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NASA
905

NASA
United States

Enterprise

BOEING




Ein beispielloser Schritt

In den 1970er- und 1980er-Jahren haben sich die NASA und Boeing zusammengetan, um eine innovative Technologie zu entwickeln, mit deren Hilfe die Orbiter der NASA transportiert werden könnten, die wir heute als Spaceshuttles kennen. Die Idee zu einem fliegenden Transportmittel ergab sich aus einer ganz konkreten Herausforderung, denn die Beförderung der Spaceshuttles am Boden war nicht nur kompliziert, sondern auch sehr zeitaufwendig.

Teams von der NASA und Boeing loteten zusammen aus, ob und wie sich die ursprünglich für den kommerziellen Gebrauch entwickelten Jumbos vom Typ Boeing™ 747™ umkonstruieren ließen, um als Space Shuttle Carrier Aircraft (SCA) zu dienen.

Zwischen 1974 und 1990 wurde zwei Maschinen vom Typ Boeing 747 erfolgreich umfunktioniert, um aktive Spaceshuttles von den Landeplätzen wieder zu den Startrampen zu transportieren. Das Flugziel dieser Transporte war vor allem des Kennedy Space Center der NASA.

1974 hatte die NASA die erste Boeing 747 SCA von einer Fluggesellschaft erworben. Zunächst wurde die Maschine zur Erforschung von Wirbelschleppen eingesetzt und dann später für den Transport von Spaceshuttles modifiziert. Bei den Anflug- und Landetests des Spaceshuttles im Jahr 1977 mit



dem Prototyp *Enterprise* spielte dieser Jumbo eine entscheidende Rolle. Dieses Flugzeug führte die meisten Spaceshuttle-Überführungen durch und lieferte außer Dienst gestellte Spaceshuttles an Museen. 2012 wurde die Maschine außer Dienst gestellt. Heute gehört sie zur Ausstellung im Raumfahrtzentrum der NASA in Houston. Die zweite Boeing 747 SCA war von 1990 bis 2012 im Einsatz und brachte es insgesamt auf mehr als 33.000 Flugstunden, seit sie erstmals in Dienst gestellt wurde. Heute ist sie in einem Luft- und Raumfahrtmuseum in Kalifornien ausgestellt.

Vorbereitungen für den ersten Start

An beiden SCAs wurden einige einzigartige Modifikationen vorgenommen. Der Großteil der Innenausstattung wurde entfernt, um Gewicht einzusparen und Platz für Funktionen zu machen, die für den Transport von Spaceshuttles erforderlich waren.



SEITENLEITWERKE:

Zwei zusätzliche Seitenleitwerke wurden an beiden Enden der standardmäßigen Höhenleitwerke installiert, um für eine bessere Stabilität der Maschine im Flug zu sorgen.

ZUSÄTZLICHE SPANNUNGSQUELLEN:

Spannungsquellen und Kabel wurden hinzugefügt, um während der Überführungsflüge vor allem die Heizgeräte für die Fluidsysteme und die Pumpen des Kühlwasserkreislaufs im Orbiter mit Strom zu versorgen.



HECKKONUS:

Eine spezielle Heckkonus-Triebwerksabdeckung am Spaceshuttle wurde benutzt, um während der Transporte eine bessere Aerodynamik zu erzielen.



BEFESTIGUNGSSTREBEN FÜR DEN ORBITER:

Drei Befestigungsstreben wurden hinzugefügt – eine vorne und zwei weitere am Heck –, um das Spaceshuttle sicher am Flugzeug zu befestigen.

OPTIMIERTE TRIEBWERKE:

Die Triebwerke vom Typ Pratt & Whitney JT9D wurden modifiziert, um mehr Leistung zu liefern:



Anmerkungen des LEGO® Icons Designteams

1983 wurde die erste Boeing™ 747™ SCA zusammen mit dem Orbiter *Enterprise* der NASA im Rahmen der einzigen internationalen Tour der beiden Systeme auf der Luftfahrtschau in Paris vorgestellt. Mit der Hilfe unserer Partner bei der NASA und bei Boeing haben wir neue Baulösungen und Elemente entwickelt, um bestimmte Konstruktionsdetails und Funktionen möglichst originalgetreu in unser Modell zu übernehmen. Hoffentlich habt ihr beim Bauen dieses Wunders der Luftfahrt genauso viel Spaß wie wir bei seiner Entwicklung.

COCKPIT:

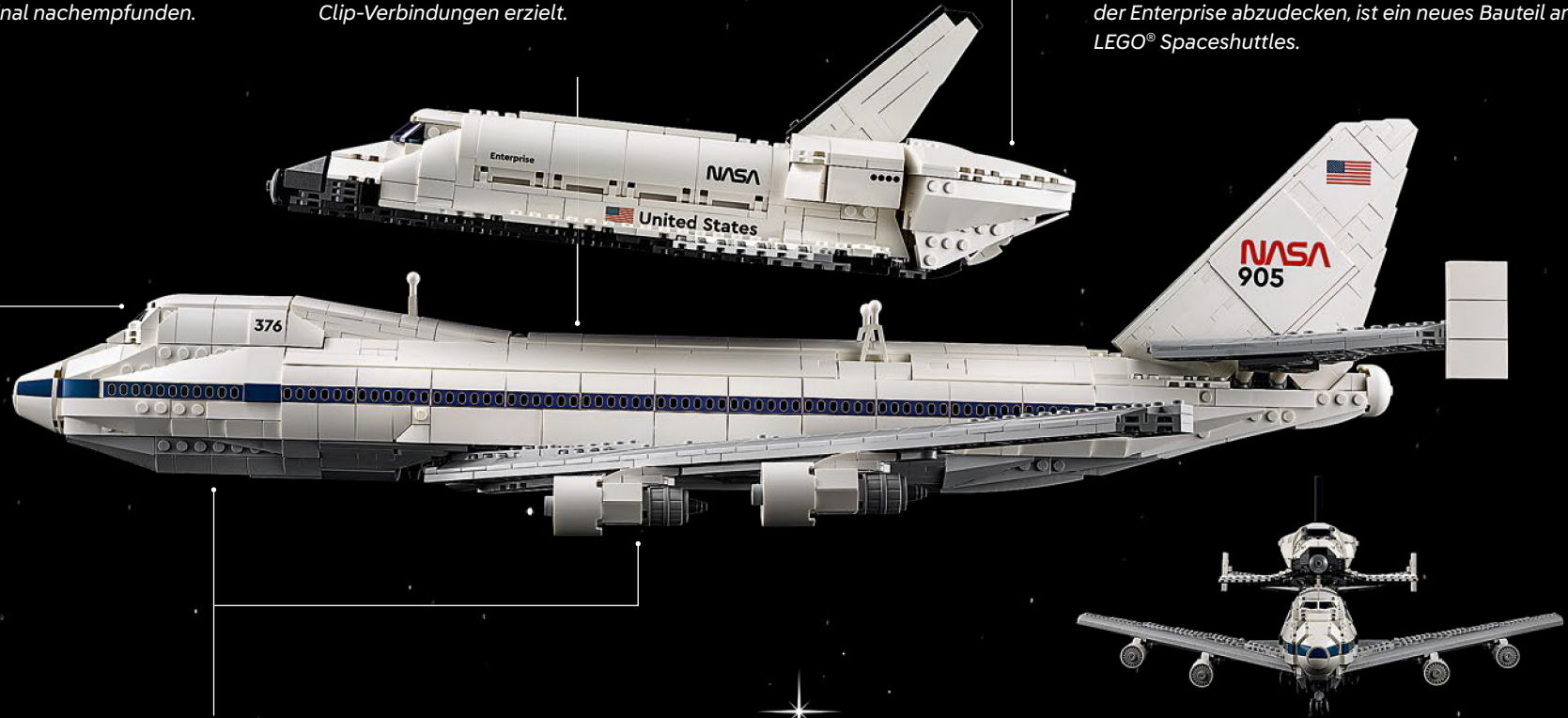
Das geschwungene Cockpit und die charakteristische Nase sind dem Original nachempfunden.

FLUGZEUGRUMPF:

Die geschmeidige Röhrenform der Boeing 747 wird mithilfe von innovativen Bautechniken sowie mit Clip-Verbindungen erzielt.

HECKKONUS:

Der Heckkonus, der benutzt wird, um die Triebwerke der Enterprise abzudecken, ist ein neues Bauteil an LEGO® Spaceshuttles.

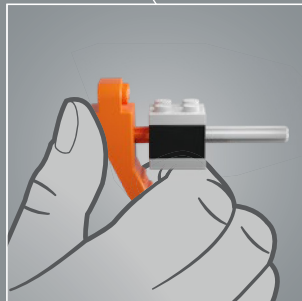
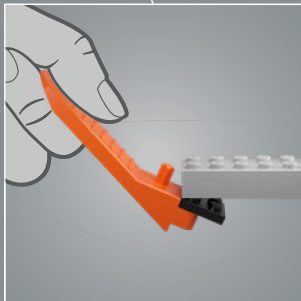
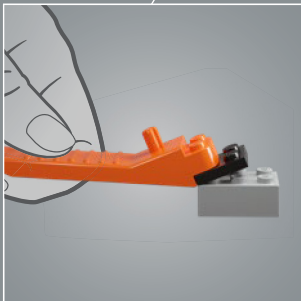
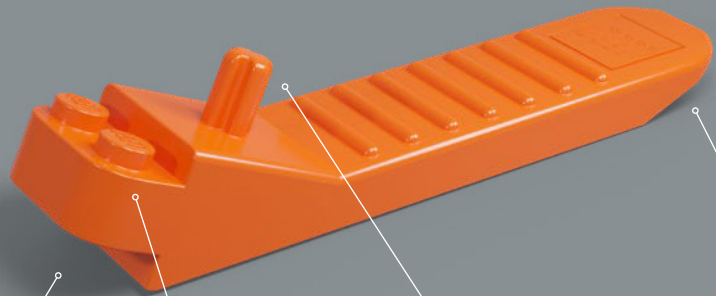


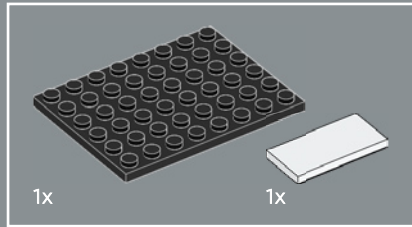
FAHRGESTELL:

Das ist das erste offizielle LEGO® Flugzeug mit 5 Fahrwerken, die so aufeinander abgestimmt sind, dass sie gleichzeitig ein- und ausgefahren werden. An einem der neuen Fahrwerkelemente sitzen vier Räder des Flugzeugs.

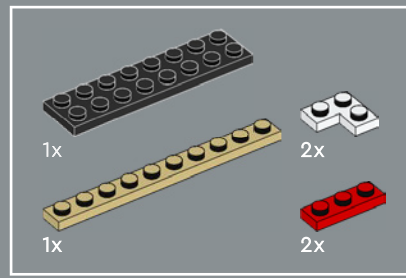
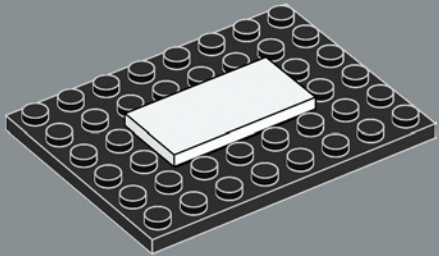
FLÜGEL:

Eine horizontale und eine vertikale Dreiecksstruktur verleihen den Flügeln der Boeing™ 747™ ihre geschwungene Vorderkante und lassen die Flügel geringfügig schräg nach oben zeigen.

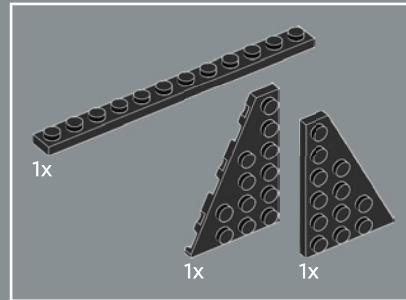
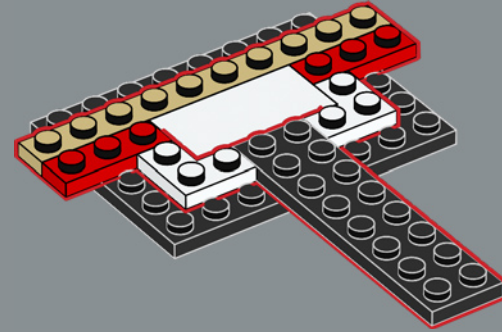




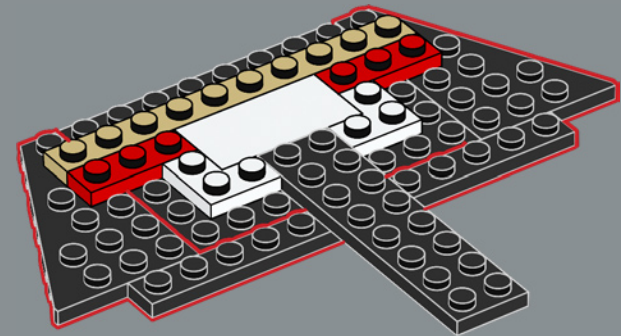
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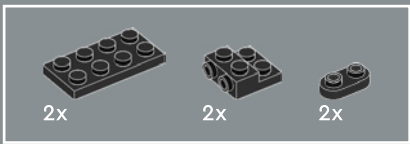


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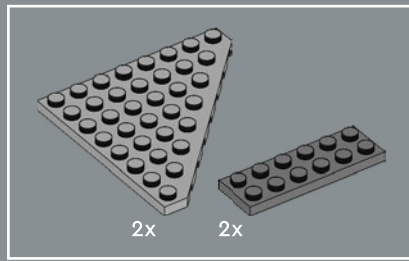
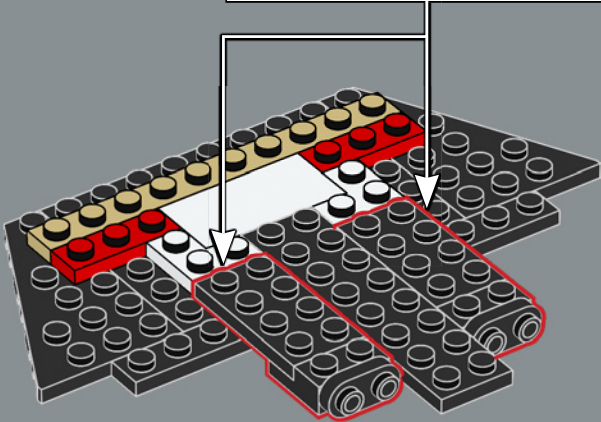
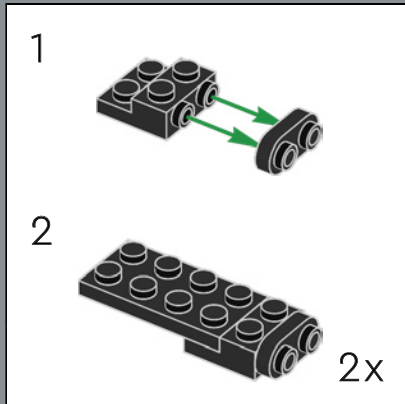


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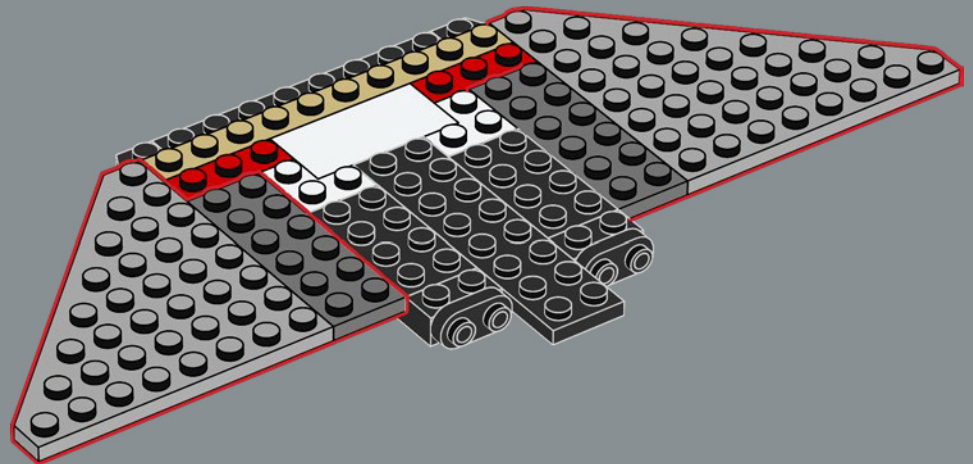


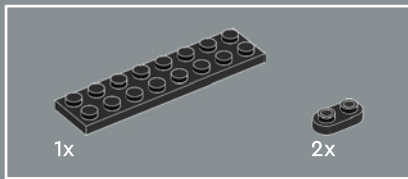


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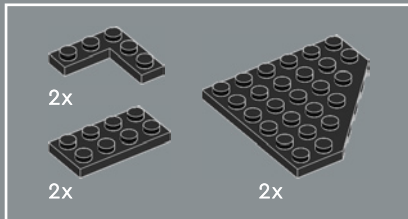
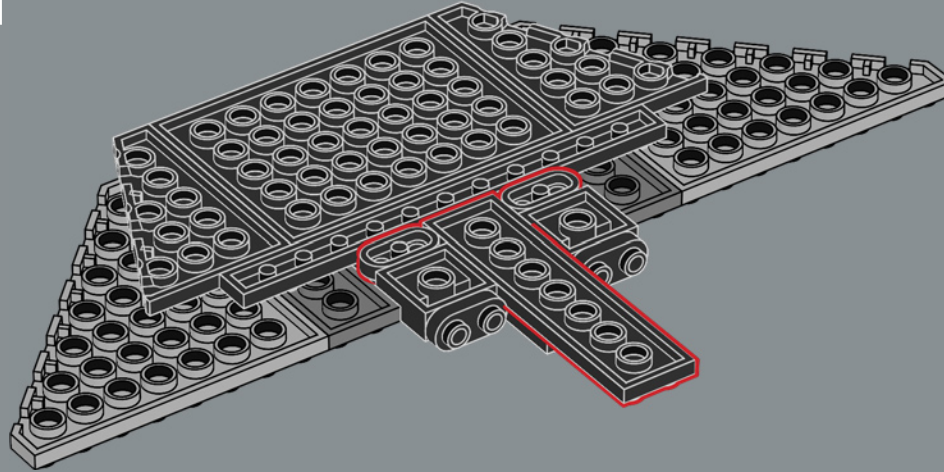


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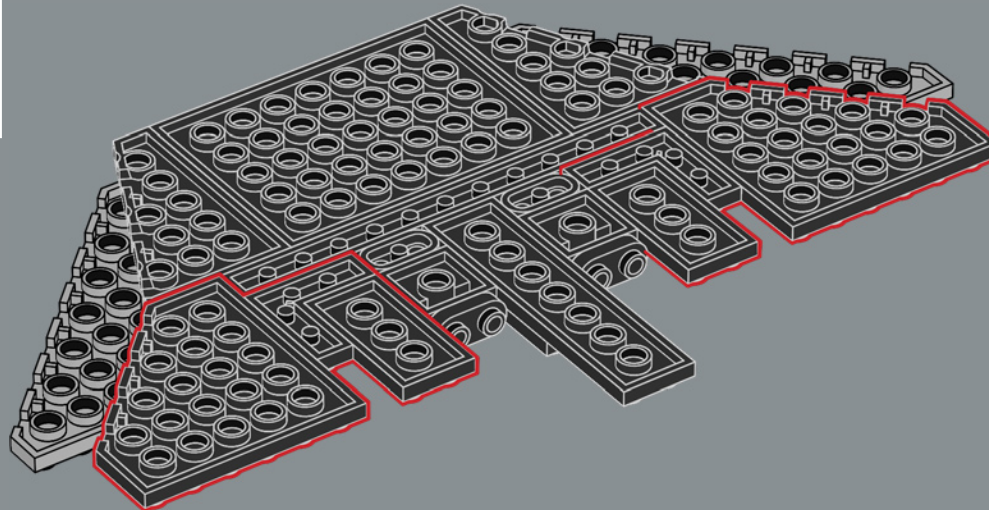


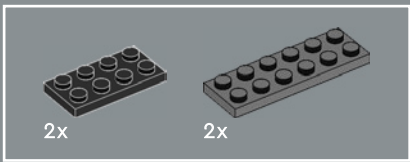


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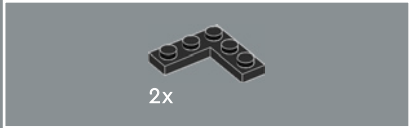
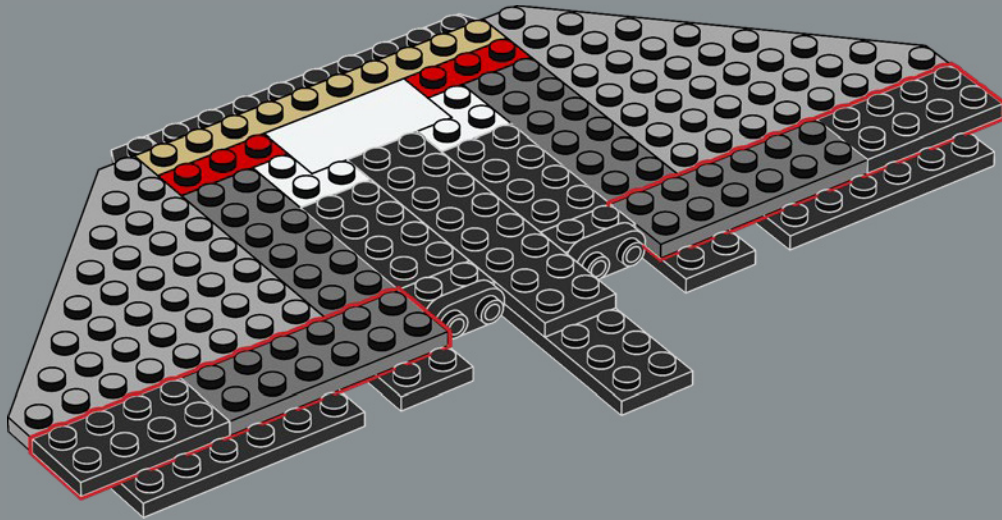


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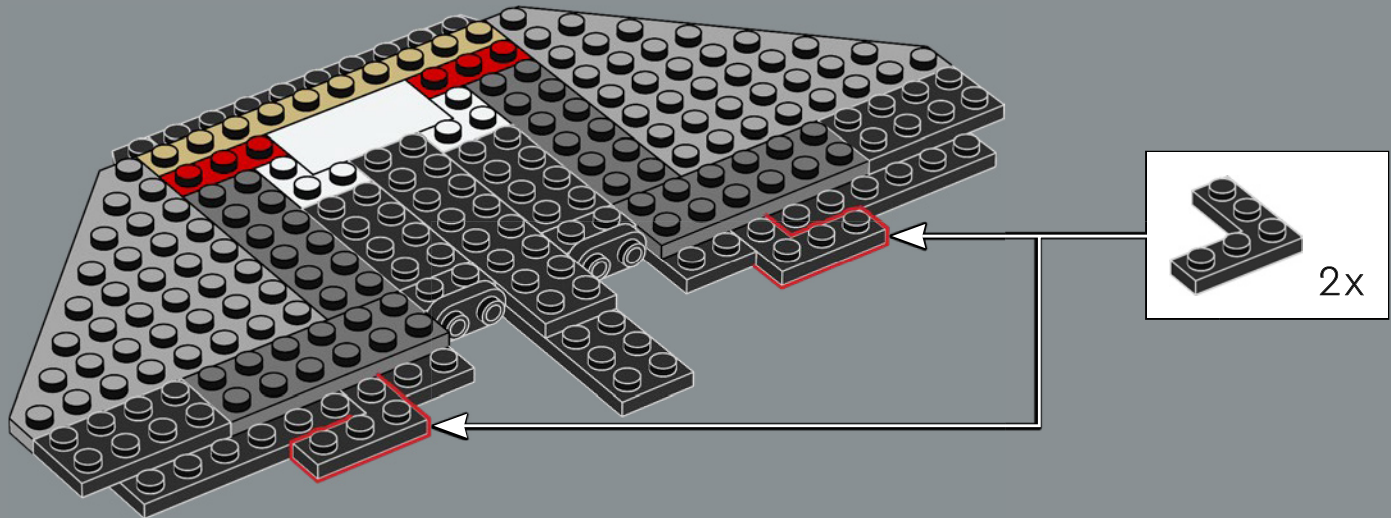


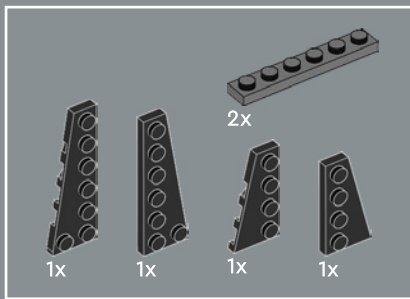


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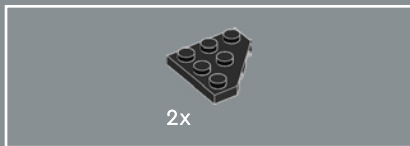
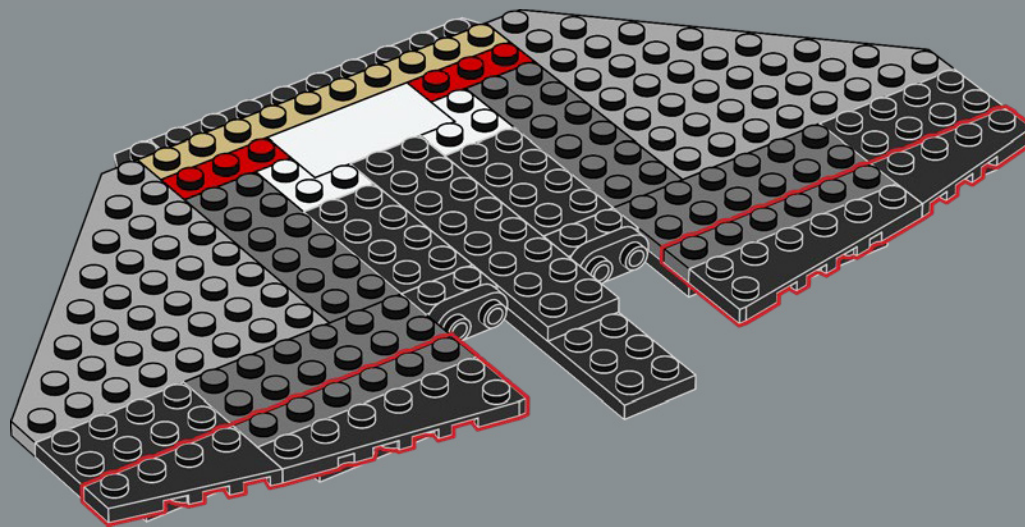


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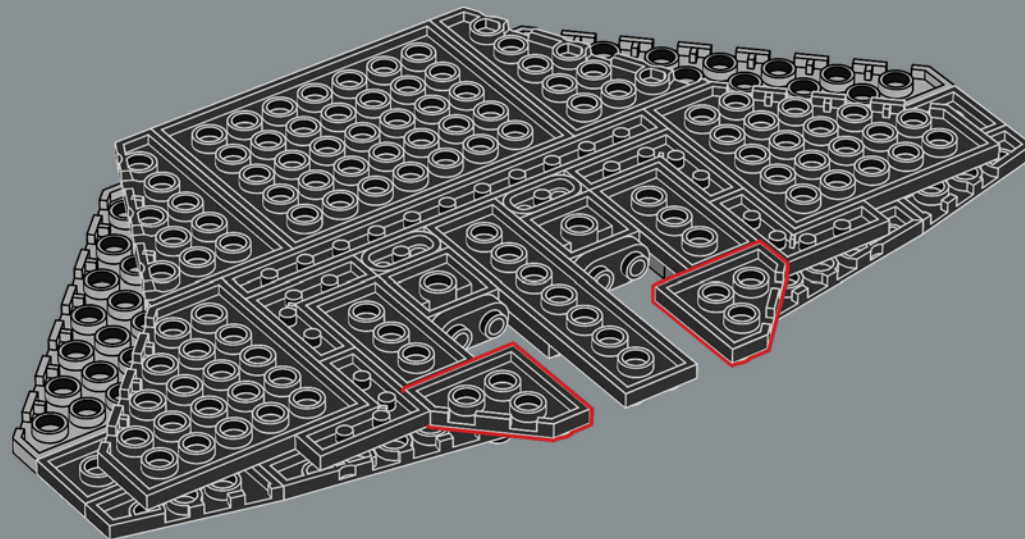


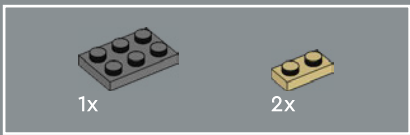


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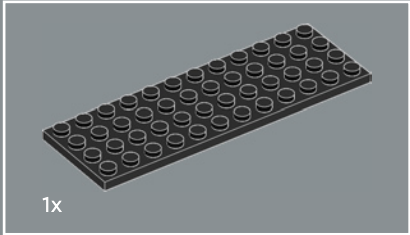
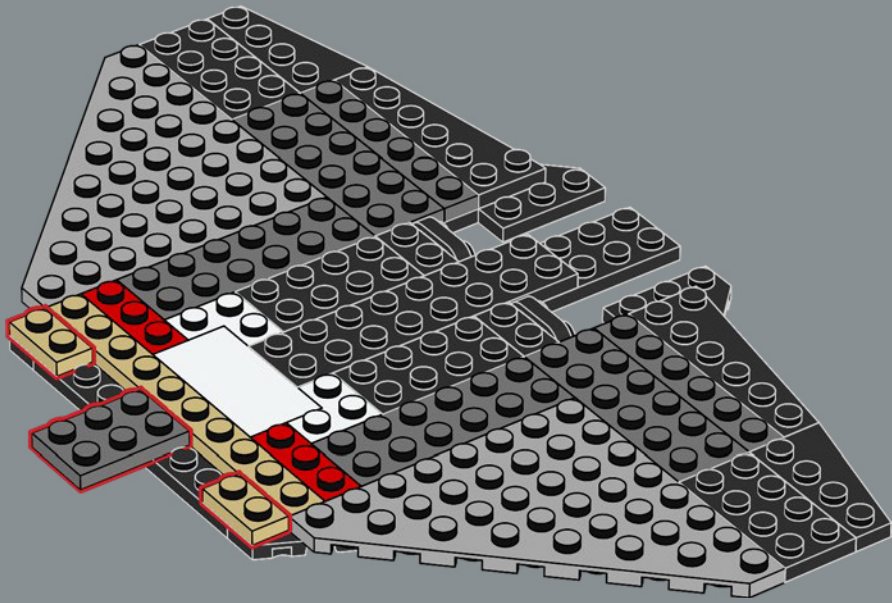


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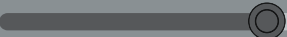
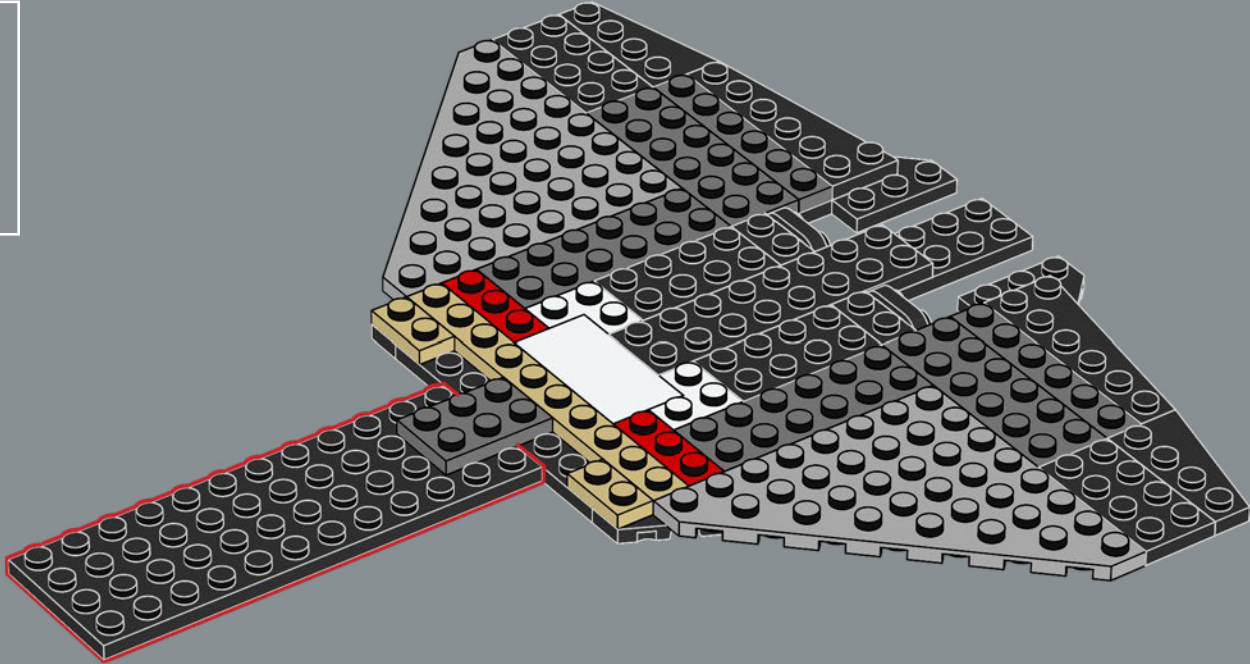


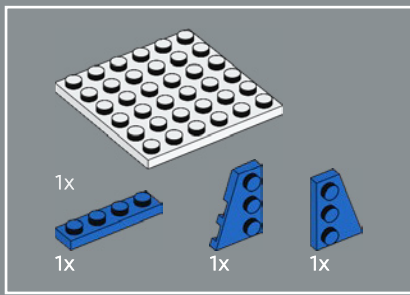


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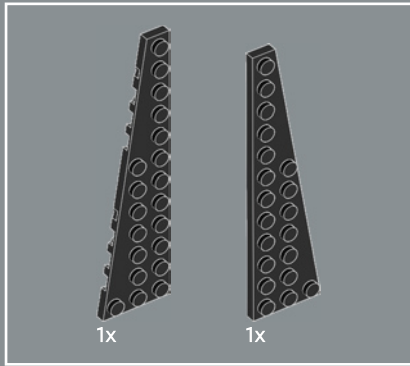
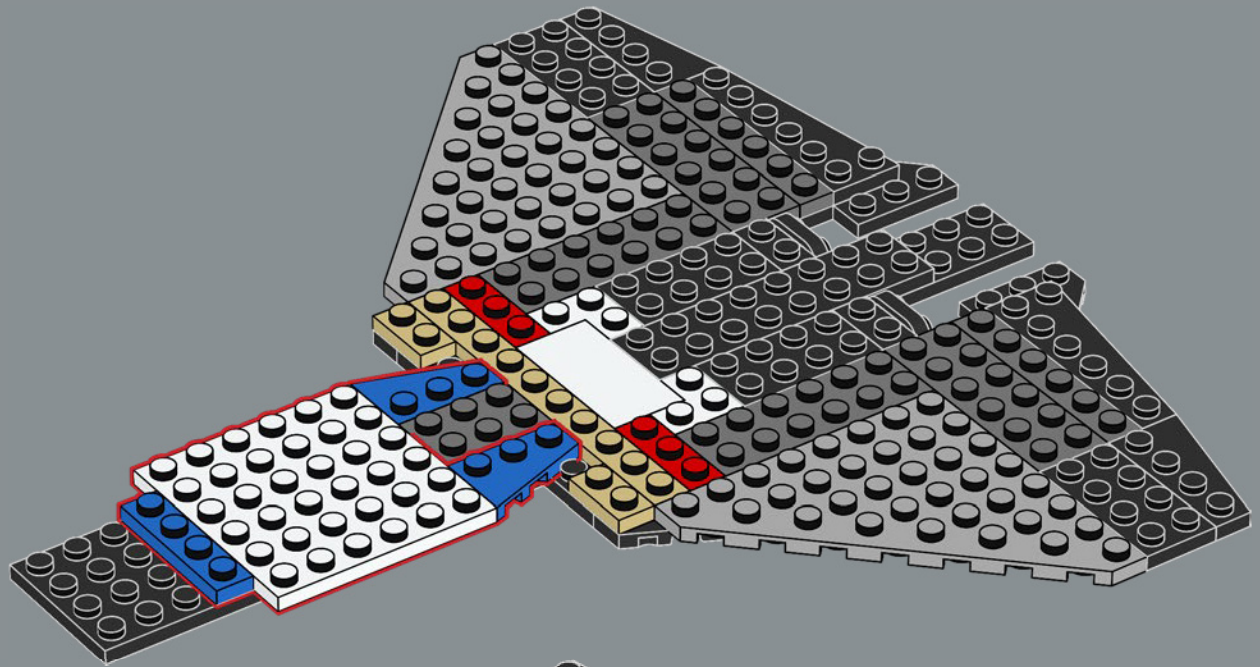


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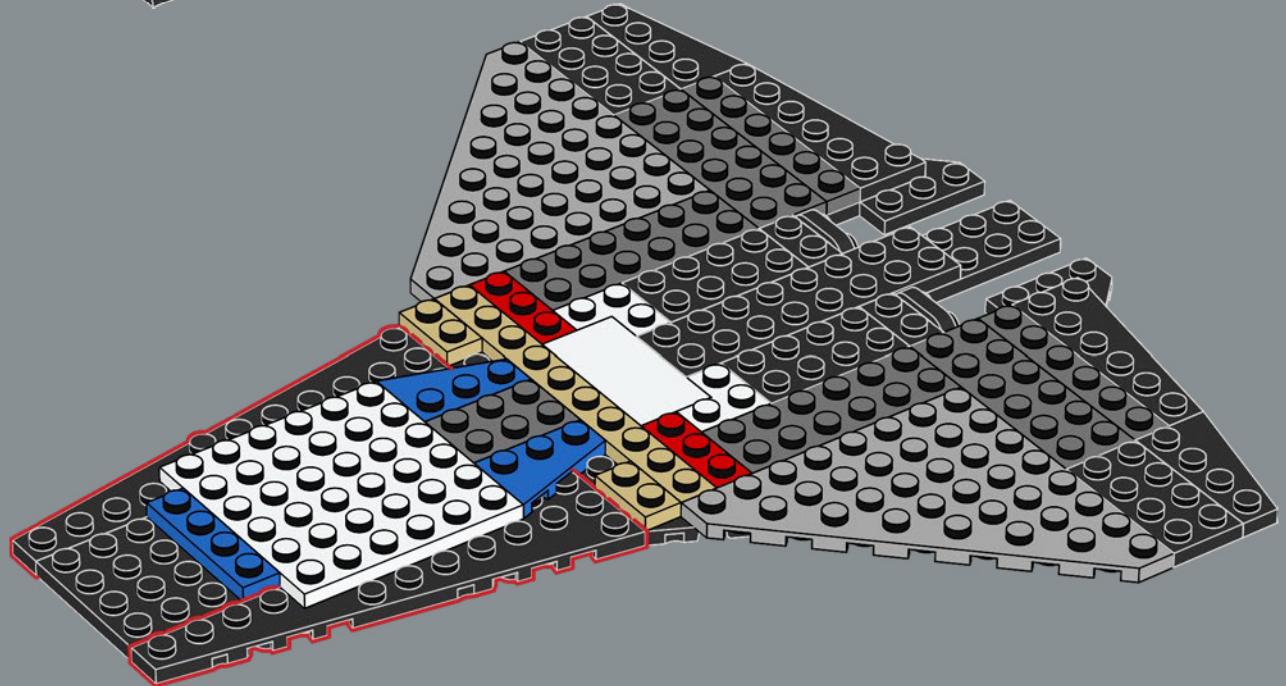


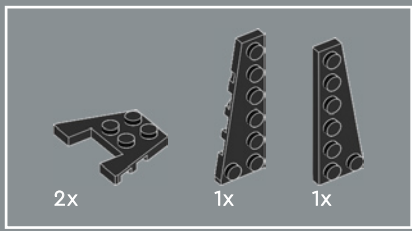


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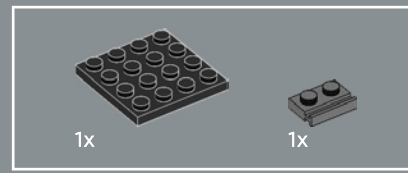
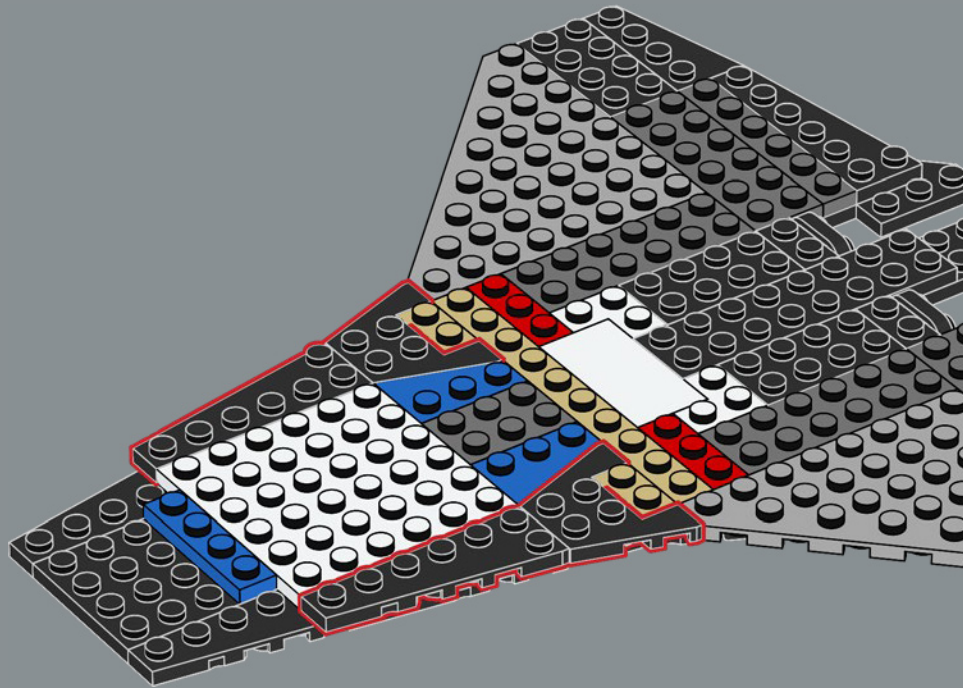


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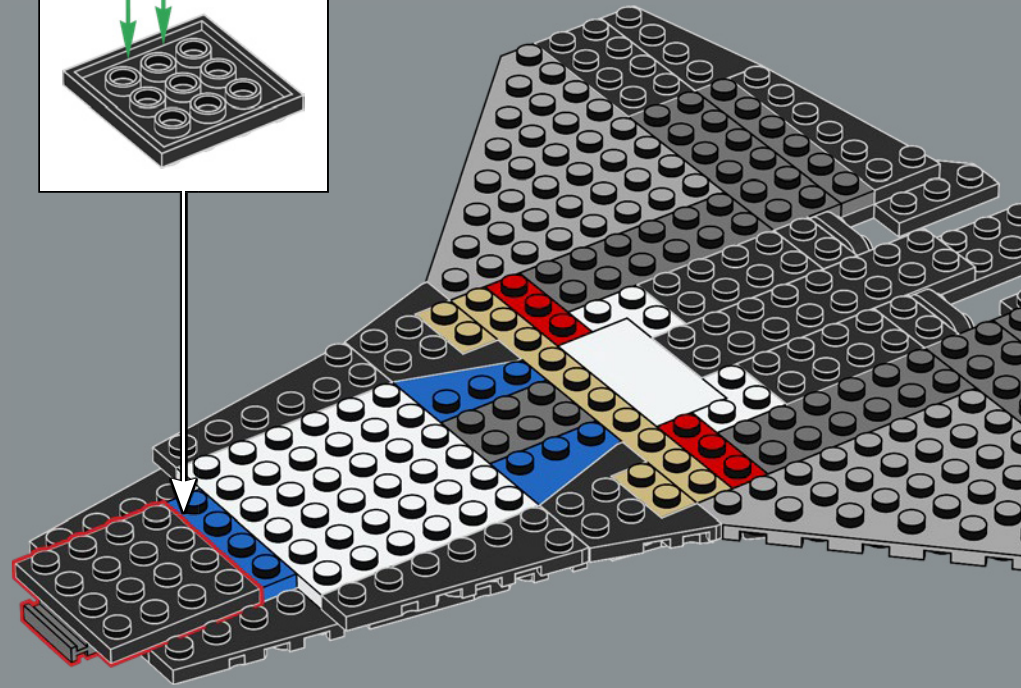
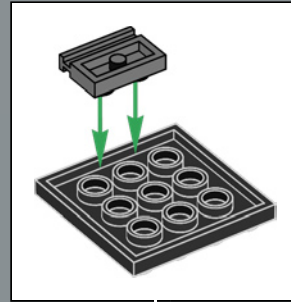


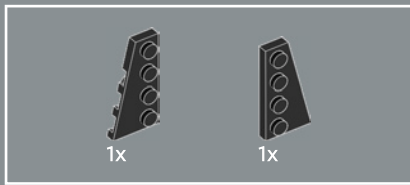


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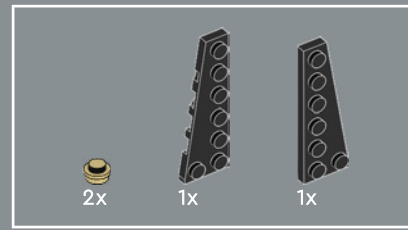
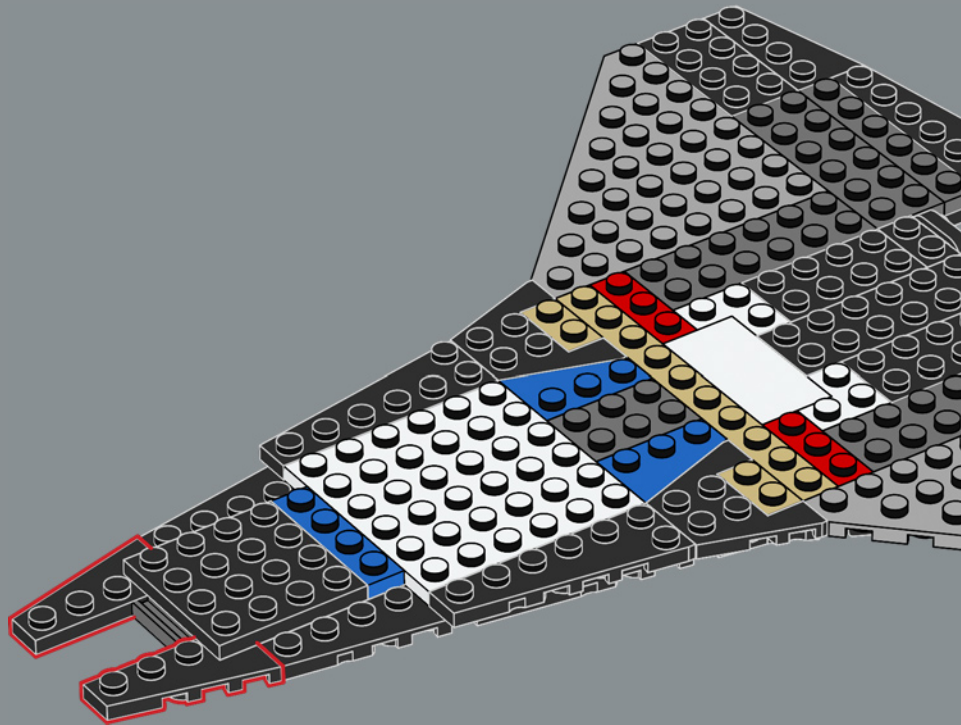


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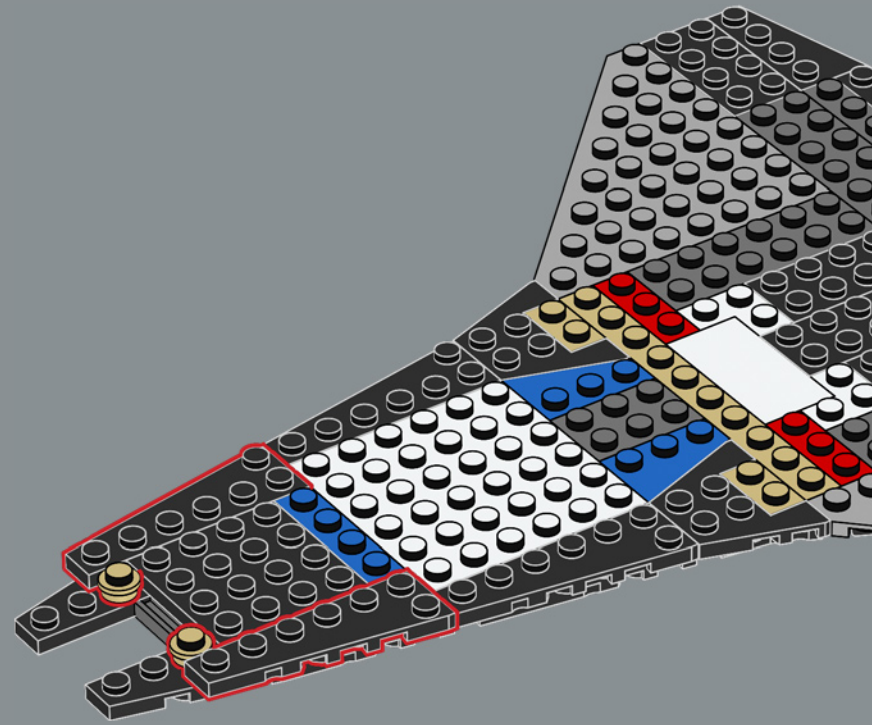


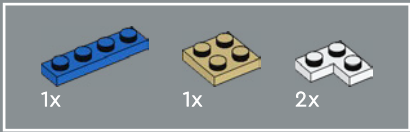


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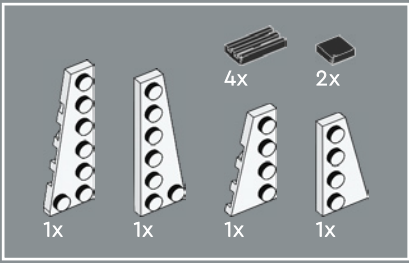
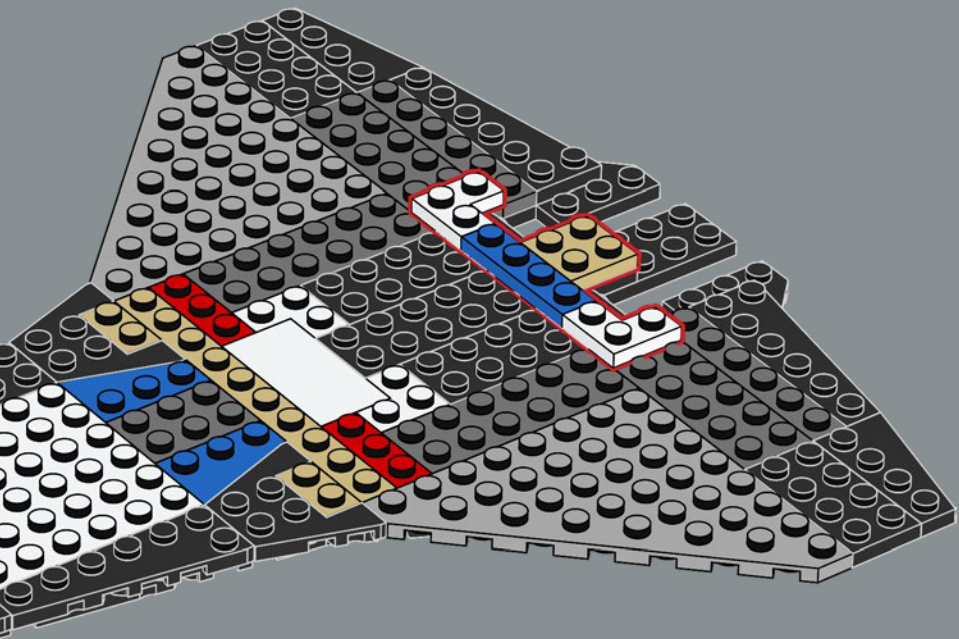


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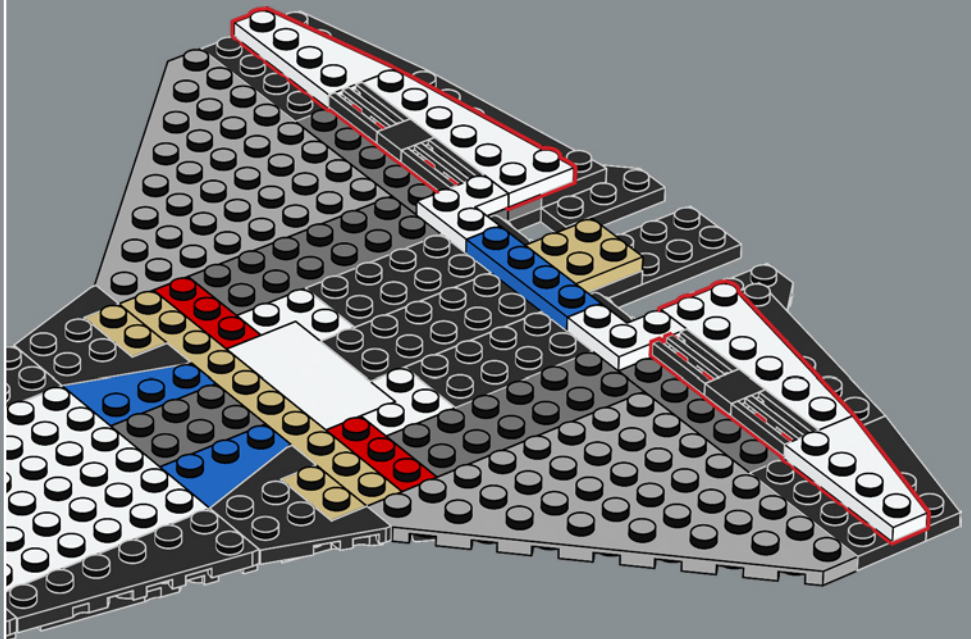


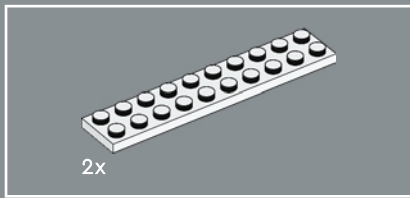


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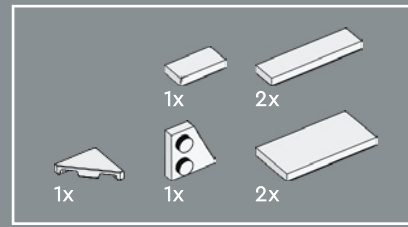
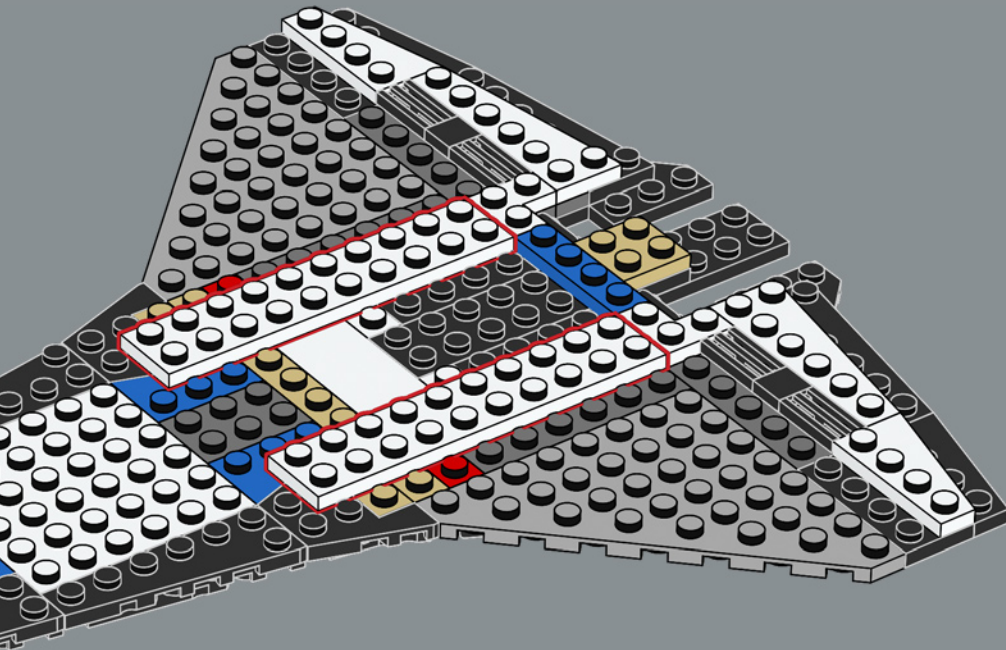


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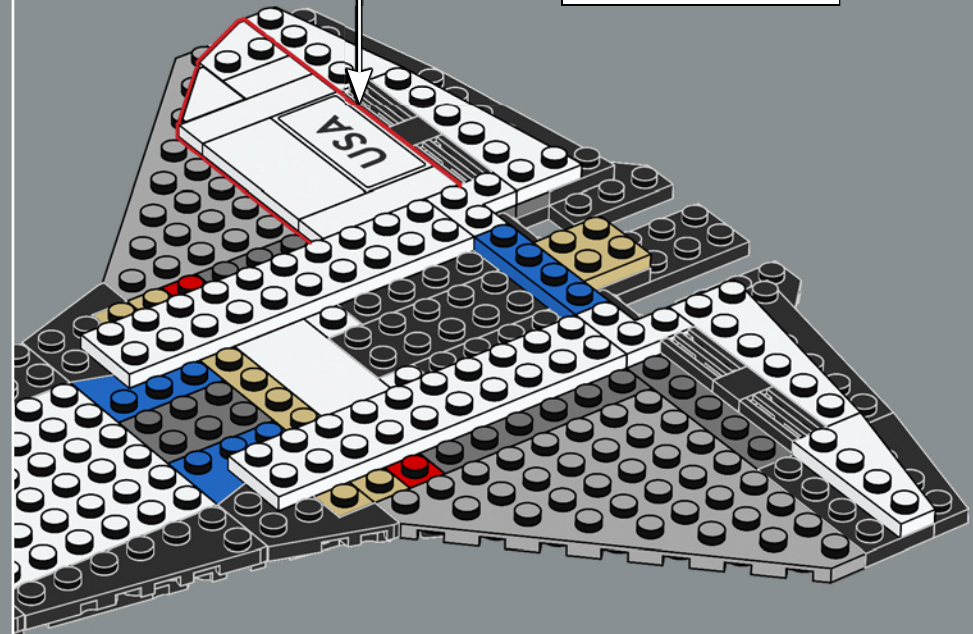
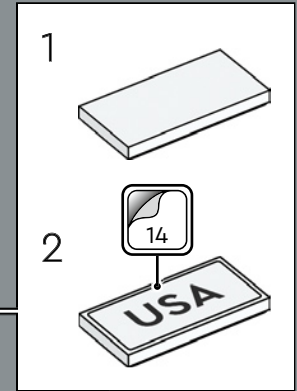


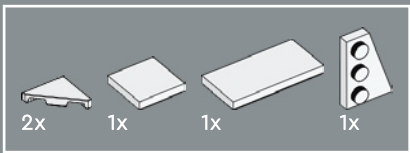


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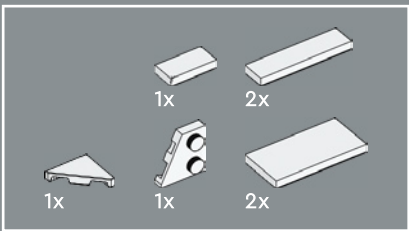
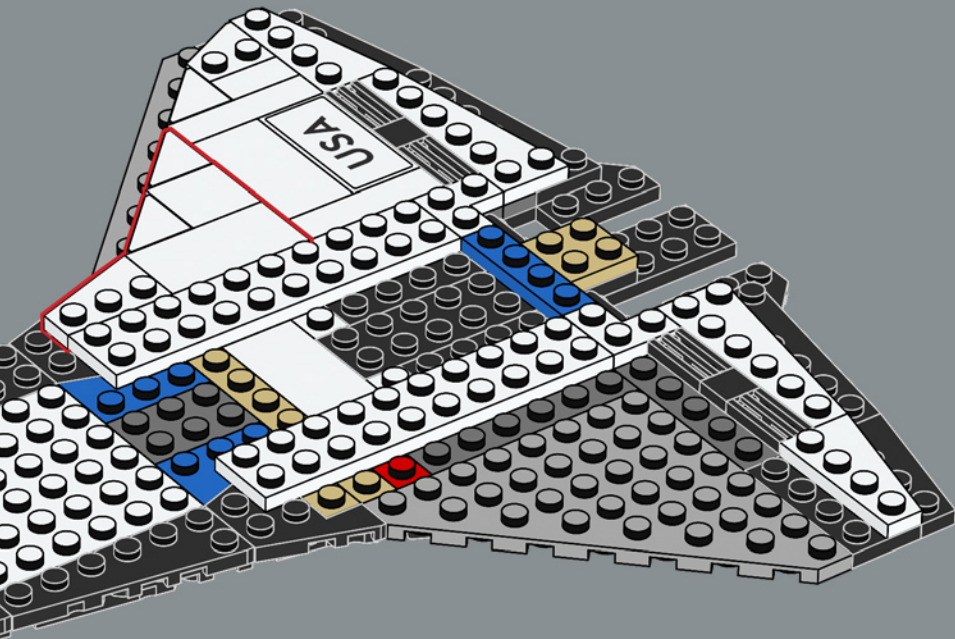


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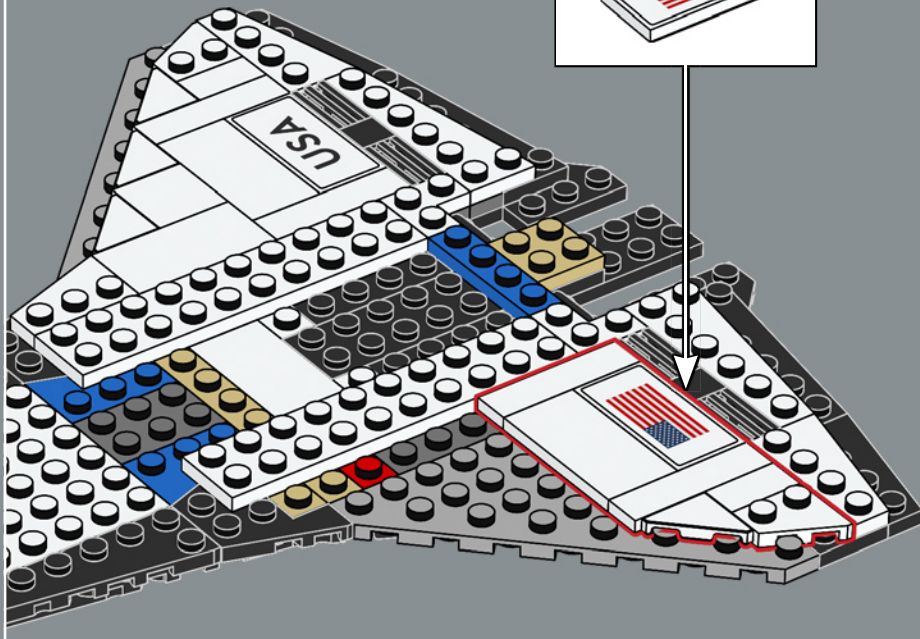
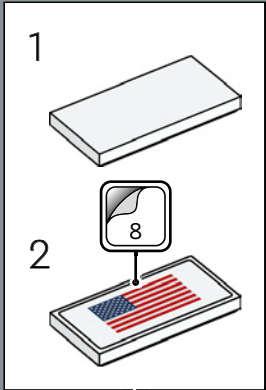


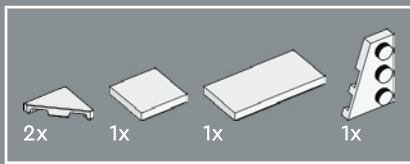


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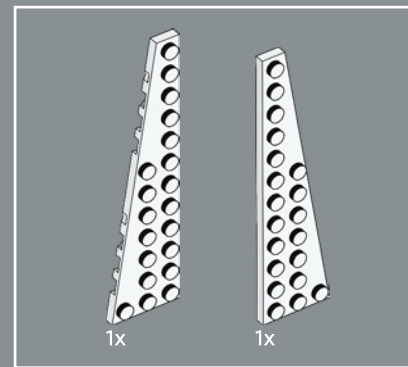
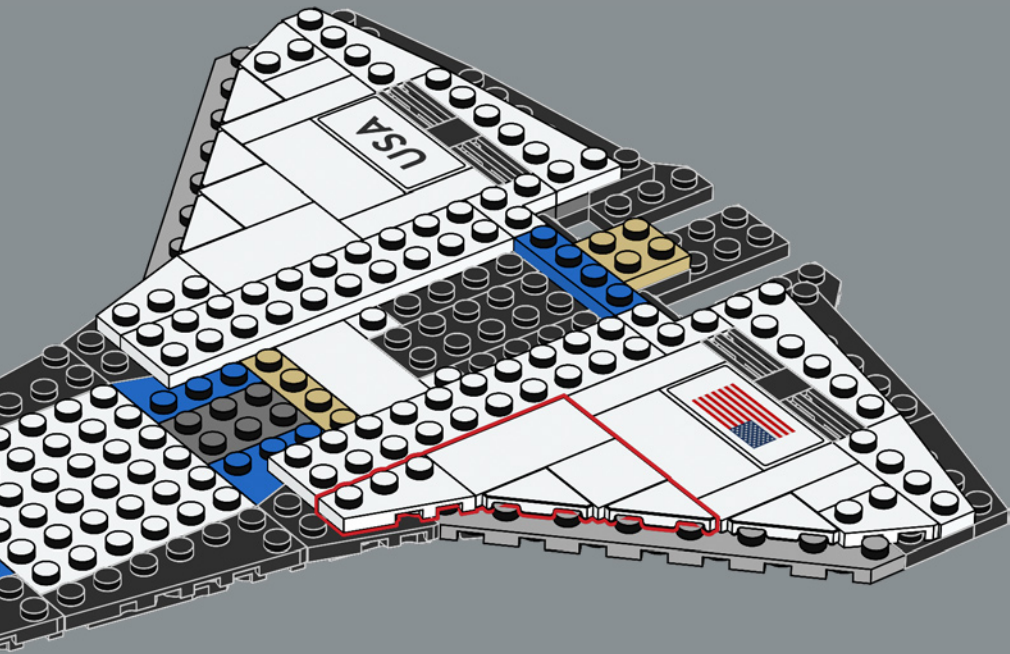


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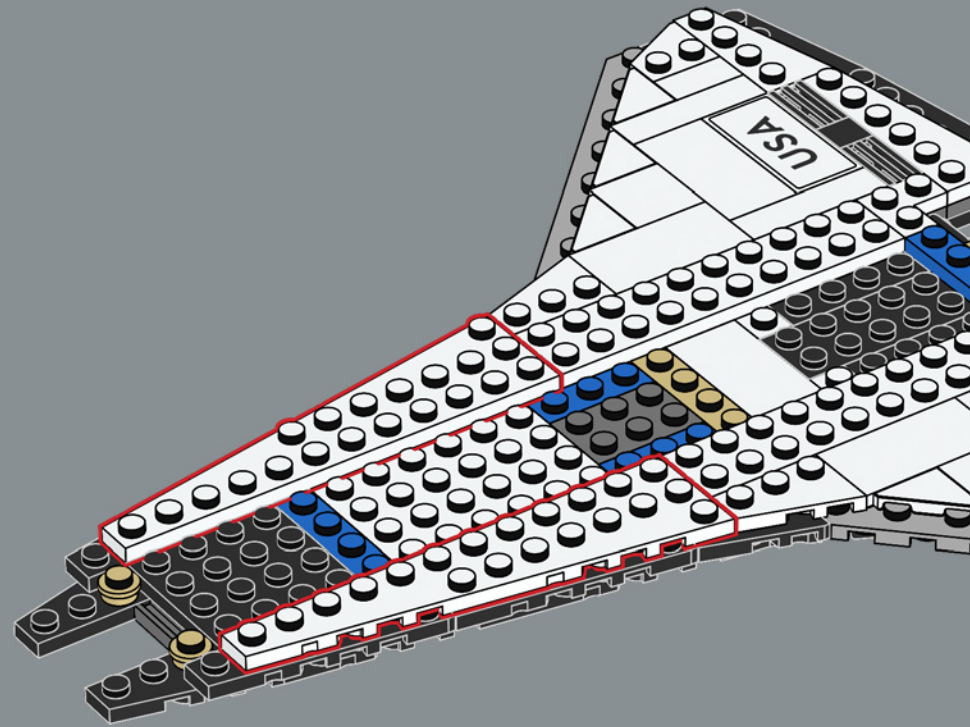


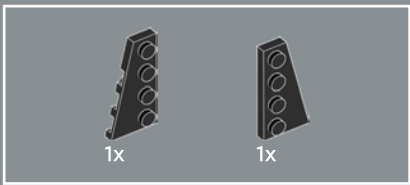


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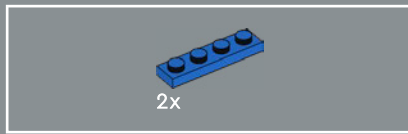
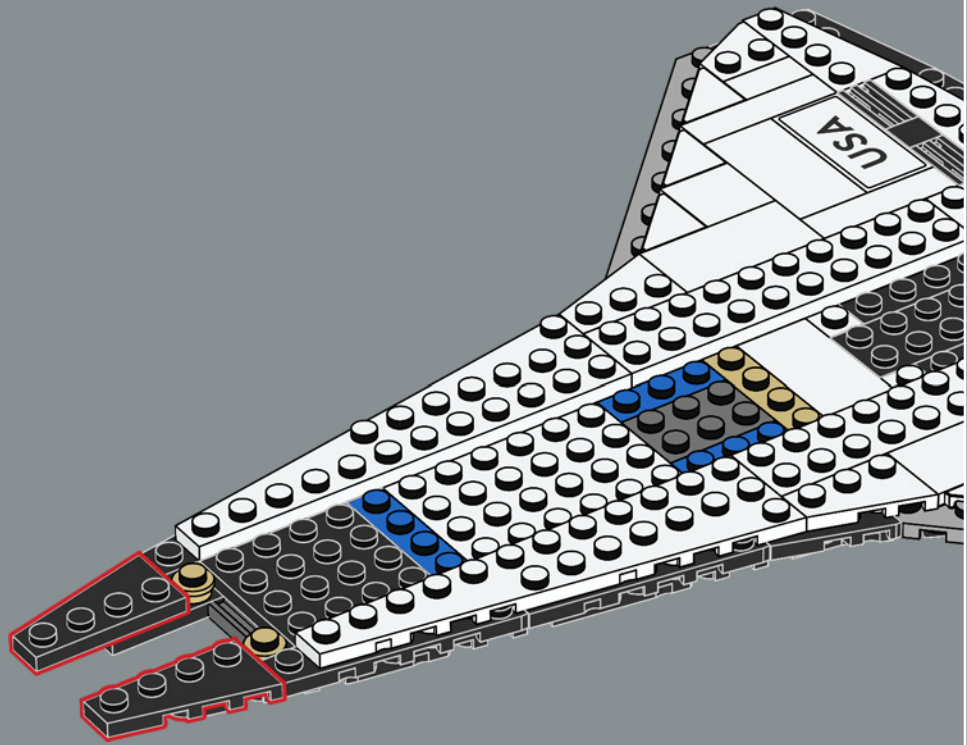


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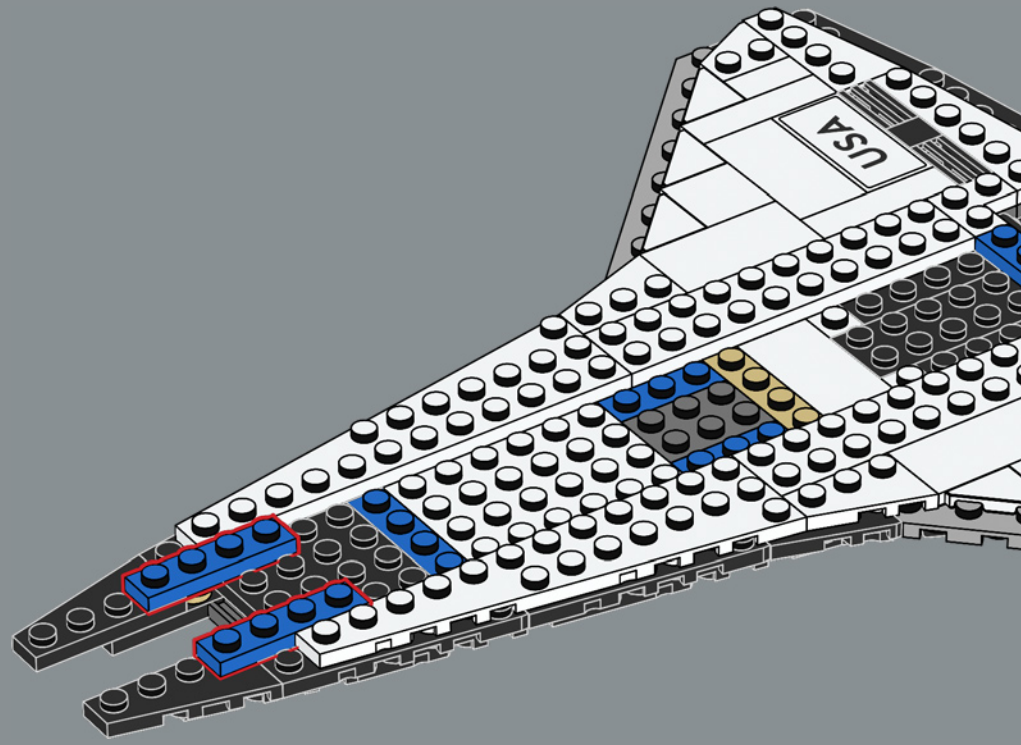




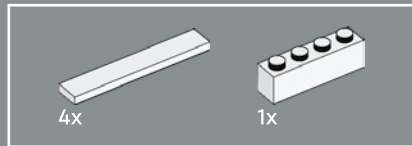
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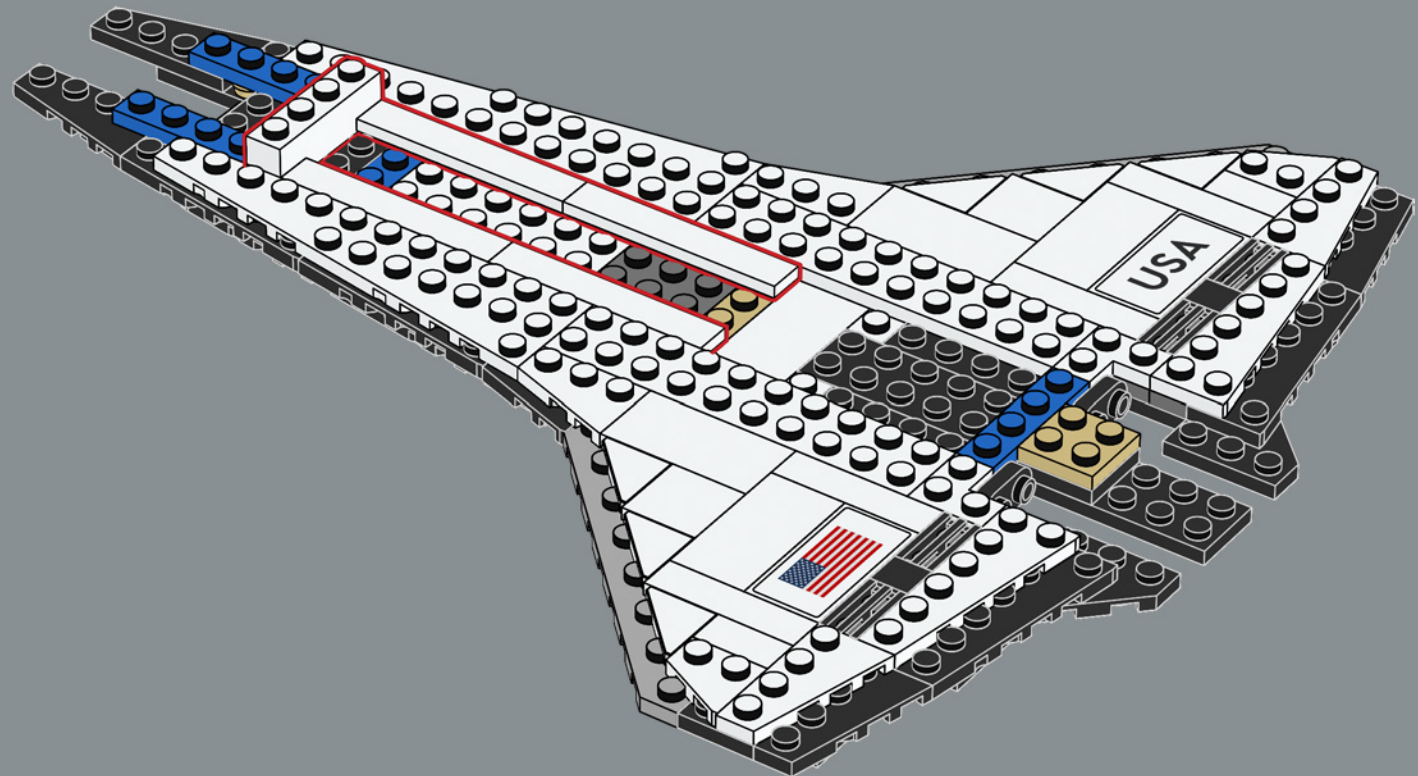
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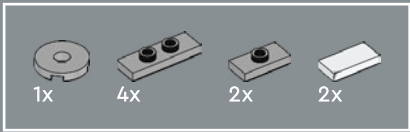


Die *Enterprise* kann auch heute noch
in einem Luftfahrtmuseum in New
York bestaunt werden.

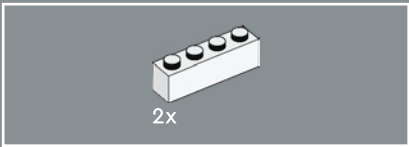
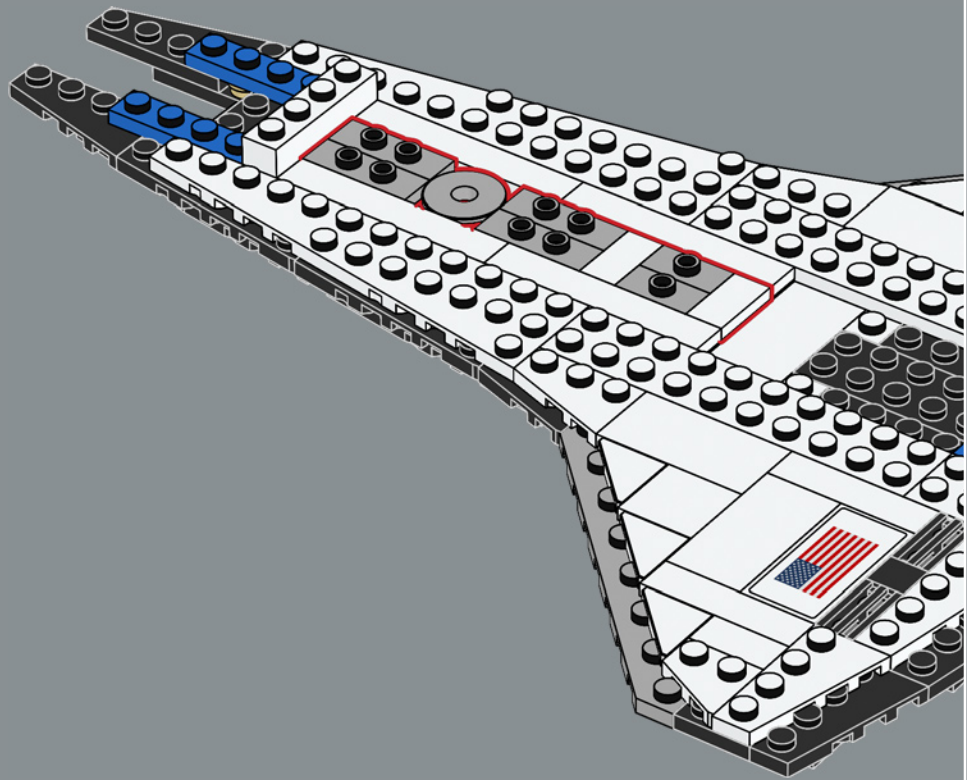


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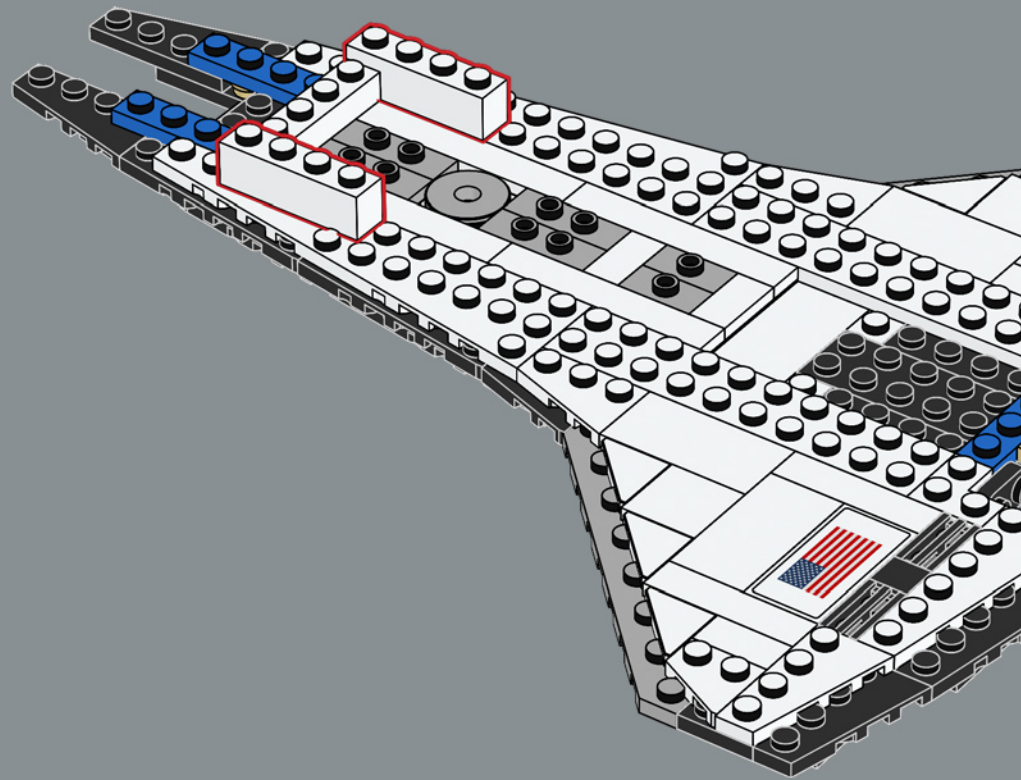


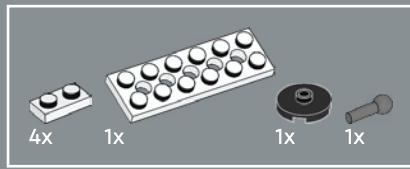


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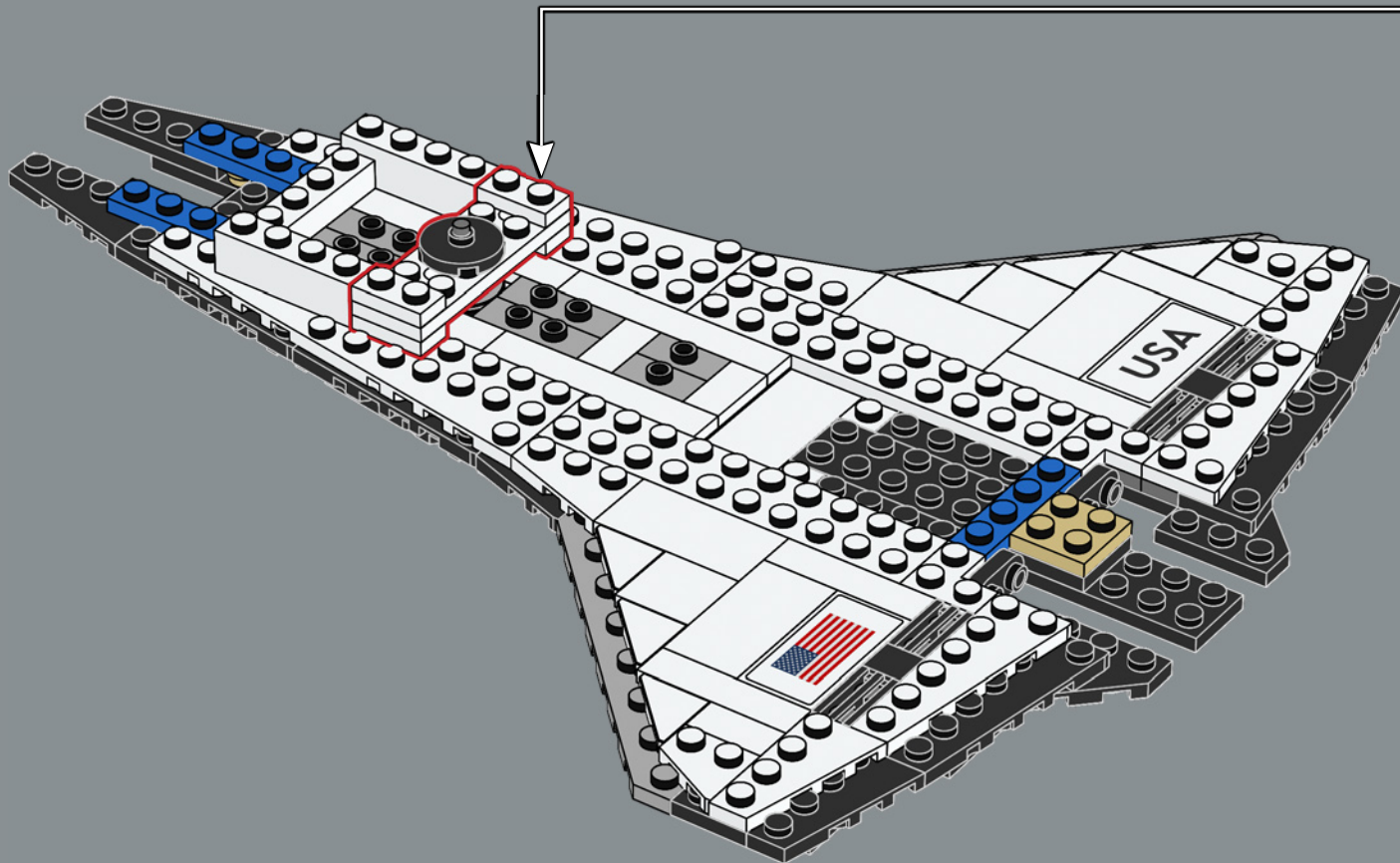
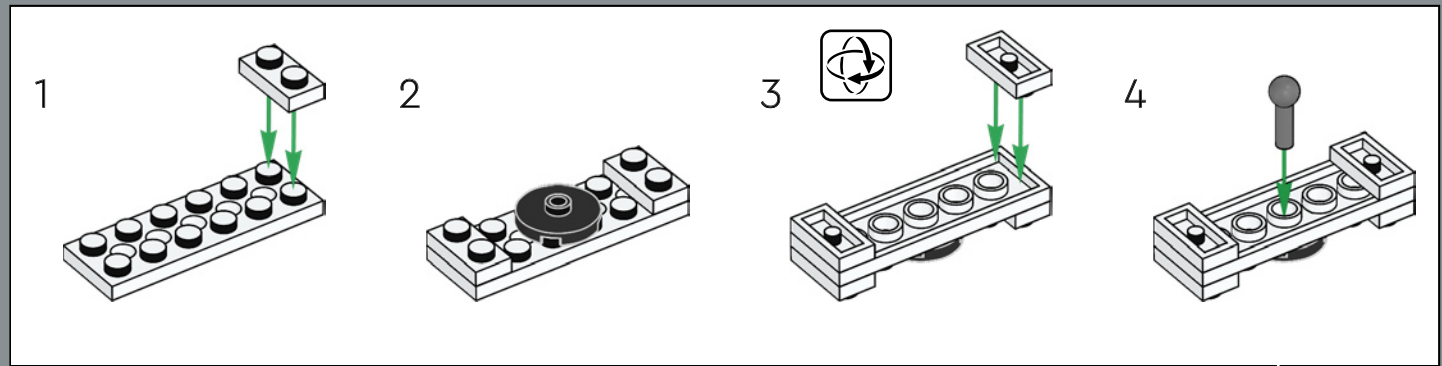


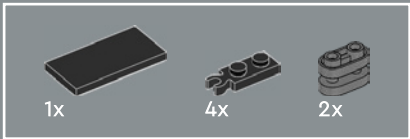
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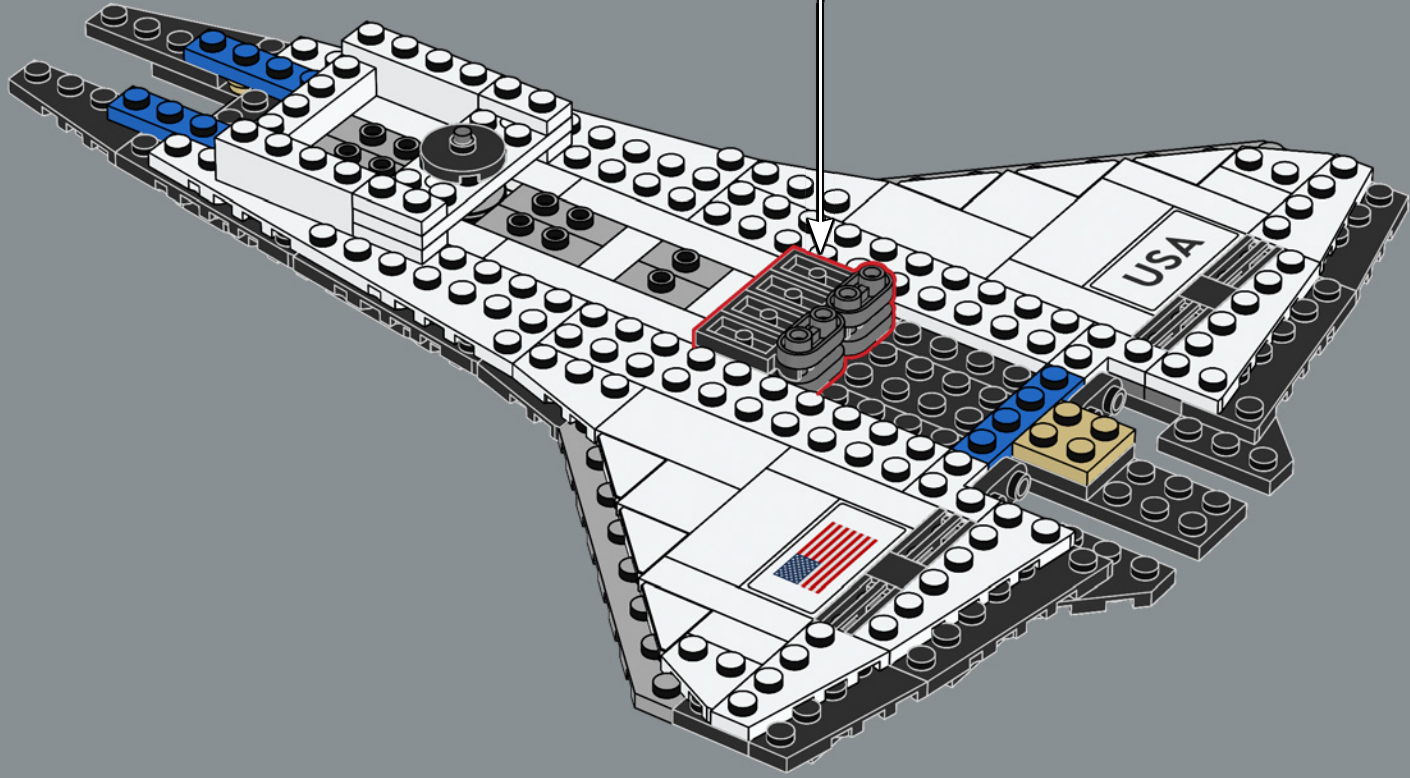
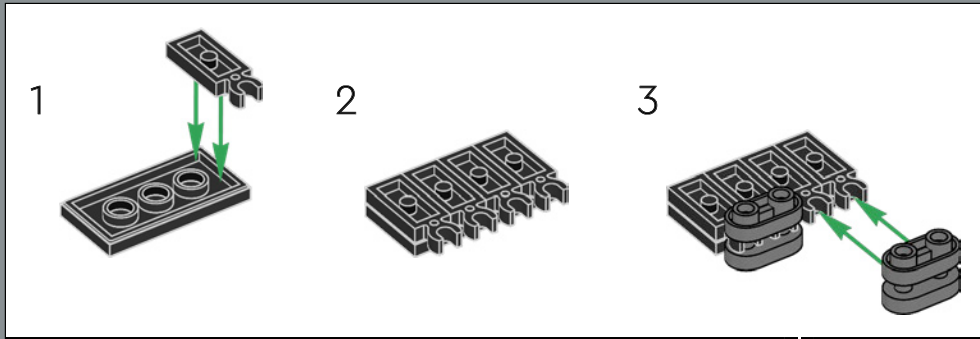


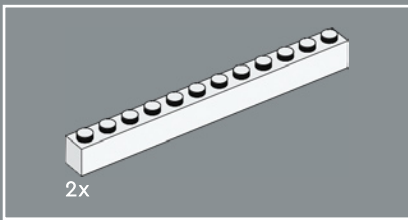
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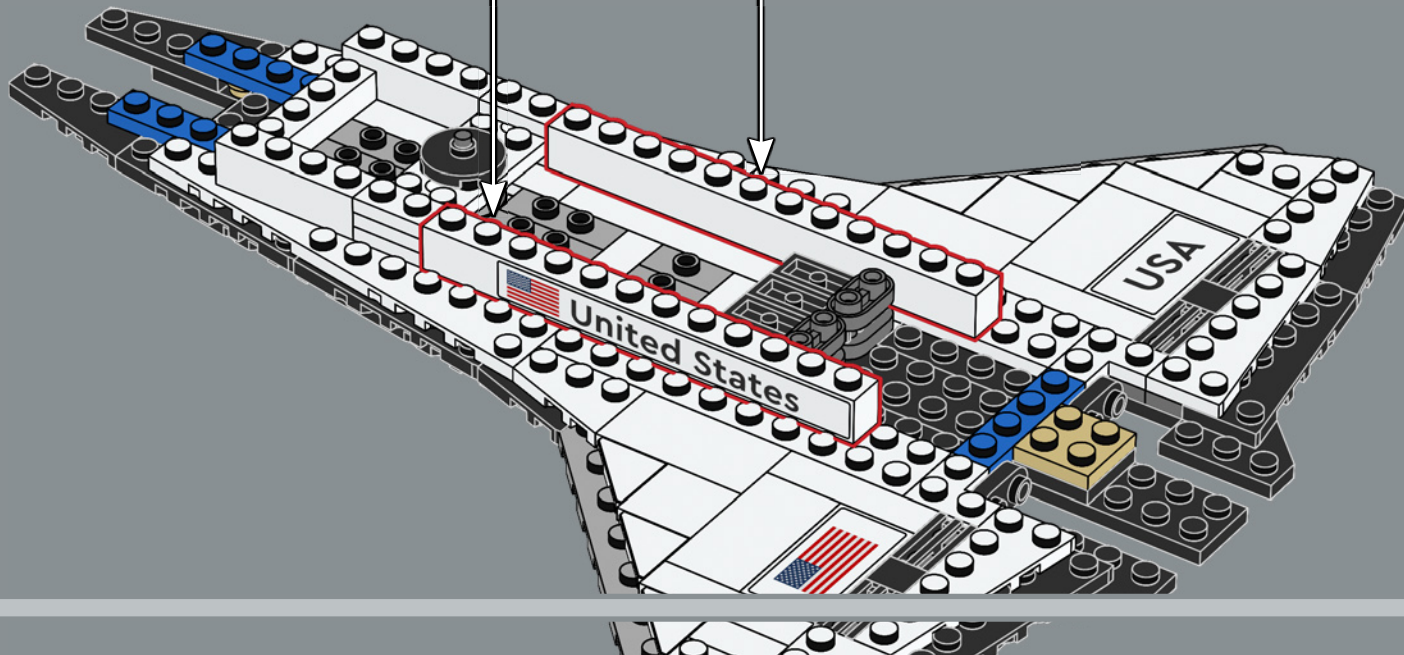
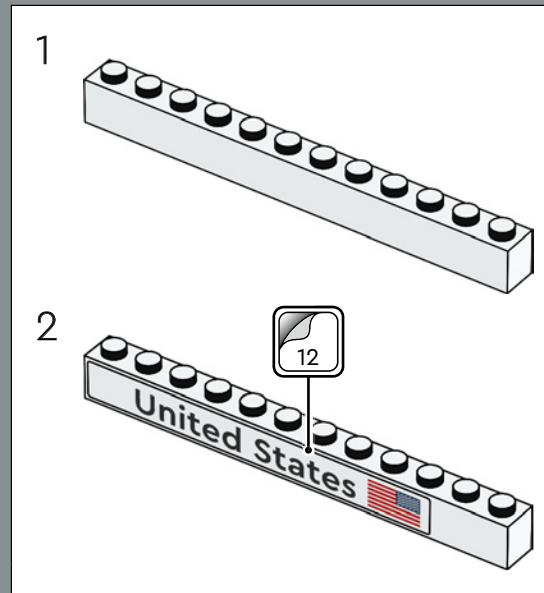
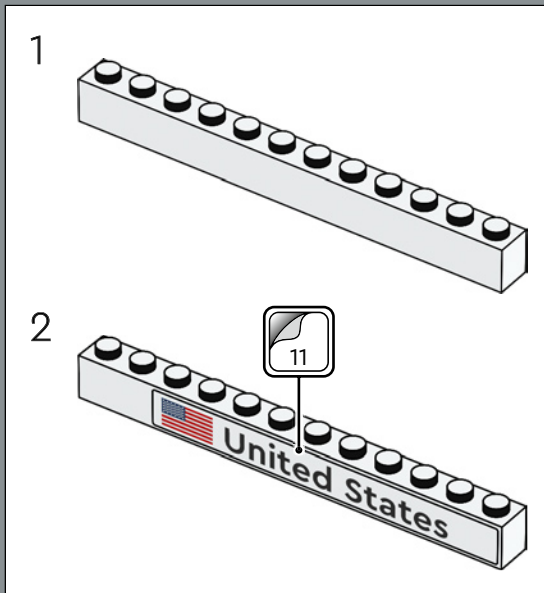


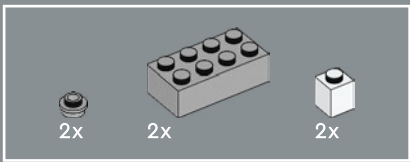
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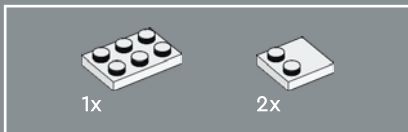
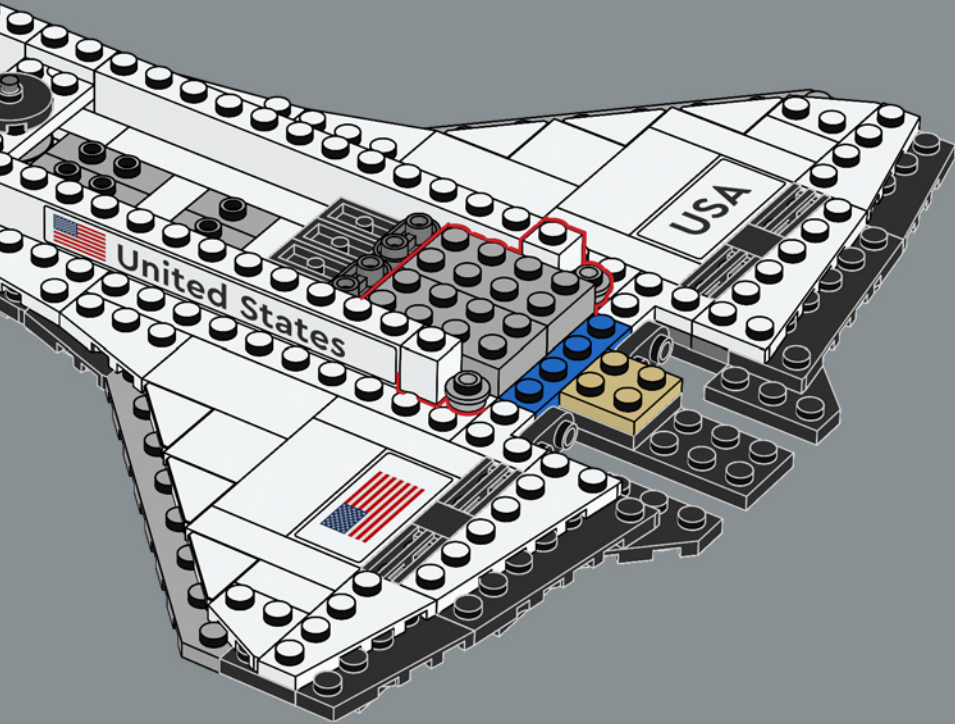


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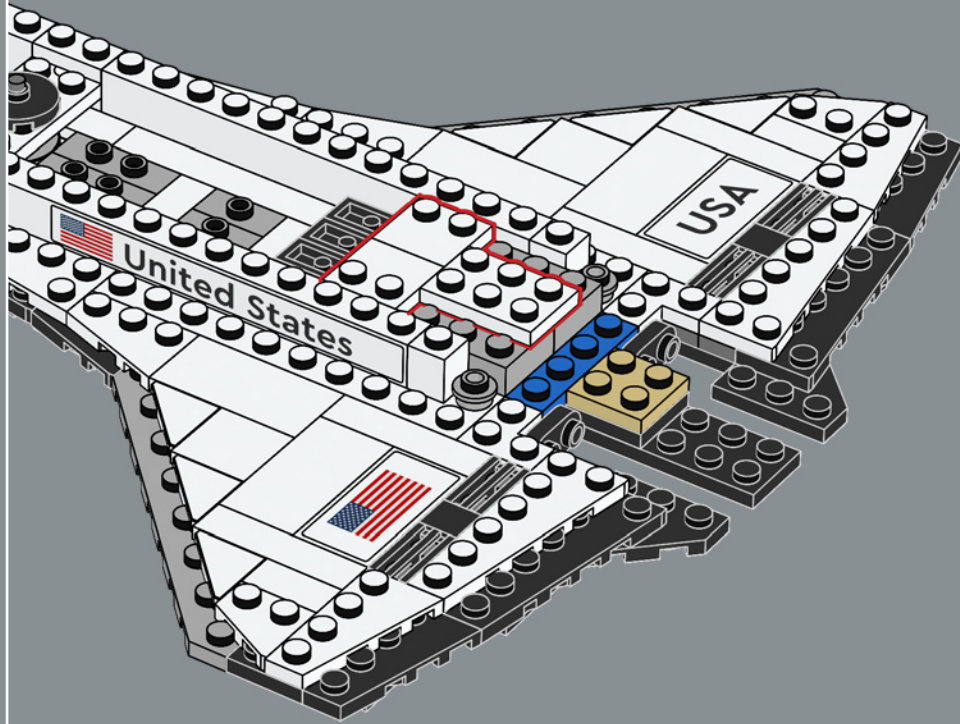




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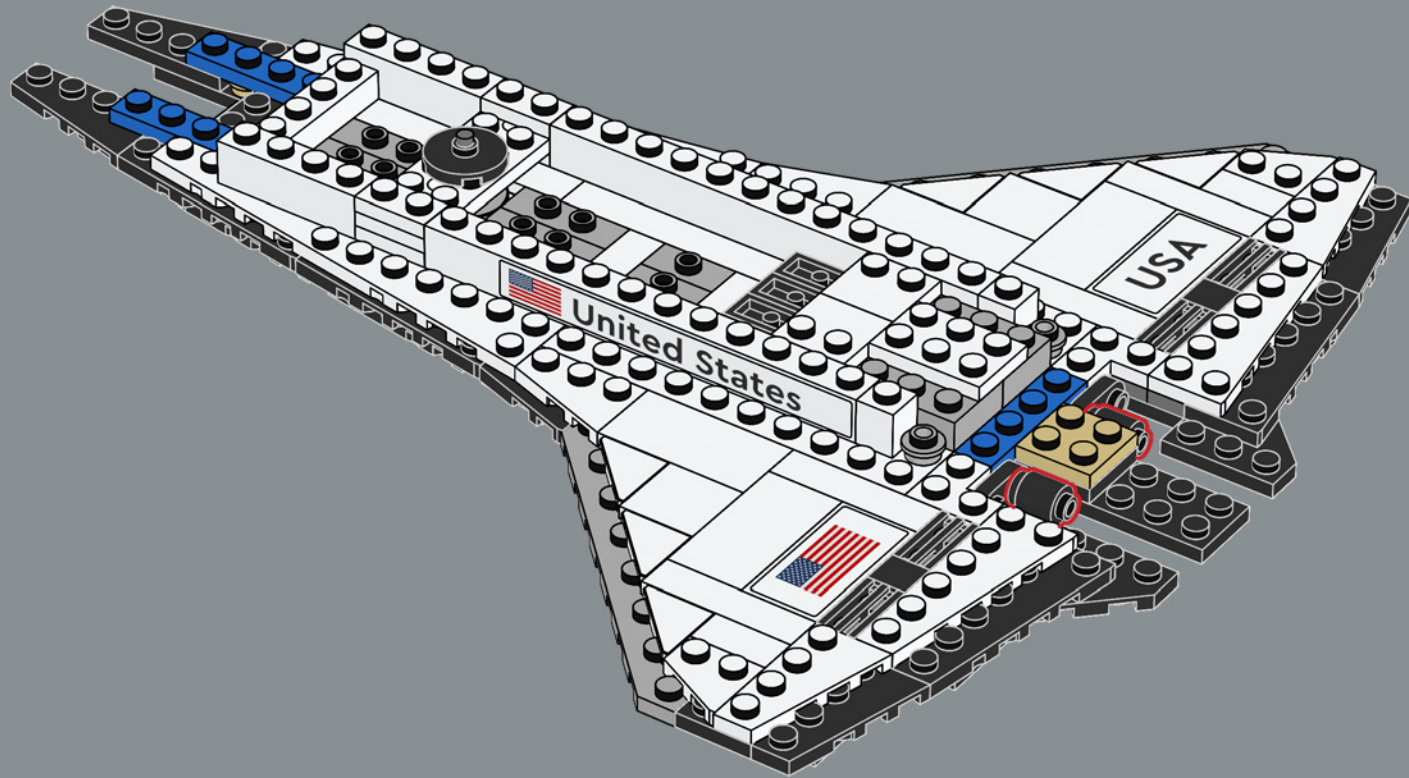
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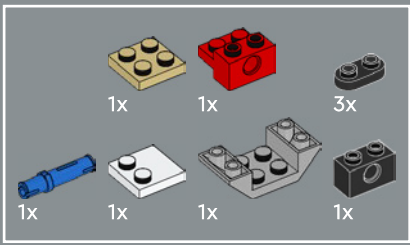




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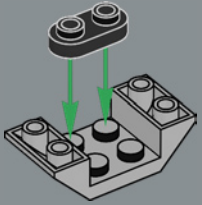
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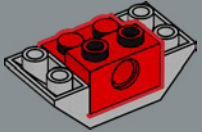


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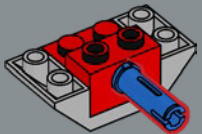
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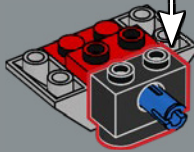
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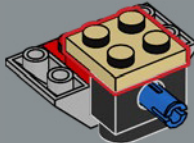
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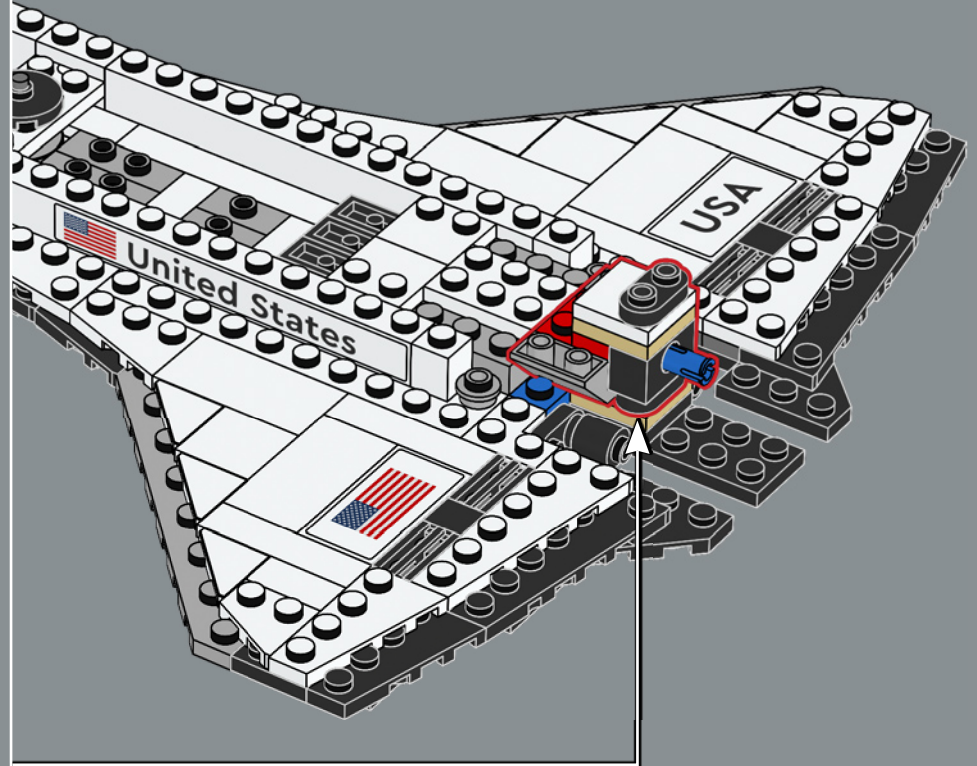
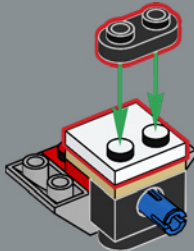
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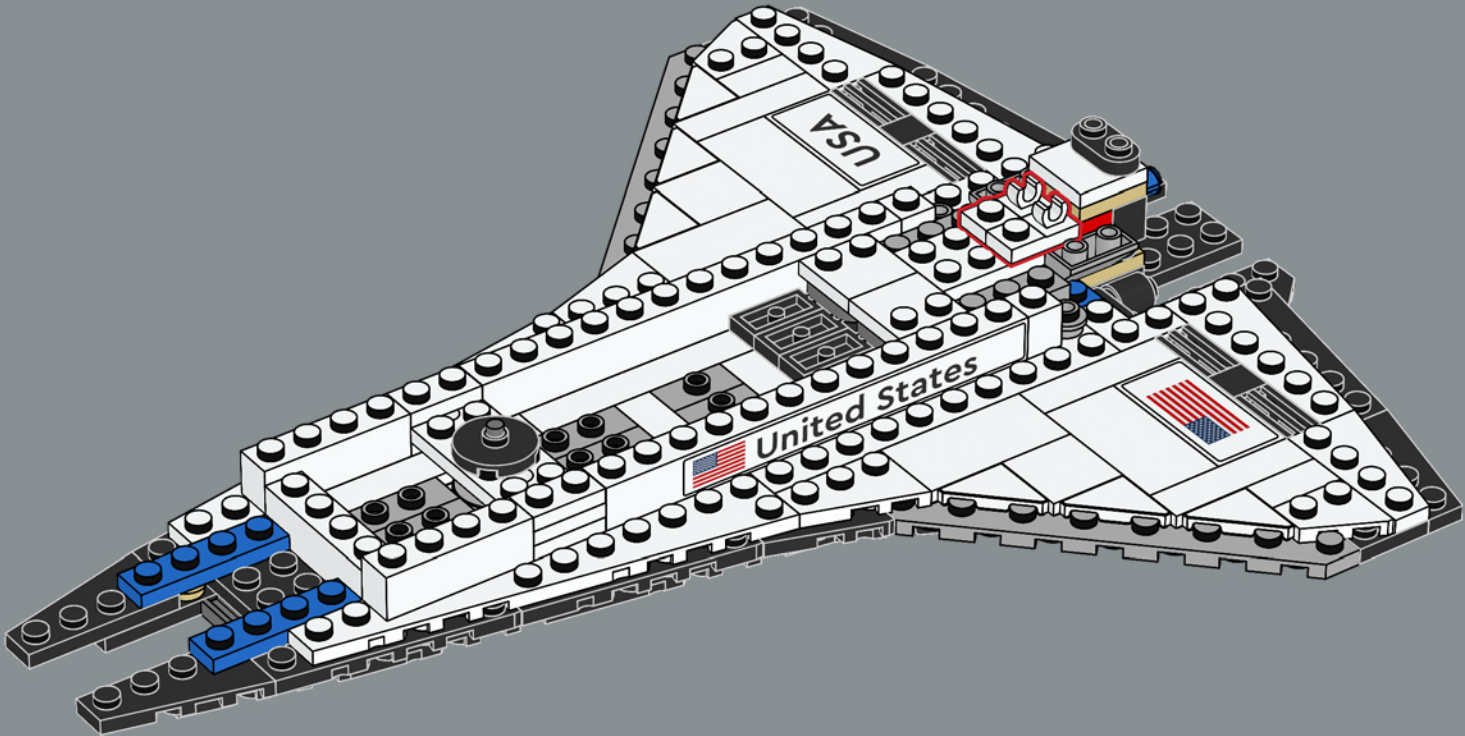


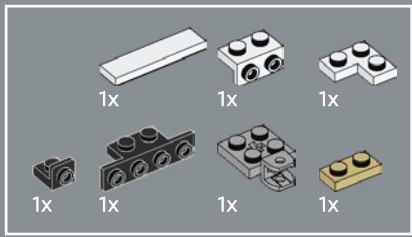
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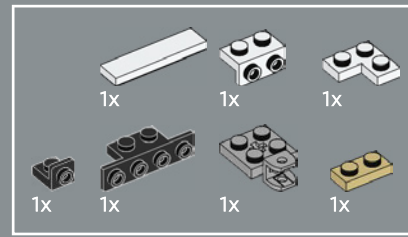
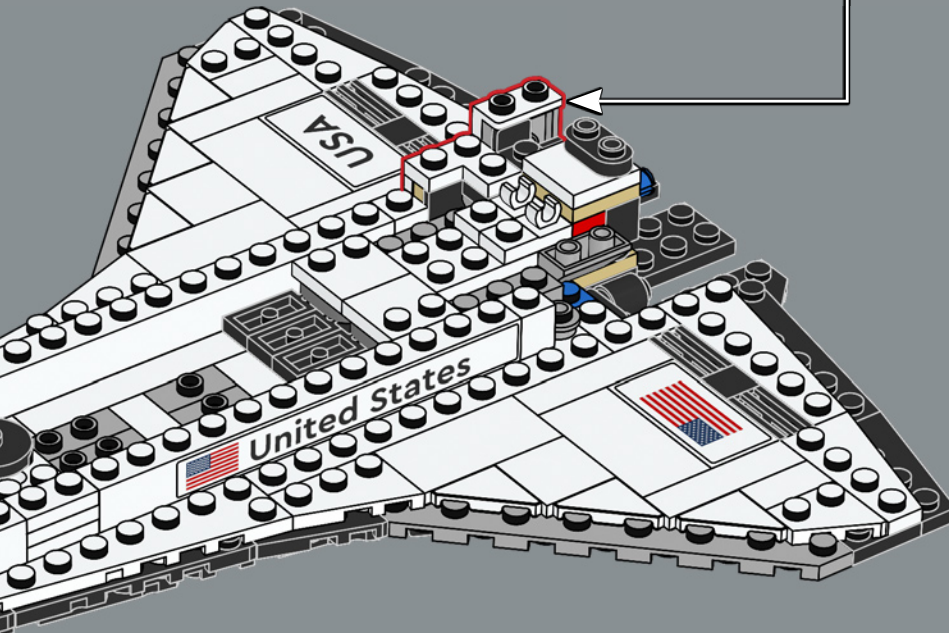
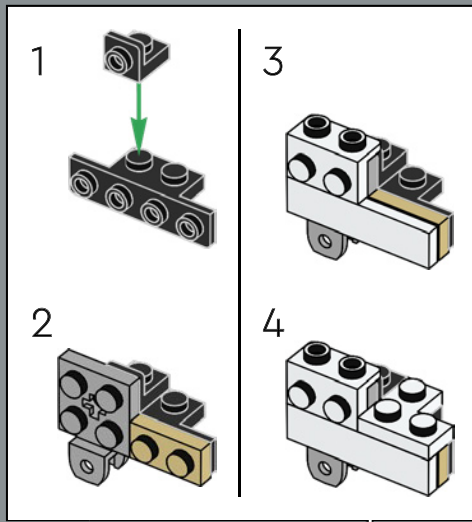


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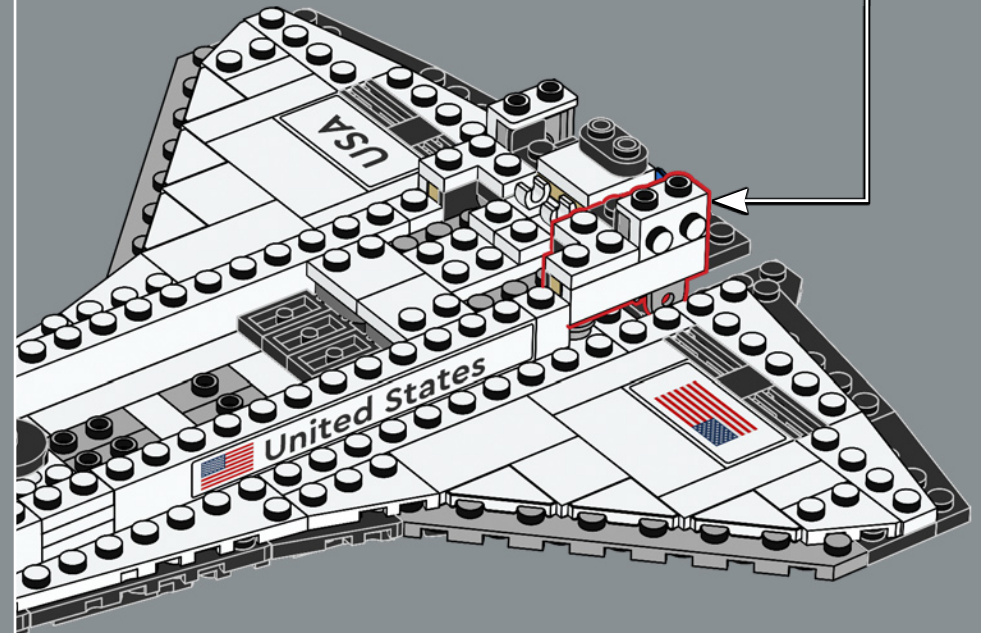
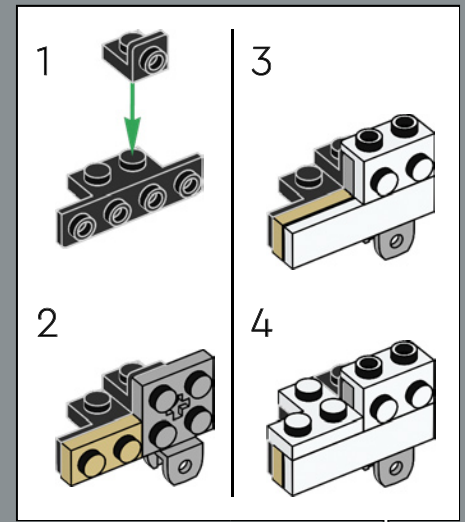


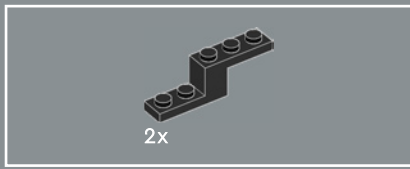


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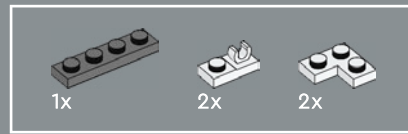
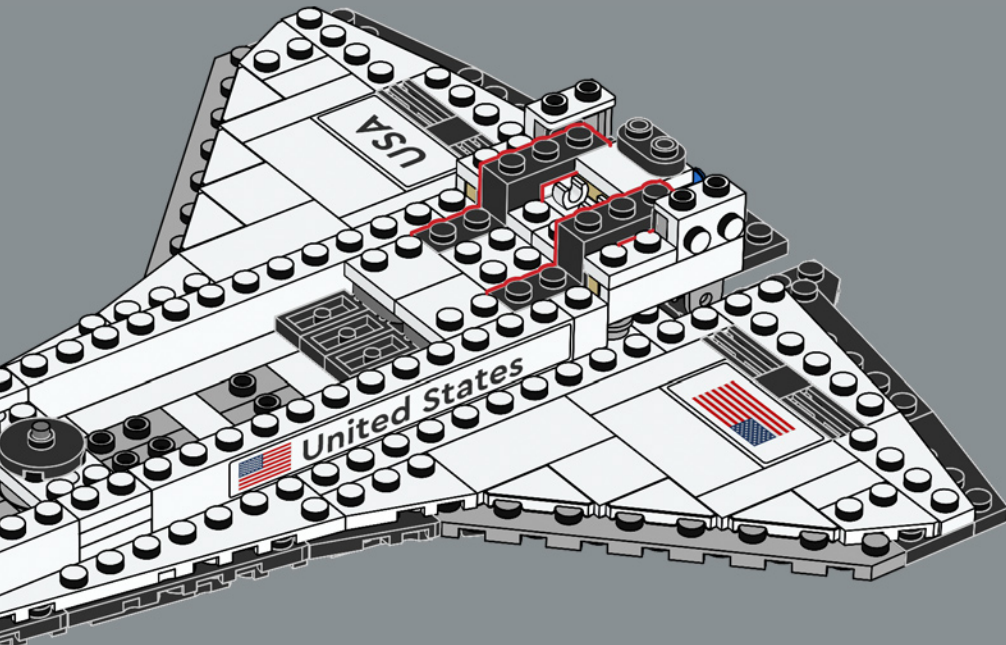


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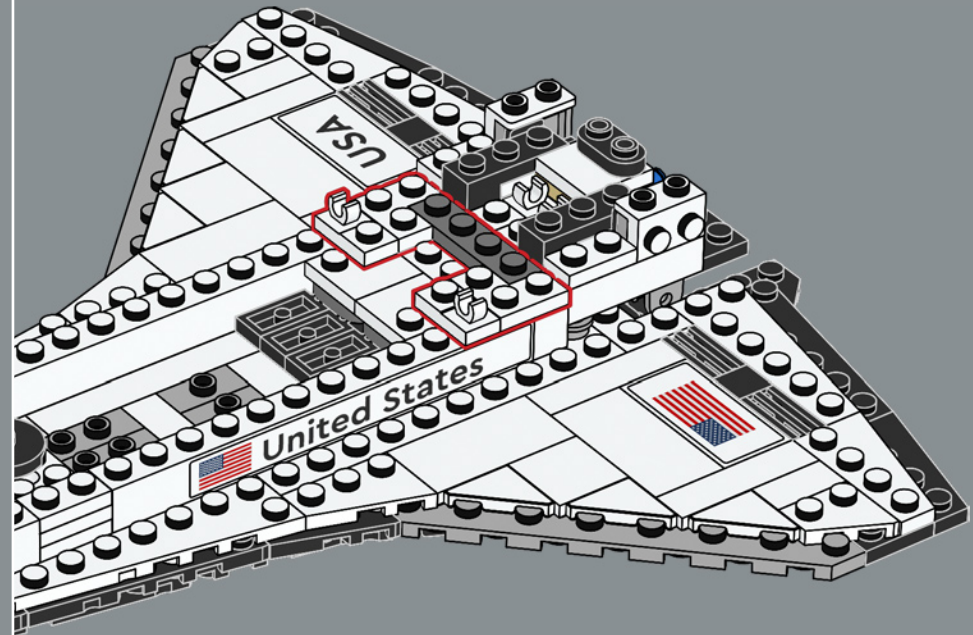


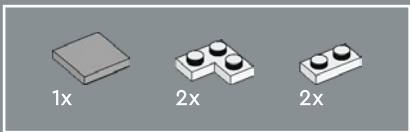


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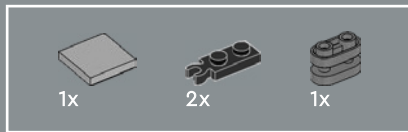
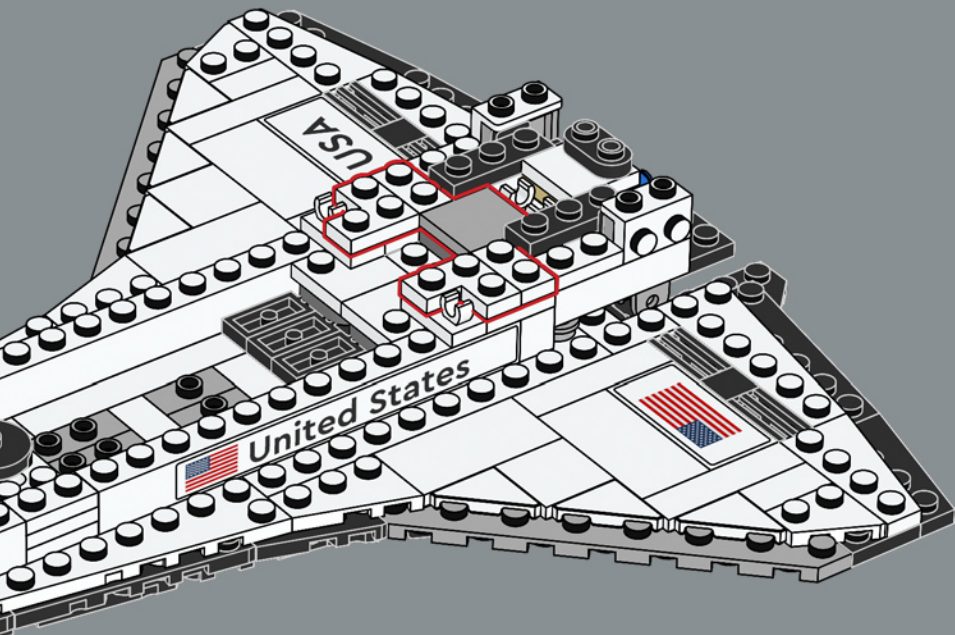


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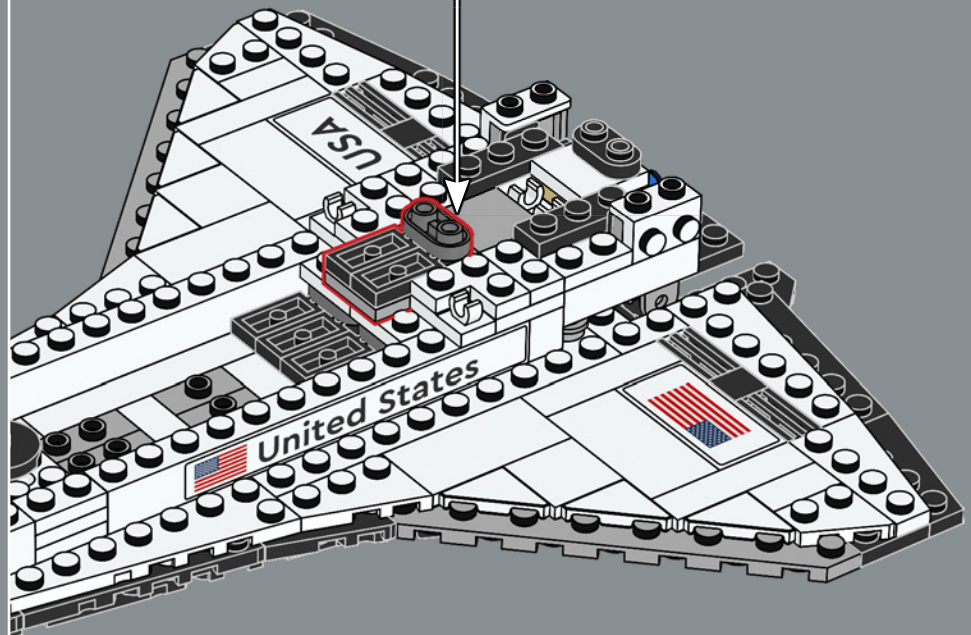
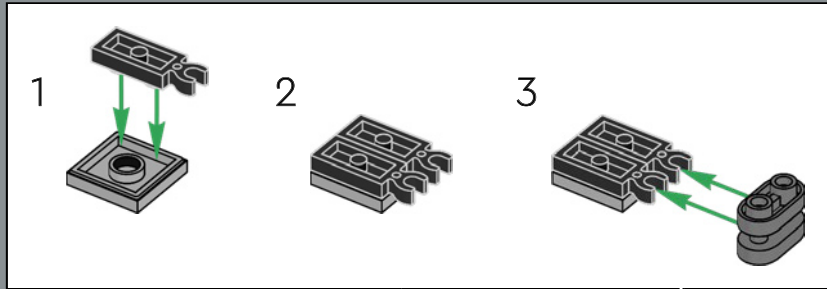


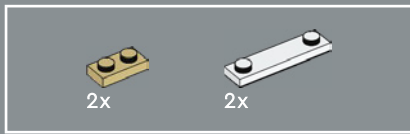


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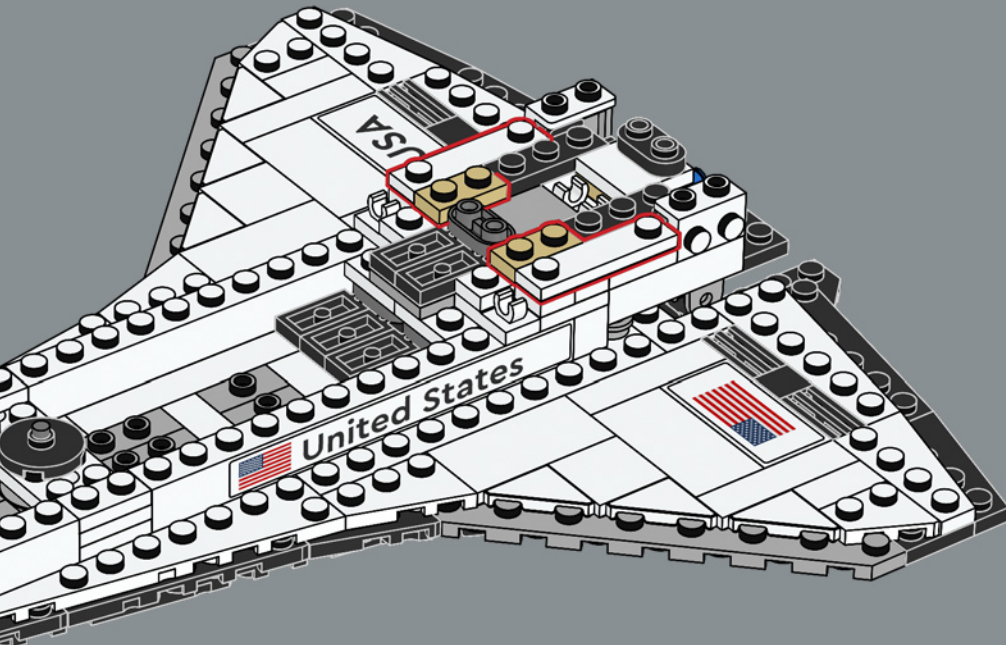


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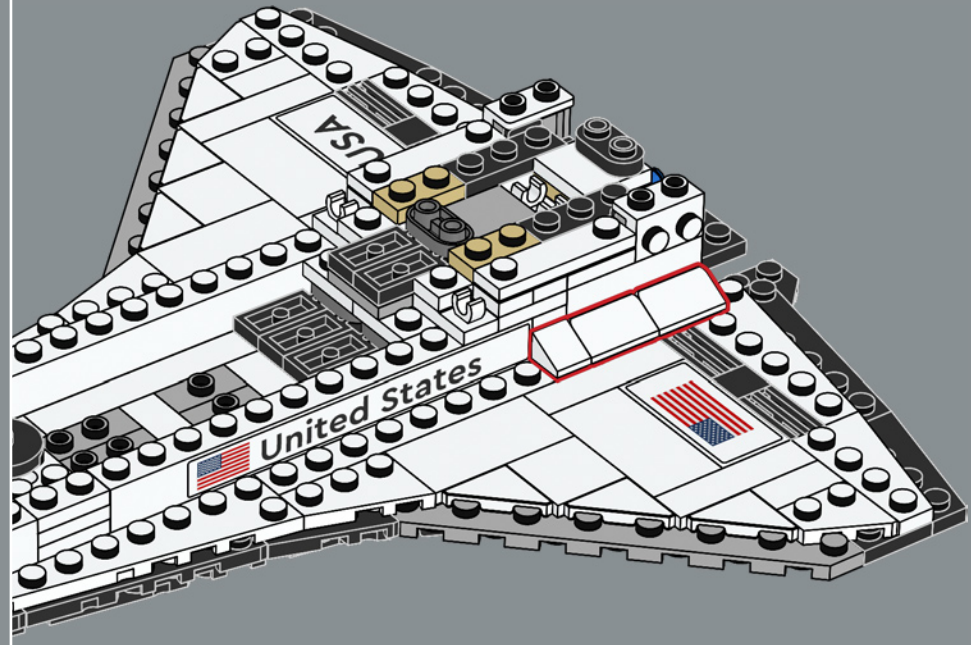


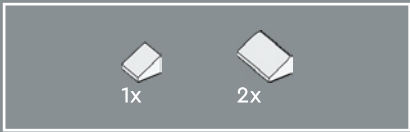


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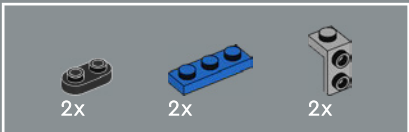
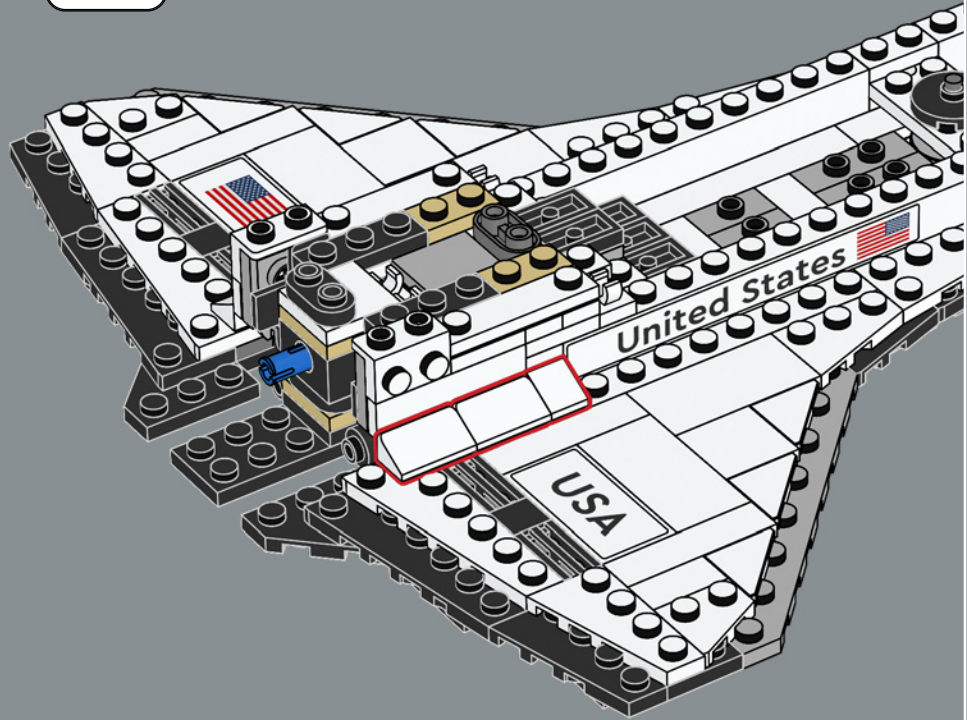


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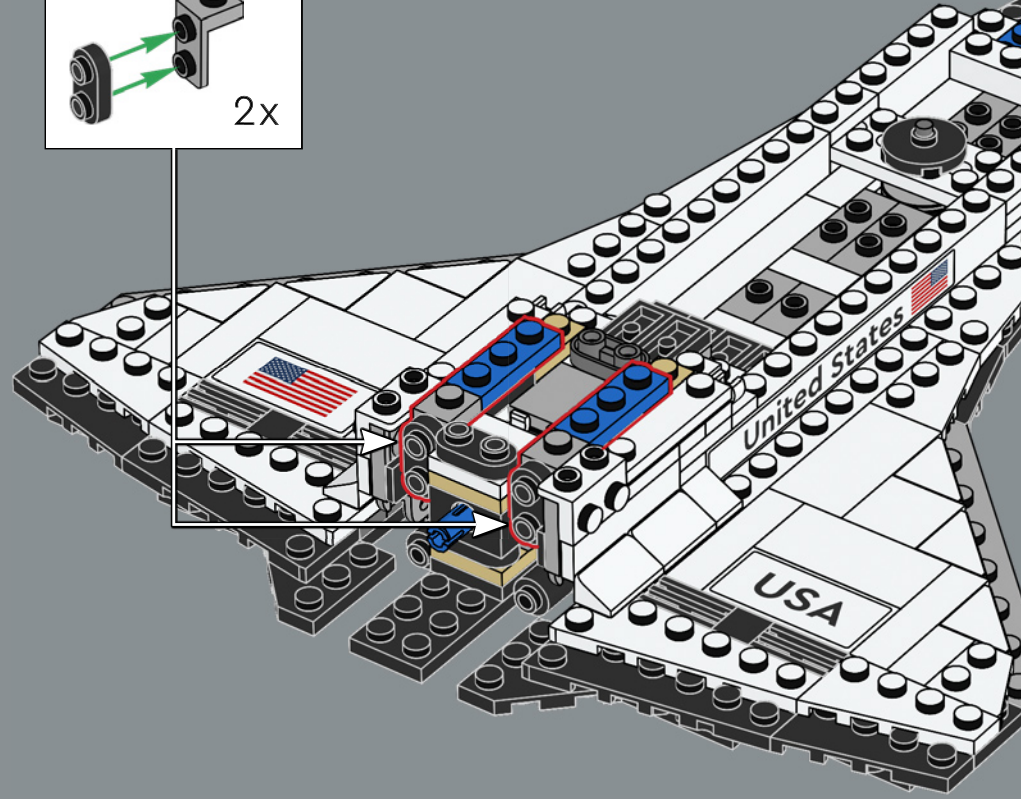
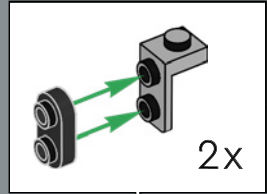


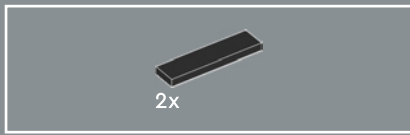


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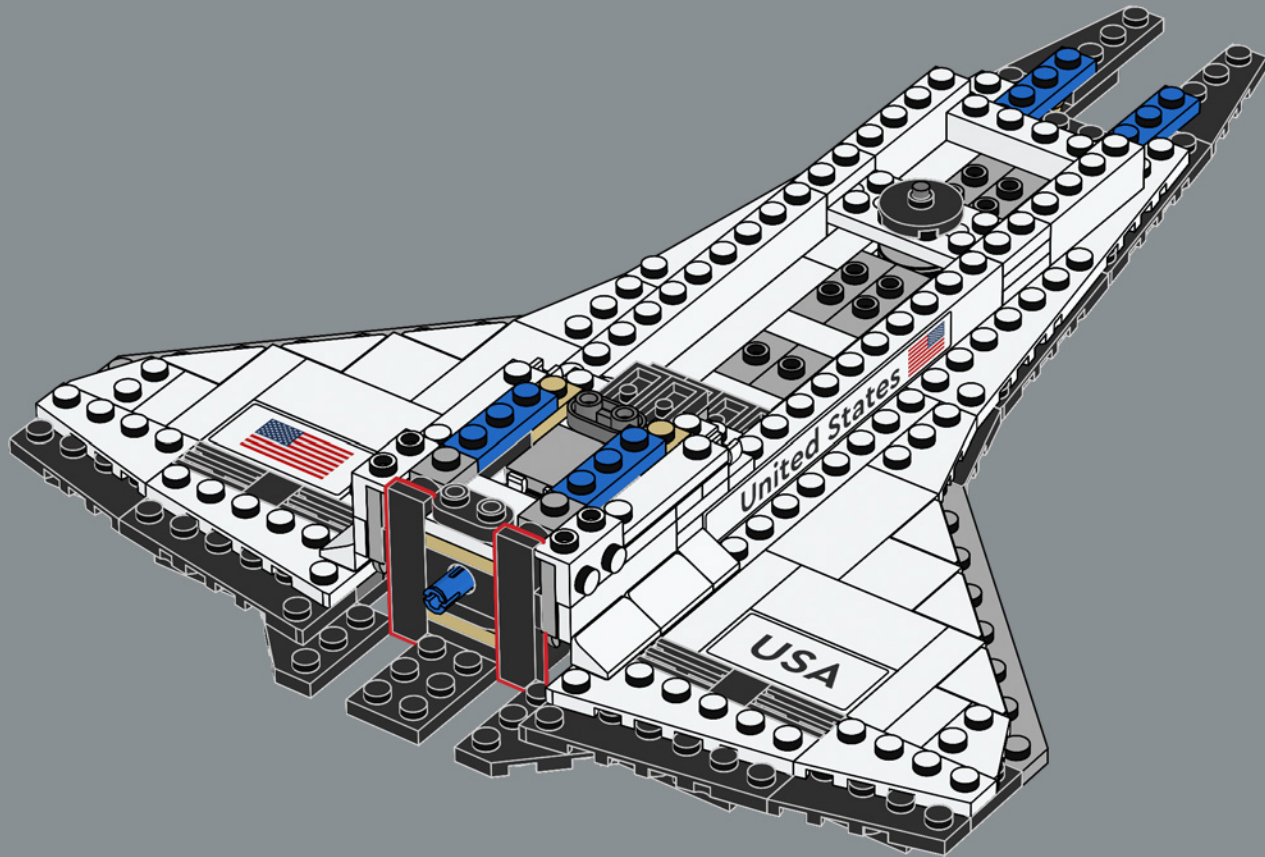


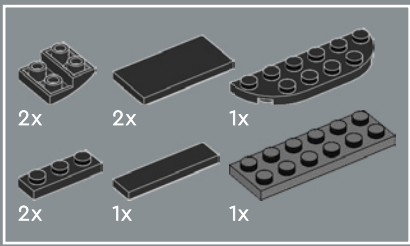
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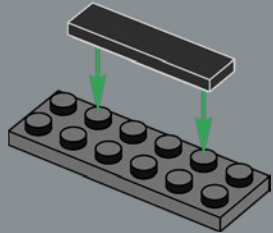
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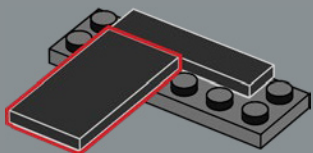


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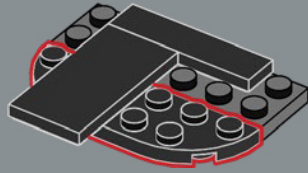
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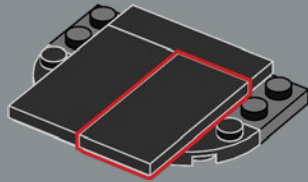
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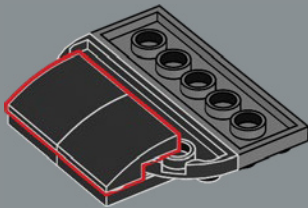
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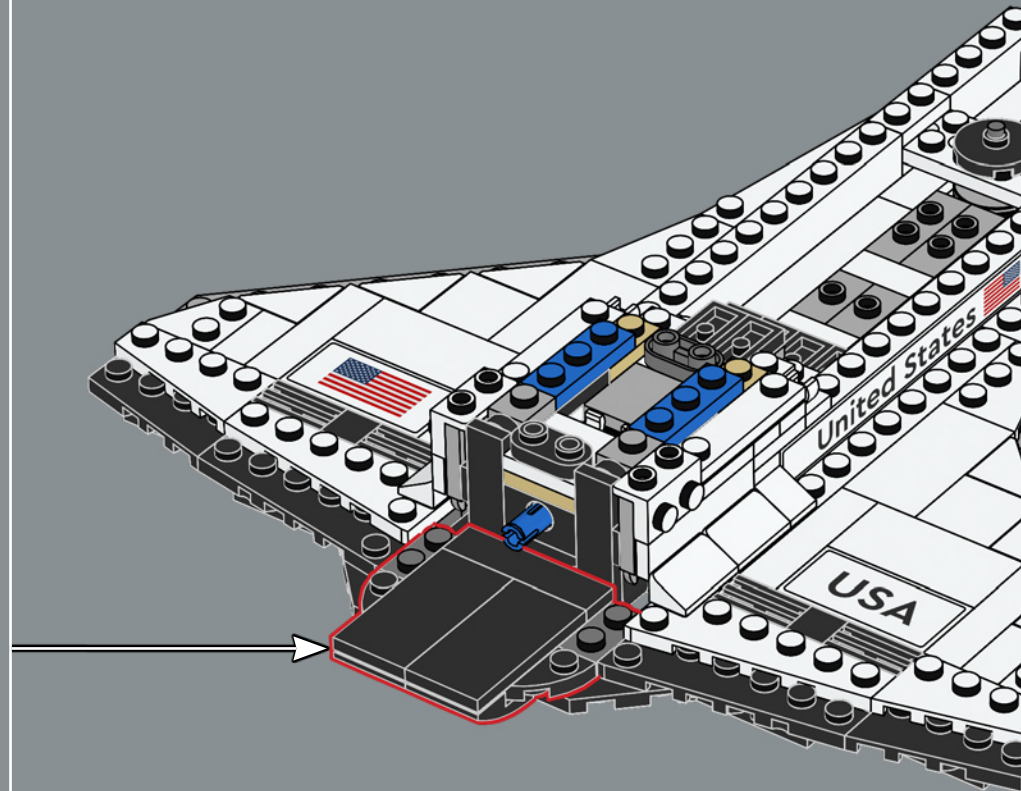
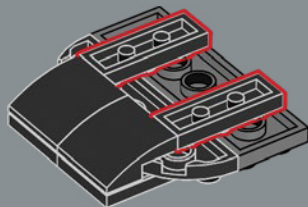
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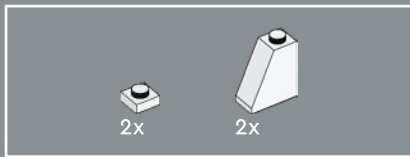


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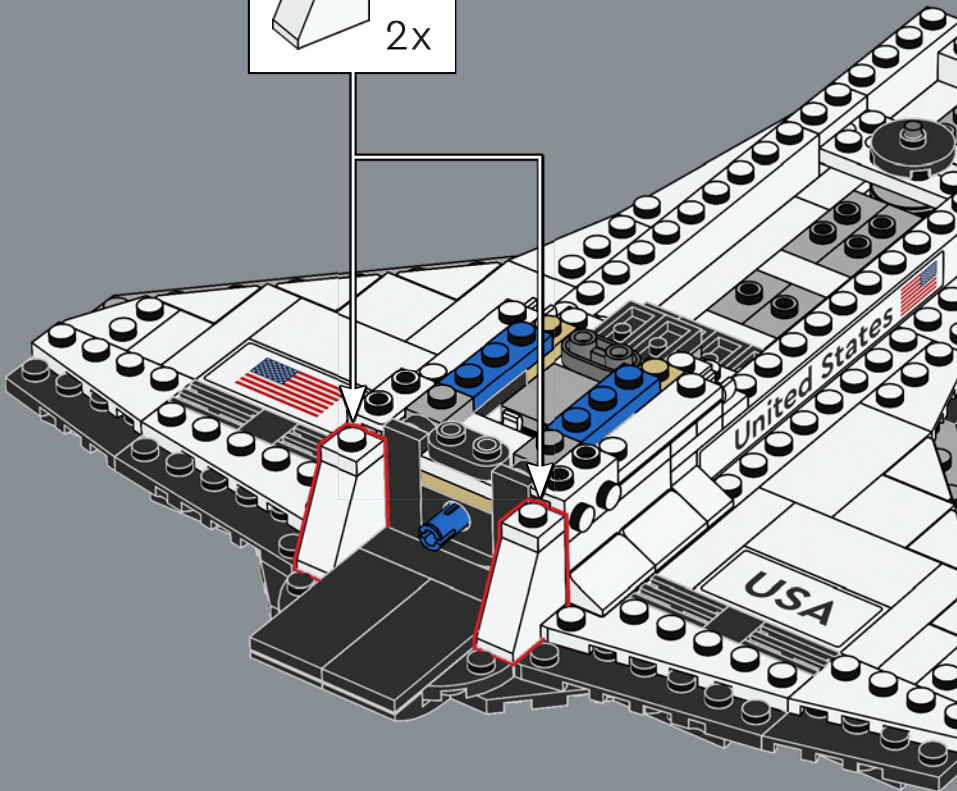
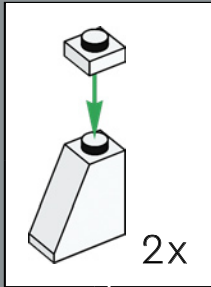


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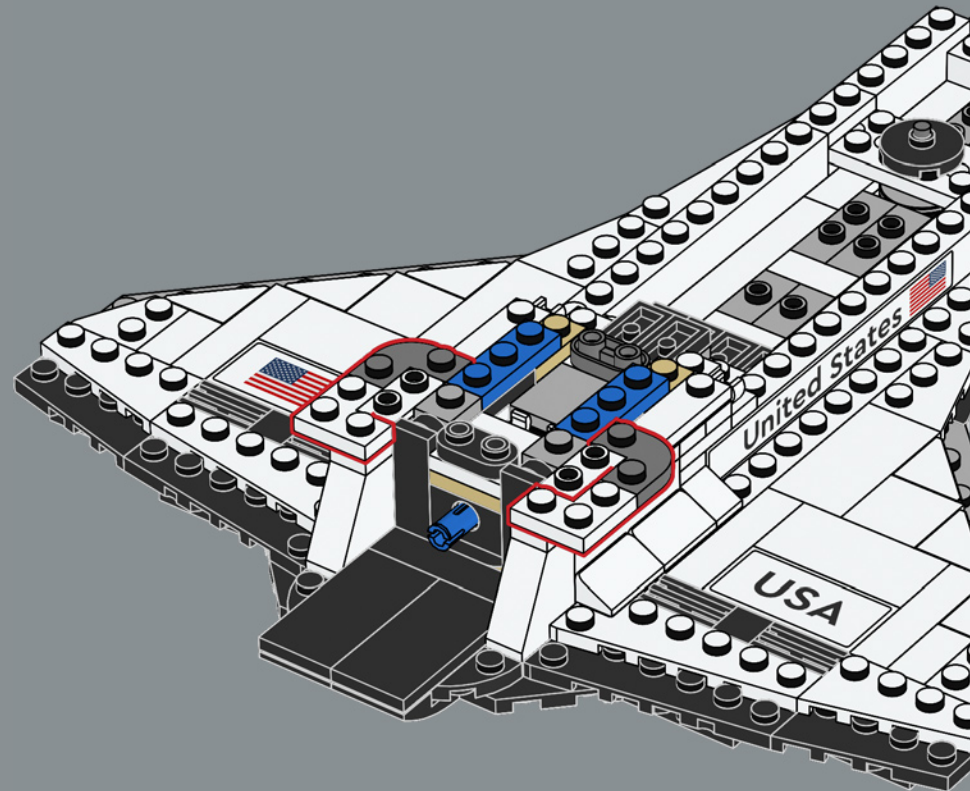


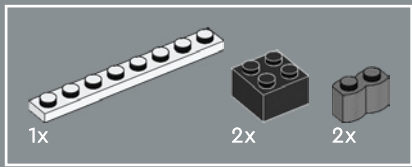


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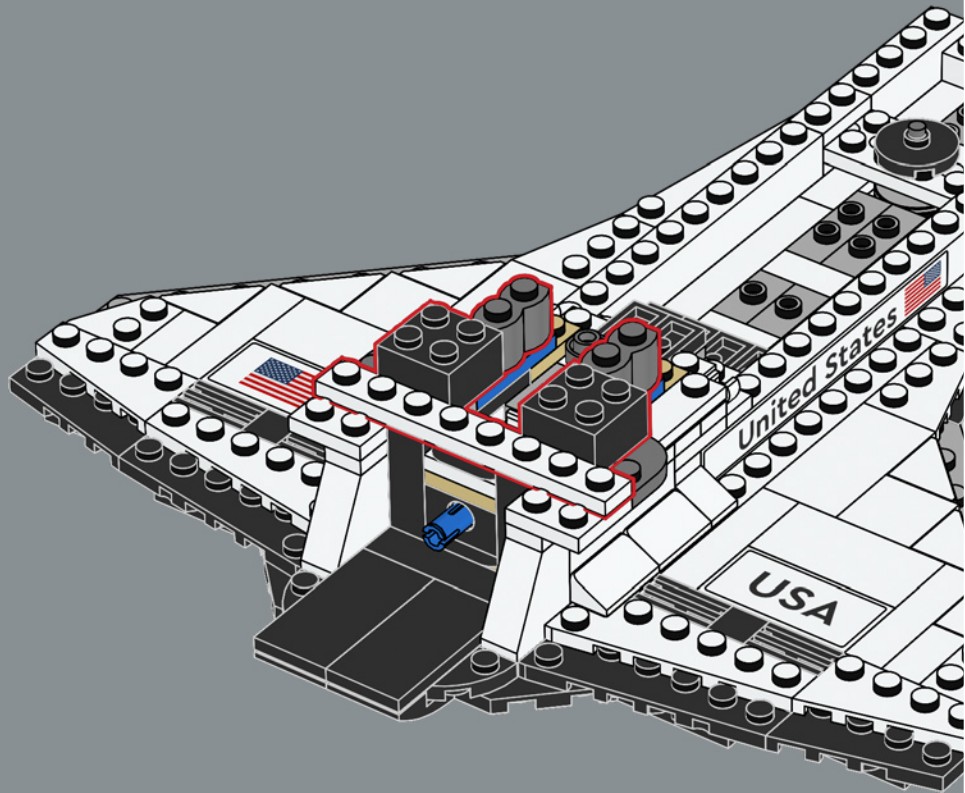


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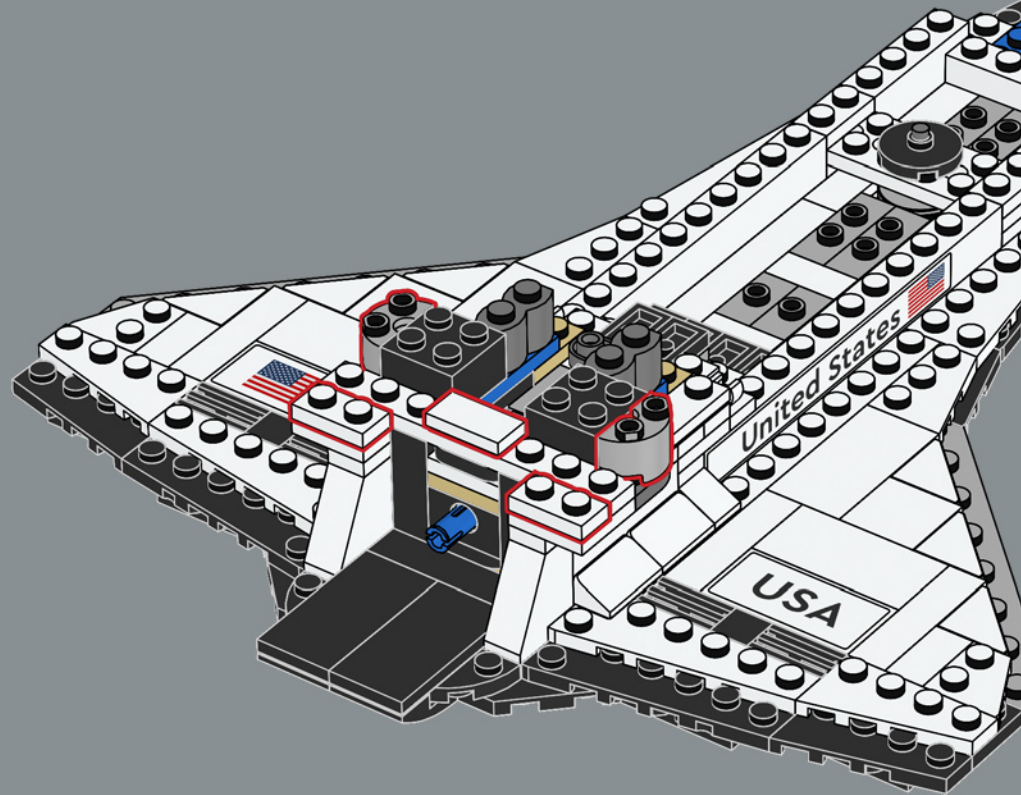


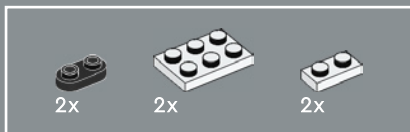


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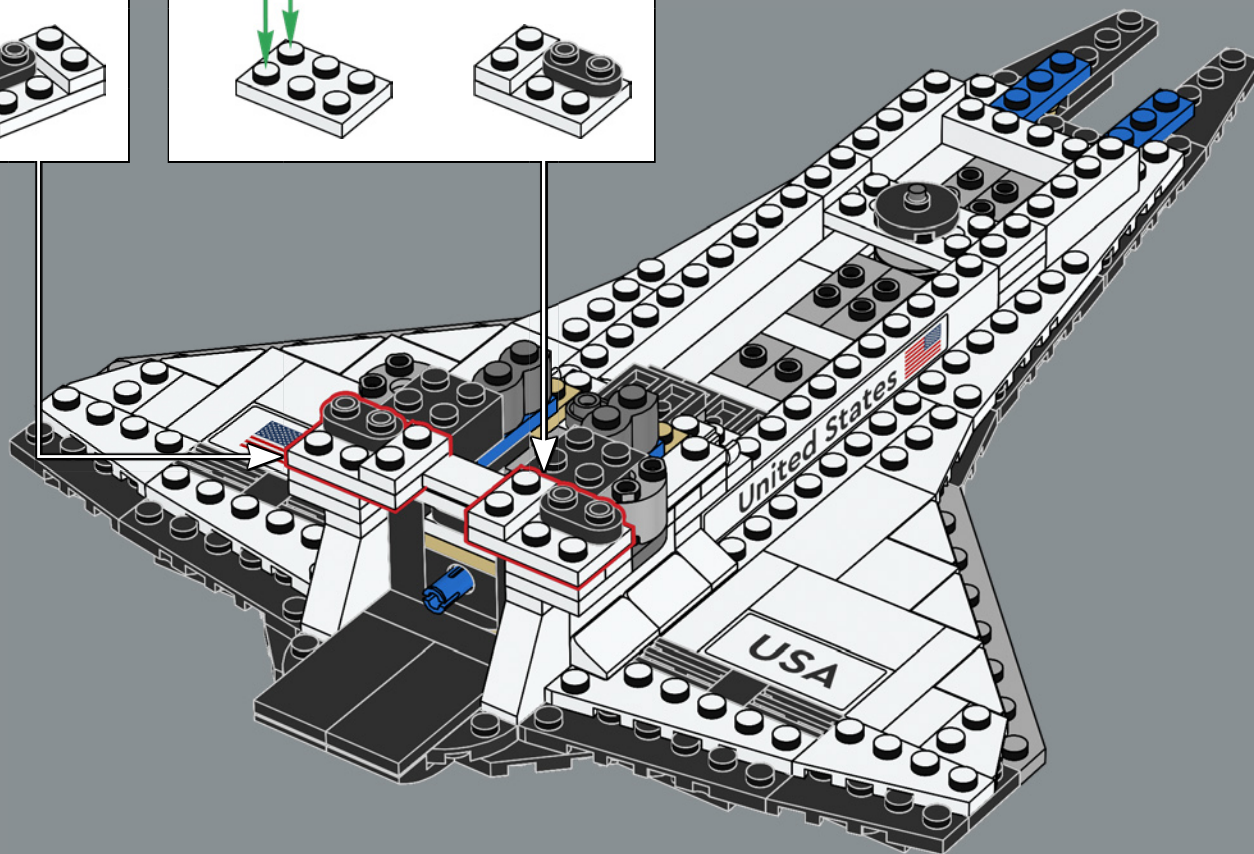
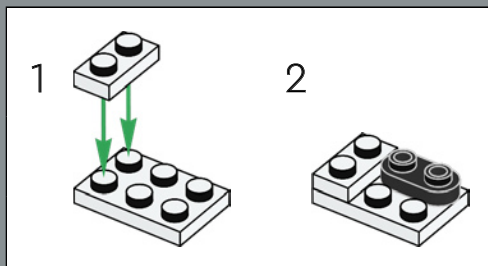
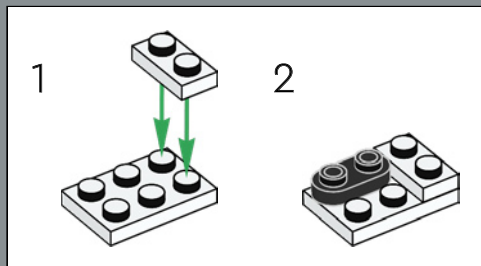


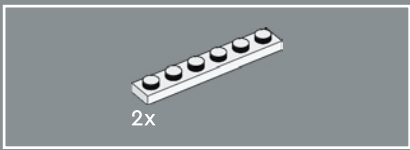
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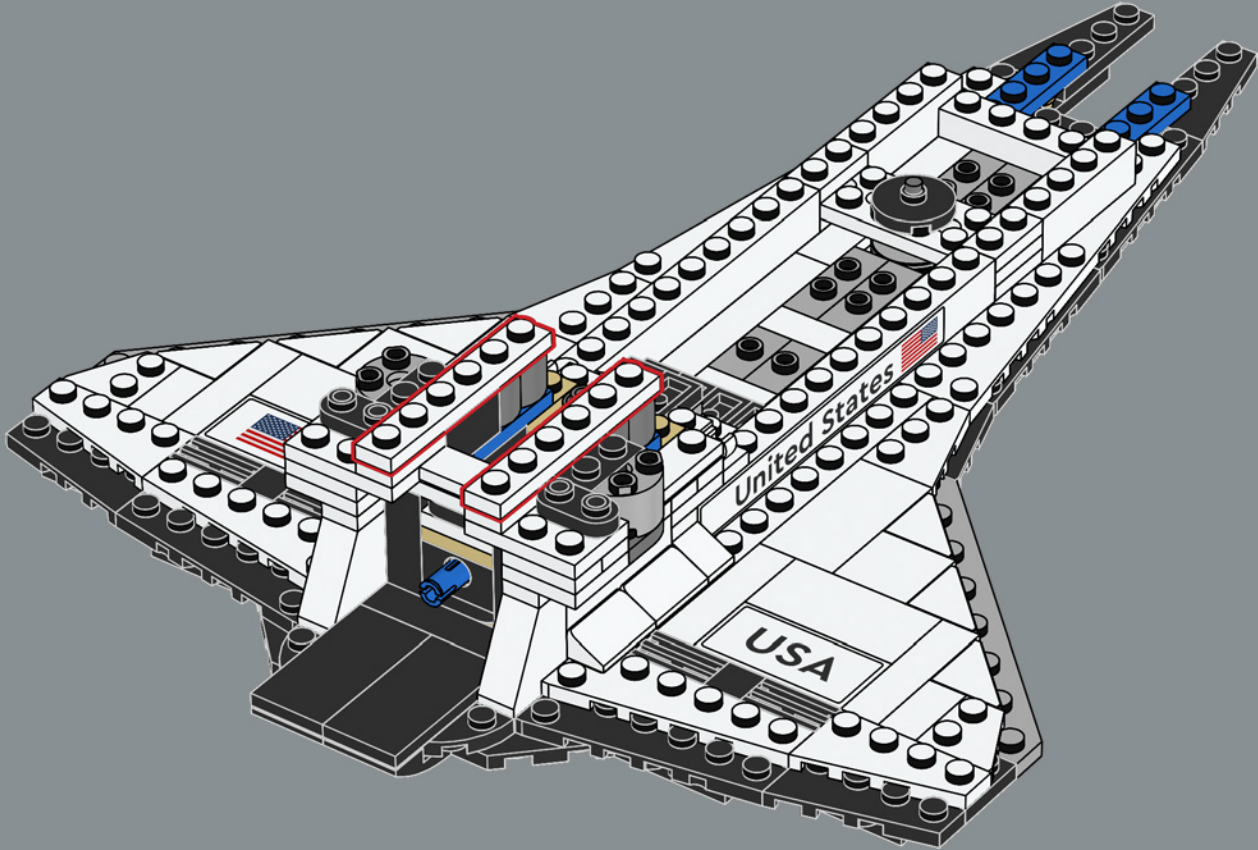


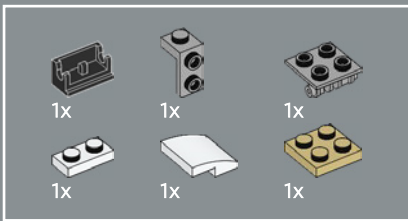
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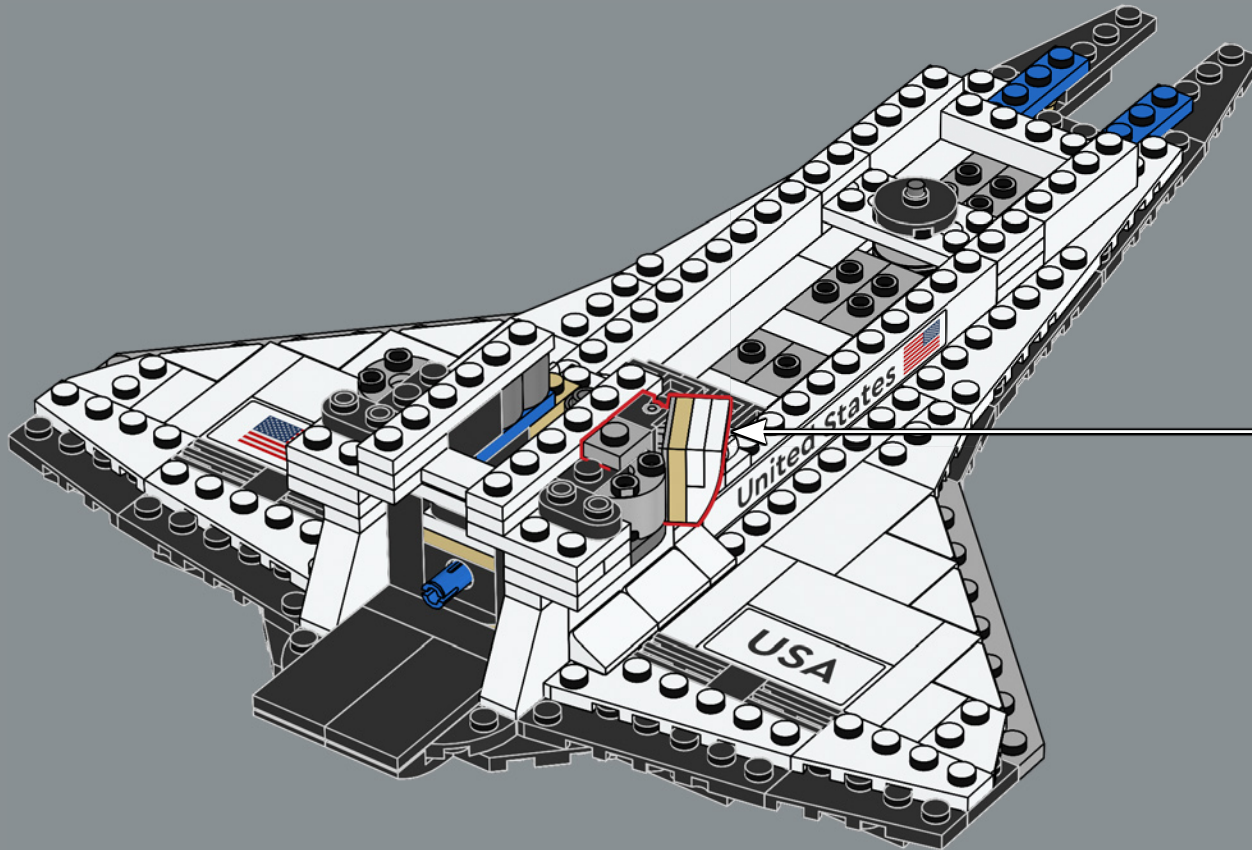
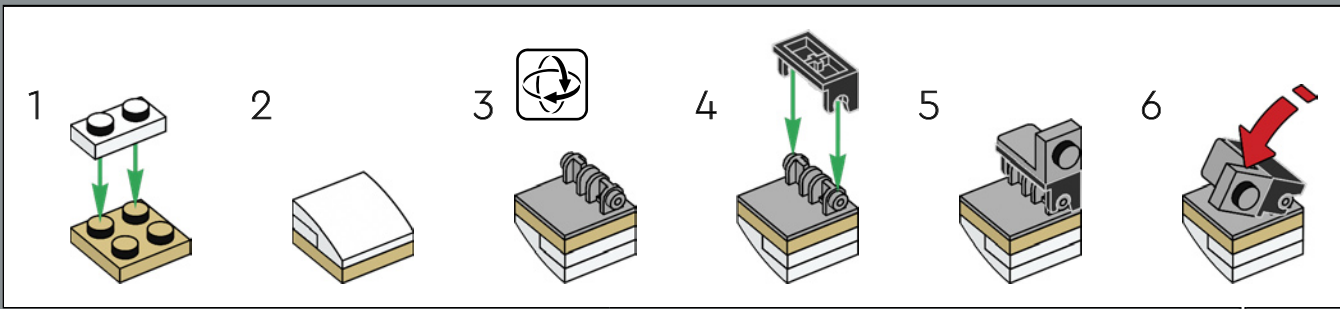


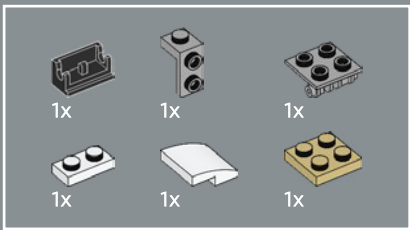
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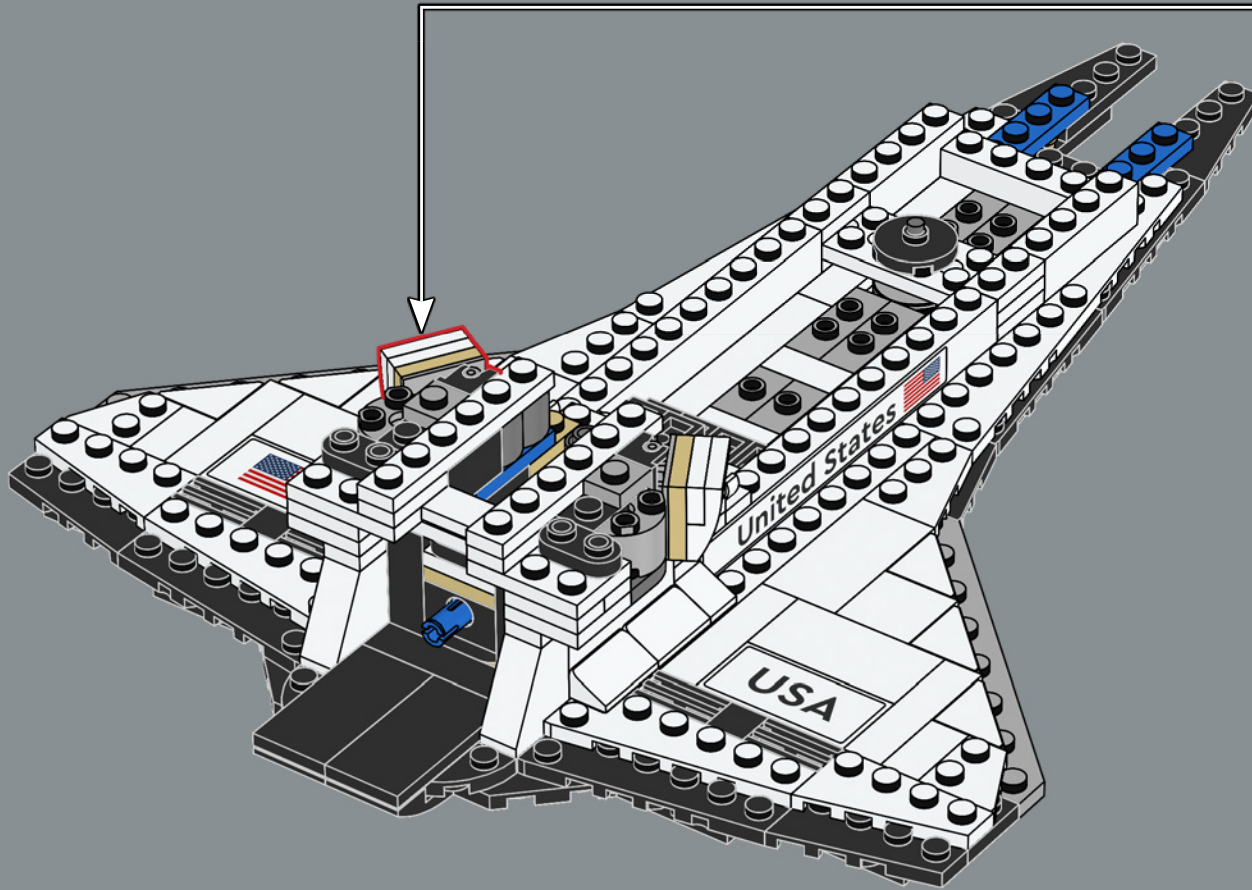
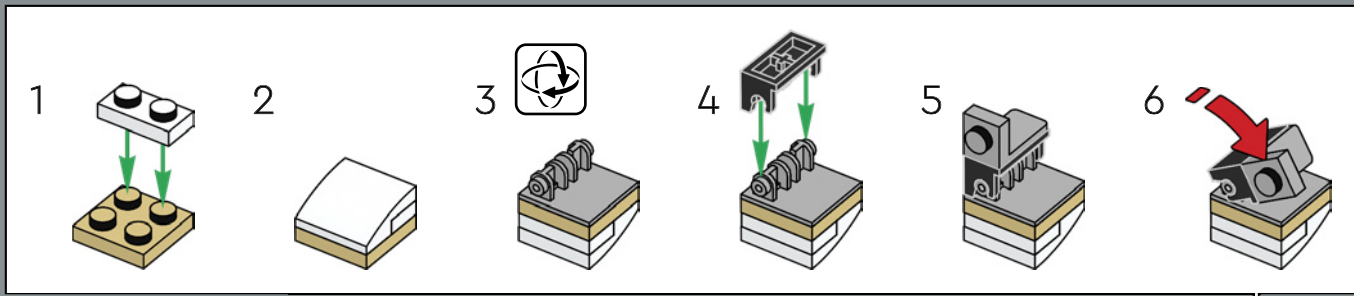


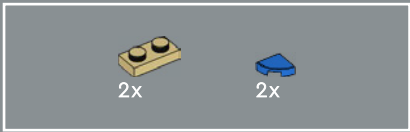
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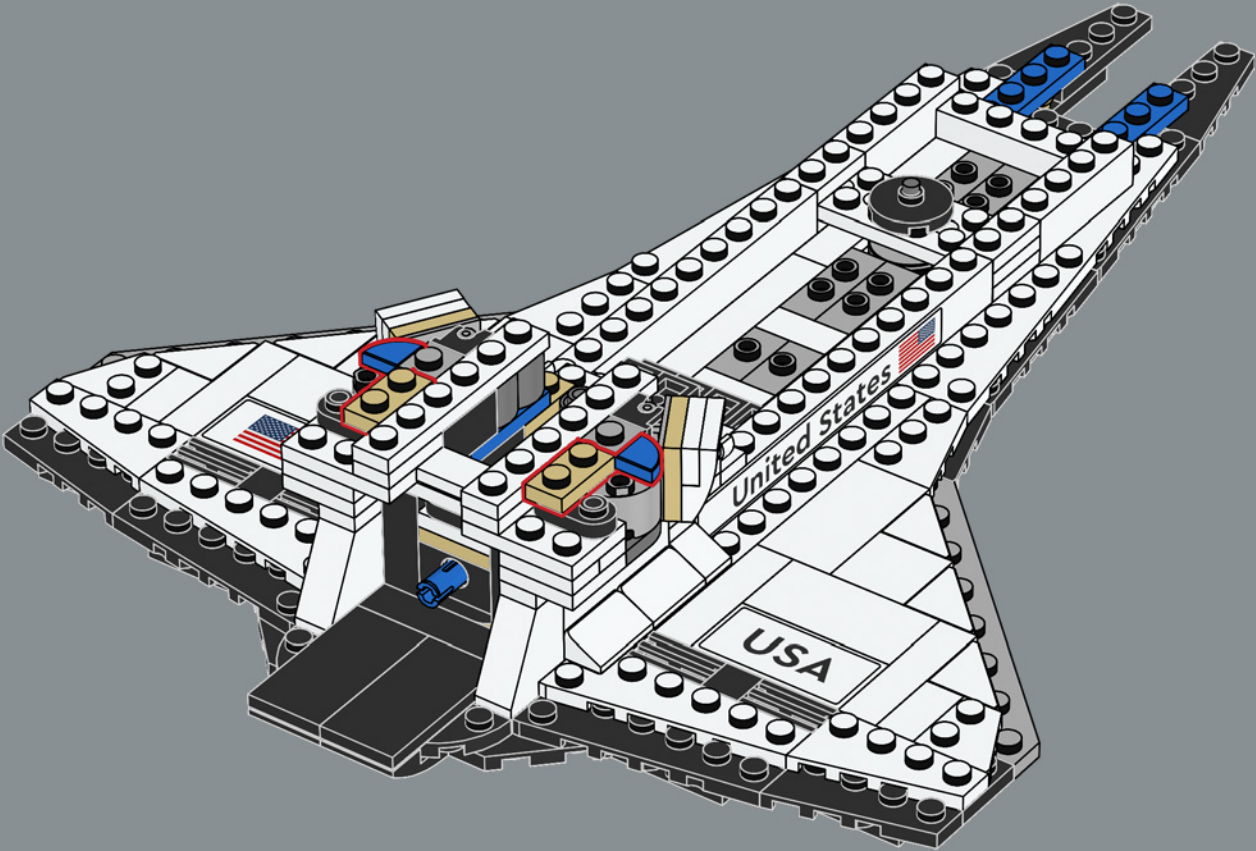


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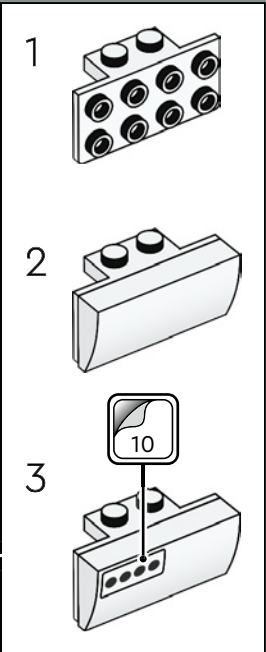
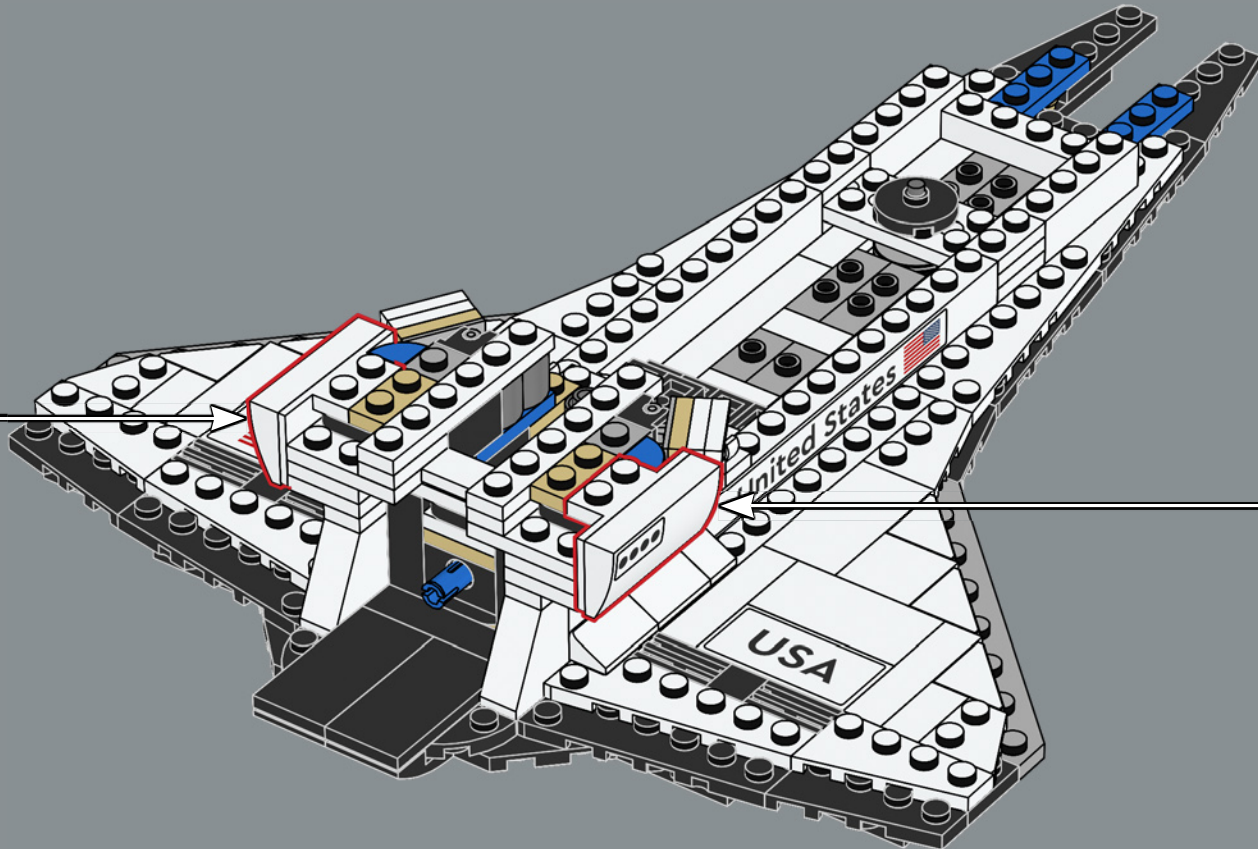
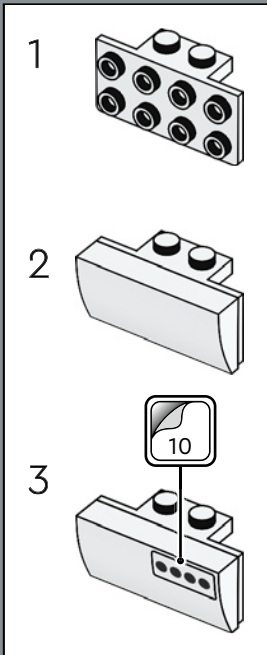


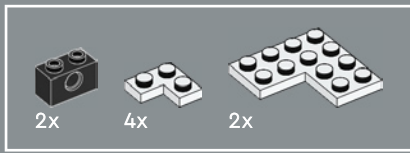
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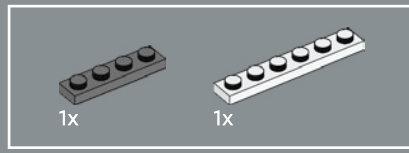
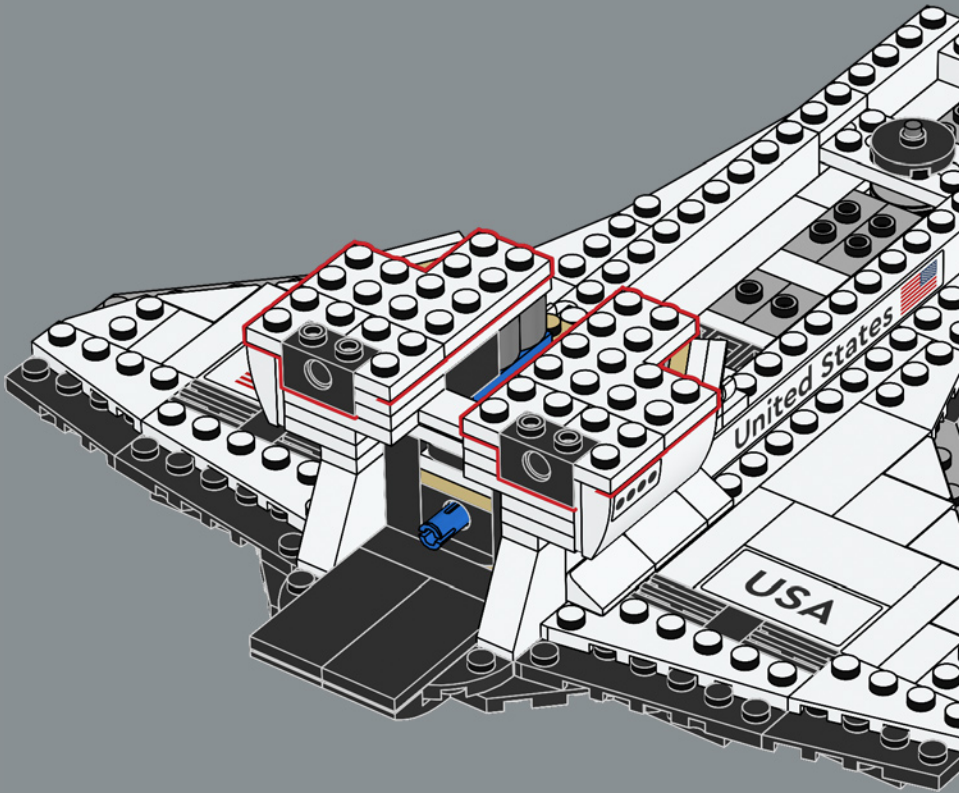


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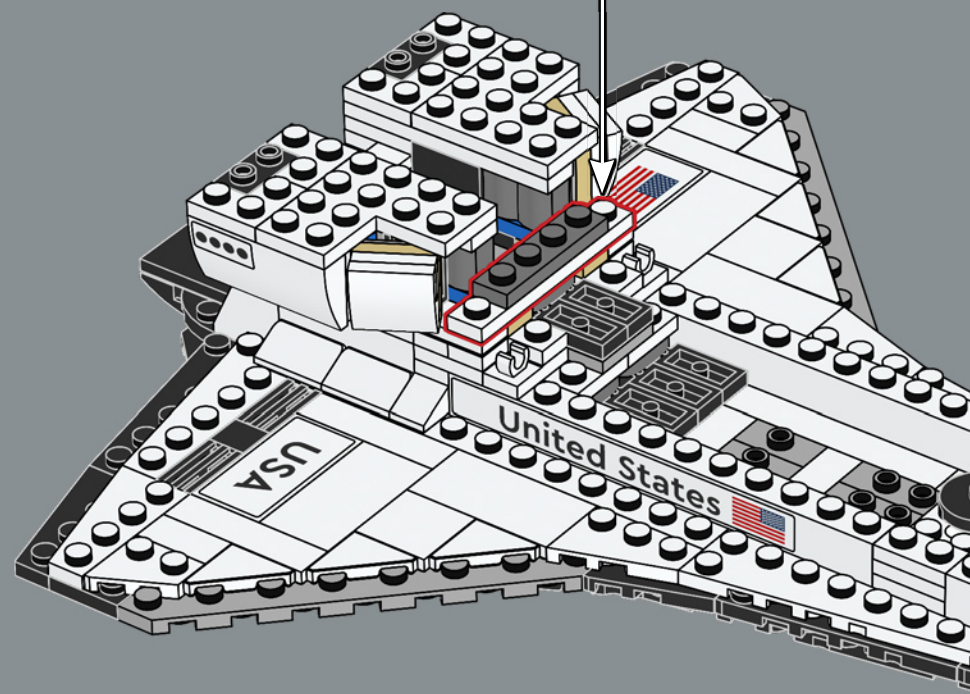
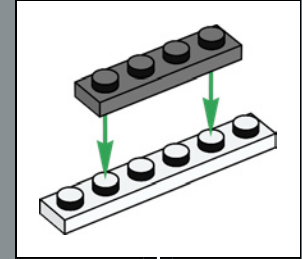




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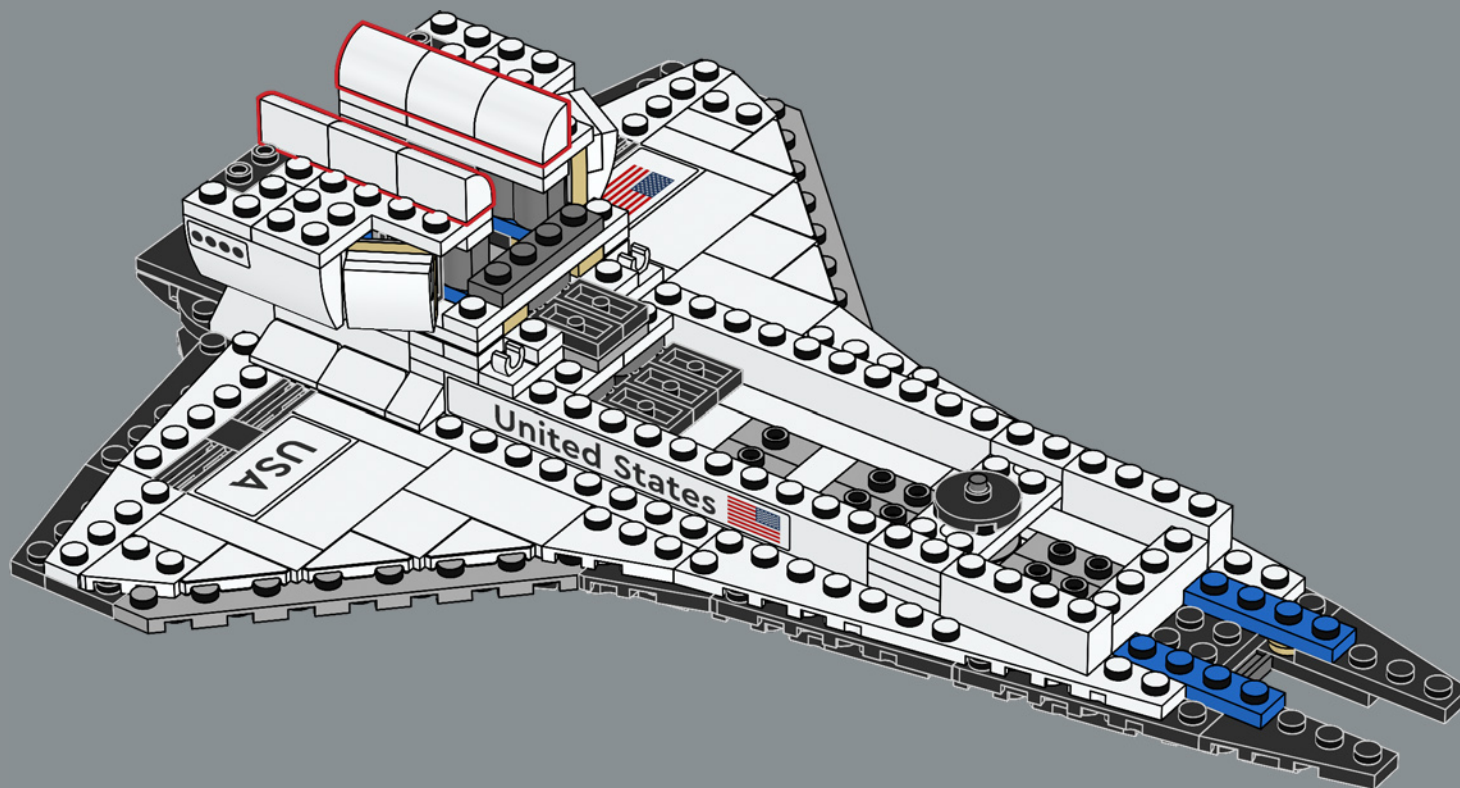
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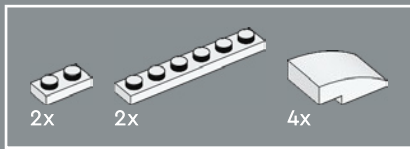




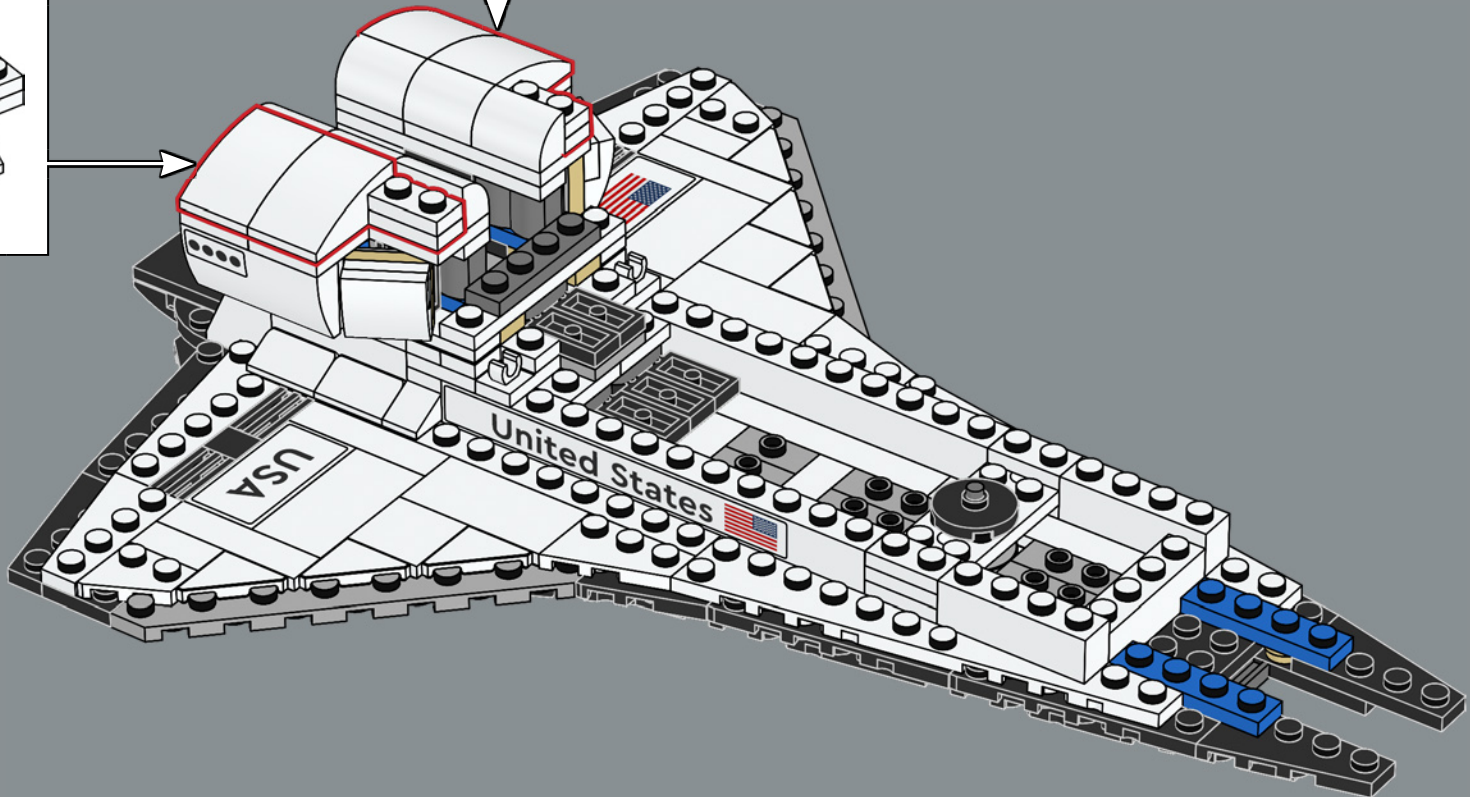
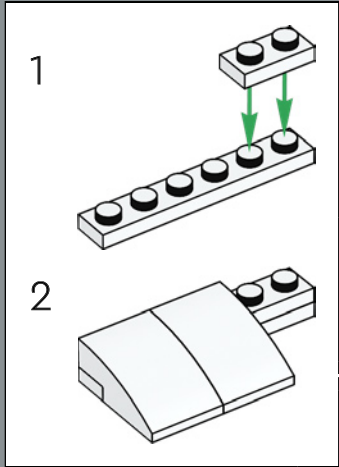
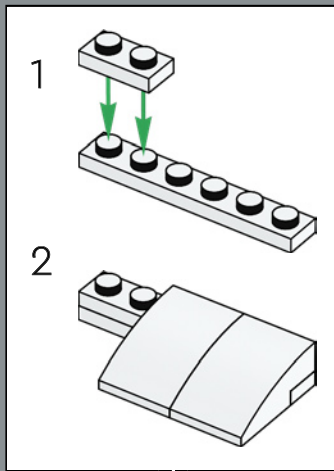
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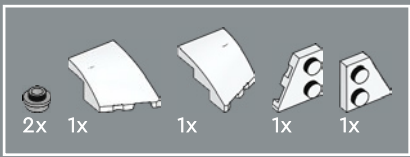
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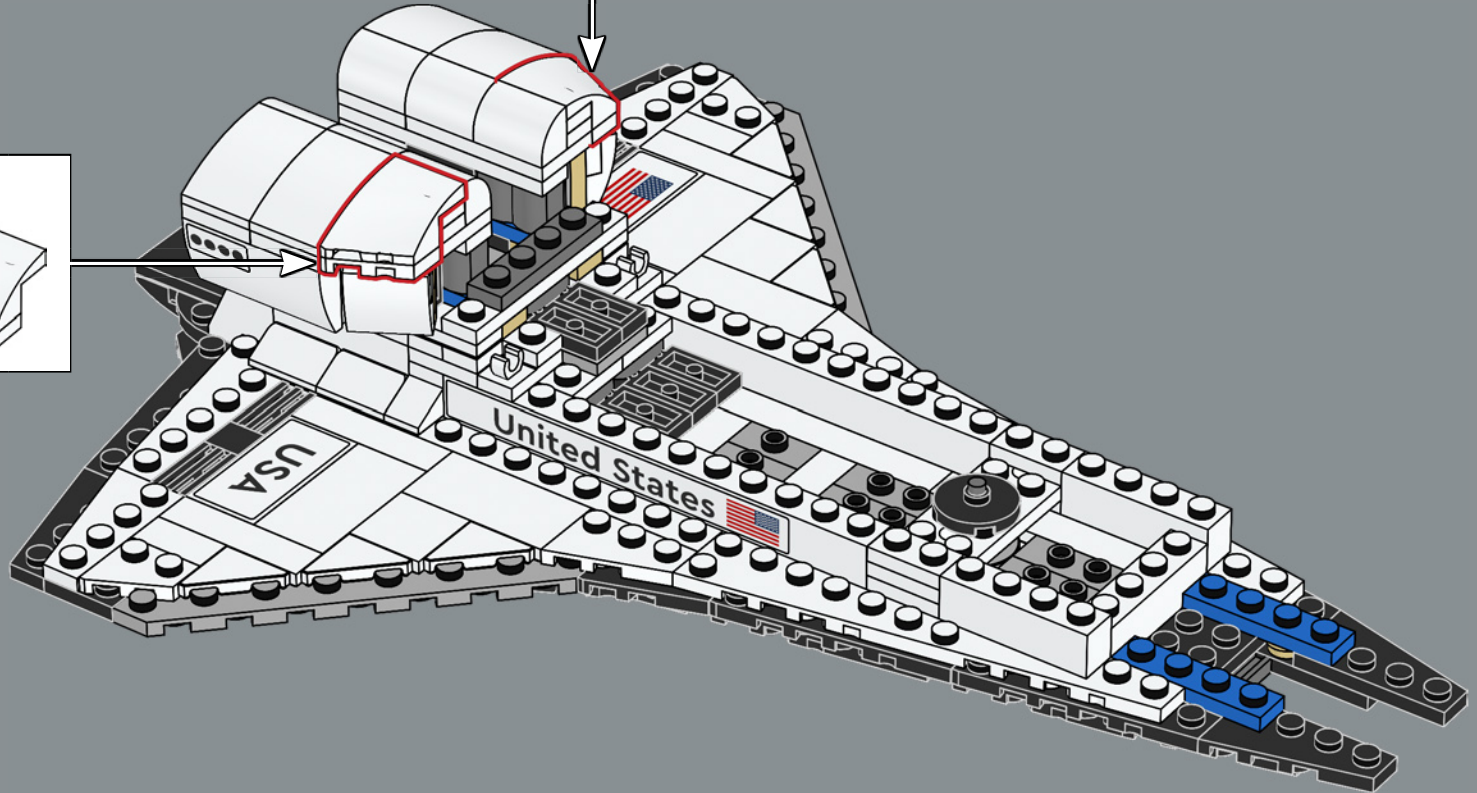
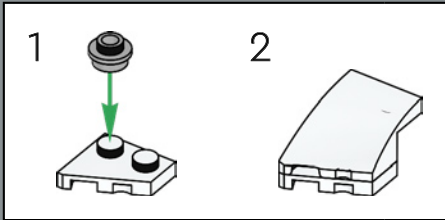
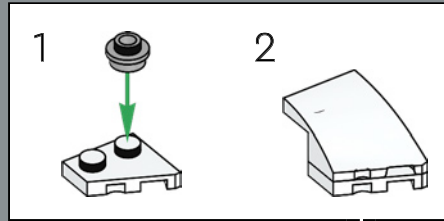


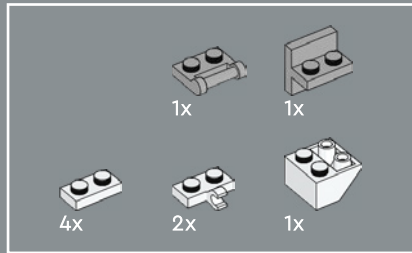
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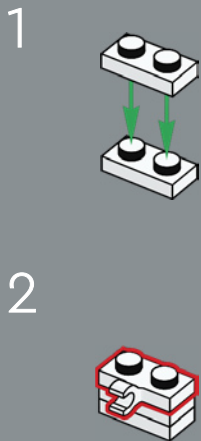


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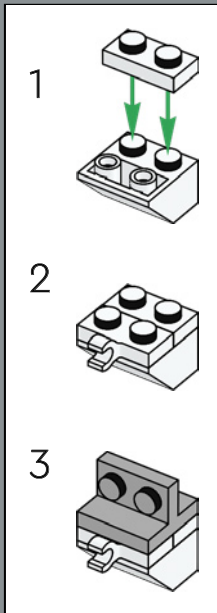
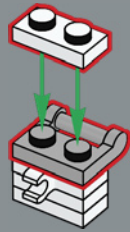




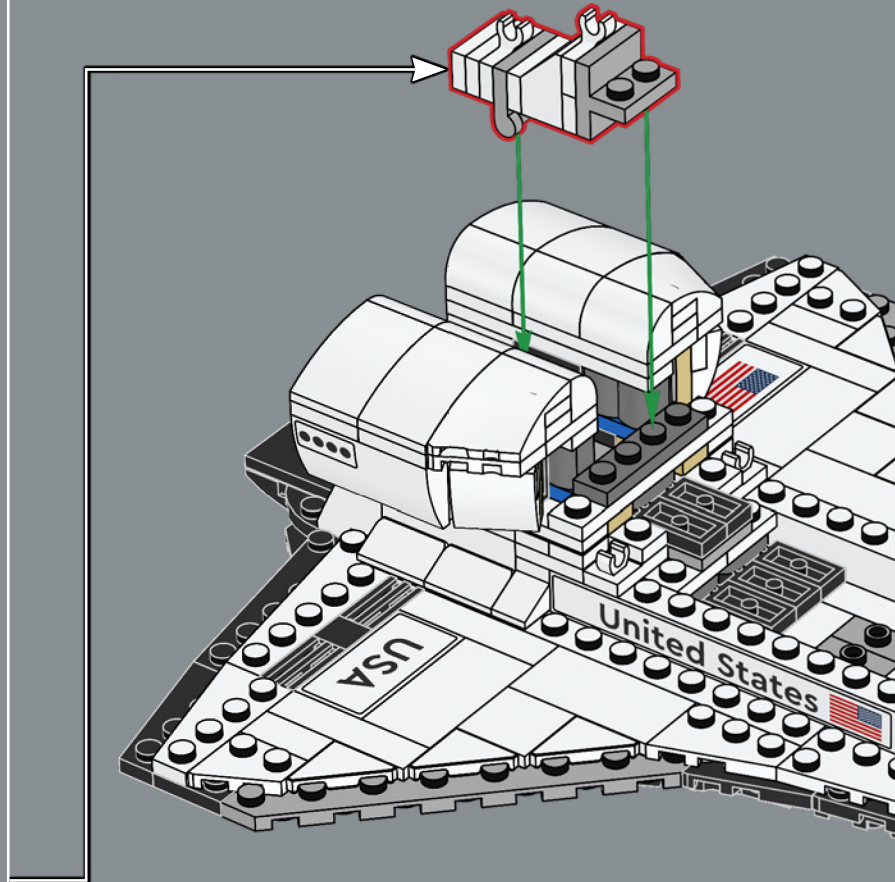
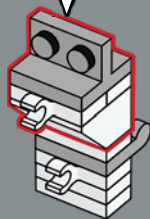
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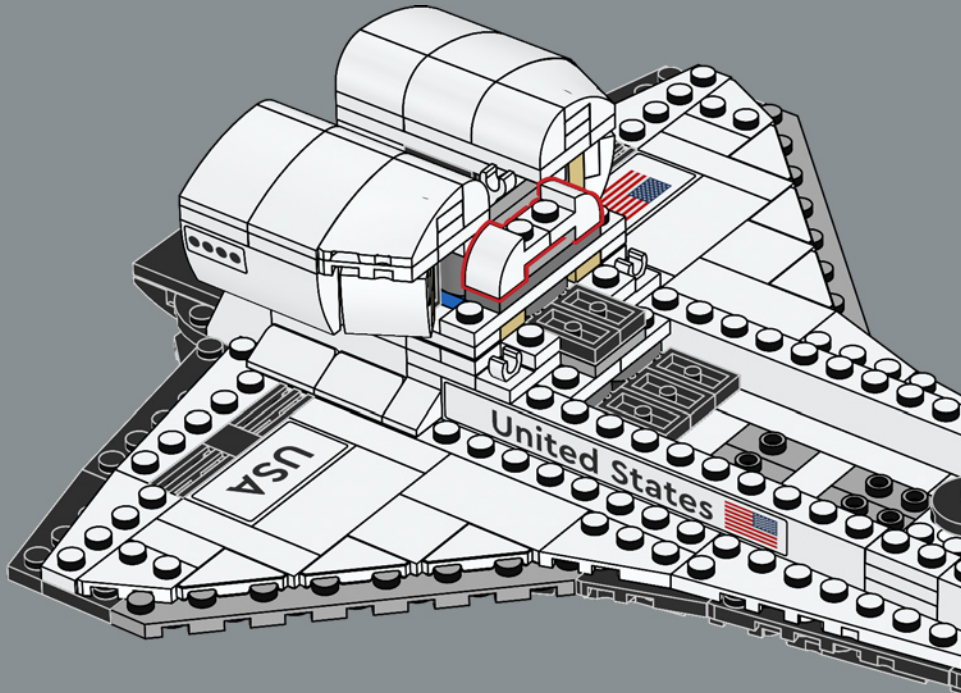
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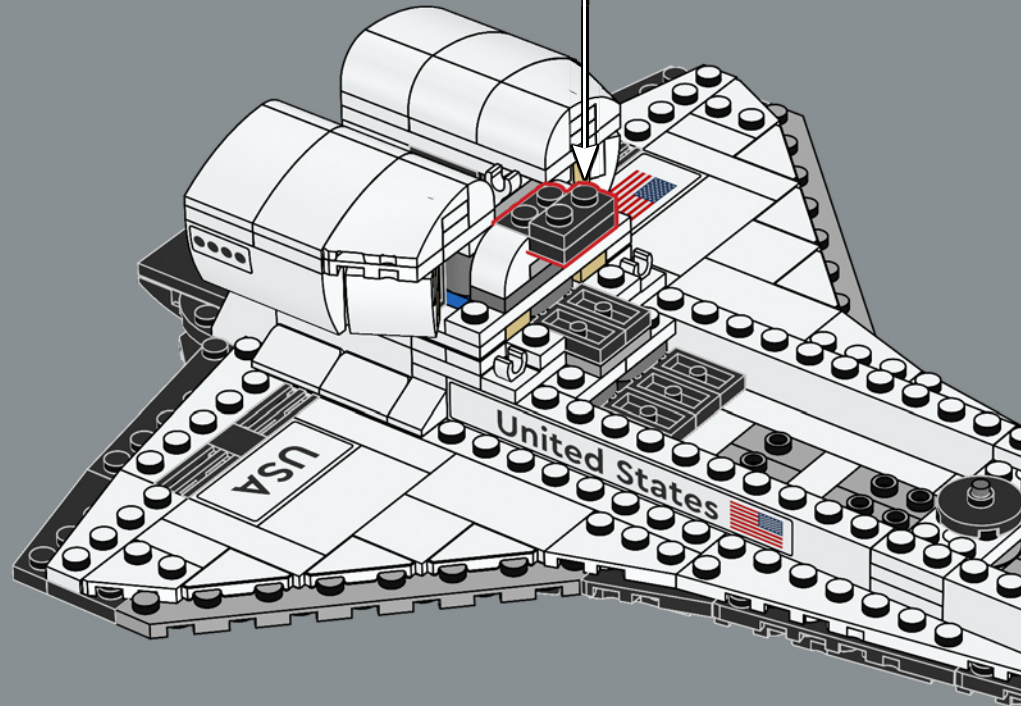
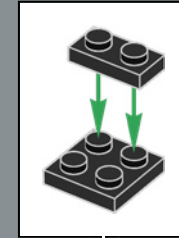


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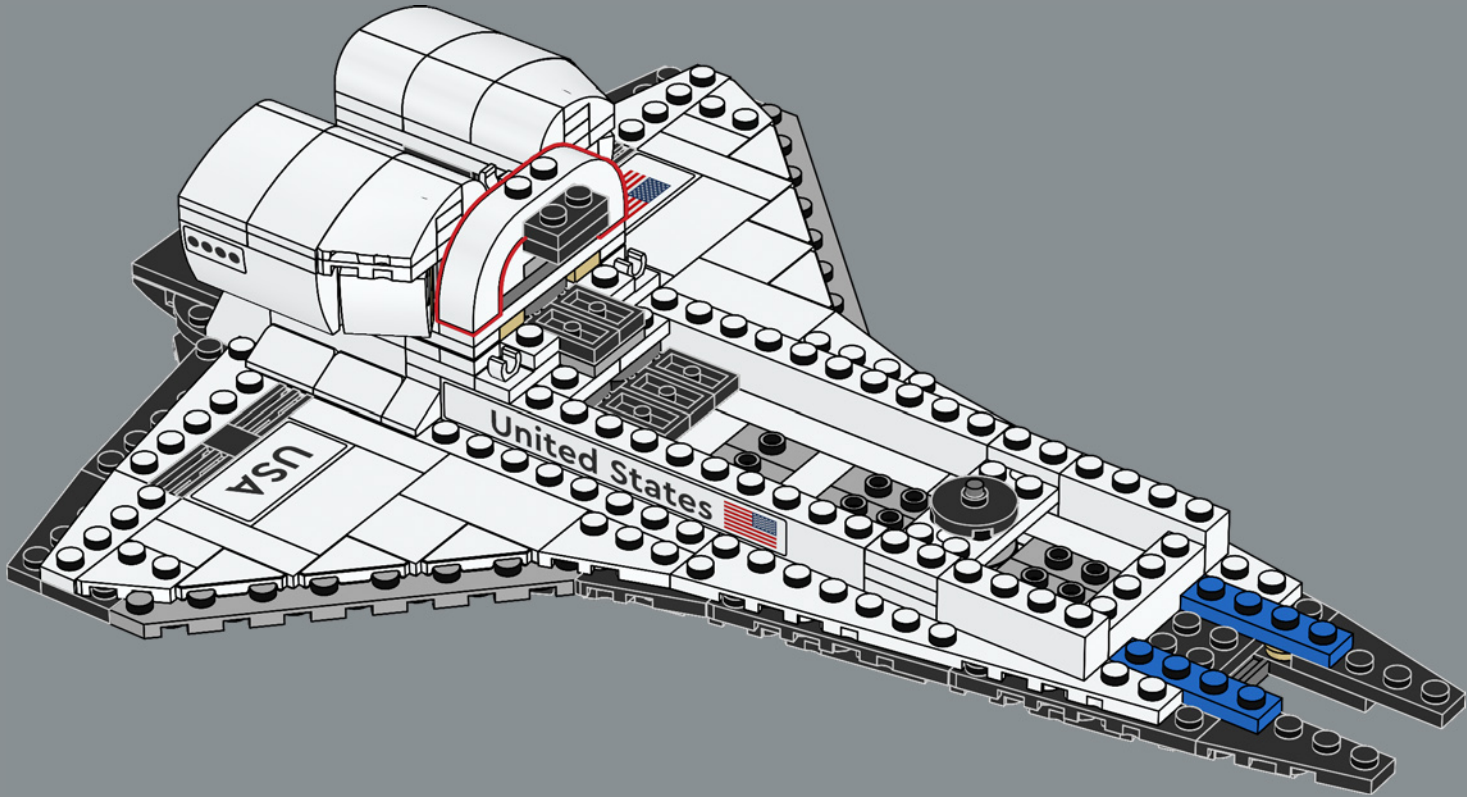
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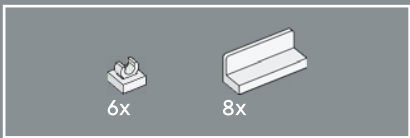
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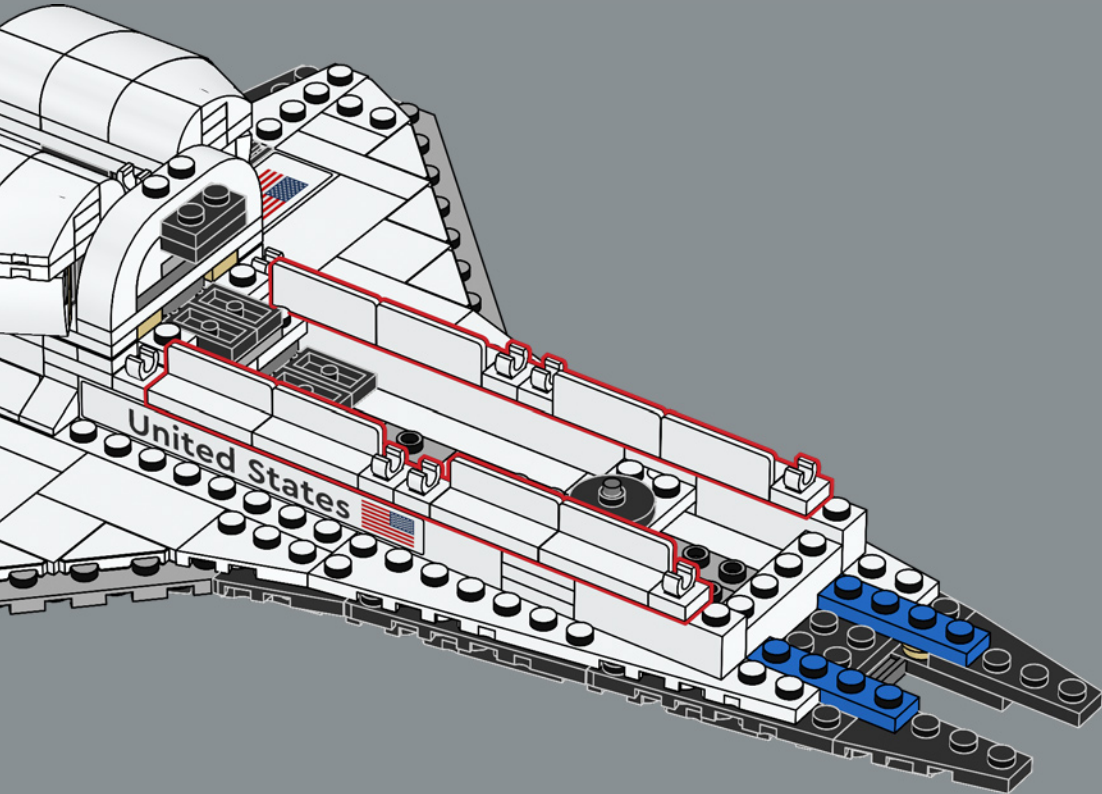


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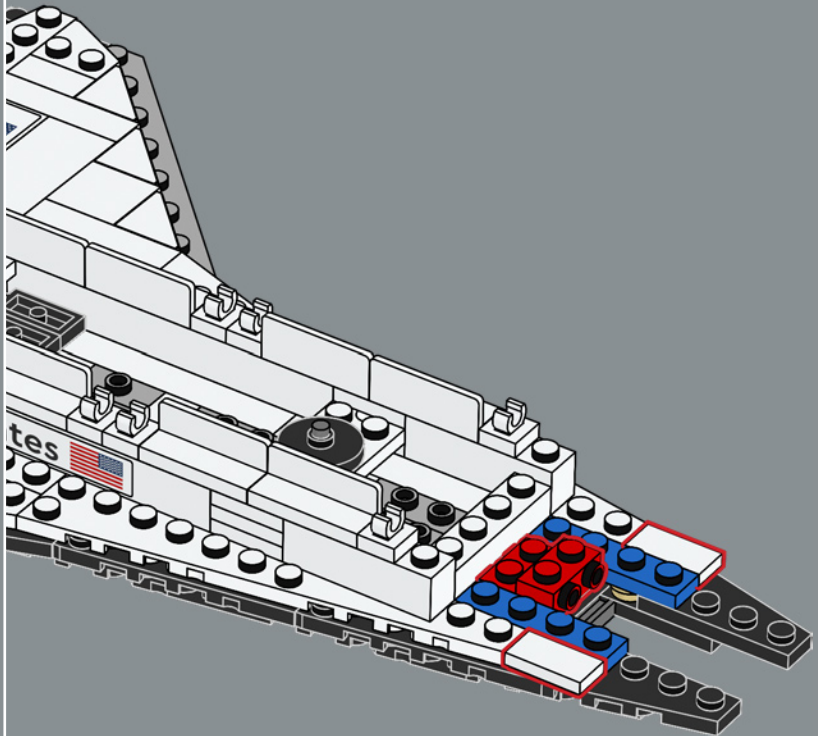




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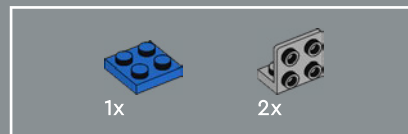
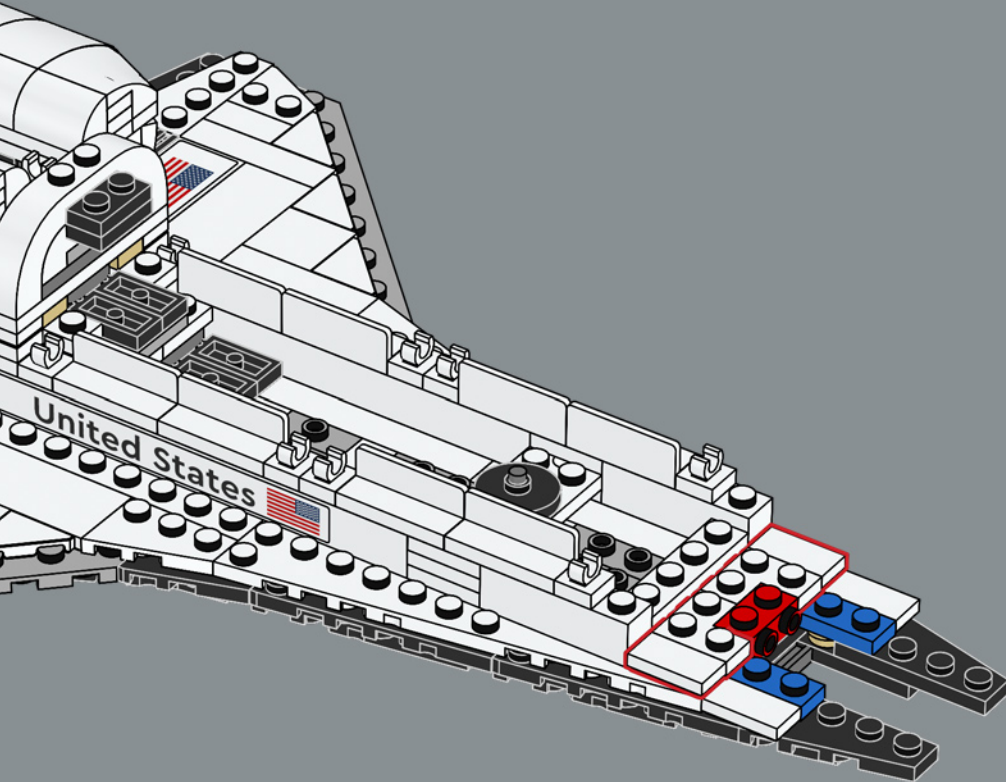


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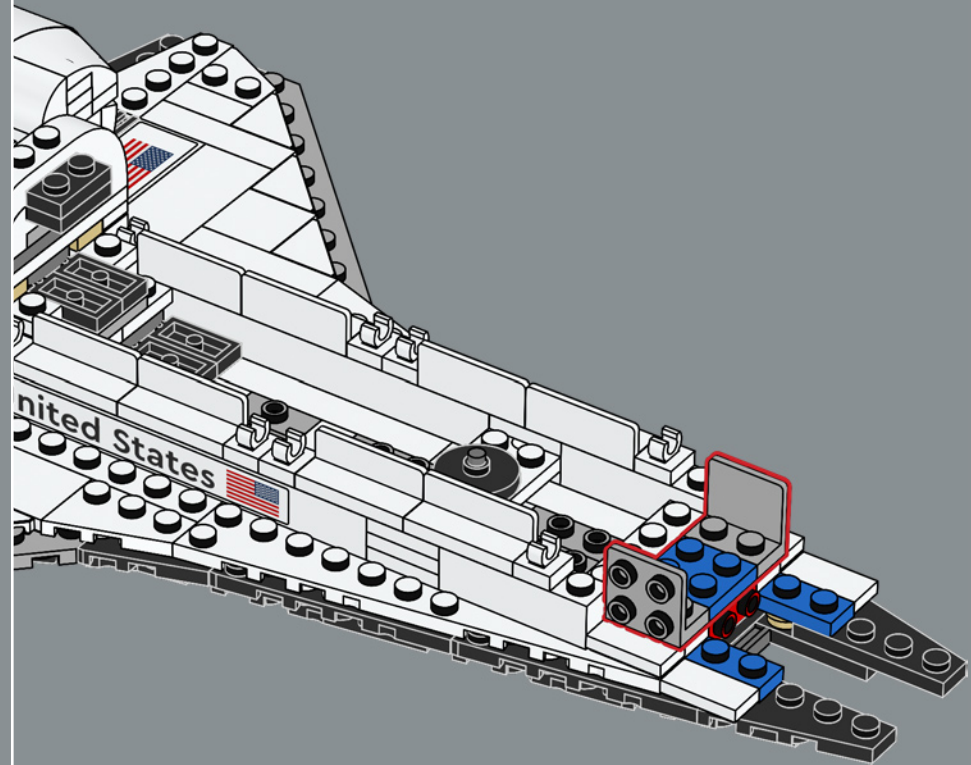


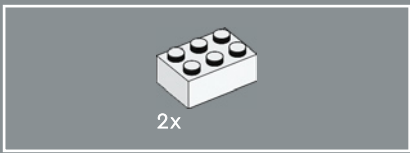


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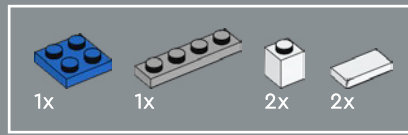
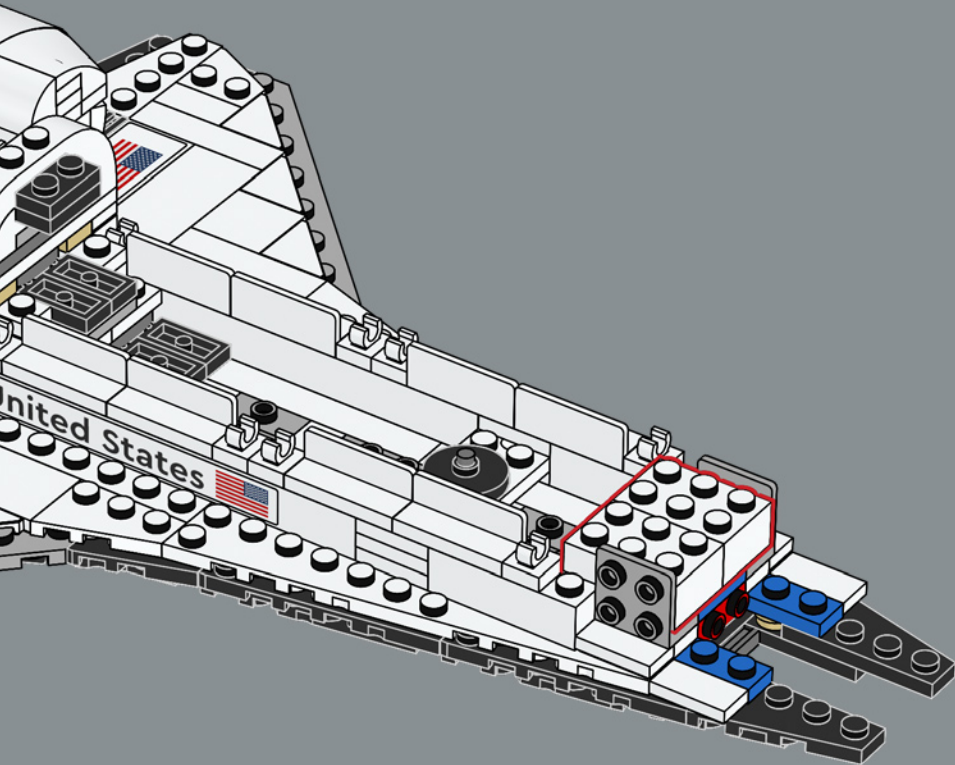


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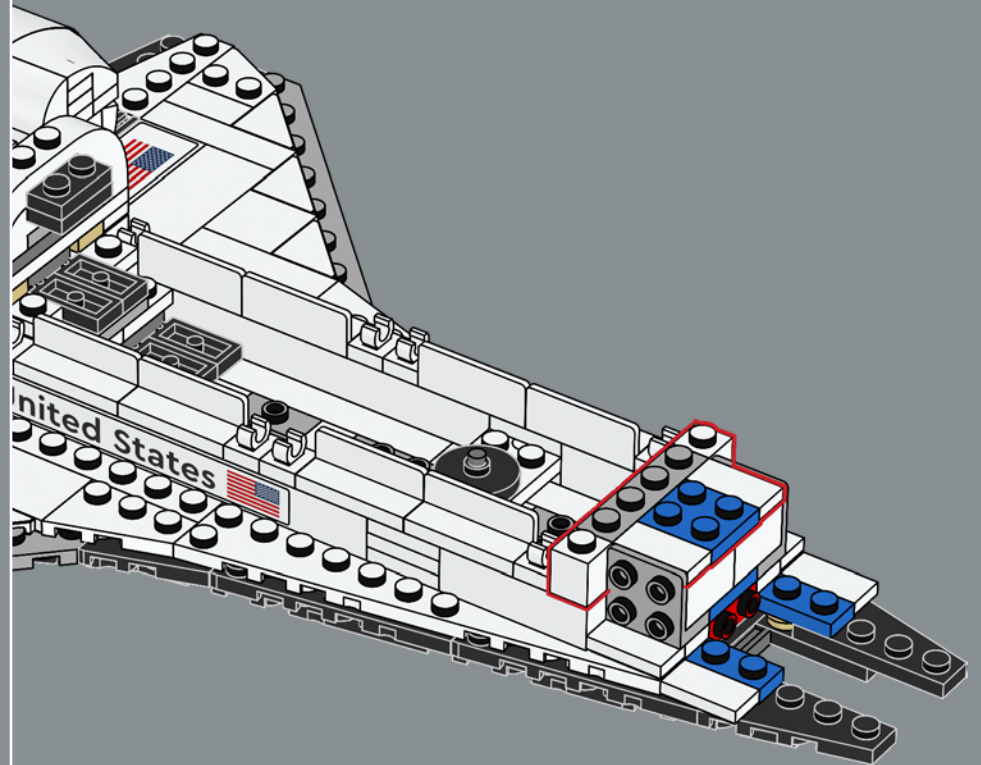


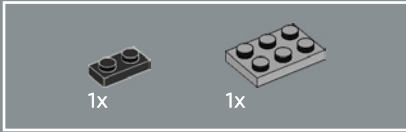
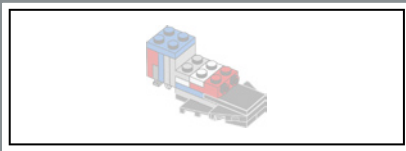


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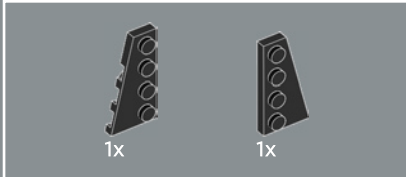
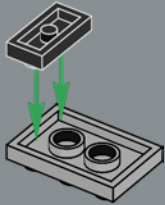


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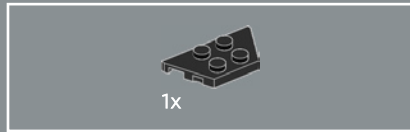
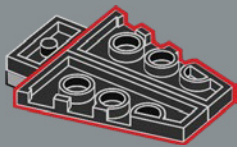




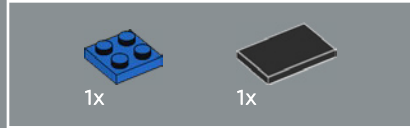
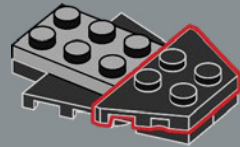
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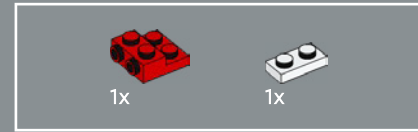
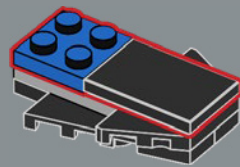
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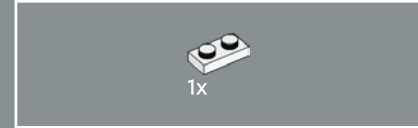
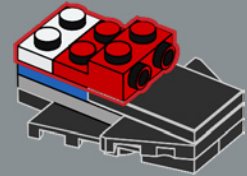
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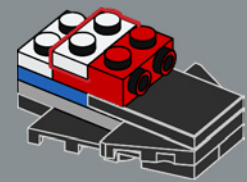
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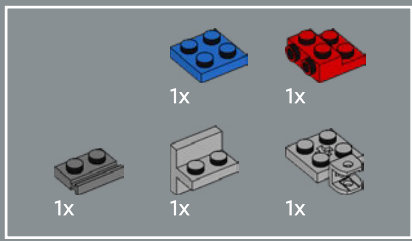


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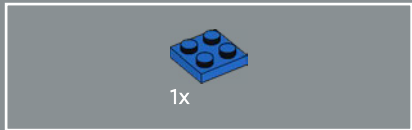
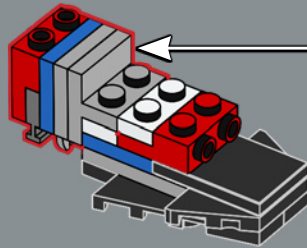
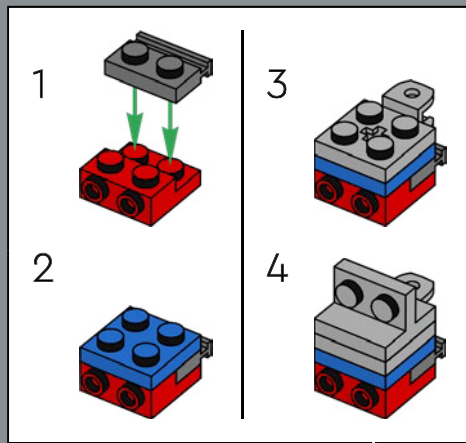


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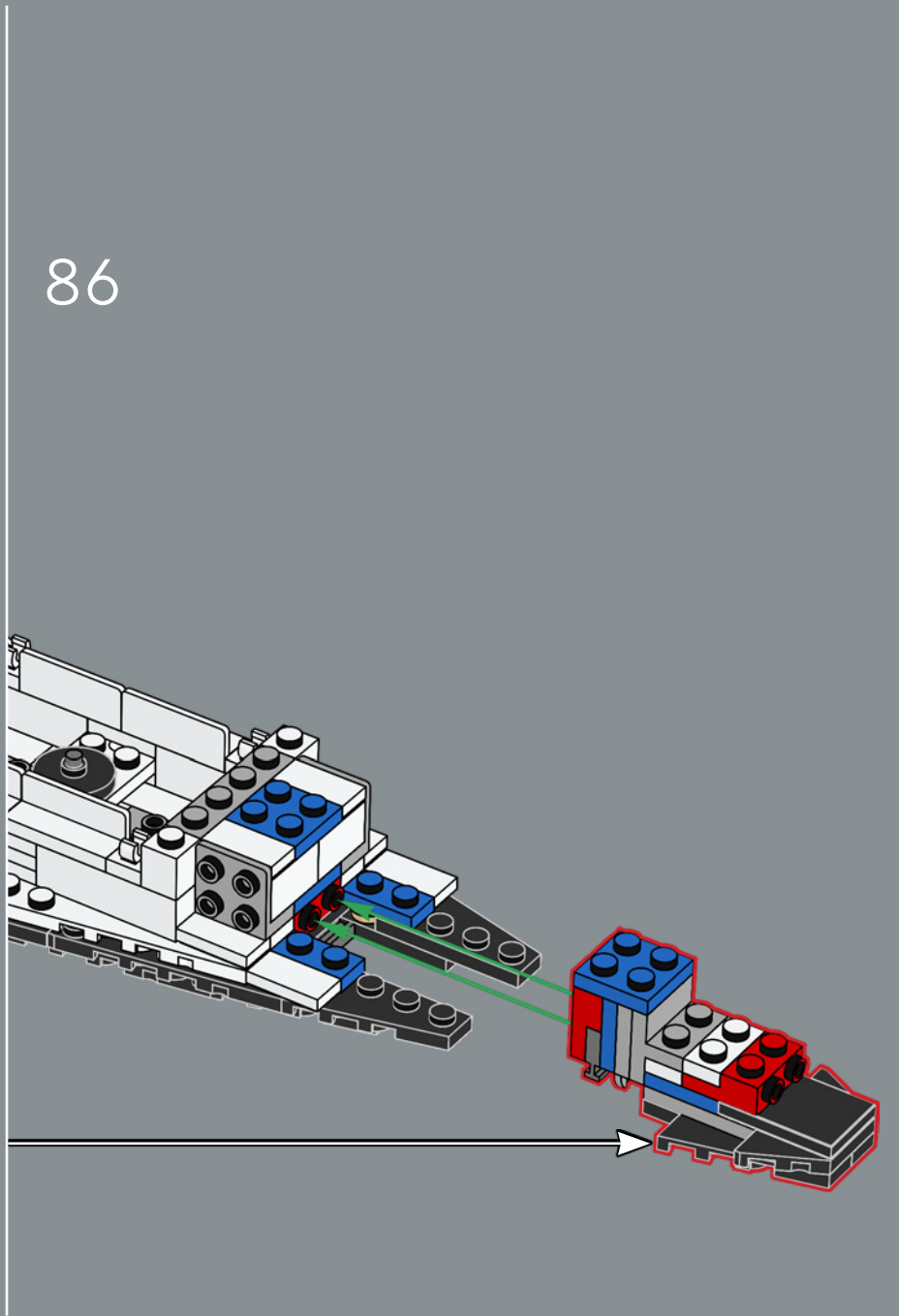
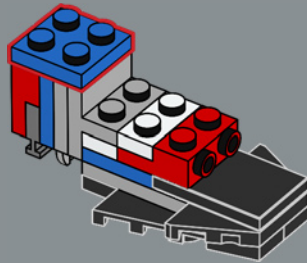




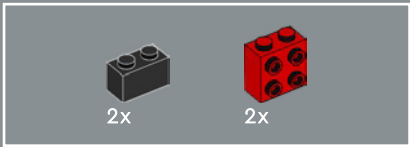
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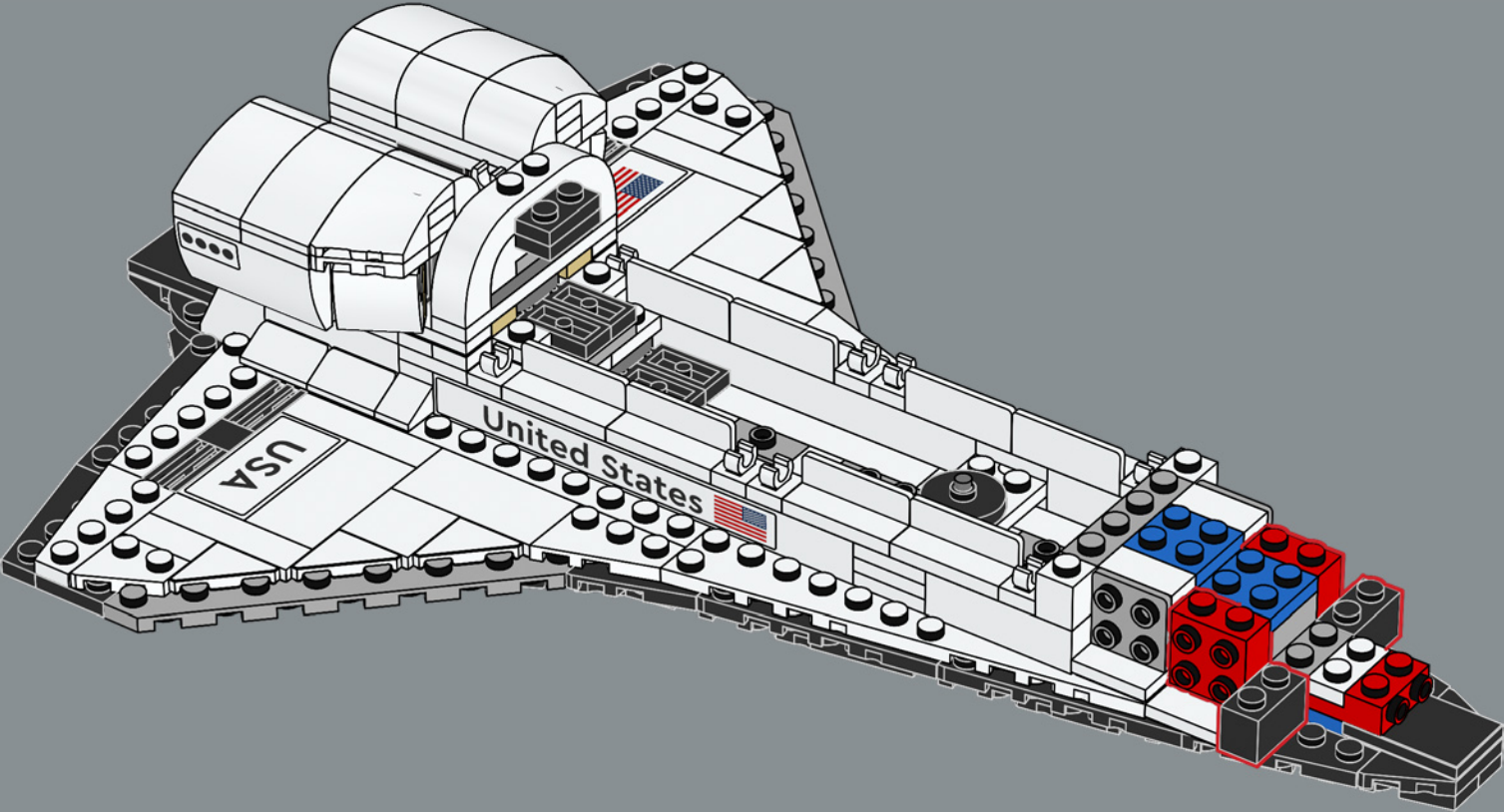
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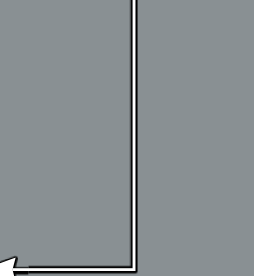
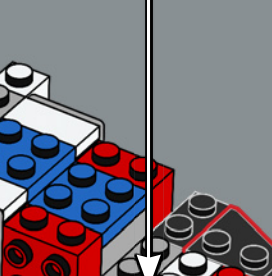
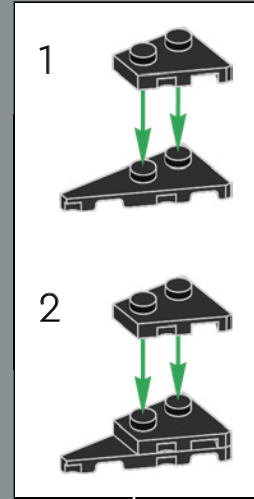
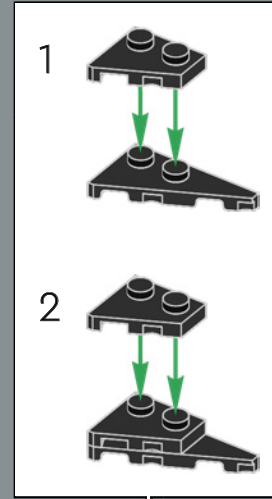
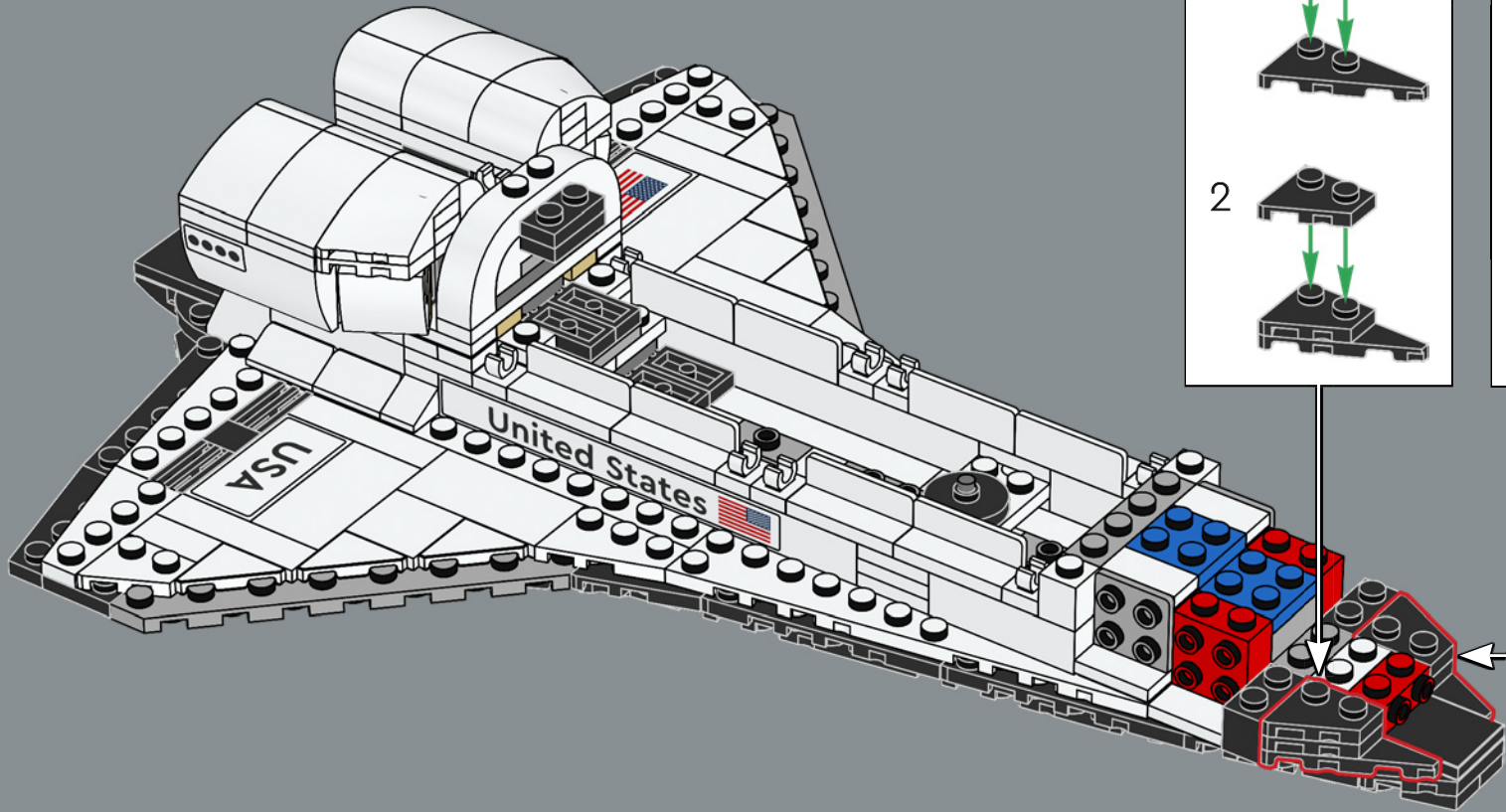


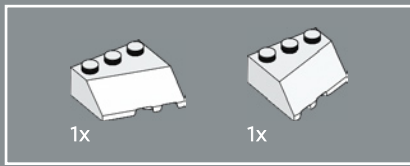
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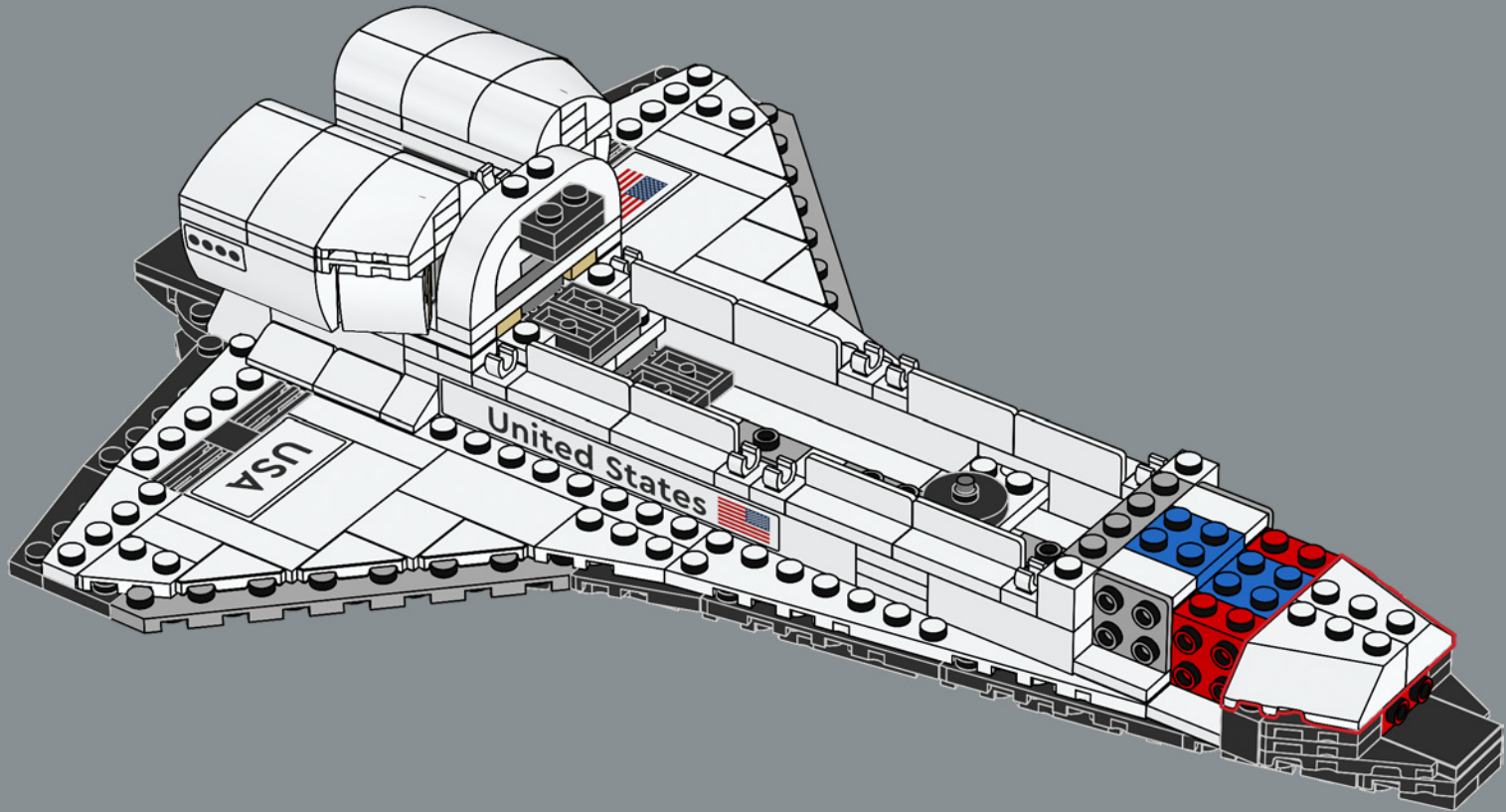


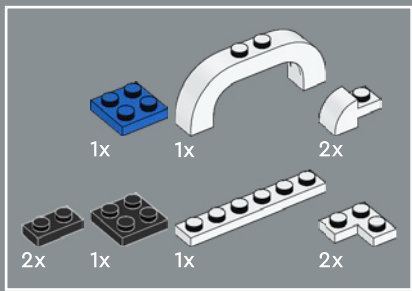
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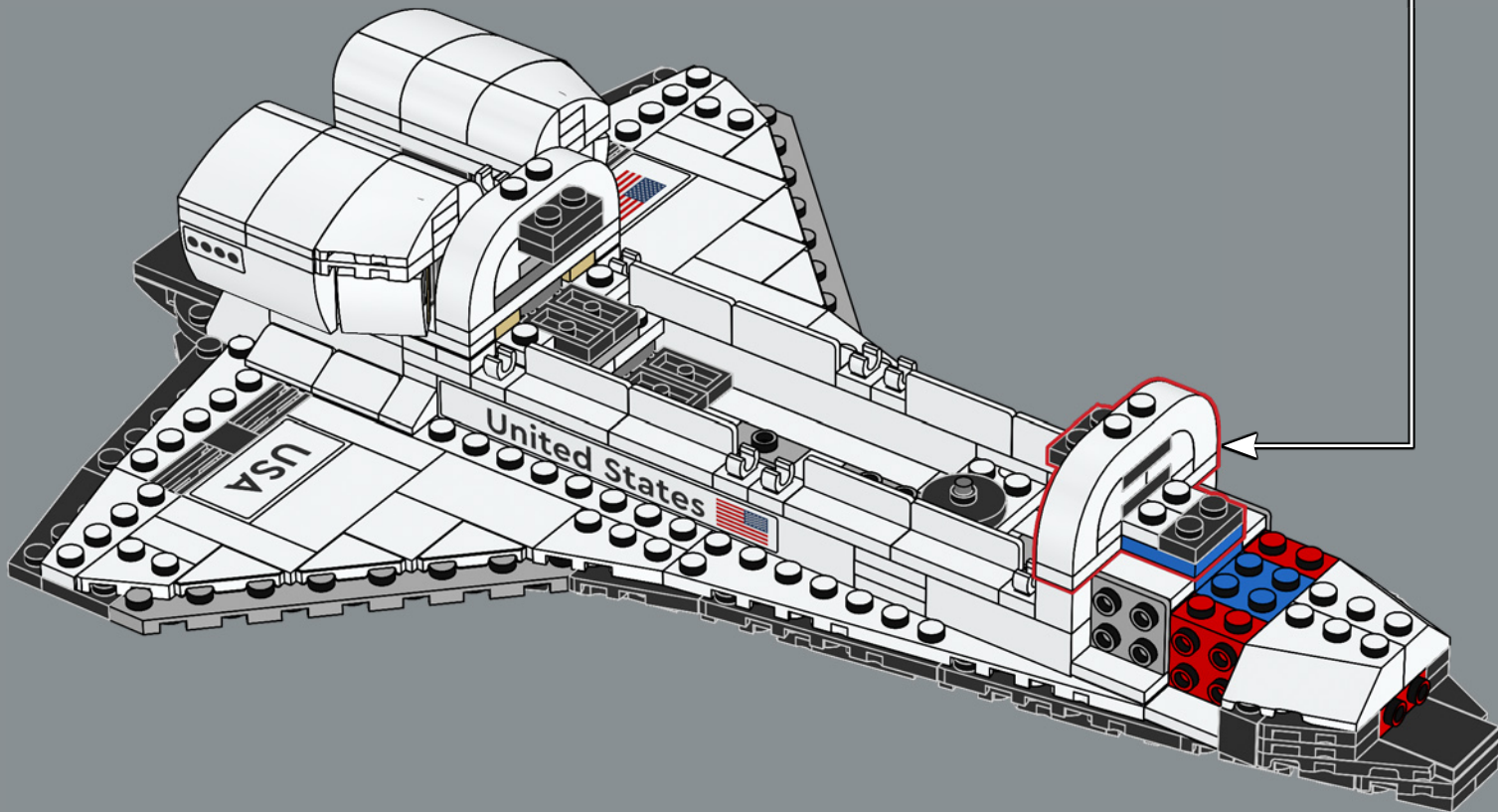
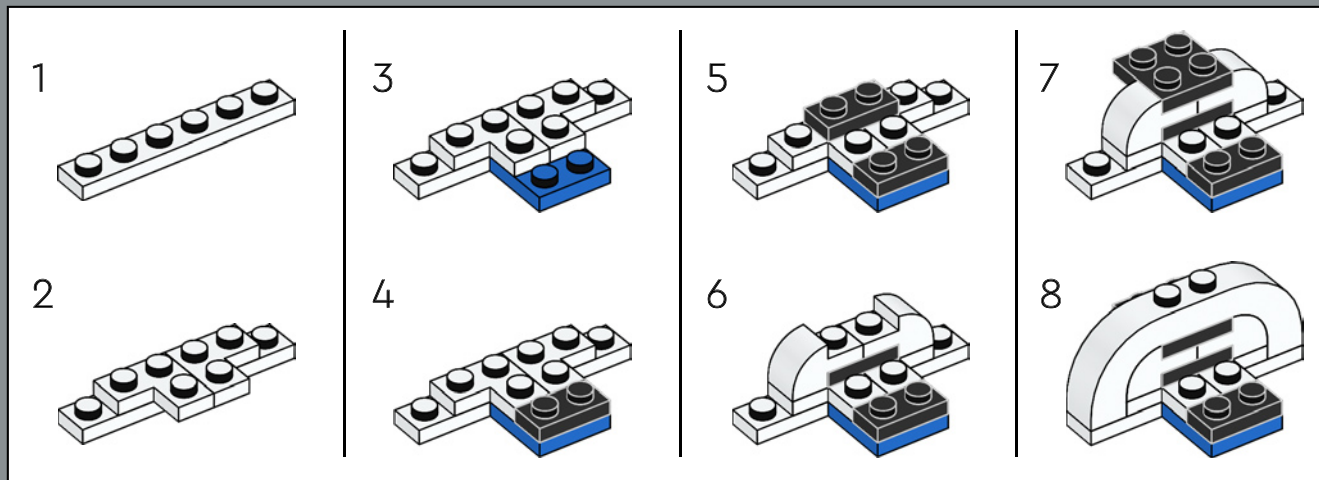


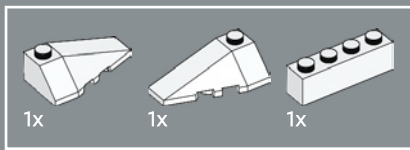
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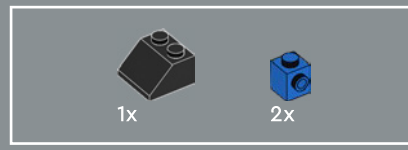
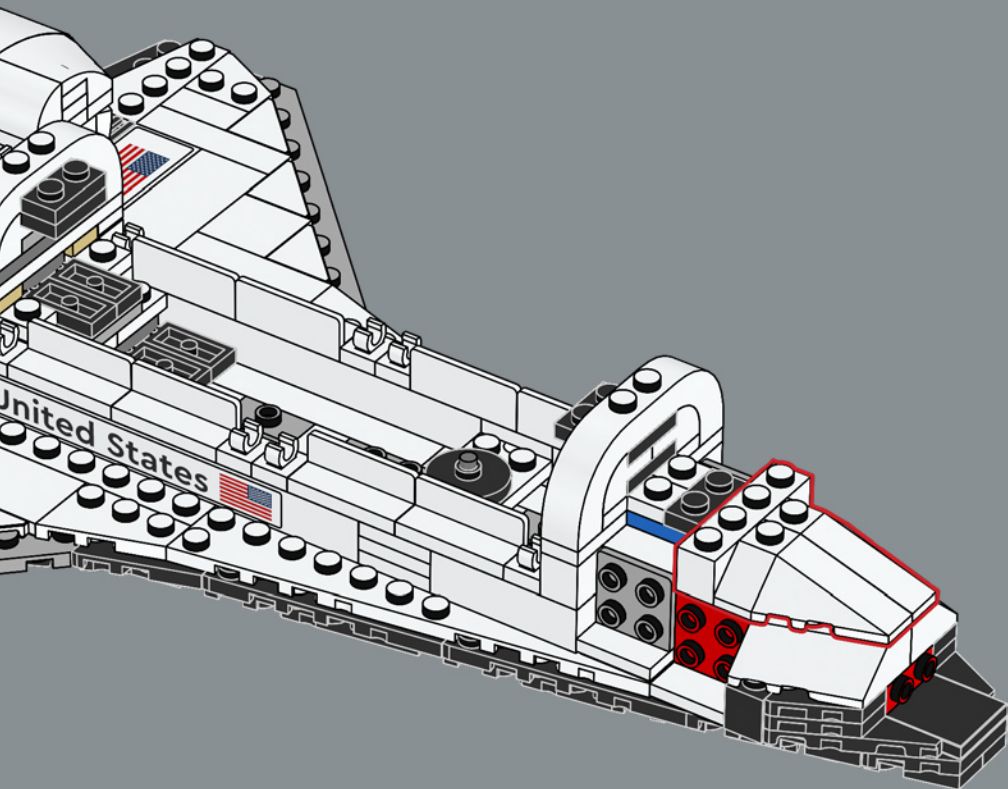


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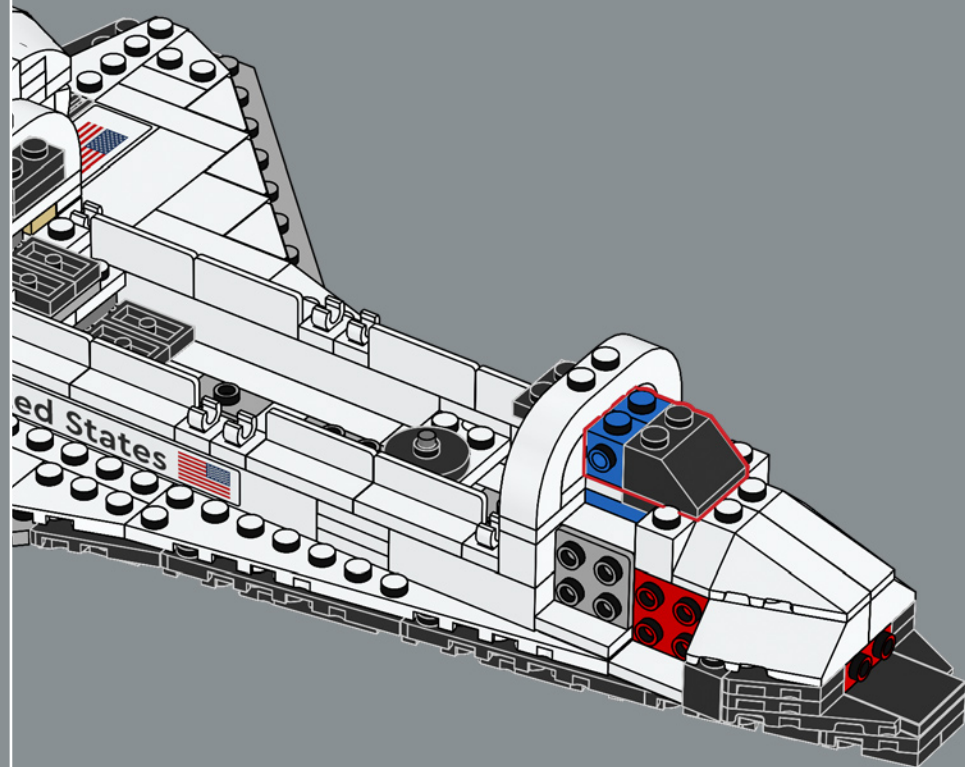


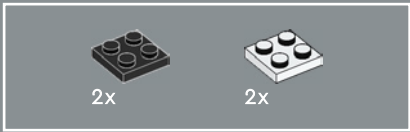


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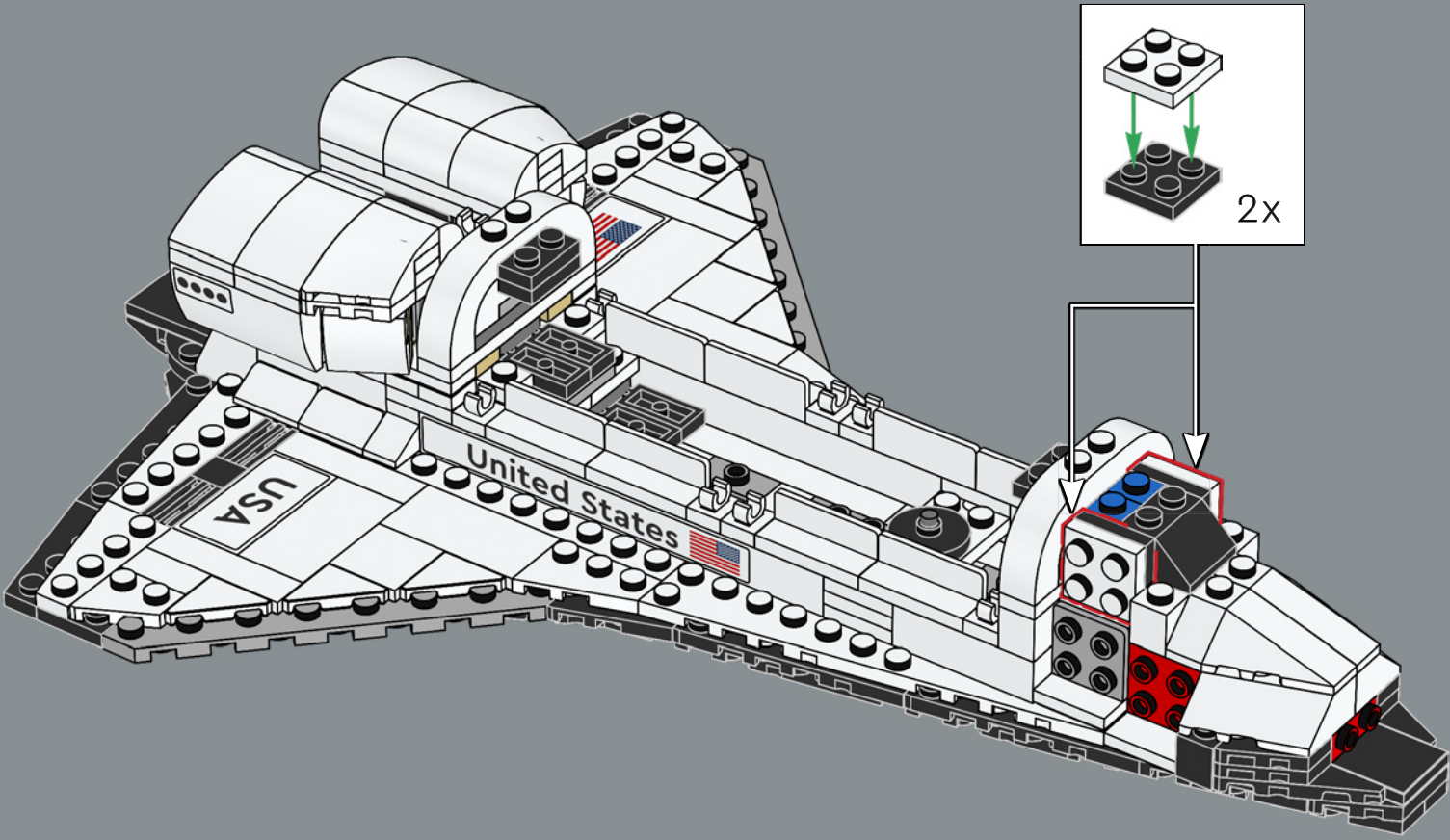


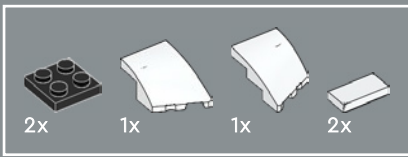
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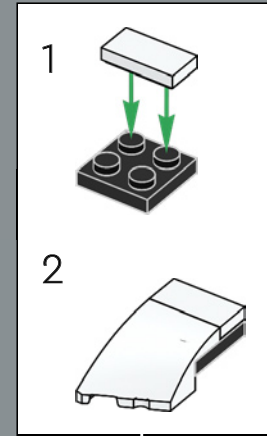
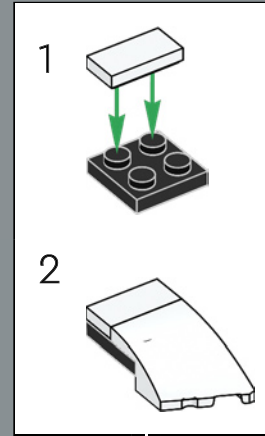
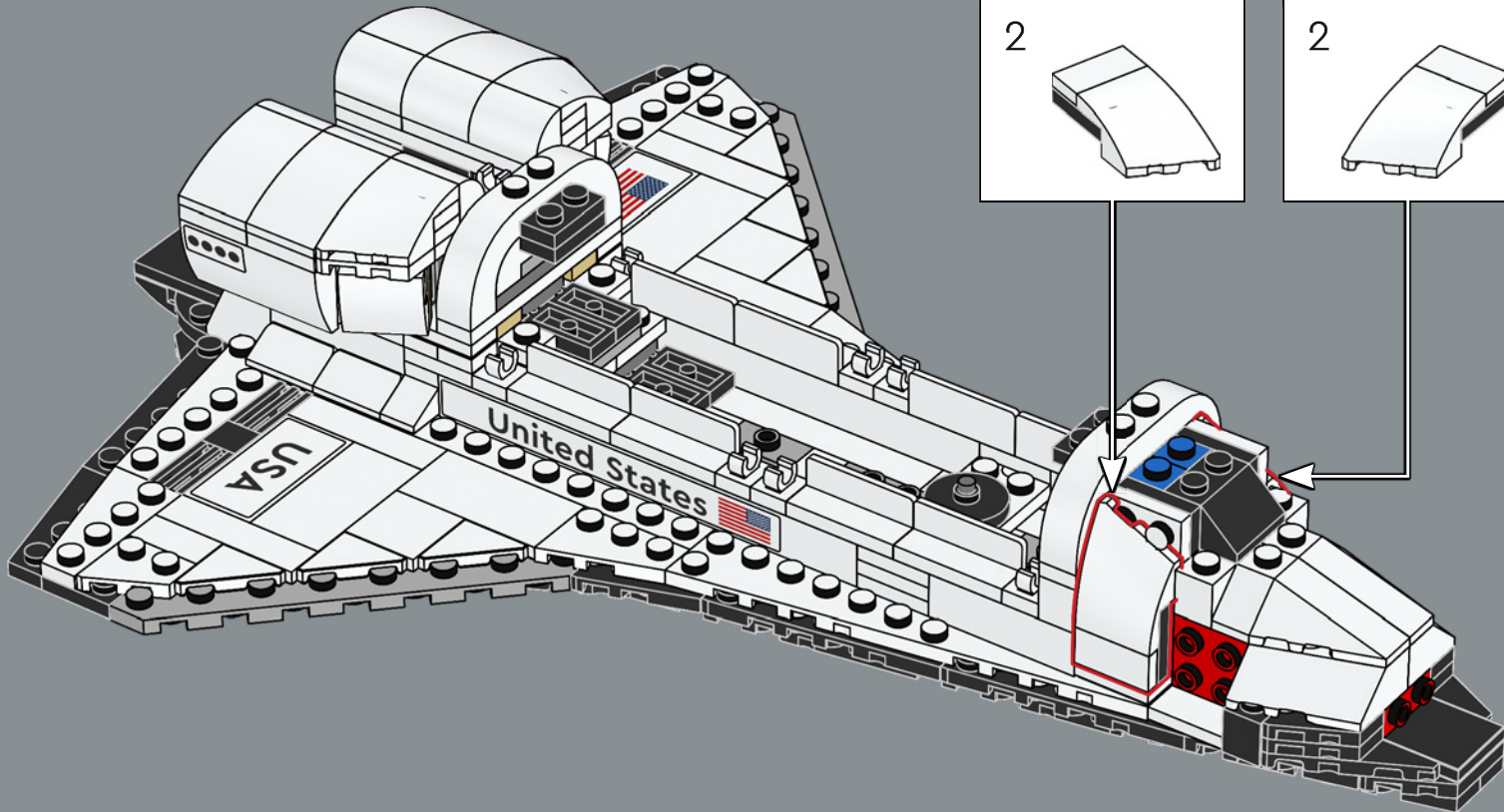


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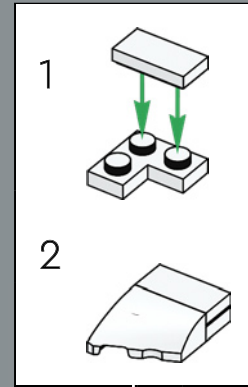
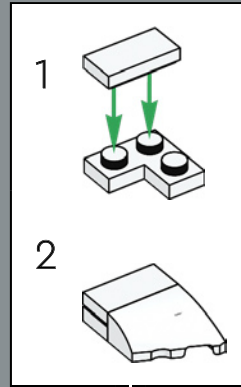
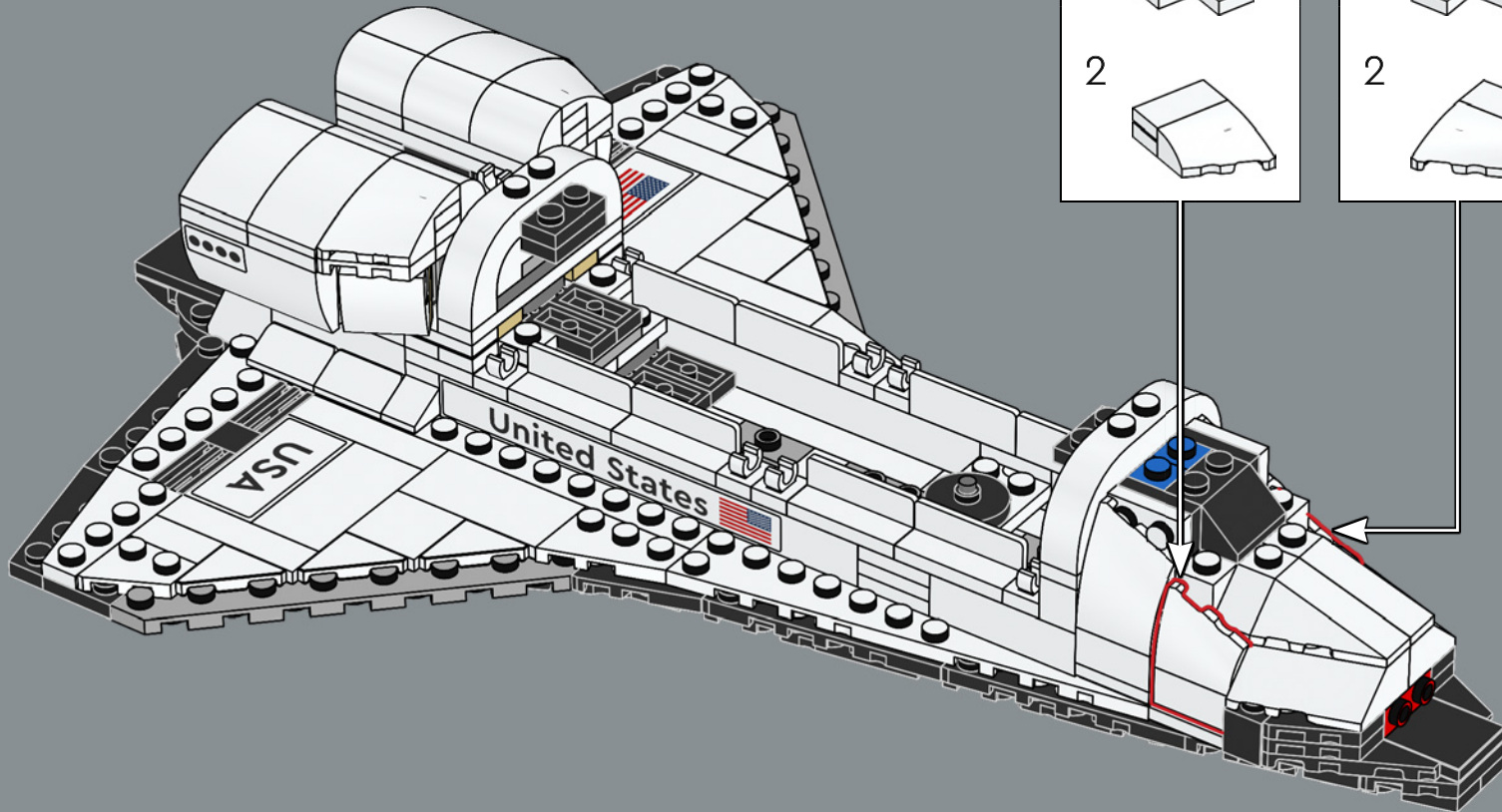


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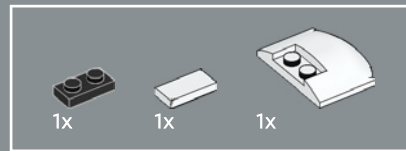
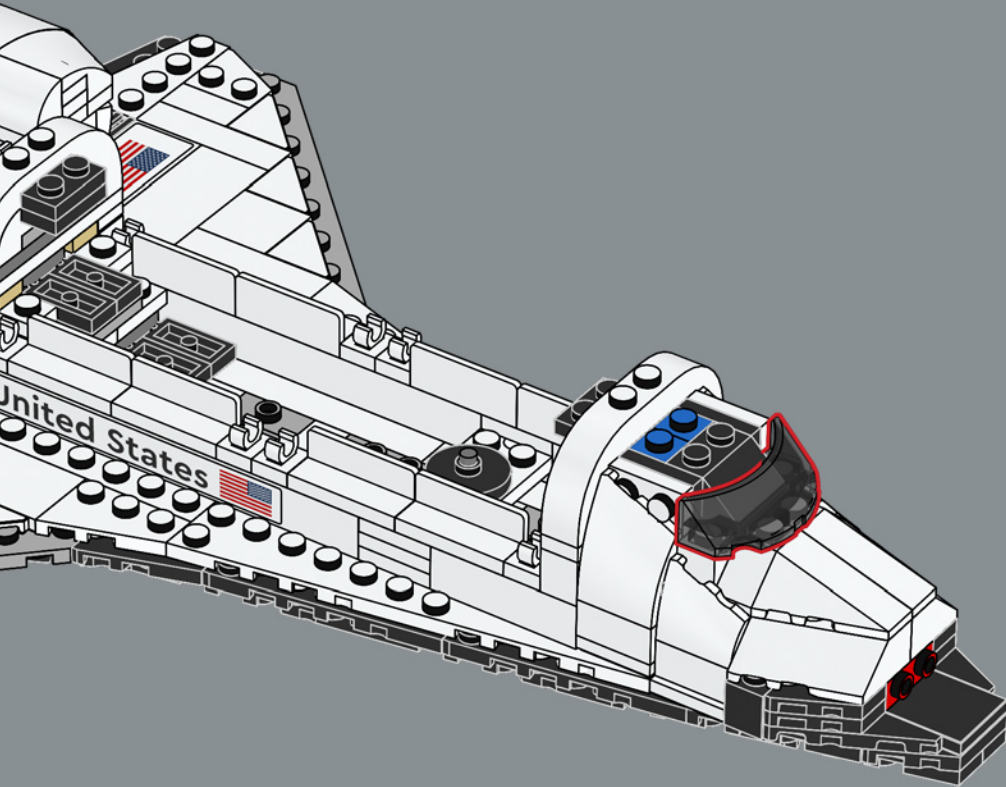


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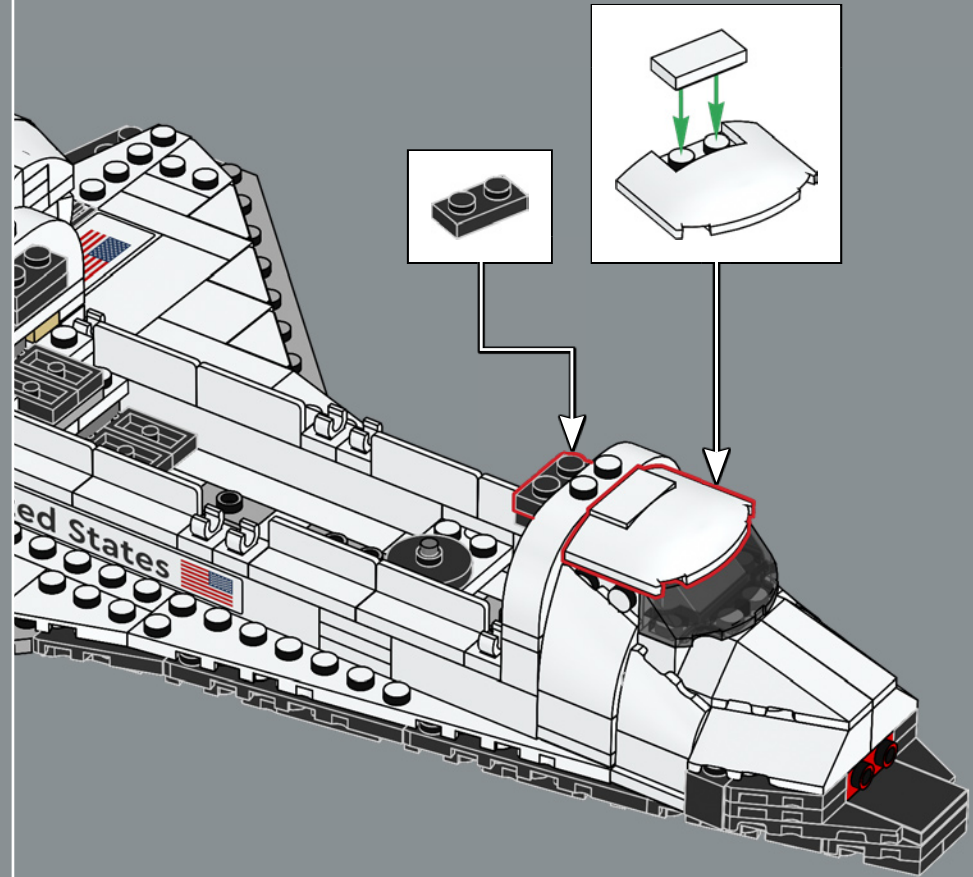




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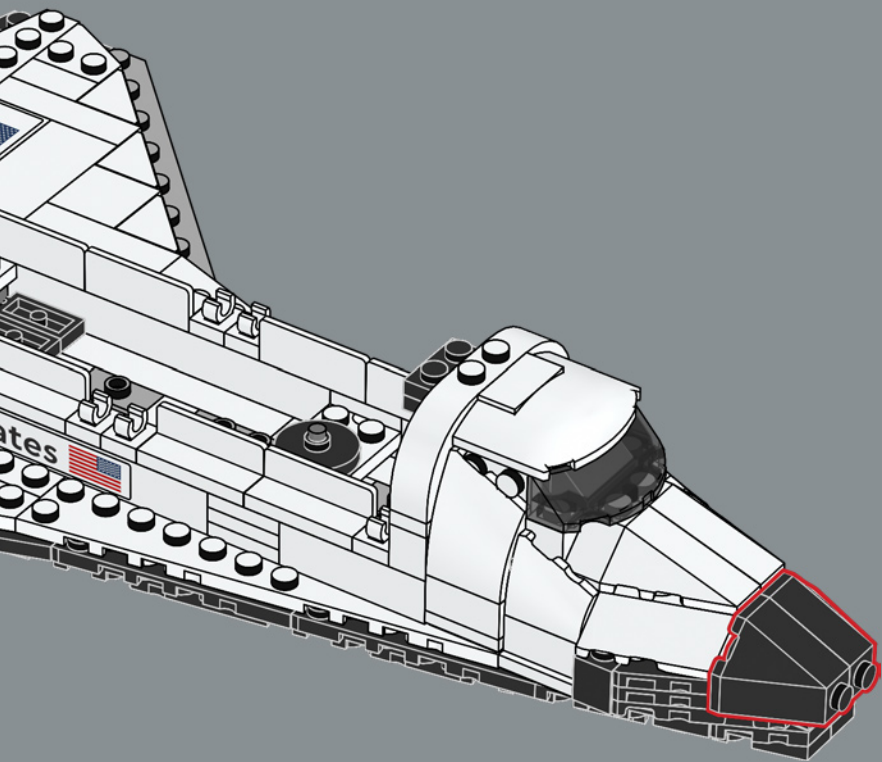


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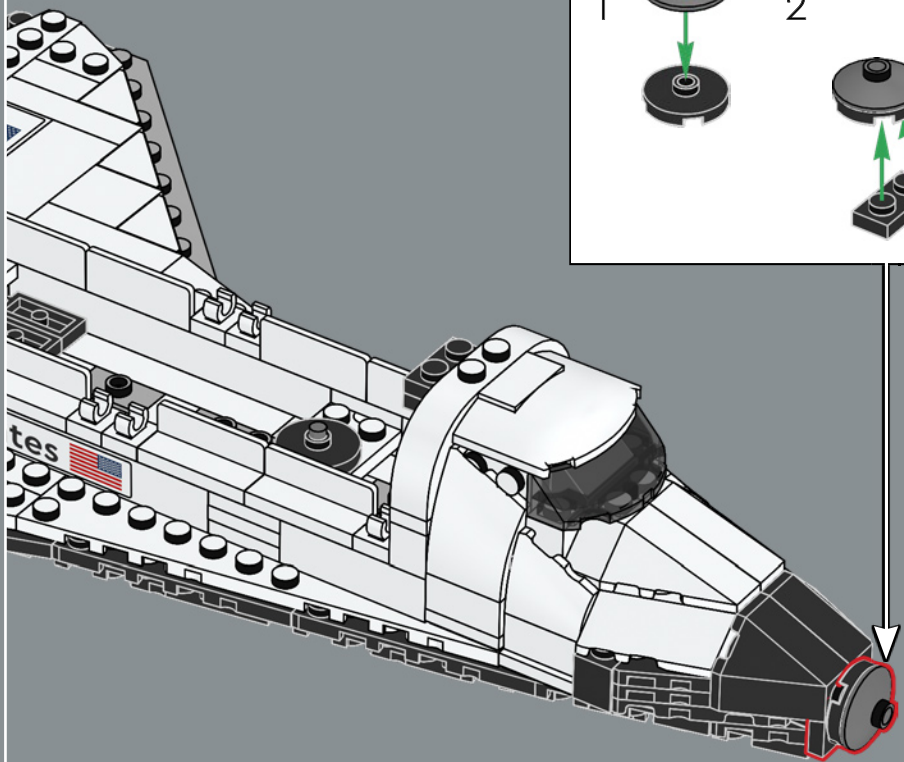


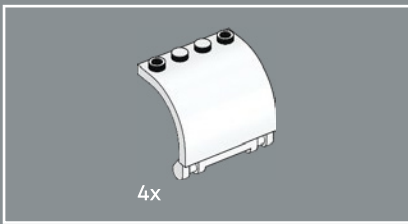


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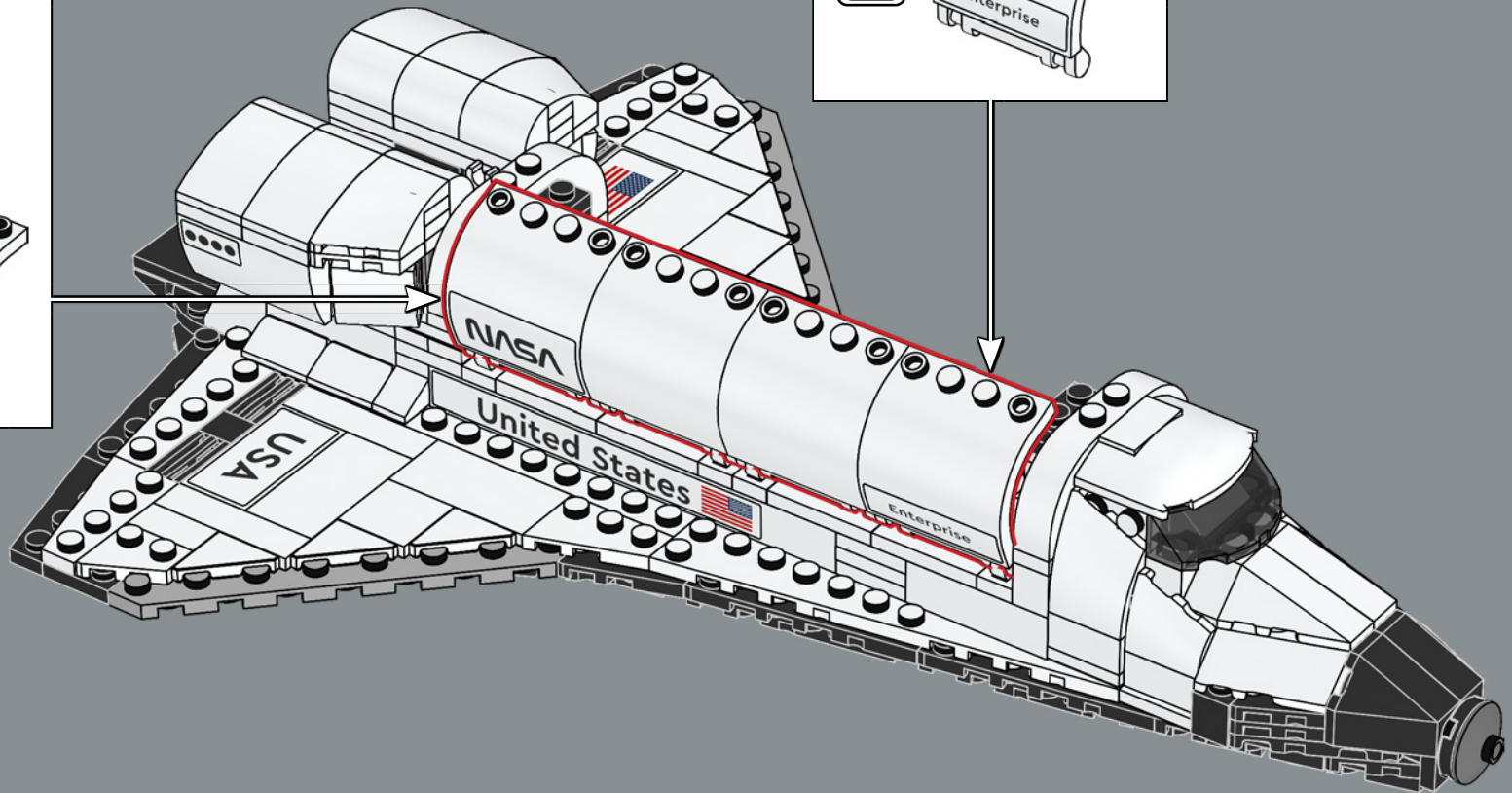
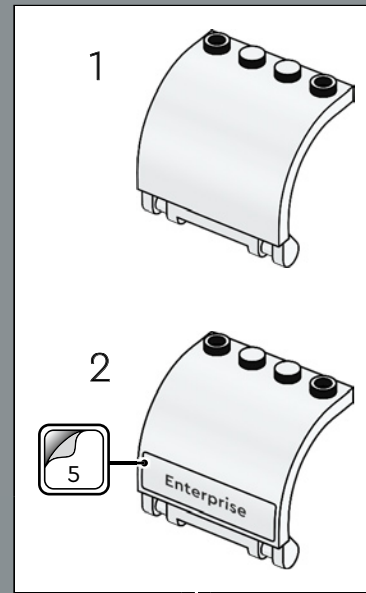
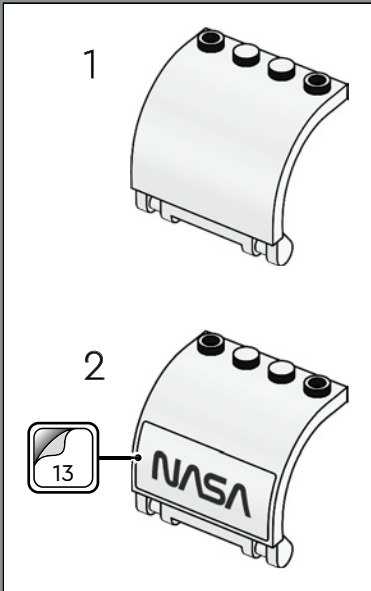


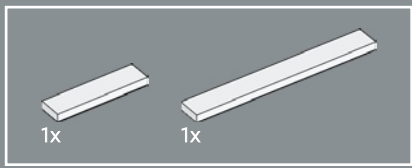
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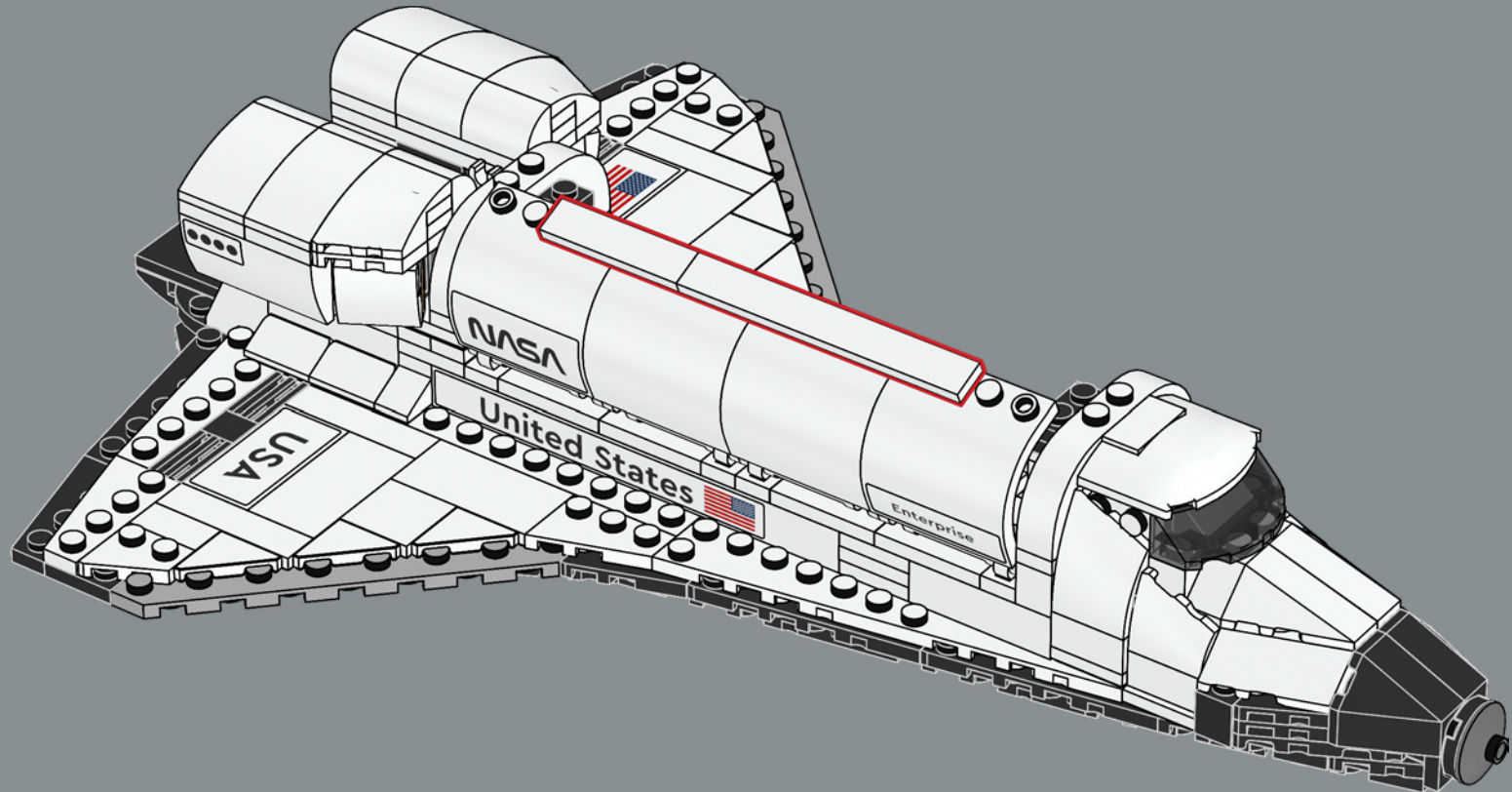


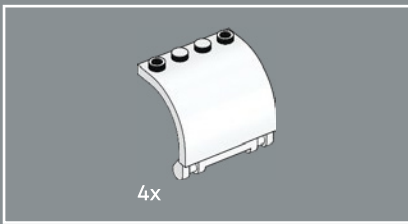
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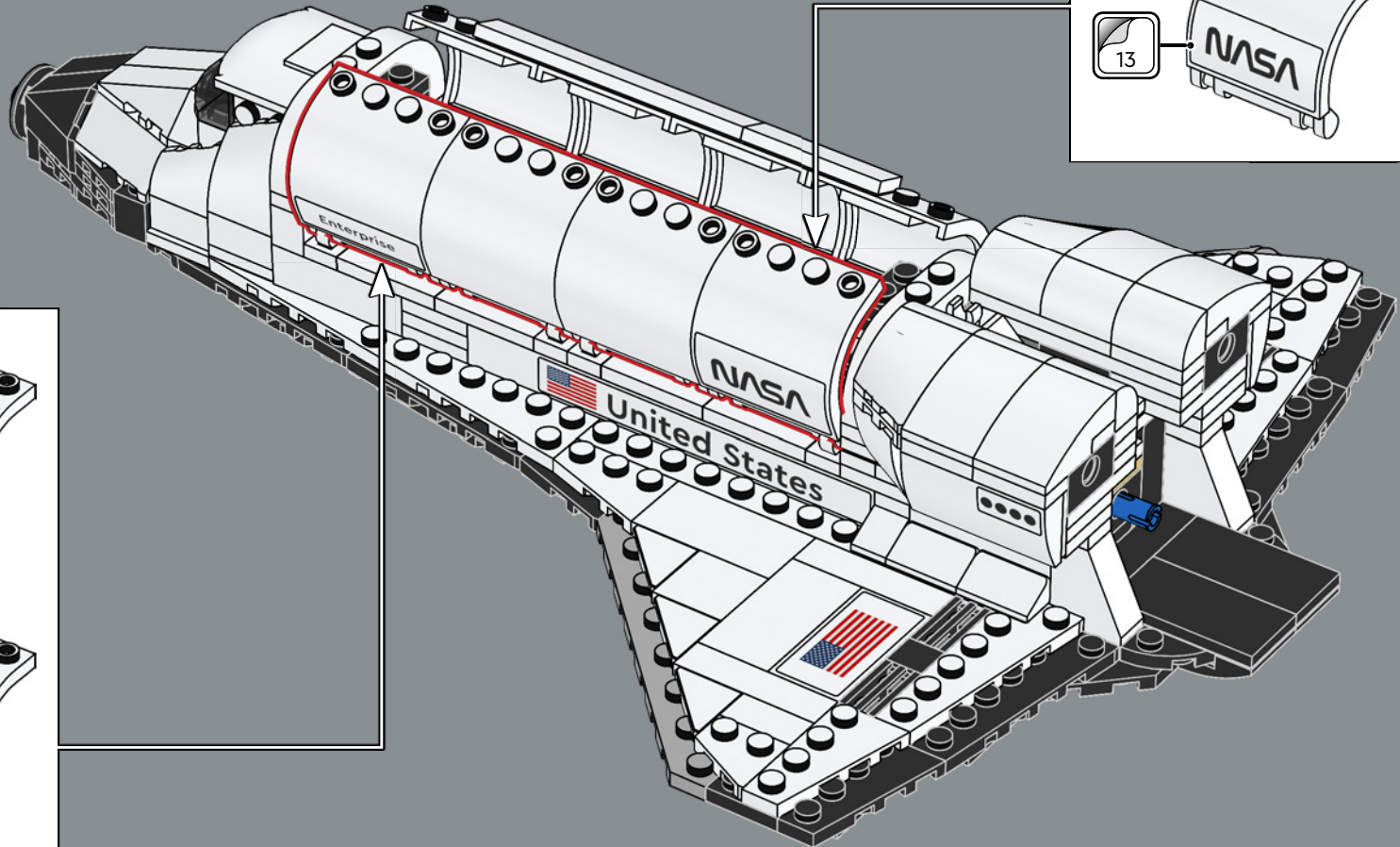
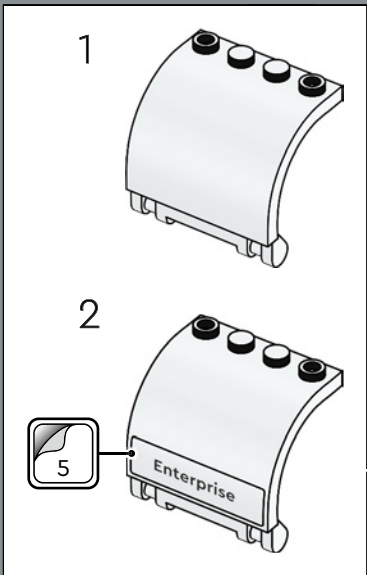
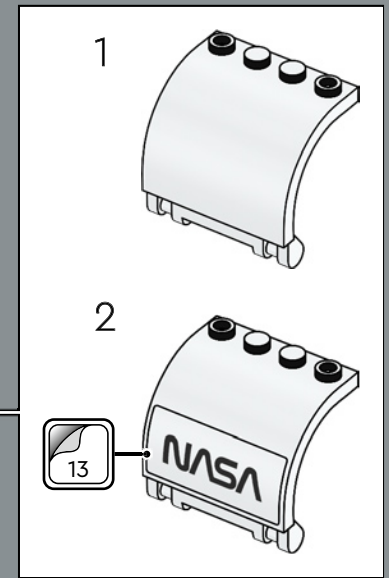


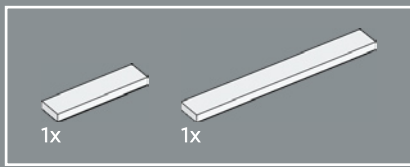
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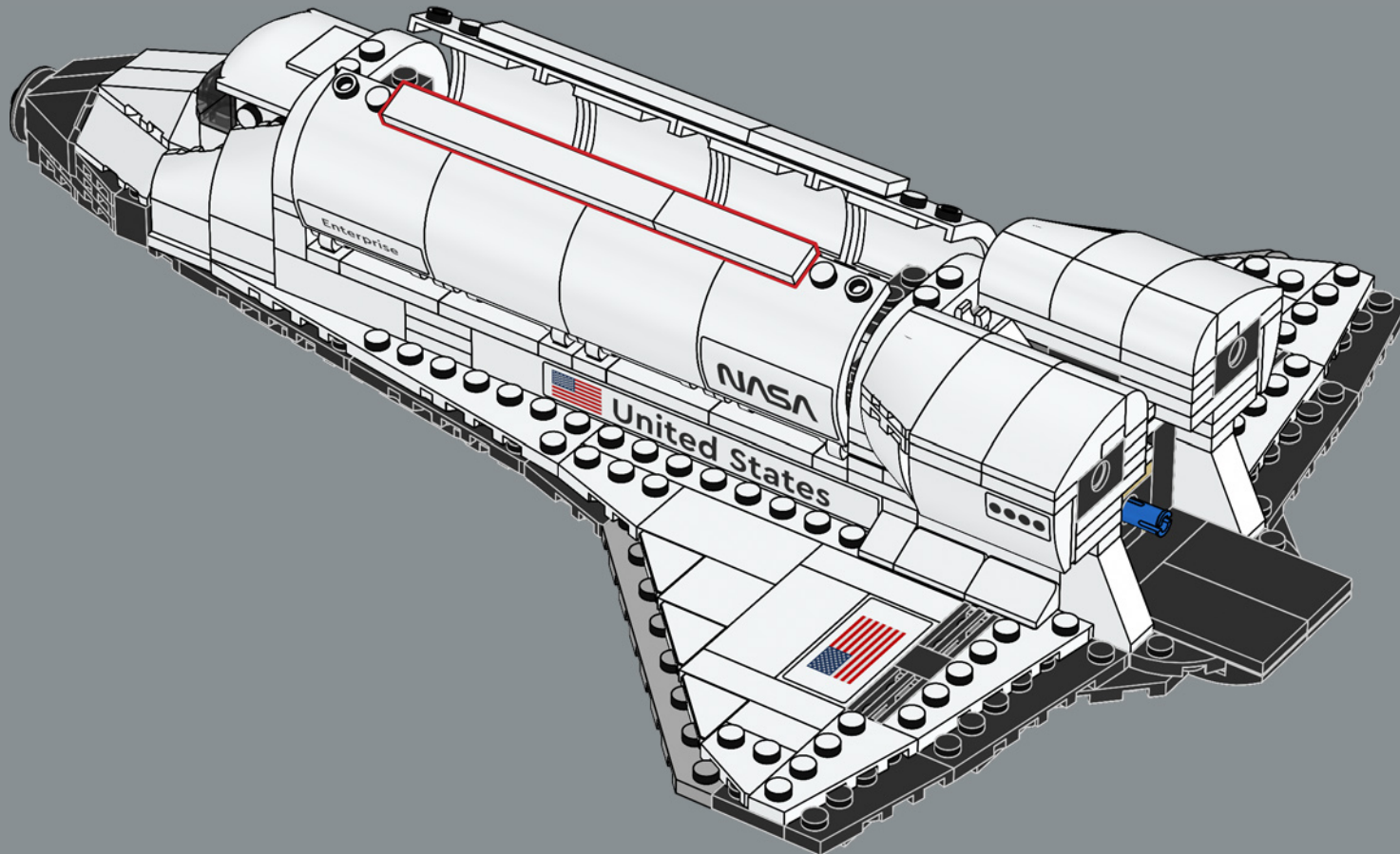
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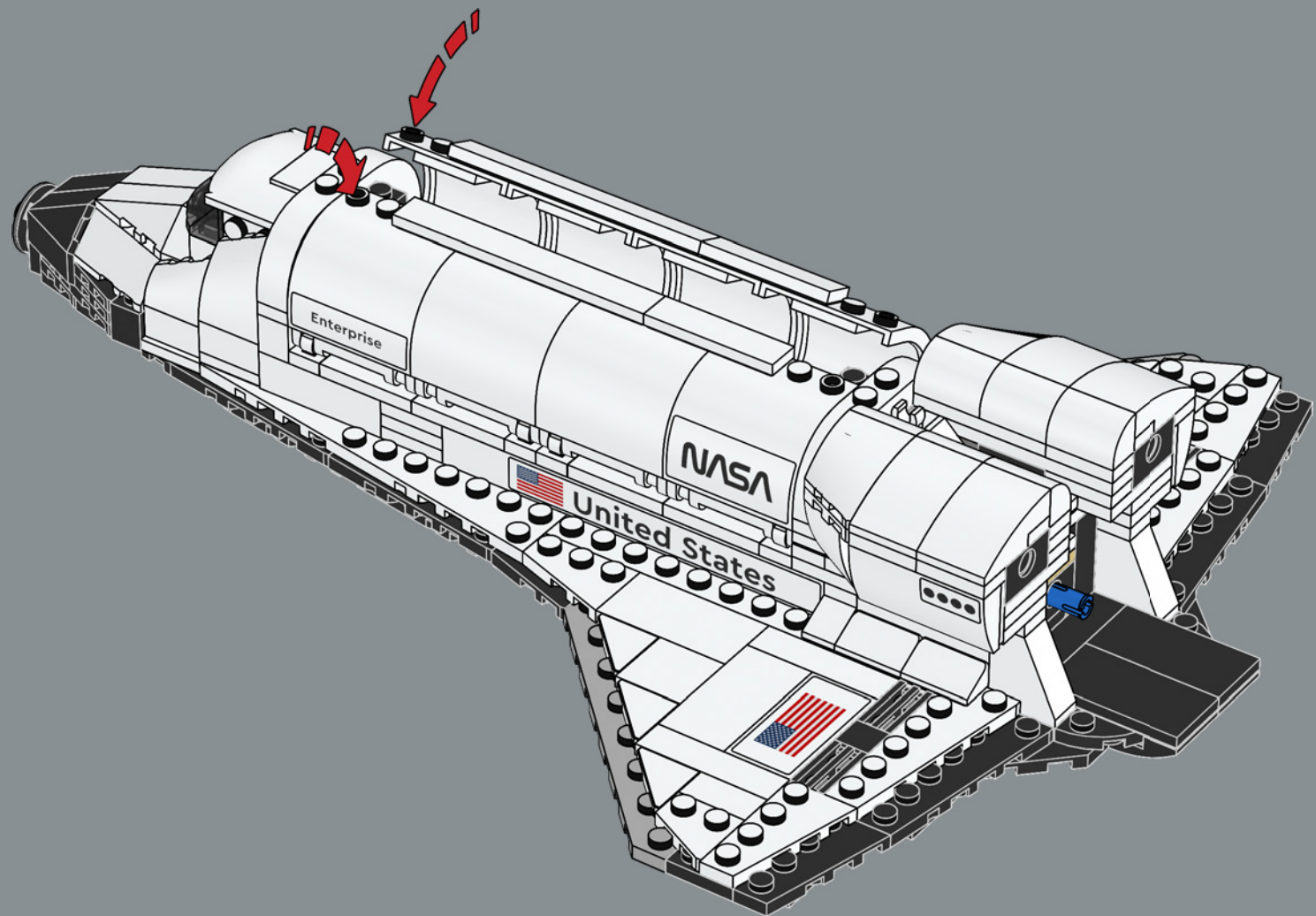


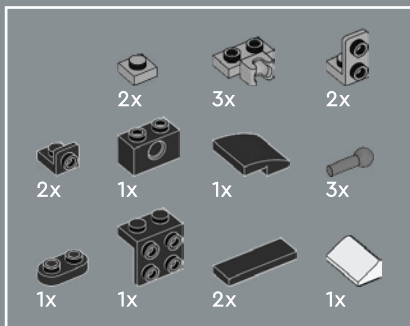


Ursprünglich sollte die *Enterprise* auf den Namen *Constitution* getauft werden, doch die US-Regierung ließ sich durch eine Briefaktion von Science-Fiction-Fans noch umstimmen.

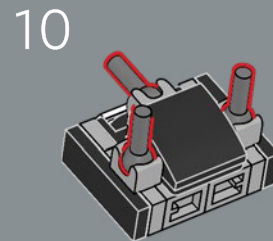
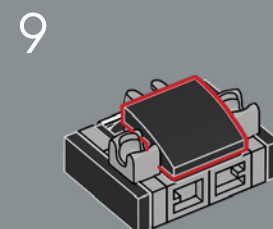
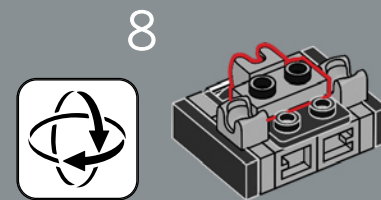
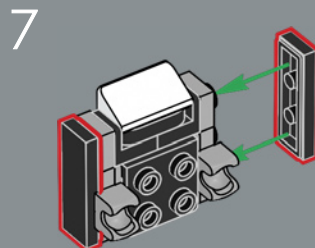
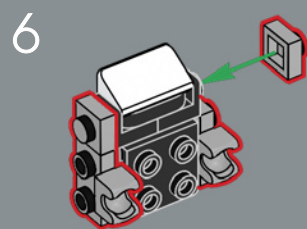
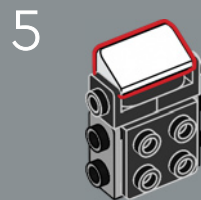
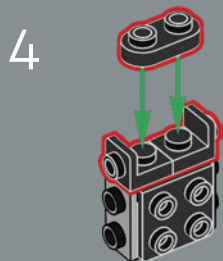
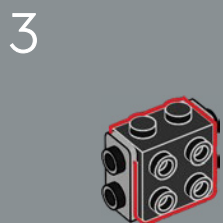
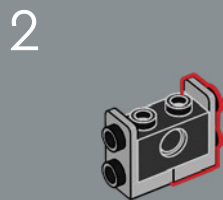
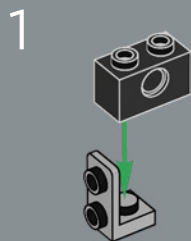
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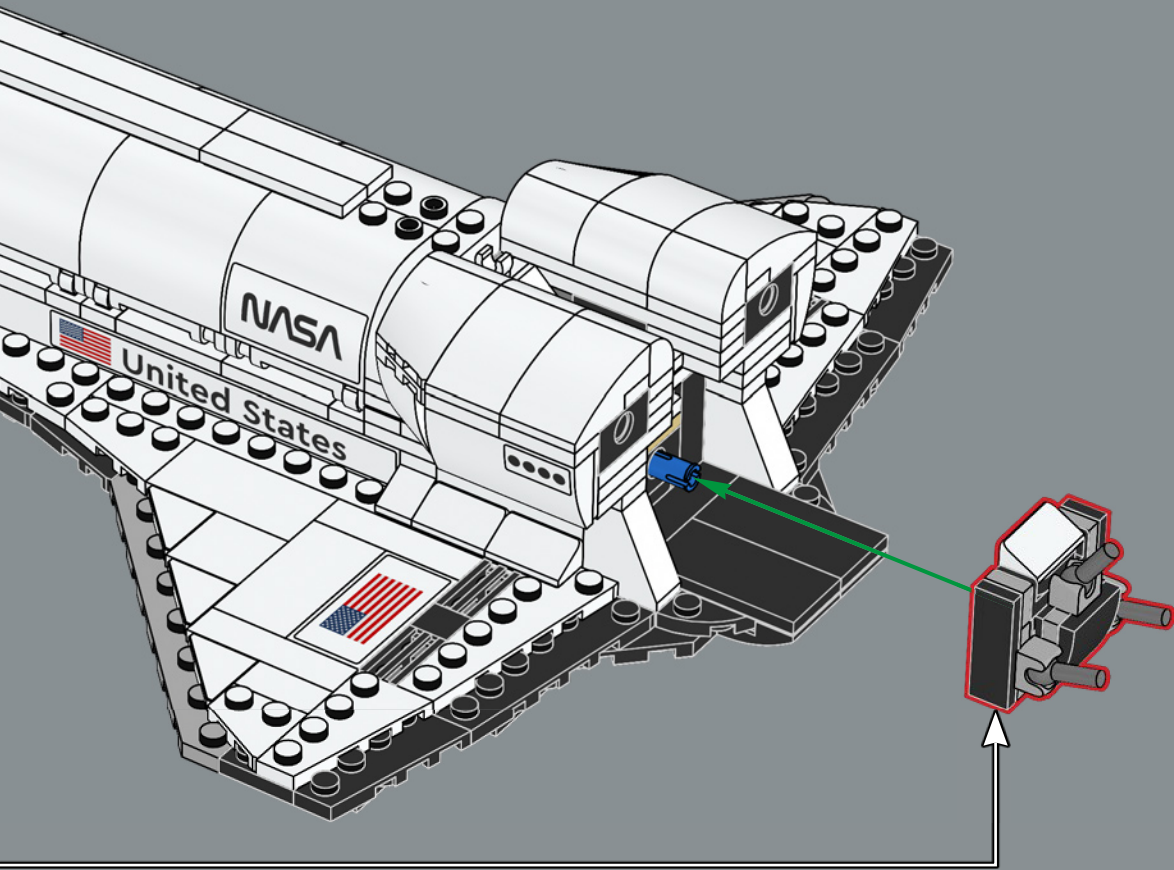




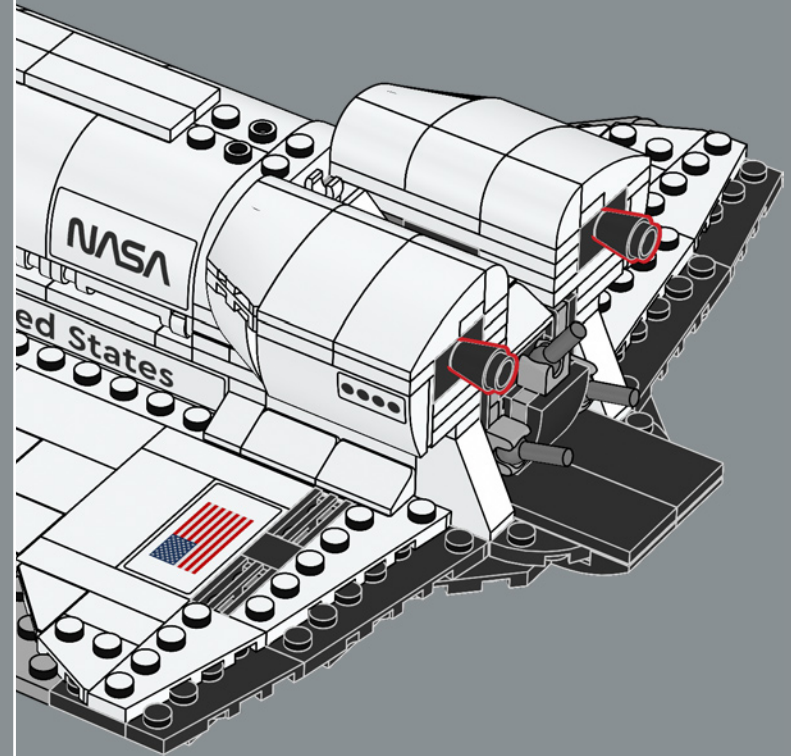


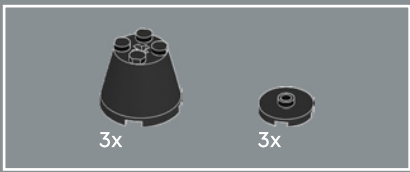
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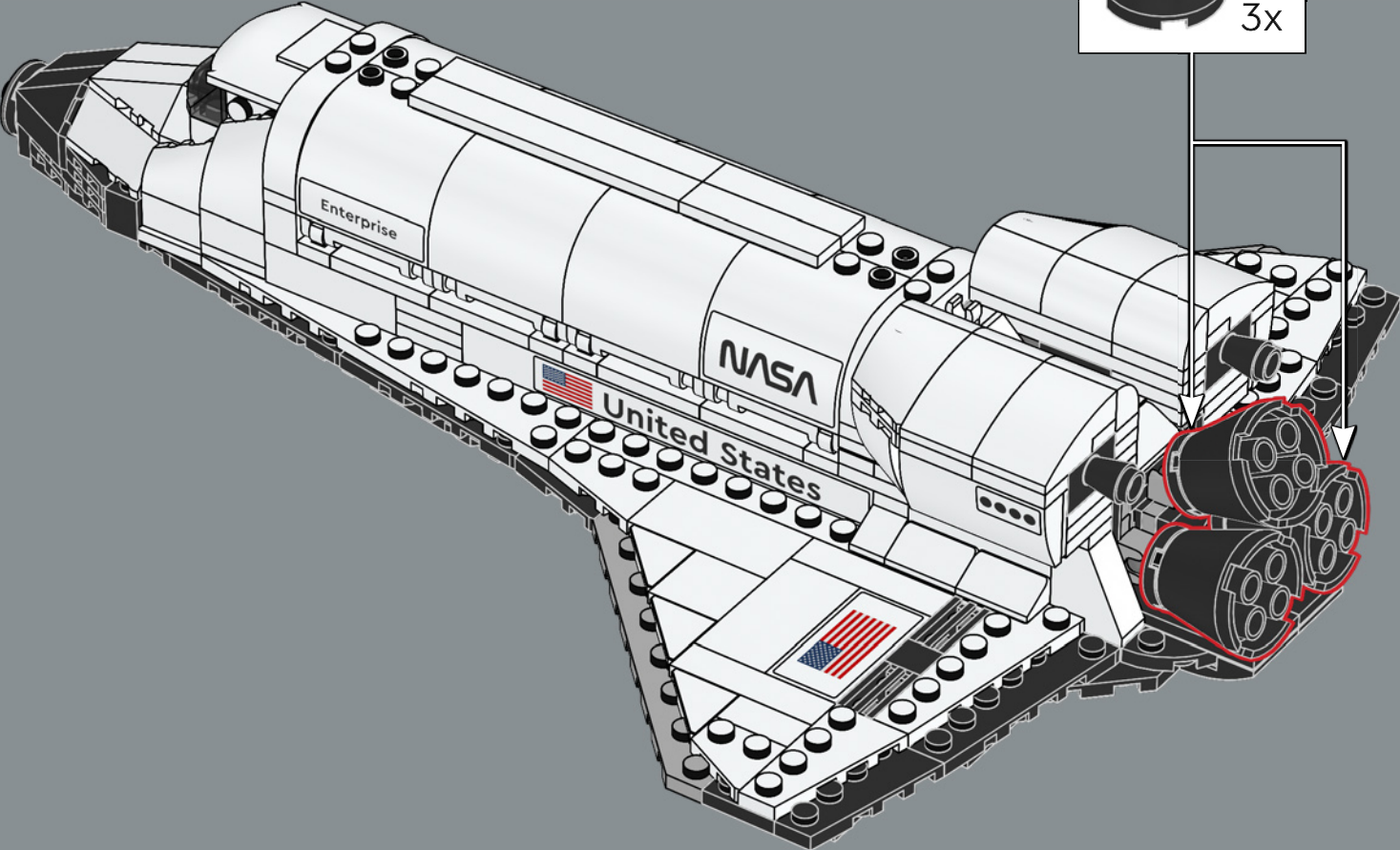
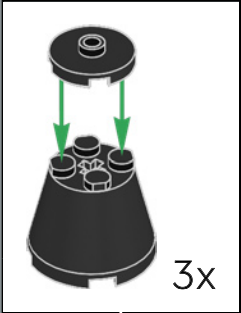


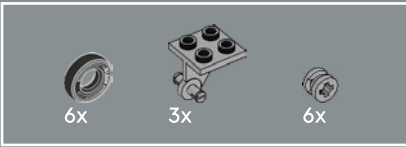
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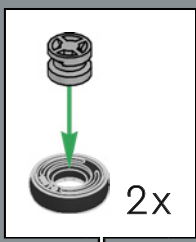
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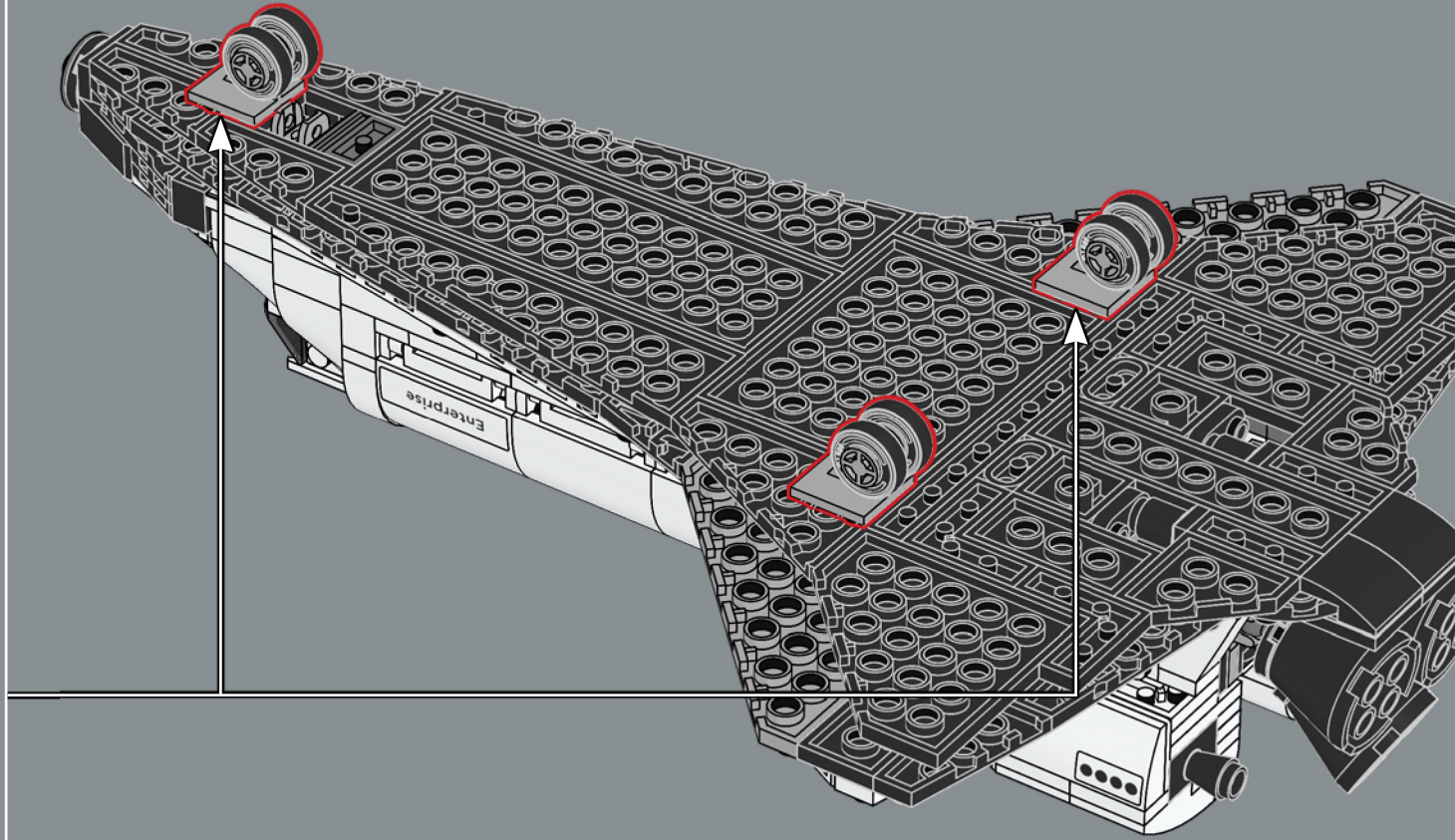
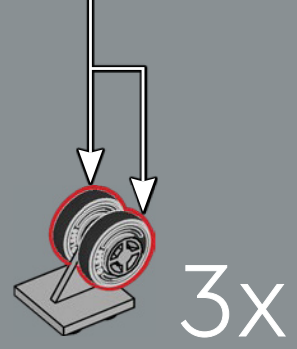


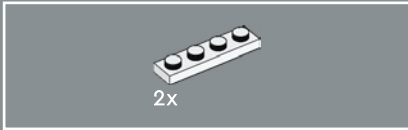
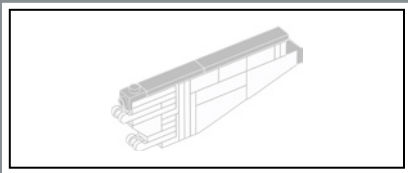
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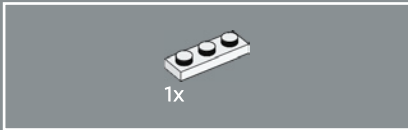
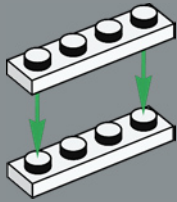


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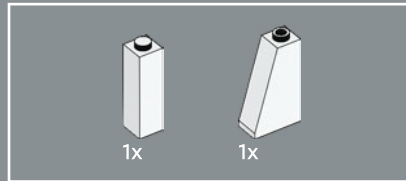
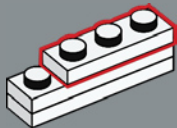




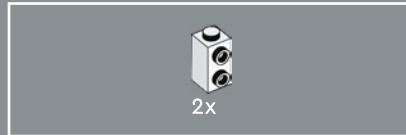
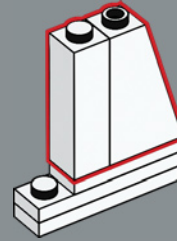
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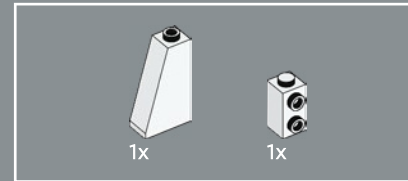
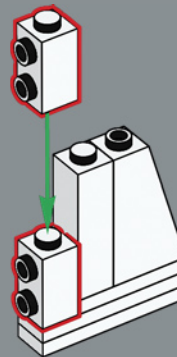
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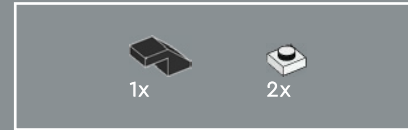
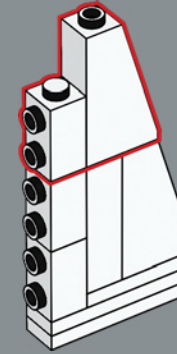
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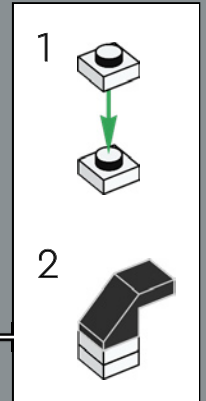
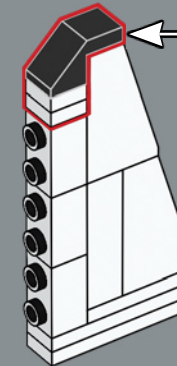
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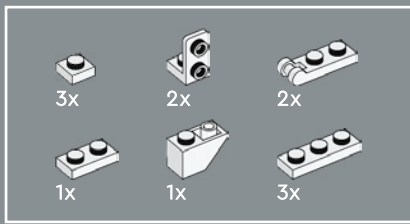


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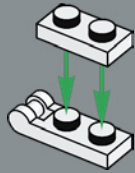
114



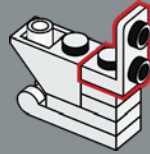


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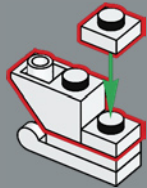
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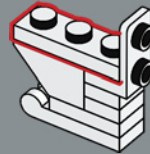
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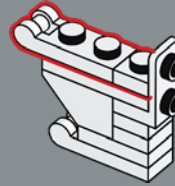
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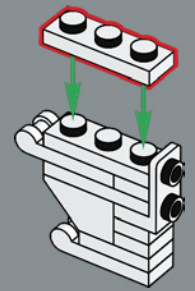
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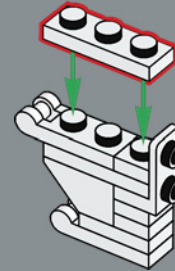
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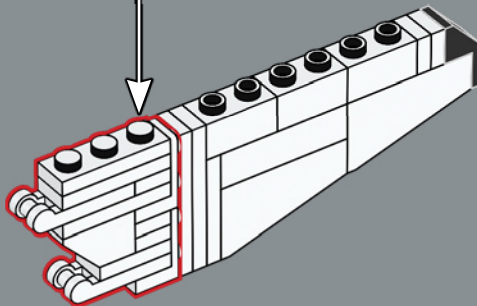
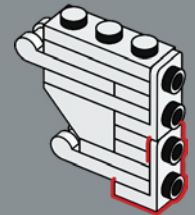
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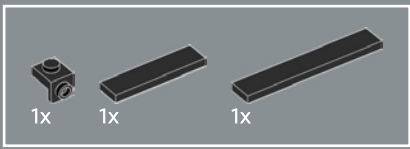


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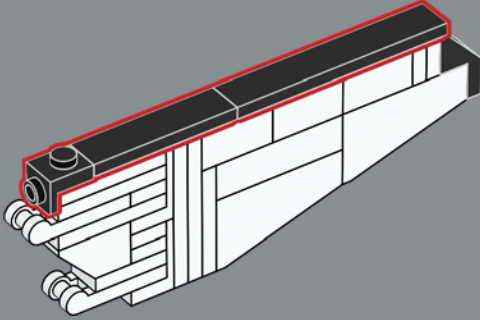


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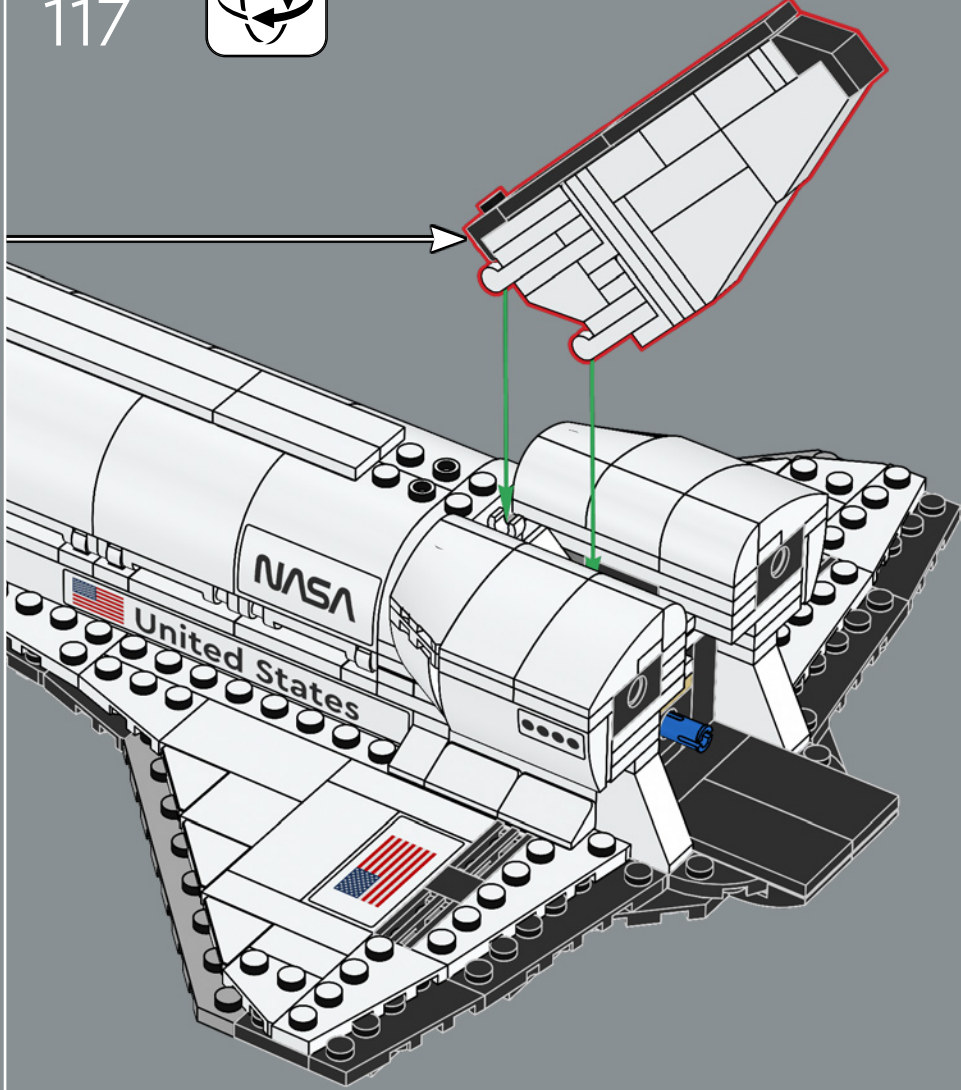


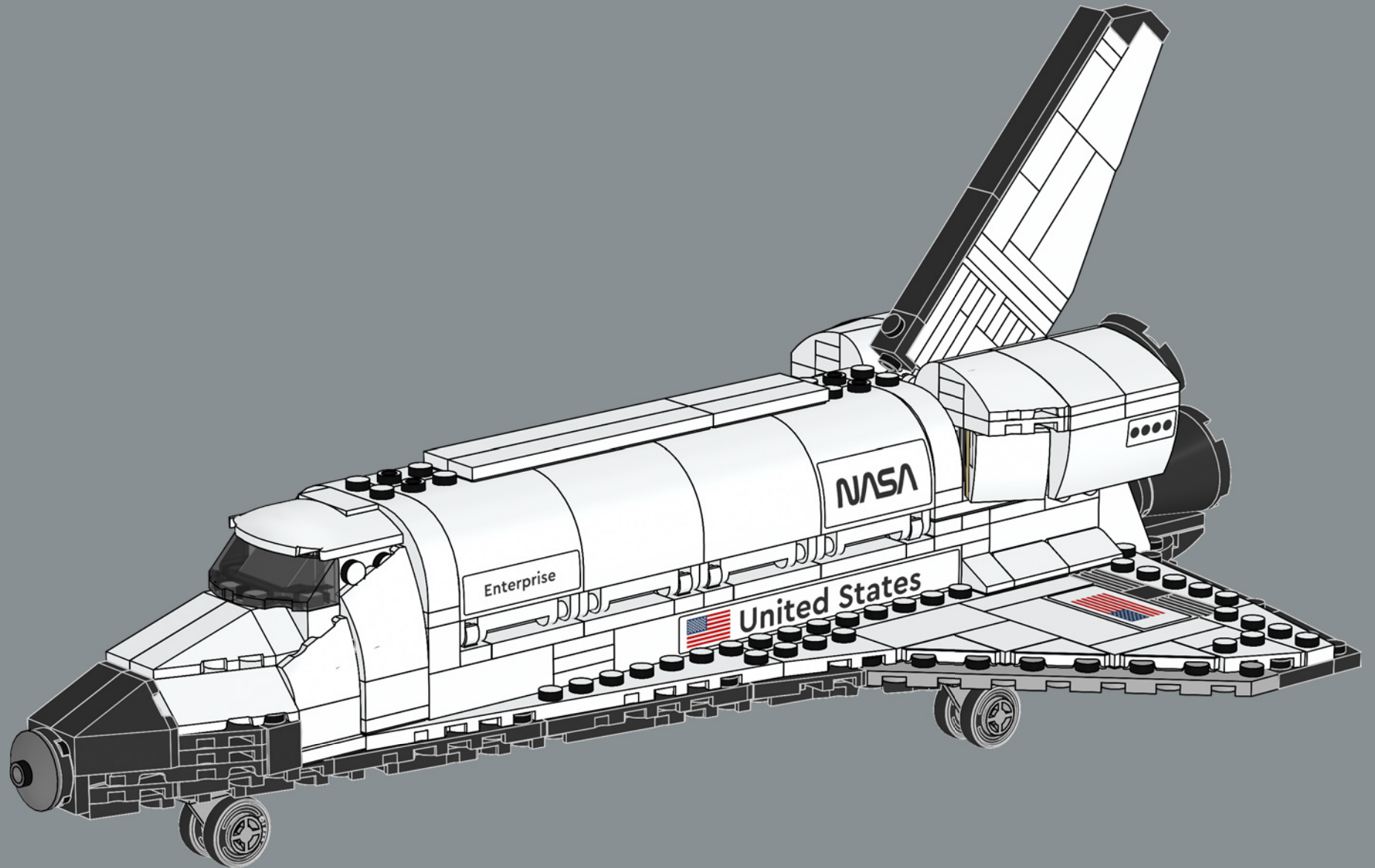


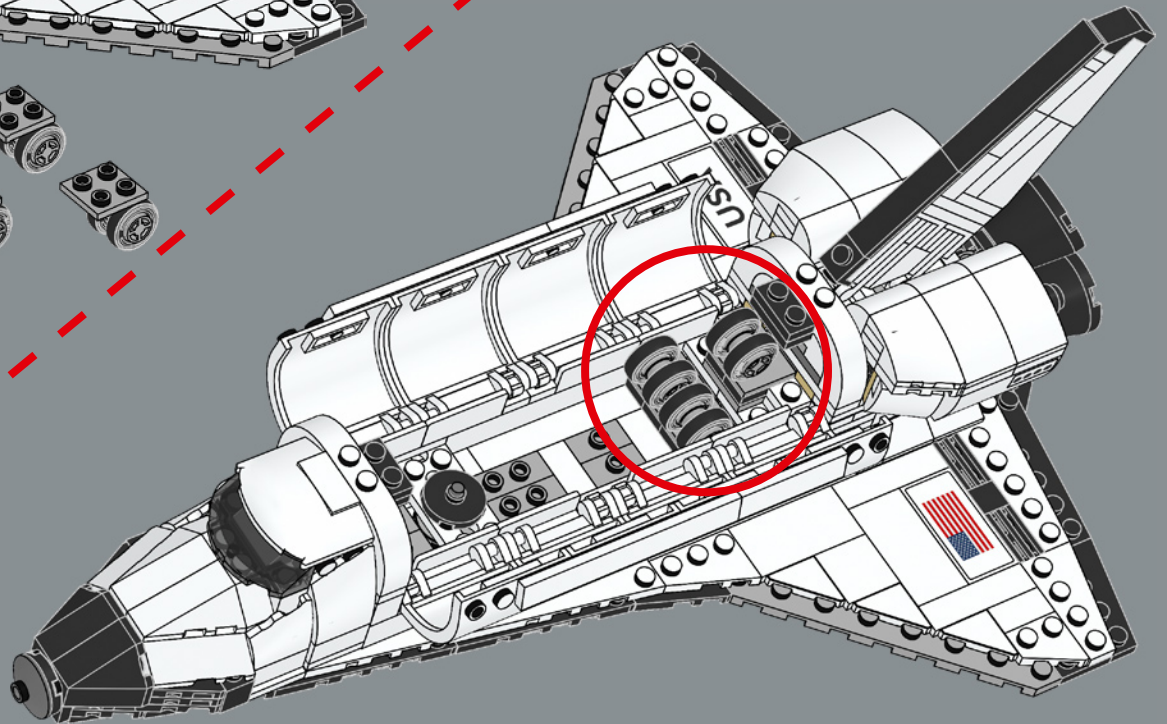
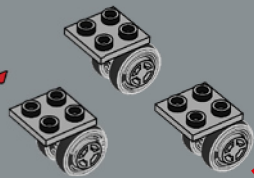
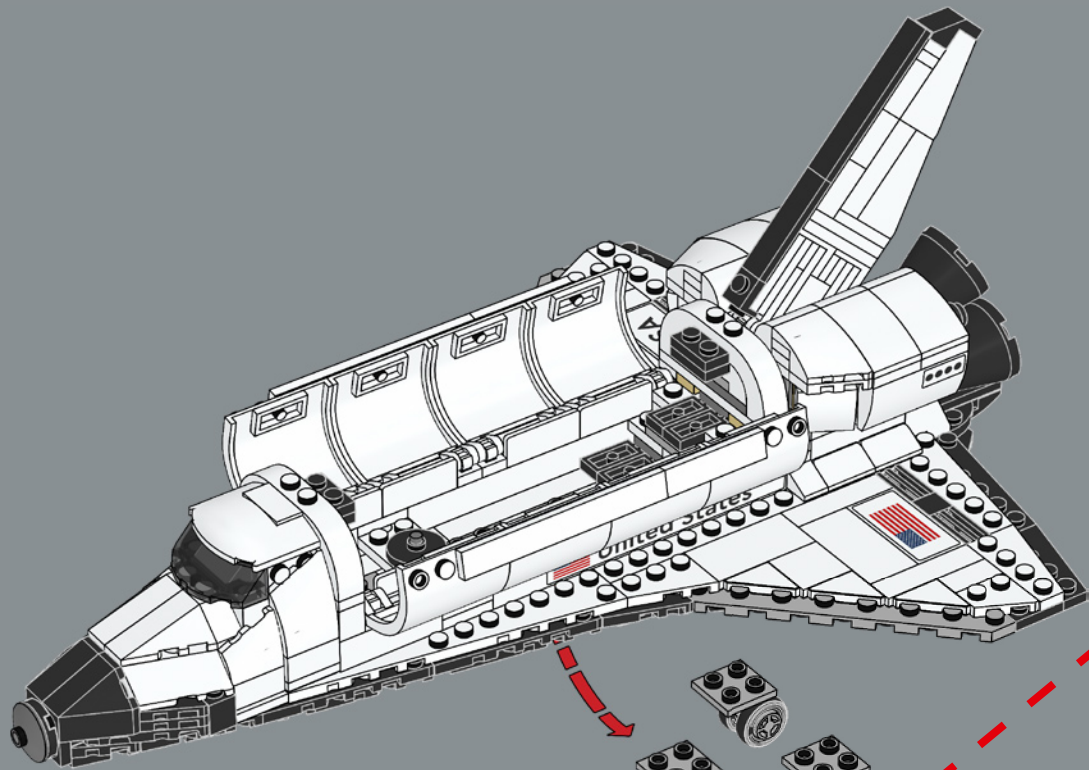
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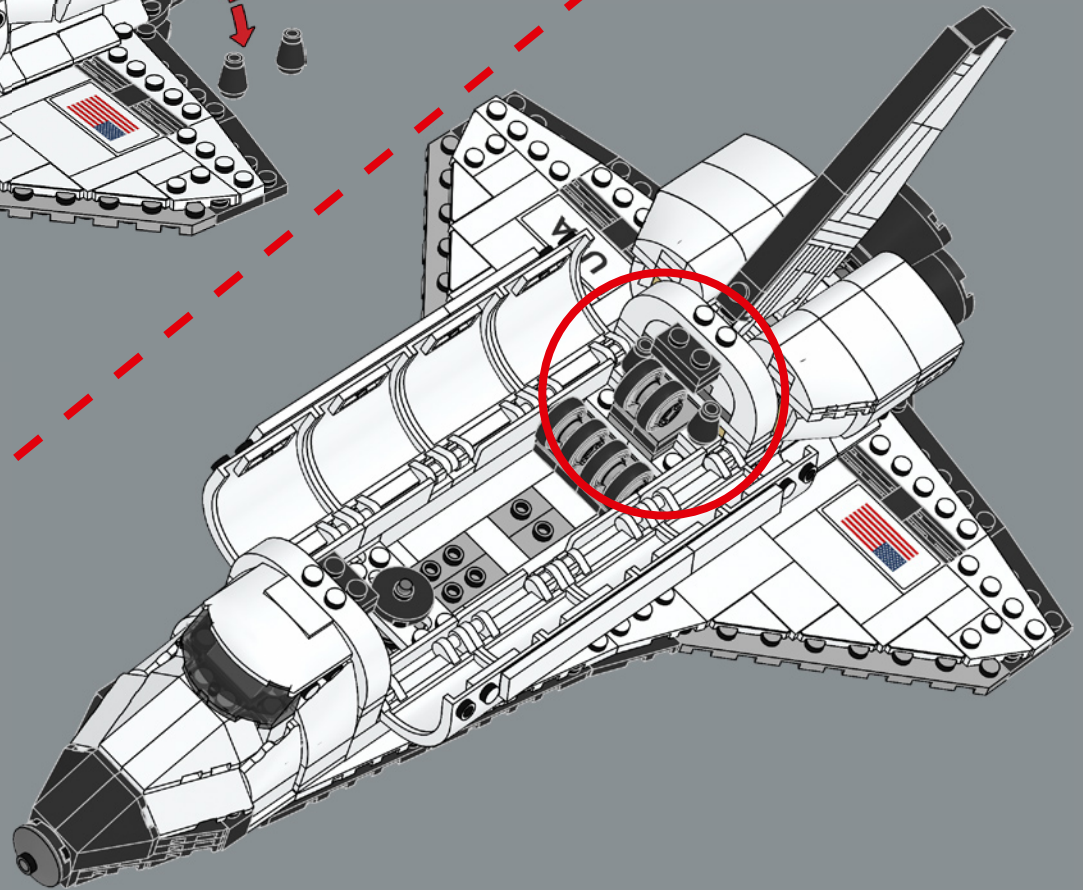
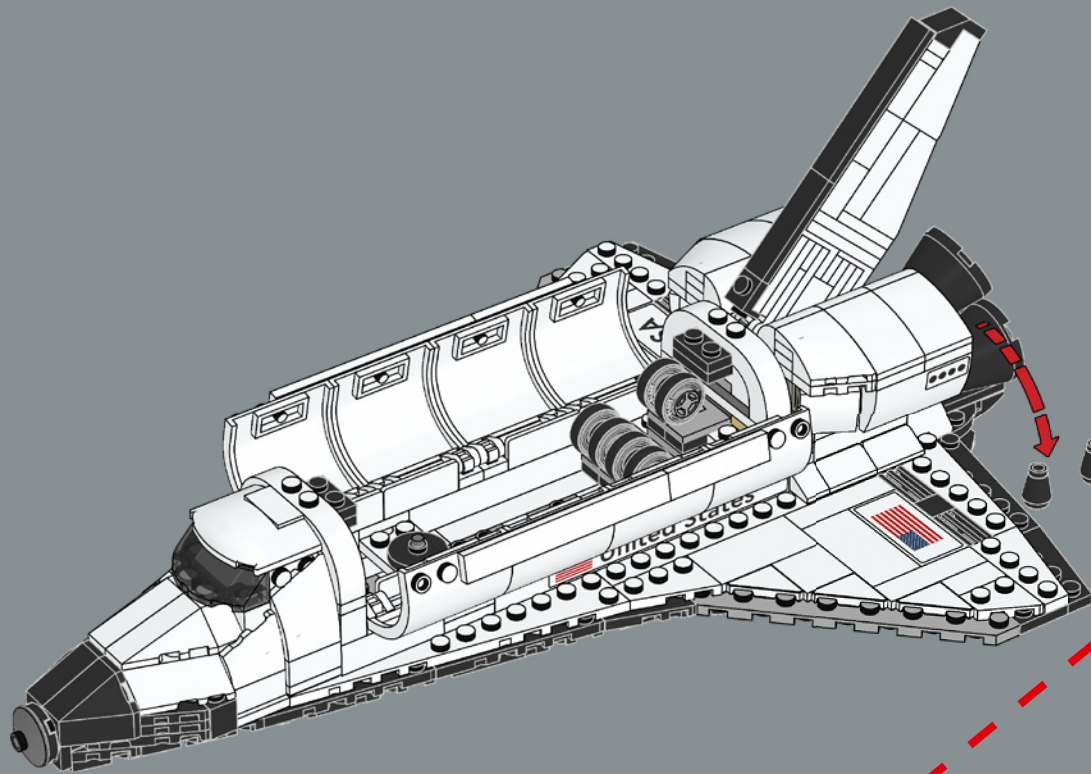


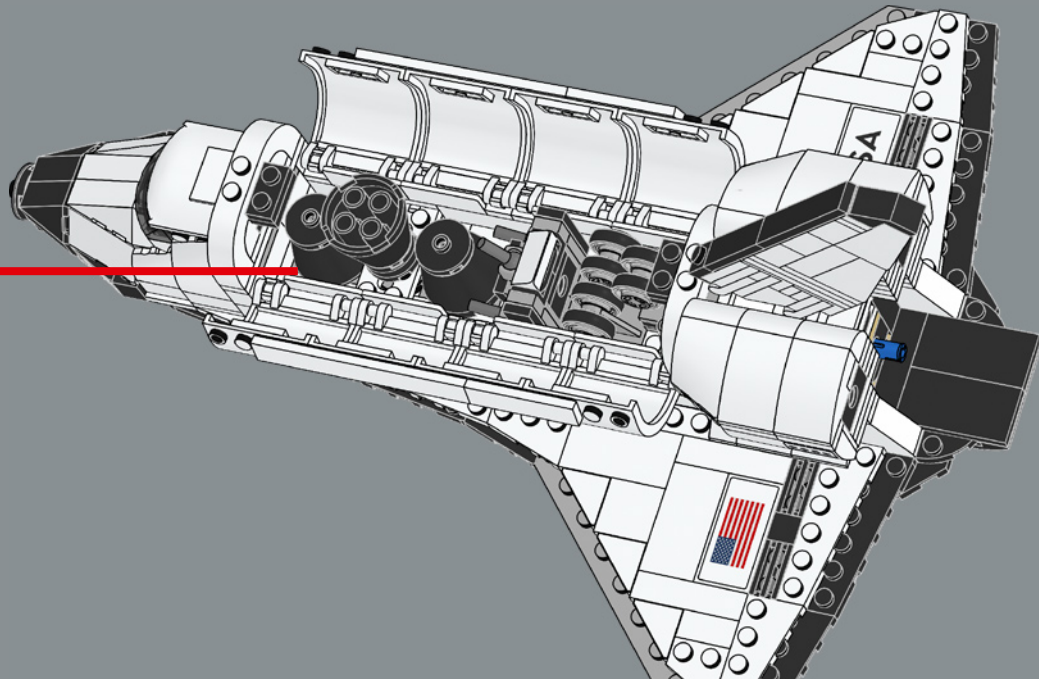
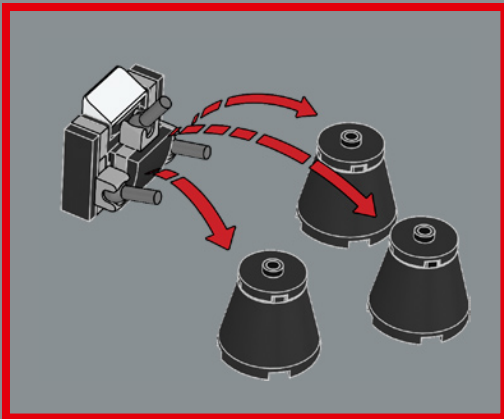
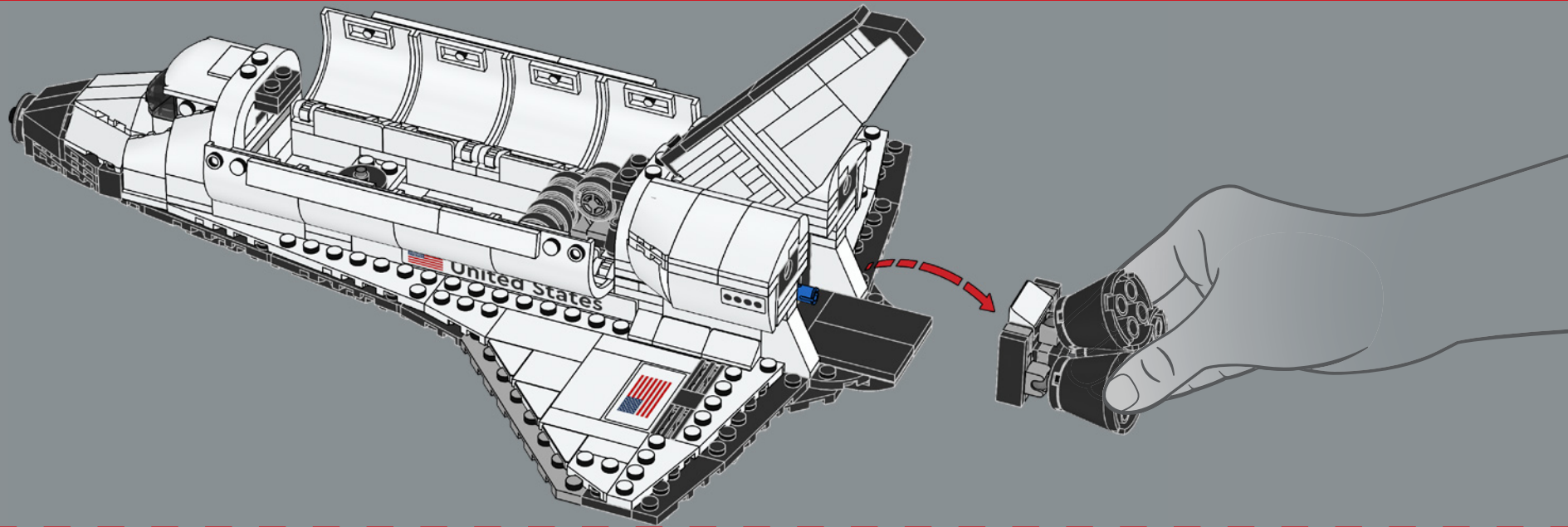
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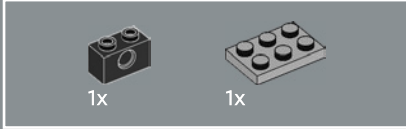
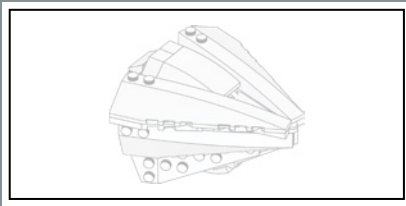




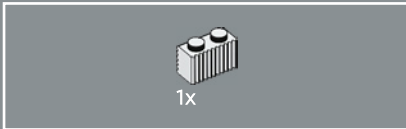
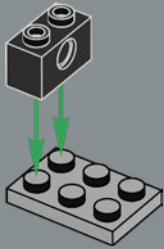




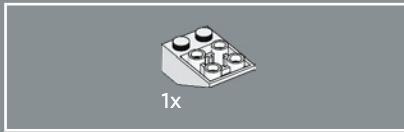
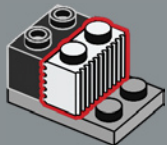




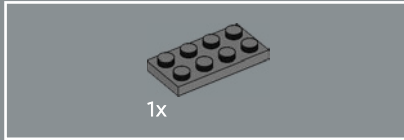
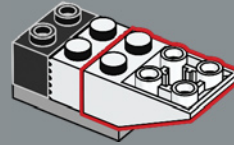
118



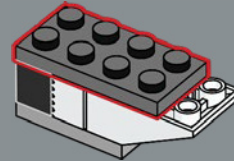
119



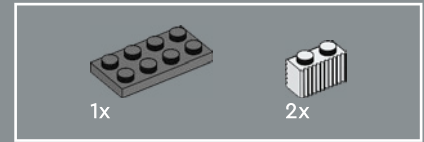
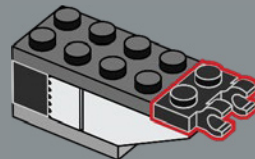
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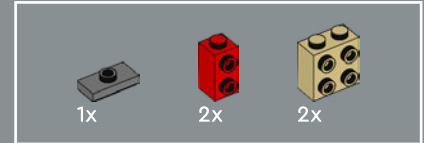
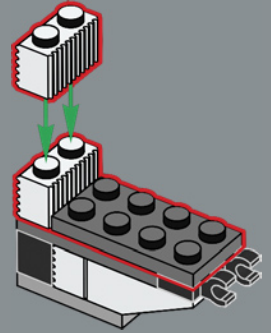
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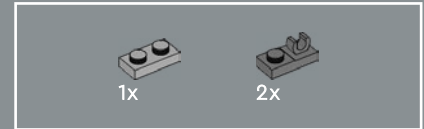
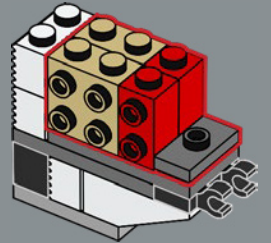
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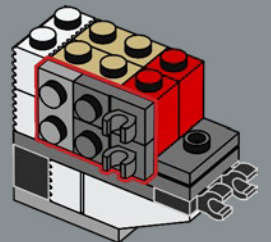
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124



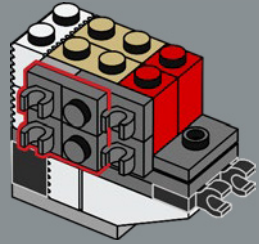
125





2x

126

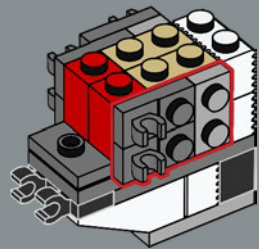


1x



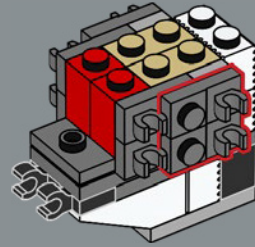
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127



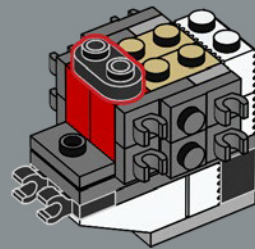
2x

128



1x

129



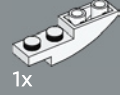
1x



1x

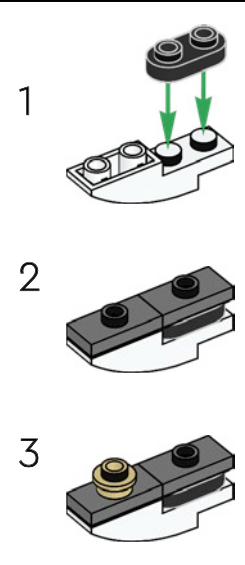


2x



1x

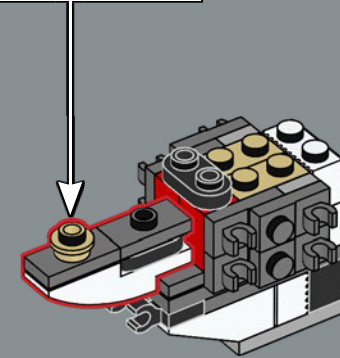
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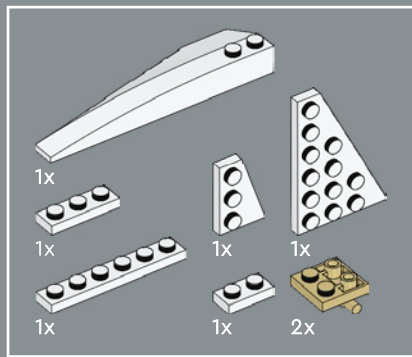


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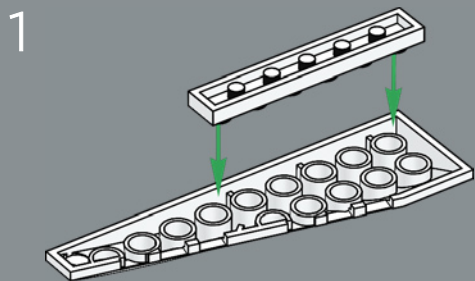
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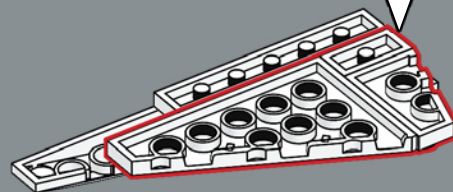
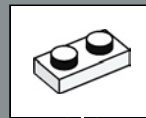


131

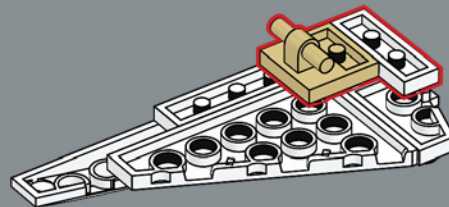


1

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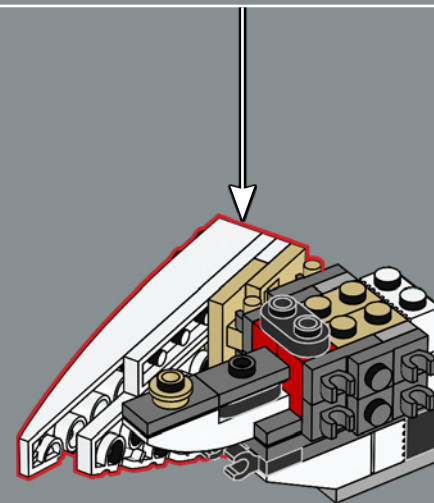
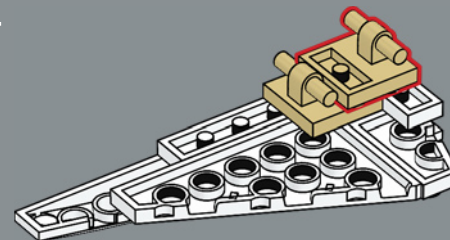


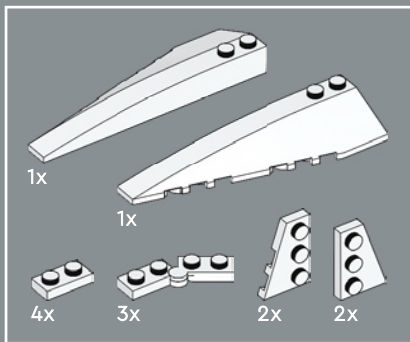
3



Der Heckkonus, der die Triebwerke am Original-Spaceshuttle abdeckte, wurde beim Transport angebracht, um die Aerodynamik zu verbessern. Die LEGO® Version ist dieser Form nachempfunden und ist nicht hohl.

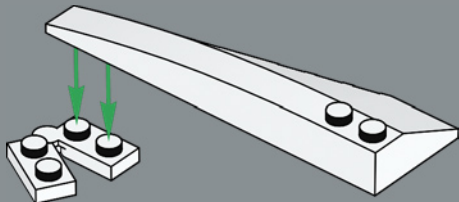
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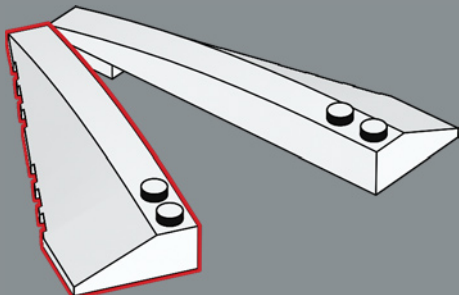


133

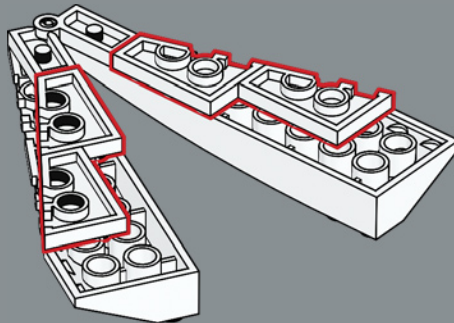
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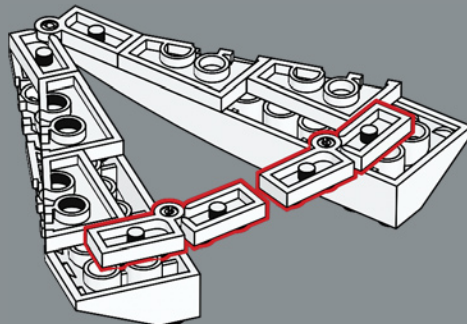
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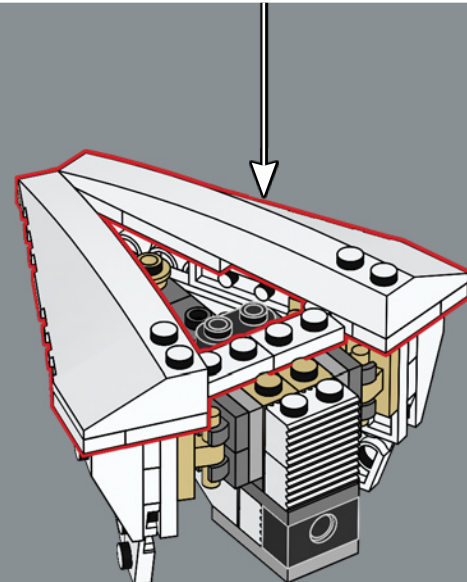
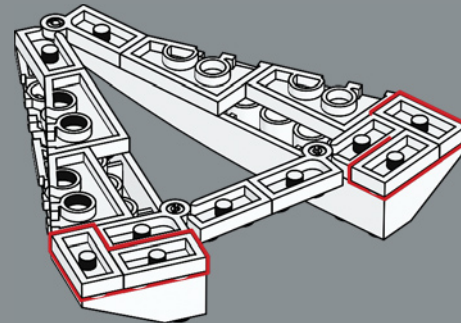
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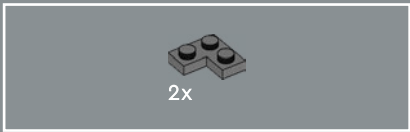


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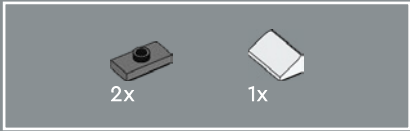
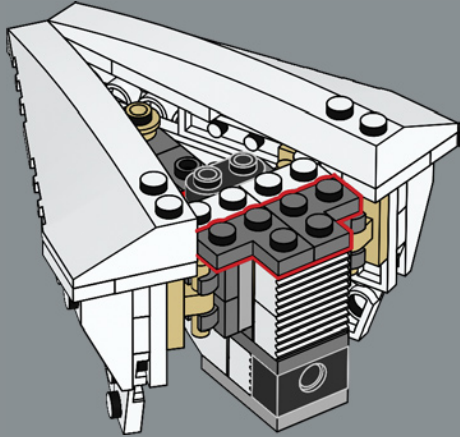


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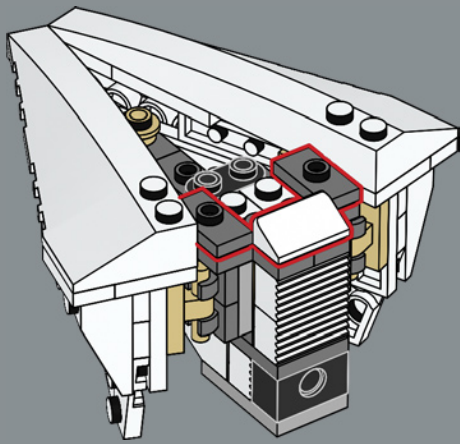




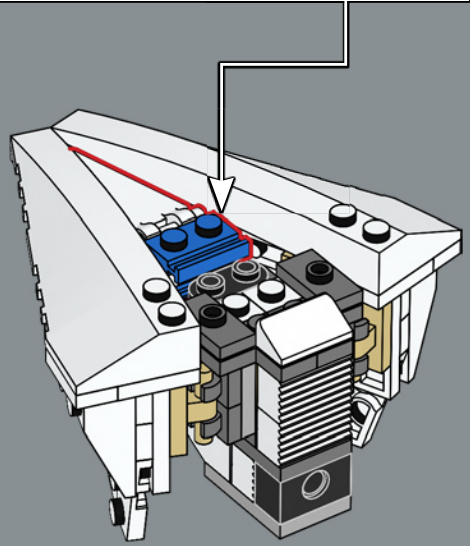
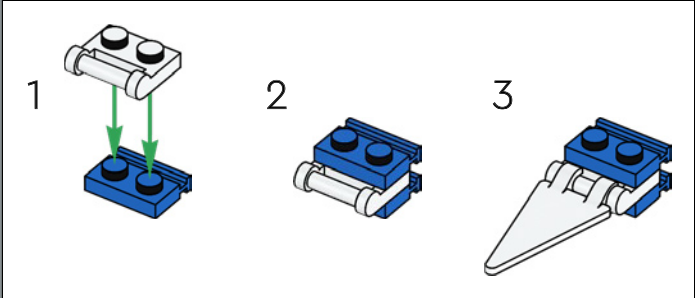
134

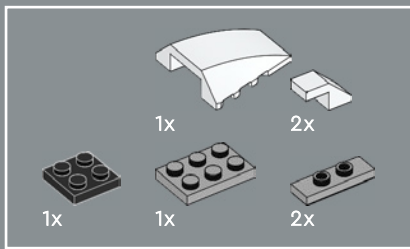


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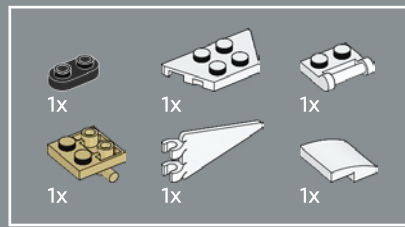
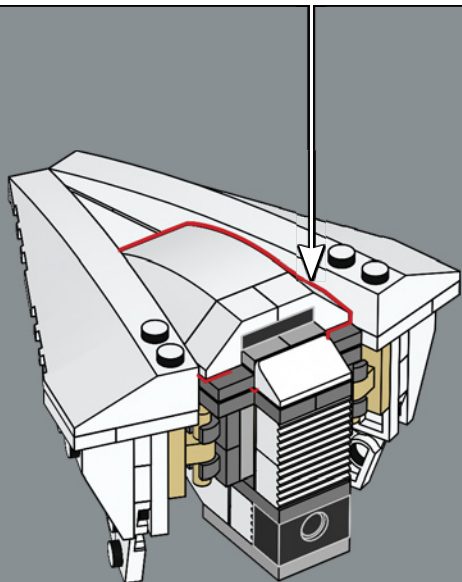
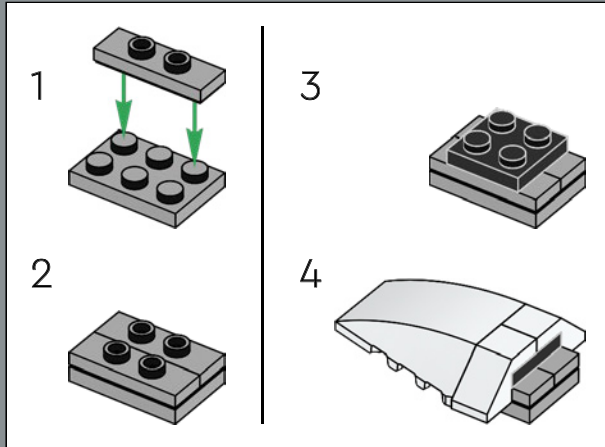


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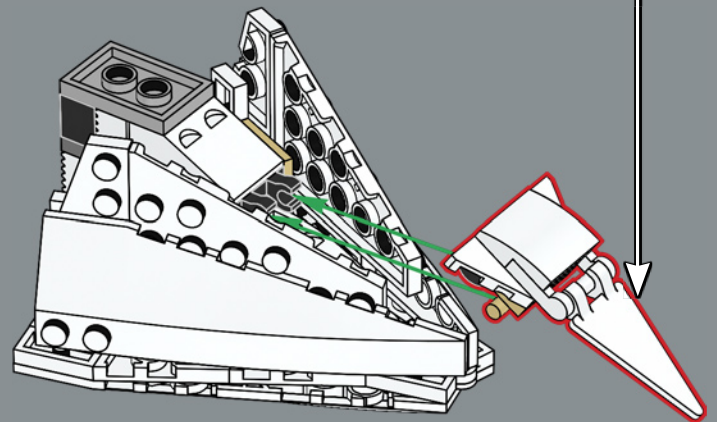
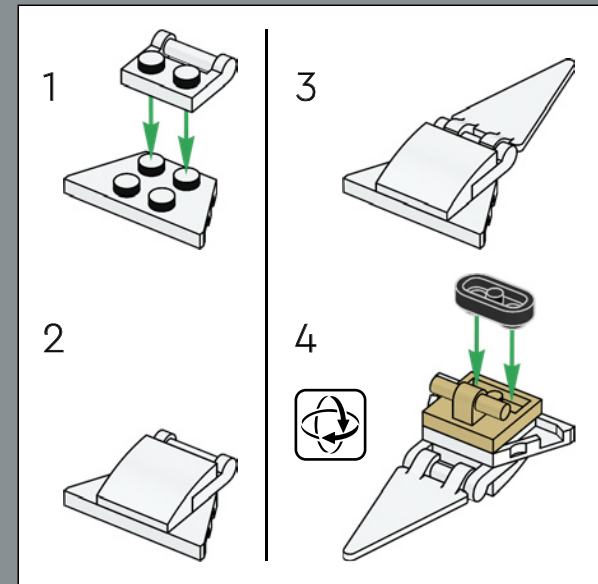




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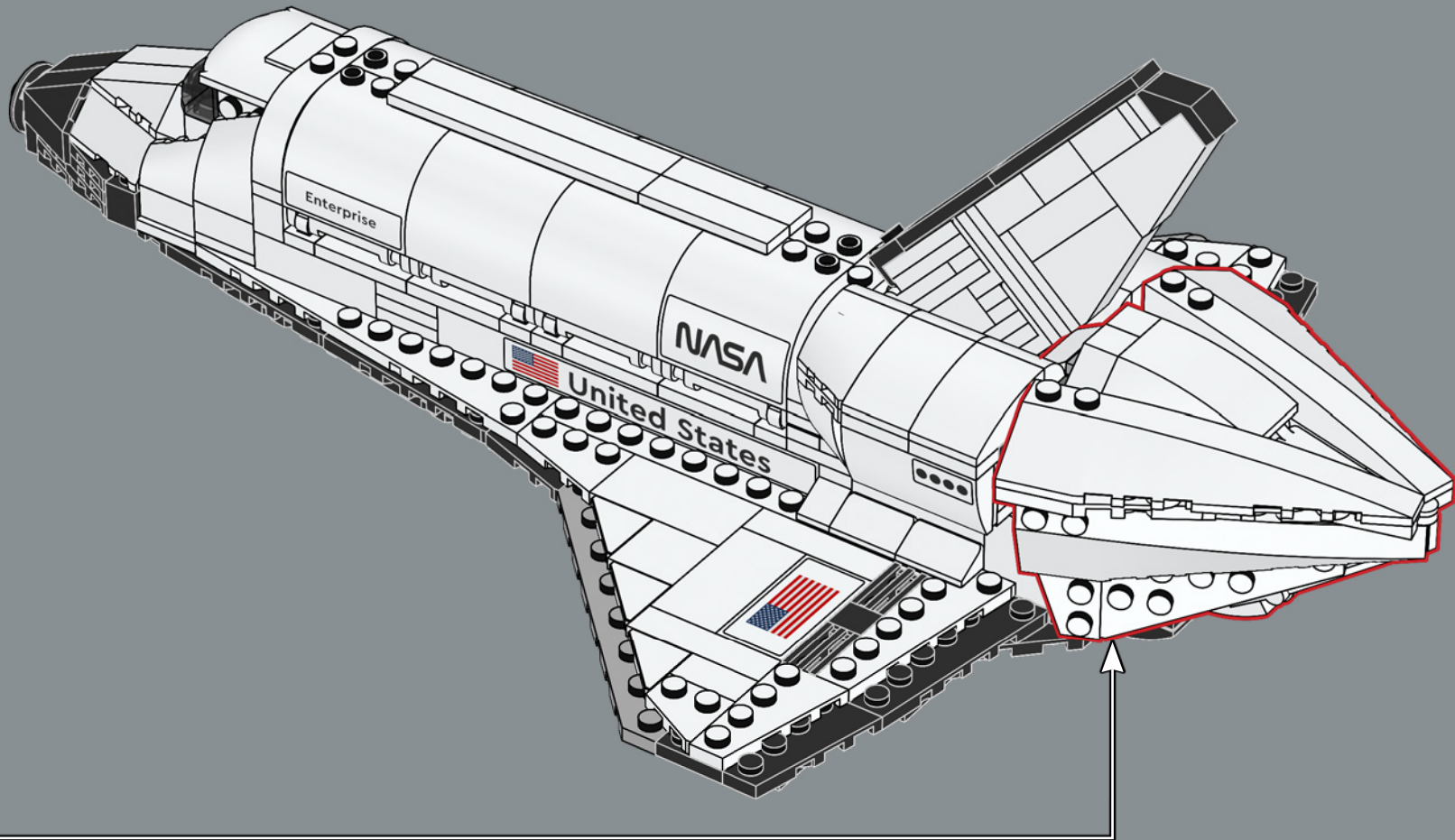


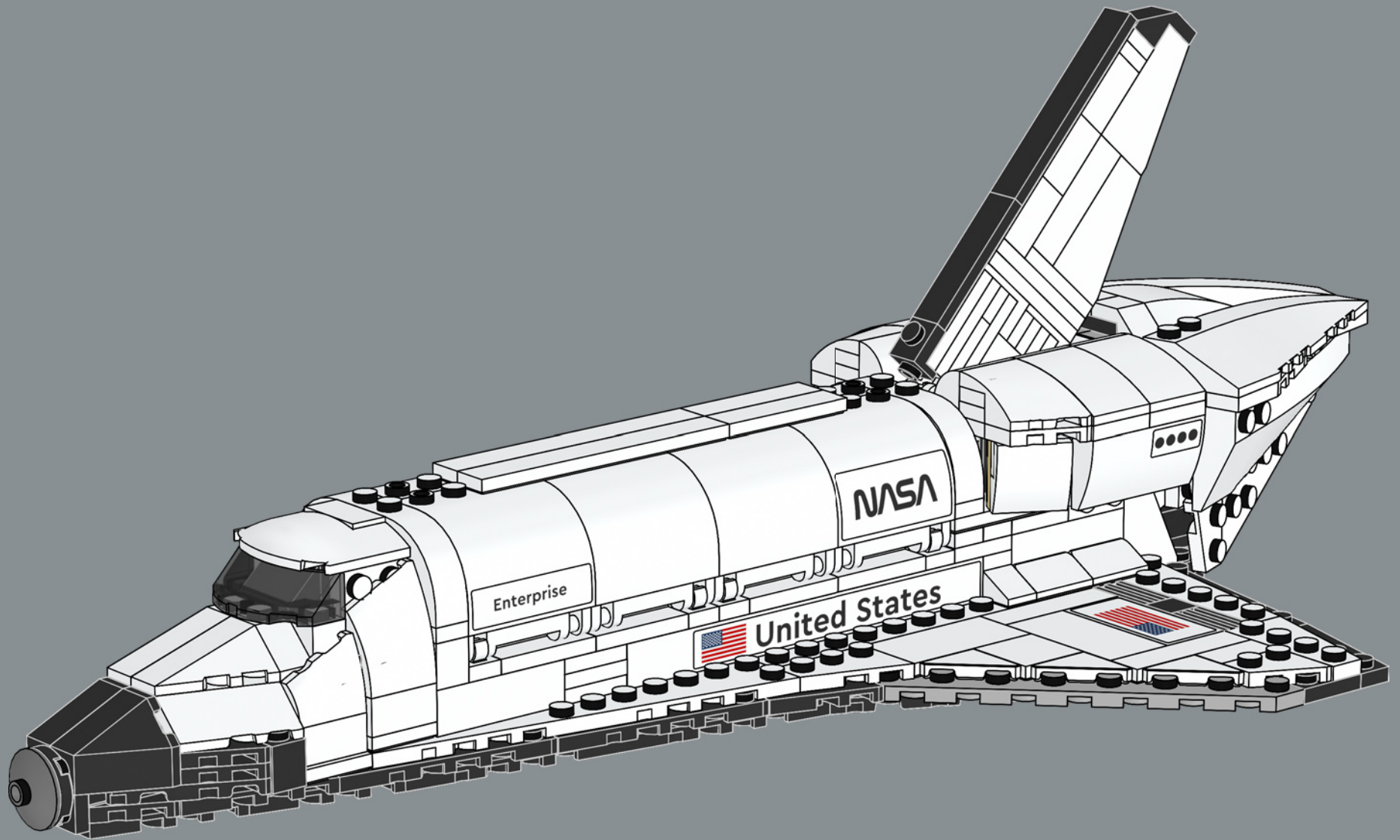
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Die *Enterprise* hat fünf bemannte Testflüge absolviert. Die ersten drei dieser Testflüge wurden mit Heckkonus durchgeführt. Bei den letzten beiden Testflügen waren stattdessen Triebwerkimitate installiert.

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