



Камов Ка-32

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ROBOTIC EDUCATION



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Мечты о полете

Люди с давних времен мечтают о полете. Возможность свободно перемещаться в пространстве захватывает. Древнегреческие мифы описывают выдающегося художника и инженера Дедала, который создал искусственные крылья, которые позволяли человеку летать.



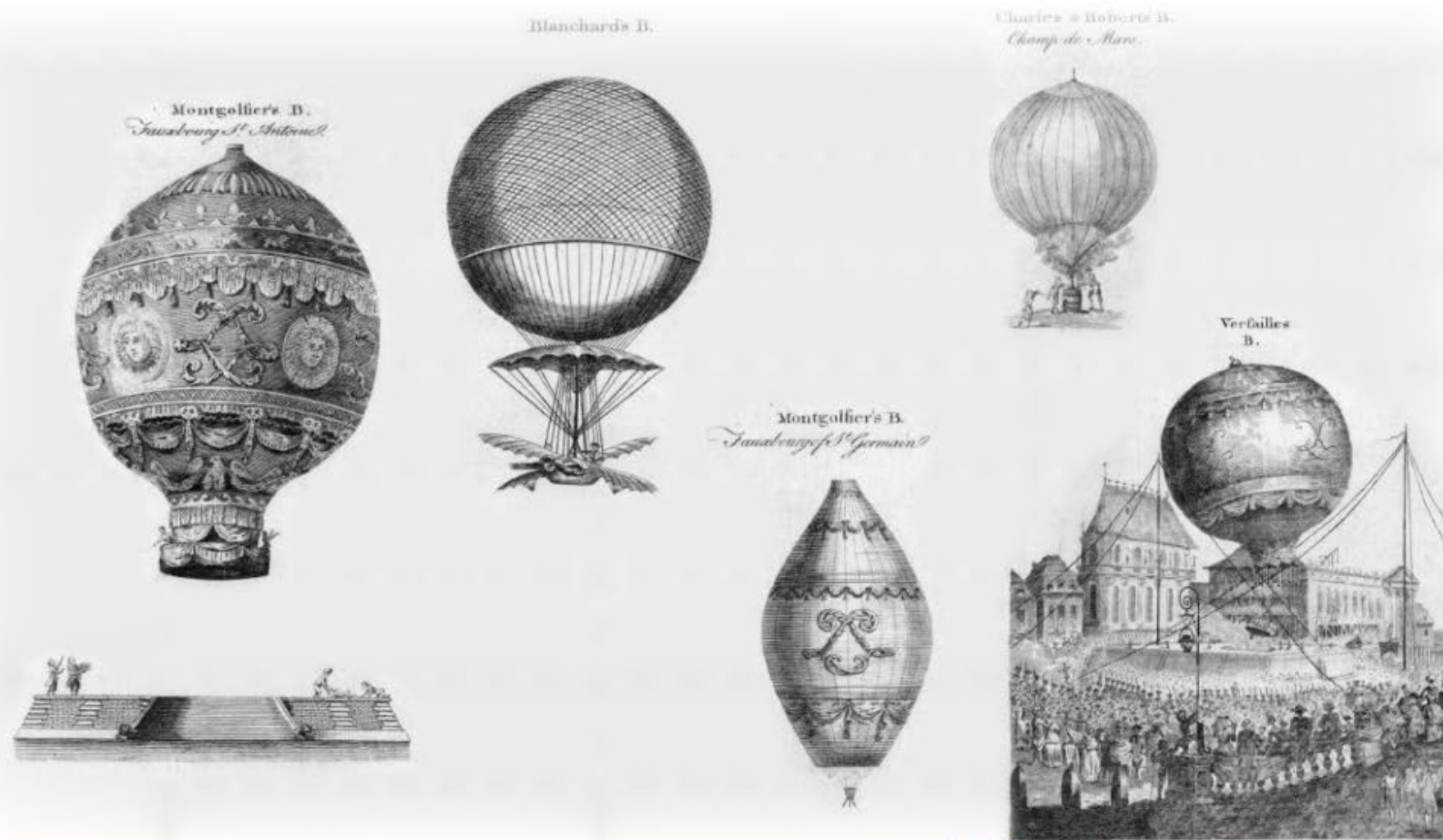
На этой фреске Дедал крепит крылья своему сыну Икару.





Мечты о полете

Первыми поднялись в воздух летательные аппараты легче воздуха. Эти шары, заполненные горячим воздухом, могли поднять даже человека.



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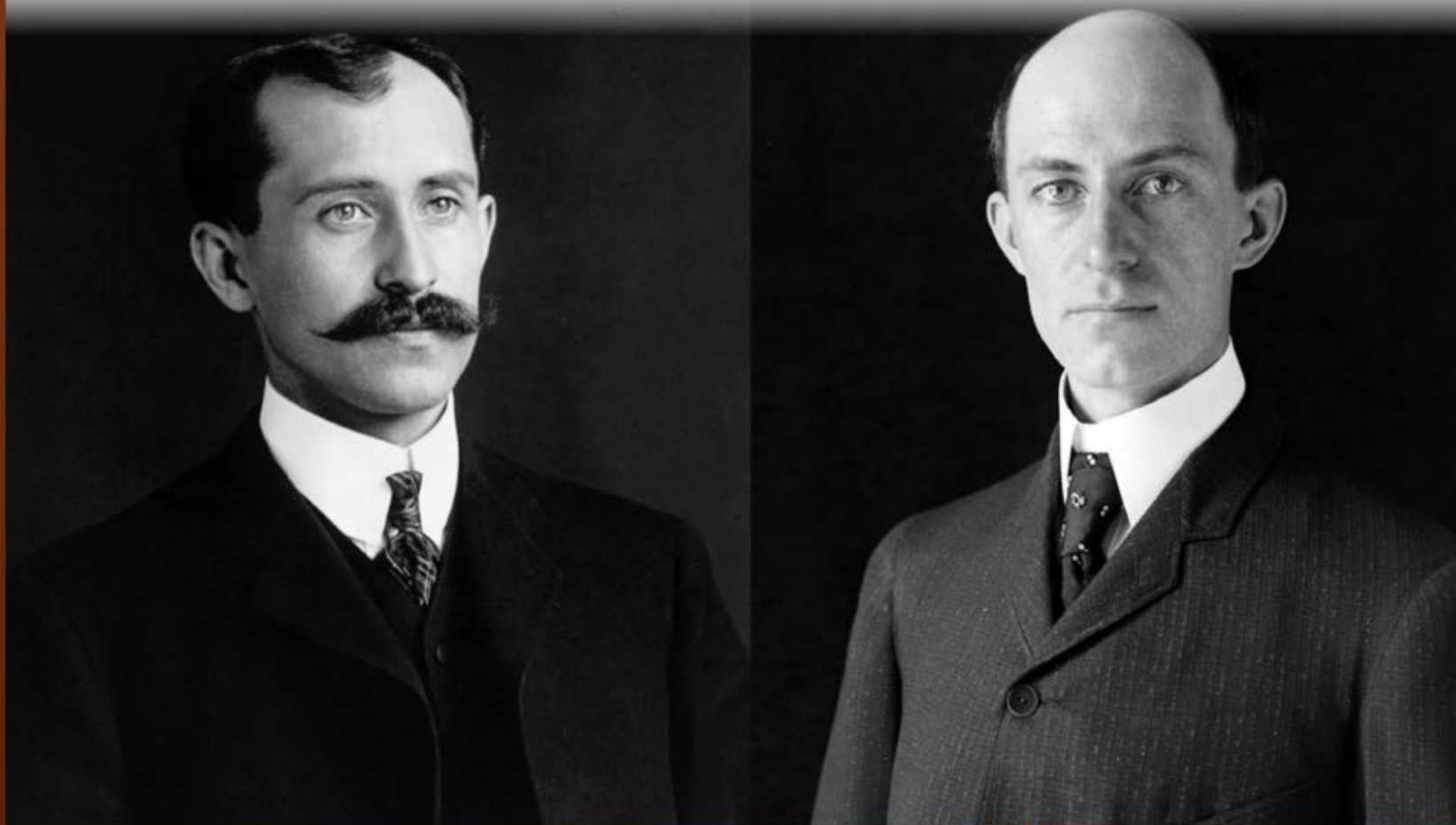




Мечты о полете

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Одним из пионеров авиации тяжелей воздуха, были братья Райт. Они создавали свои самолеты и планеры на стыке 19 и 20 веков.





Самолет братьев Райт

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На фото ниже - первый удачный контролируемый полет на самолете, оборудованном мотором и винтом, которые приводили его в движение.



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Реактивная авиация

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Постепенное развитие авиации в течение следующих 50 лет привело к созданию первого реактивного пассажирского авиалайнера DH.106 «Комета». Первый полет «Кометы» состоялся 27 июля 1949 года





Ракетостроение

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Но мечты людей не ограничиваются только атмосферой Земли и полетами в ее пределах. Следующий шаг - покорение космоса и полеты к соседним планетам Солнечной системы, а затем - и дальше.



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Обсудите!



Какие летательные аппараты вам нравятся
больше всего?
На каких из них вы летали?



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Вертолеты

Эти машины также тяжелее воздуха. Взлетают они благодаря вращению винтов. Лопасты винтов имеют форму крыла, поэтому они создают подъемную силу при движении сквозь воздух



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Вертолеты

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Присмотритесь к этим вертолетам. Чем они отличаются?



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Варианты строения

Чаще всего встречаются два варианта строения вертолетов.



С одним несущим винтом
(красный) и одним рулевым
(синий)



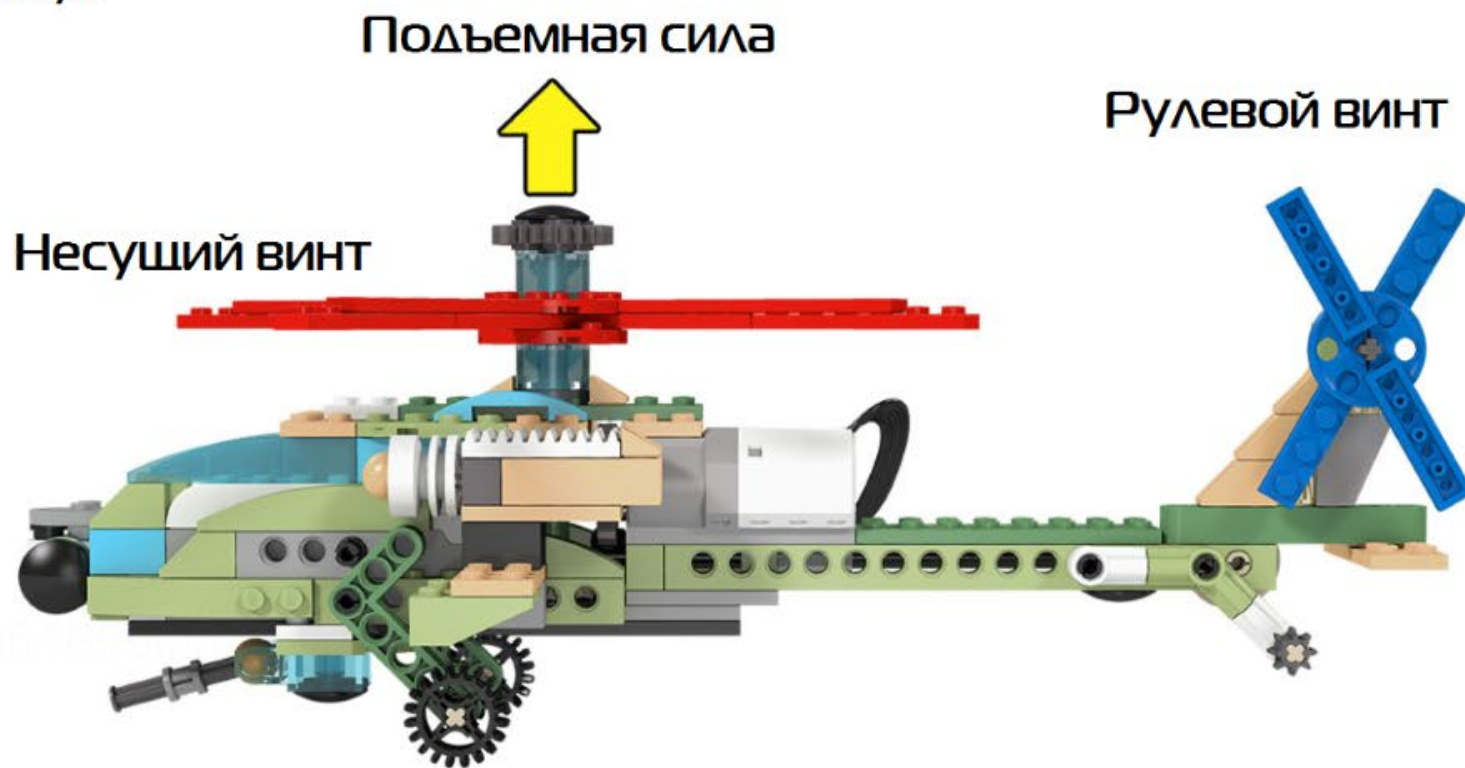
С двумя несущими винтами,
вращающимися в
противоположных направлениях





Почему летает вертолет?

Большинство вертолетов имеют один несущий винт и один рулевой винт. Вращаясь, несущий винт создает подъемную силу, и поднимает вертолет в воздух.





Почему летает вертолет?

В вертолетах с соосной схемой размещения несущих винтов силы, вращающие вертолет, компенсируются. Благодаря этому в таких вертолетах можно отказаться от хвостового винта. Такая конструкция более сложная, но она более эффективна, позволяет строить более быстрые и маневренные машины.





Движение винтов в соосной схеме

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Вертолет Ка-32

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Вертолет Ка-32, изображенный на фото ниже, построен по соосной схеме несущих винтов. Это означает, что он имеет два винта, вращающихся в противоположных направлениях



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Вертолет Ка-32

Ка-32 - это средний транспортный вертолет, построенный по соосной схеме, имеющий очень широкий спектр применений:

- ▶ Перевозка пассажиров или транспортировка больных
- ▶ Эвакуация людей из горящих зданий во время борьбы с огнем
- ▶ Транспортировка грузов на внешнем подвесе
- ▶ Строительно-погрузочные работы в условиях, где доступ любой другой техники невозможен
- ▶ Разведка ледовой обстановки и поисково-спасательные операции с морским базированием





Встречайте Ка-32!

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Это роботизированный вертолет с соосной схемой несущих
ВИНТОВ.



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Особенности конструкции

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Ка-32 имеет один мотор, приводящий в движение оба несущих винта. Смартхаб размещен в передней части робота для равномерного распределения веса.



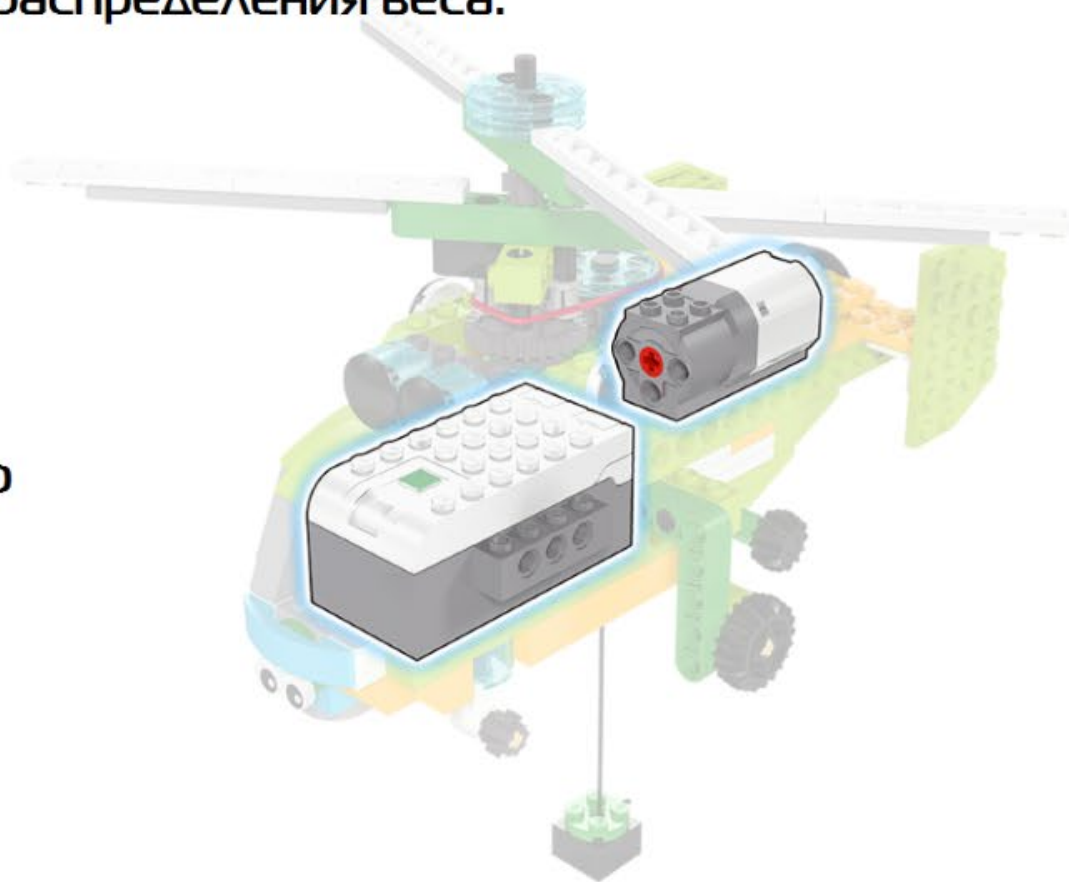
Найдите:



Smart Hub



мотор



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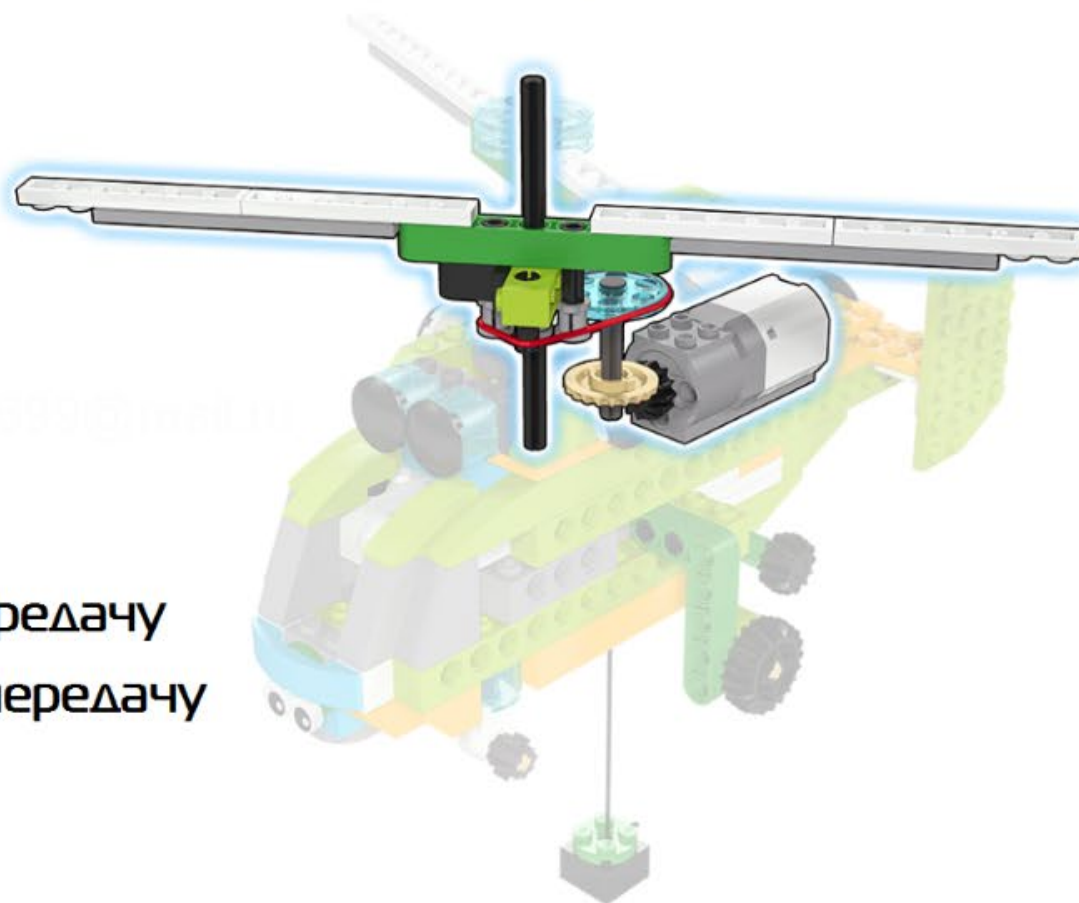
Особенности конструкции

Нижний винт приводится от мотора через угловую и ременную передачу. Поэтому он вращается в том же направлении, что и ось бежевой шестерни



Найдите:

- мотор
- угловую передачу
- ременную передачу





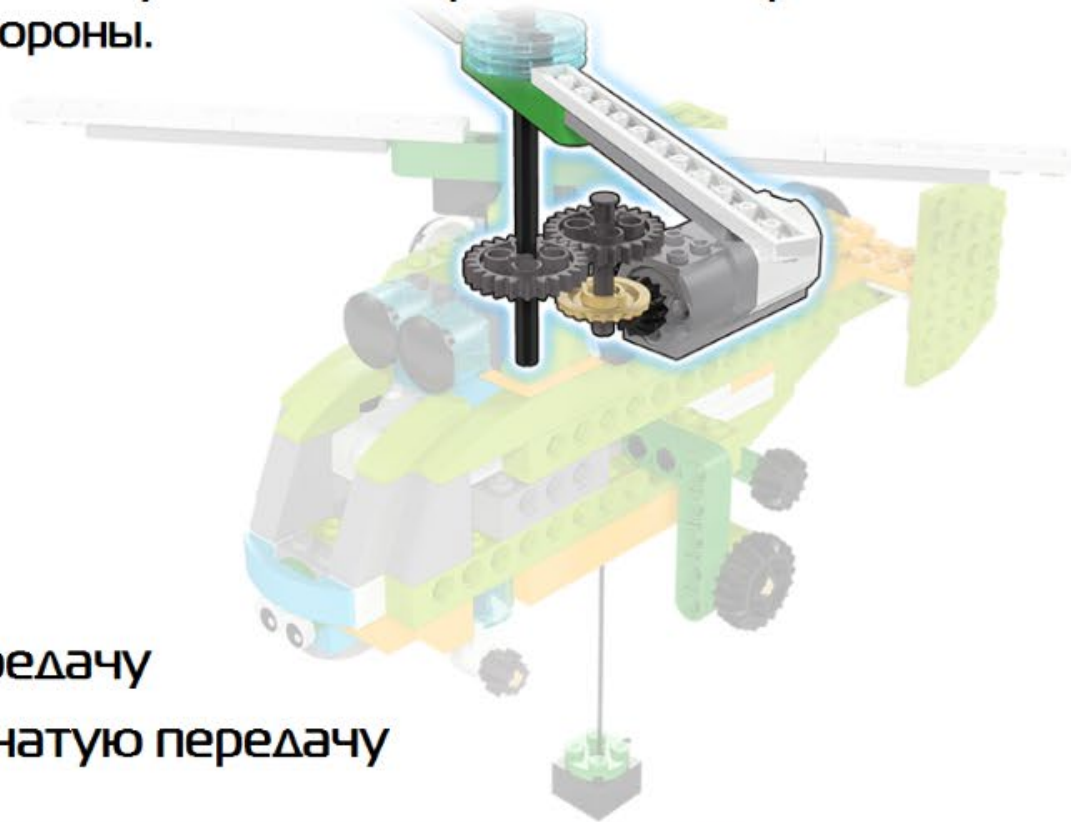
Особенности конструкции

В отличие от нижнего винта, верхний несущий винт приводится через ту же угловую и прямой зубчатую передачу. Зубчатая передача изменяет направление вращения относительно оси бежевой шестерни, поэтому нижний и верхний винты вращаются в противоположные стороны.



Найдите:

- мотор
- угловую передачу
- прямую зубчатую передачу





Особенности конструкции

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Особенности конструкции

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Особенности конструкции

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Постройте робота!

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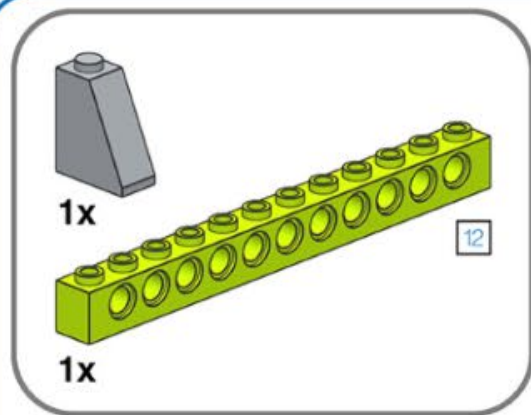
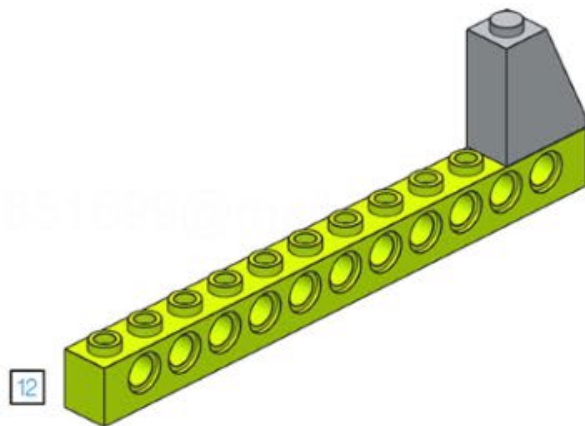
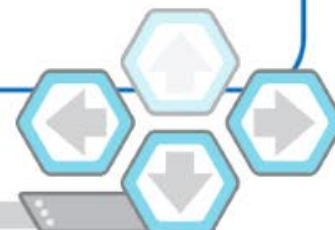
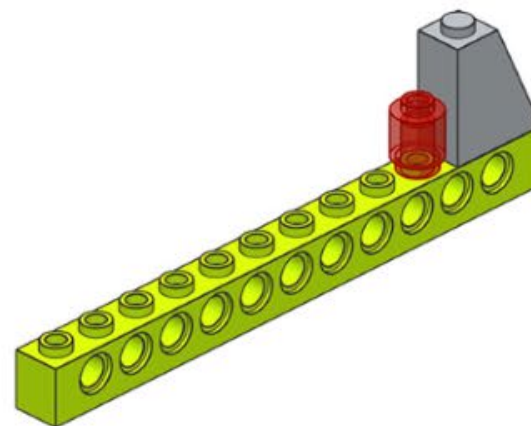


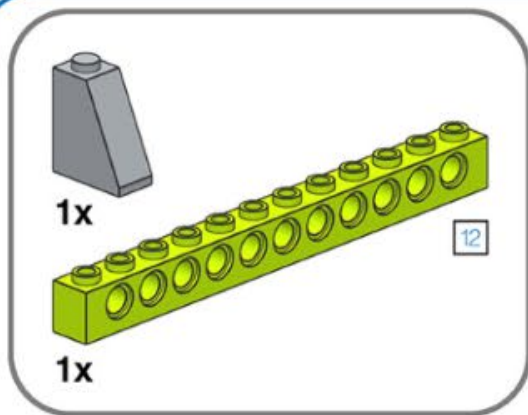
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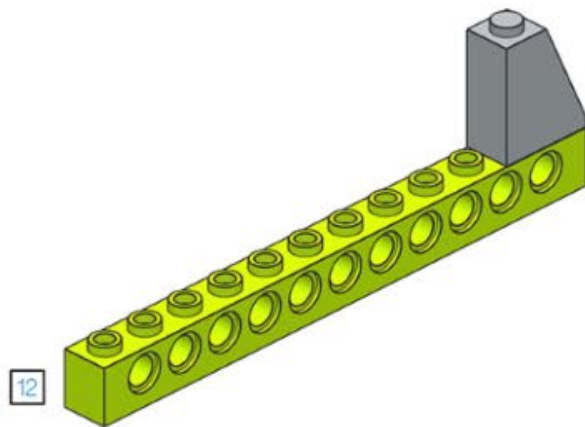
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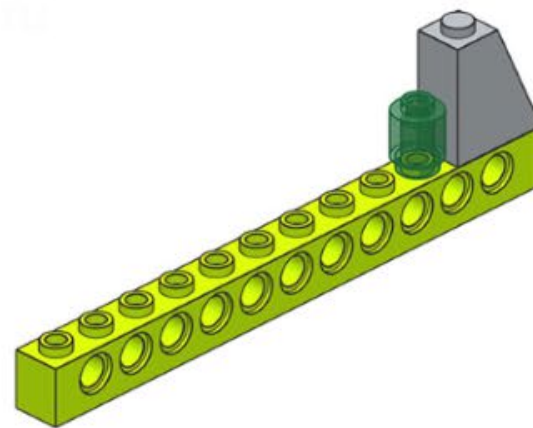
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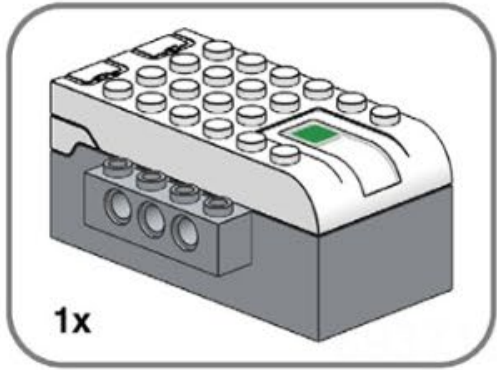


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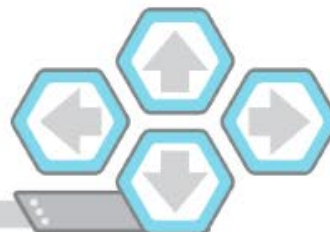
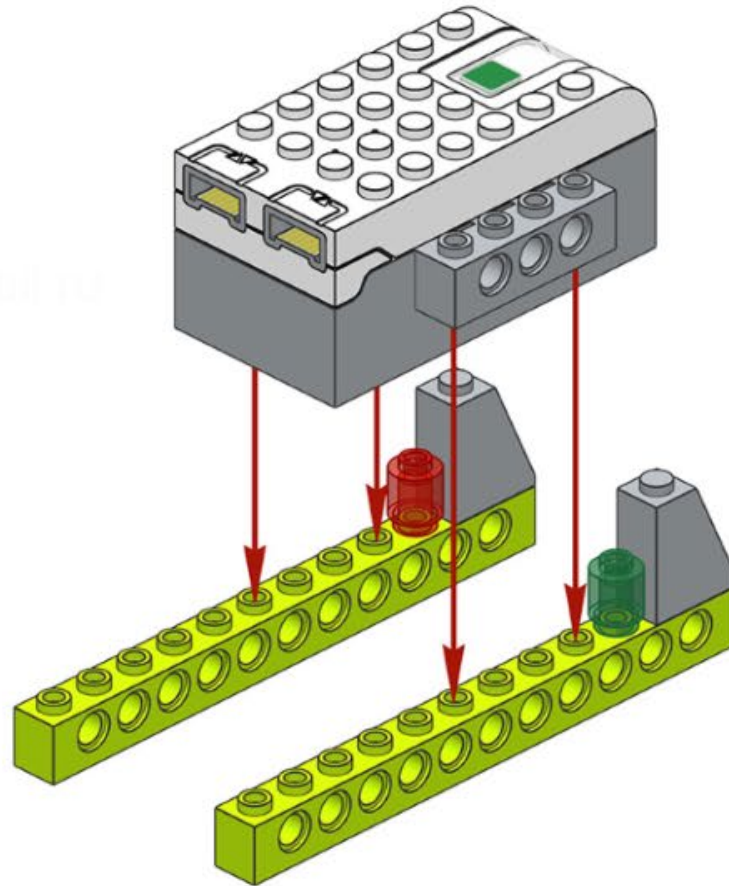


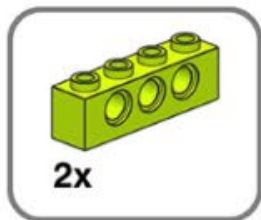
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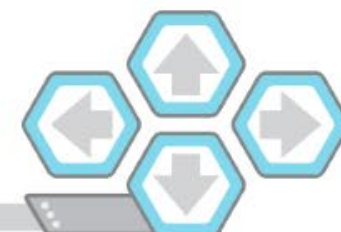
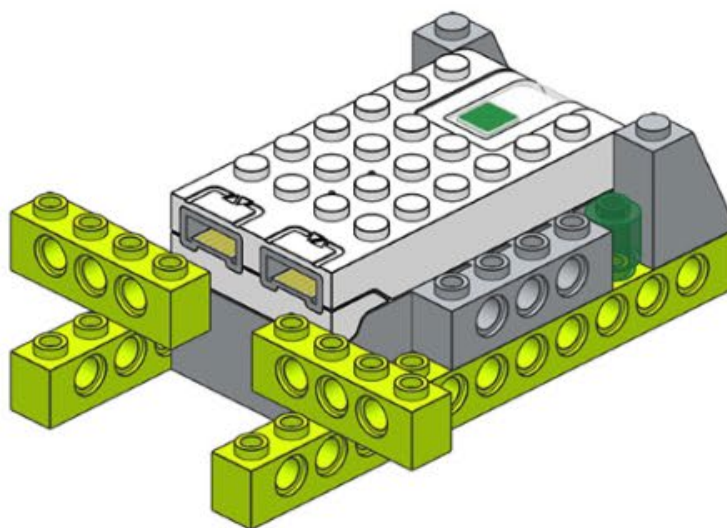


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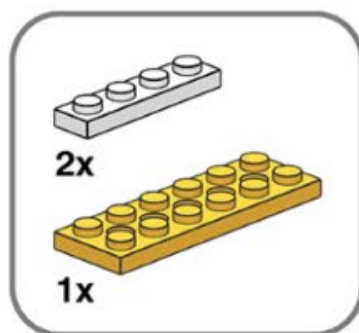
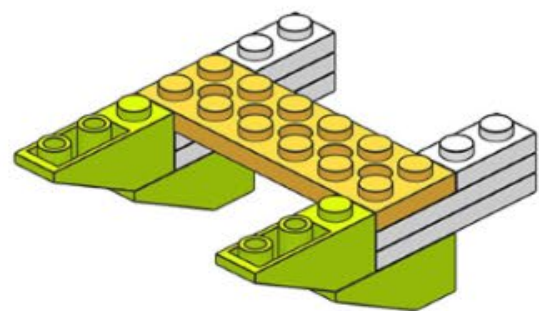




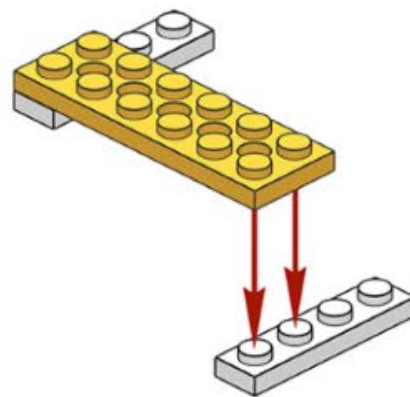
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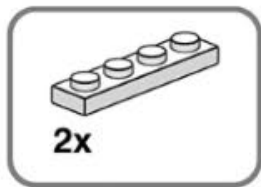


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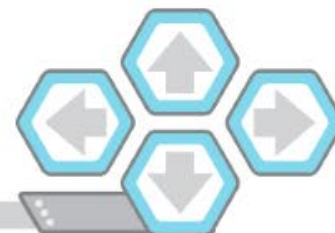
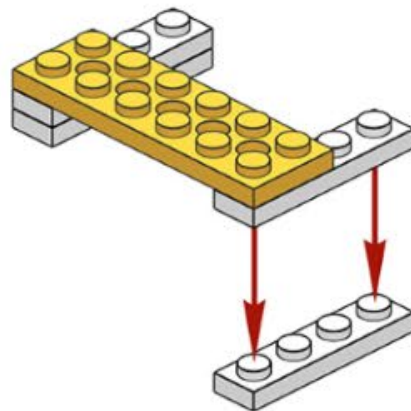
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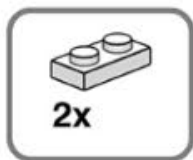




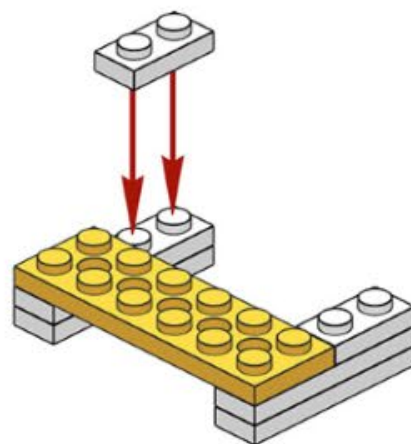
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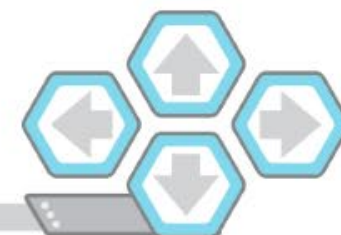


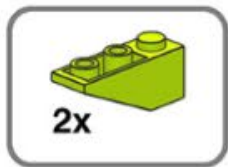


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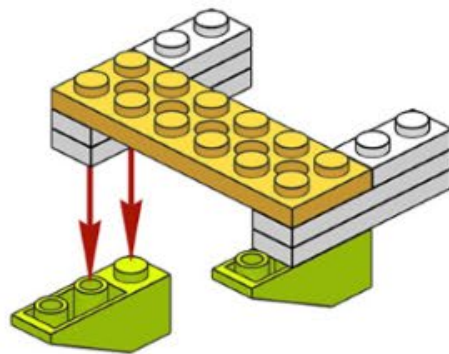


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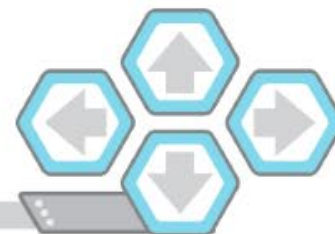


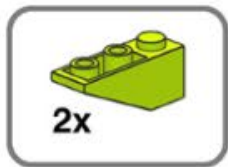


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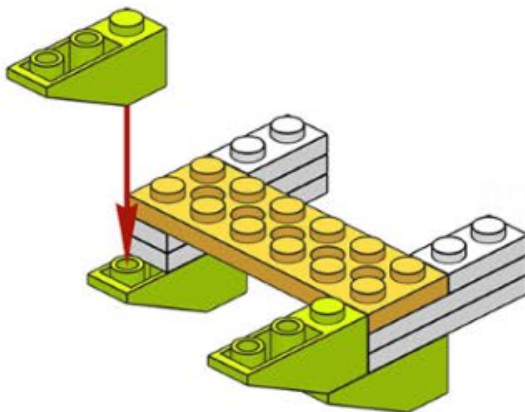


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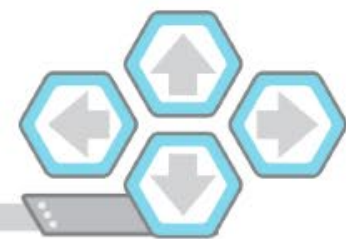




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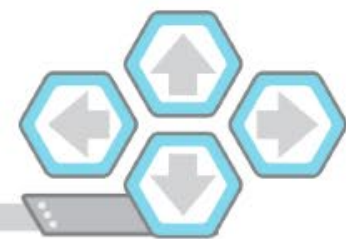
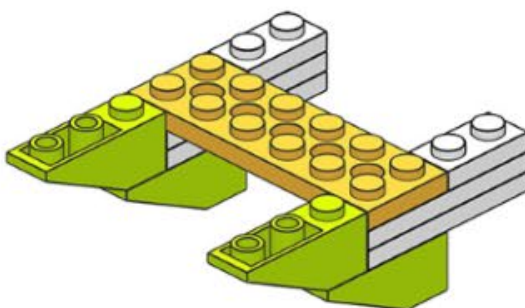
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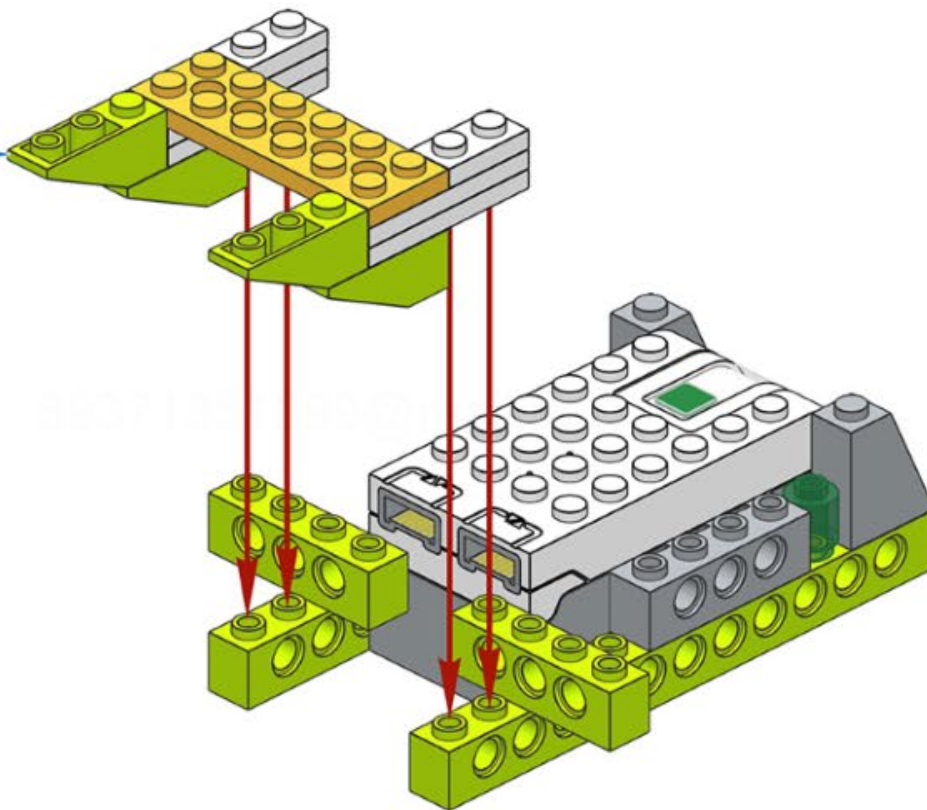




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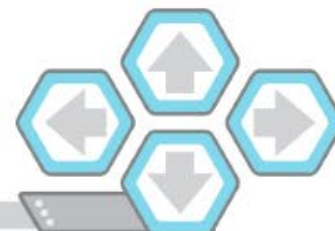


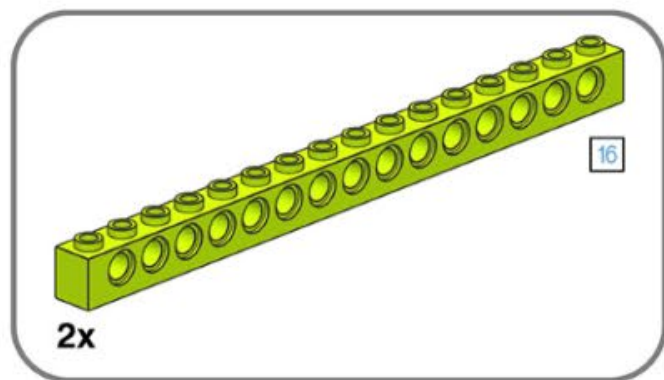
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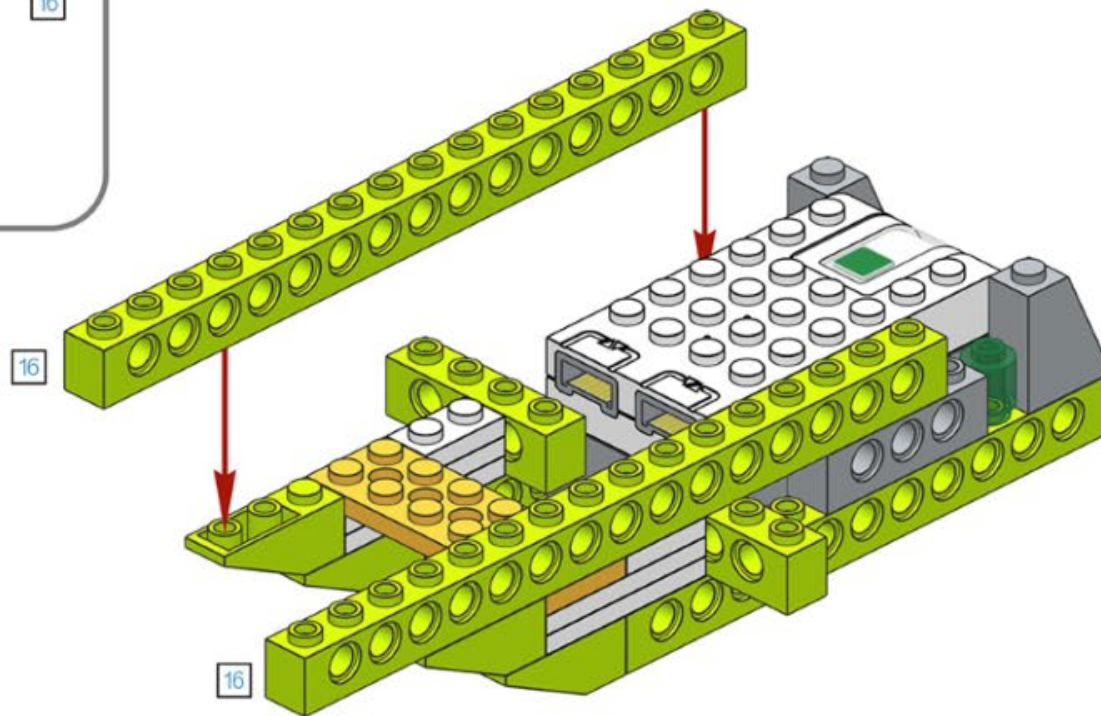
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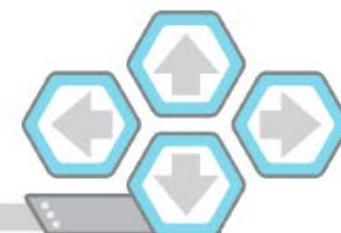




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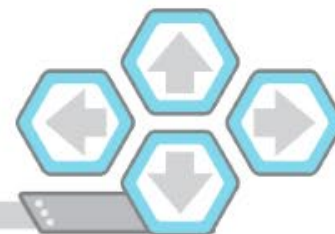
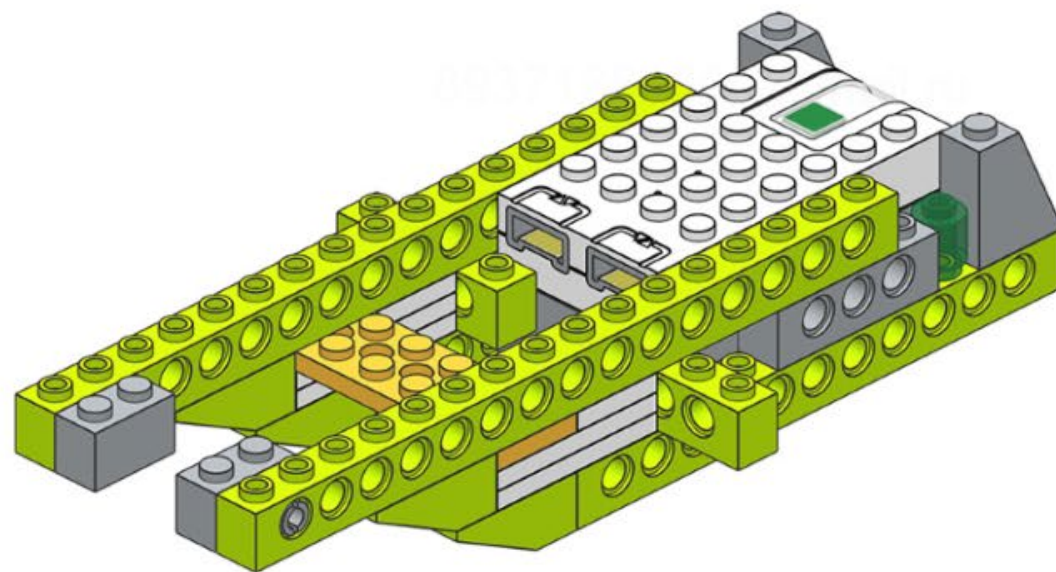


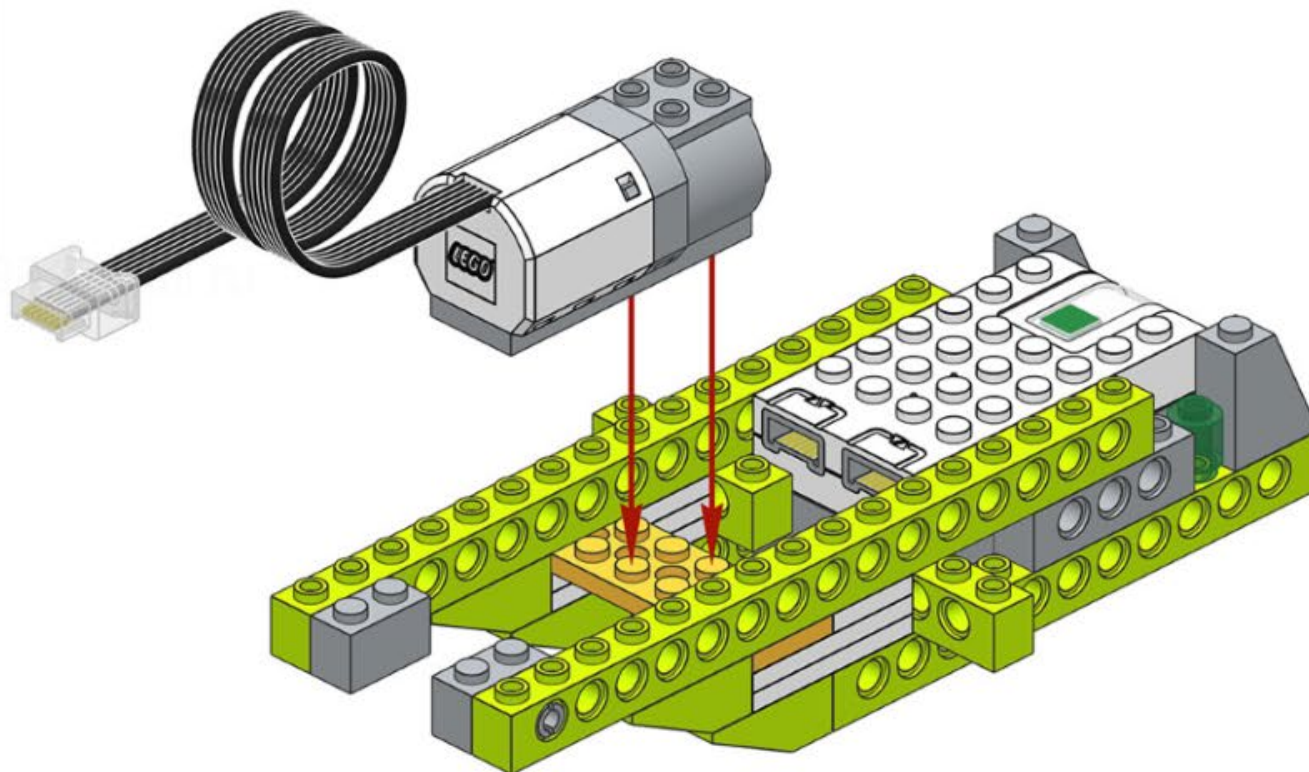
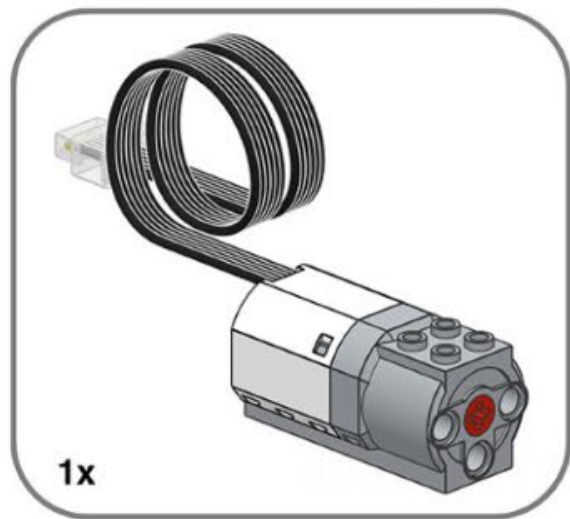
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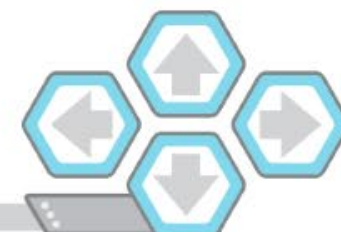


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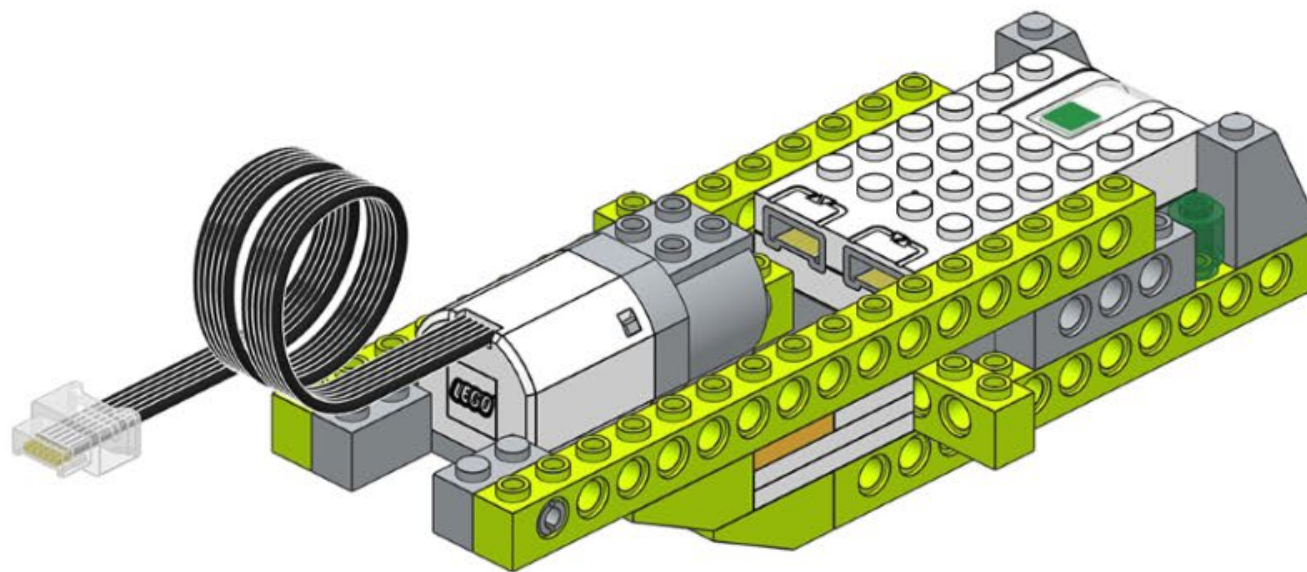
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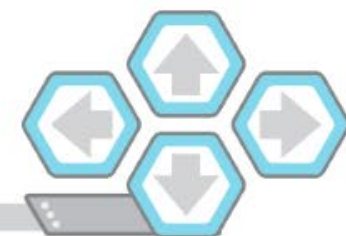
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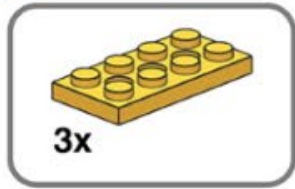


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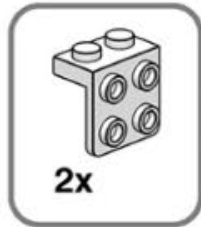
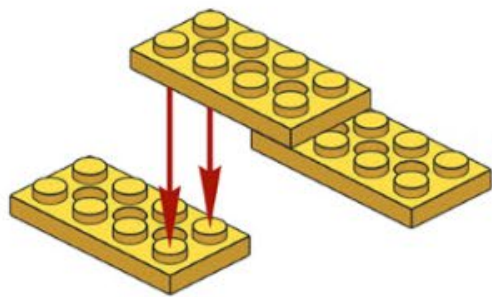
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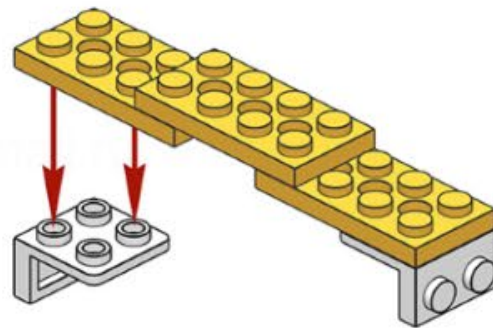




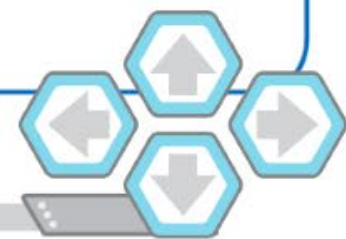
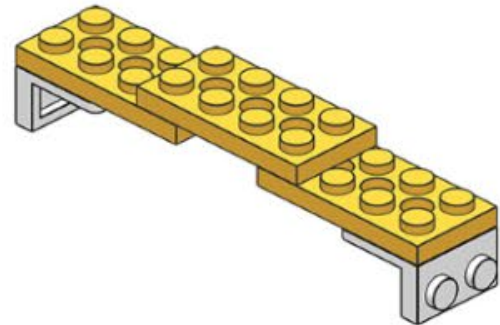
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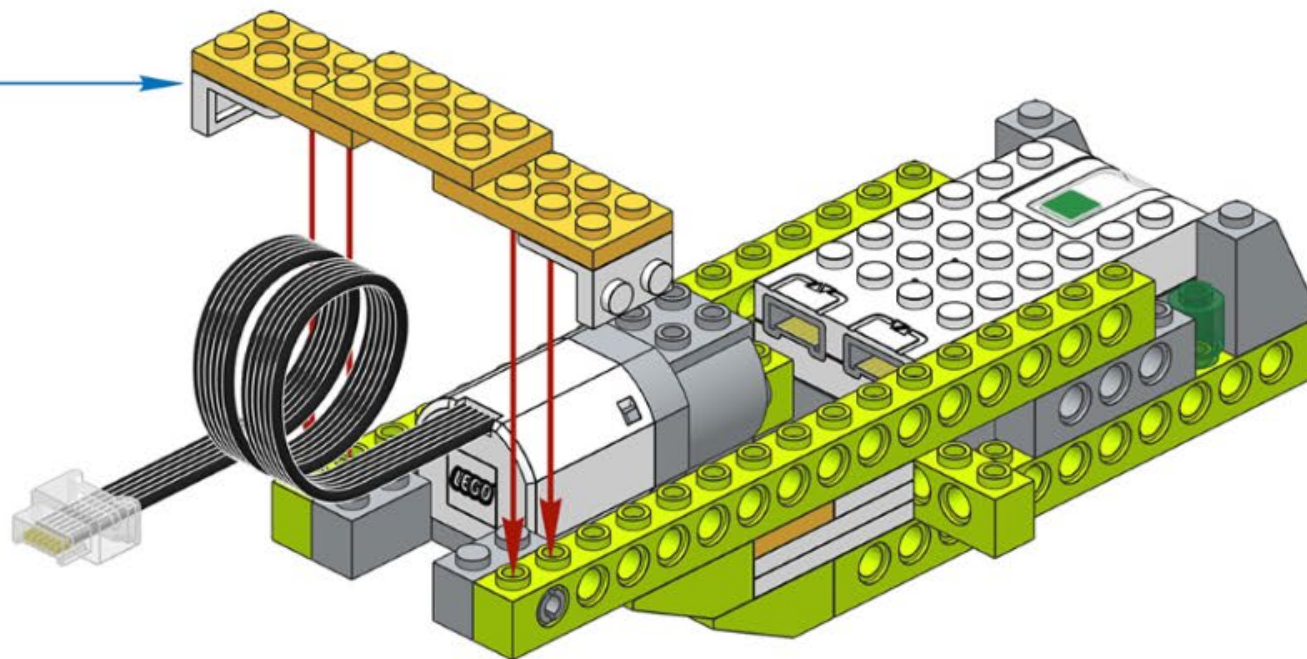


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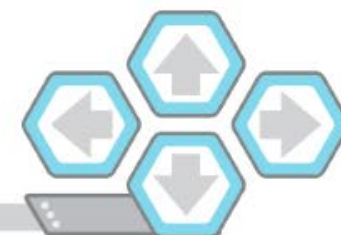
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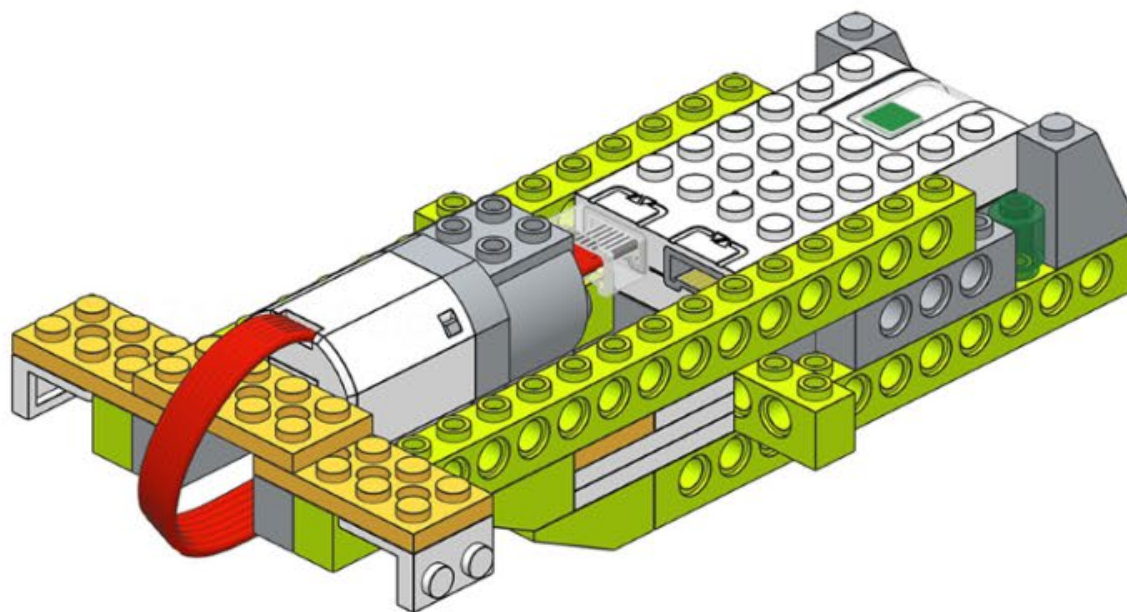
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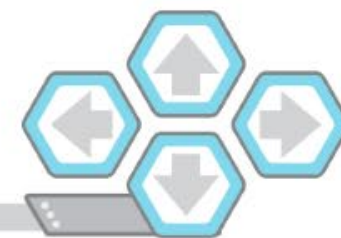
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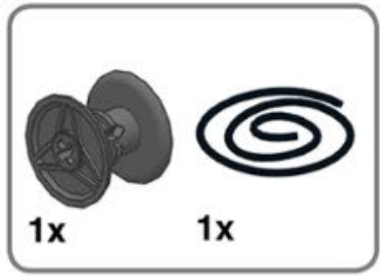


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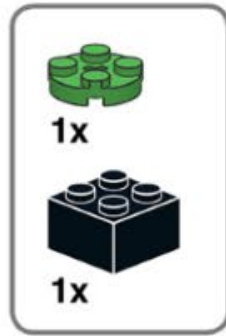
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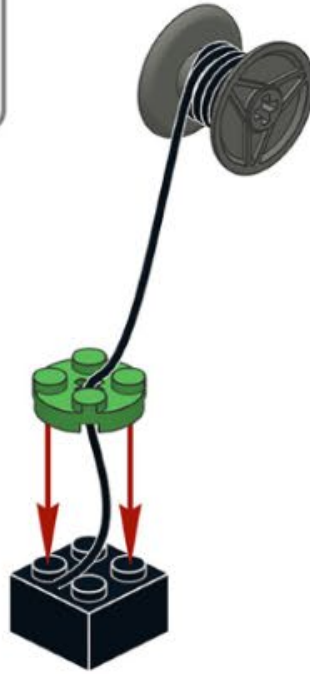




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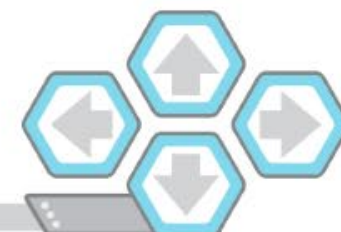
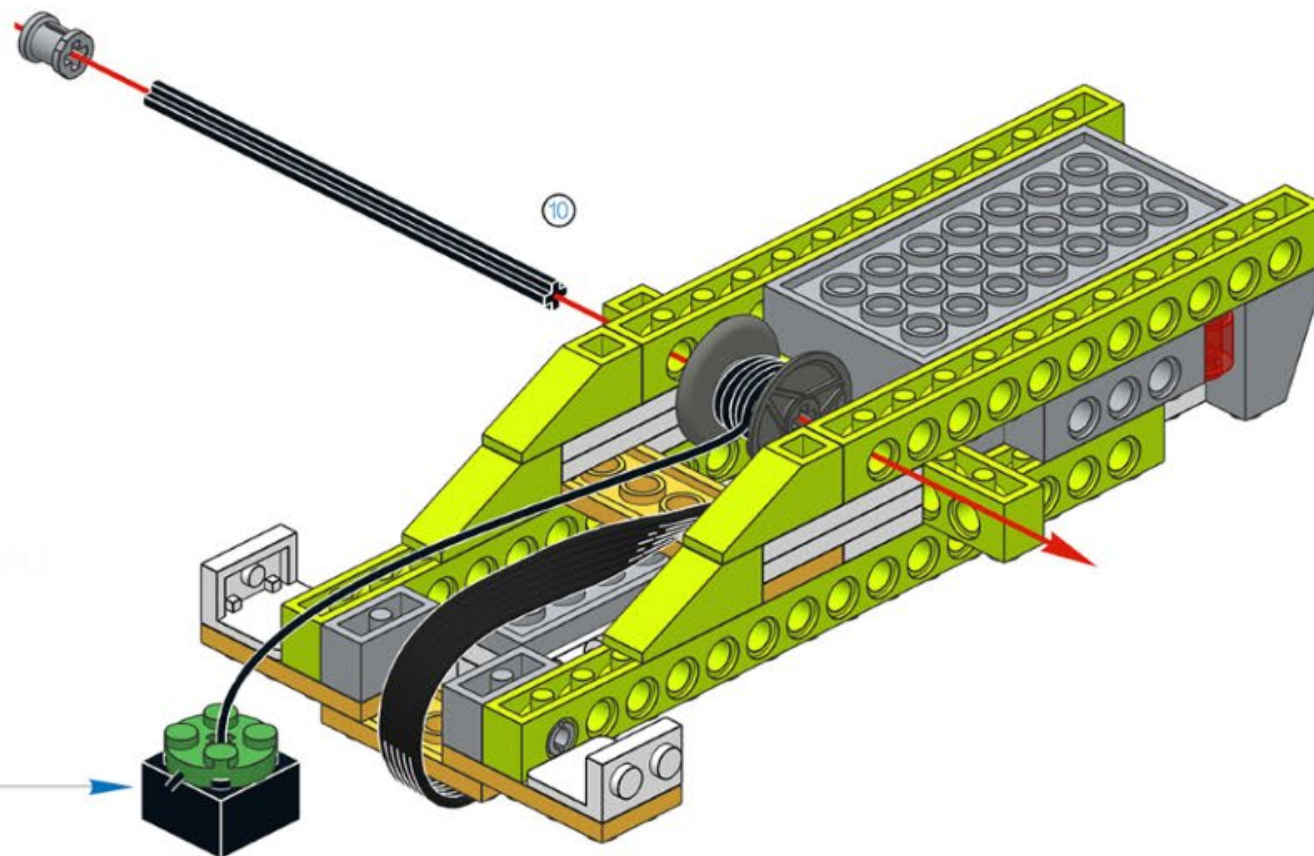


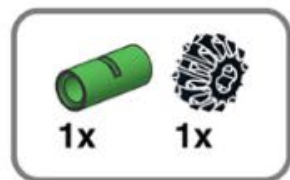
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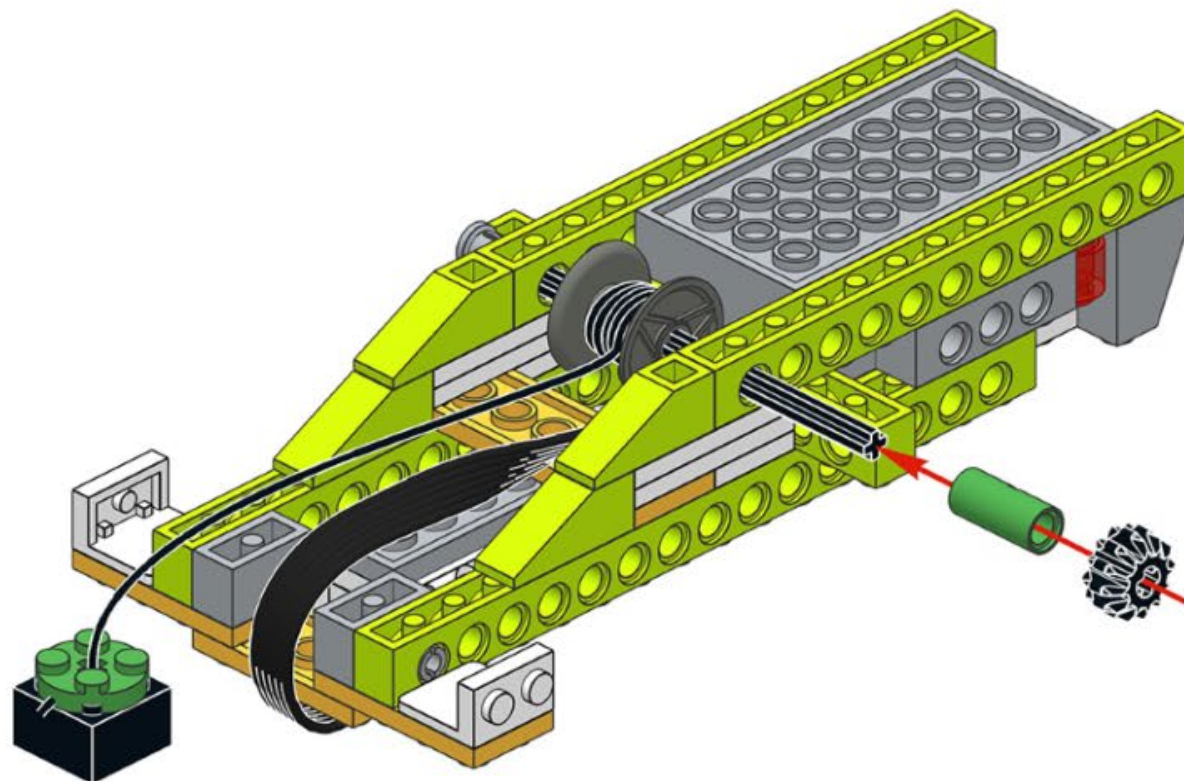


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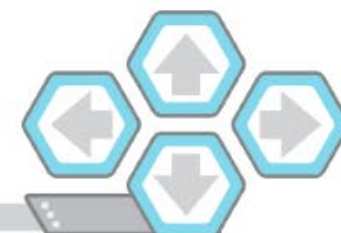
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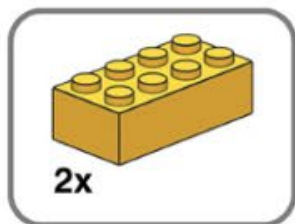


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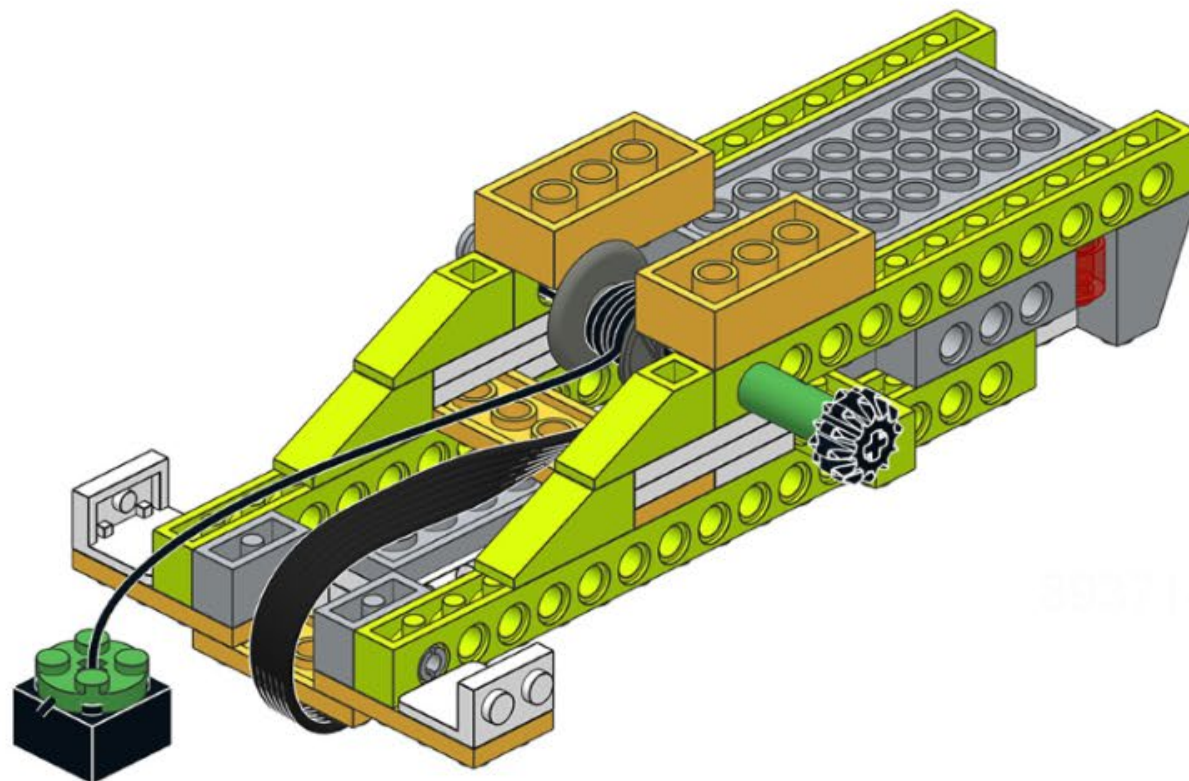


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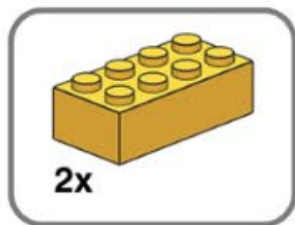


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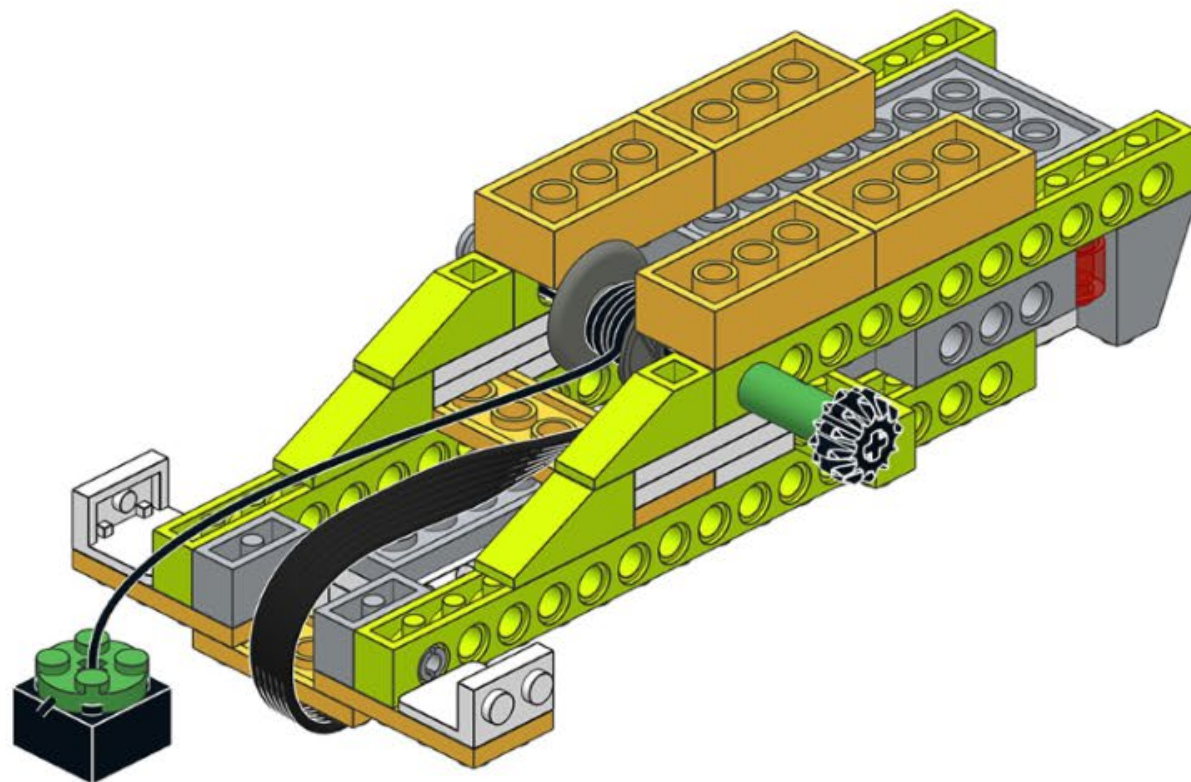


39371851699@gmail.ru

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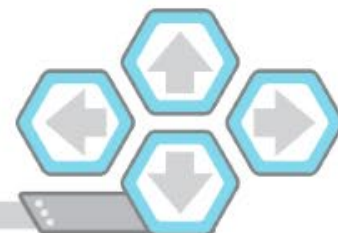
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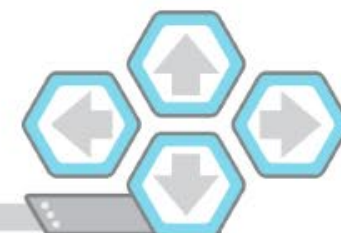
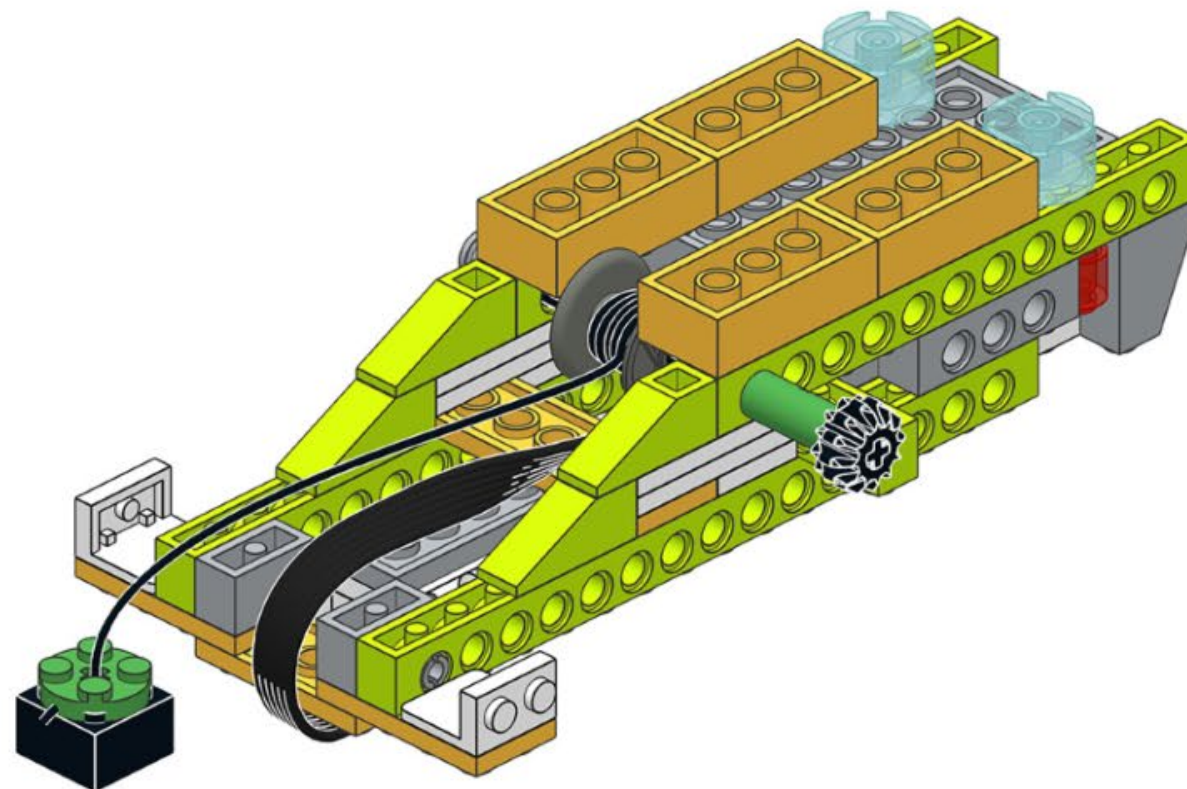
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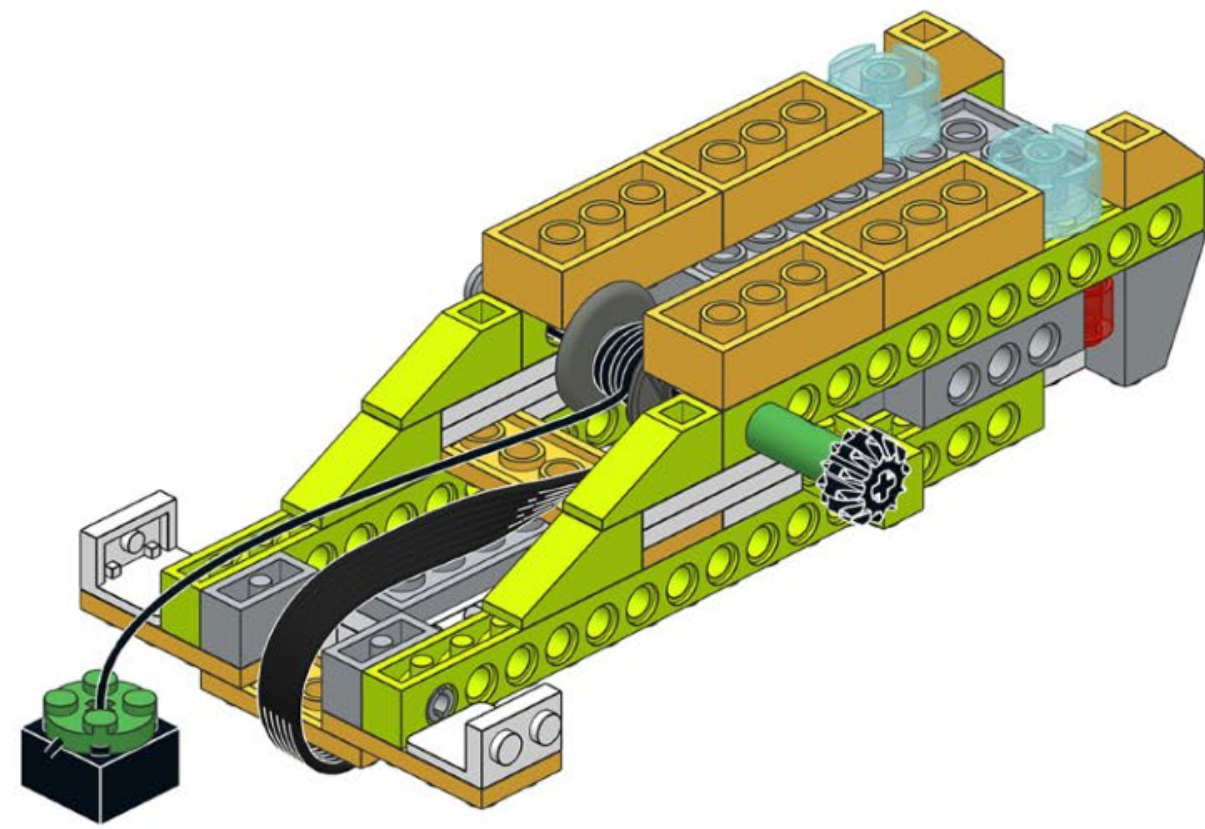


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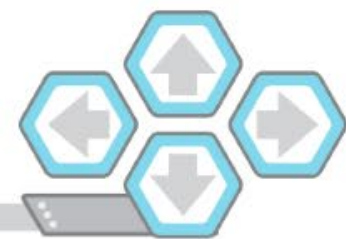


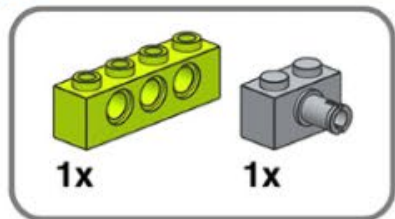


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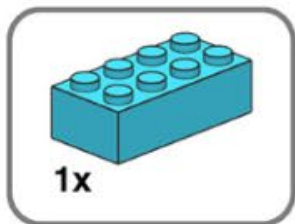


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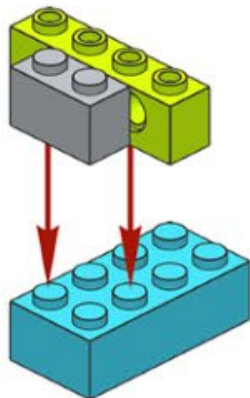




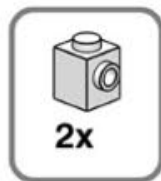
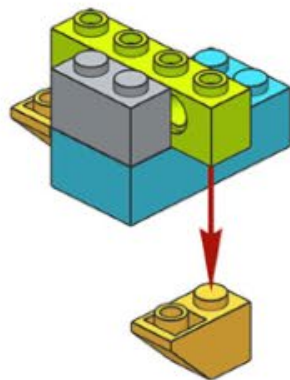
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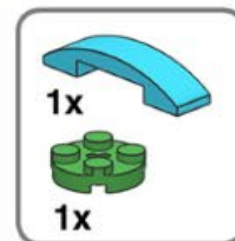
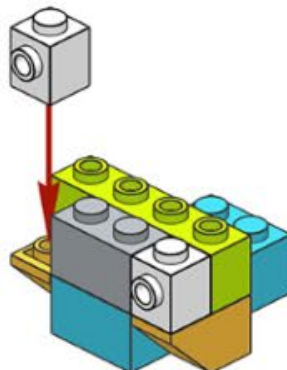
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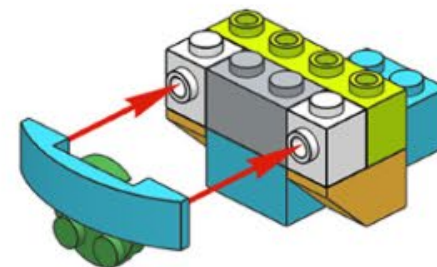
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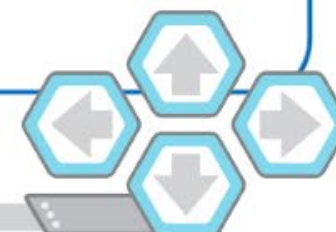
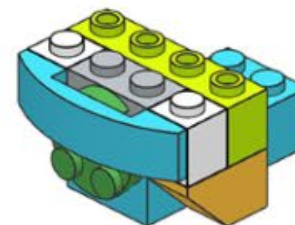
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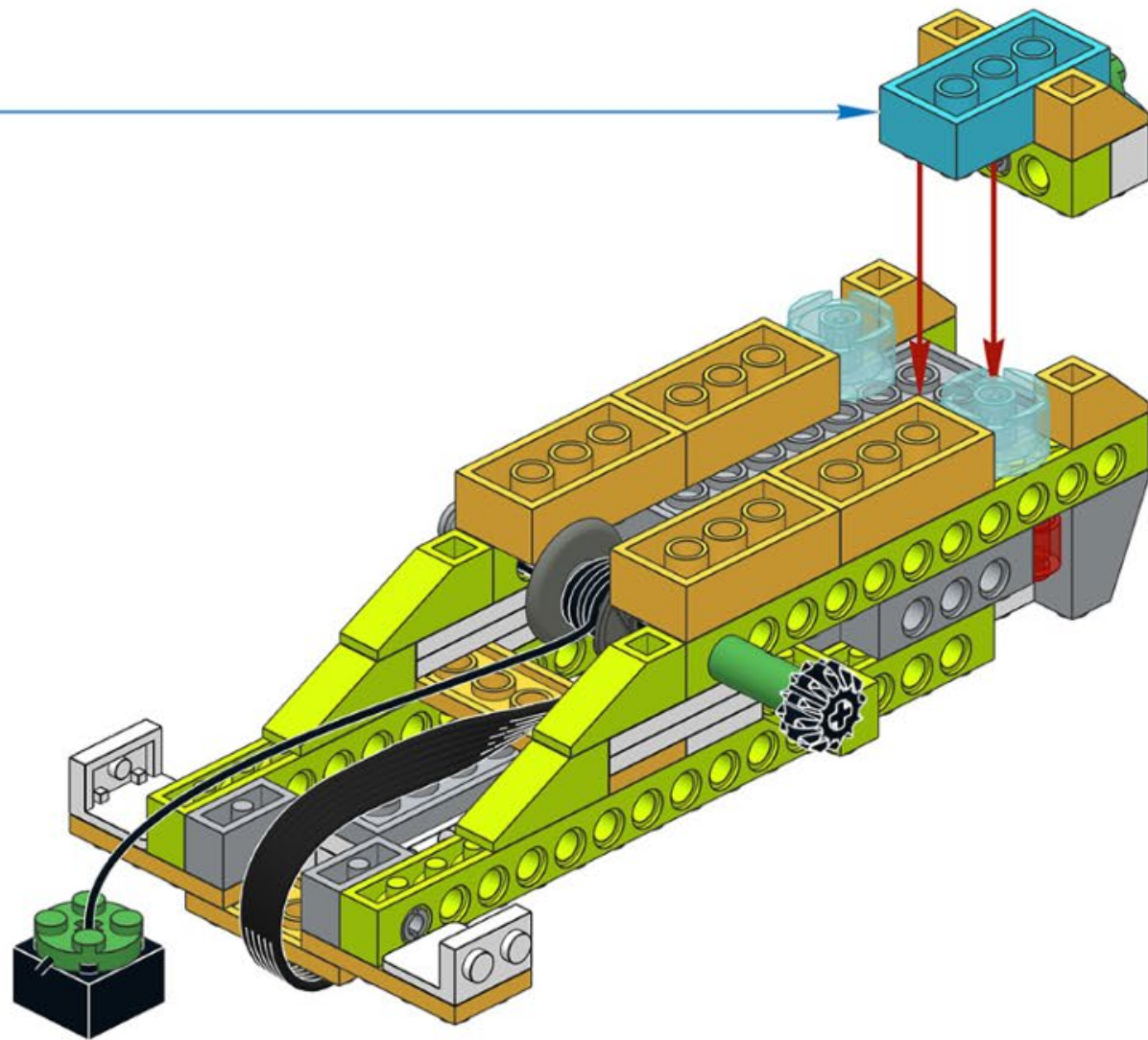
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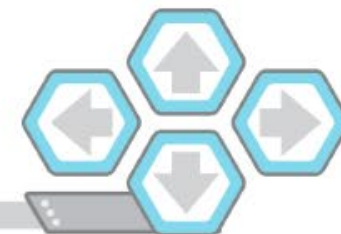
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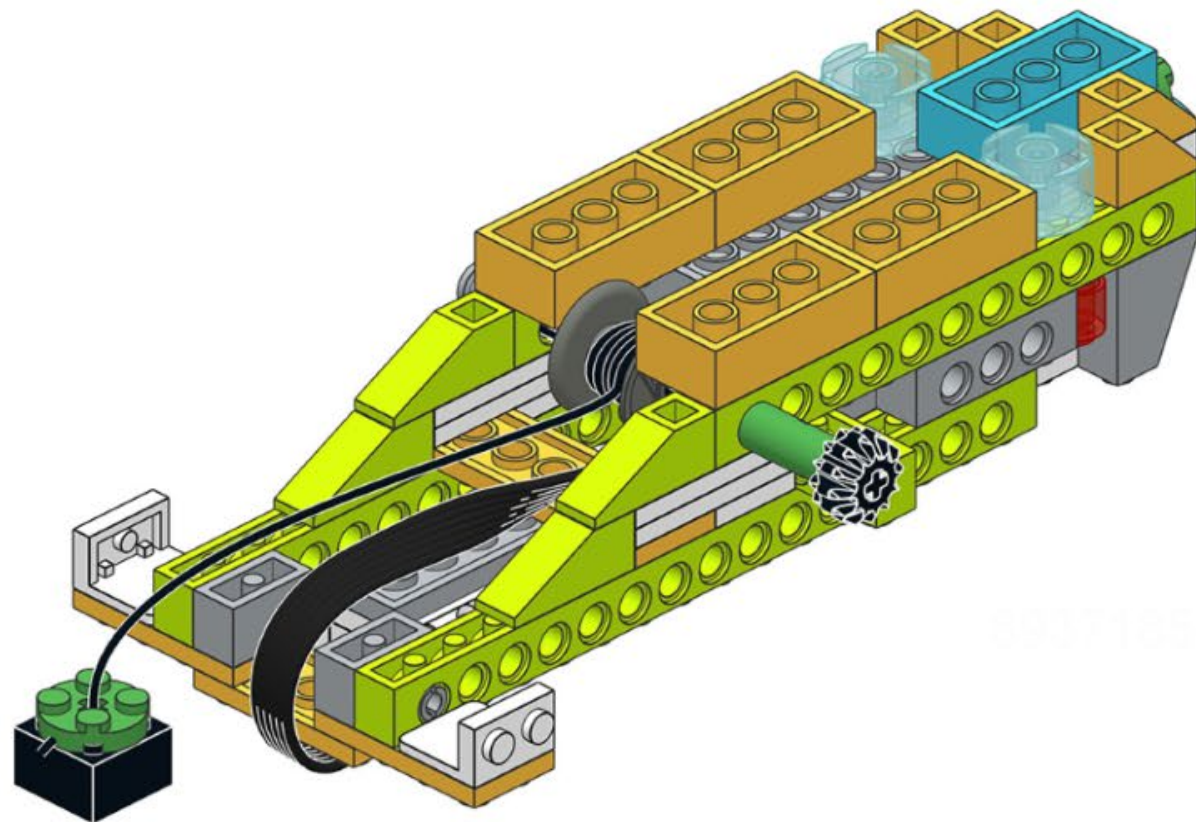
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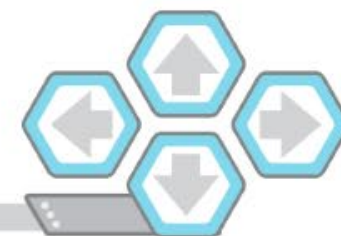


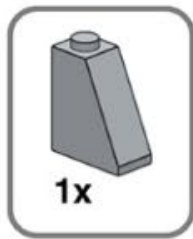
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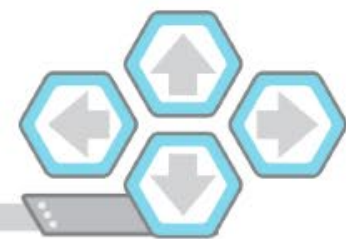
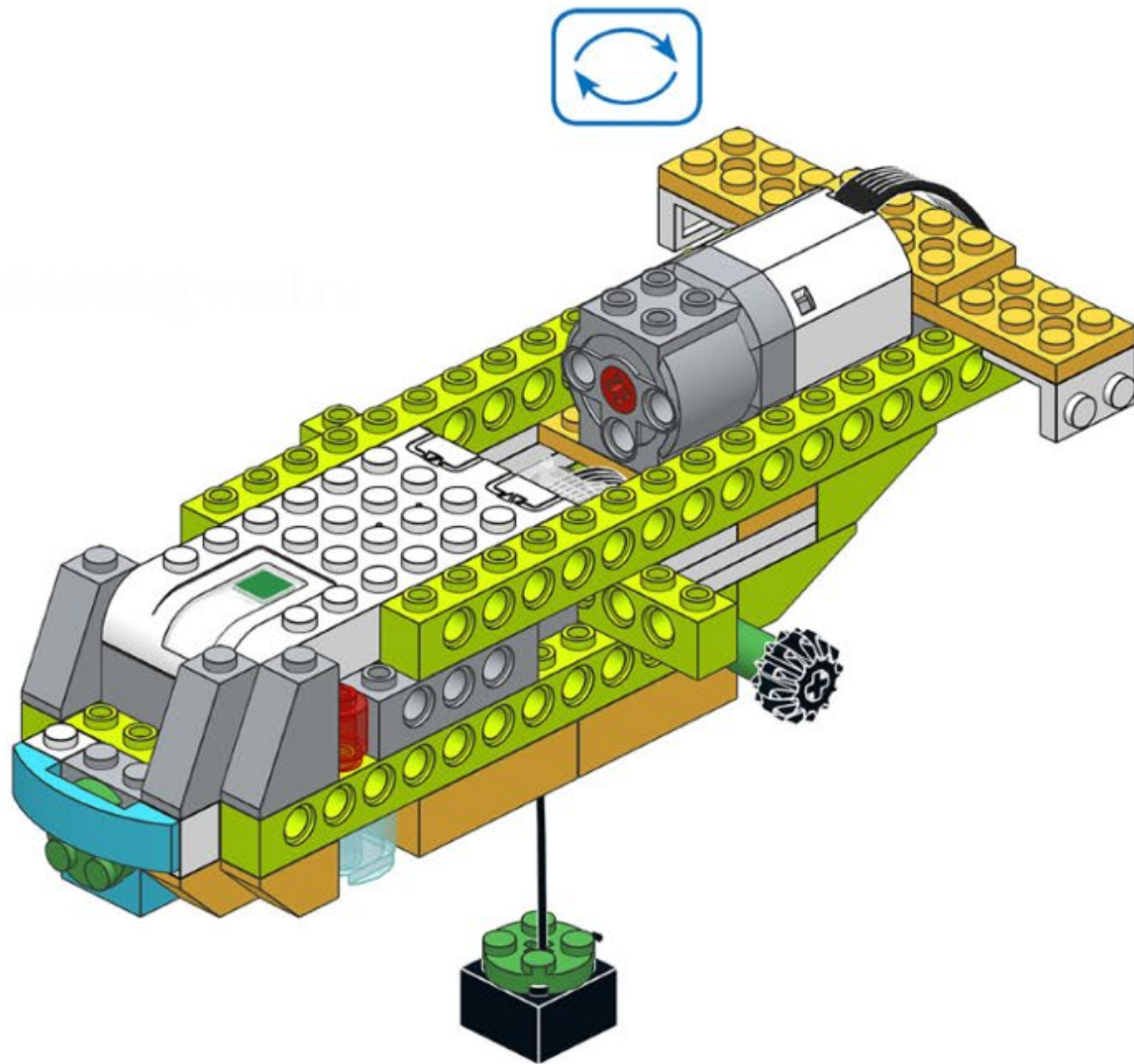
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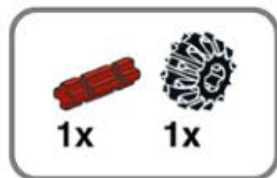




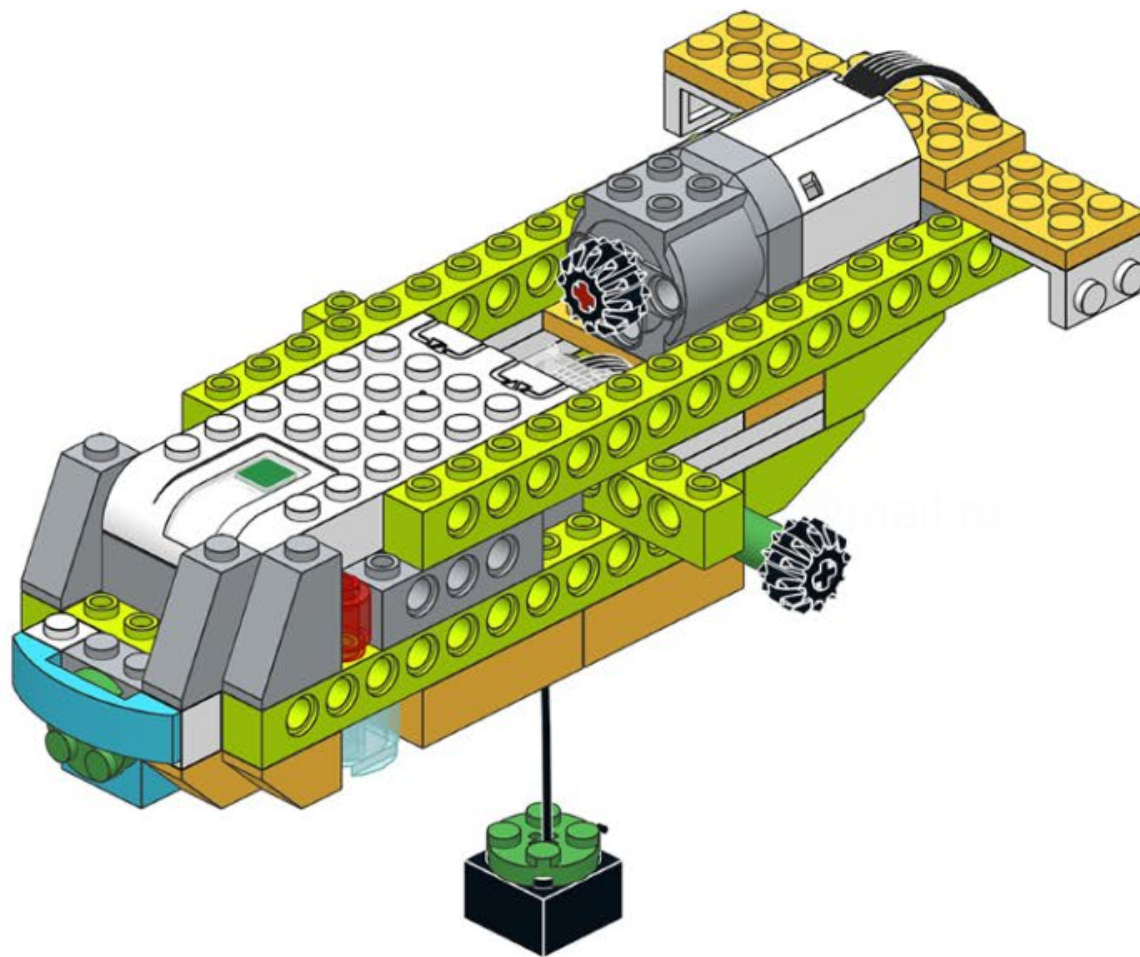
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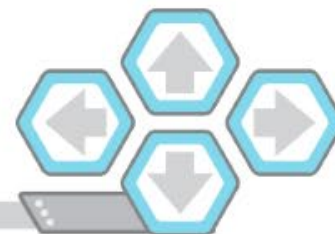
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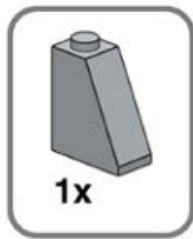


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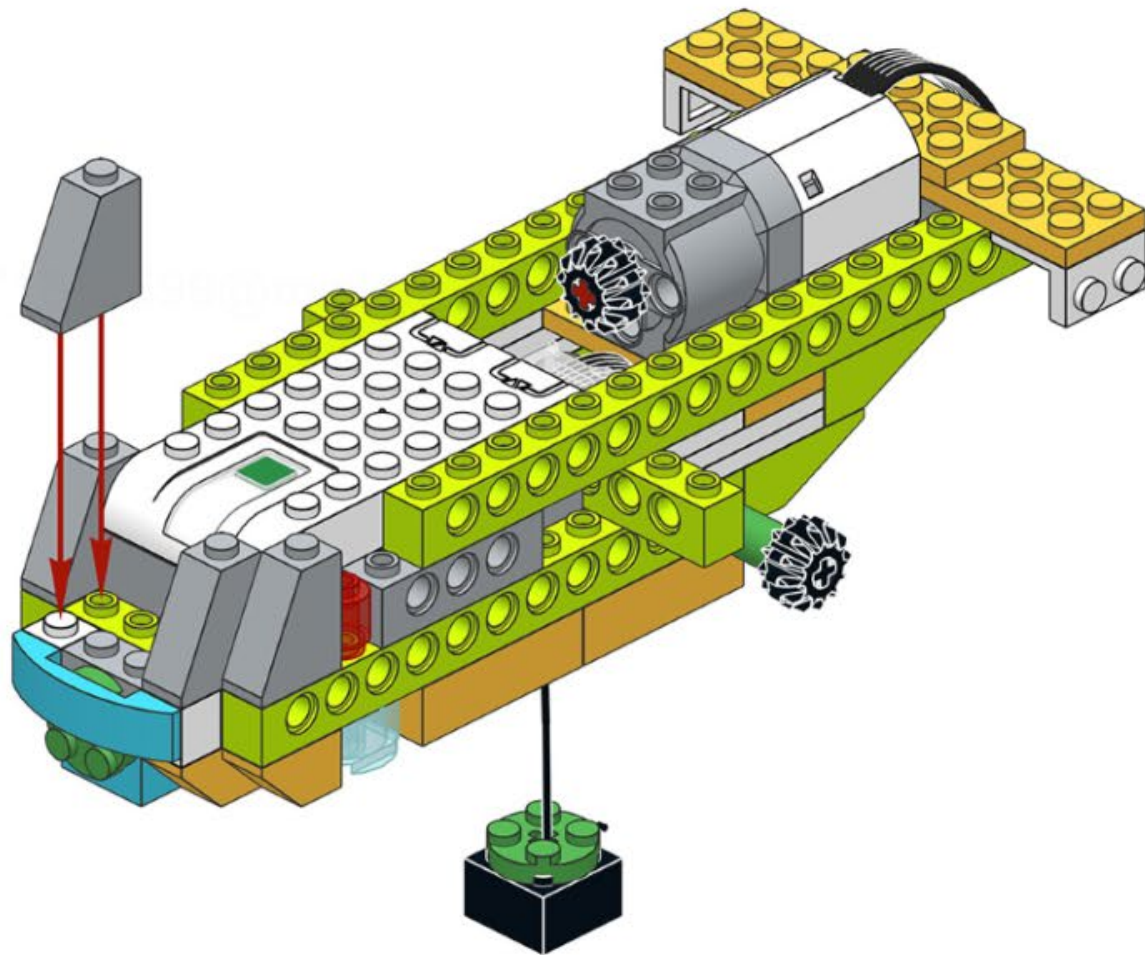
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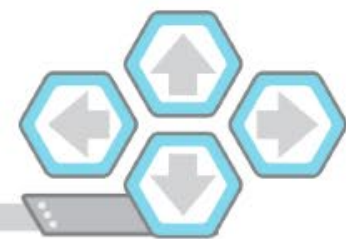
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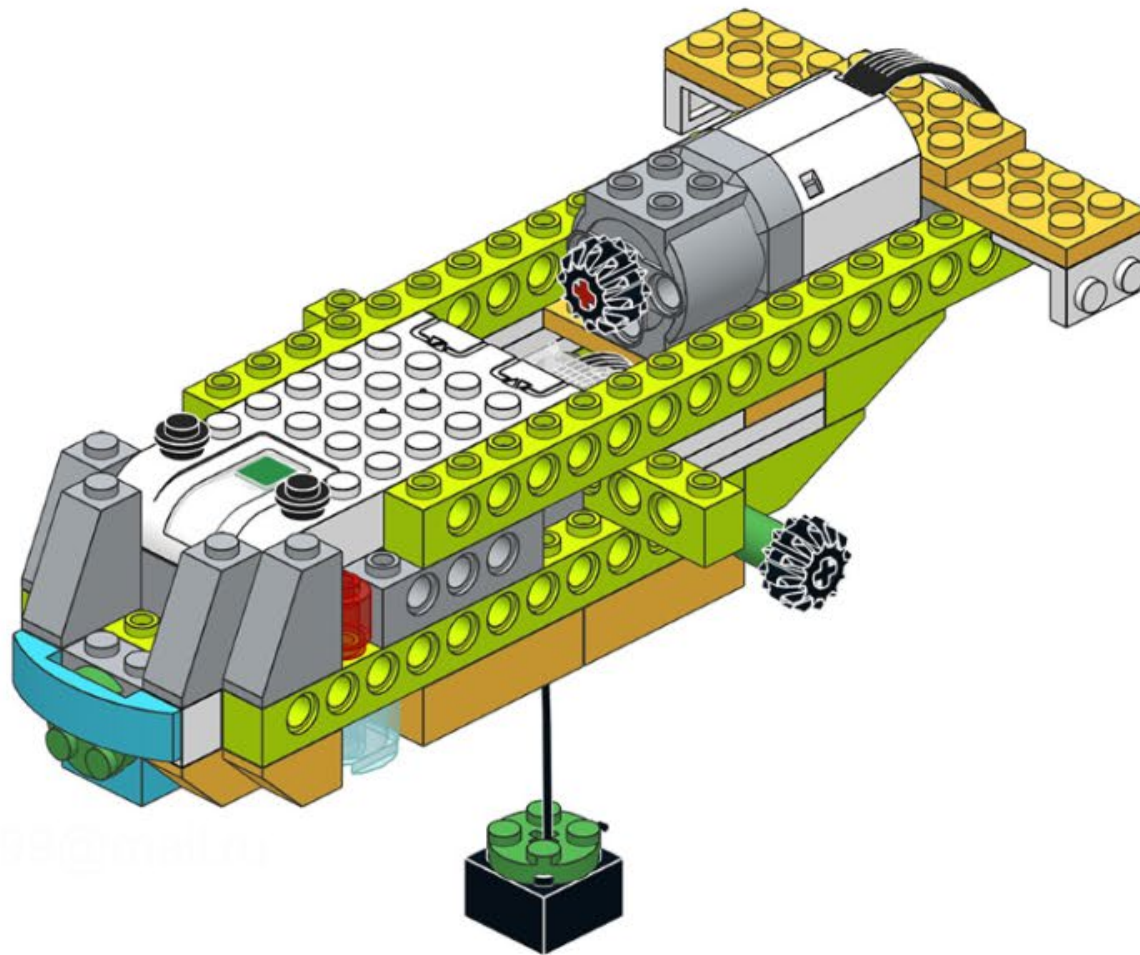
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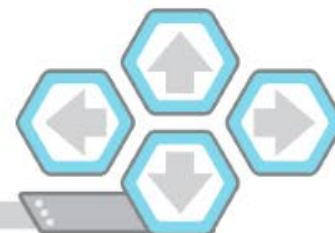


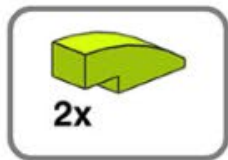
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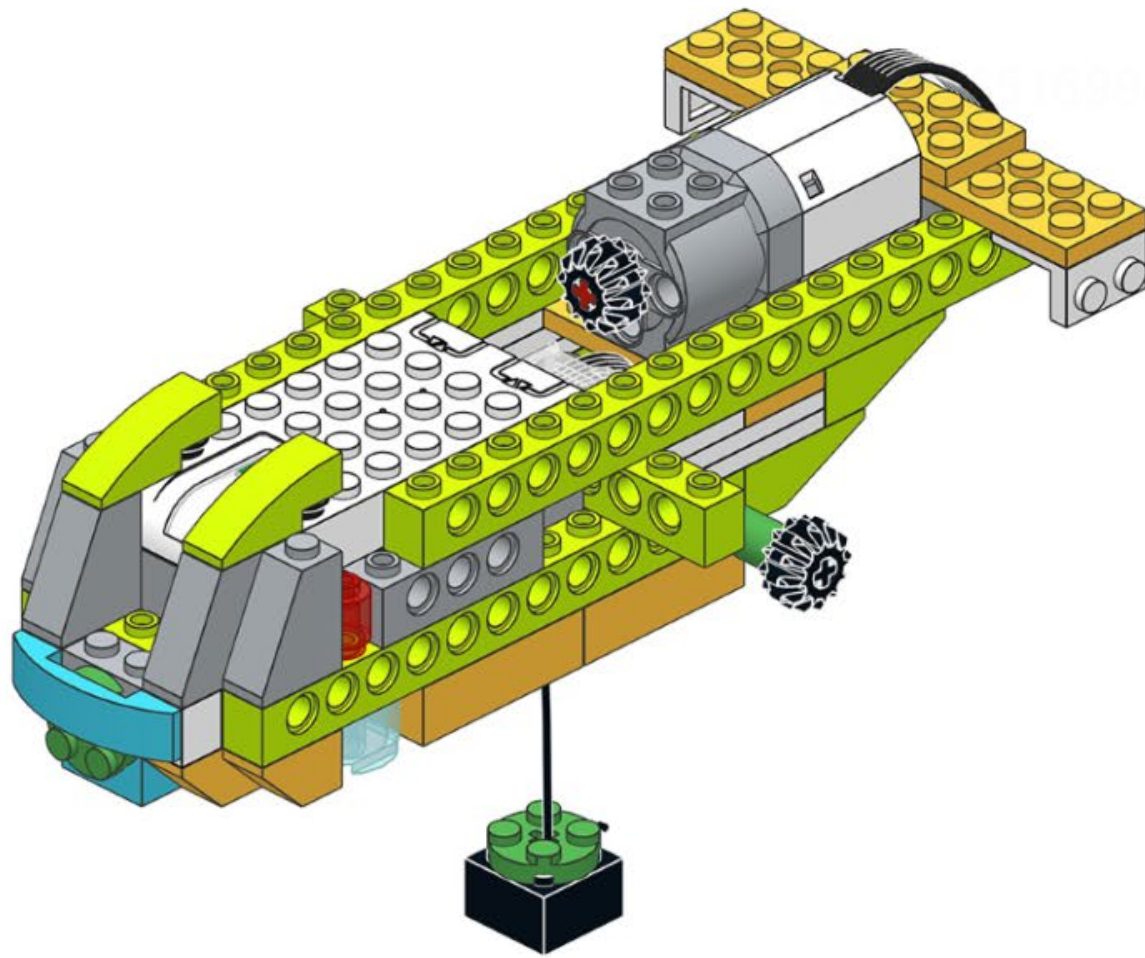
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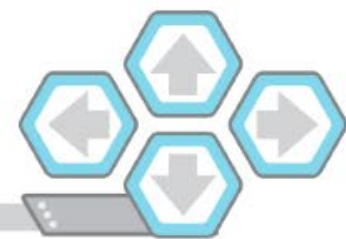
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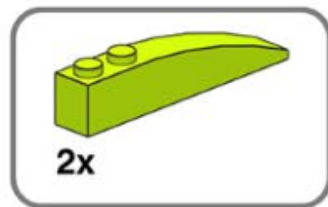


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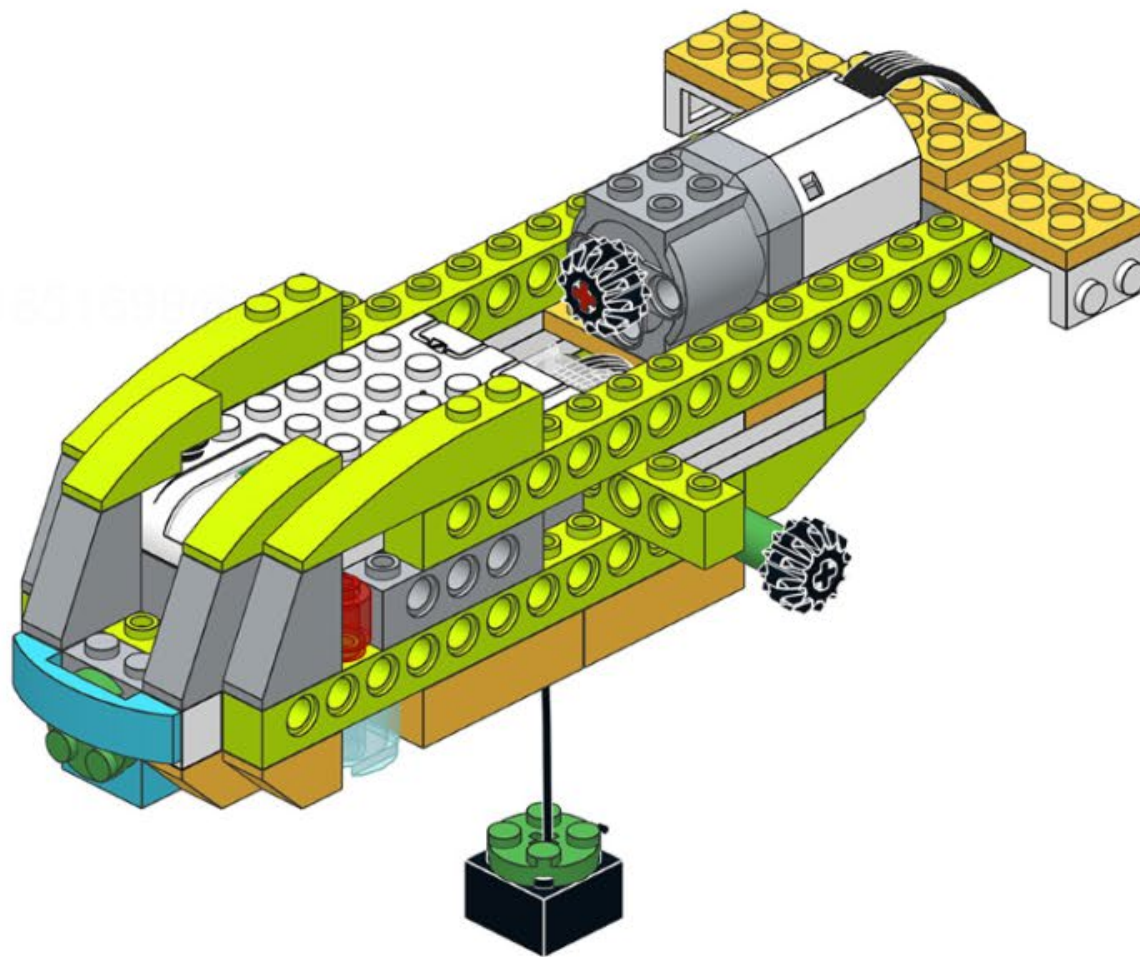
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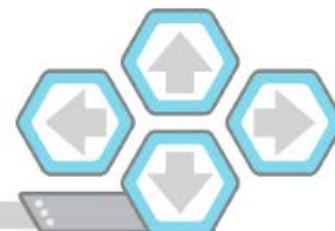
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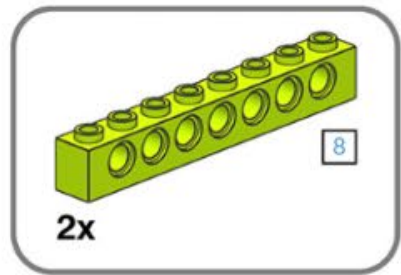


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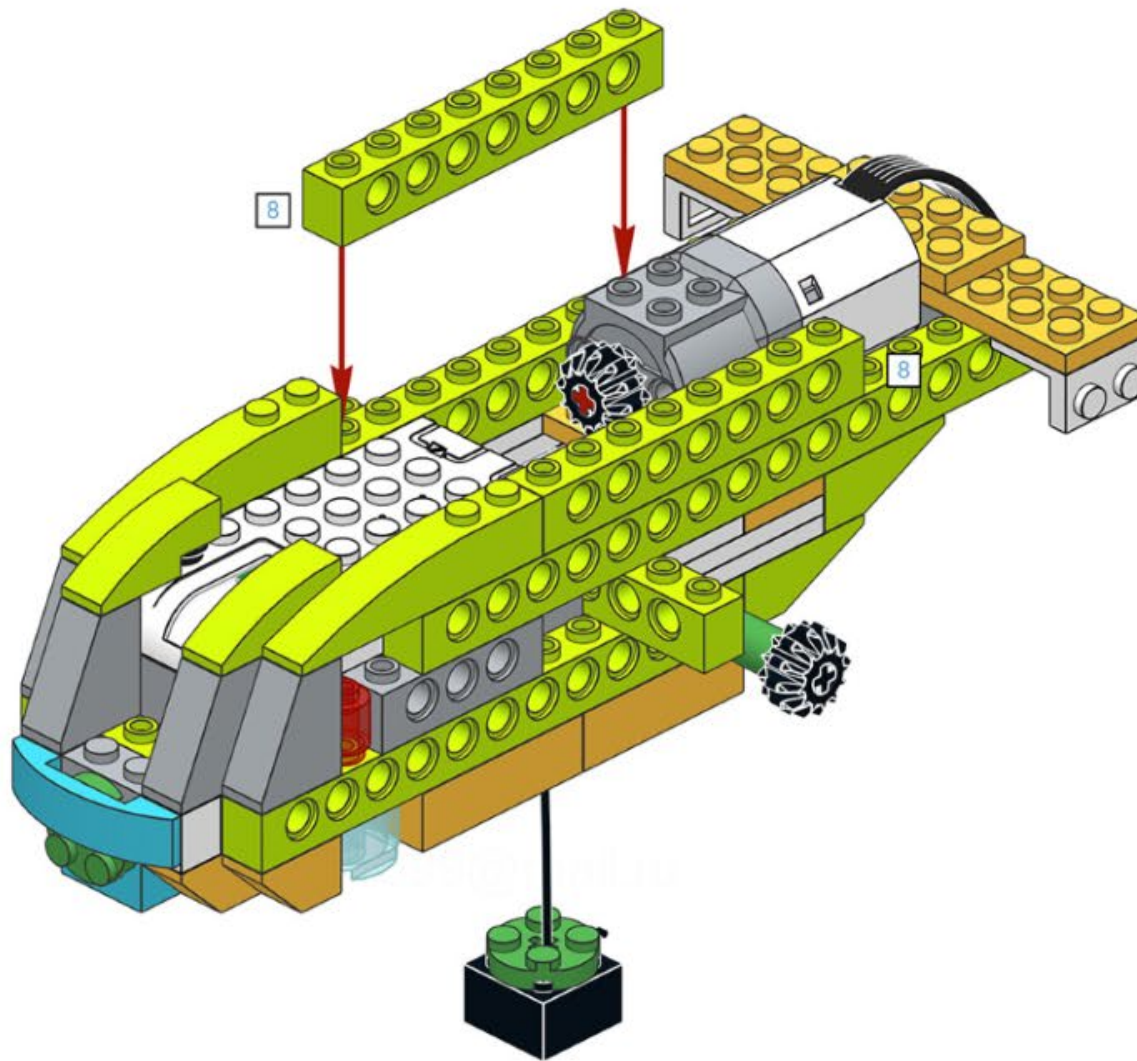
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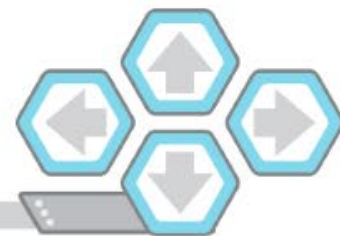
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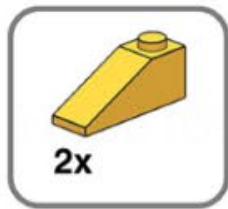


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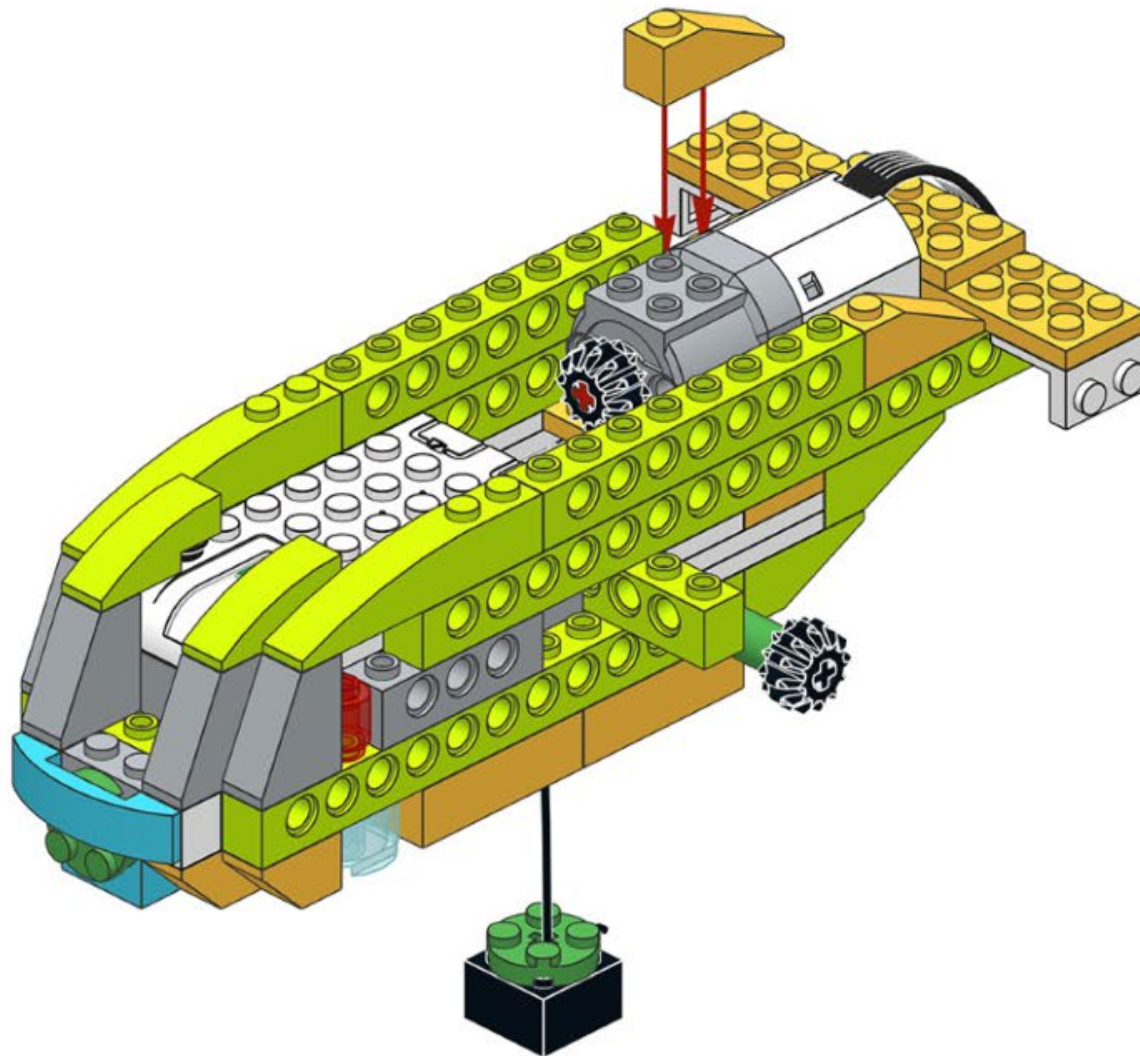
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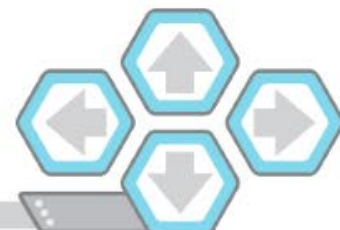
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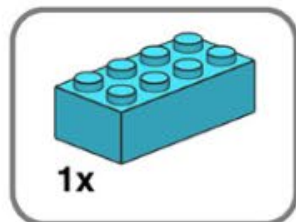


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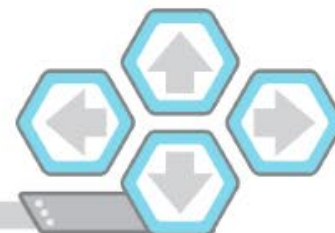
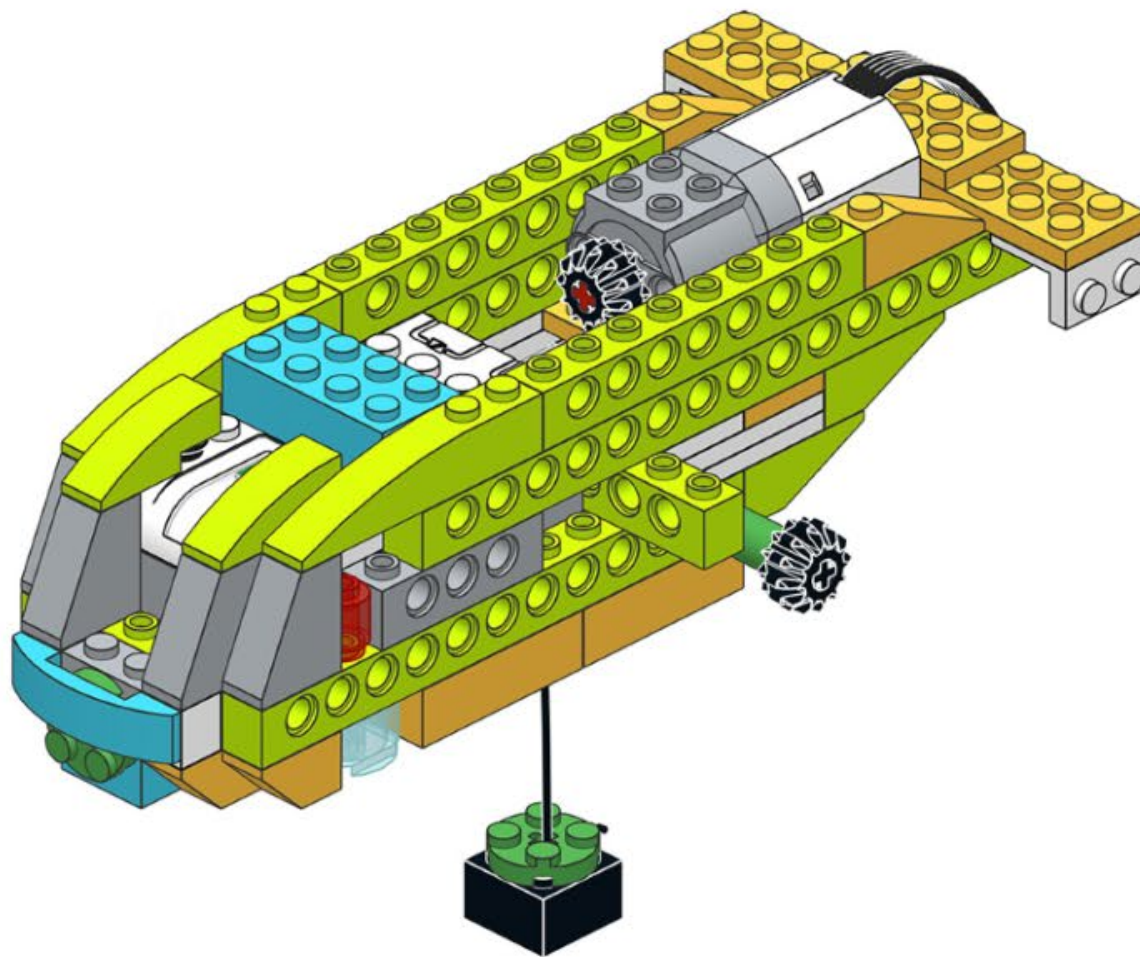
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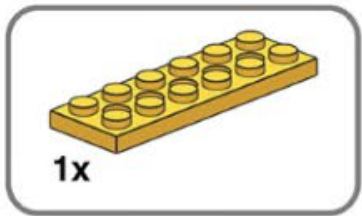
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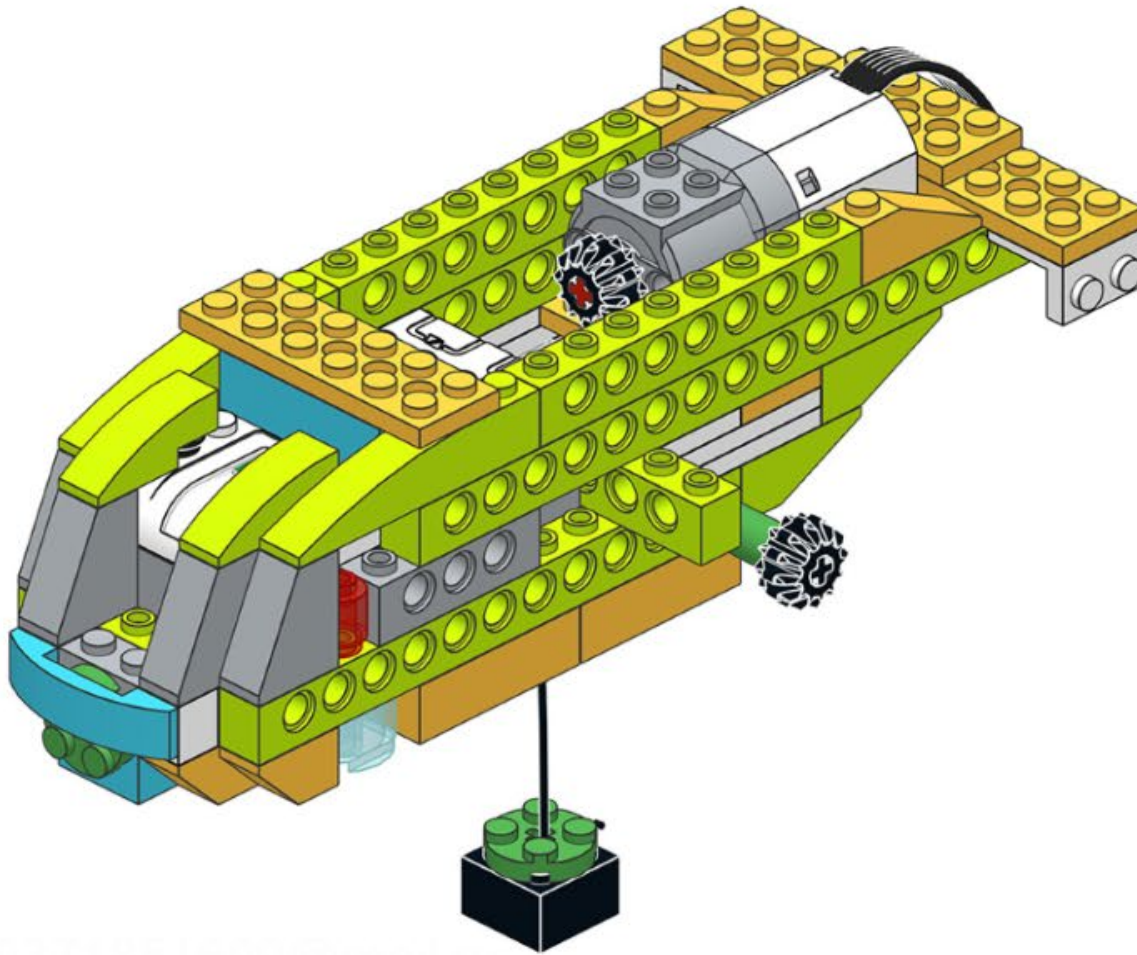


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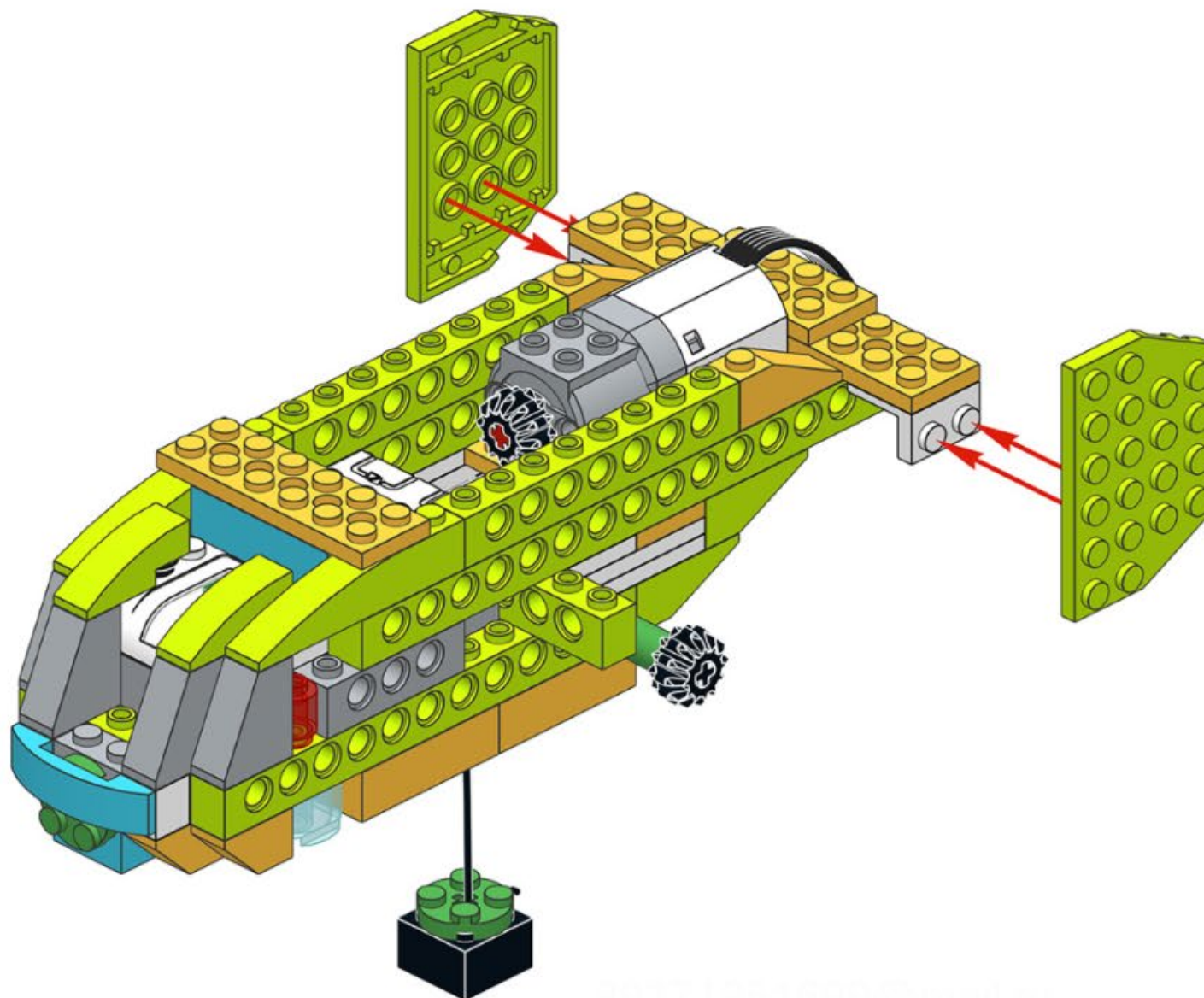


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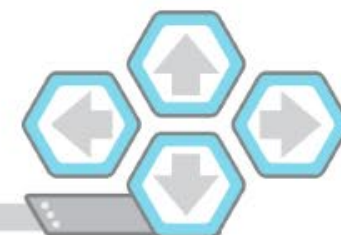
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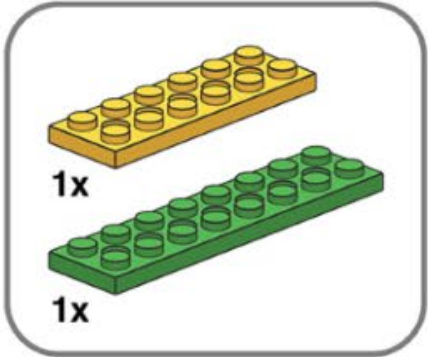
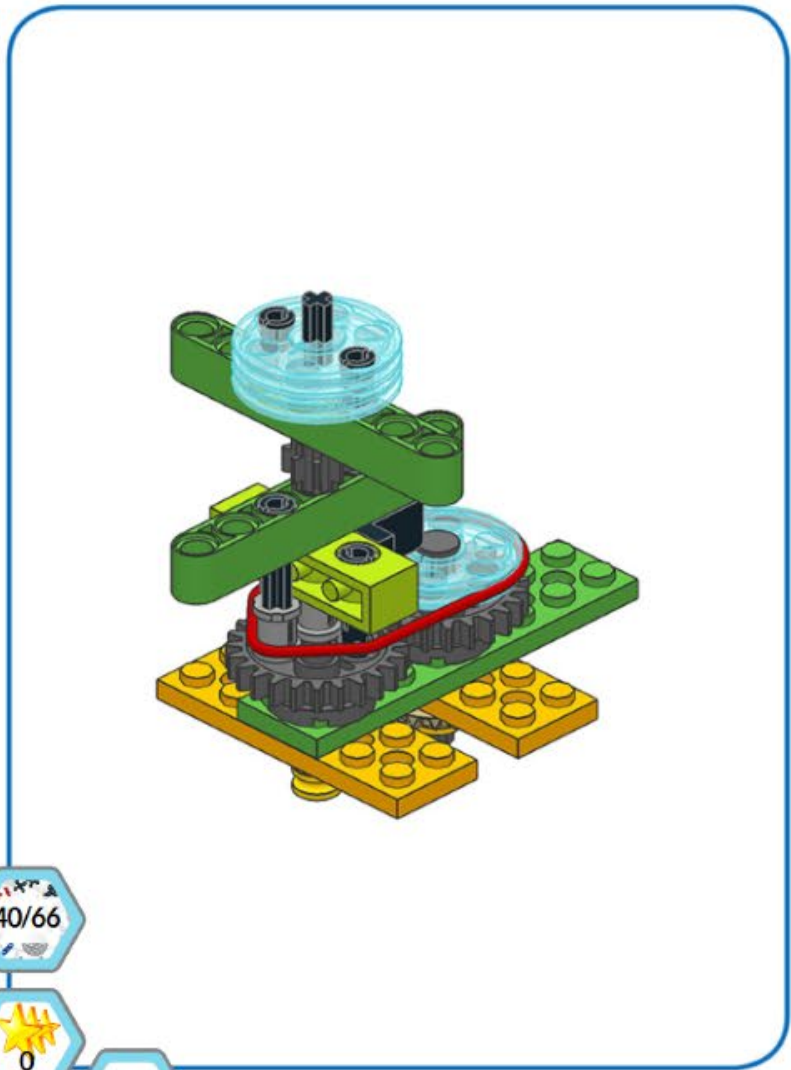


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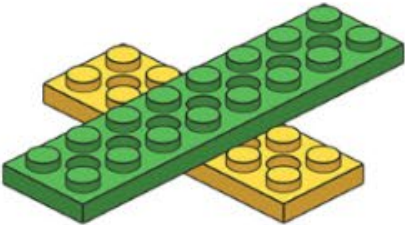
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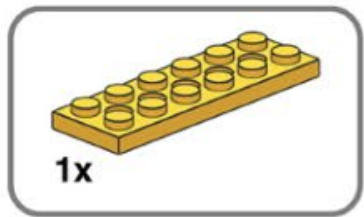
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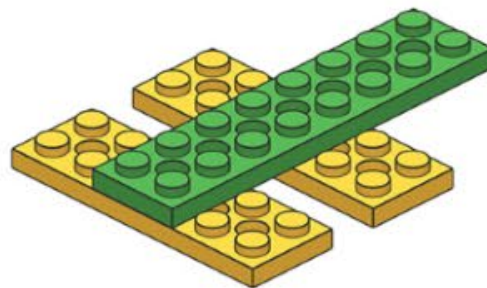


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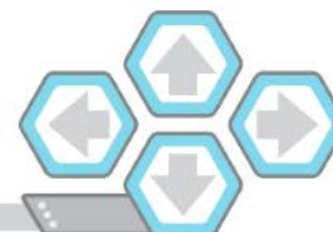


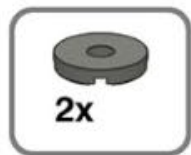


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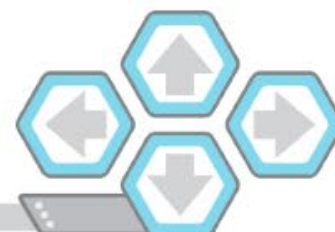
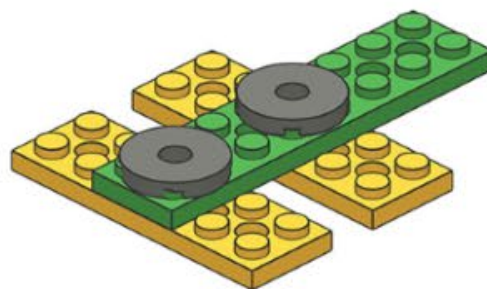
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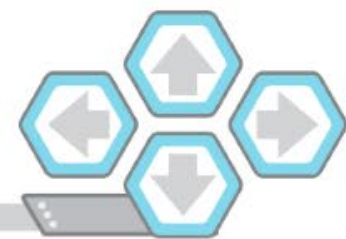
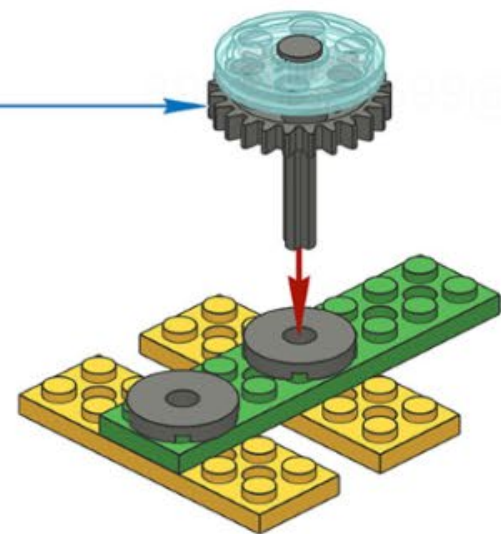
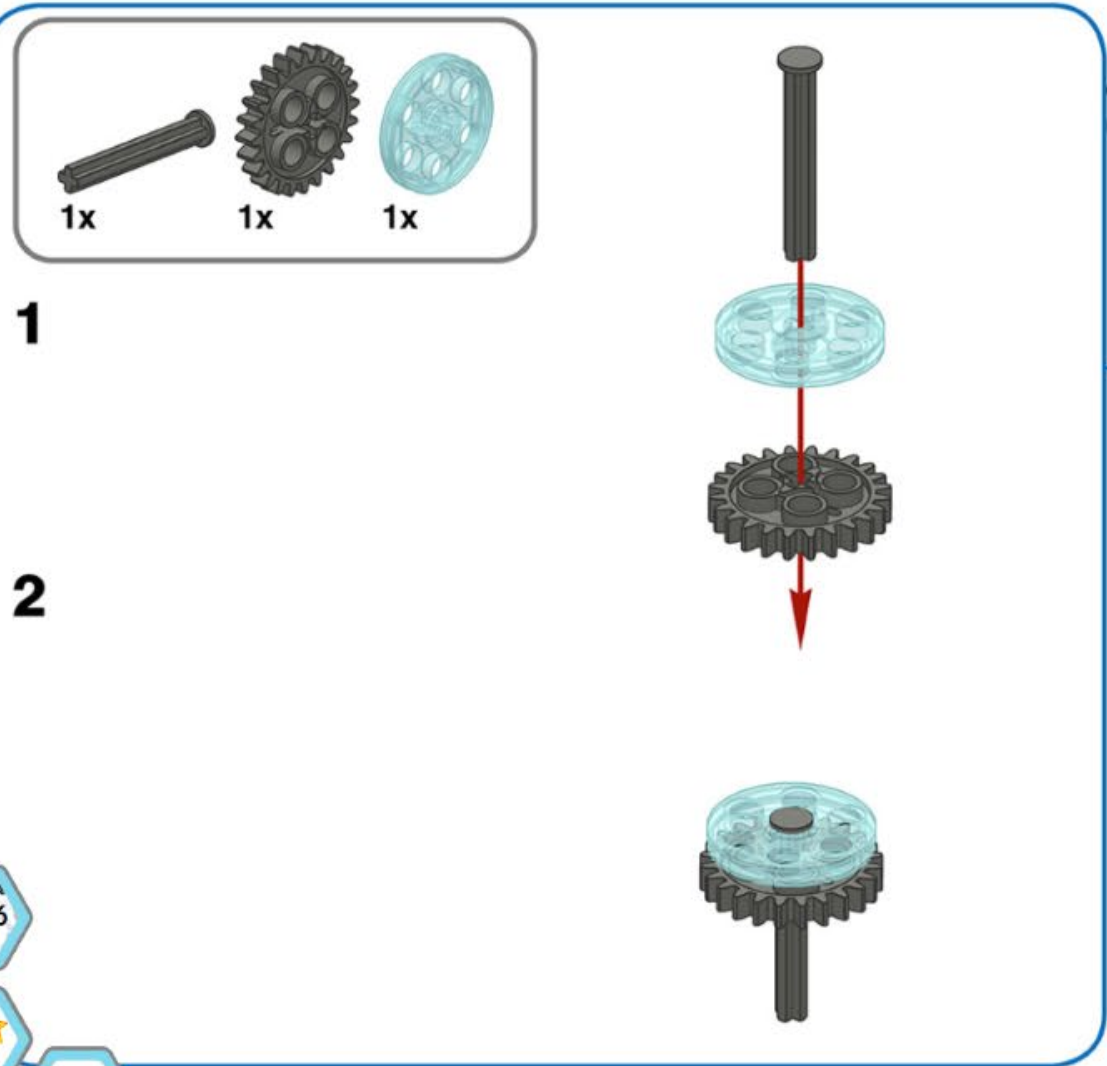




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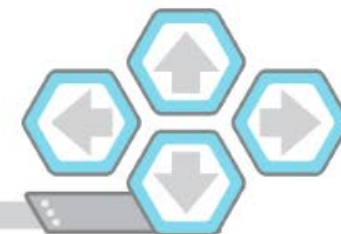
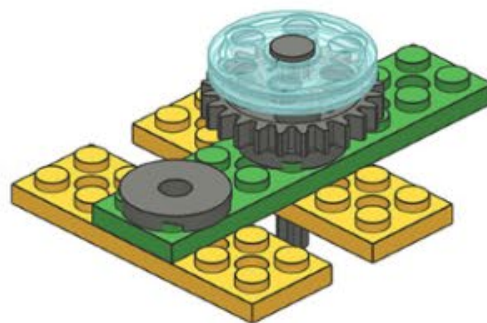


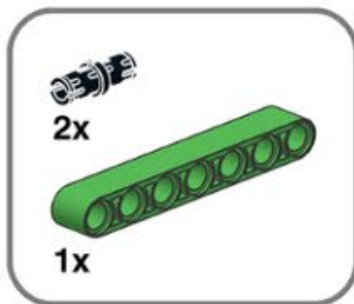
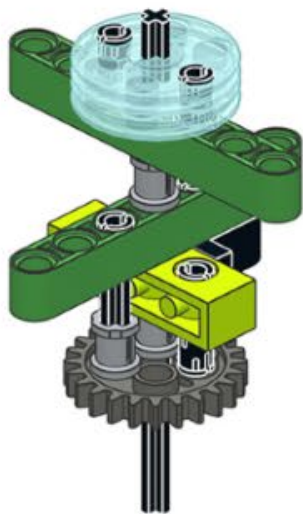




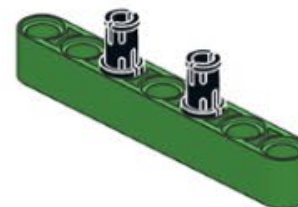
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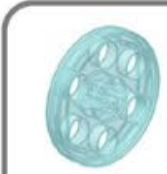


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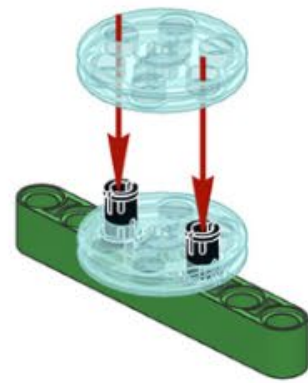


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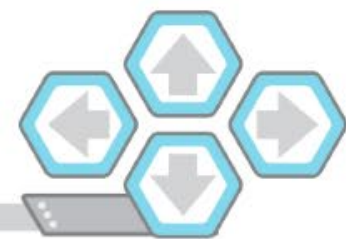
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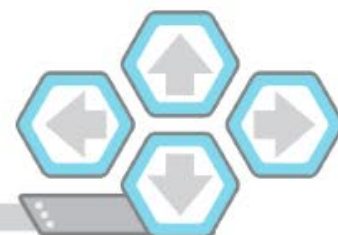
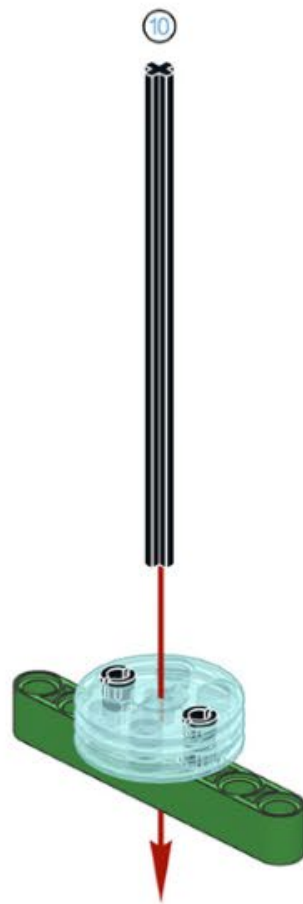
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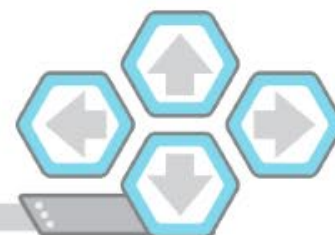


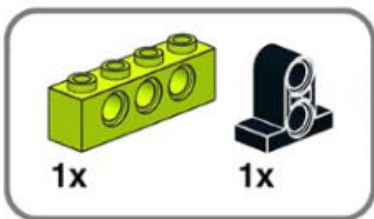


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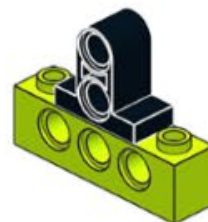
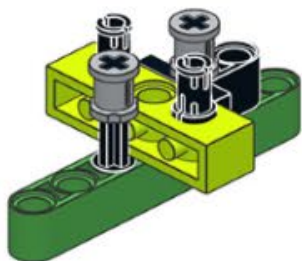


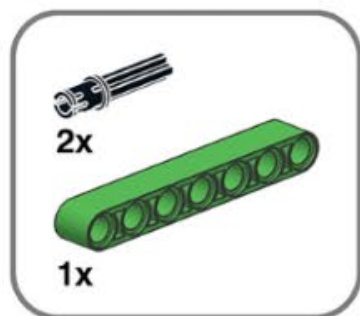
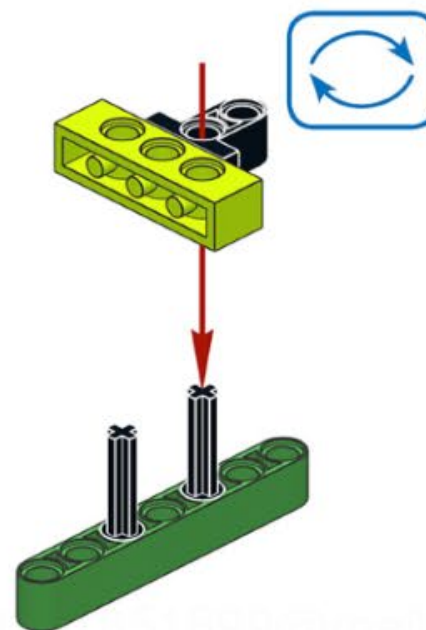
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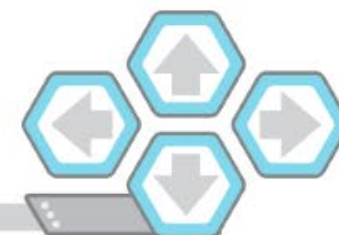


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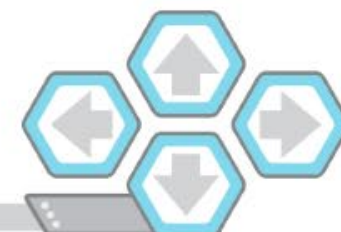
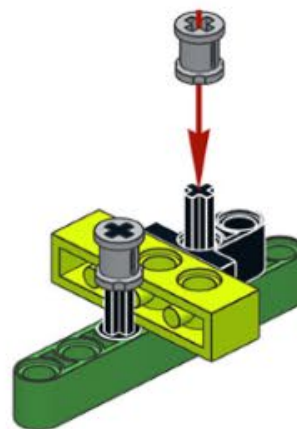
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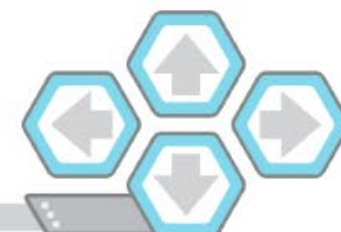
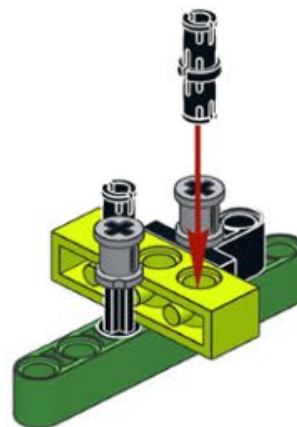
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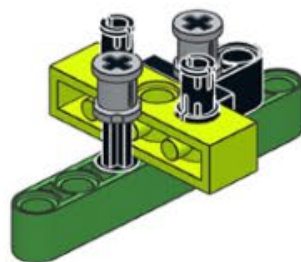
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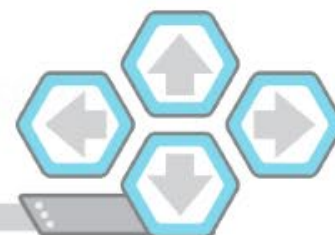




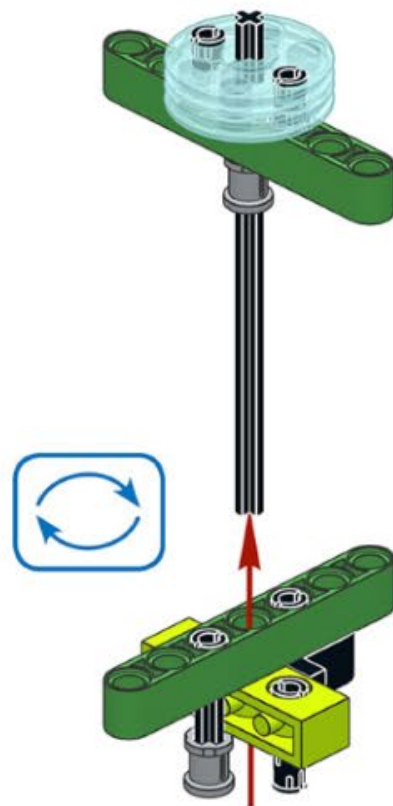
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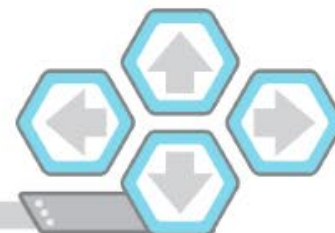


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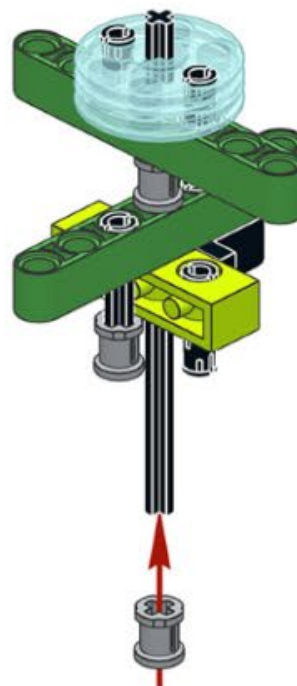
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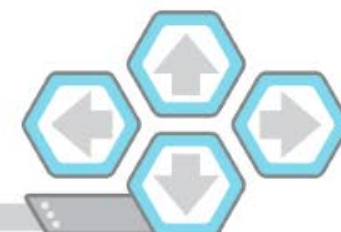


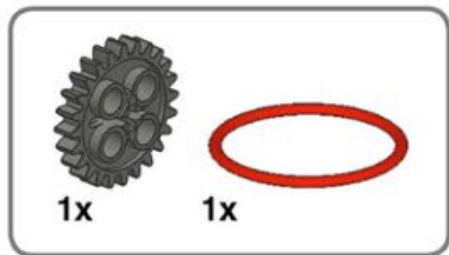


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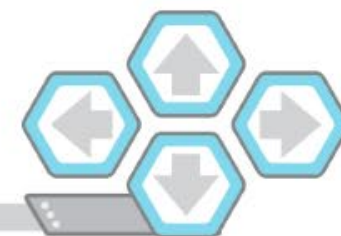
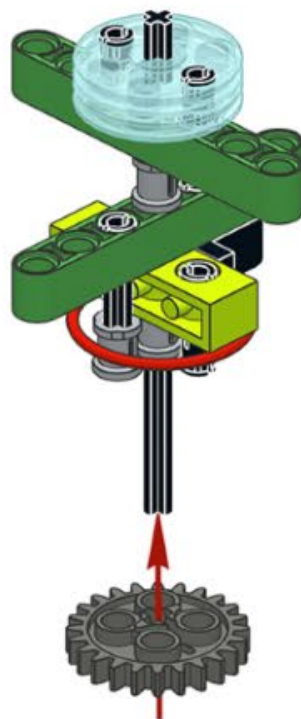


04371851599@mail.ru



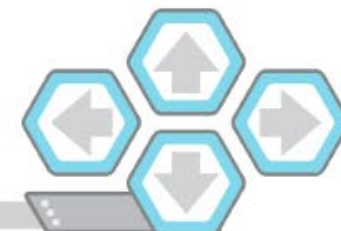
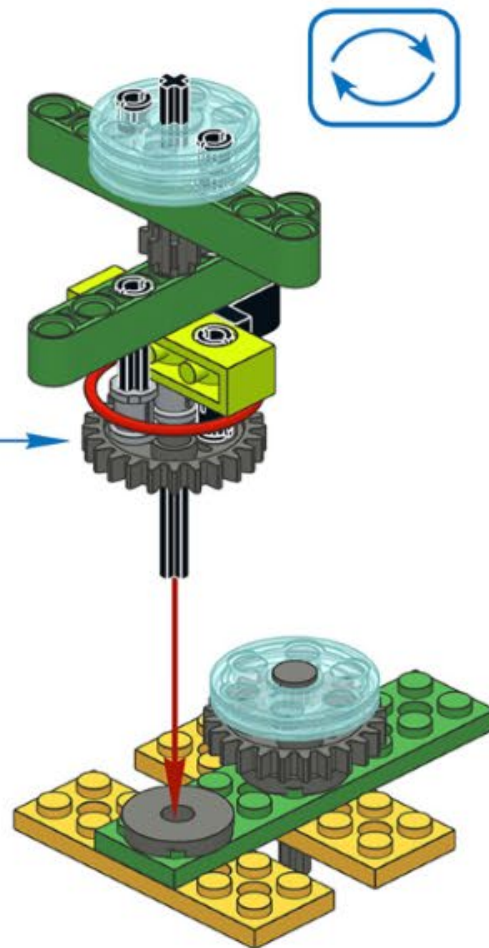


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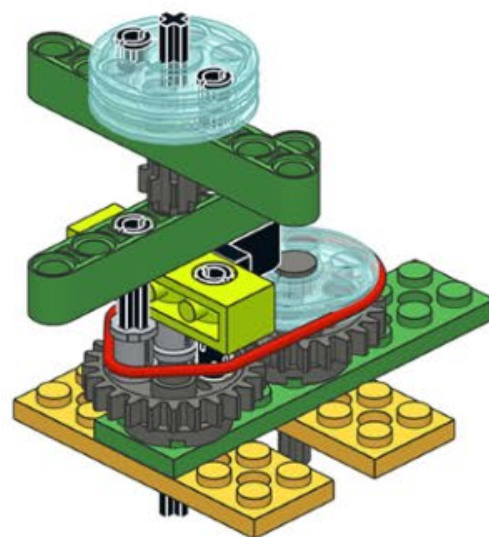


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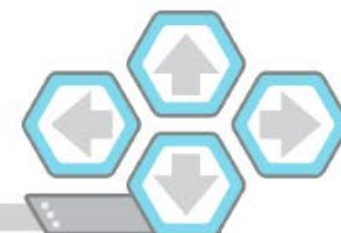
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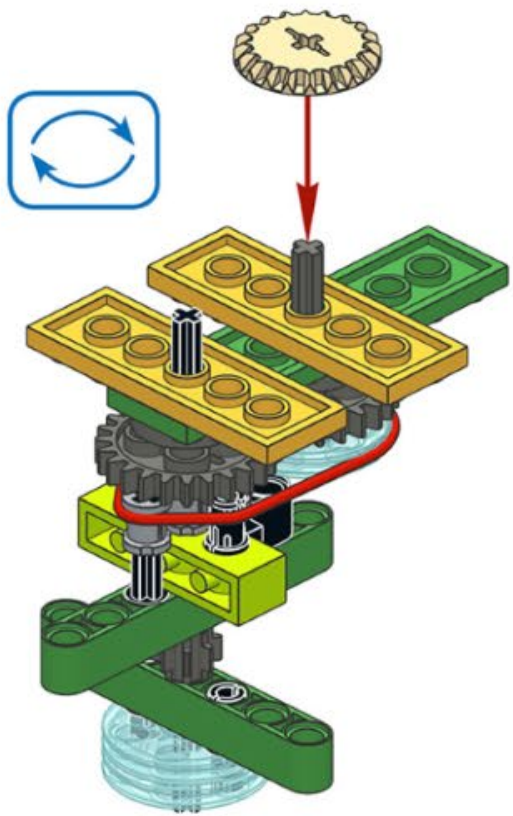


89371051699@mail.ru

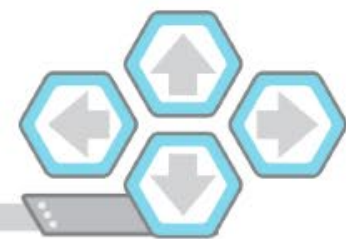




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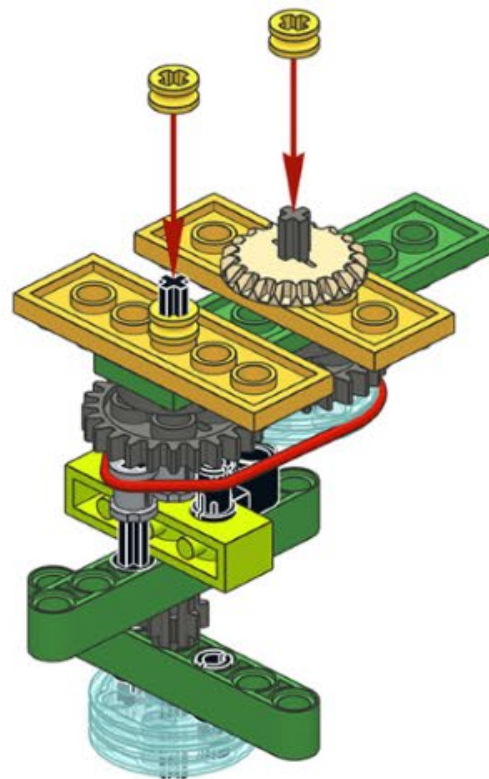


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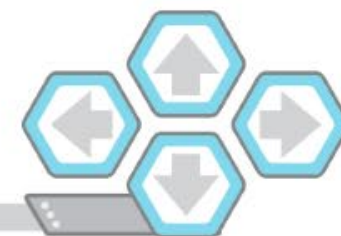




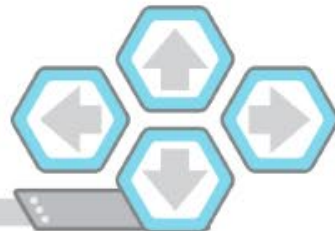
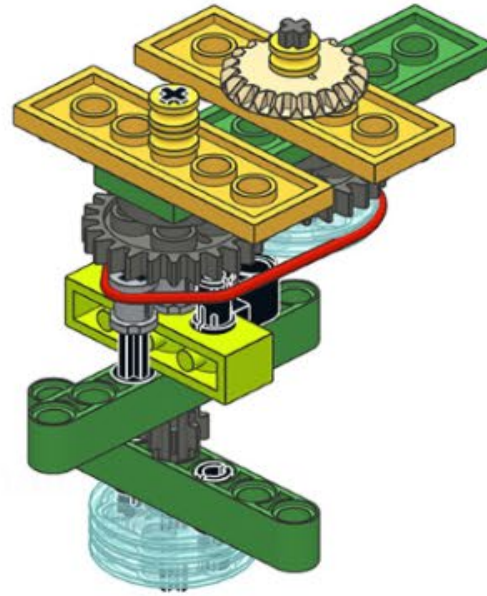
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2837061690@mail.ru

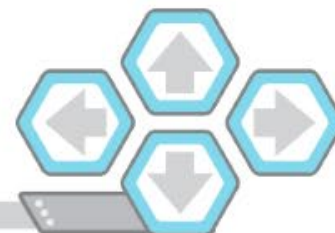
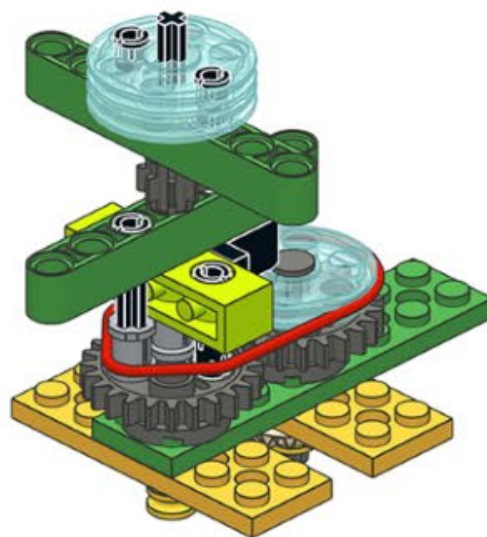


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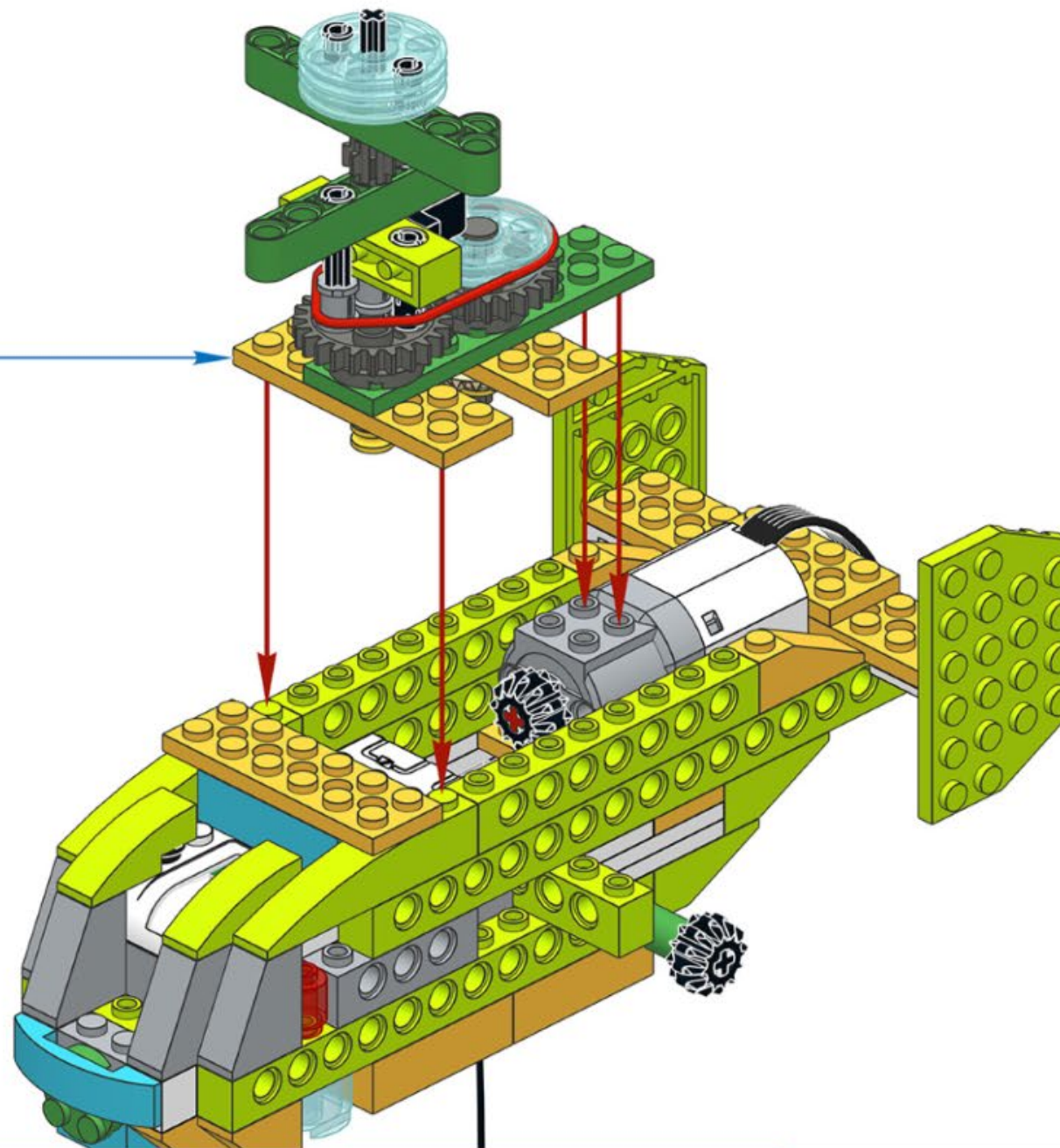


69371051699@mail.ru

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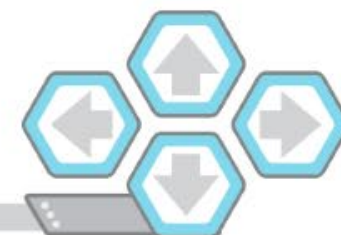
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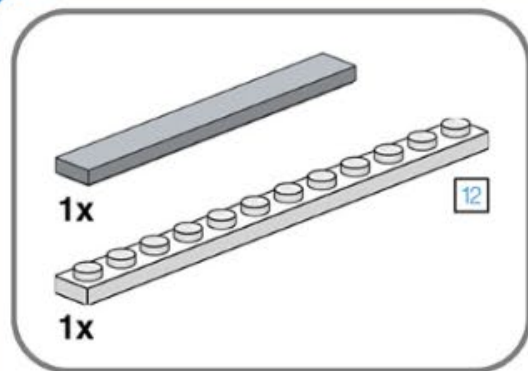


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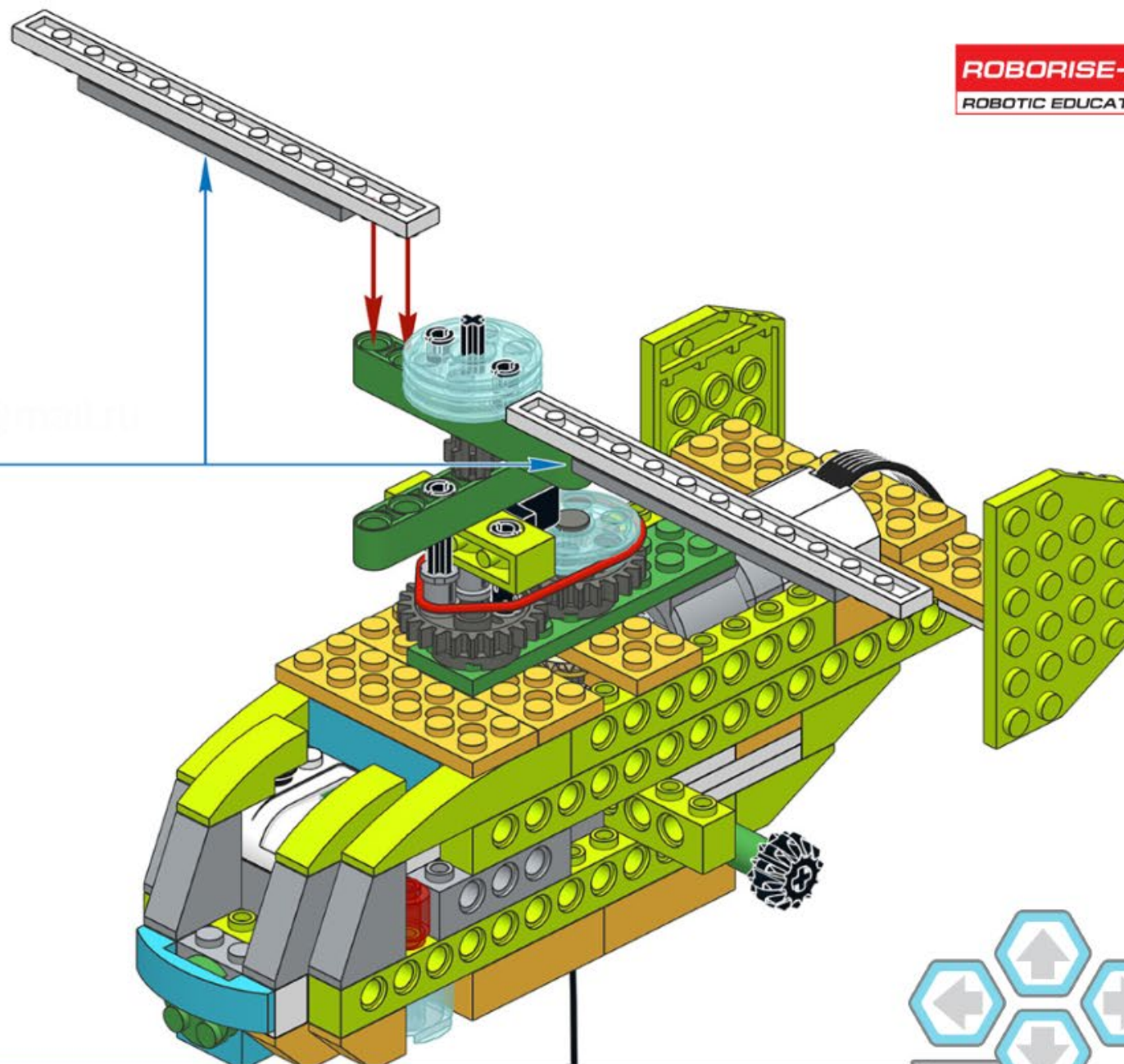
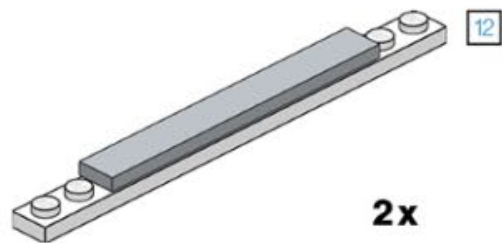
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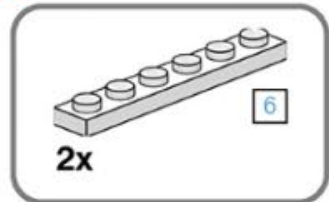
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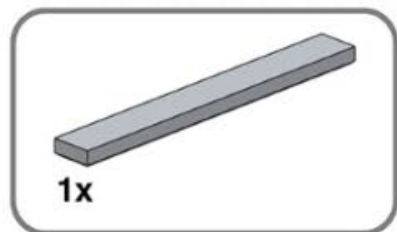
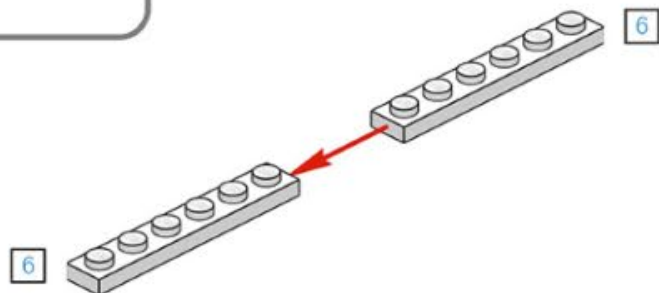


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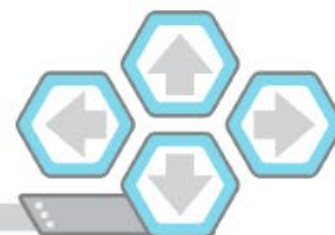
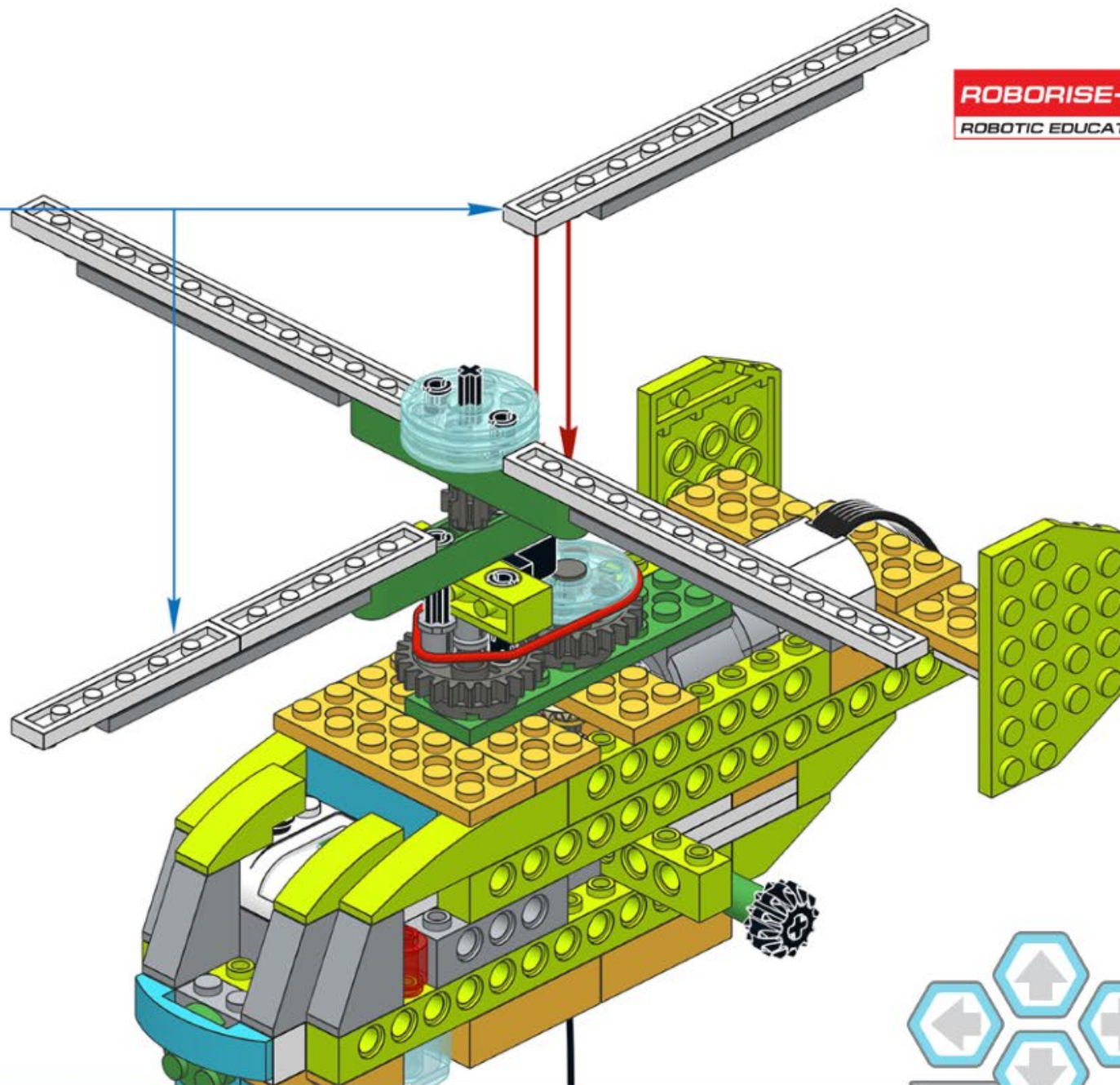
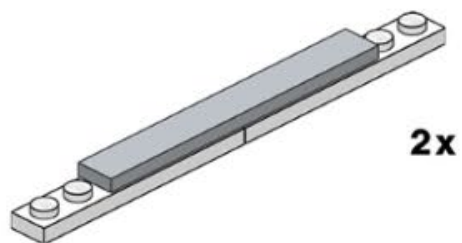




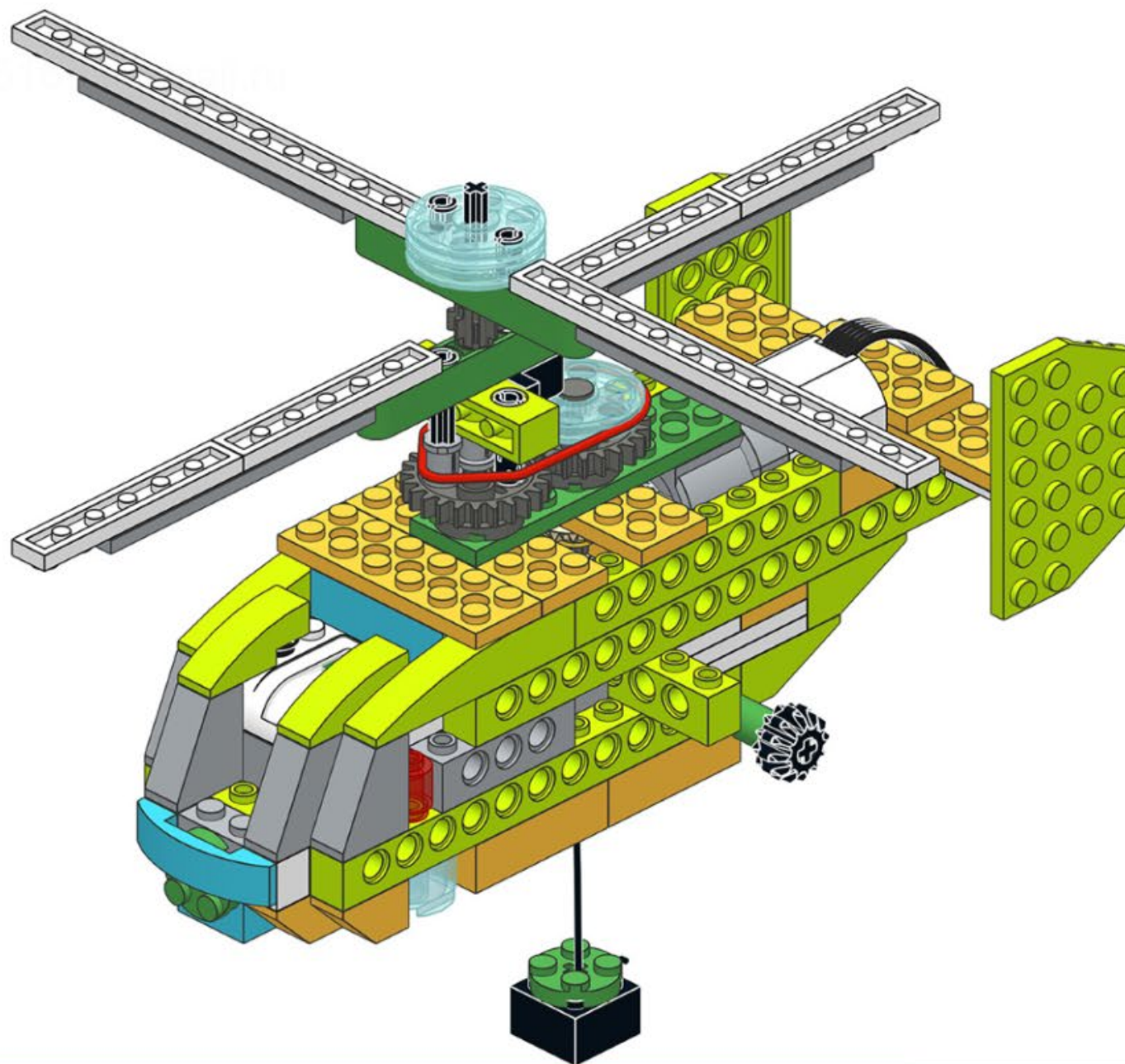
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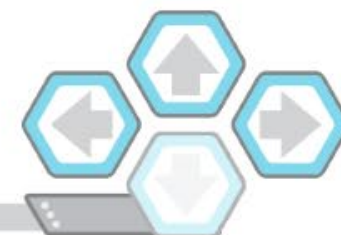
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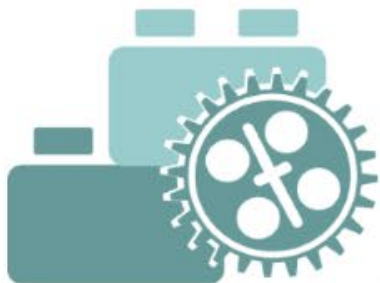
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Расширенная версия

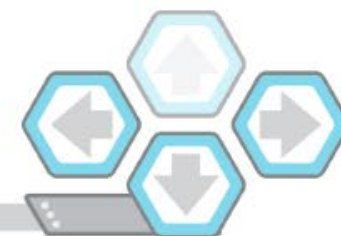
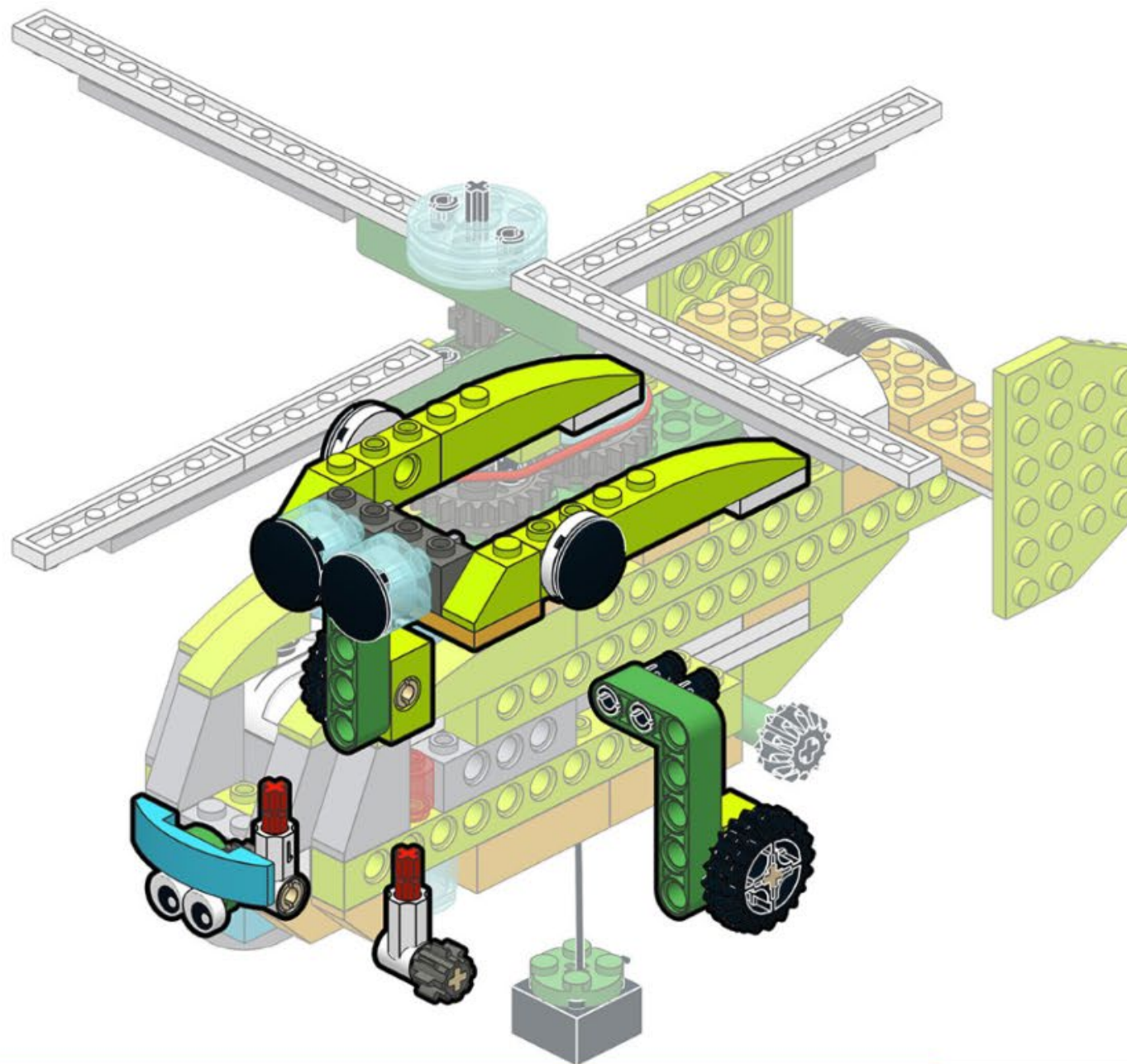
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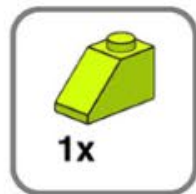


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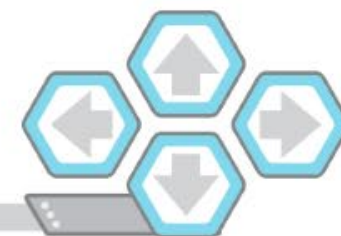
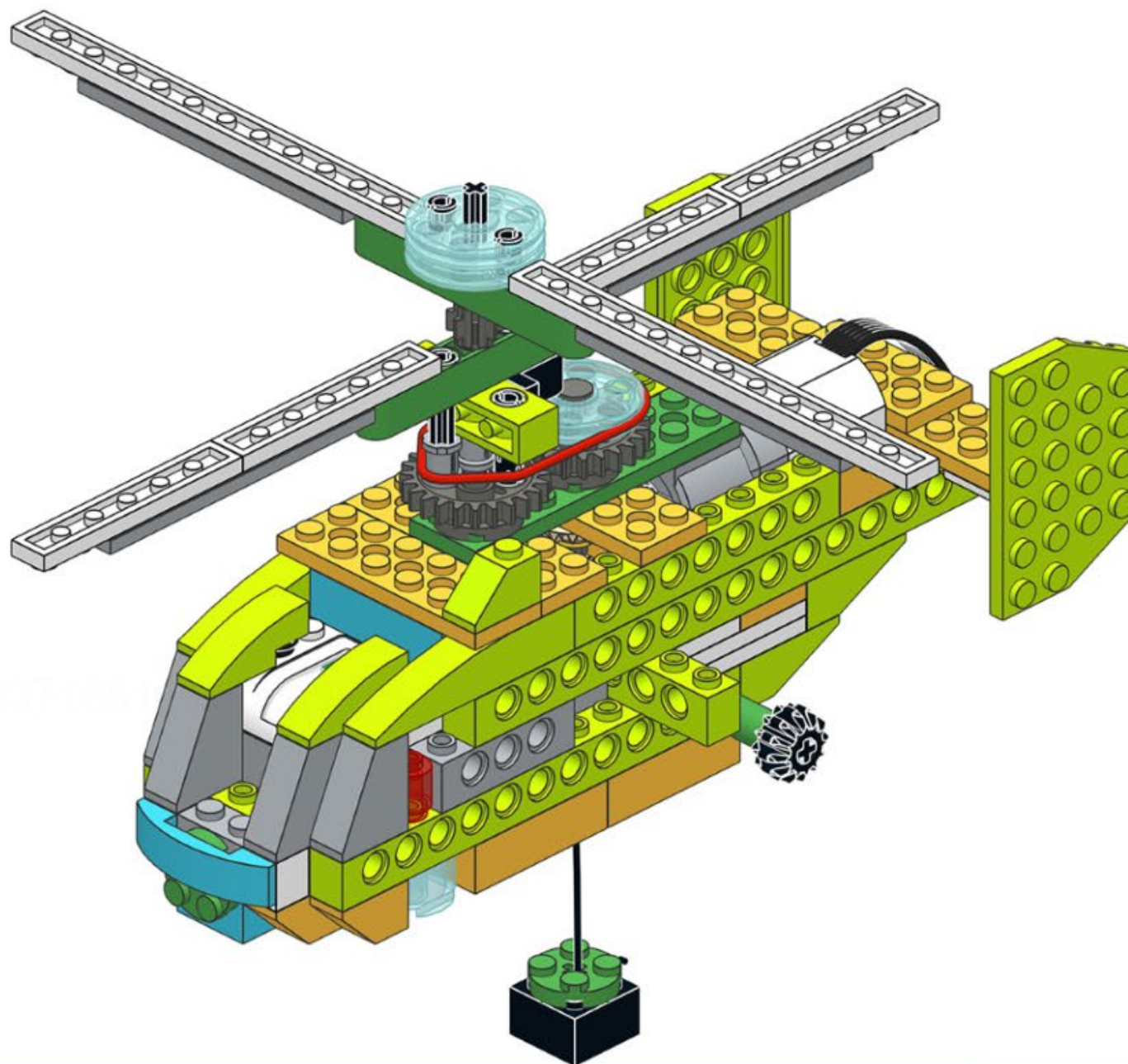


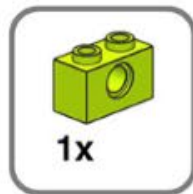
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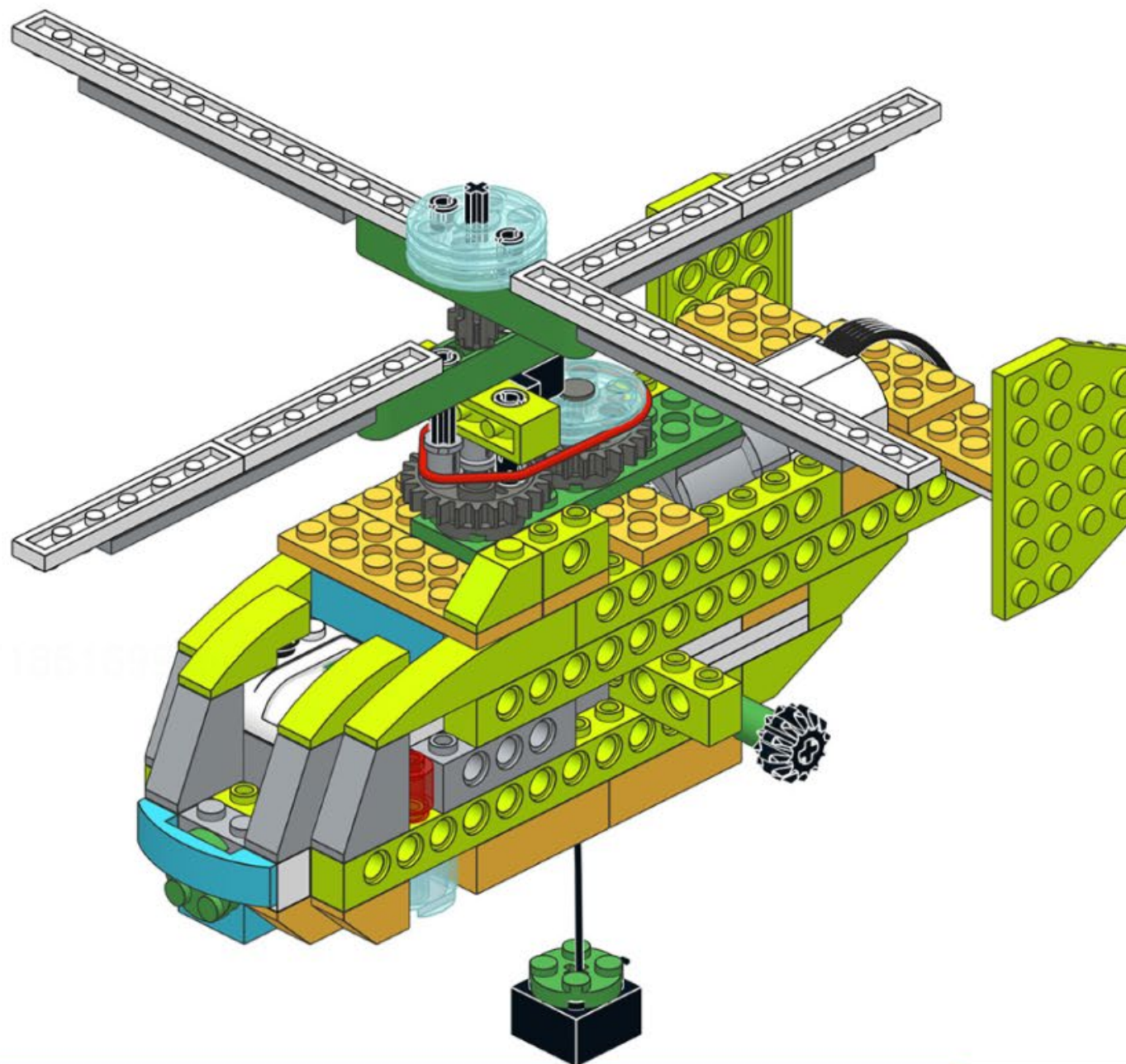


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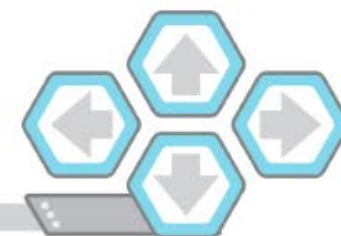


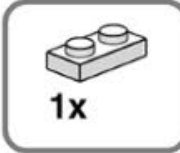


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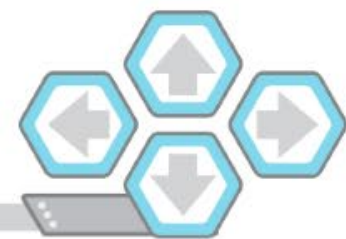
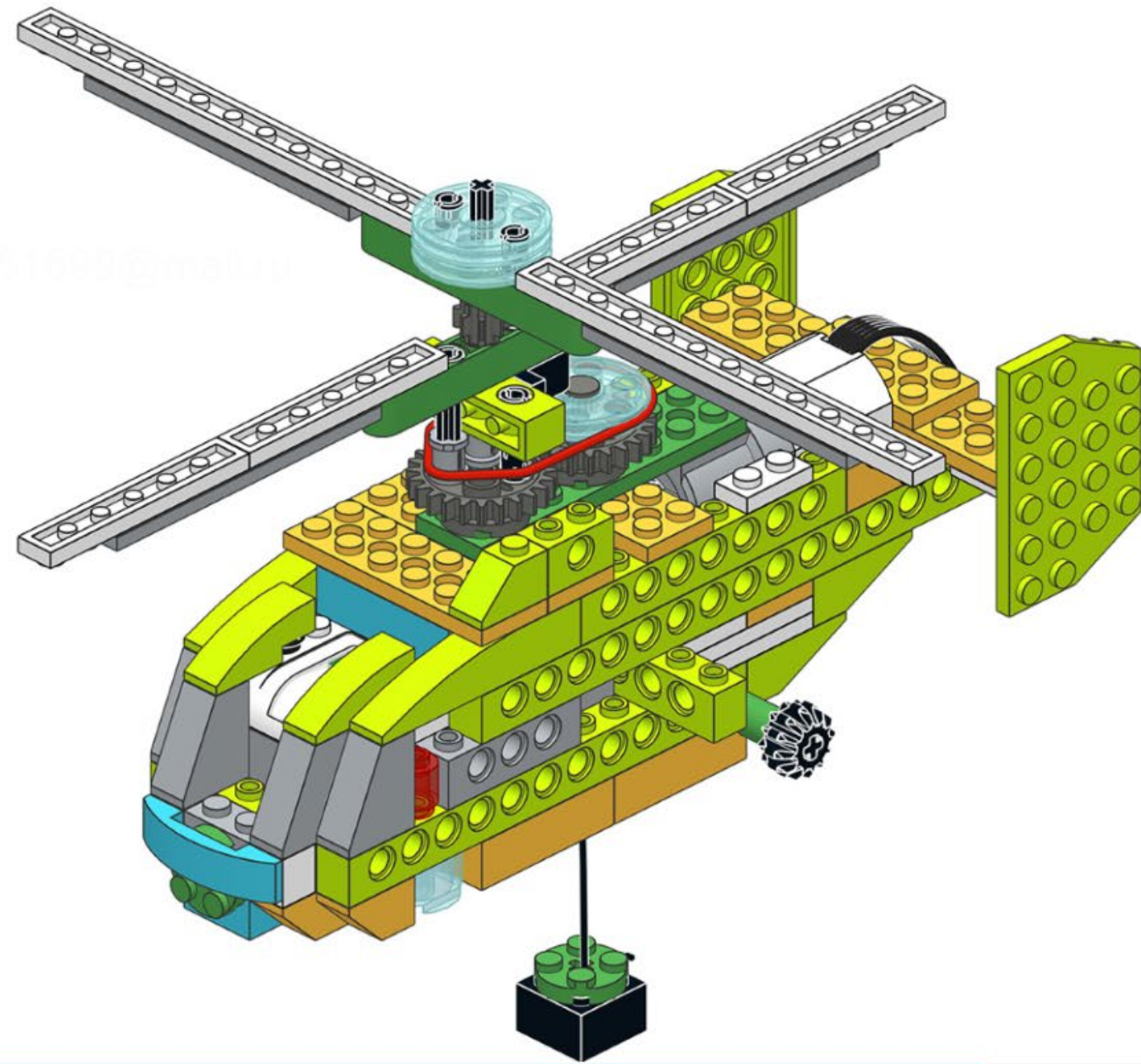


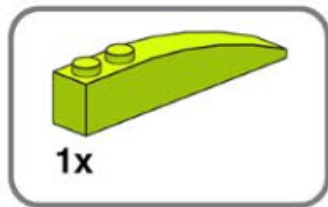
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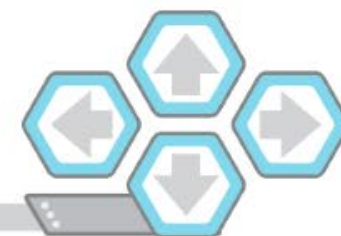
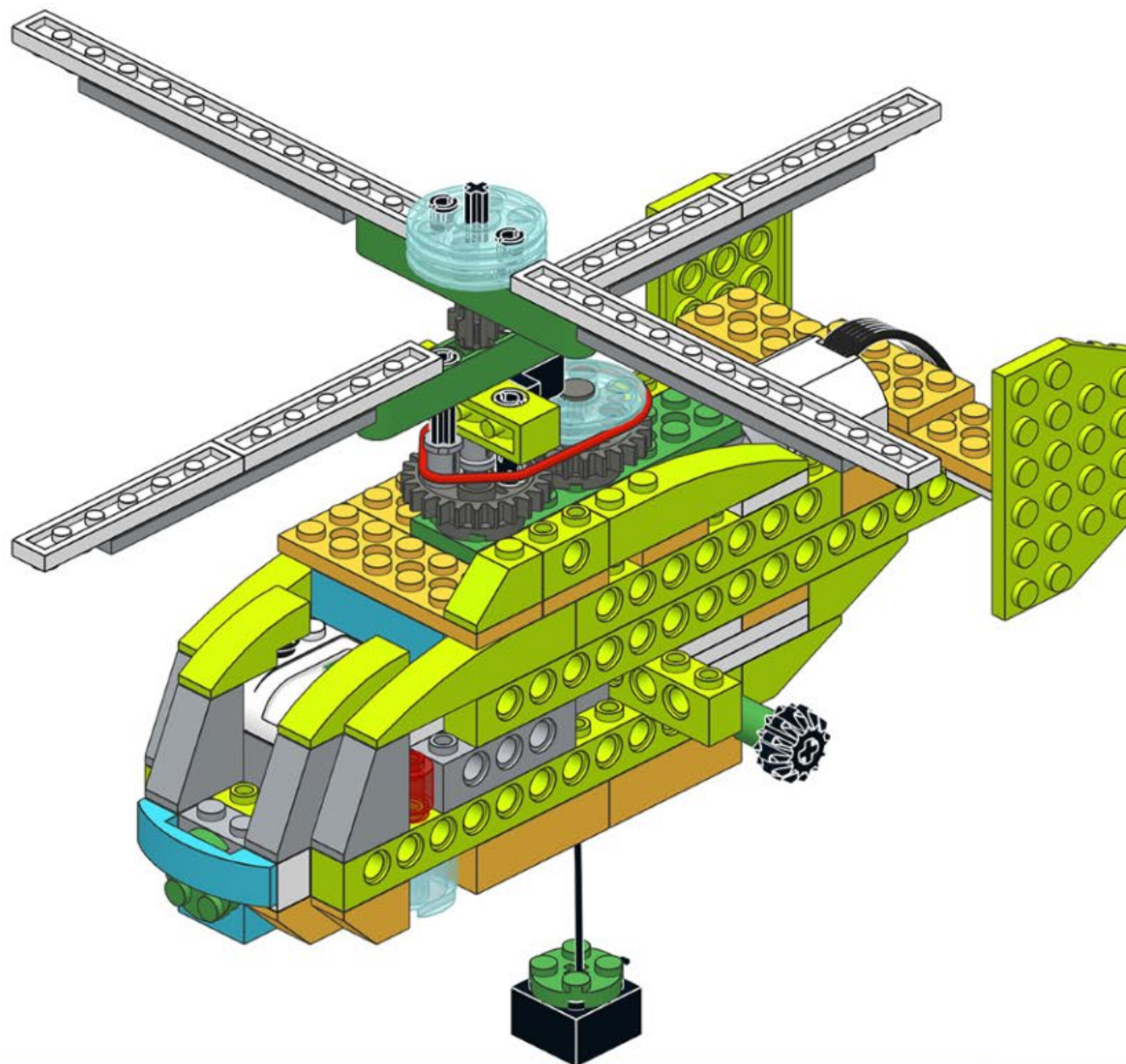


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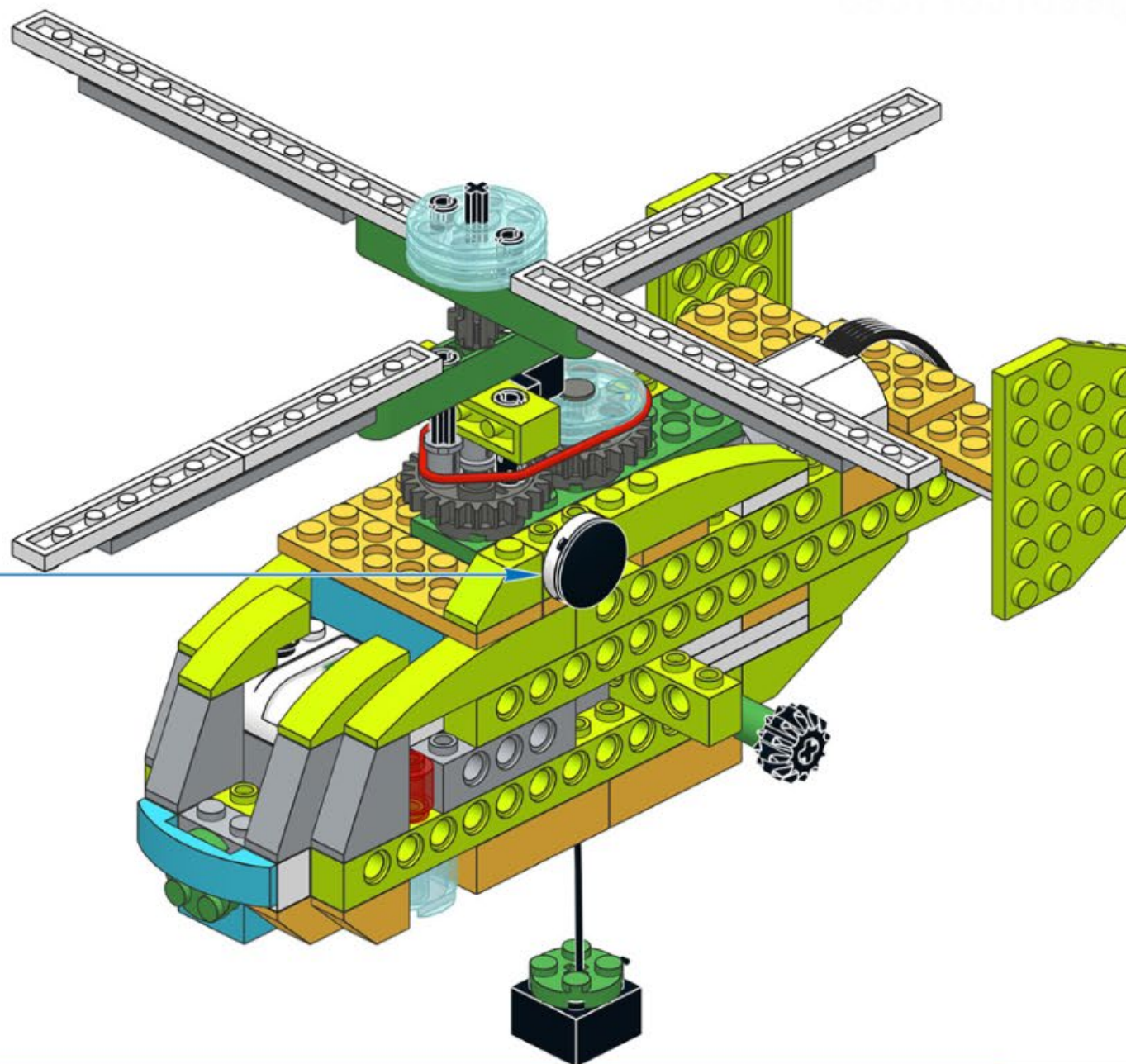
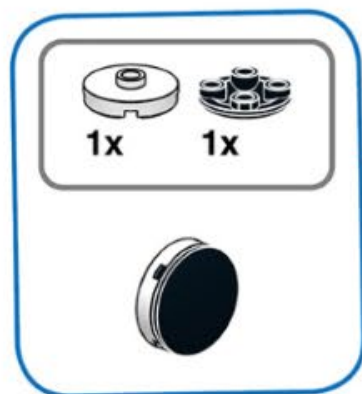




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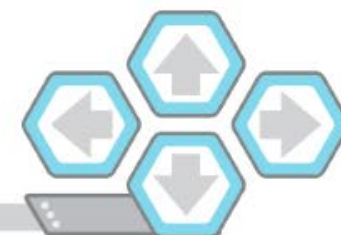
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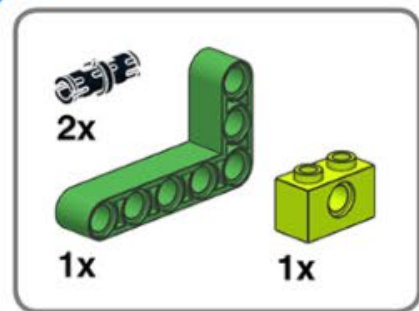
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98

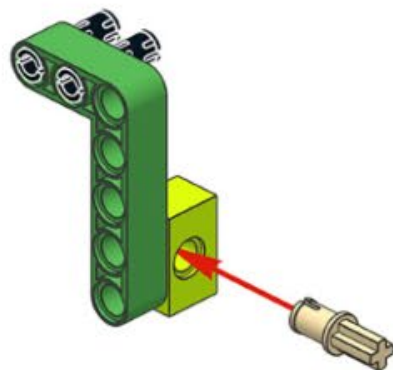




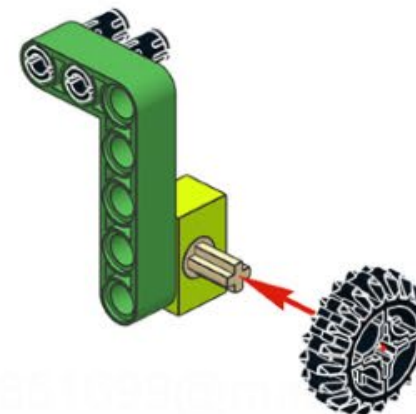
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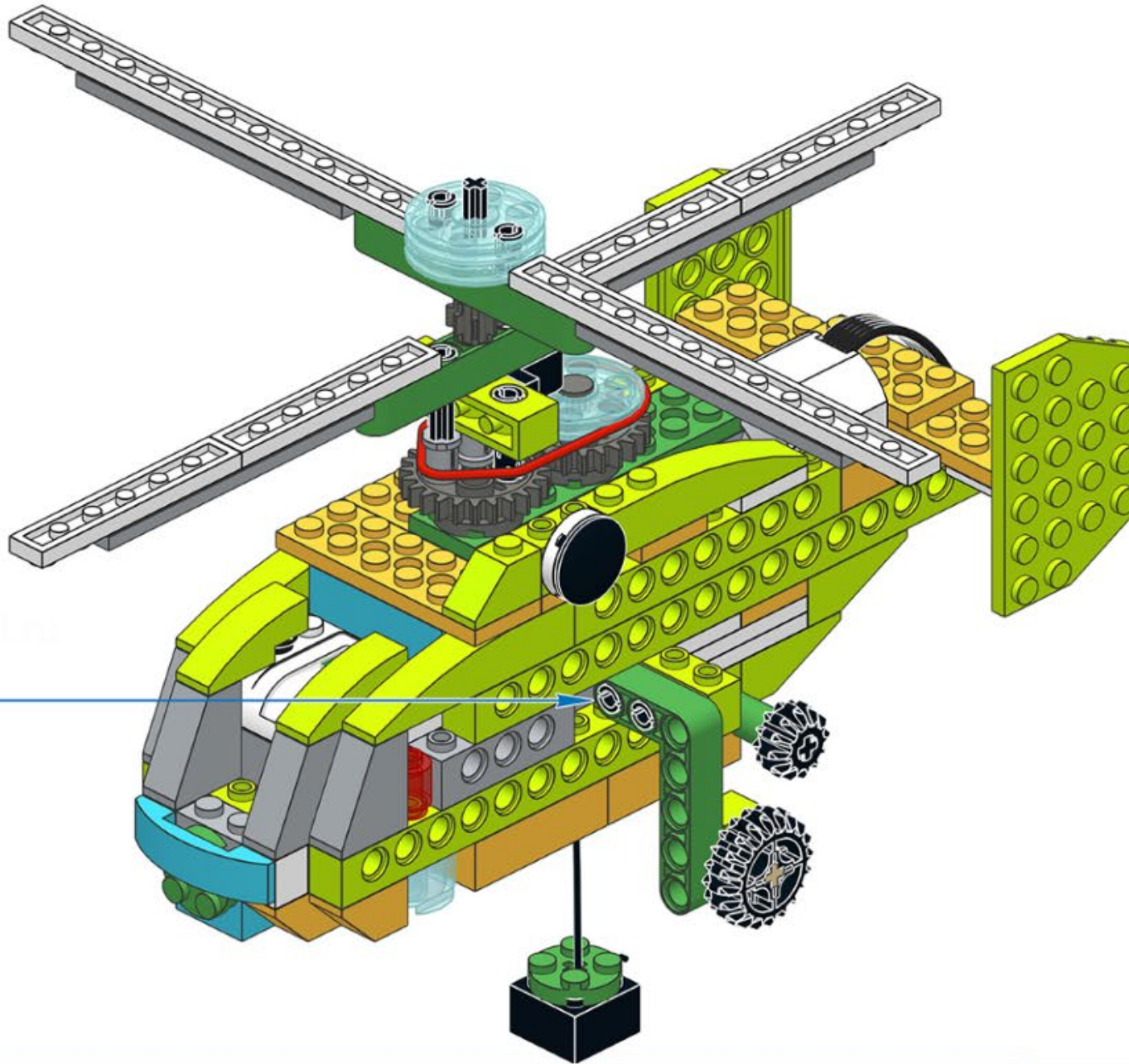
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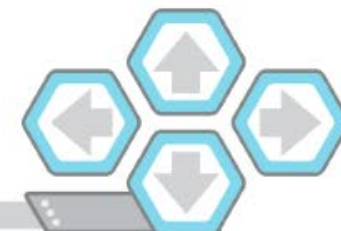
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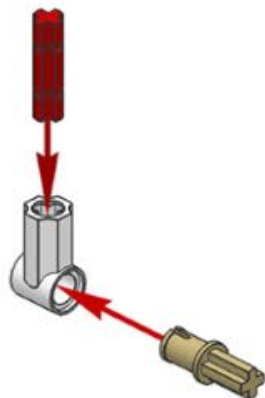
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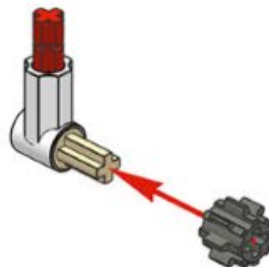




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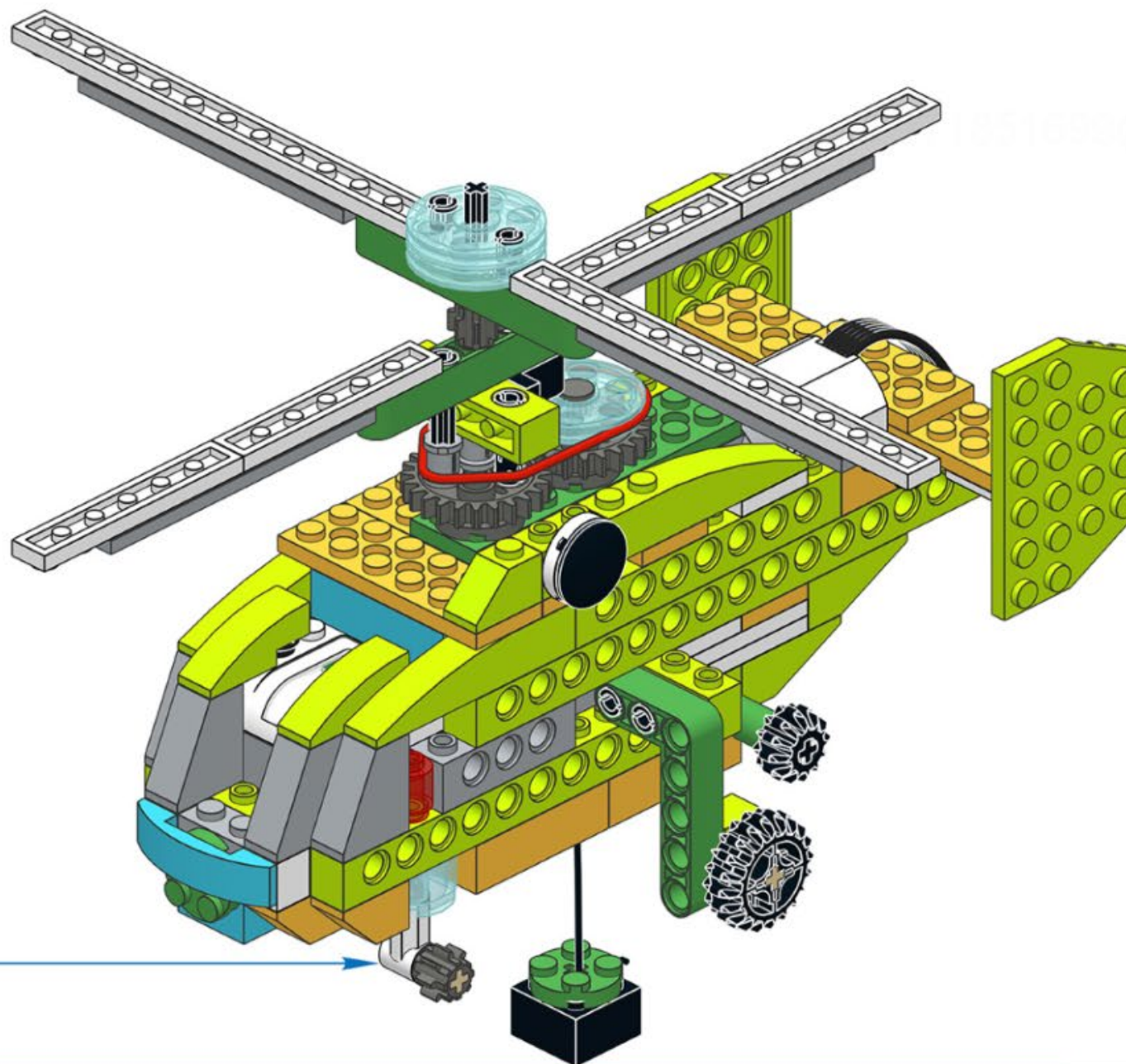
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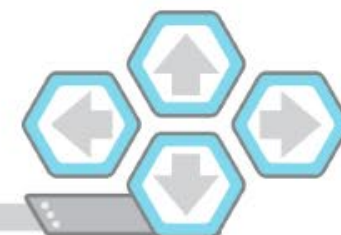
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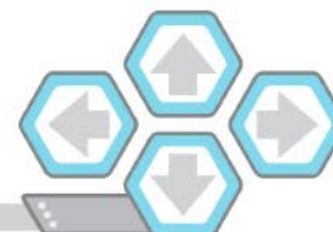
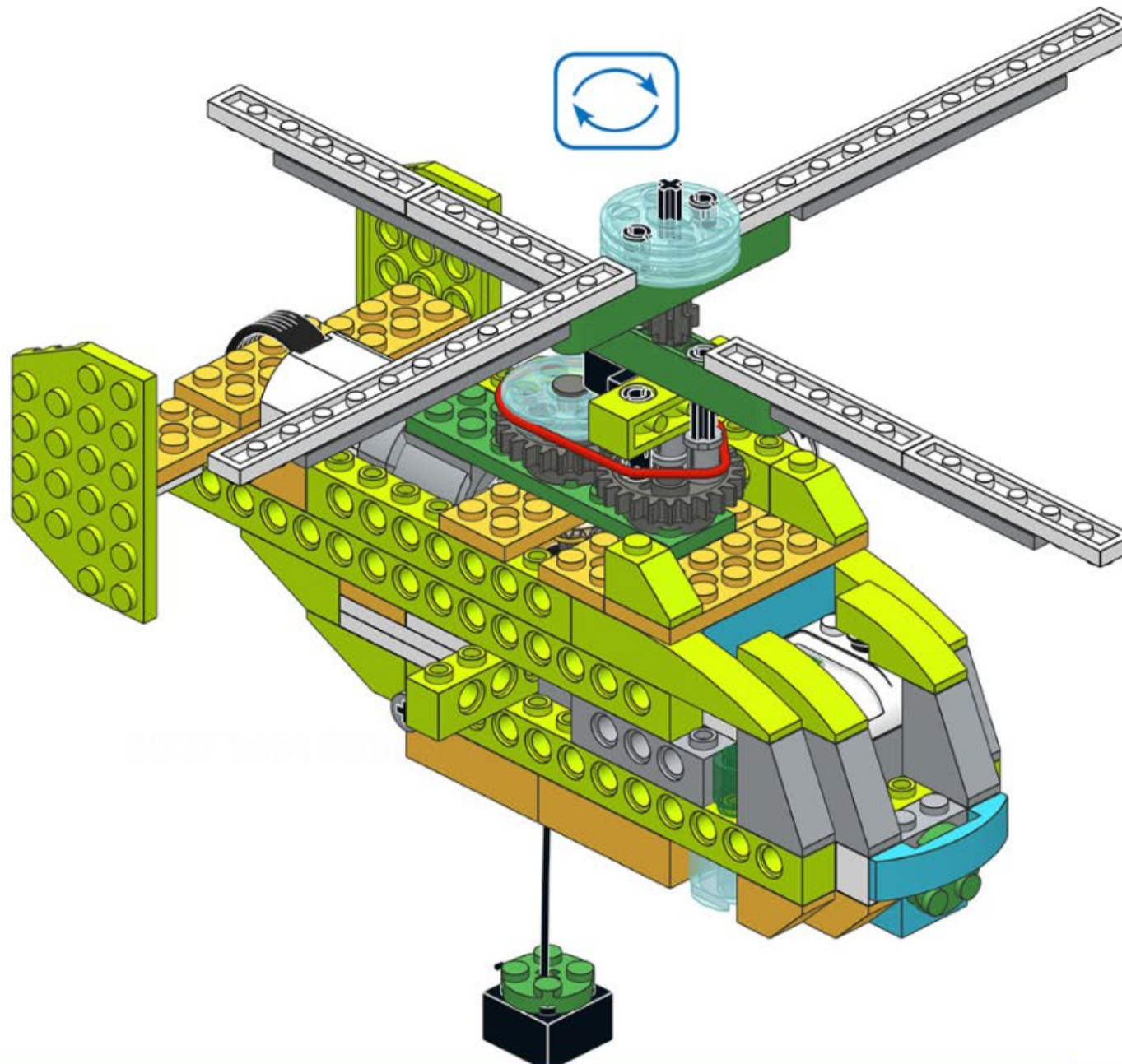
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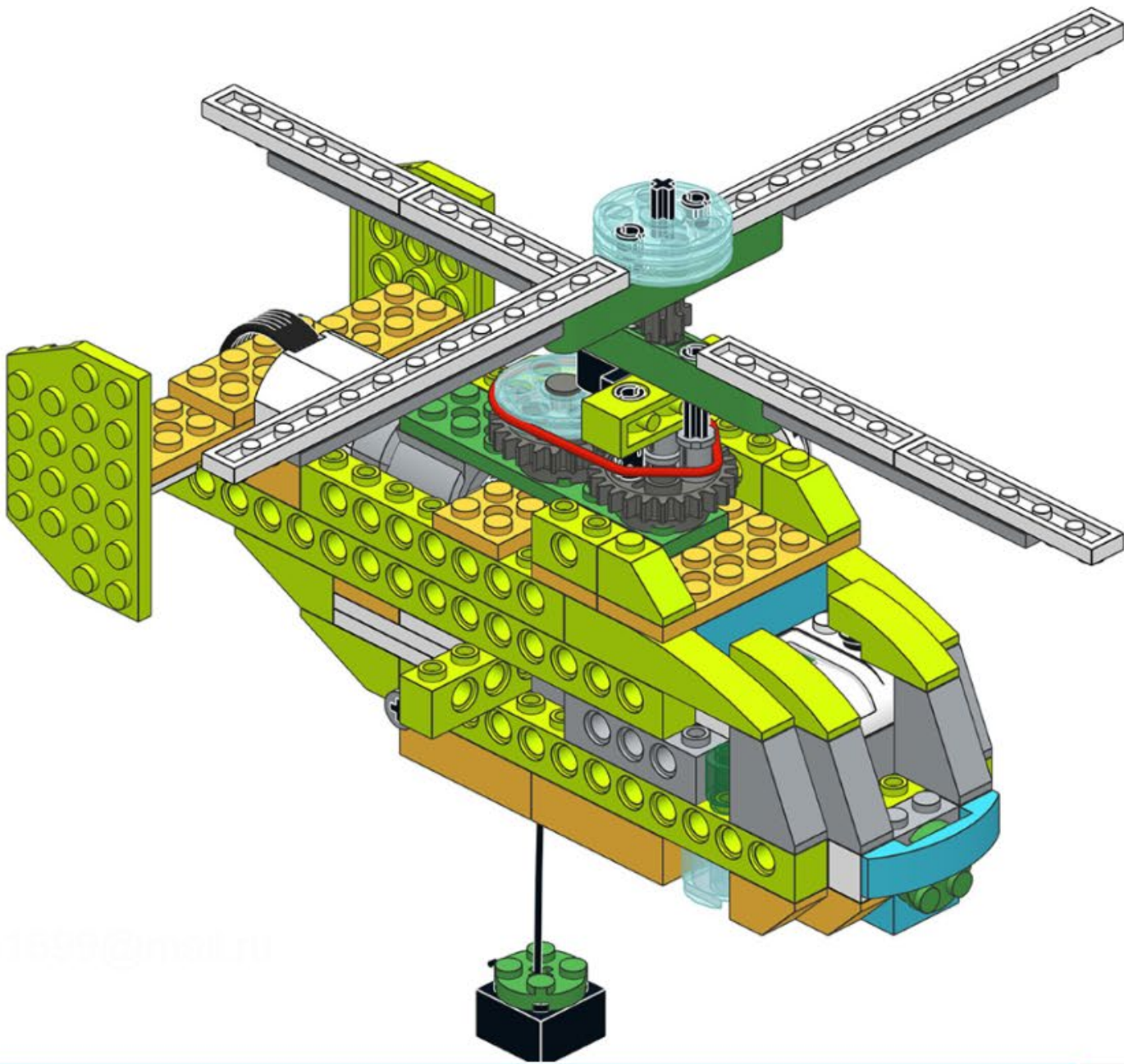


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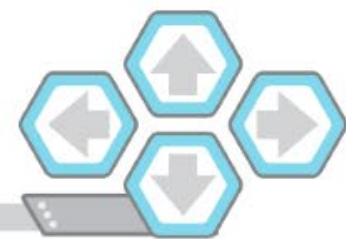
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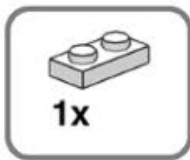


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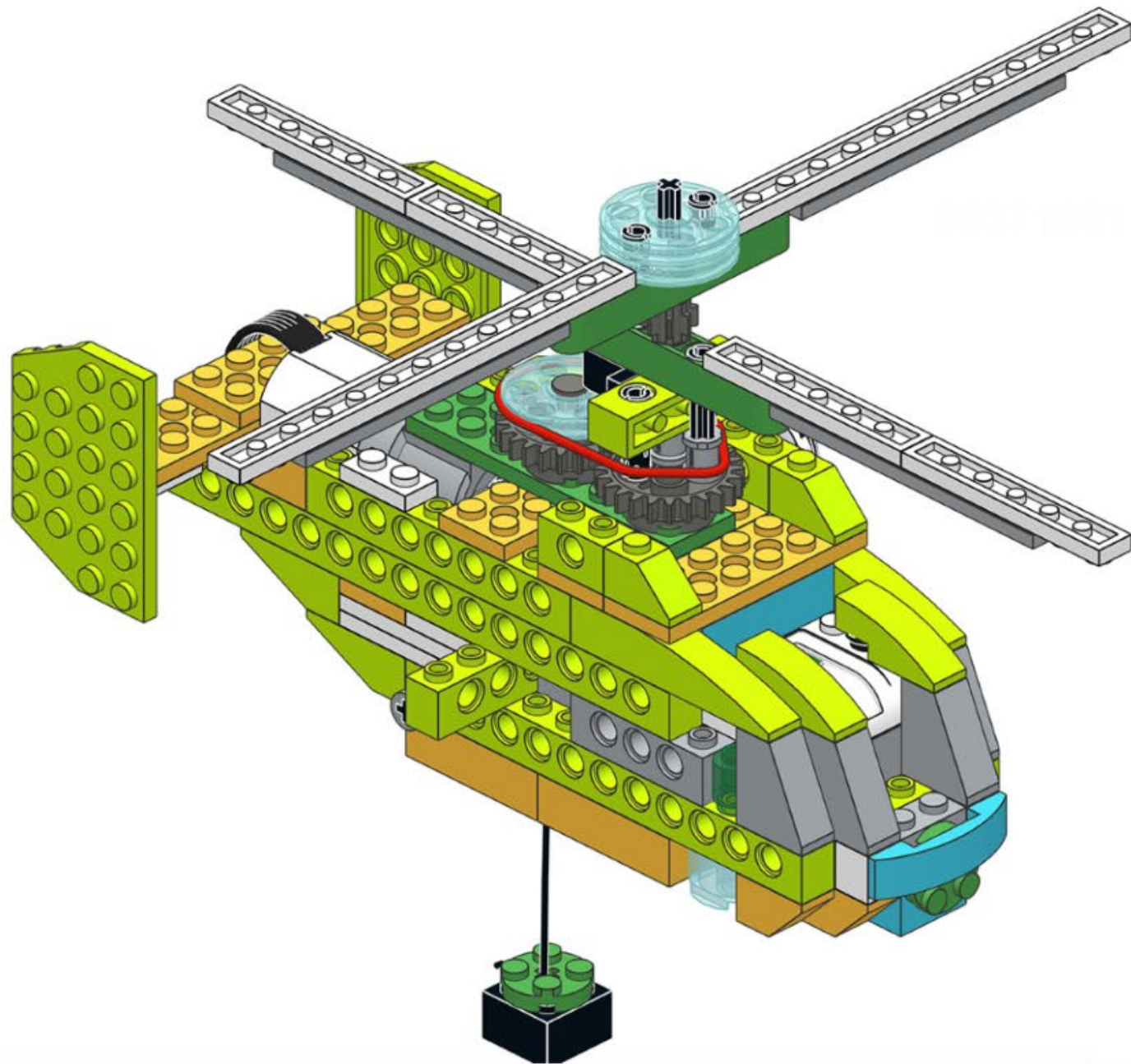
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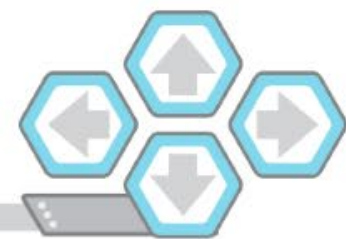


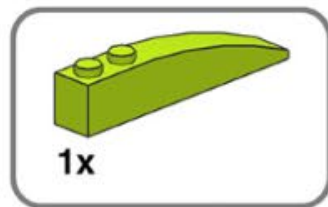
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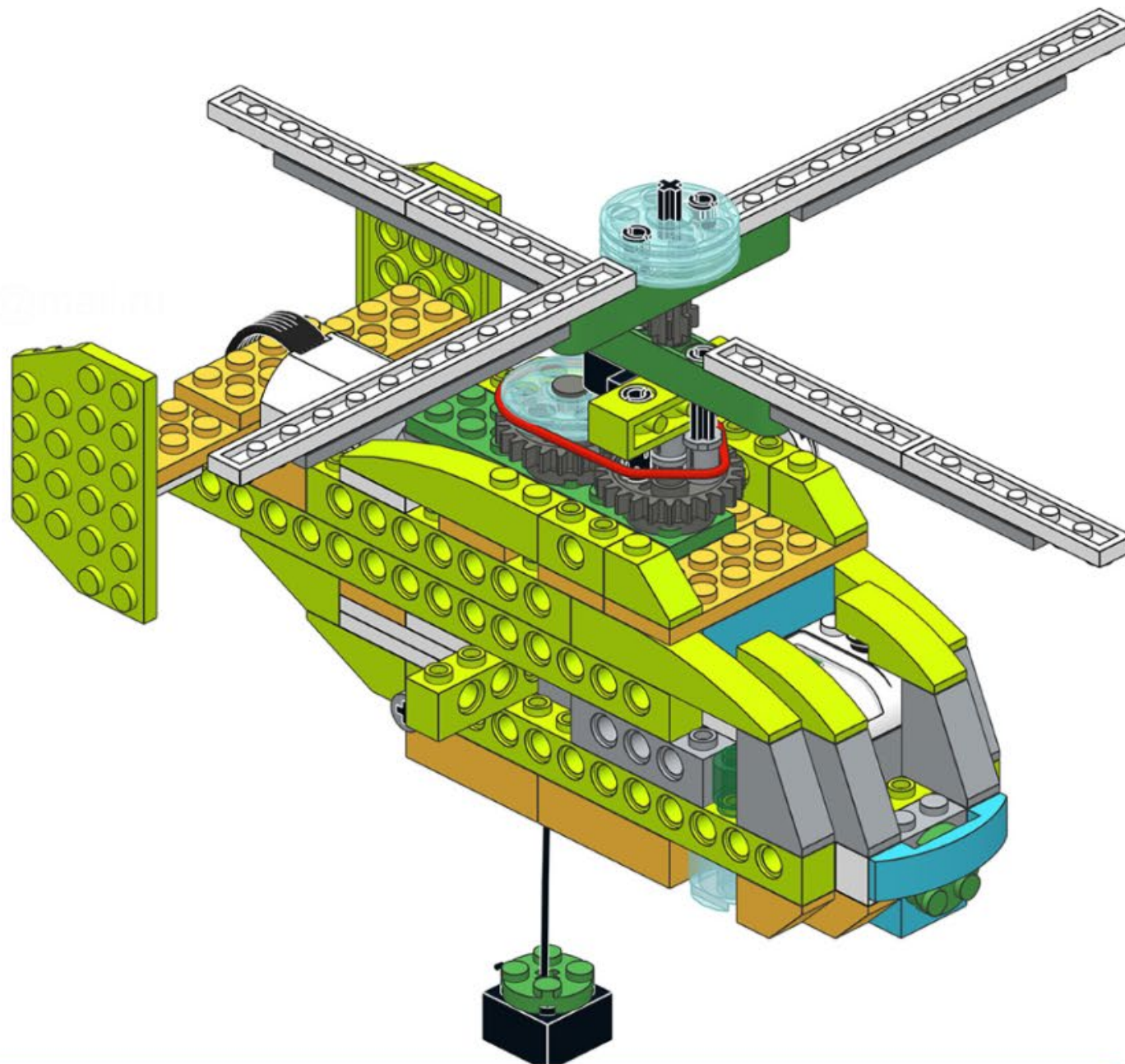
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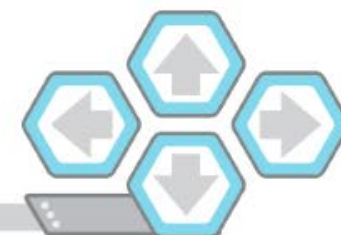
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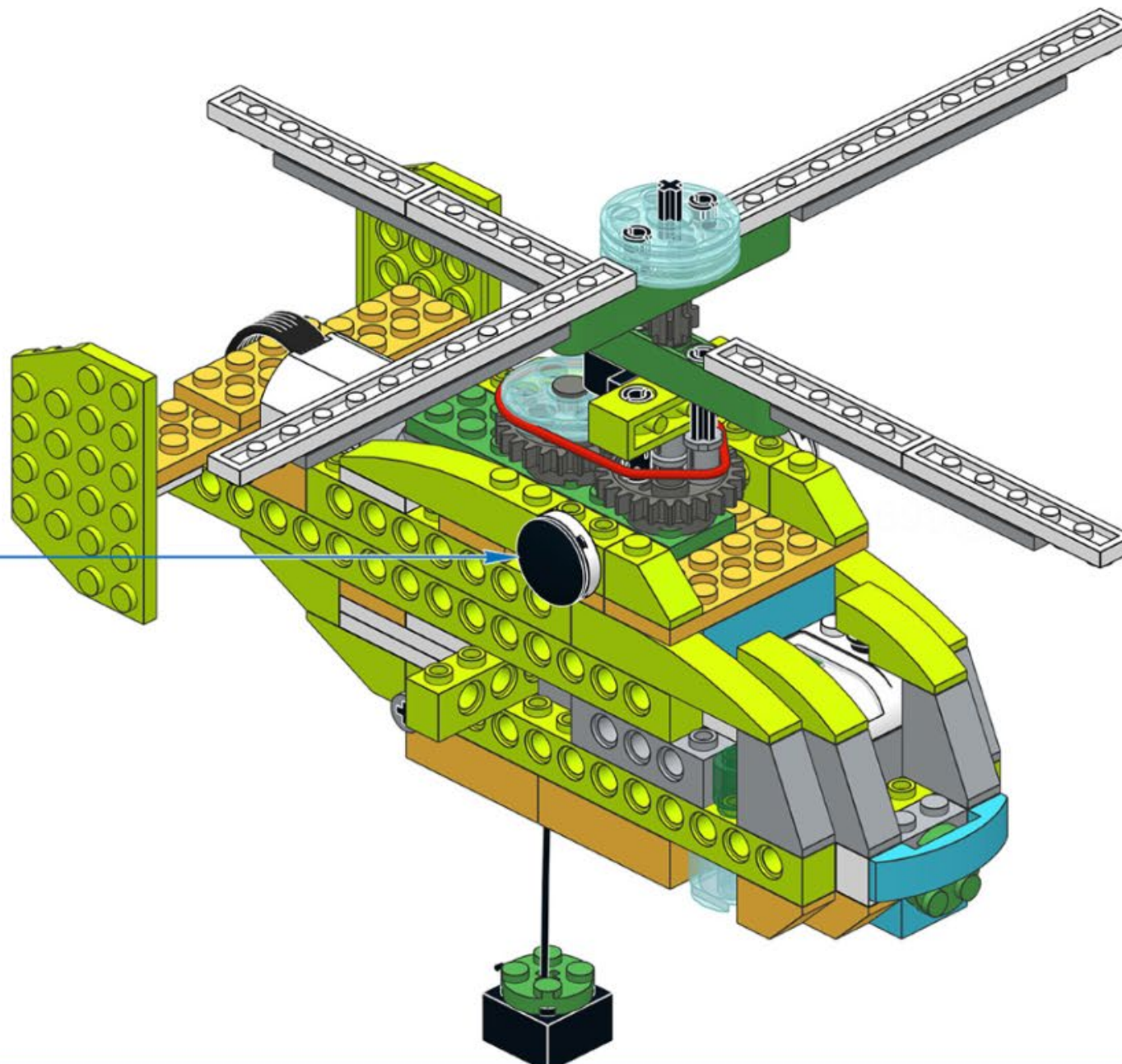
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56



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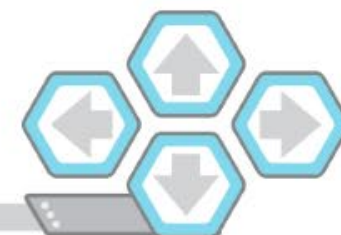


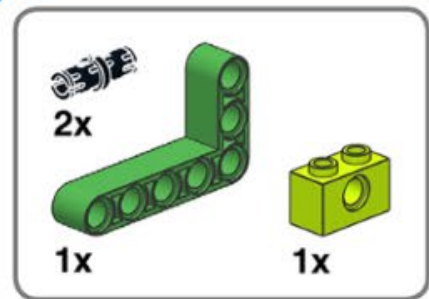
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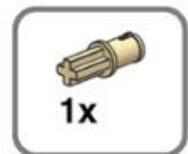
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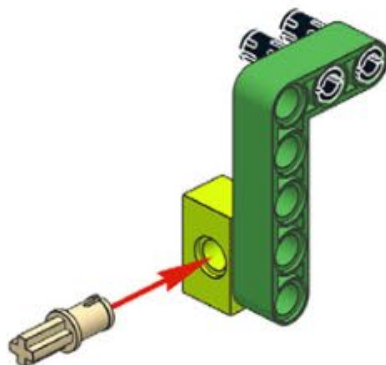




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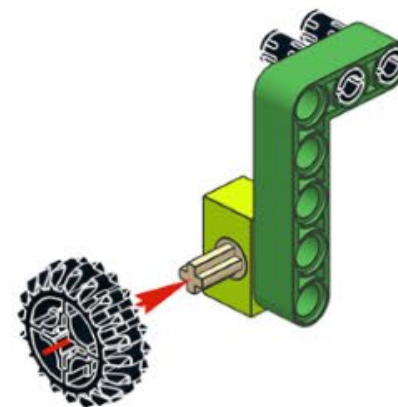


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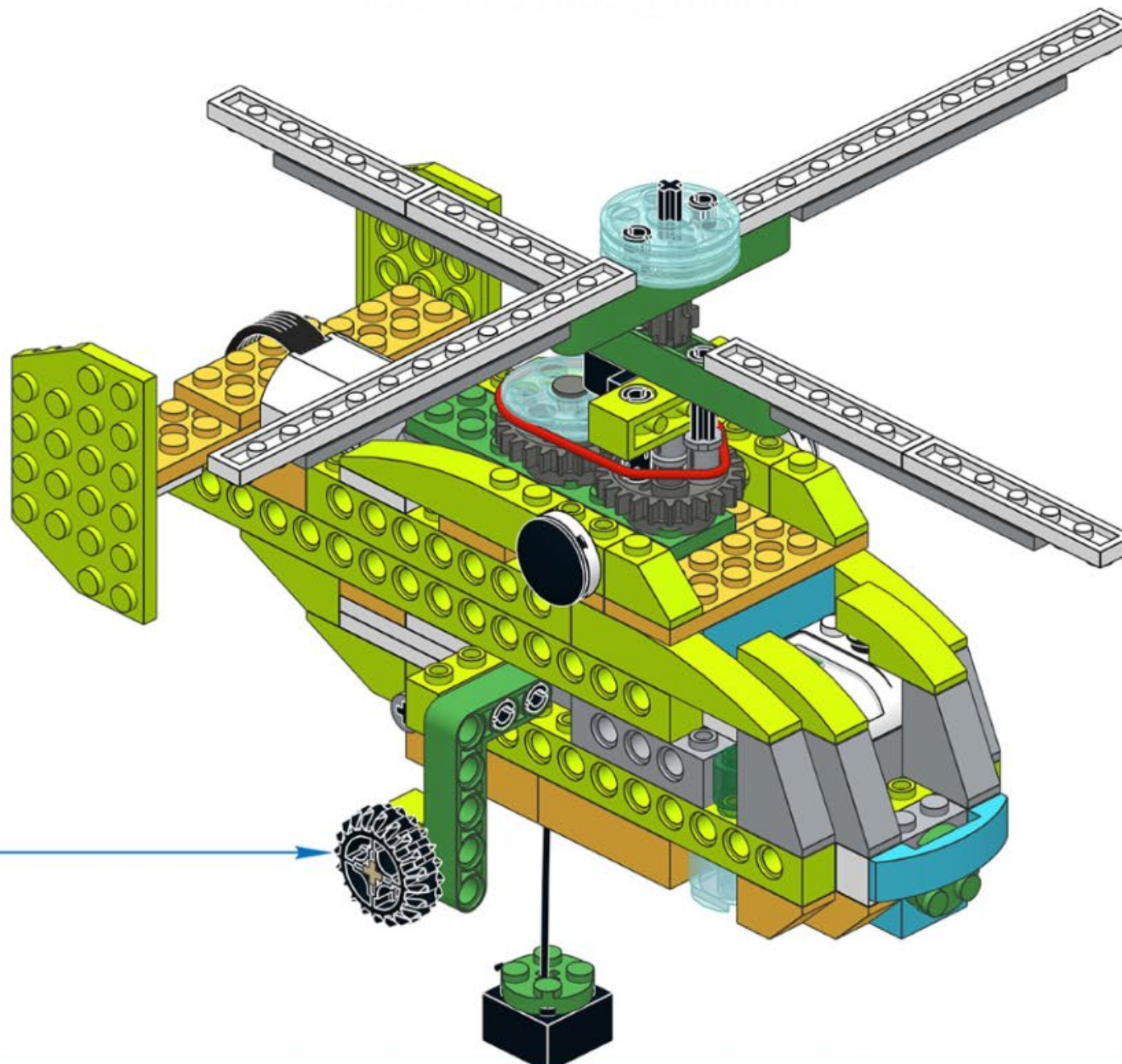


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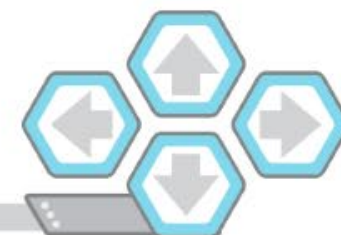
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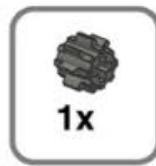
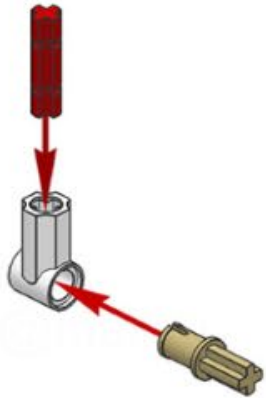
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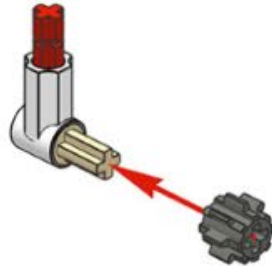




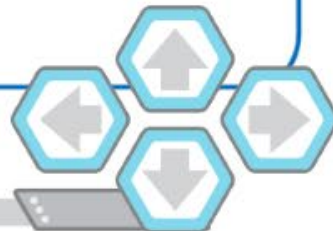
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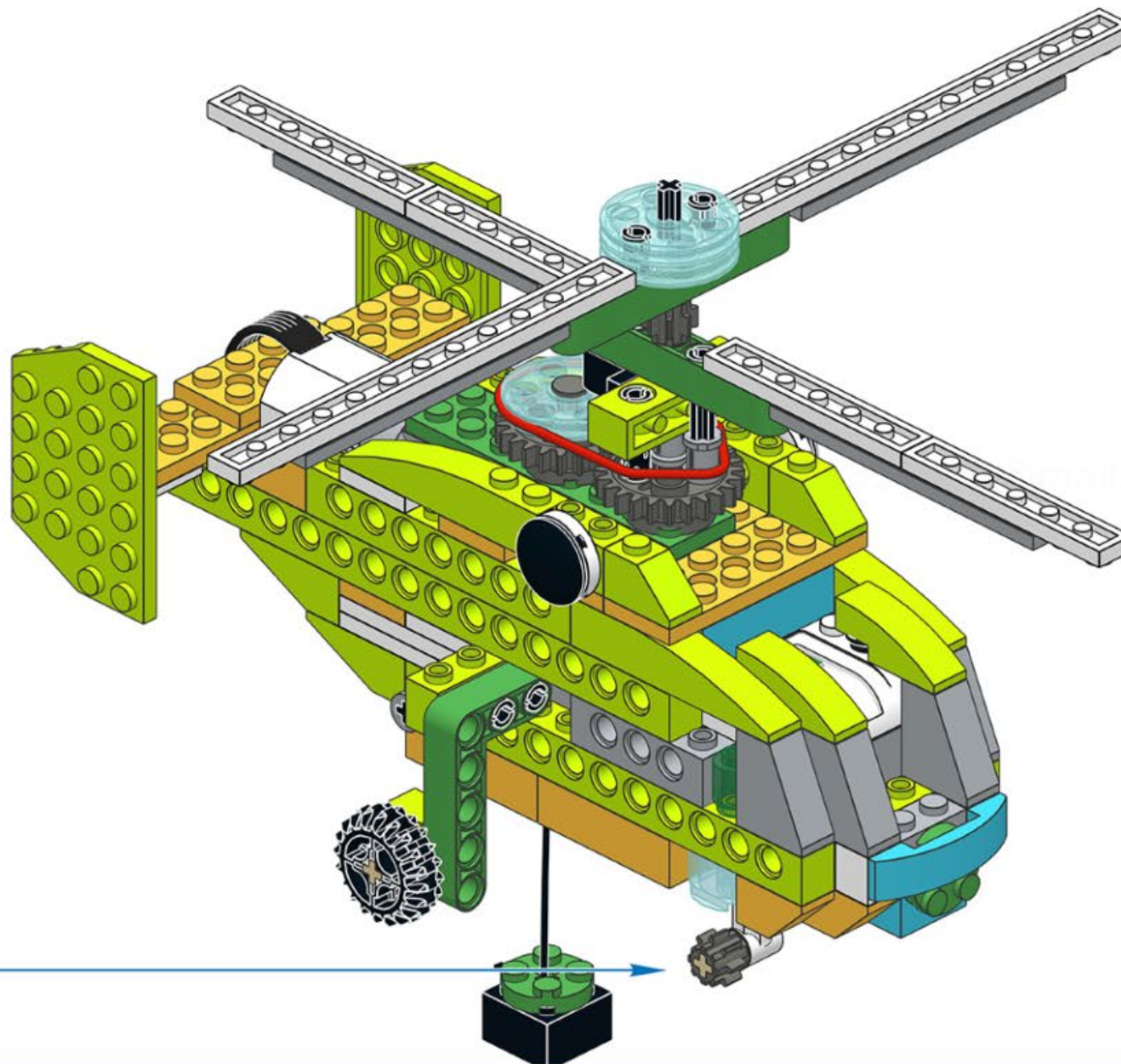
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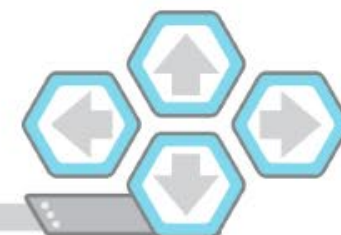
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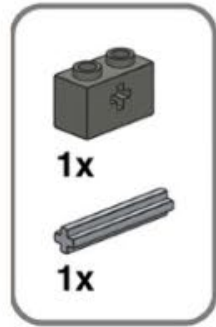


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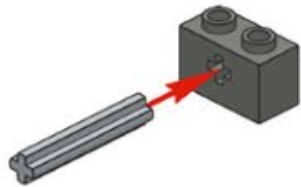
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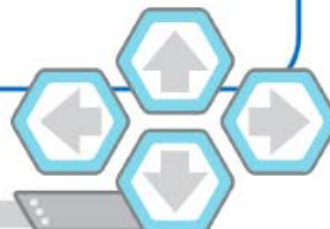
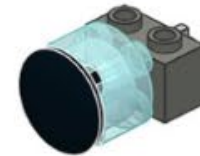
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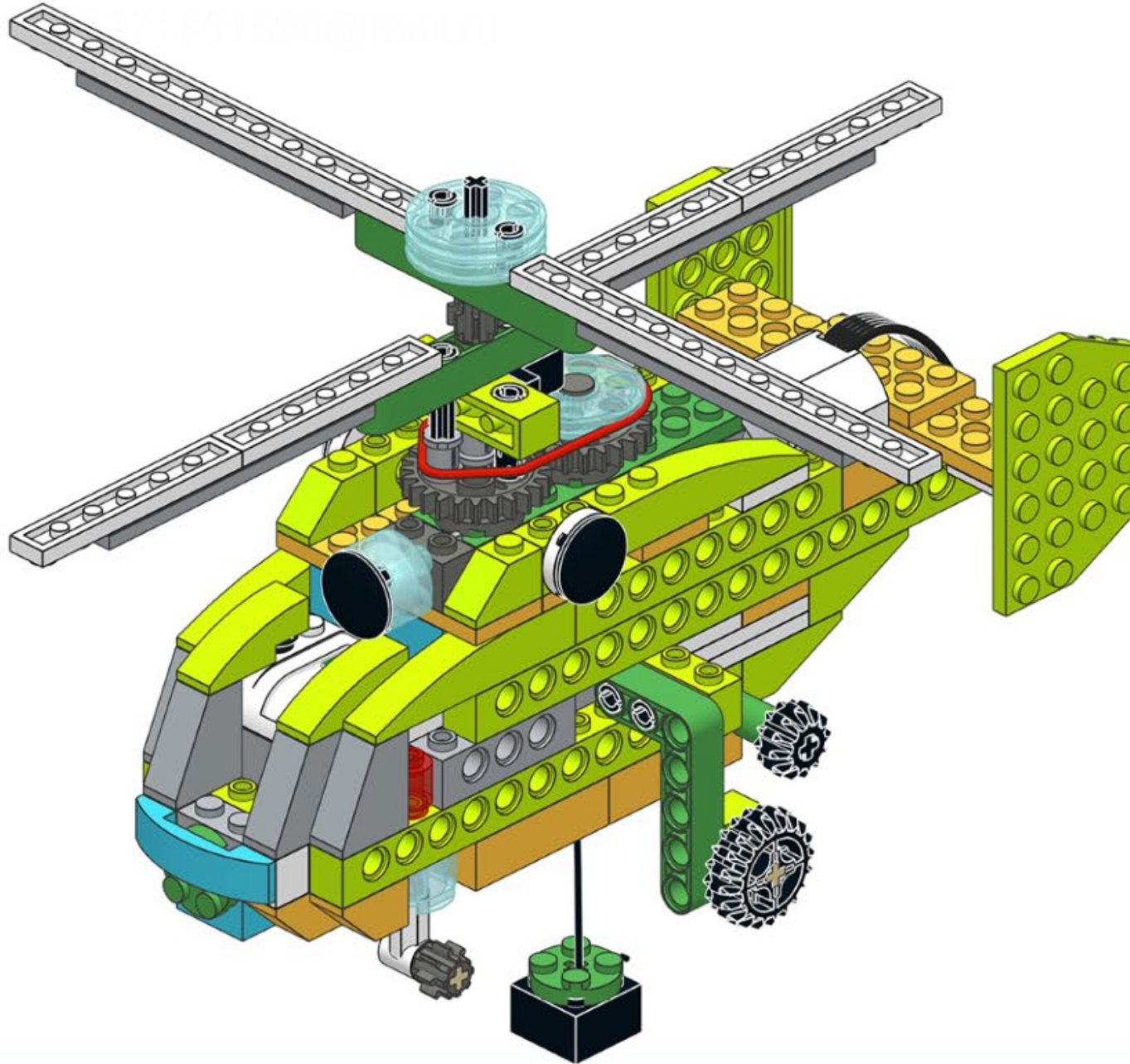
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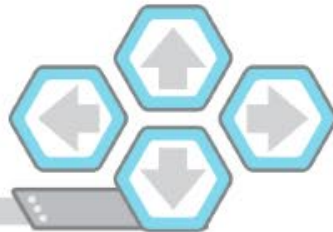
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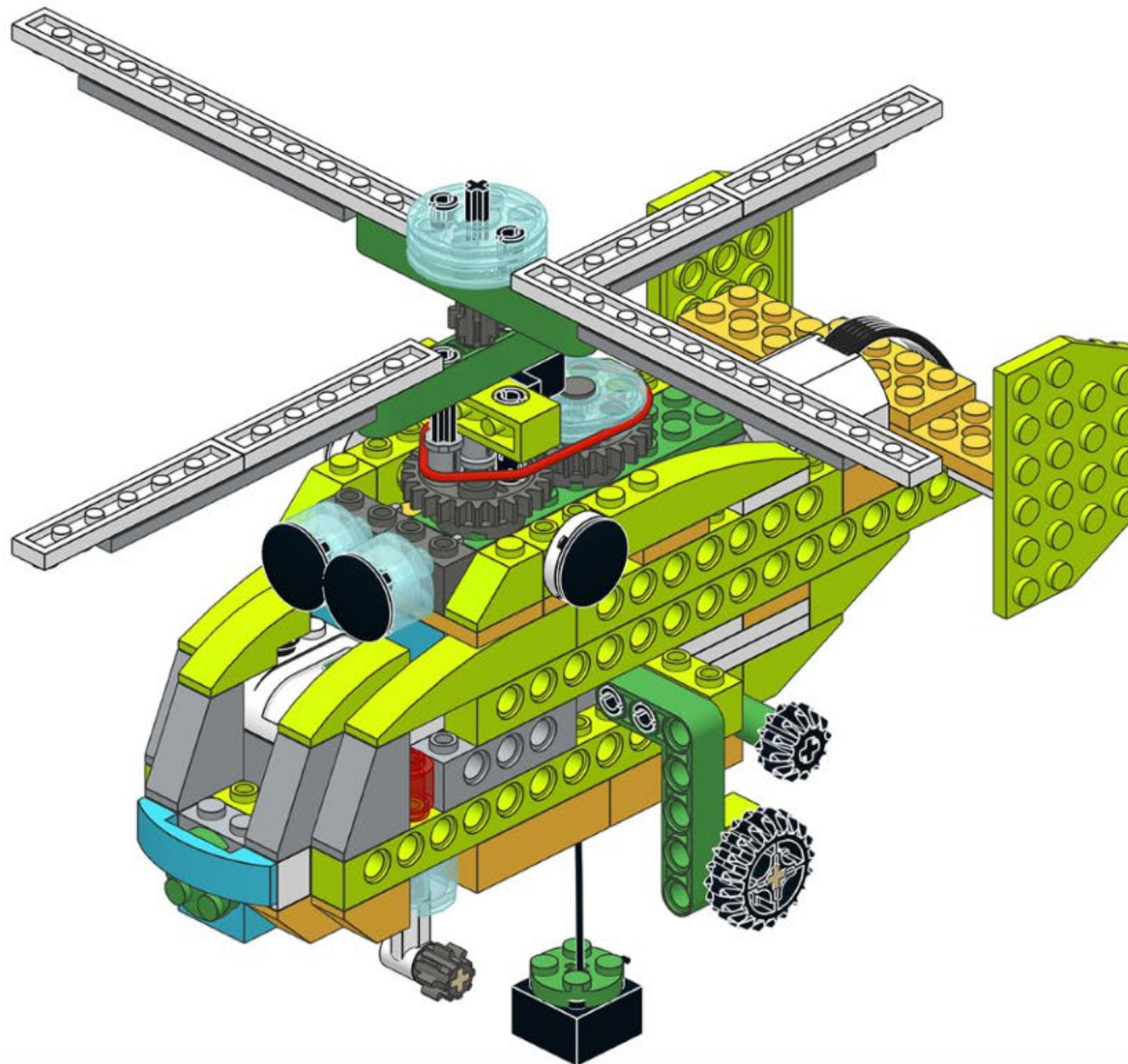
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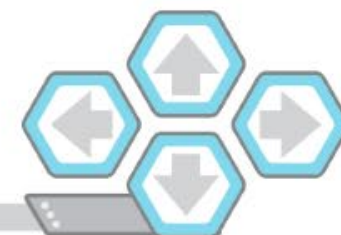
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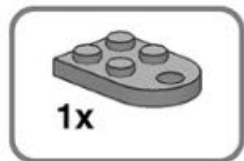


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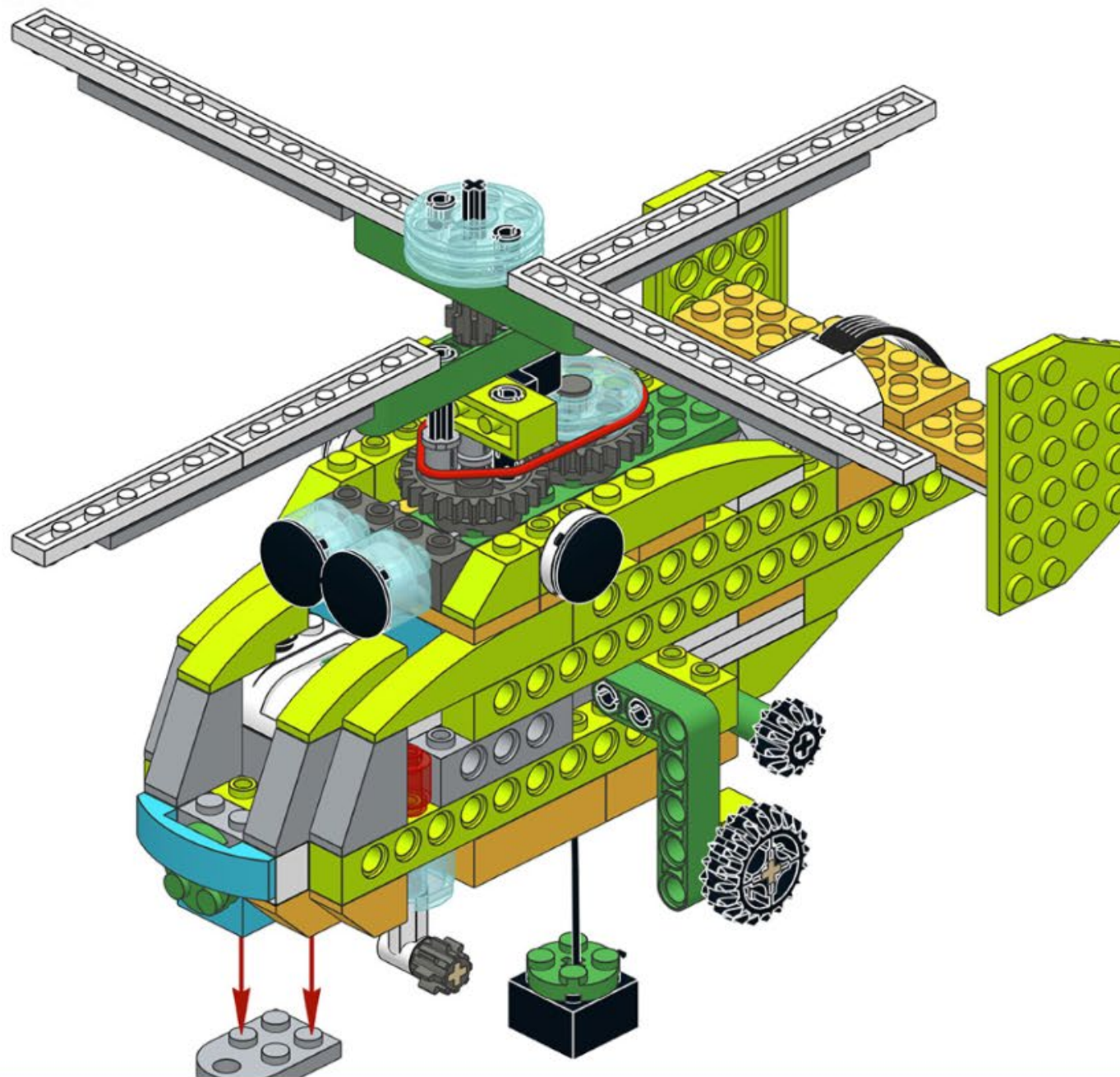
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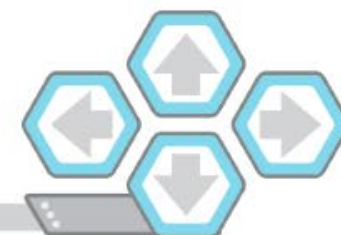
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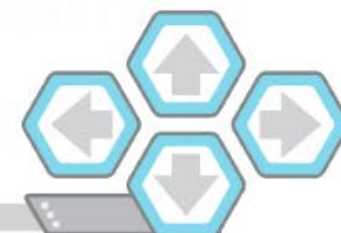
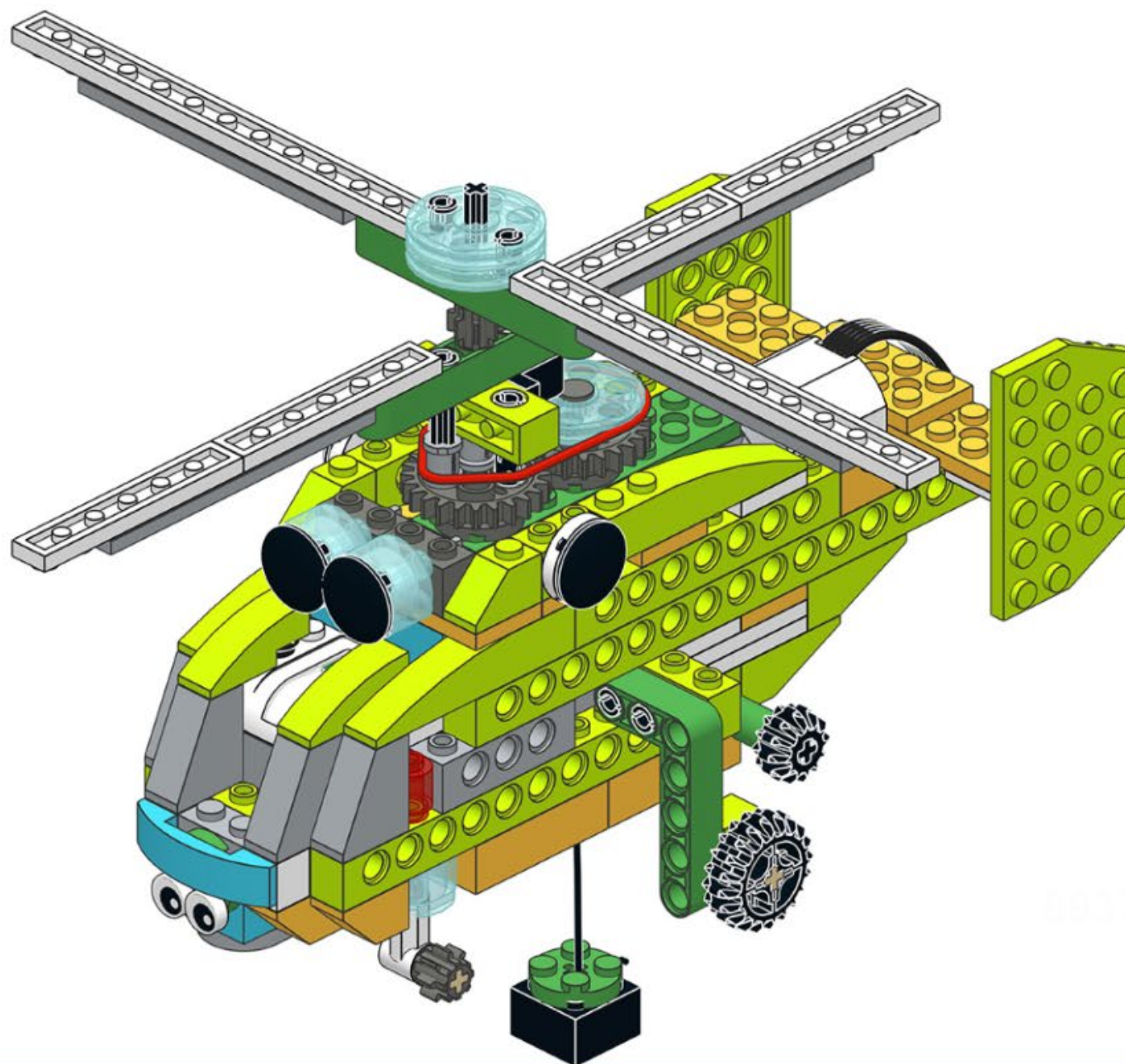
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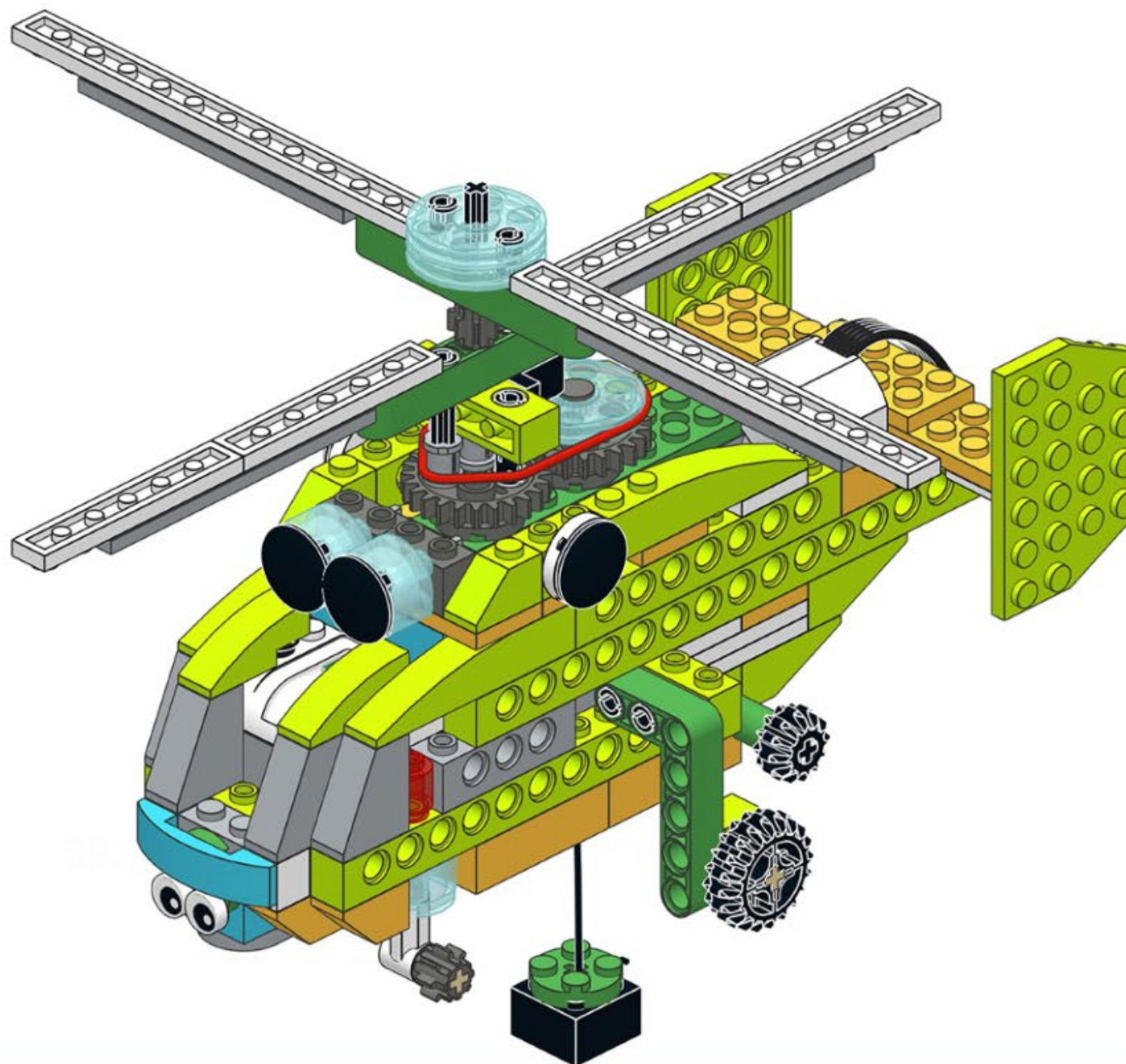




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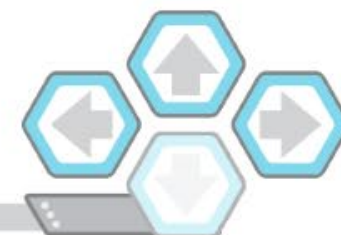
63



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0

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ROBOTIC EDUCATION

Когда робот
движется, кабели
не должны
тереться!



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Задание

ROBORISE-IT!
ROBOTIC EDUCATION

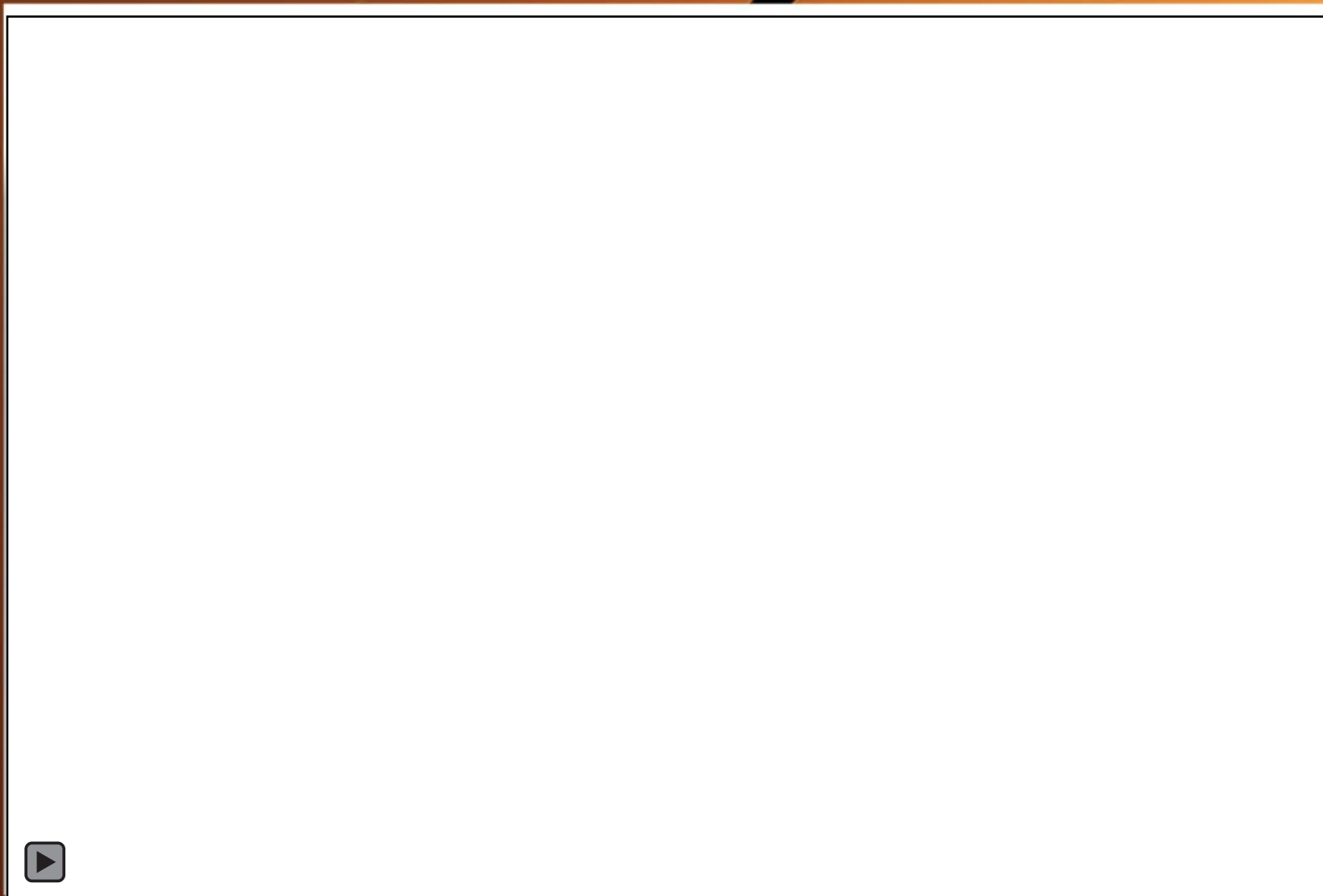
Соберите трансмиссию робота





Задание 1

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Задание 1

Напишите и протестируйте следующую программу:





Задание 2

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Задание 2. Программа

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Измените программу следующим образом:



3



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Задание 3 *

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3



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Задание 4

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Обсудите!

- Какие летательные аппараты бывают?
- Благодаря чему держатся в воздухе летательные аппараты тяжелее воздуха?
- Какие основные компоновки вертолетов используются?
- По какой схеме несущих винтов построен ваш вертолет?



- Почему винты робота должны обращаться в противоположных направлениях и как этого удалось достичь?





Ваши достижения

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Всего: 3 

