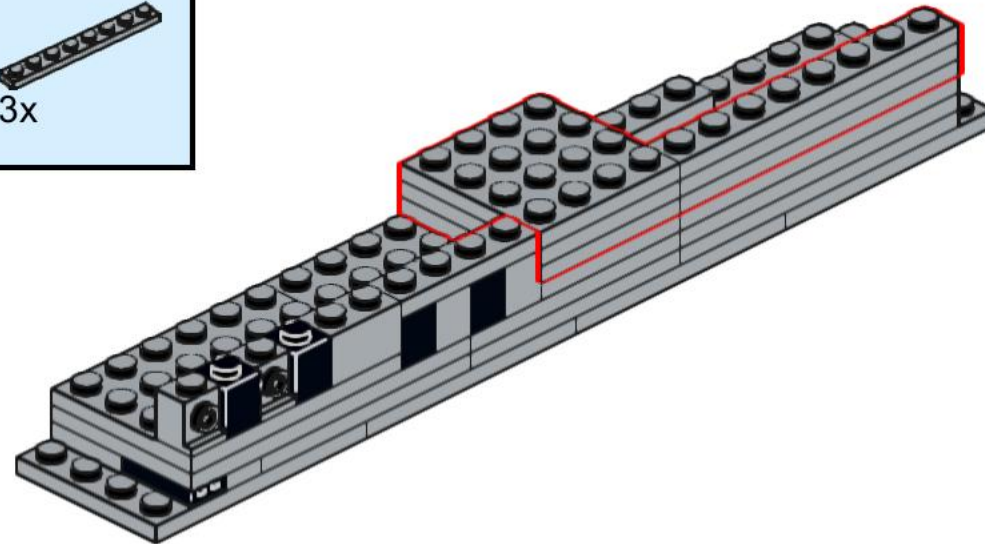
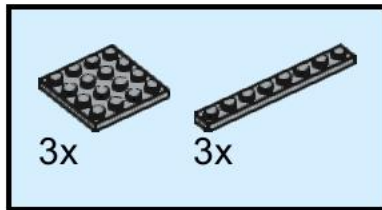
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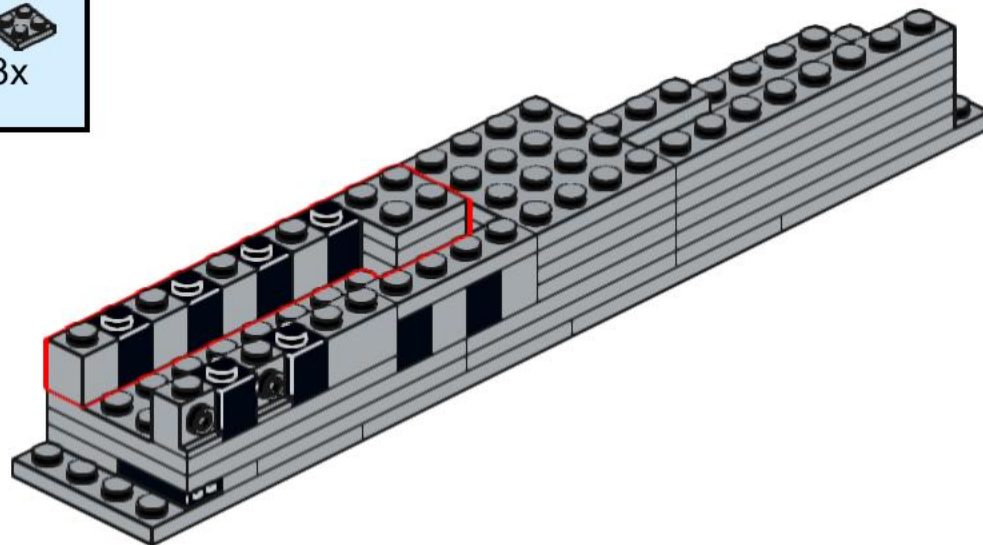
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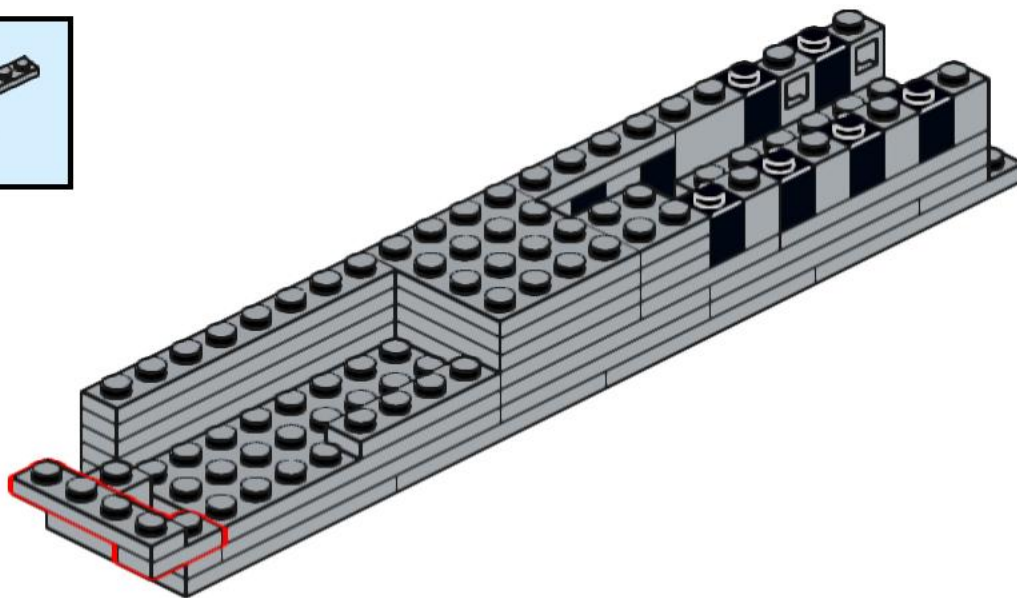
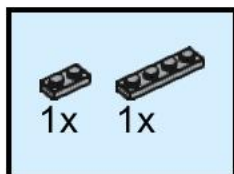
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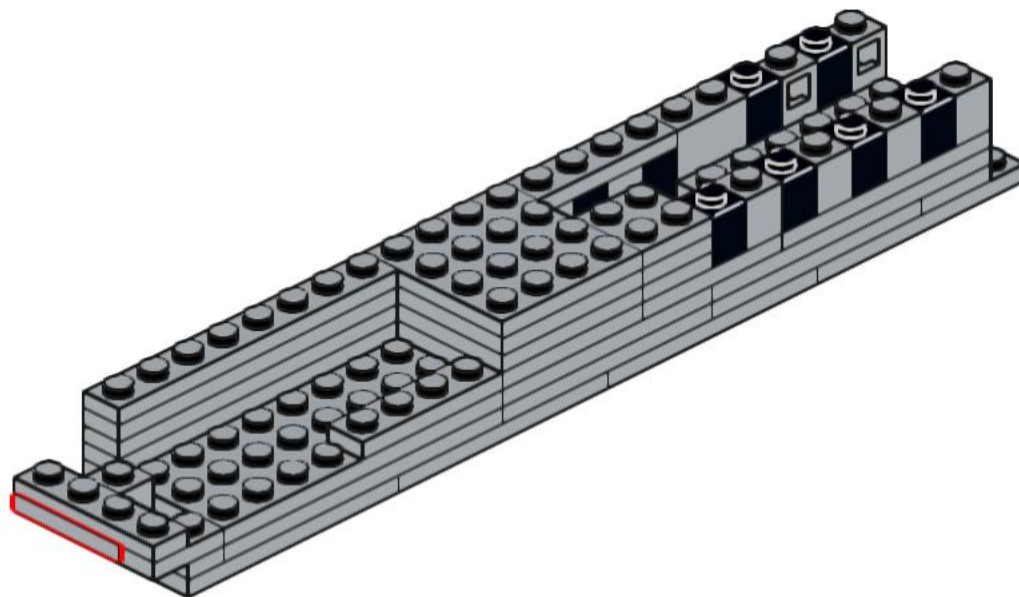
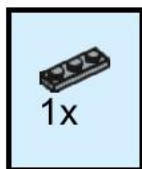
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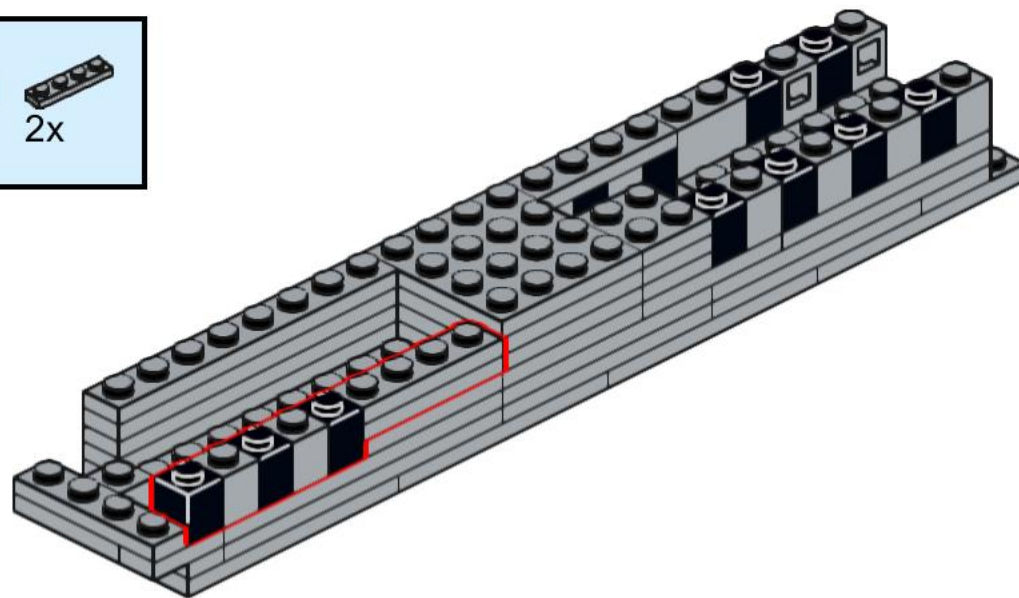
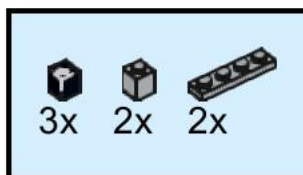
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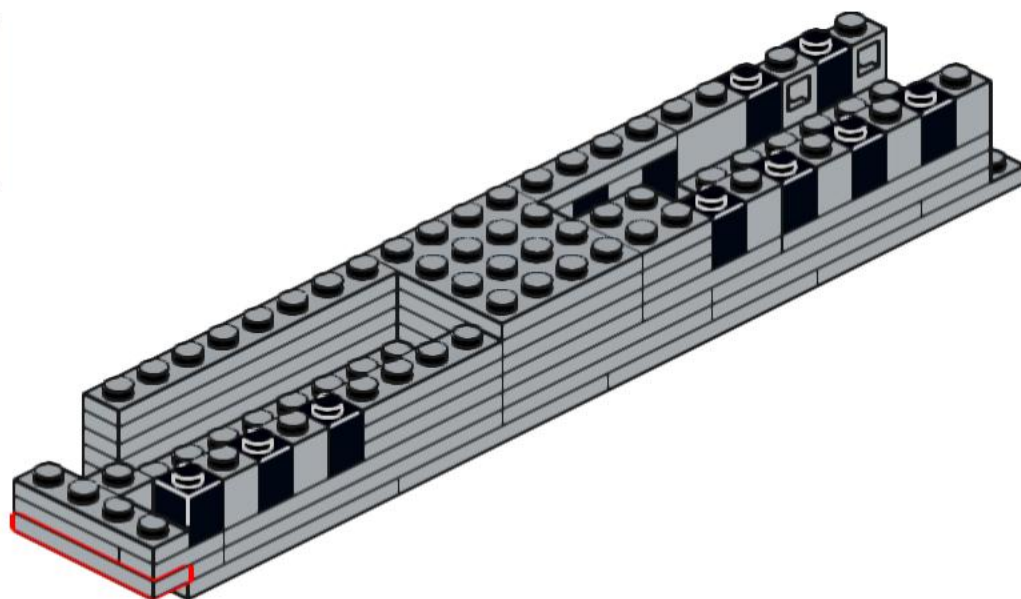
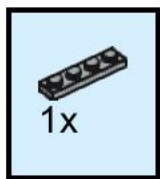
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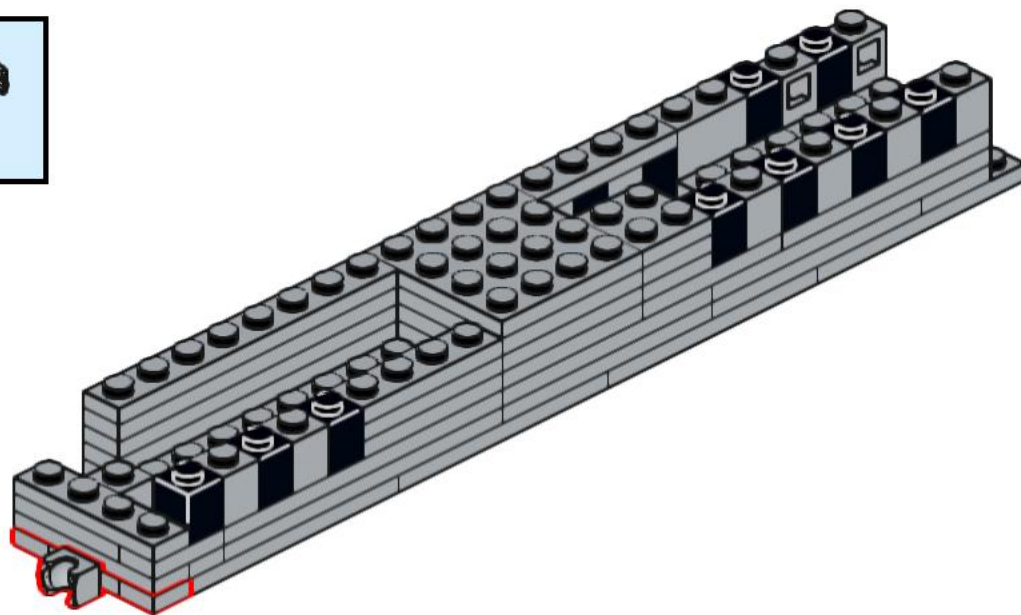
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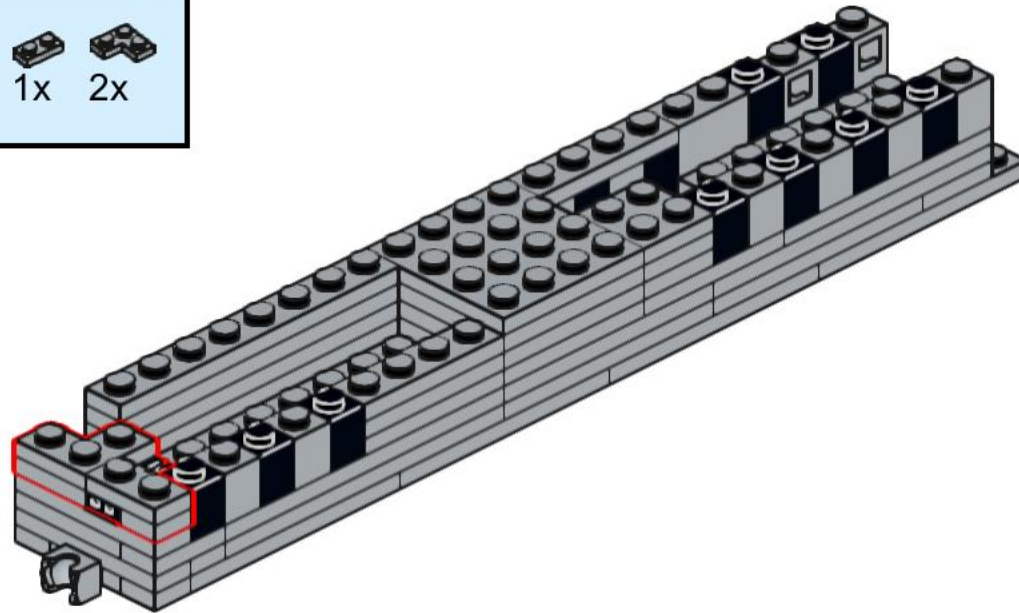
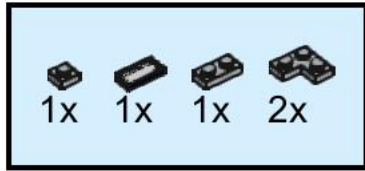
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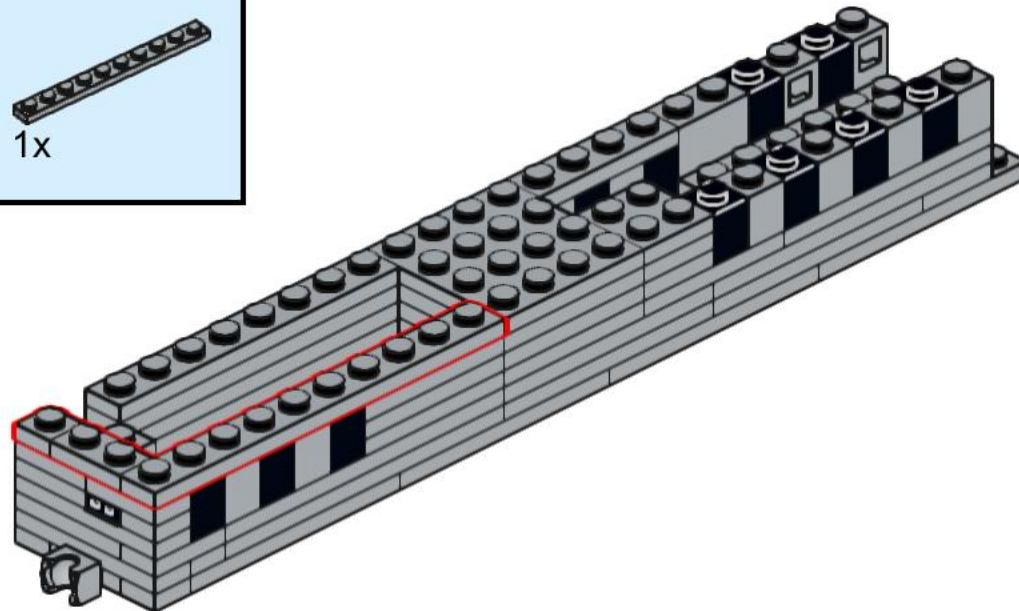
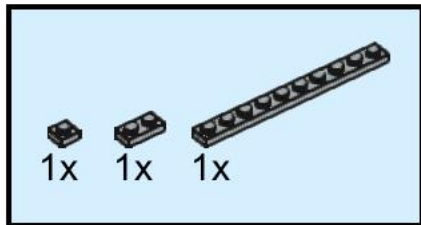
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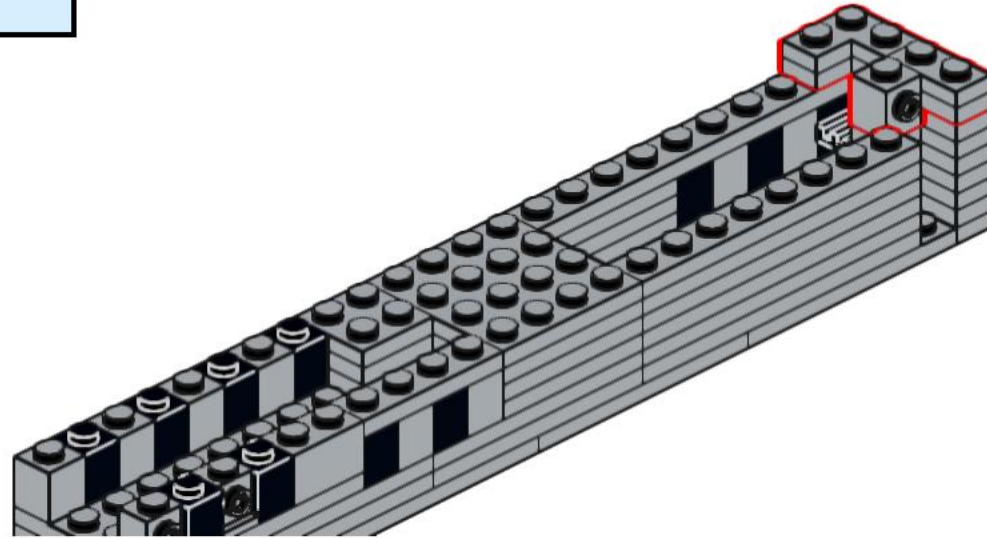
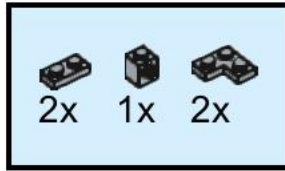
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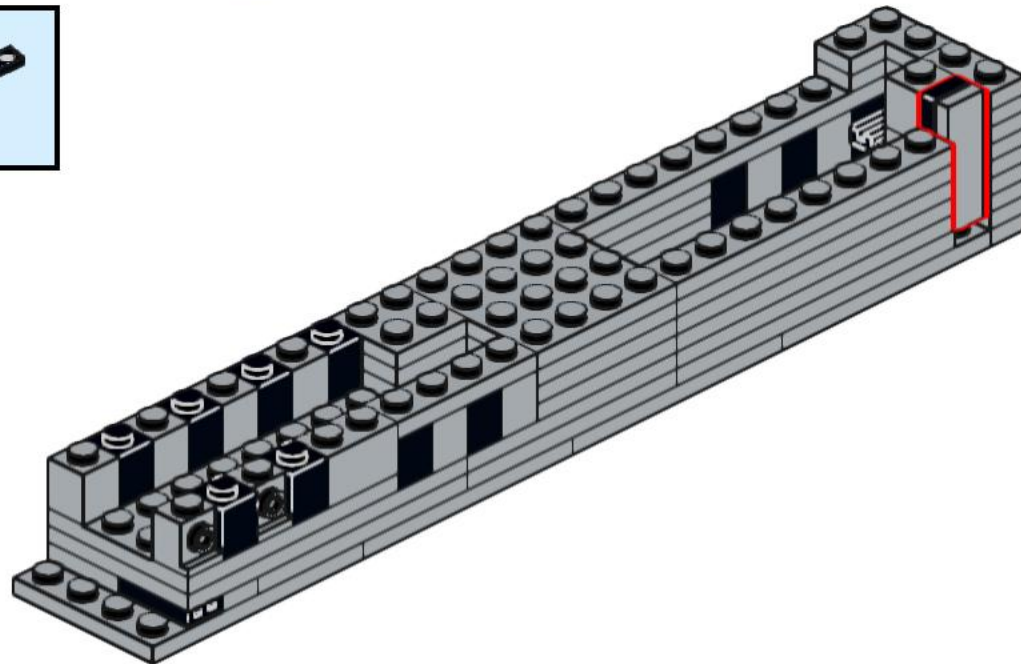
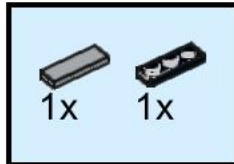
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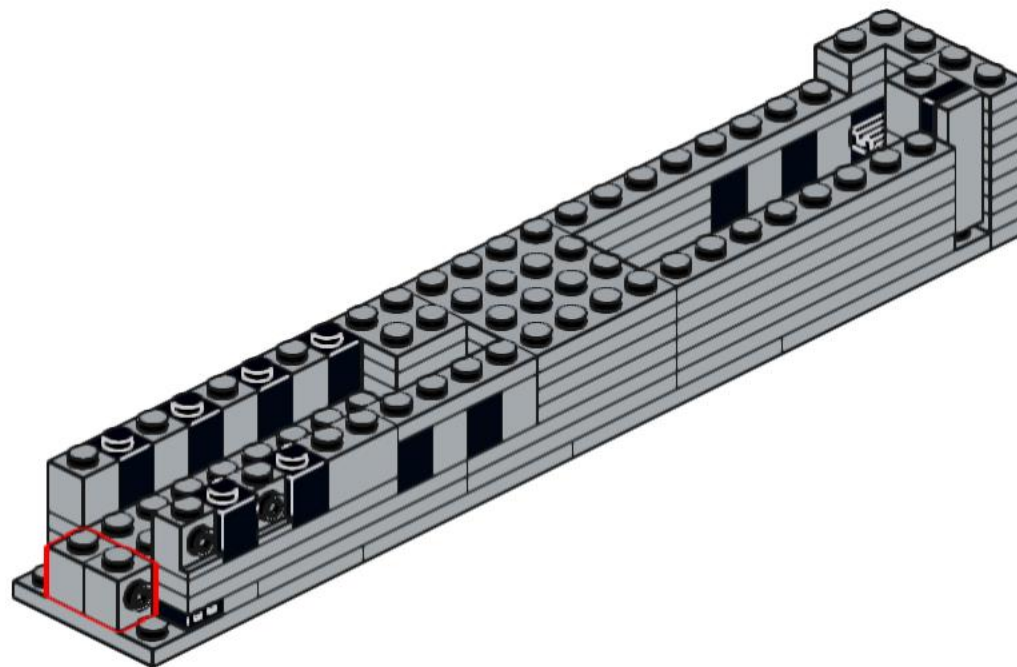
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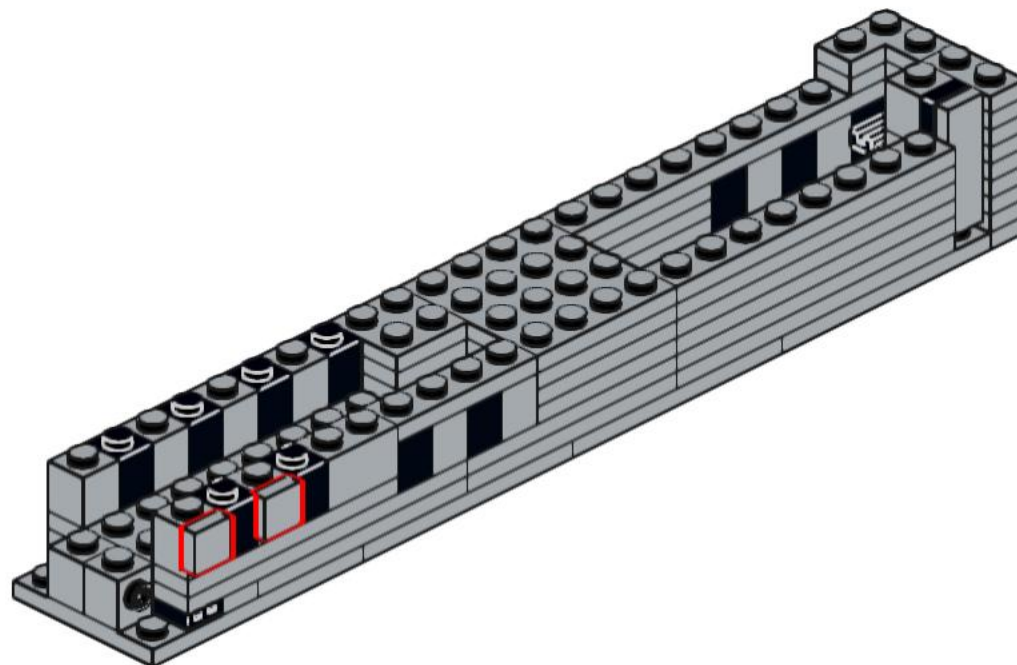
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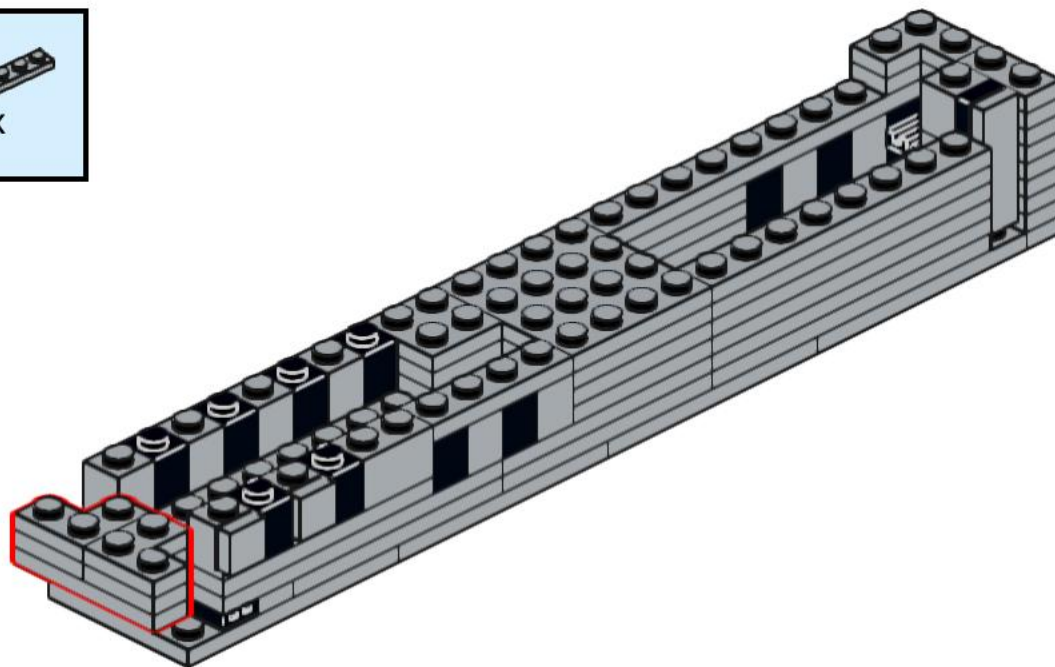
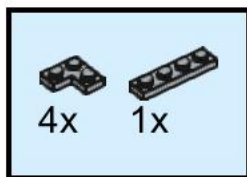
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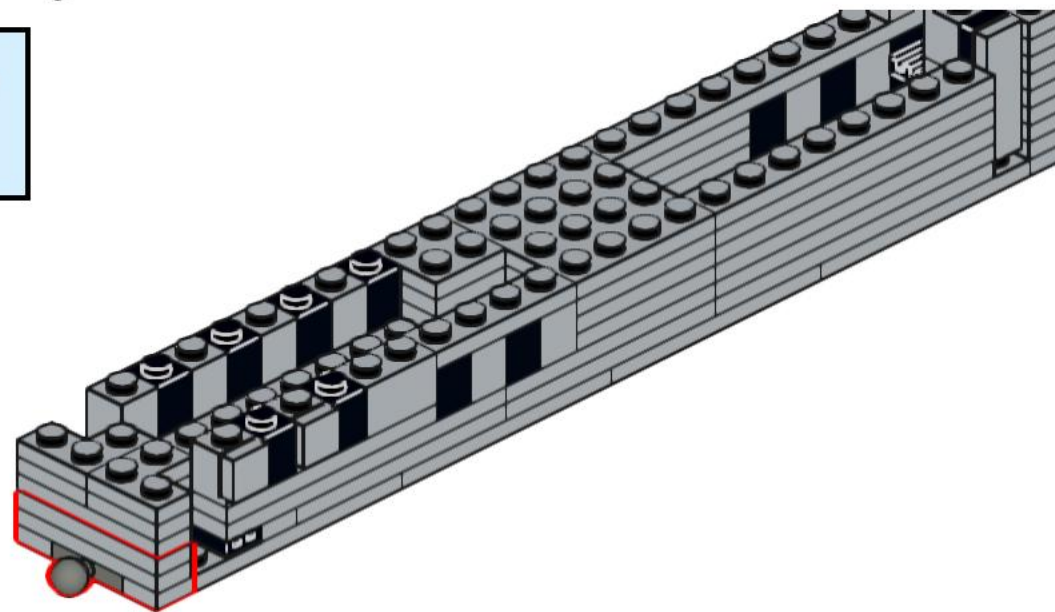
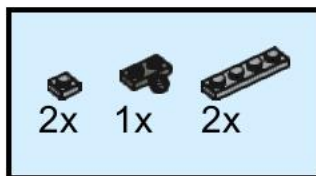
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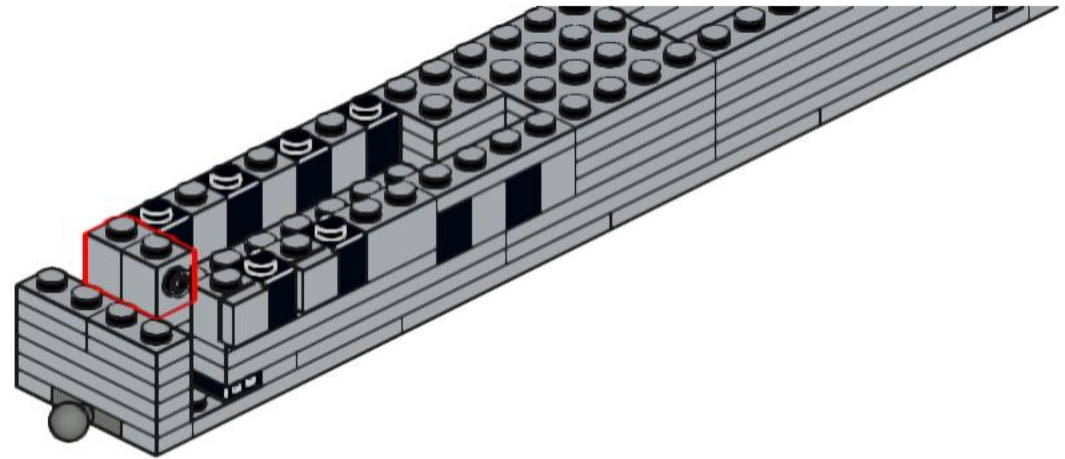
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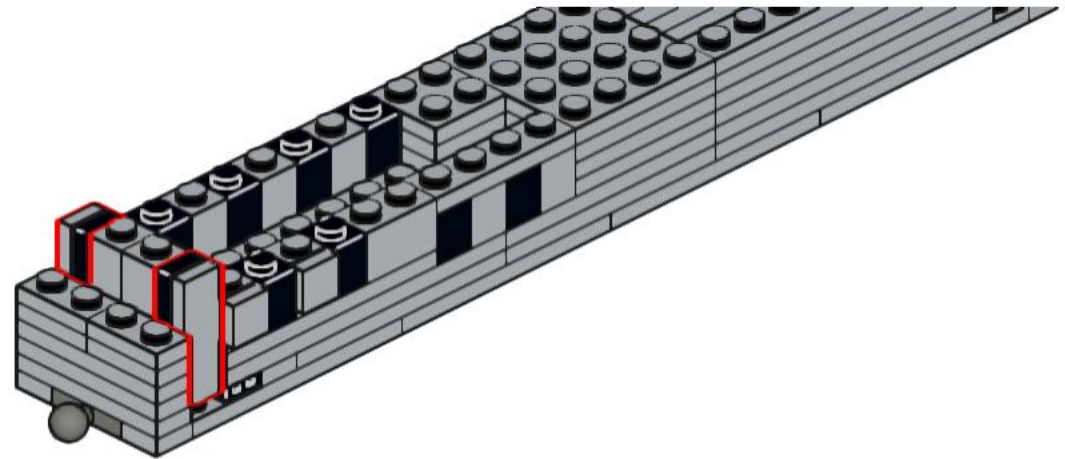
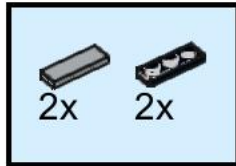
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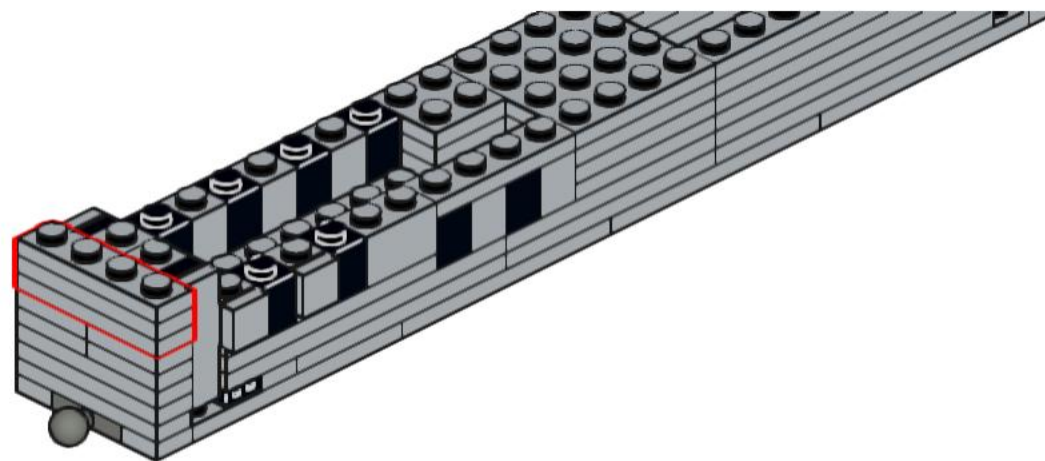
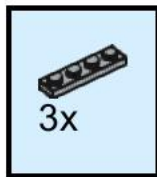
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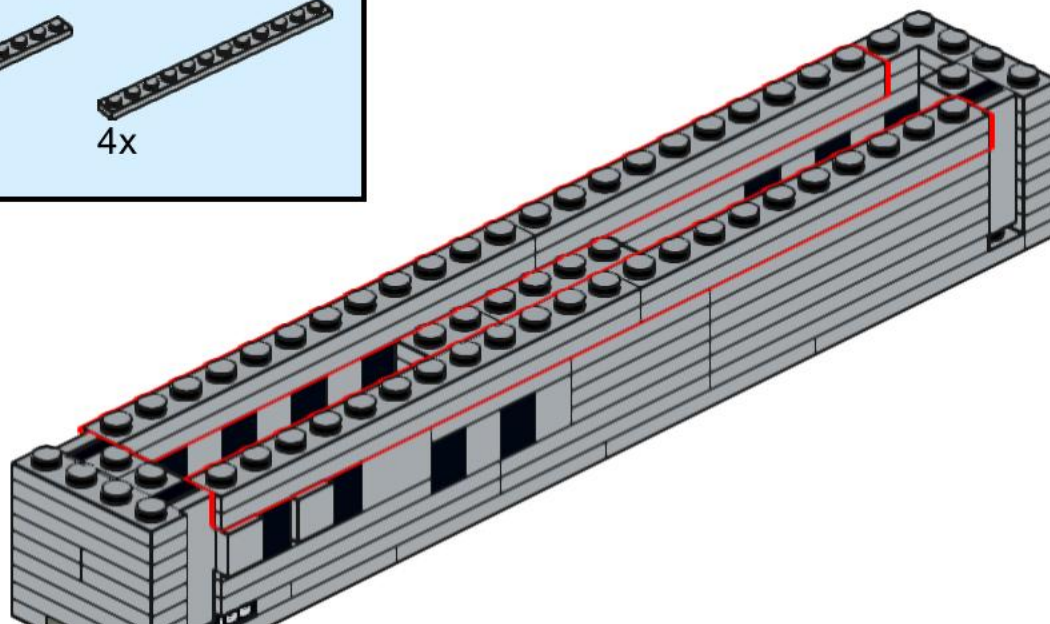
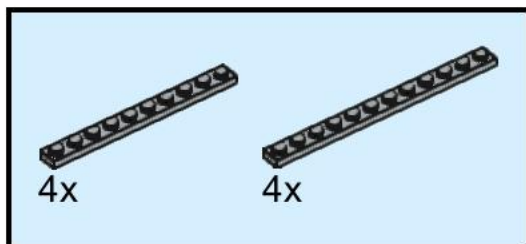
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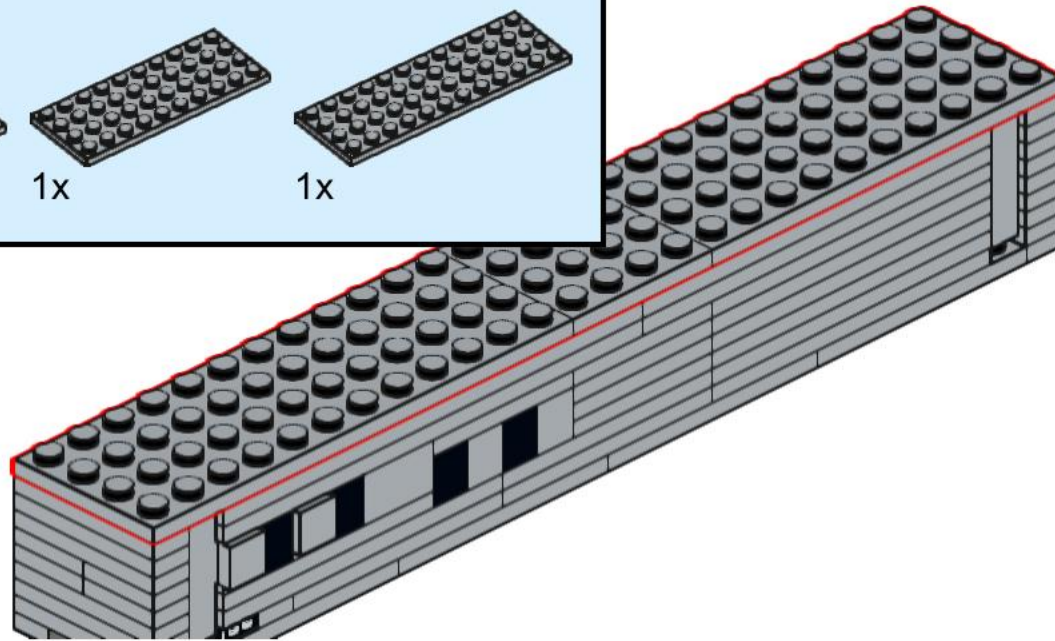
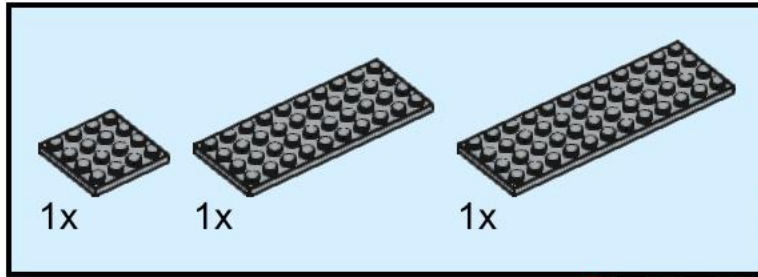
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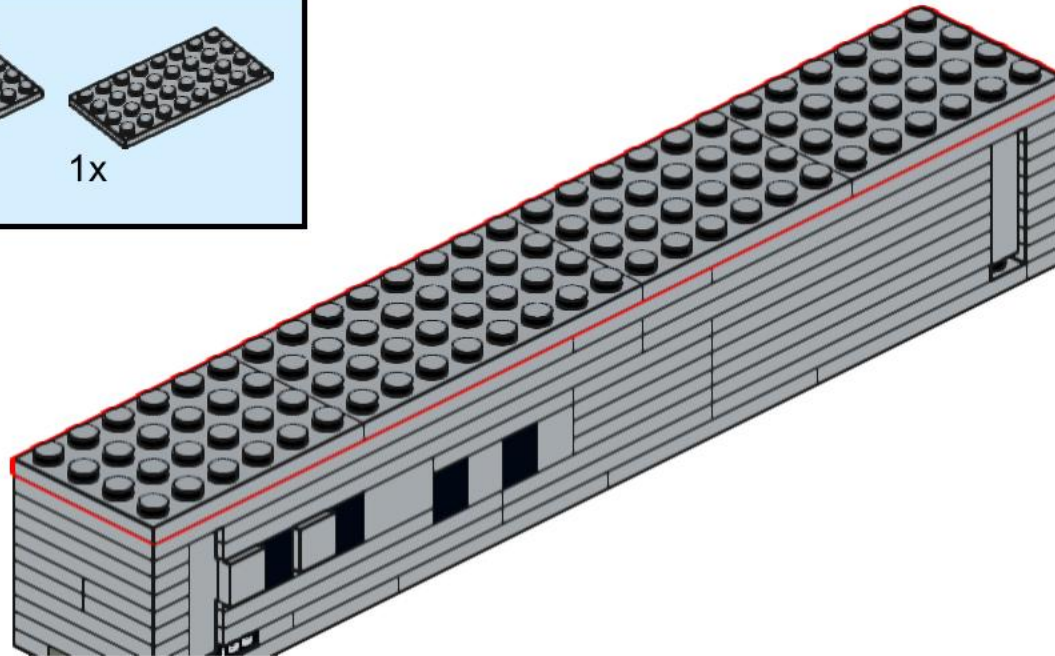
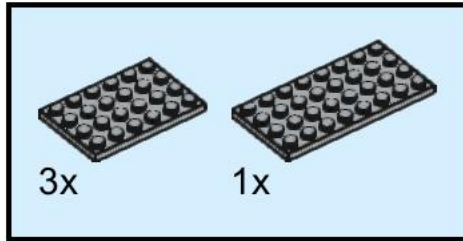
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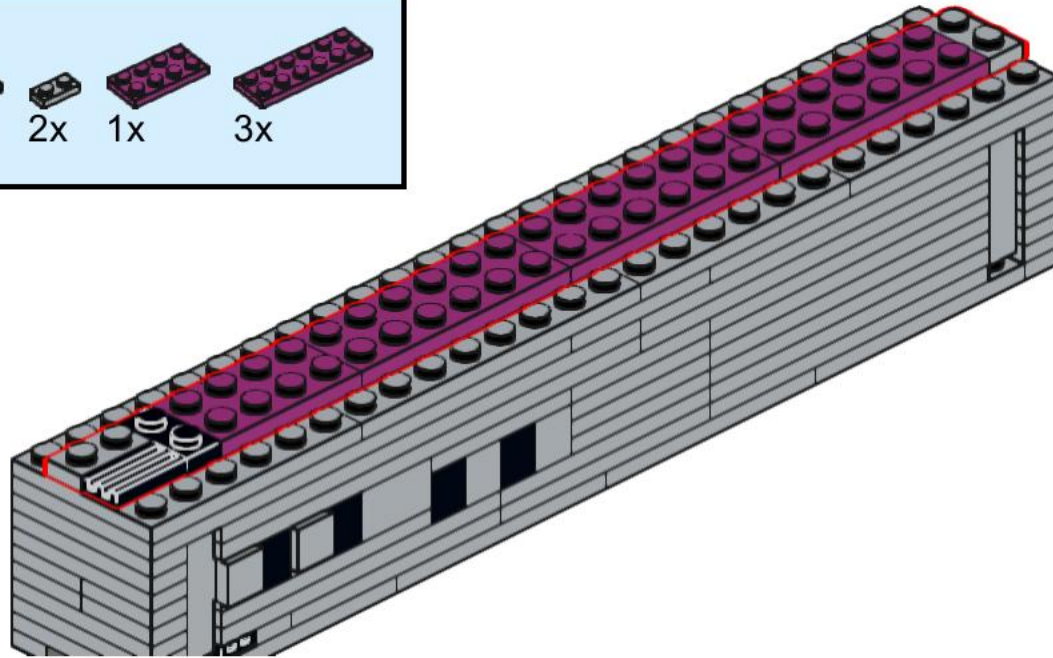
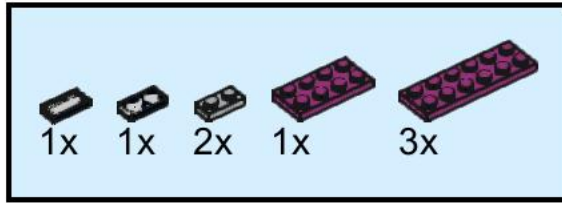
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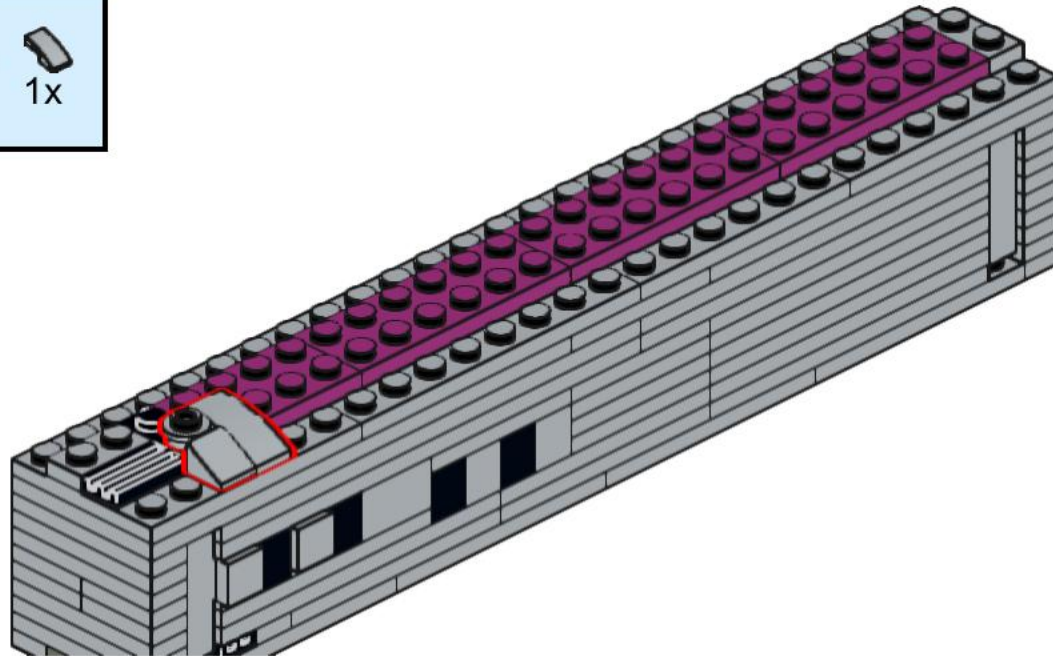
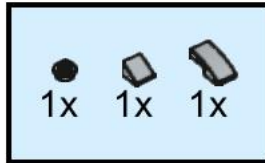
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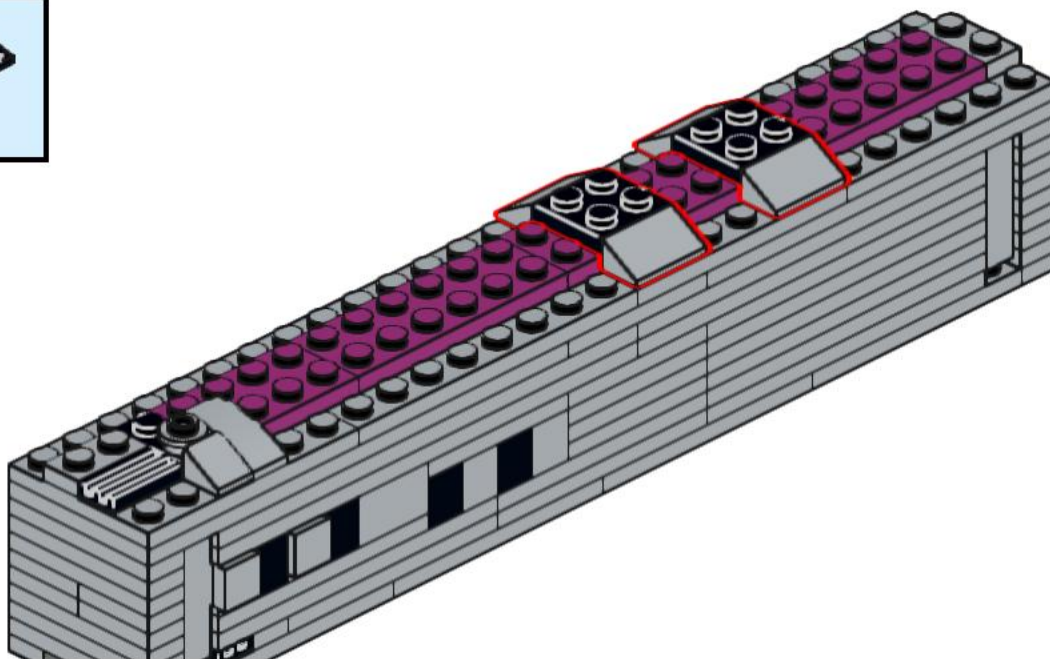
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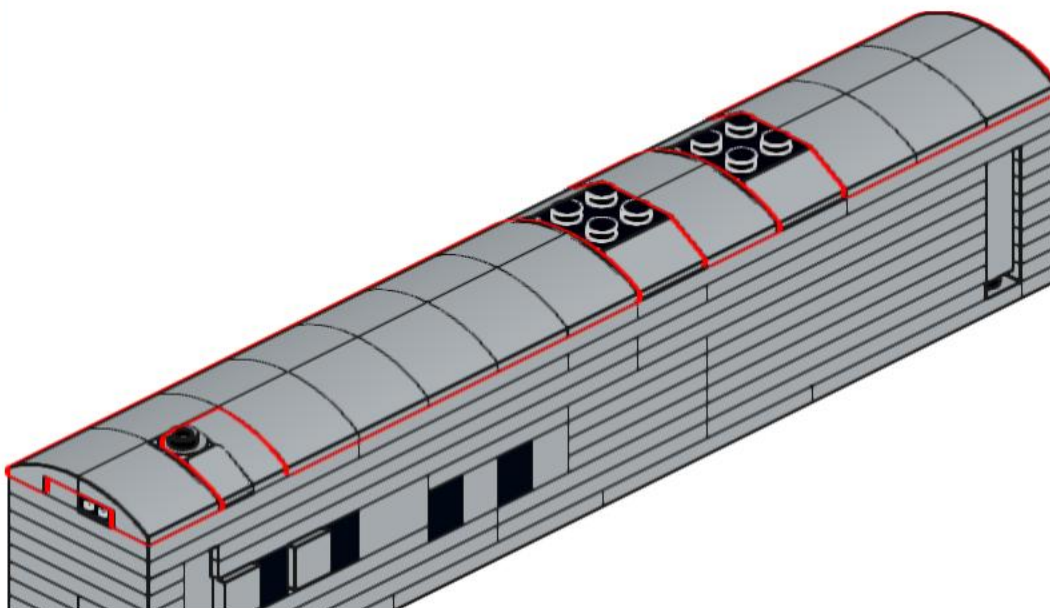
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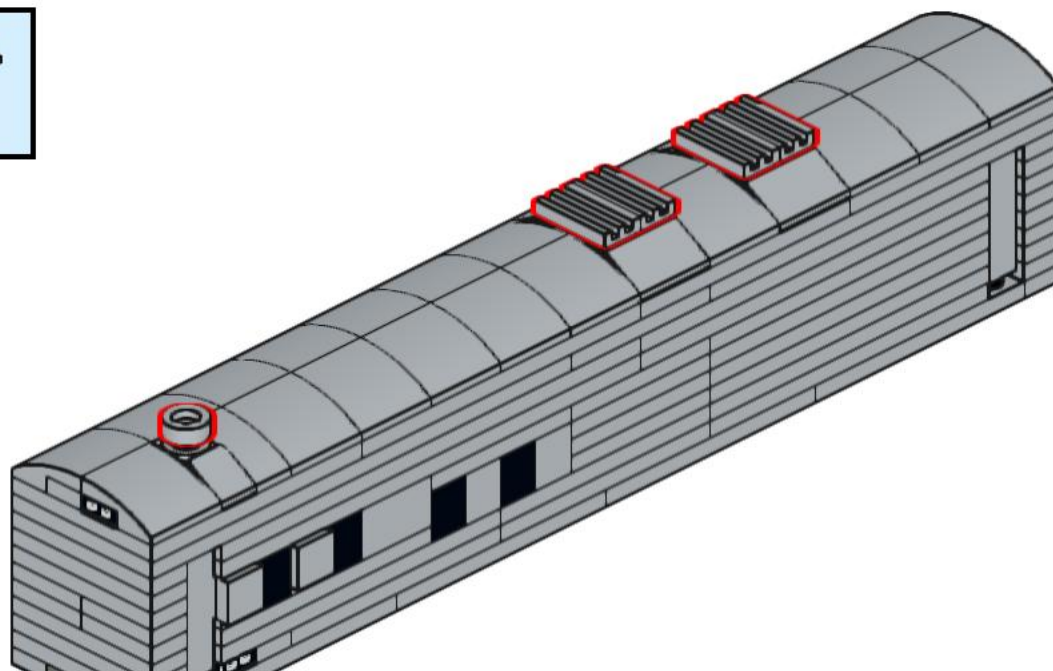
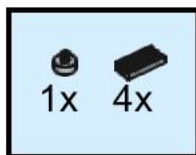
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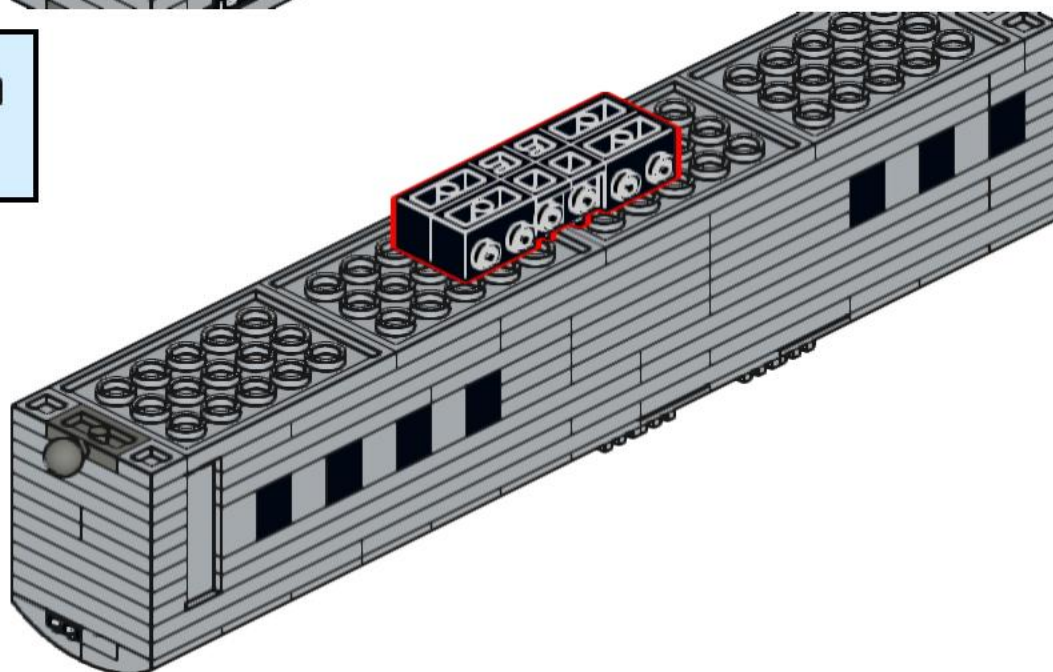
151



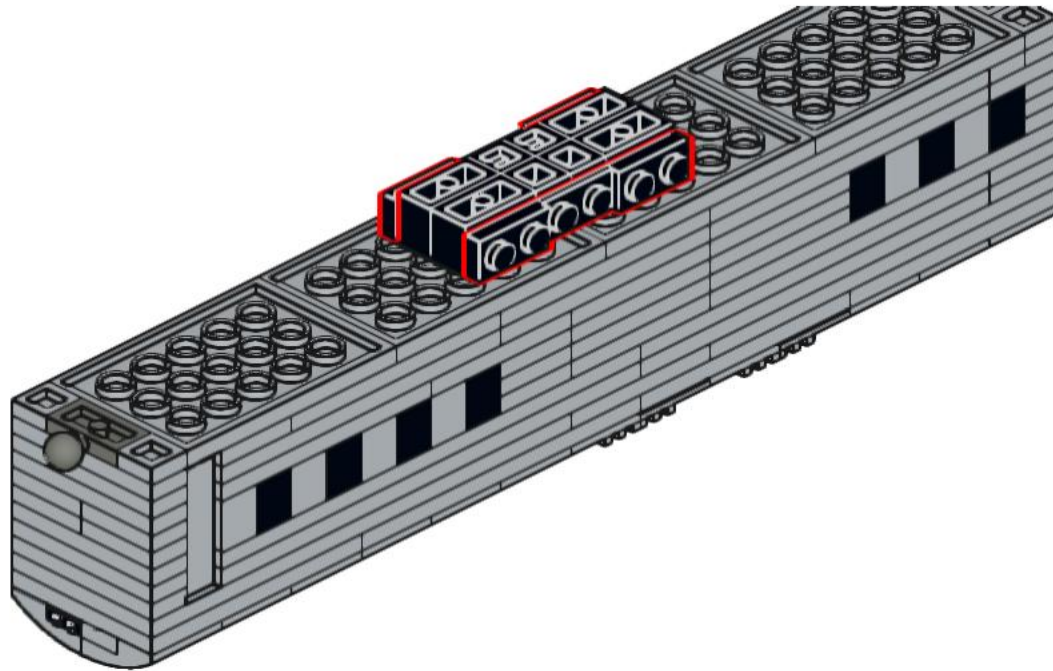
152



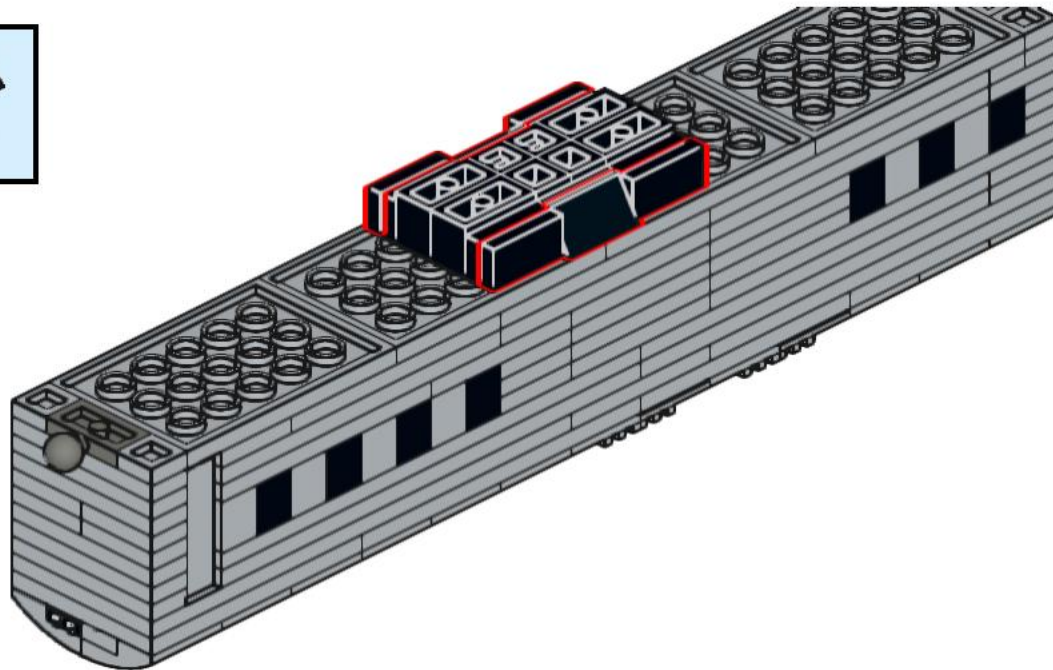
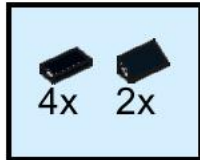
153



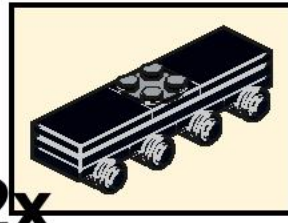
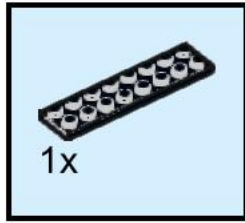
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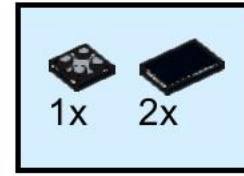
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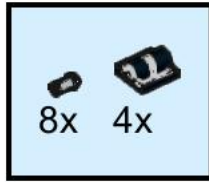
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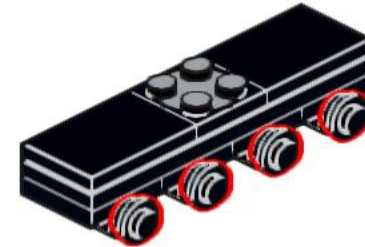
157



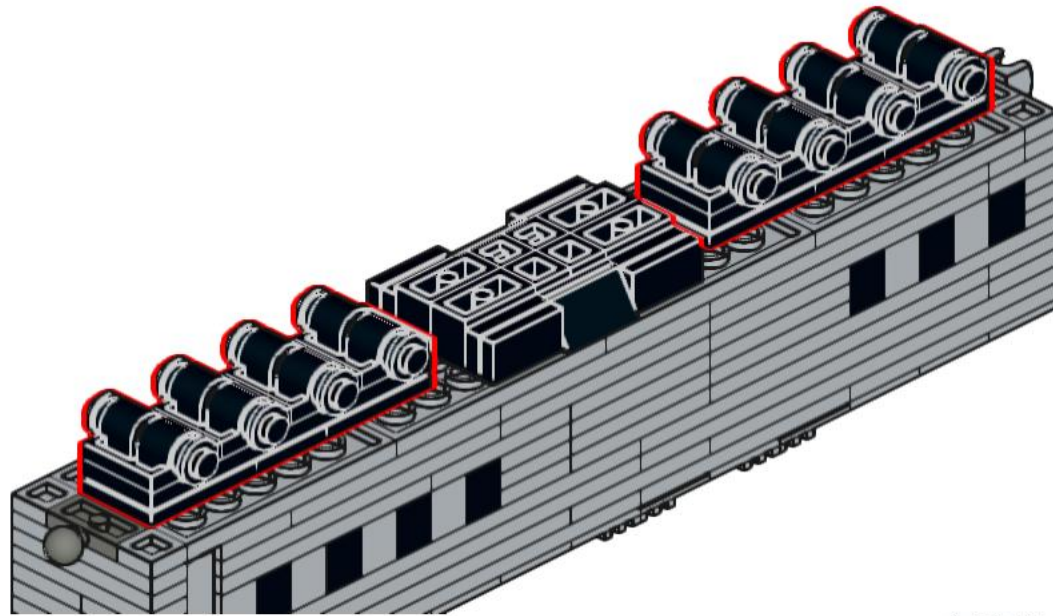
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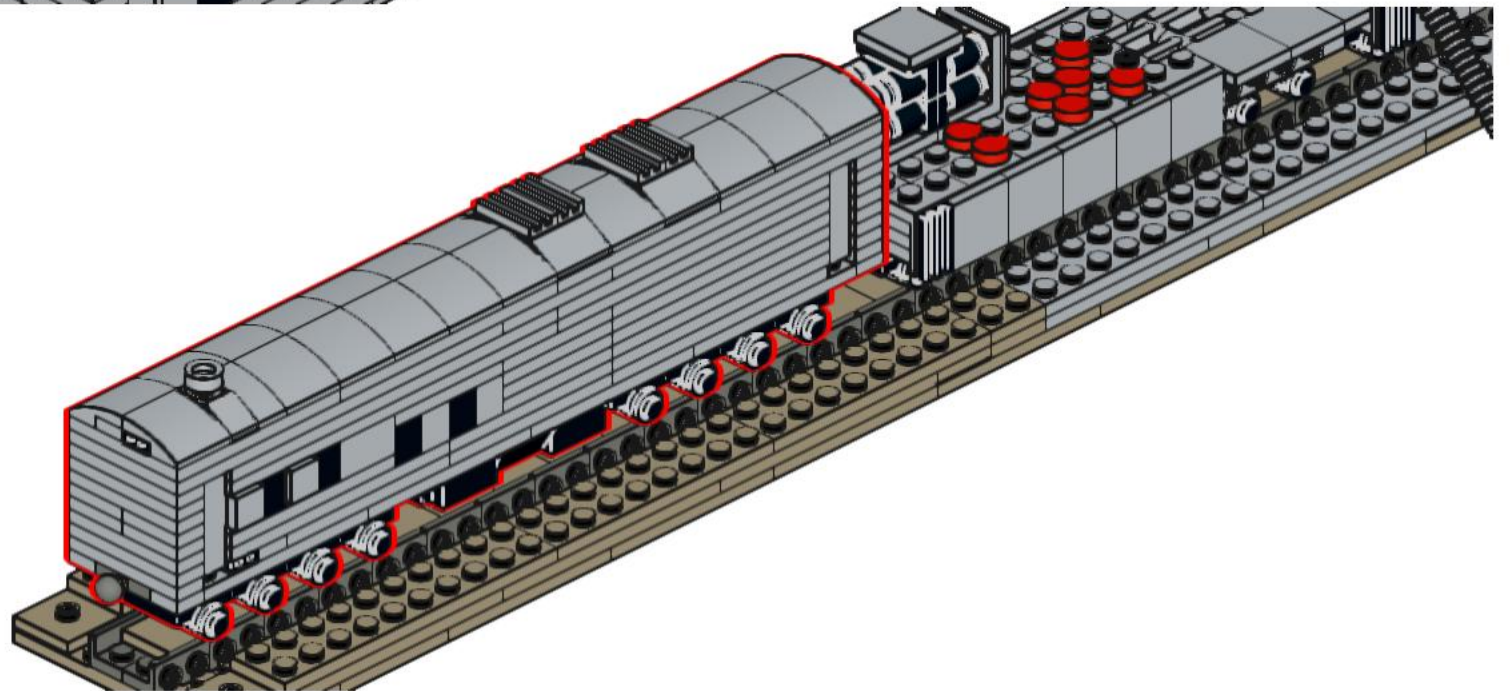
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160



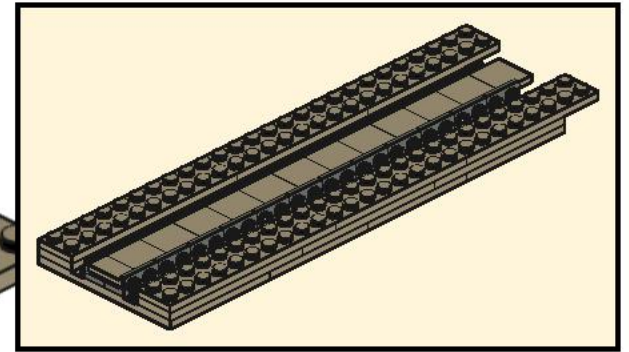
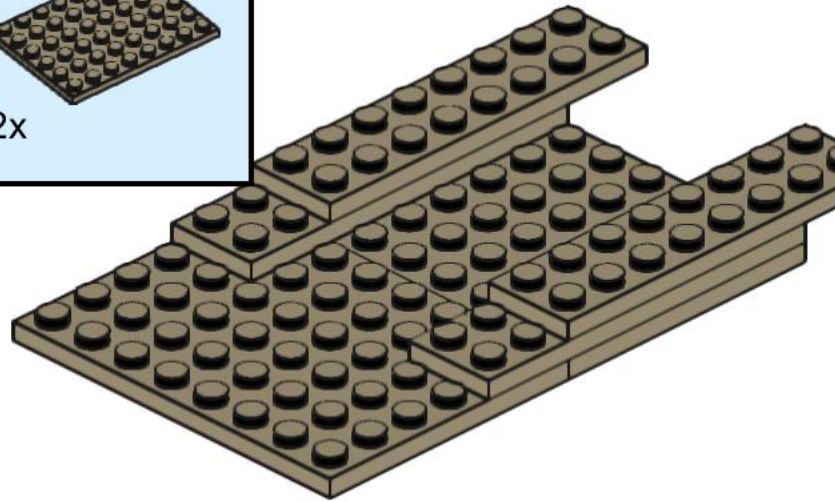
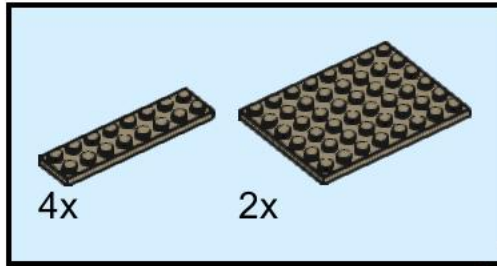
161



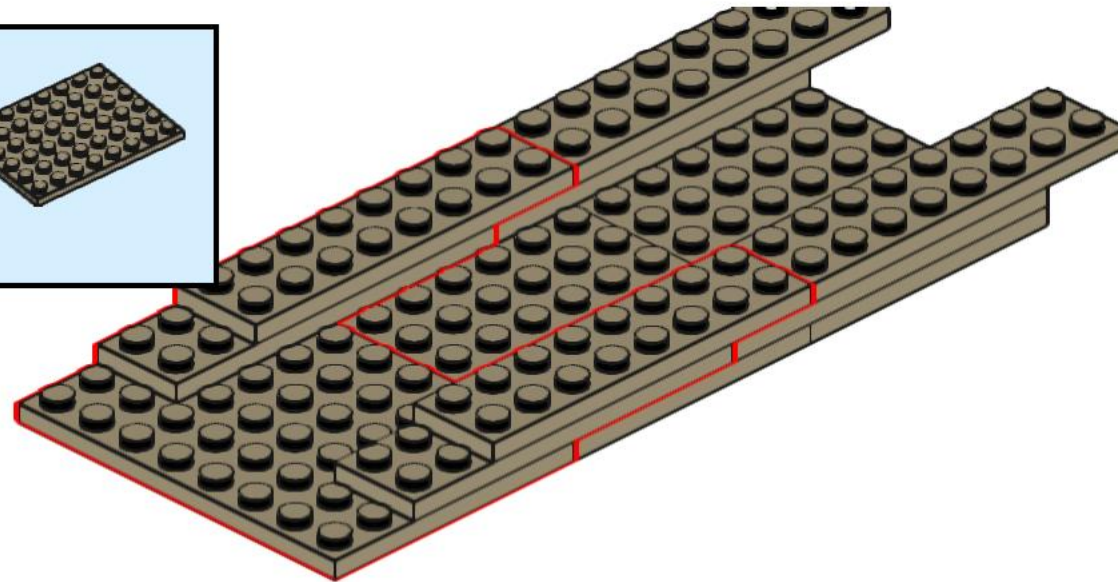
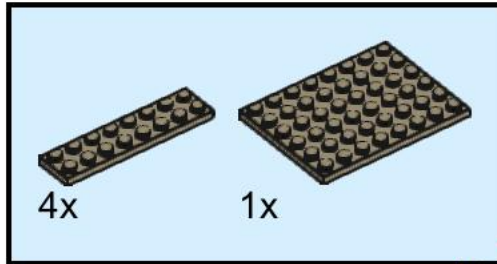
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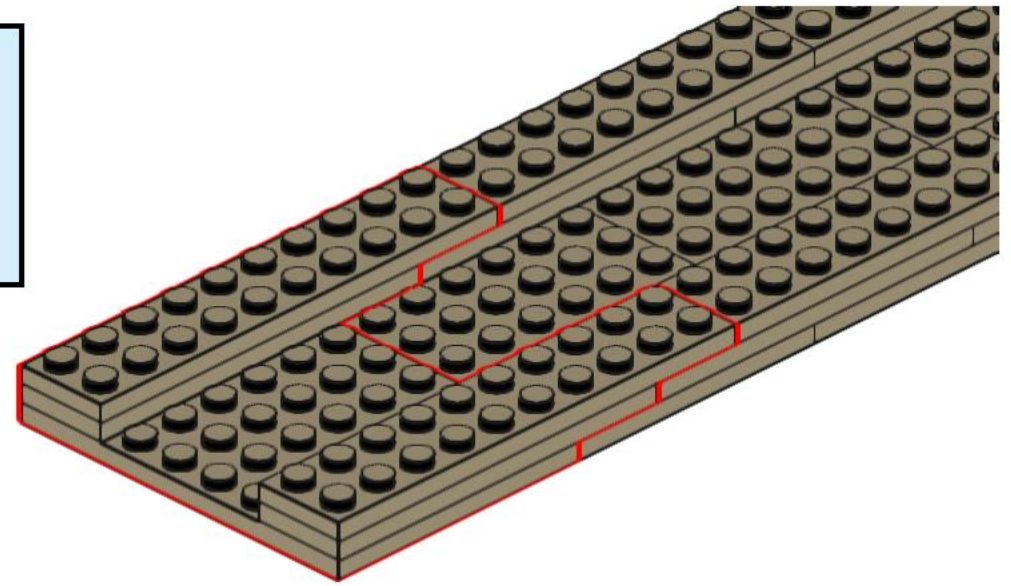
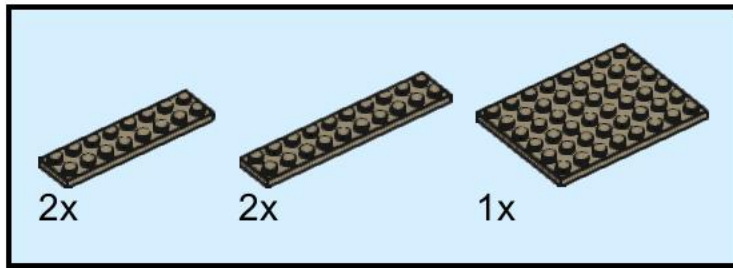
162



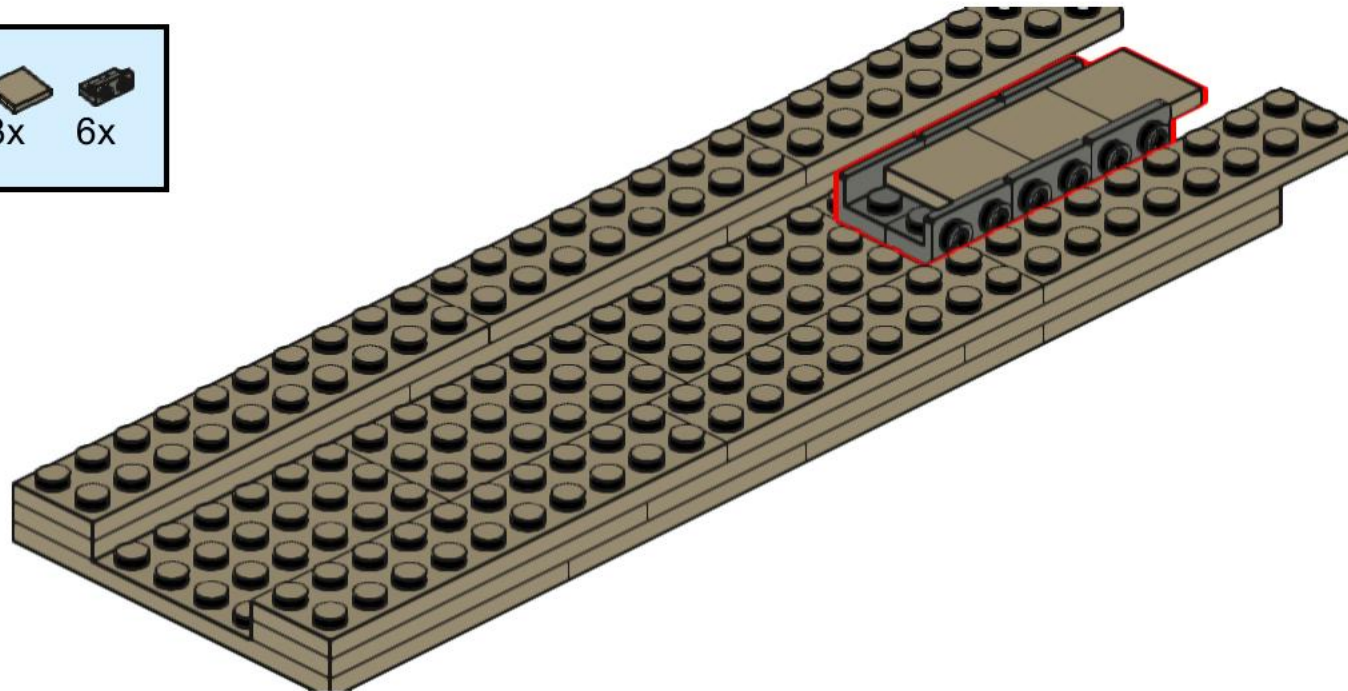
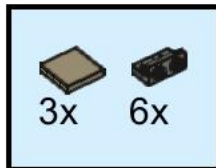
163



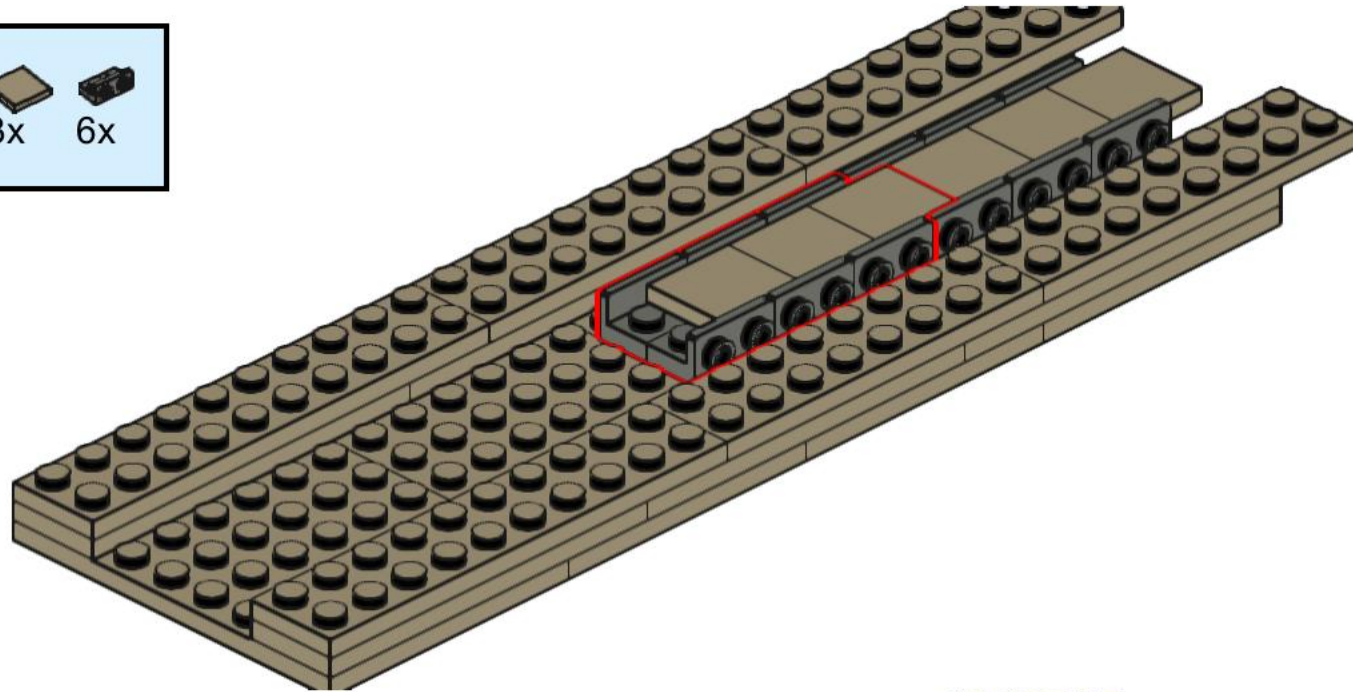
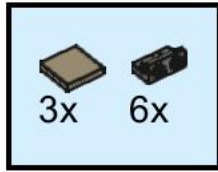
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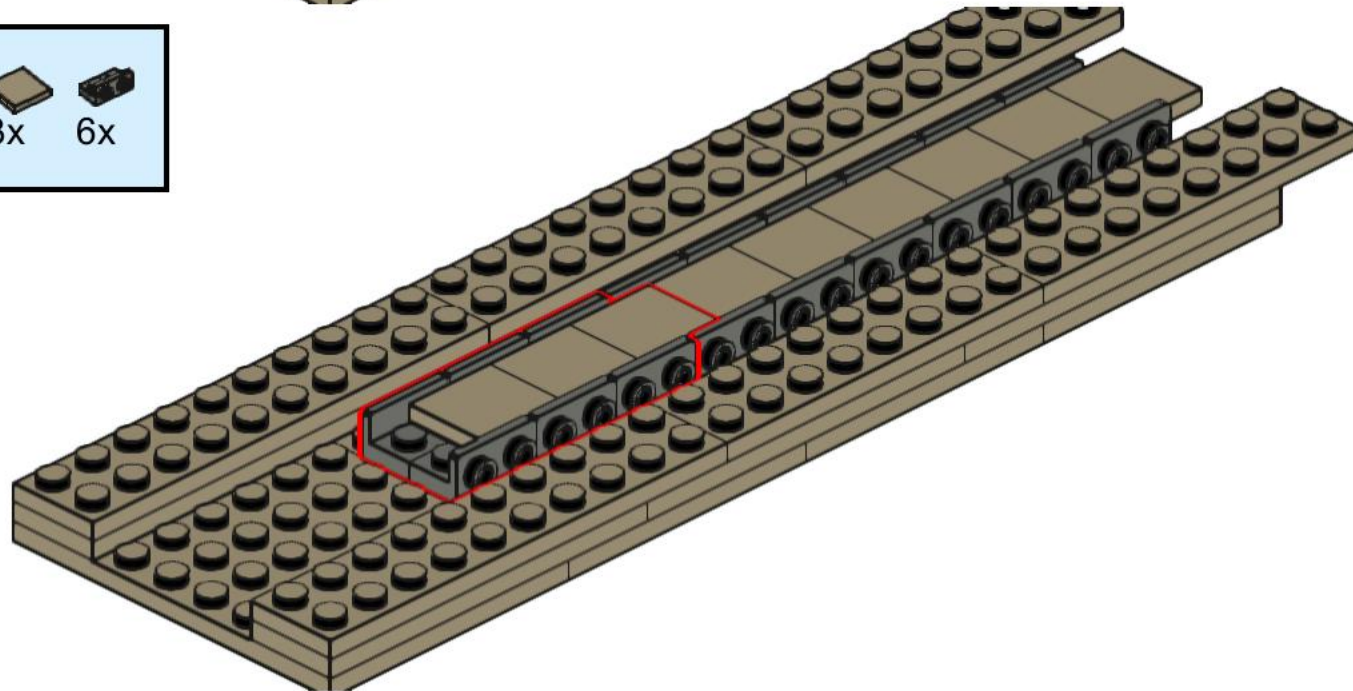
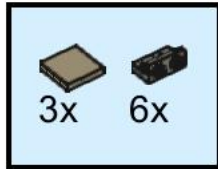
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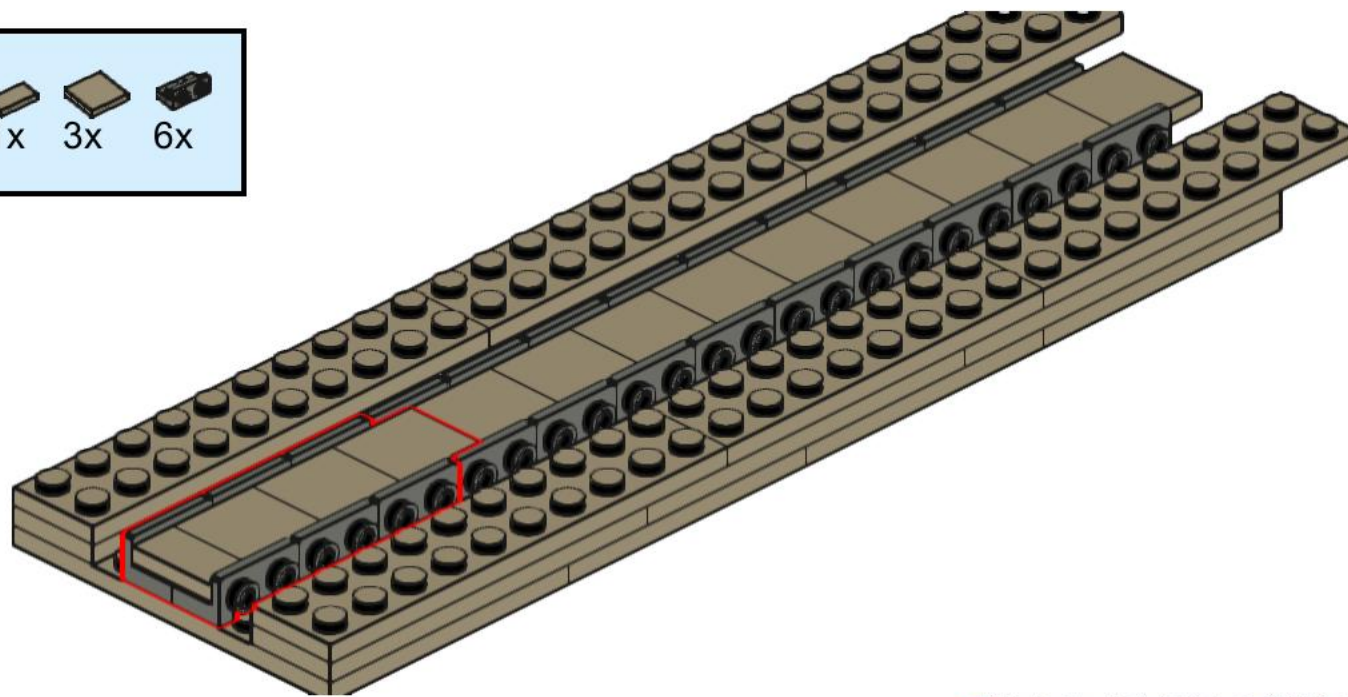
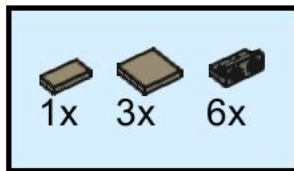
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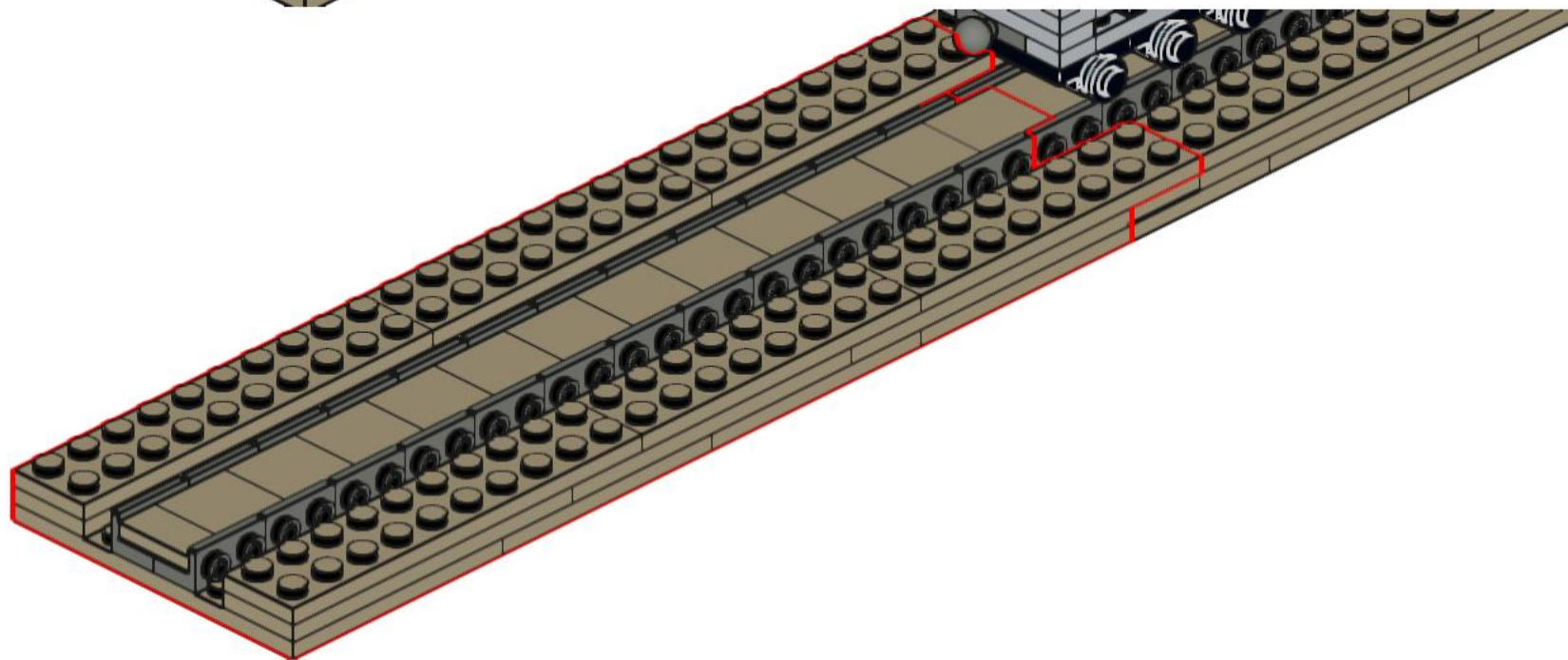
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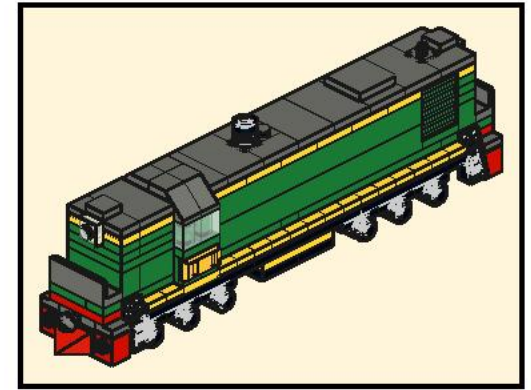
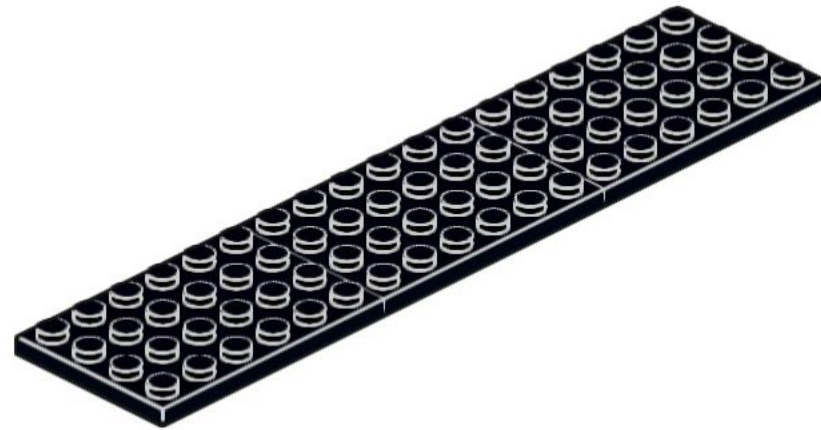
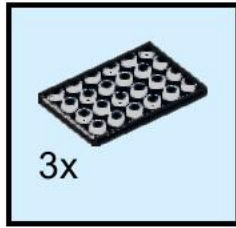
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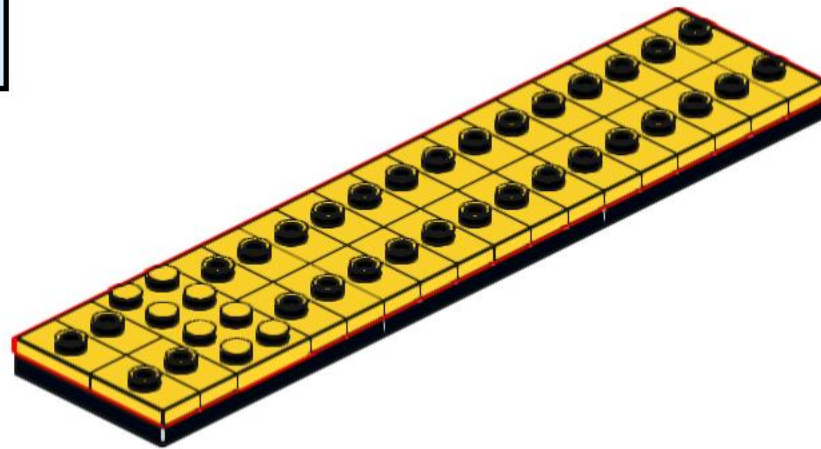
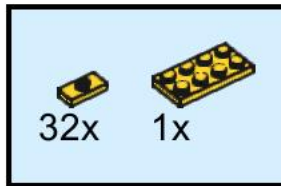
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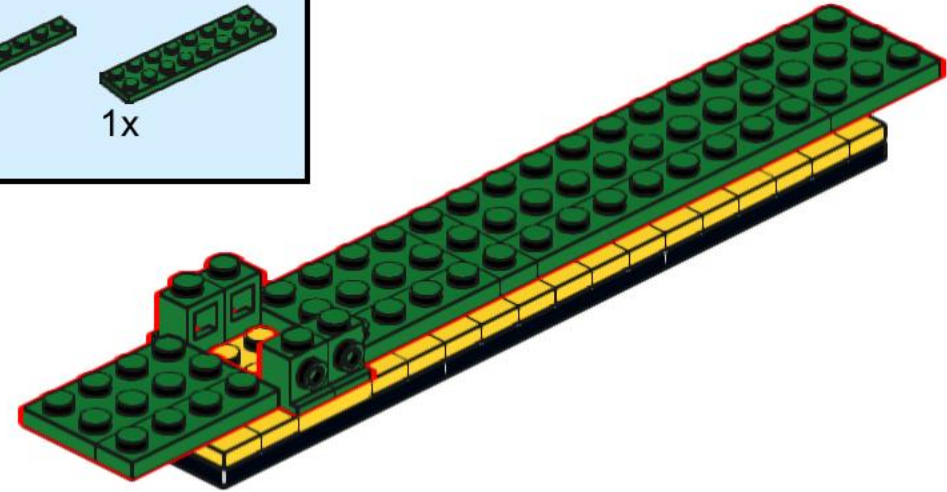
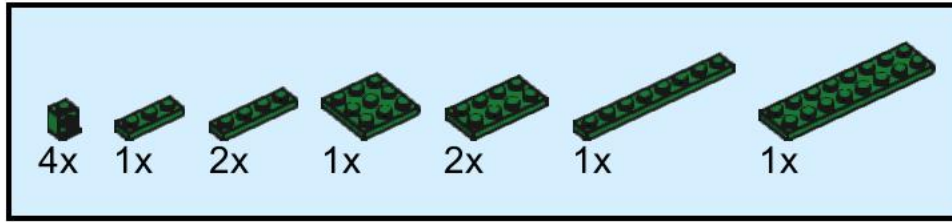
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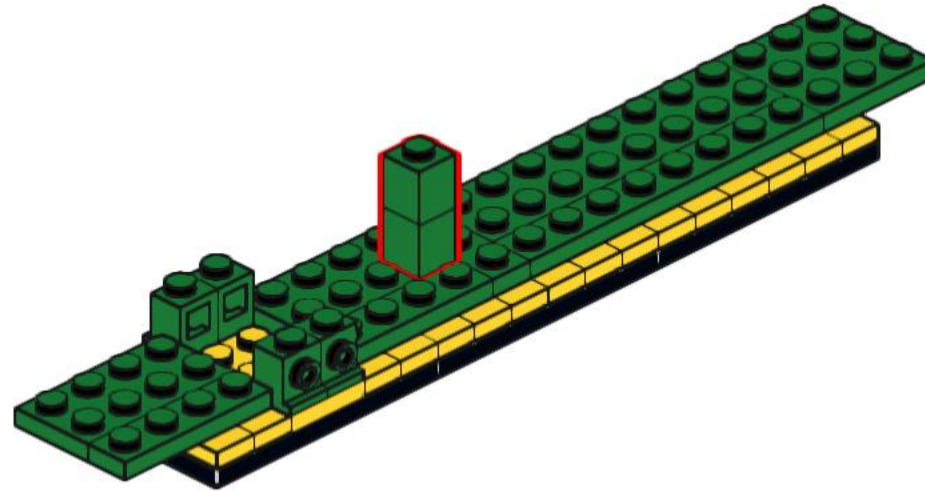
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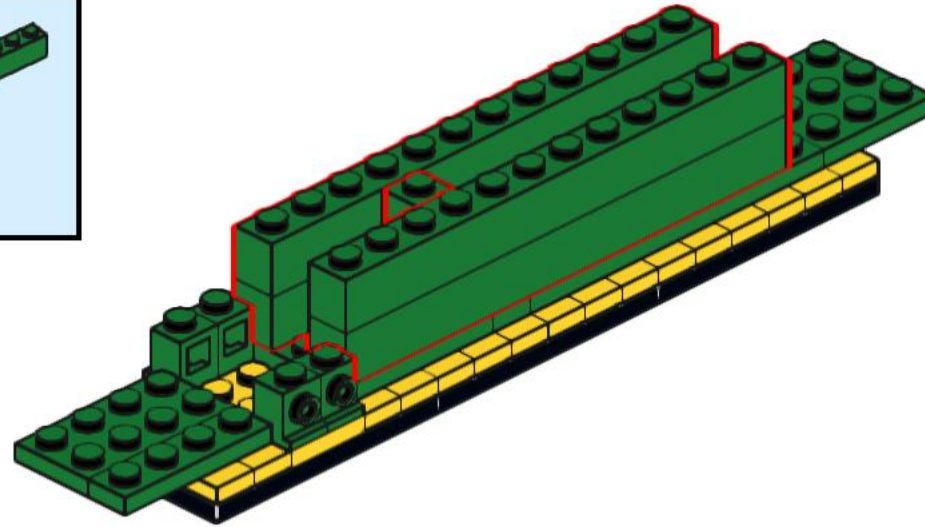
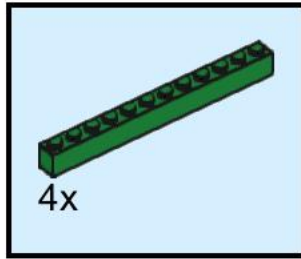
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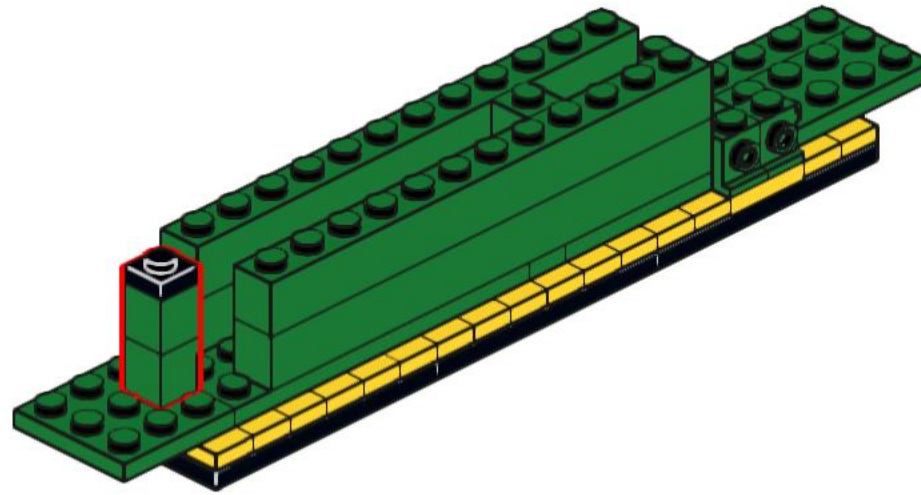
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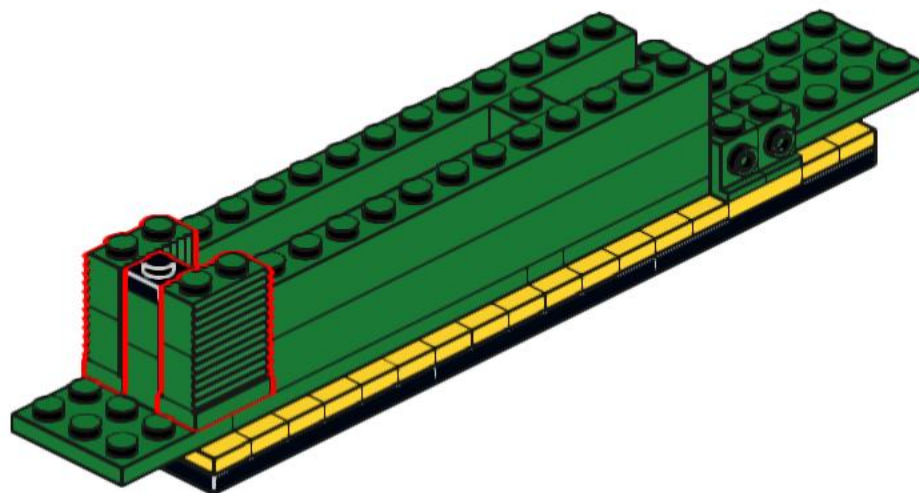
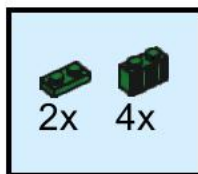
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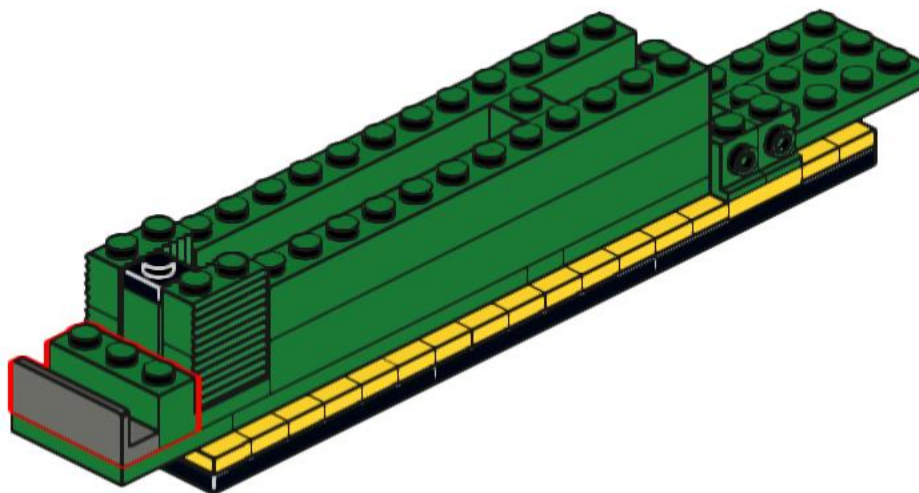
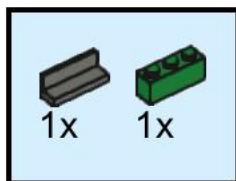
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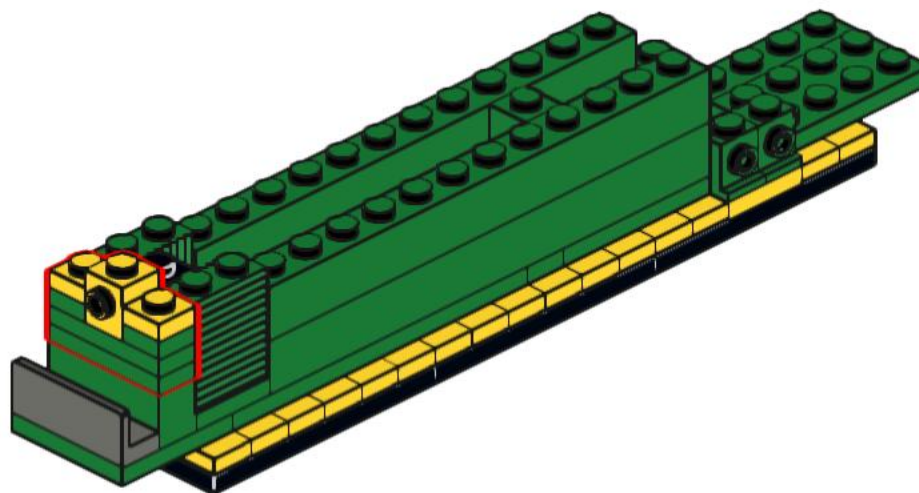
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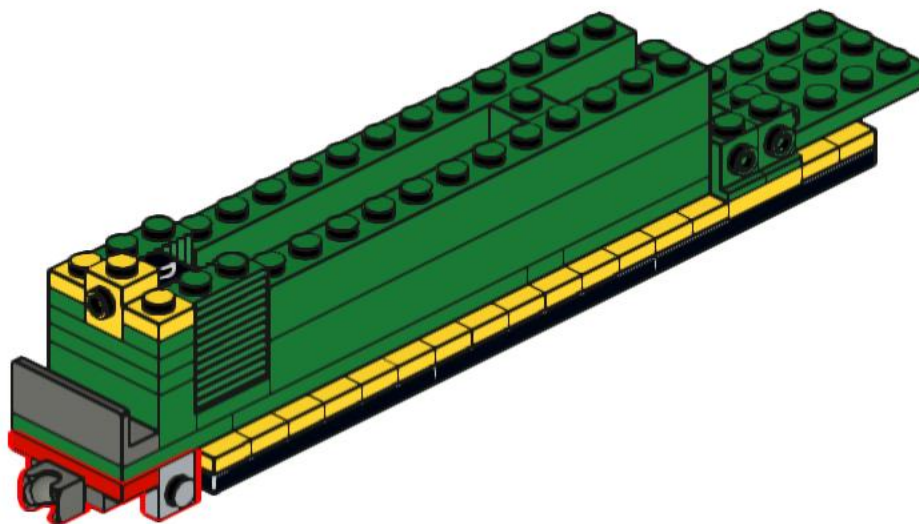
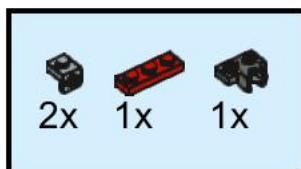
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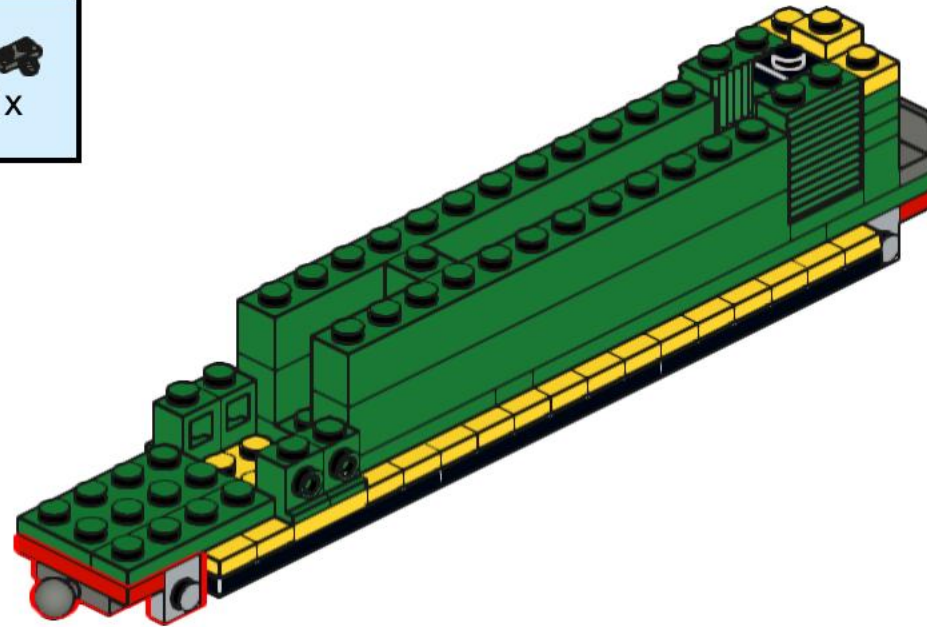
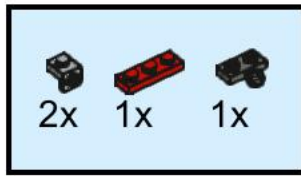
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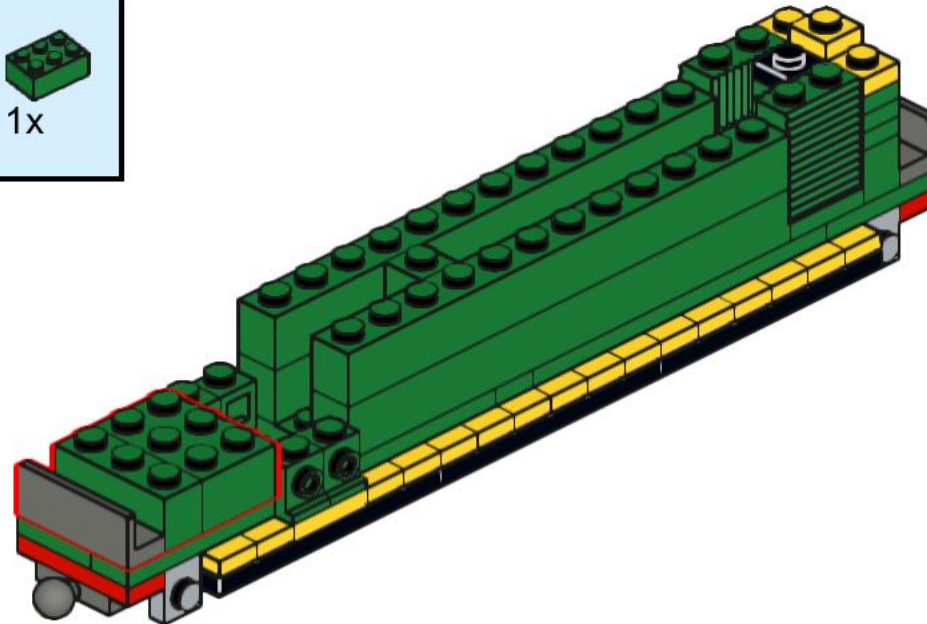
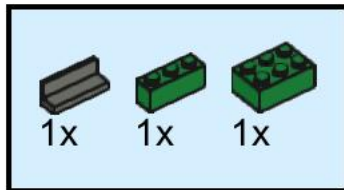
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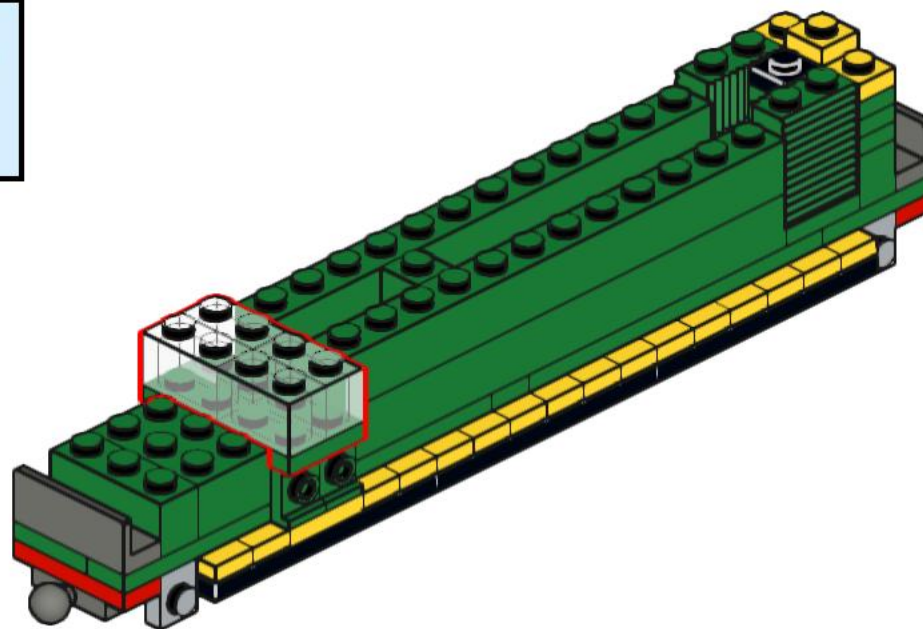
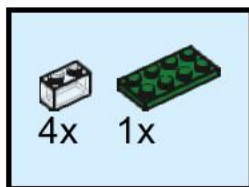
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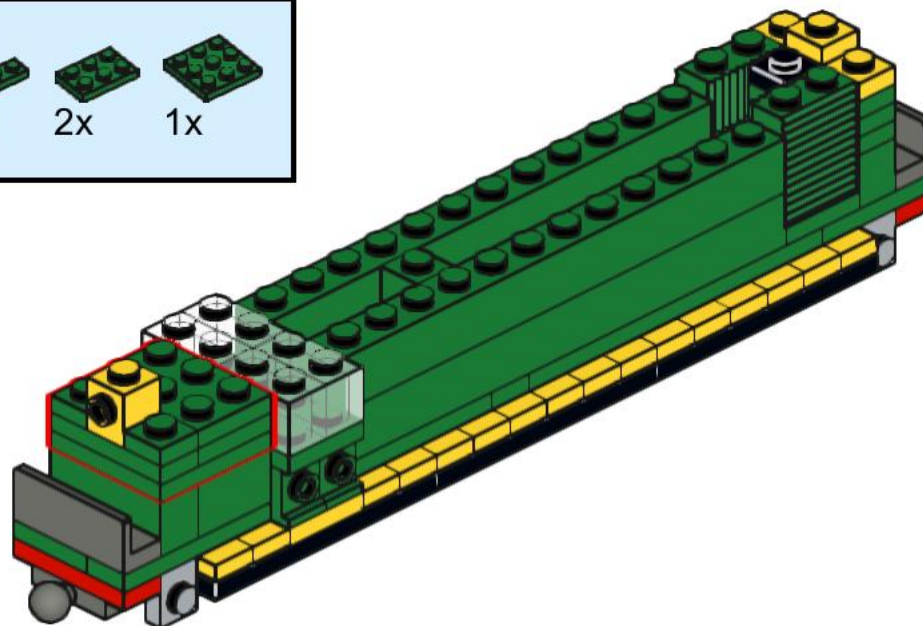
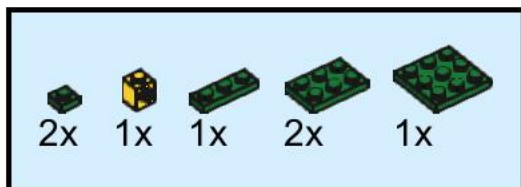
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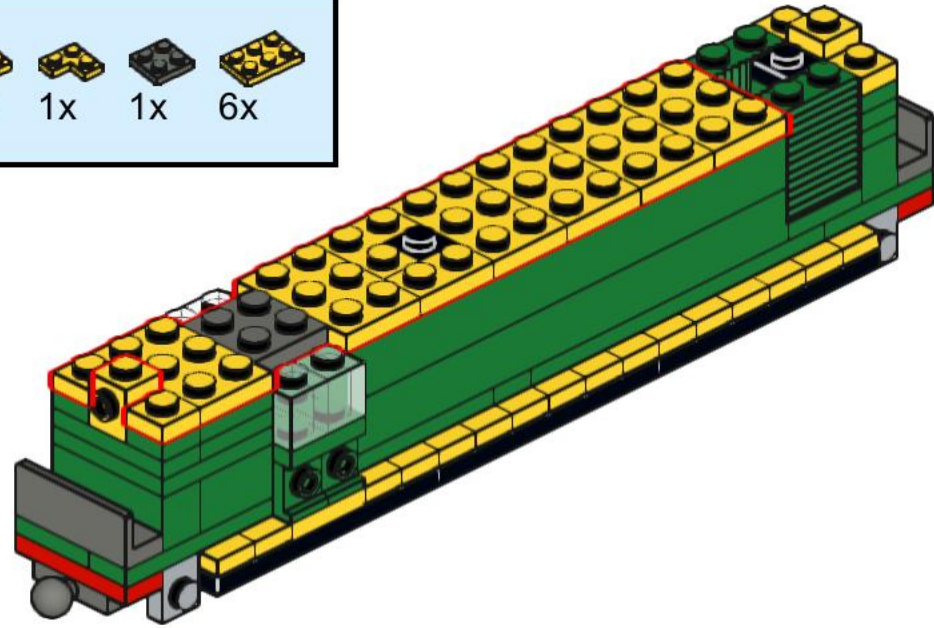
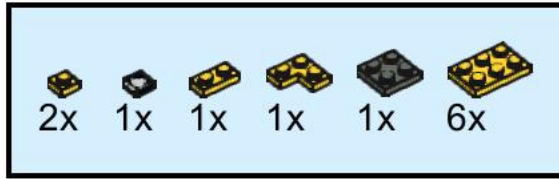
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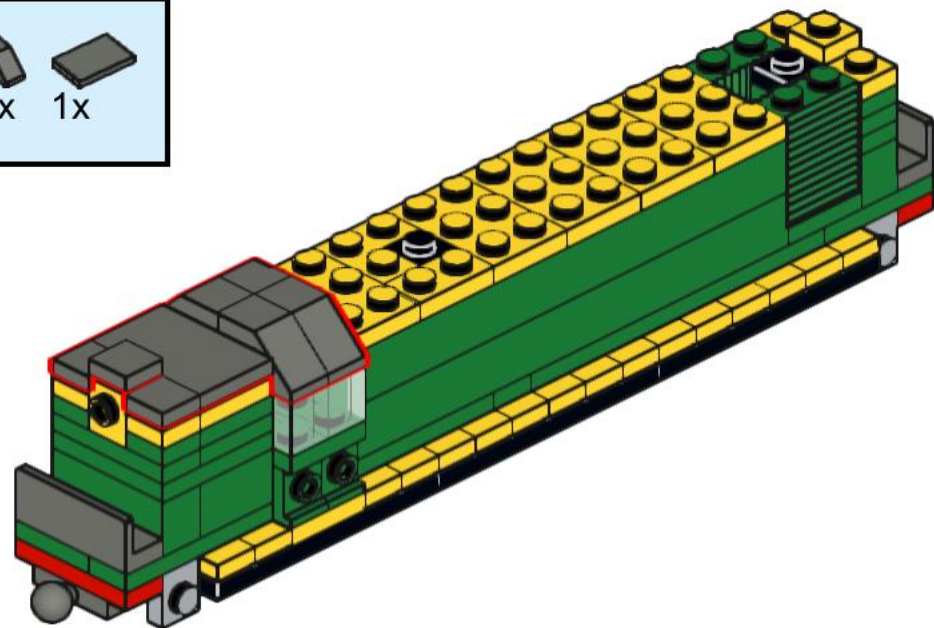
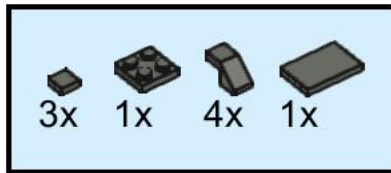
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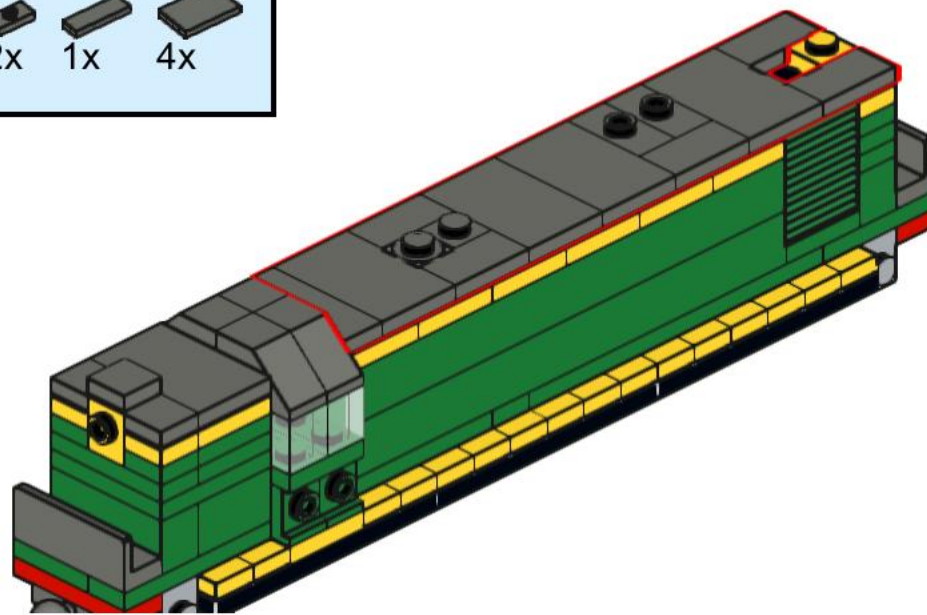
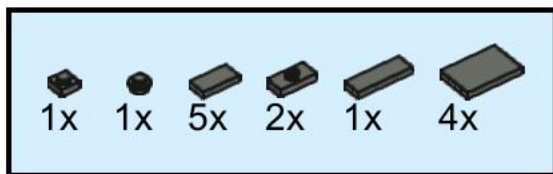
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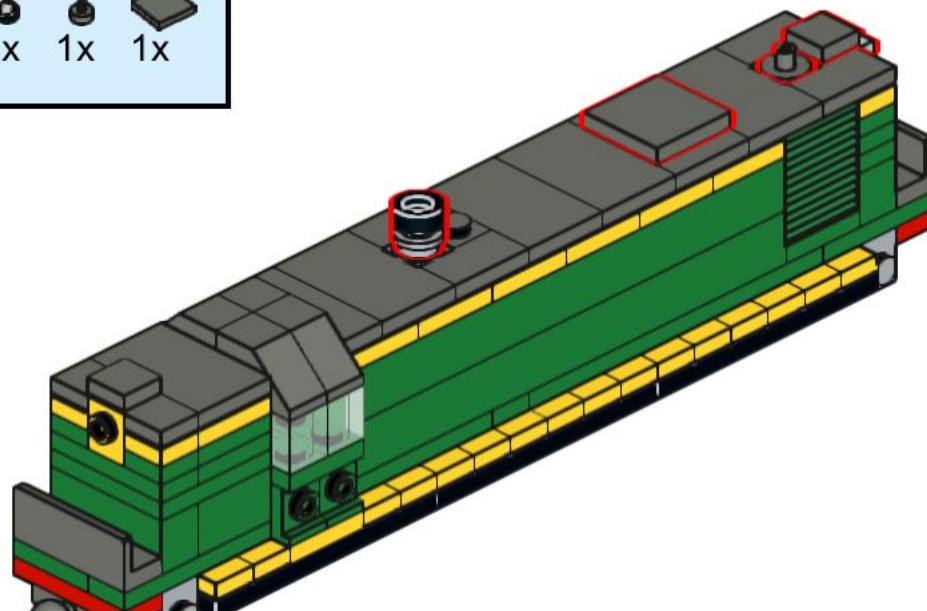
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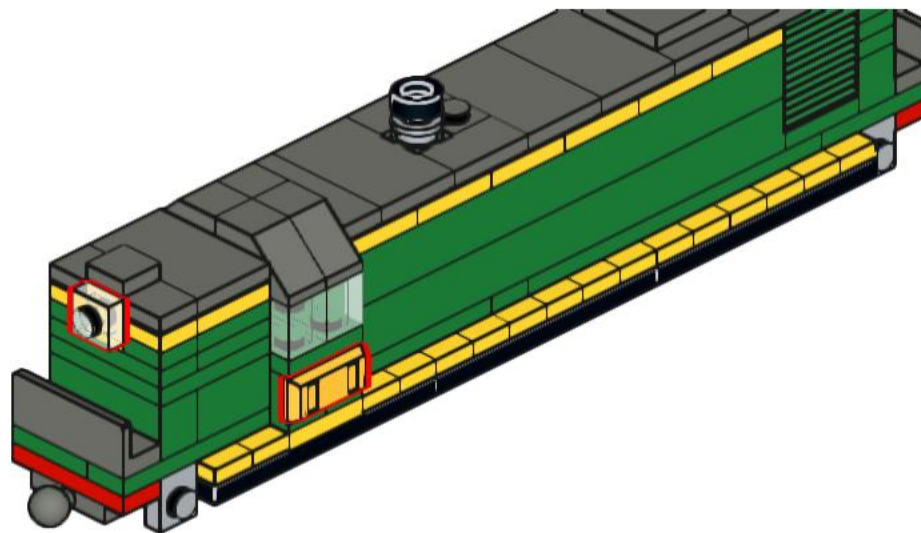
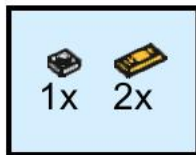
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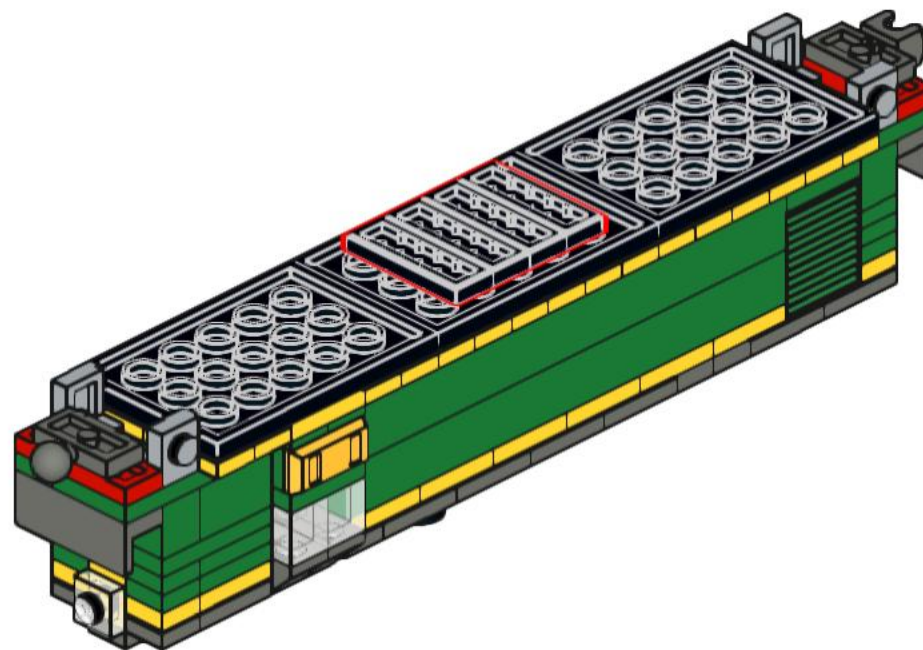
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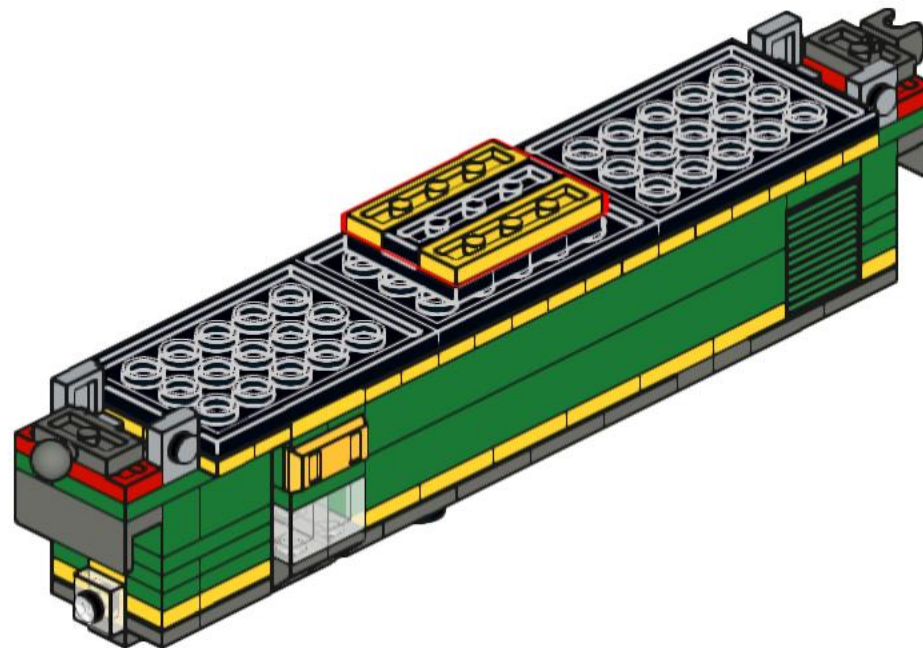
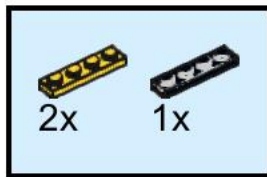
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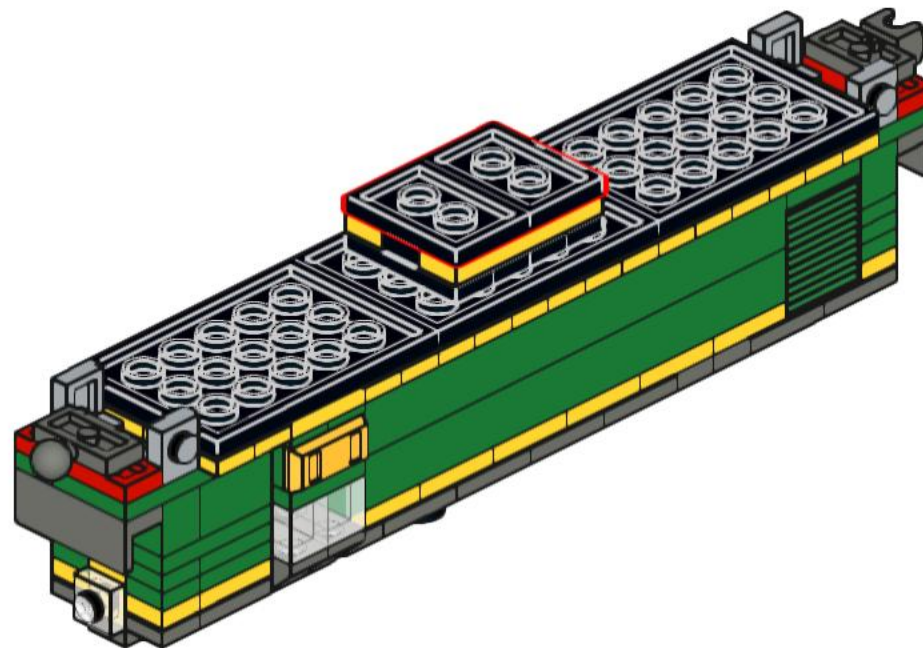
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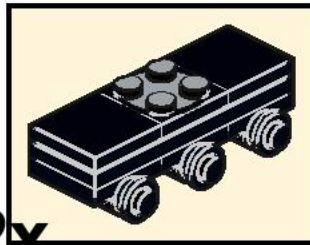
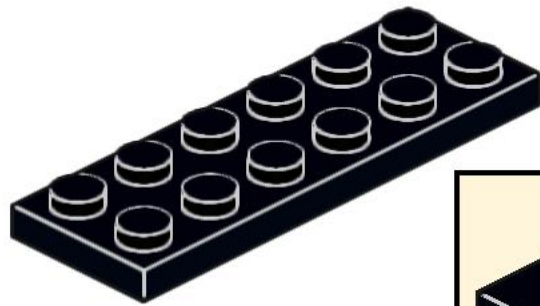
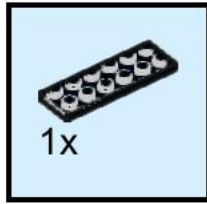
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191

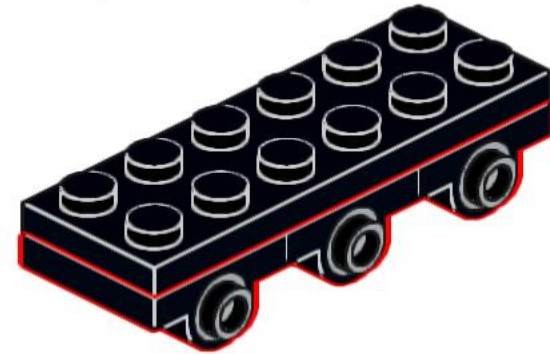
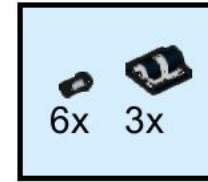


192

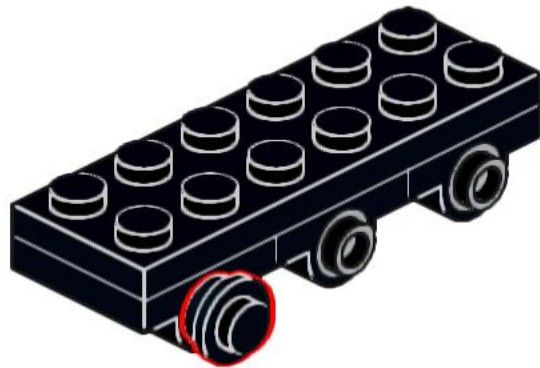


2x

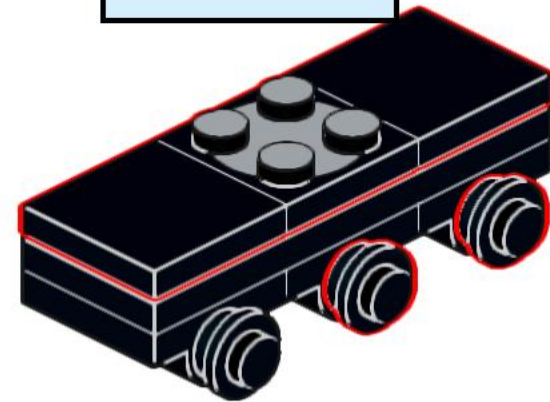
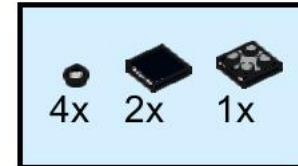
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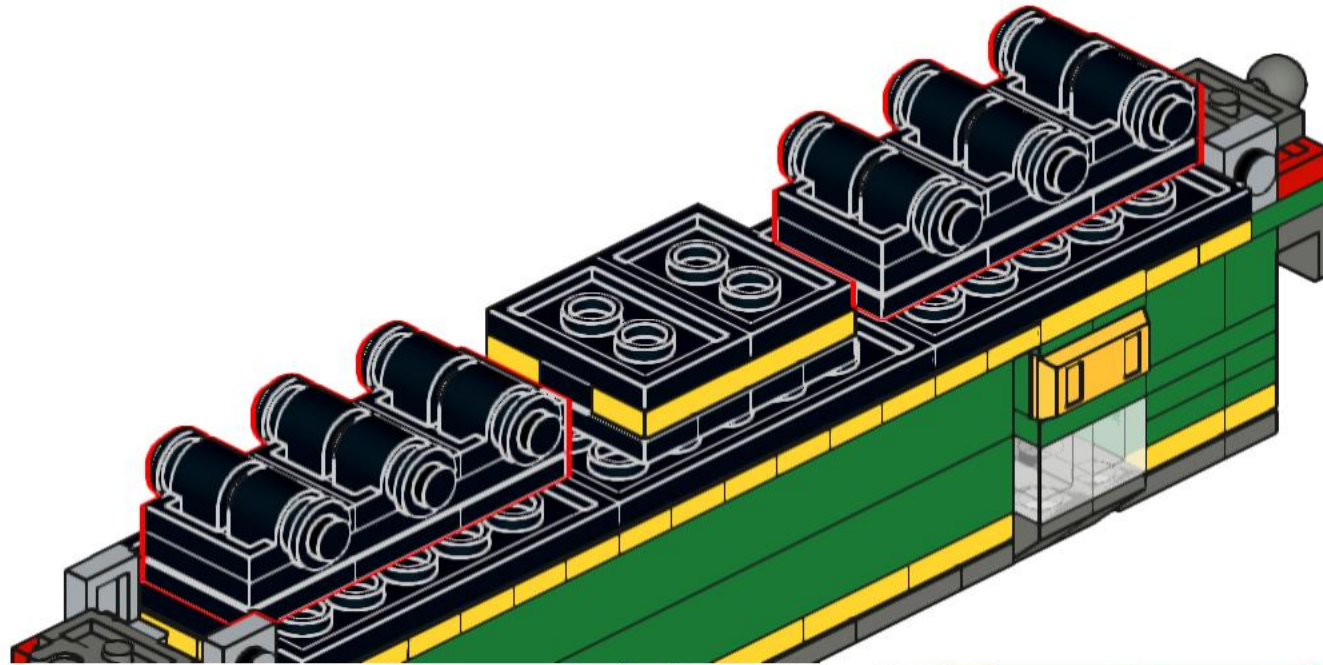
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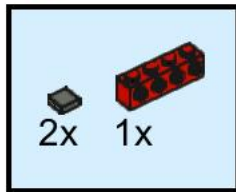
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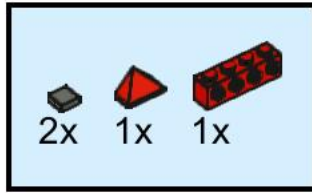
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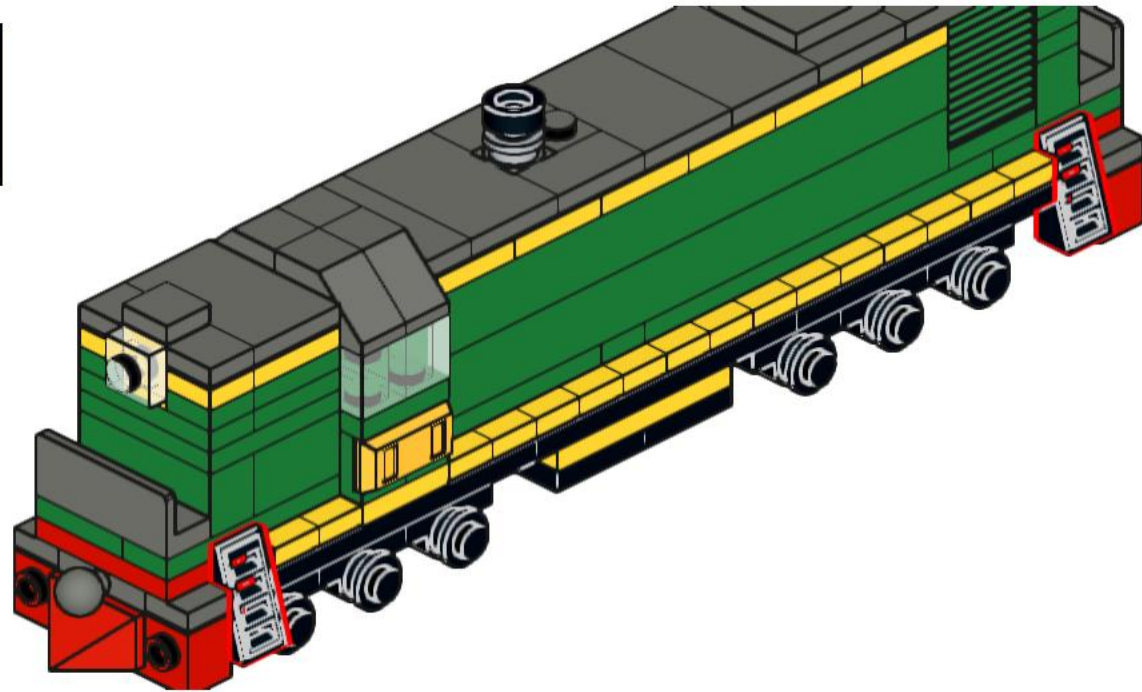
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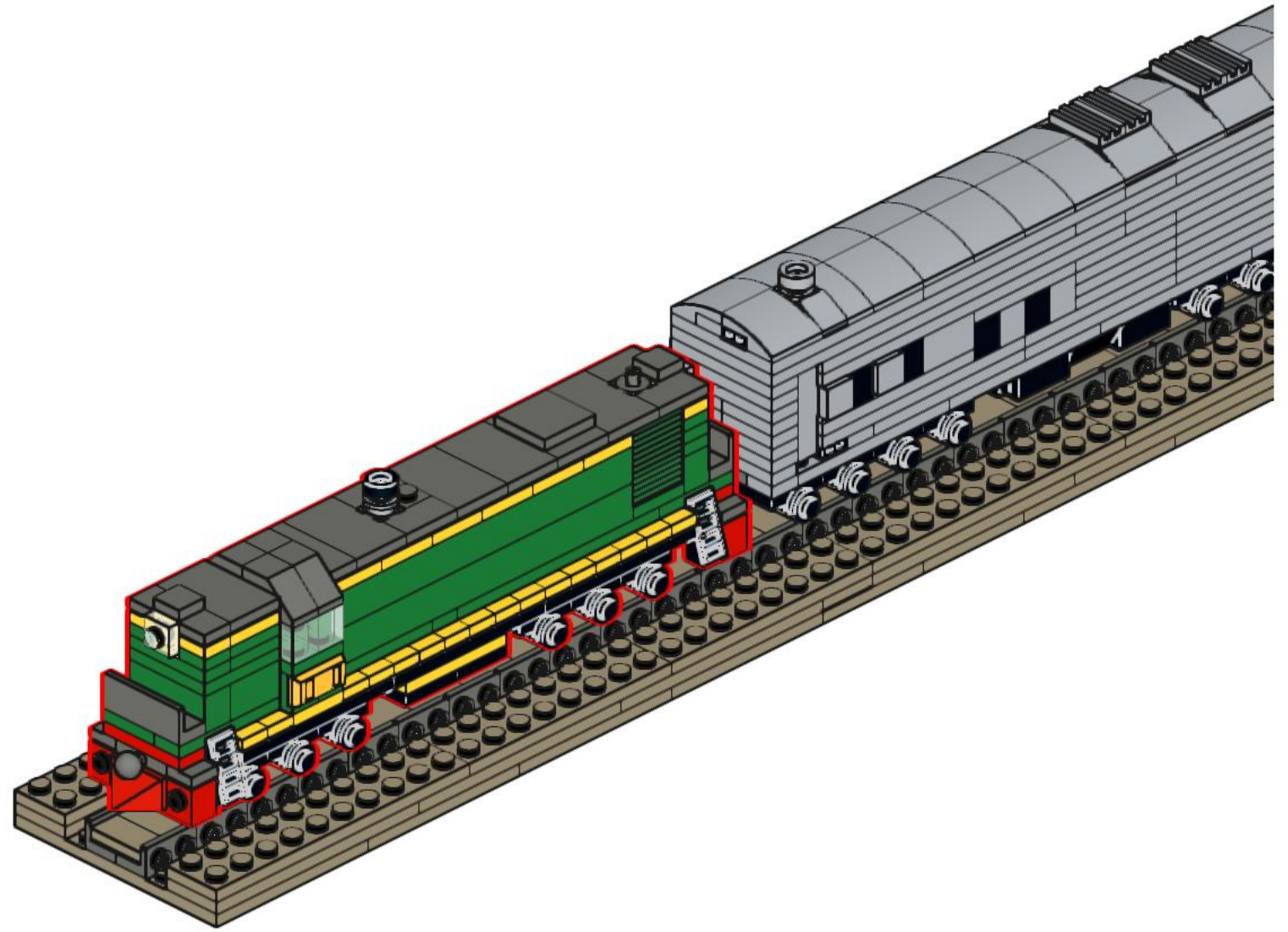
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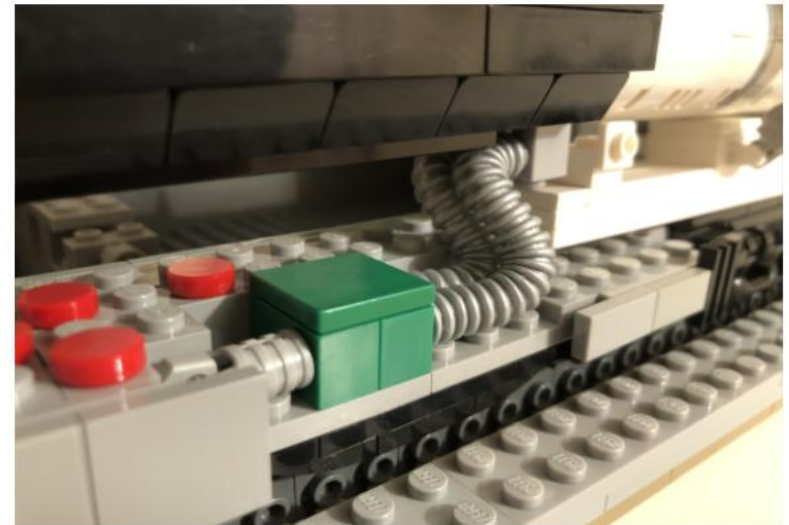
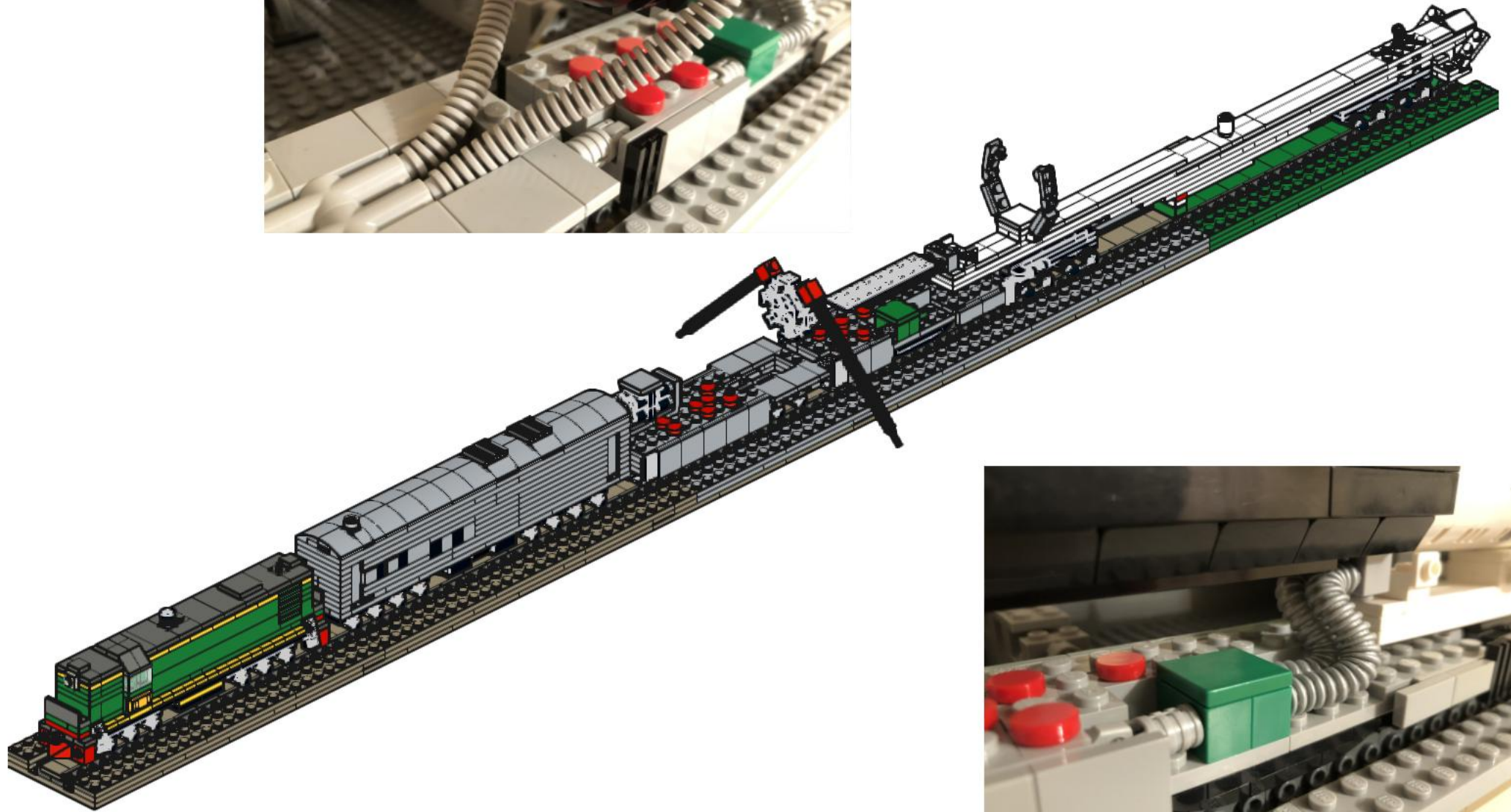
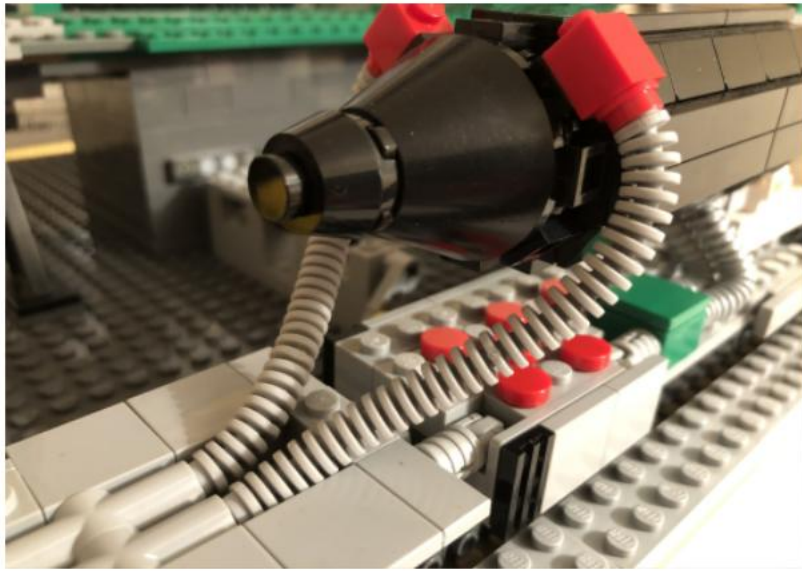
199



200



201



2x
24246, 11



4x
61409, 11



4x
11211, 11



8x
6190, 11



2x
3021, 11



1x
75937, 11



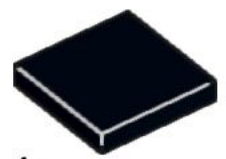
52x
4073, 11



11x
3005, 11



2x
85984, 11



4x
3068b, 11



30x
2817, 11



7x
26603, 11



2x
3795, 11



2x
3024, 11



15x
3069b, 11



8x
24201, 11



10x
3680c02, 11



1x
3941, 11



6x
3710, 11



1x
20482, 11



14x
3023, 11



1x
99780, 11



2x
3022, 11



4x
34103, 11



2x
3020, 11



3x
3032, 11



8x
2555, 11



9x
2412b, 11



1x
99781, 11



1x
4032, 11



3x
3623, 11



4x
4070, 11



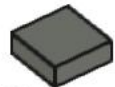
4x
4081b, 11



2x
4162, 11



4x
3034, 11



8x
3070b, 85



1x
4073, 85



1x
3024, 85



1x
20482, 85



2x
36840, 85



5x
3069b, 85



2x
3794a, 85



4x
28192, 85



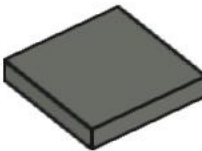
124x
99780, 85



1x
14704, 85



5x
14417, 85



1x
3068b, 85



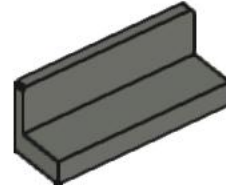
2x
3022, 85



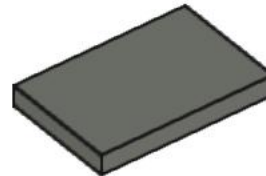
1x
63864, 85



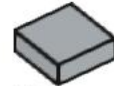
1x
6587, 85



2x
23950, 85



5x
26603, 85



2x
3070b, 86



16x
4073, 86



17x
3024, 86



2x
85861, 86



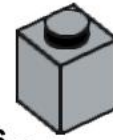
1x
54200, 86



60x
4274, 86



3x
20482, 86



8x
3005, 86



2x
4070, 86



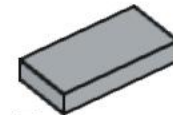
4x
36841, 86



6x
87087, 86



2x
30553, 86



7x
3069b, 86



1x
3673, 86



2x
99563, 86



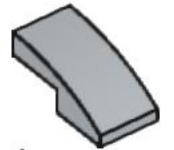
4x
2412b, 86



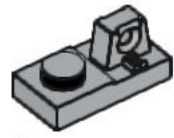
18x
3023, 86



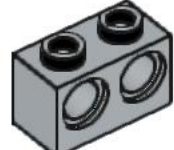
4x
85984, 86



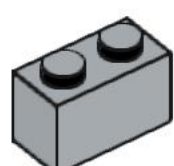
1x
11477, 86



1x
30383, 86



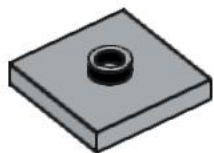
1x
32000, 86



2x
3004, 86



3x
14704, 86



2x
87580, 86



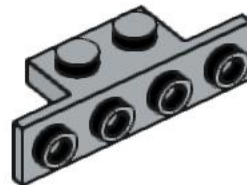
2x
44302a, 86



2x
3623, 86



1x
3021, 86



2x
2436, 86



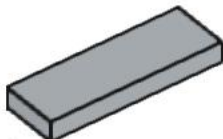
5x
3031, 86



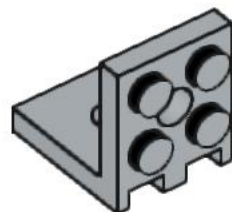
21x
15068, 86



4x
44301b, 86



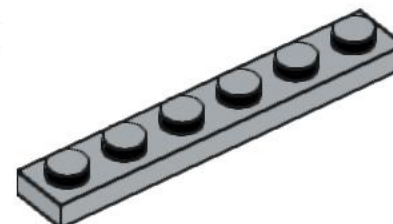
3x
63864, 86



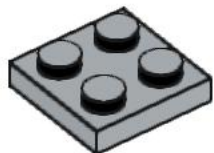
1x
3956, 86



1x
3020, 86



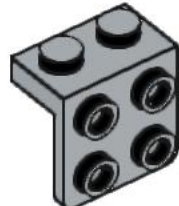
2x
3666, 86



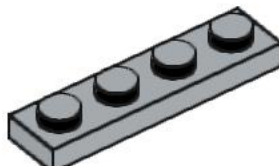
4x
3022, 86



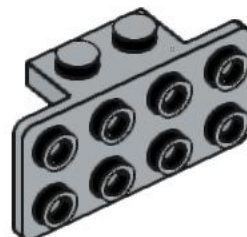
1x
44301a, 86



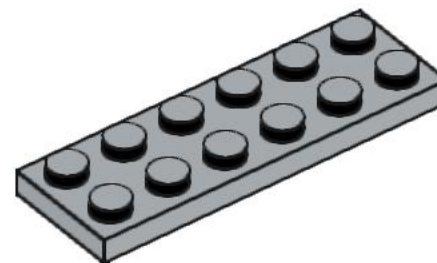
14x
44728, 86



21x
3710, 86



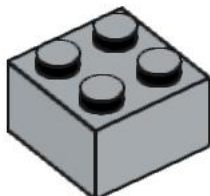
2x
93274, 86



6x
3795, 86



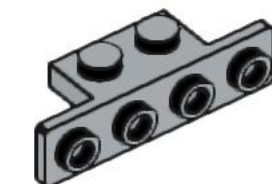
8x
2420, 86



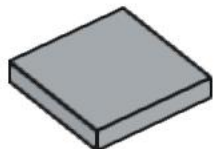
1x
3003, 86



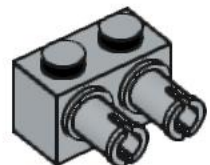
2x
32034, 86



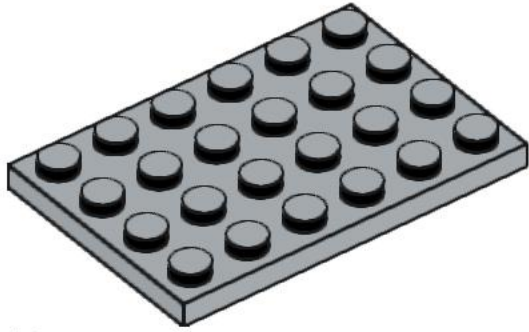
2x
2436b, 86



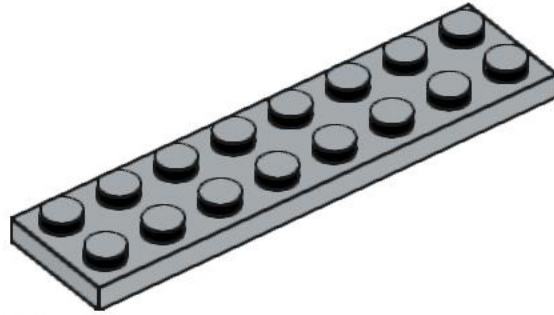
23x
3068b, 86



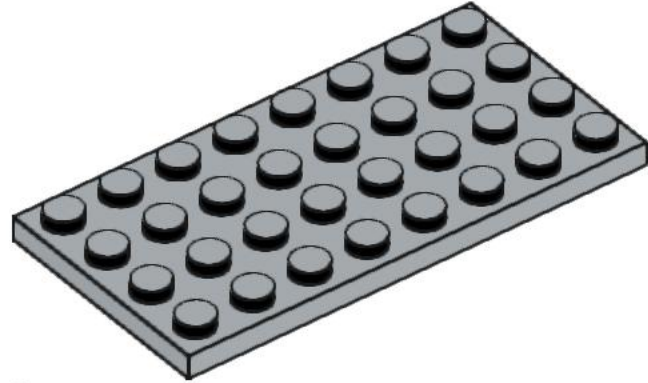
1x
30526, 86



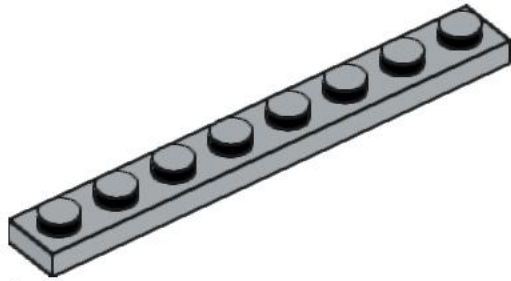
11x
3032, 86



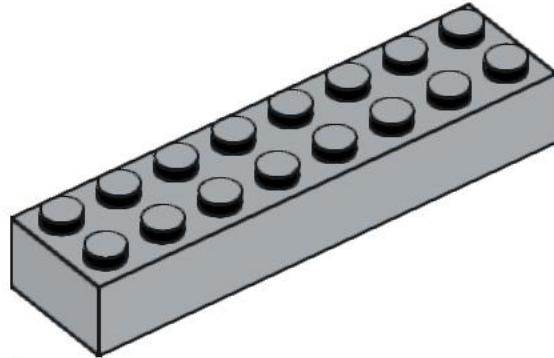
14x
3034, 86



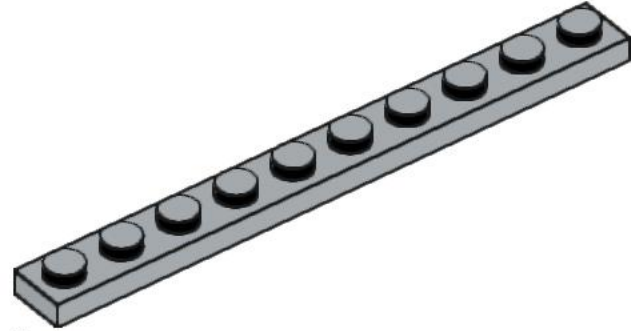
8x
3035, 86



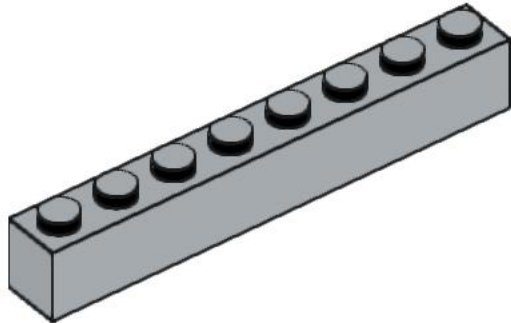
9x
3460, 86



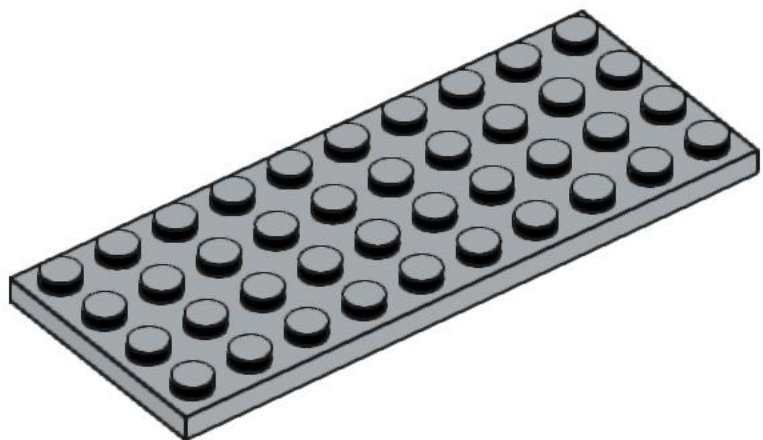
1x
3007, 86



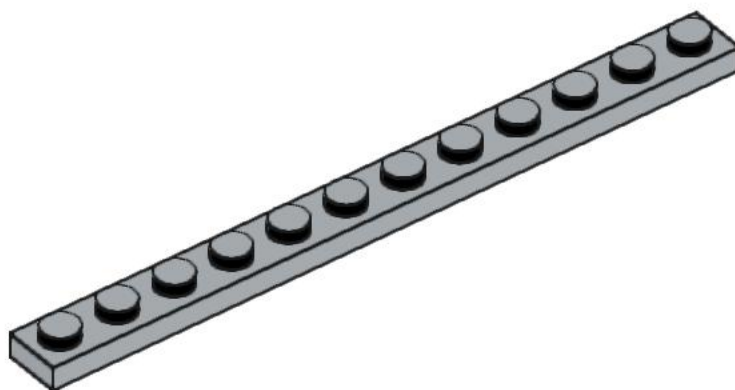
5x
4477, 86



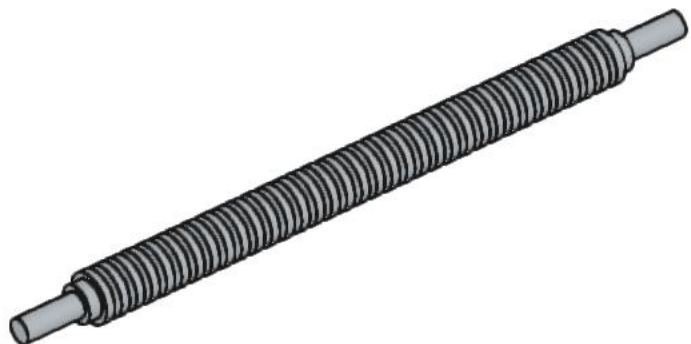
1x
3008, 86



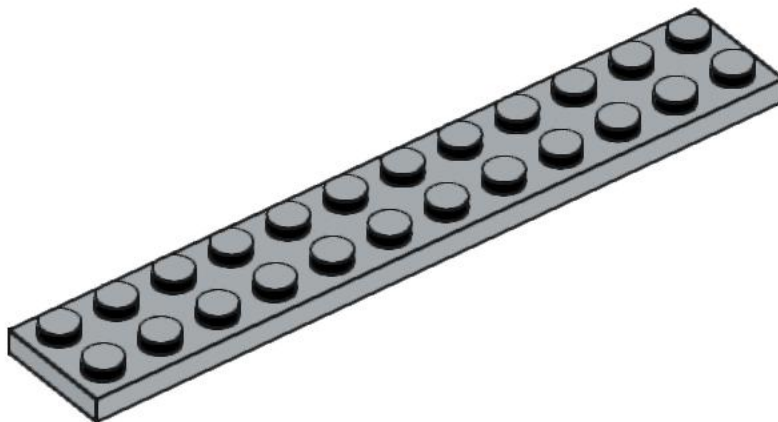
1x
3030, 86



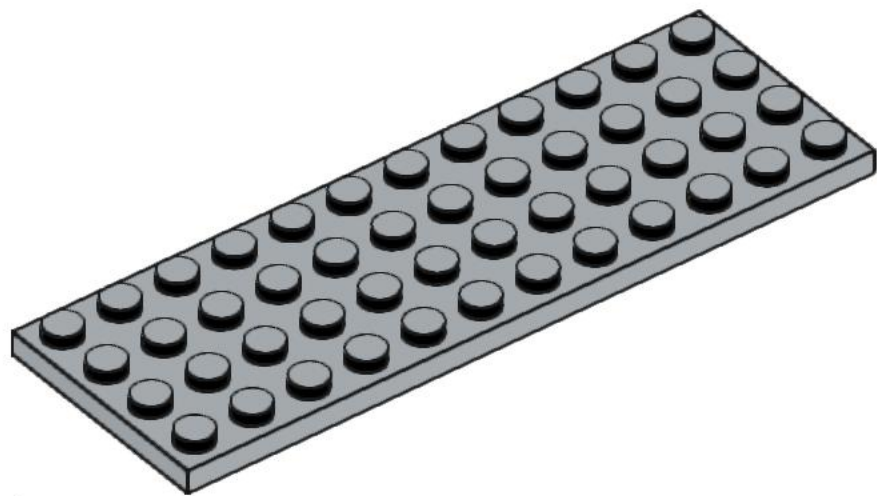
5x
60479, 86



2x
14301, 86



2x
2445, 86



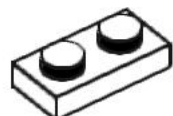
1x
3029, 86



2x
36840, 1



1x
3062b, 1



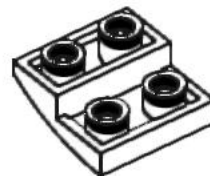
10x
3023, 1



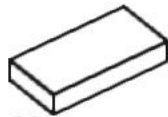
1x
15573, 1



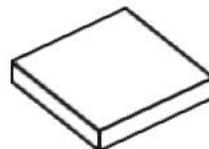
2x
60471, 1



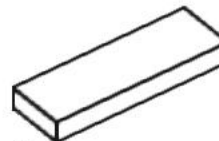
1x
32803, 1



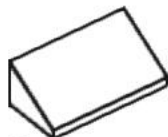
12x
3069b, 1



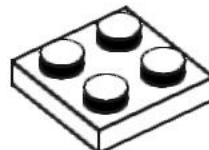
1x
3068b, 1



4x
63864, 1



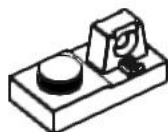
2x
85984, 1



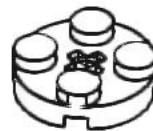
3x
3022, 1



1x
34103, 1



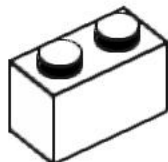
2x
30383, 1



2x
4032, 1



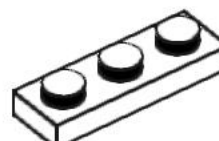
1x
35459, 1



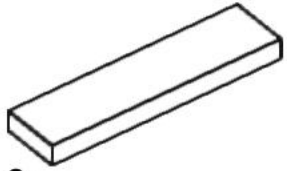
1x
3004, 1



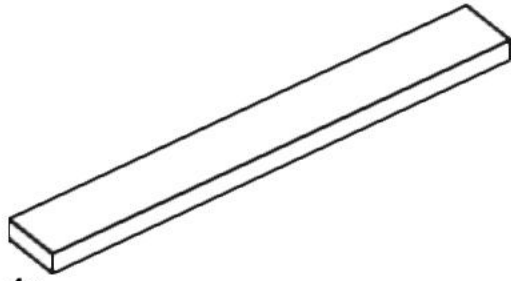
2x
44302a, 1



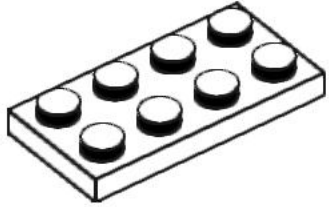
1x
3623, 1



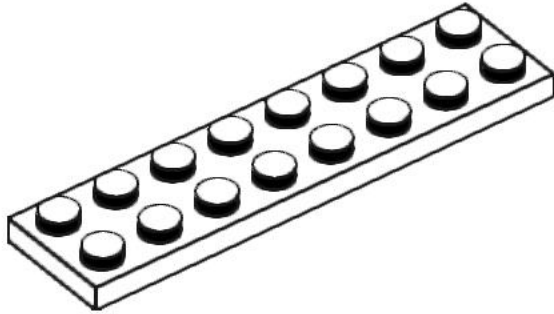
2x
2431, 1



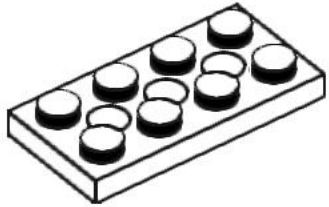
4x
4162, 1



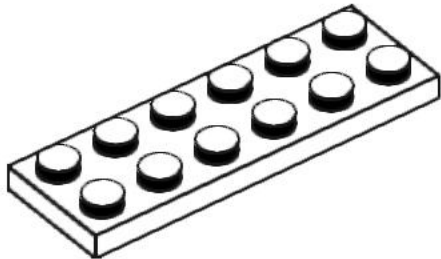
1x
3020, 1



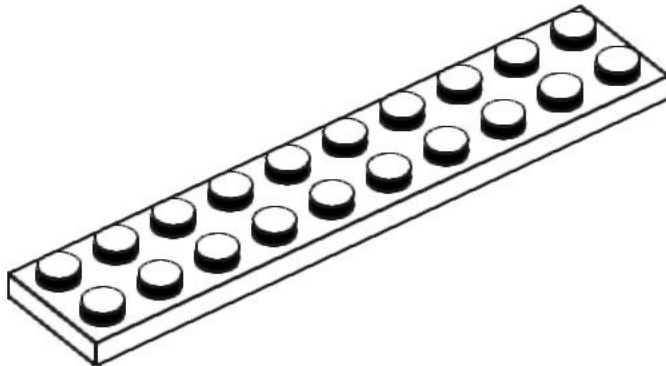
3x
3034, 1



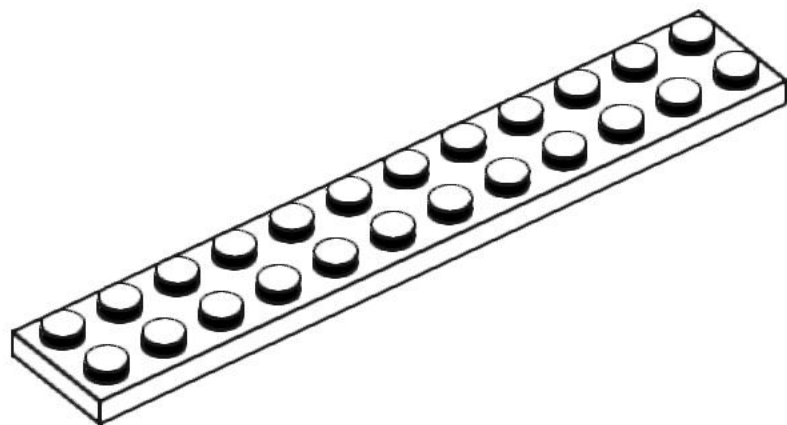
2x
3709b, 1



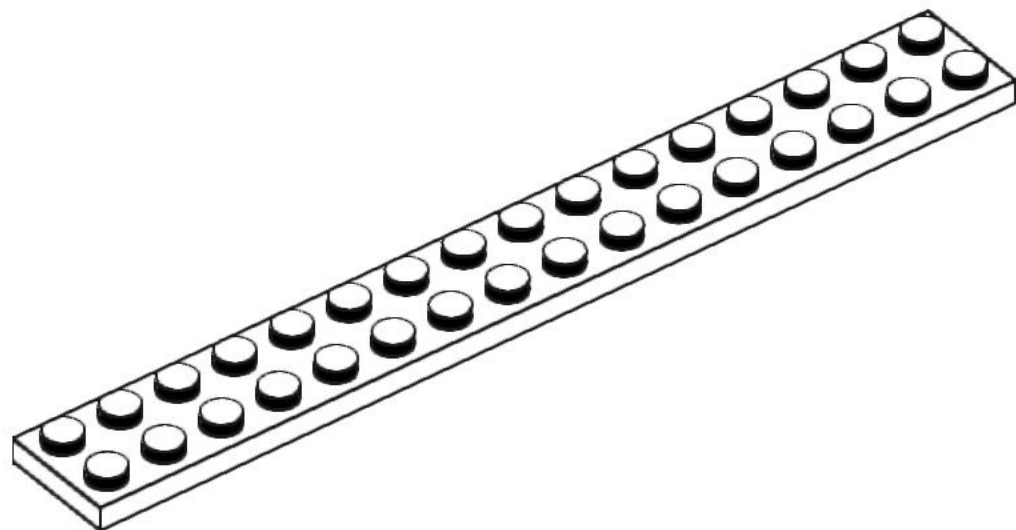
2x
3795, 1



1x
3832, 1



5x
2445, 1



1x
4282, 1



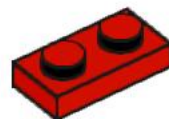
13x
98138, 5



2x
85861, 5



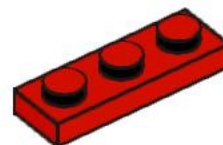
2x
87087, 5



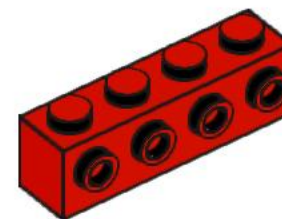
1x
3023, 5



1x
15571, 5



2x
3623, 5



2x
30414, 5



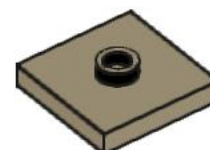
2x
3069b, 69



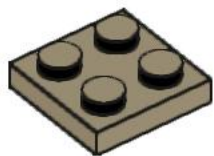
1x
3023, 69



2x
11477, 69



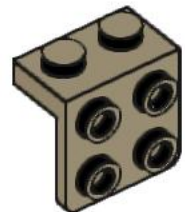
4x
87580, 69



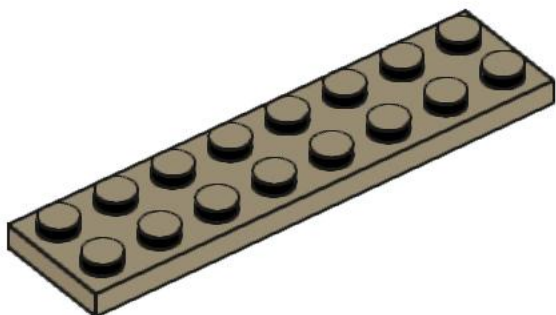
4x
3022, 69



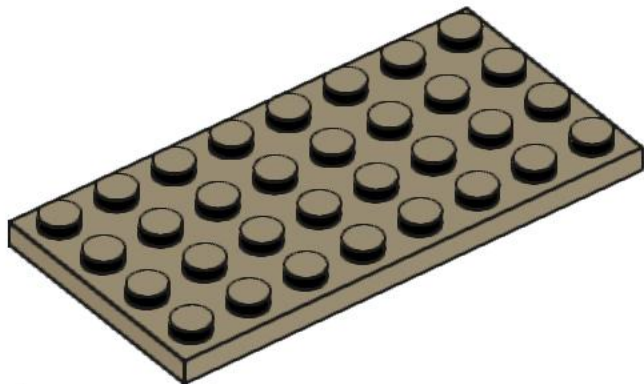
49x
3068b, 69



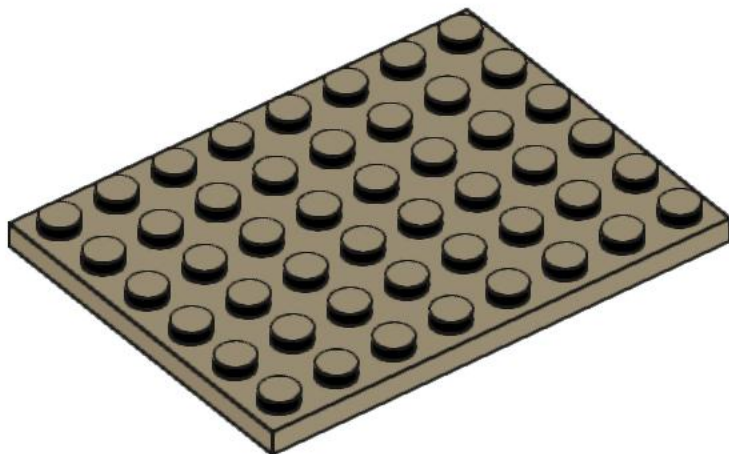
1x
44728, 69



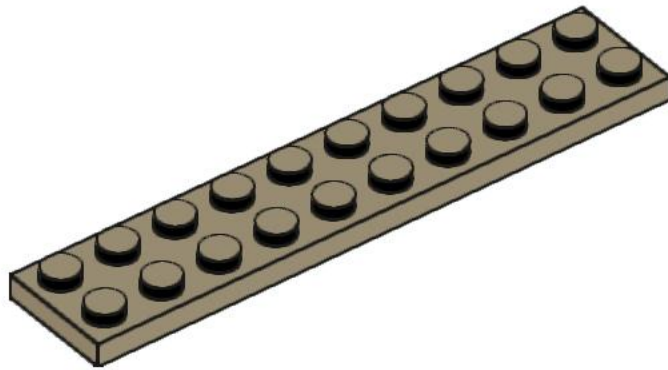
20x
3034, 69



4x
3035, 69



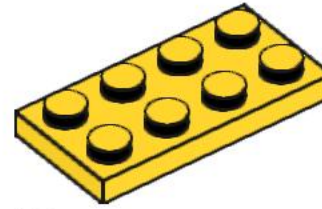
14x
3036, 69



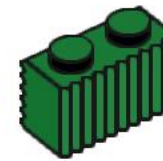
4x
3832, 69



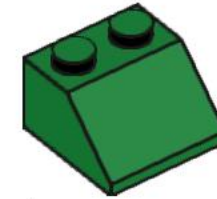
32x
3794b, 3



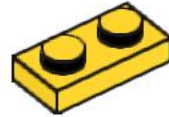
1x
3020, 3



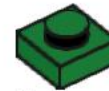
4x
2877, 6



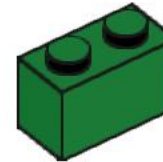
1x
3039, 6



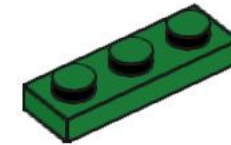
1x
3023, 3



4x
3024, 6



2x
3004, 6



4x
3623, 6



2x
3749, 2



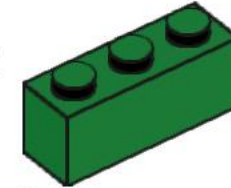
1x
2420, 3



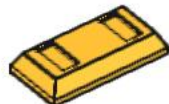
4x
3005, 6



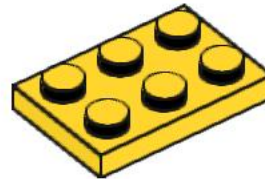
12x
3068b, 6



2x
3622, 6



2x
99563, 110



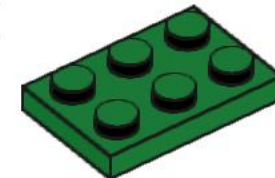
6x
3021, 3



4x
4070, 6



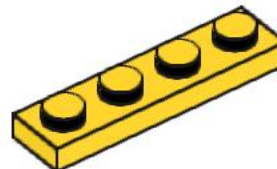
2x
3022, 6



2x
3021, 6



4x
3024, 3



2x
3710, 3



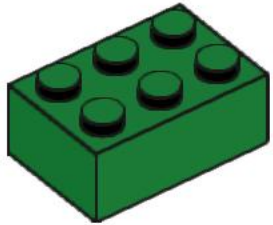
2x
3023, 6



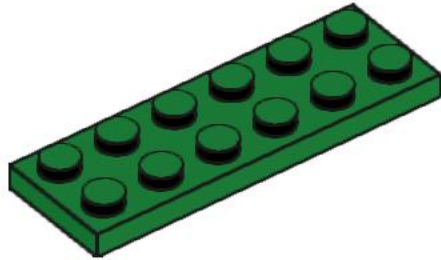
1x
30526, 6



2x
87087, 3



1x
3002, 6

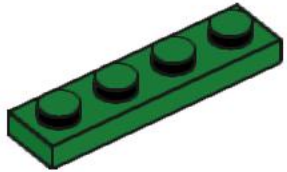


2x
3795, 6

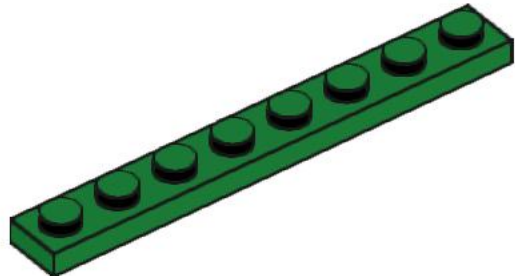


Maroon is internal structure -
can be any colour

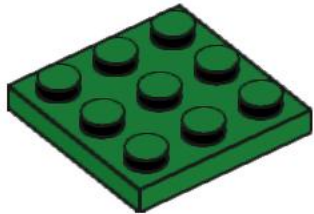
4x
3036, 6



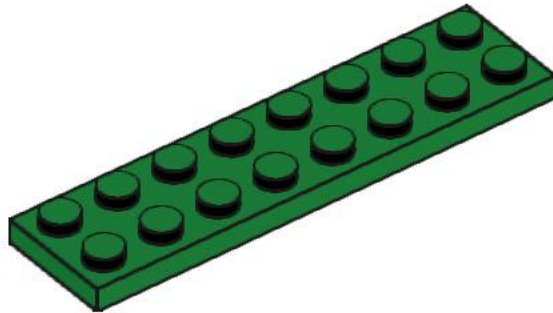
4x
3710, 6



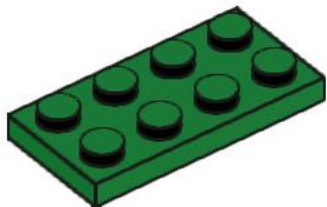
1x
3460, 6



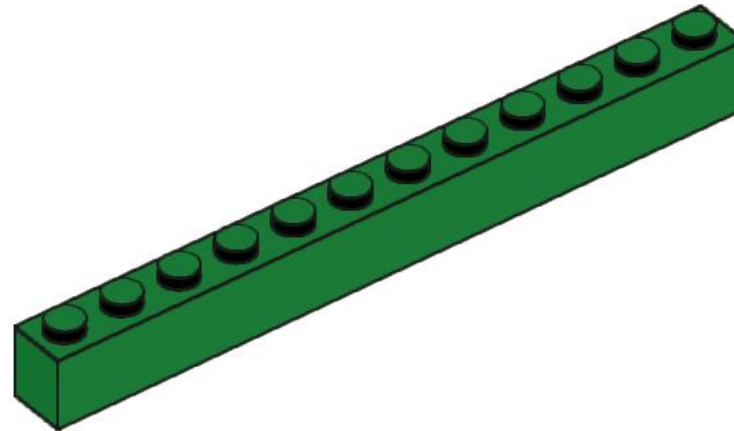
2x
11212, 6



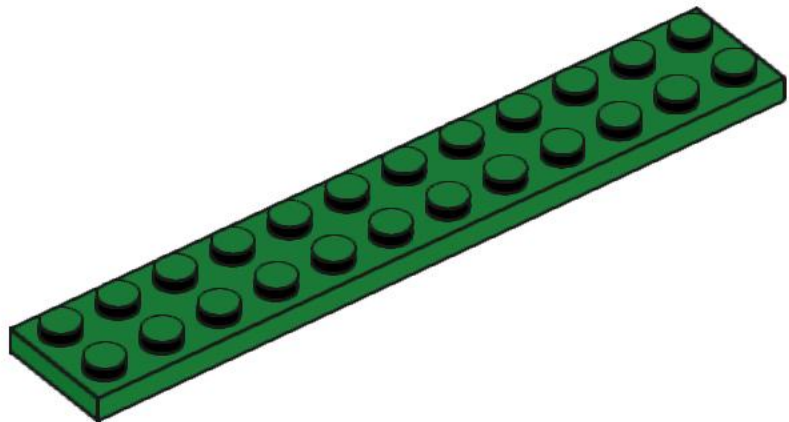
6x
3034, 6



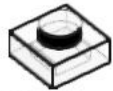
3x
3020, 6



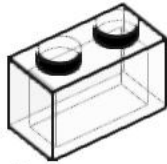
4x
6112, 6



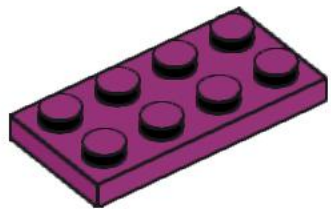
4x
2445, 6



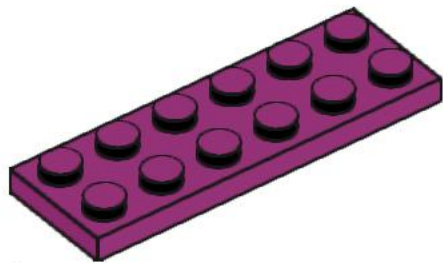
2x
3024, 12



4x
3065, 12



1x
3020, 71



3x
3795, 71



2x
78c07, 66