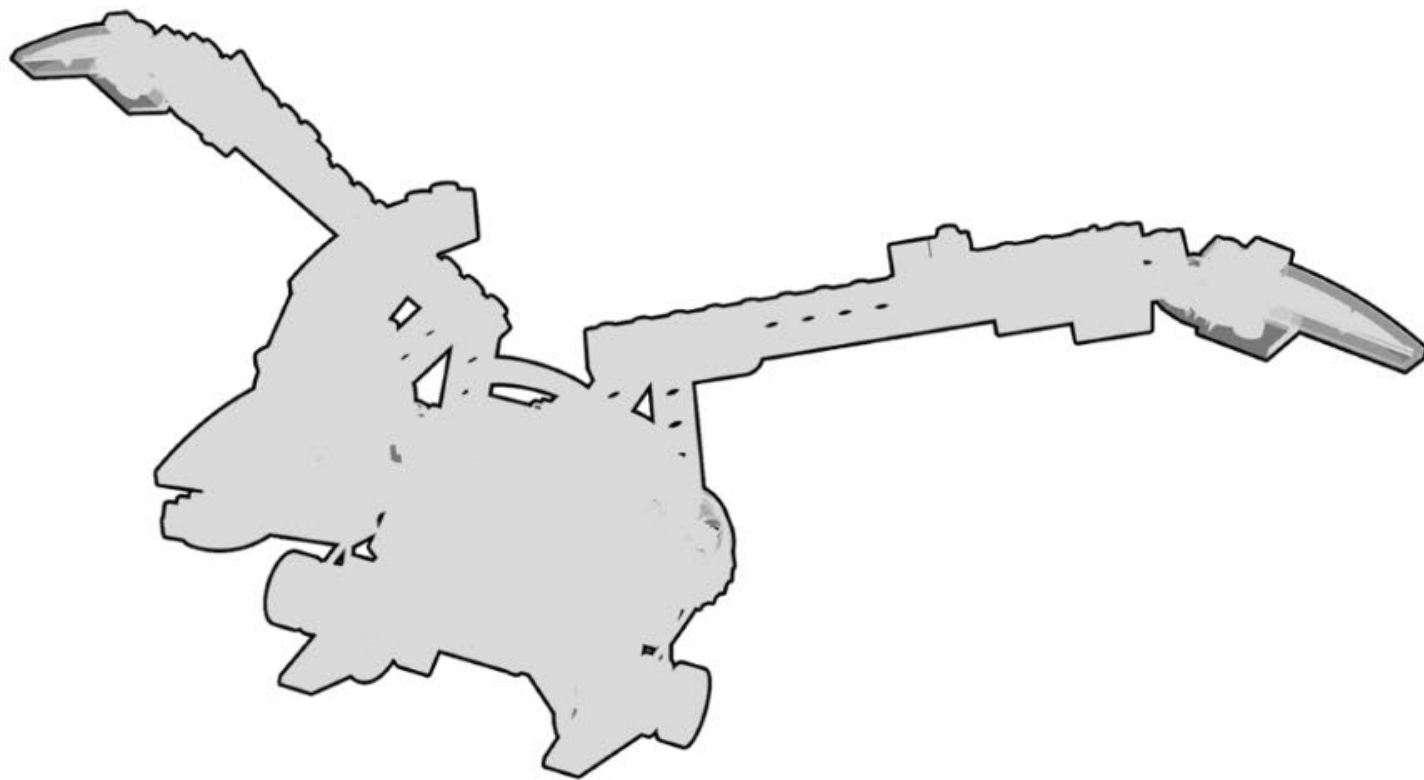




Парк динозавров

Сегодня мы продолжаем создавать современный Парк Динозавров. Мы должны разработать робота для экспозиции летающих рептилий Мелового периода Мезозоя.



5





Птерозавры

Летающие рептилии имели кожаные крылья, натянутые между очень длинным пальцем и ногой. Их челюсти были вытянутые, а на головах некоторых были гребни.



0



8





ПТИЦЫ

Интересно, что одновременно с Птерозаврами в воздухе Мелового периода активно охотились и первые Птицы. Они развивались параллельно. Ученые до сих пор не пришли к единому мнению относительно того, почему Птицы дожили до наших дней, а Птерозавры - нет.



Авизавр gloriae



Гесперорнис



0



9

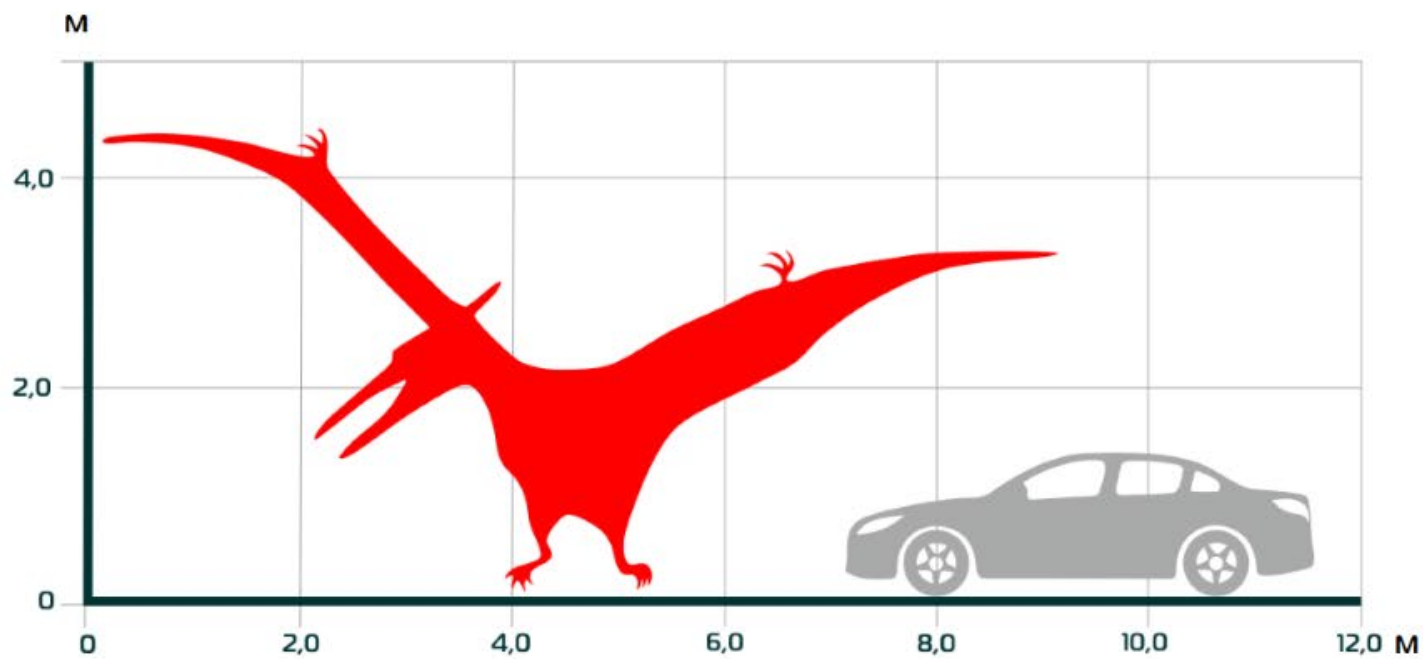






Птеранодон

Размах крыльев этих летающих ящериц достигал 9 метров, и они были значительно выше взрослого человека при весе до 40 кг.





Птеранодон

Эти летающие рептилии имели очень легкий и прочный скелет. Один из пальцев был очень вытянутым. Между ним и задней ногой было натянутое кожаное крыло.



0



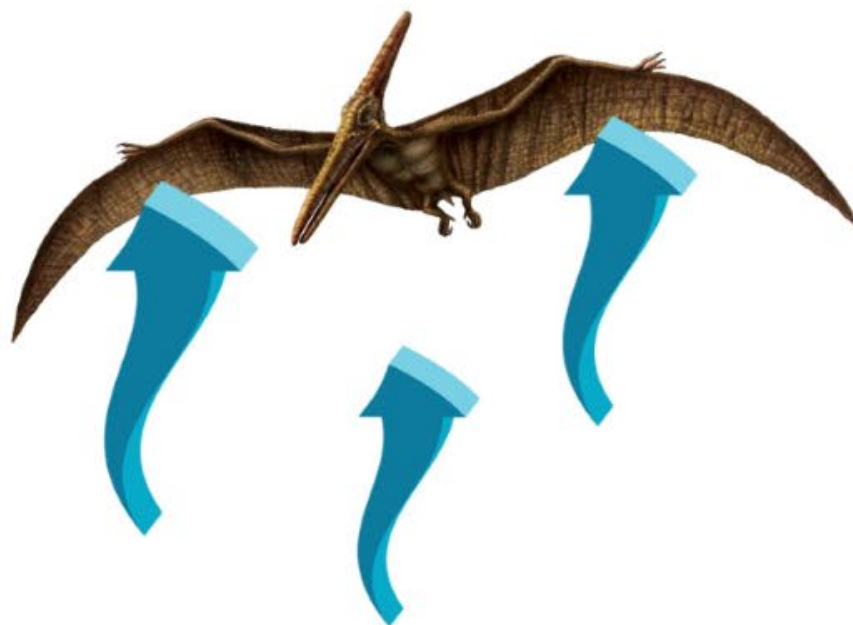
12





Птеранодон

Скорее всего, Птеранодоны могли использовать для полета восходящие потоки воздуха, как это делают современные Альбатросы. Это дает возможность тратить меньше сил.



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13





Птеранодон

Птеранодон питался рыбой. Кружась над океаном, он мог ее видеть сквозь толщу воды благодаря большим глазам. Интересно, что это была беззубая рептилия, зубы мешали заглатывать рыбу.



0



14

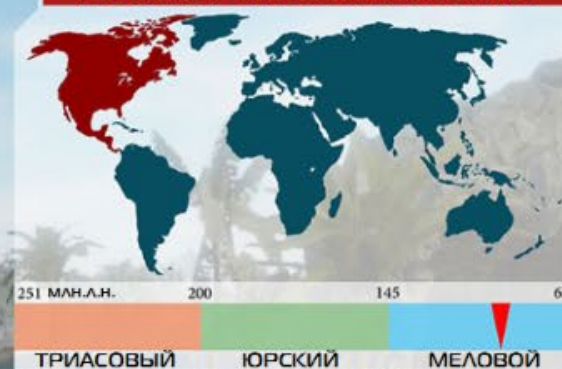




Птеранодон

Окаменелые останки Птеранодона находят по всей территории Северной Америки. Эти летающие рептилии охотились на рыбу, которой было достаточно в водоемах Мелового периода

Местонахождение окаменелых останков



15





Парк динозавров

В то время как на поверхности планеты доминировали динозавры, в небе главными были крылатые рептилии. В нашем парке будет представлен Птеранодон, один из самых известных из летающих рептилий.



16





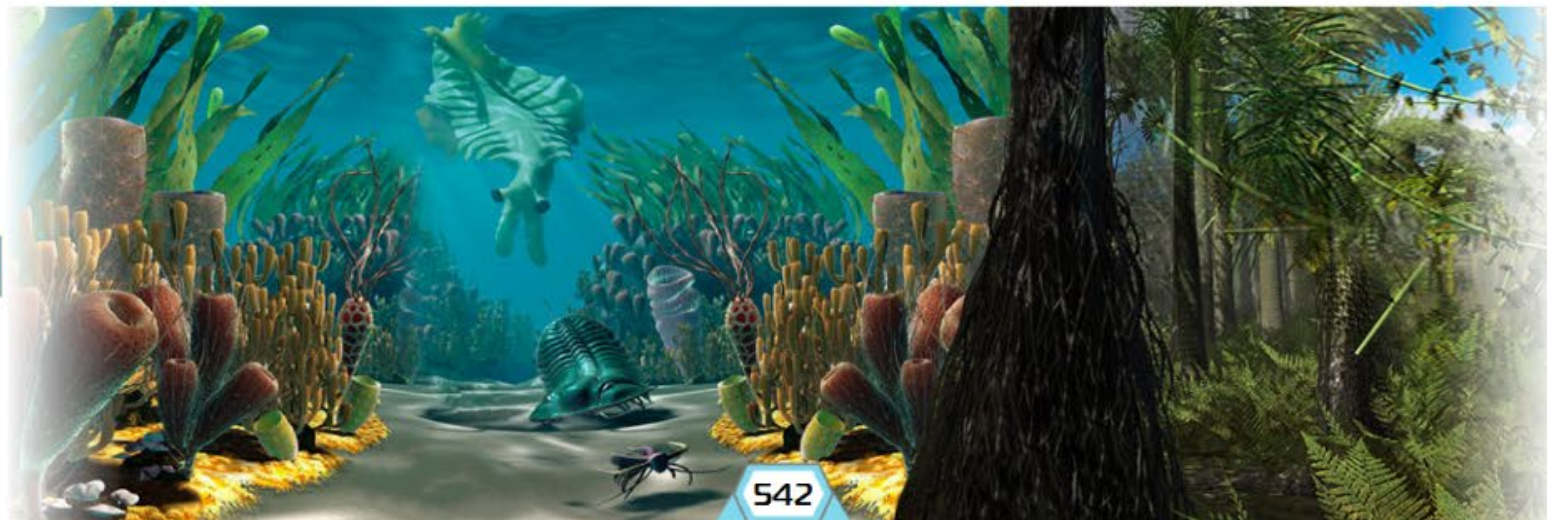
Найдите сегодняшнее животное!



Ранний Палеозой



Палеозойская эра начинается 542 миллиона лет назад. Она особенна тем, что у животных появляется твердый панцирь. Благодаря этому при раскопках находят закаменевшие останки животных и датируют их.



17





ЗАДАНИЕ



Задания



создать робота для экспозиции
летающих рептилий Мелового
периода



Требования



должен напоминать Птеранодона -
иметь крылья и характерную форму
головы



должен передвигаться по суше и
реагировать на пищу



Внешность Птеранодона



18





Особенности конструкции

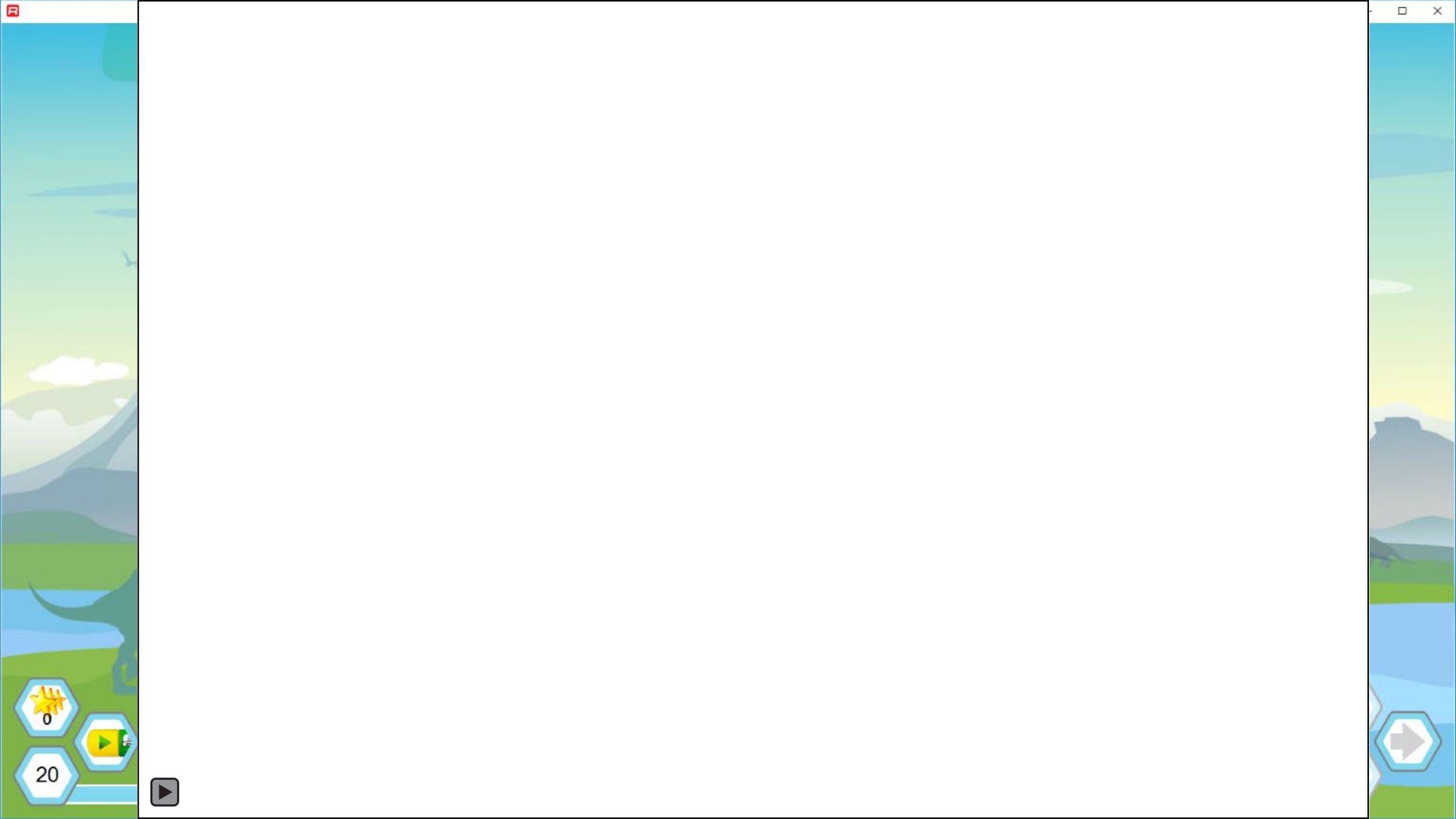
Мотор Pteranodon`а приводит в движение крылья и колеса для перемещения робота по поверхности. На голове же закреплен датчик движения.



Найдите:

- смартхаб
- мотор
- датчик движения

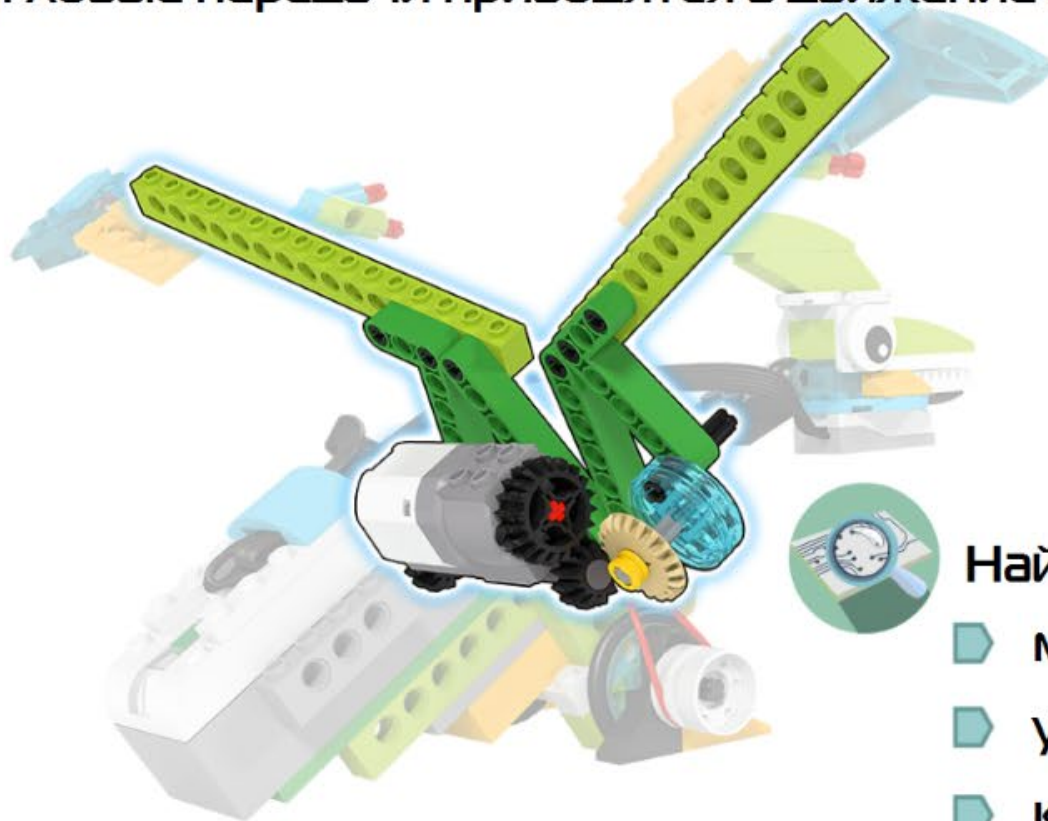






Особенности конструкции

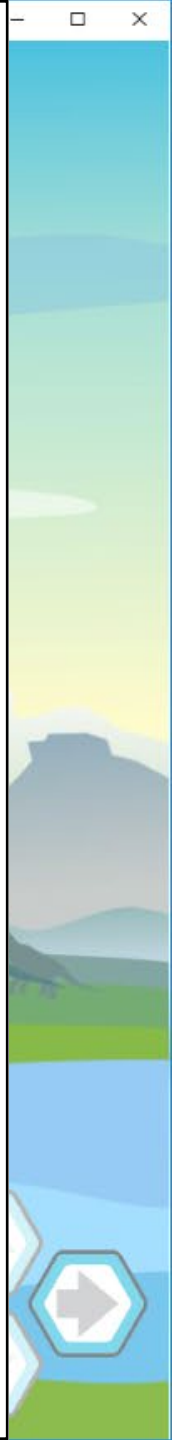
От мотора вращение передается на промежуточную ось, на которой закреплены шестерни на 12 зубов. От них через угловые передачи приводятся в движение кривошипы.



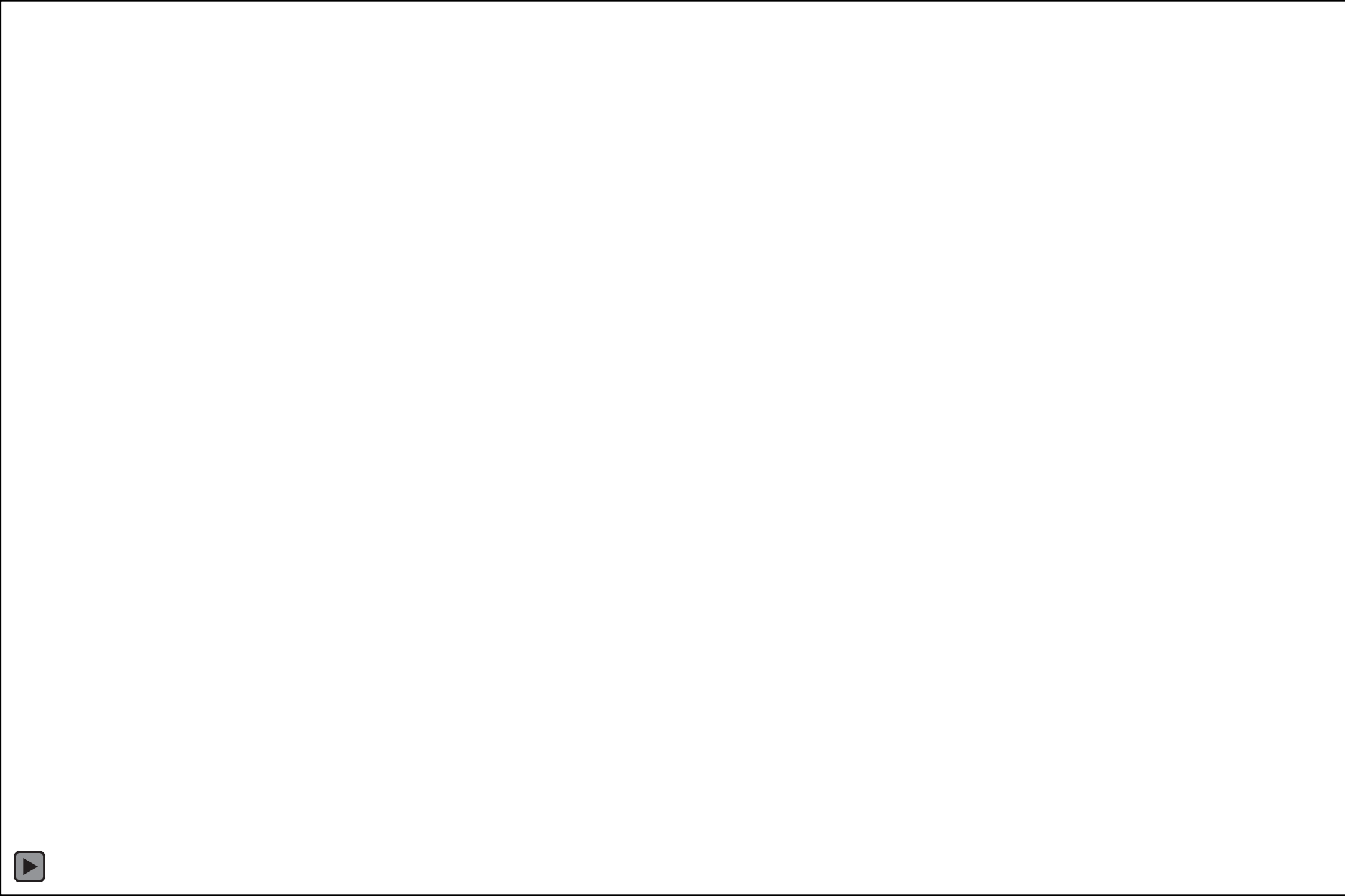
Найдите:

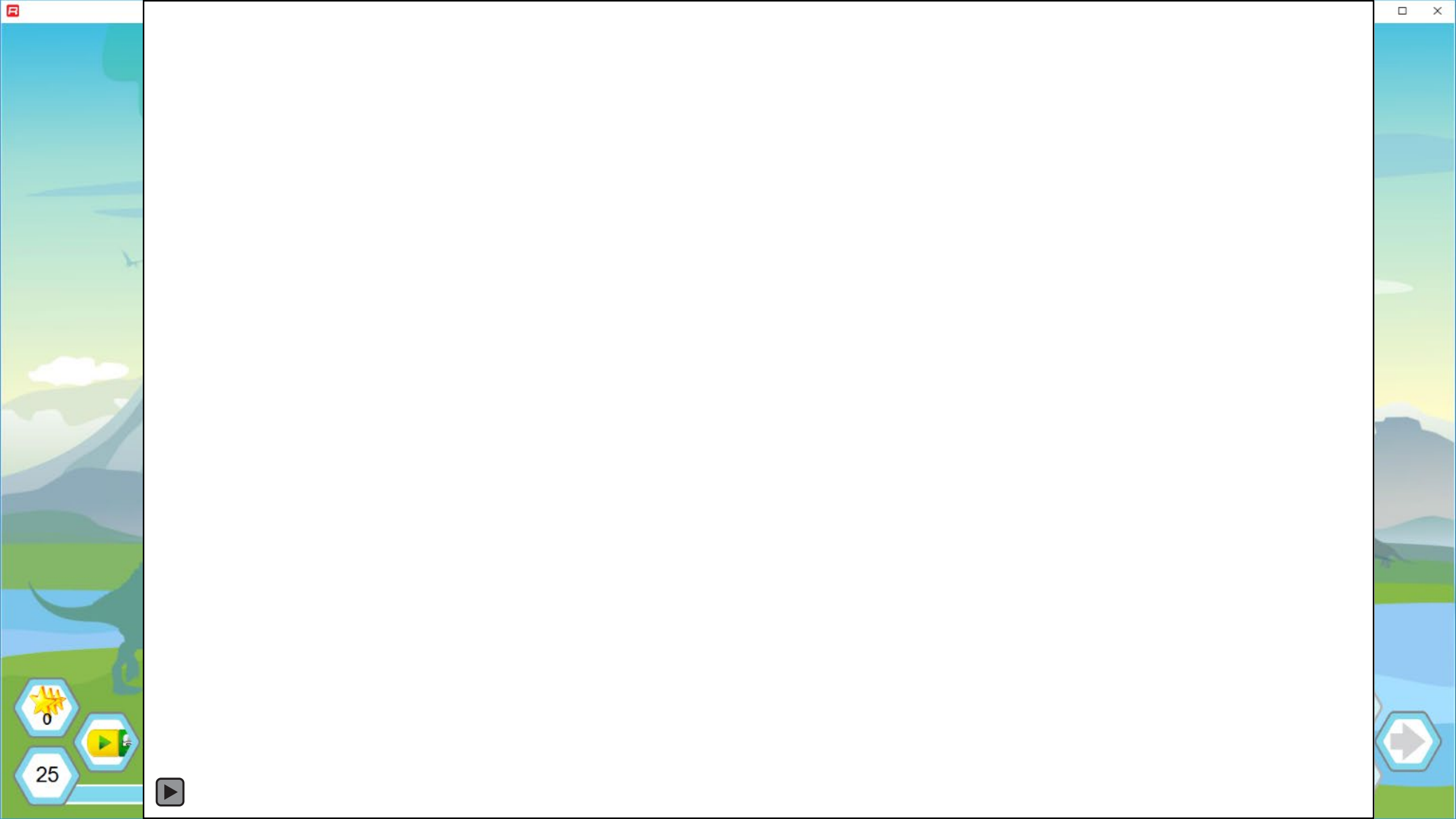
- мотор
- угловые передачи
- кривошипы и крылья













Особенности конструкции

На одной оси с кривошипами закреплены и шкивы ременной передачи. Она передает вращение на колёса робота. Обратите внимание! Движение передается не напрямую, а под углом 90 градусов.



Найдите:

- ▶ колёса
- ▶ угловые передачи
- ▶ ременные передачи





Постройте робота!



Pteranodon

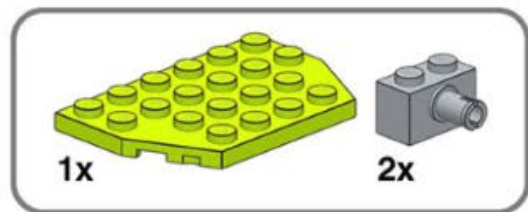


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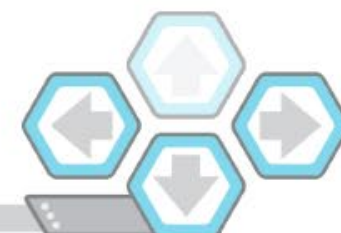
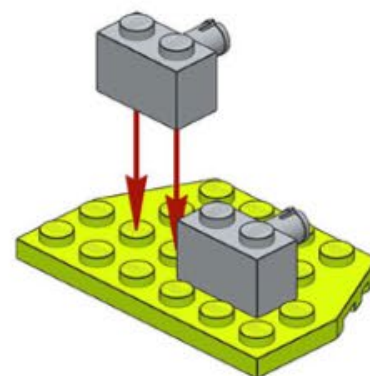


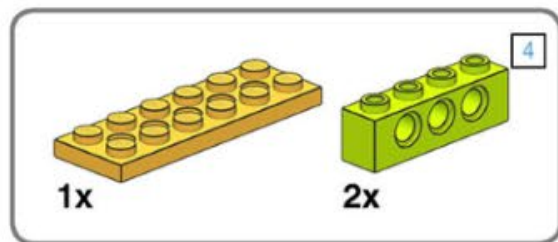
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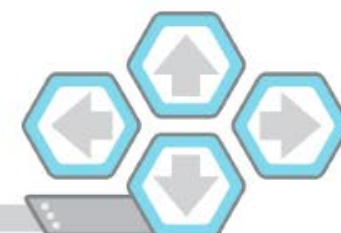
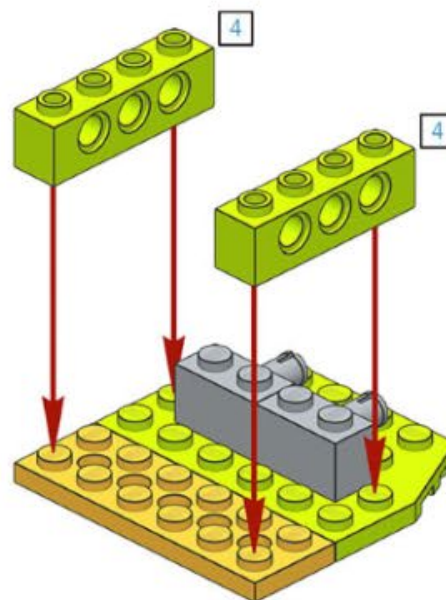


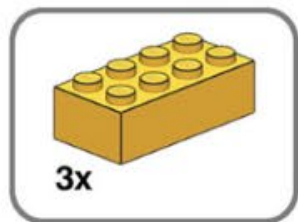
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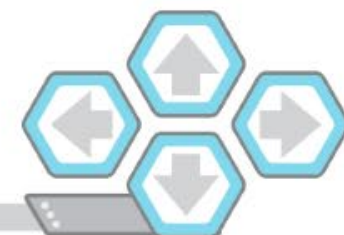
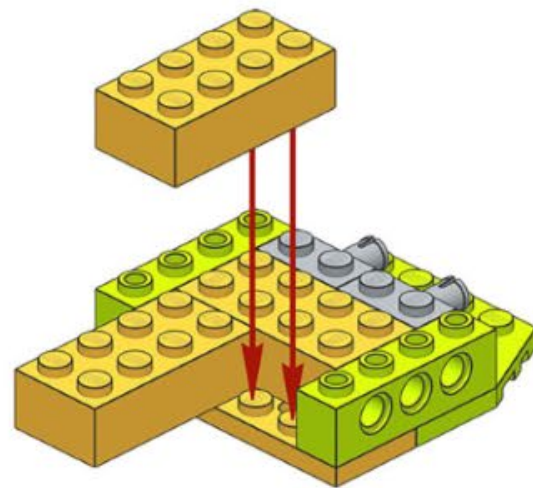


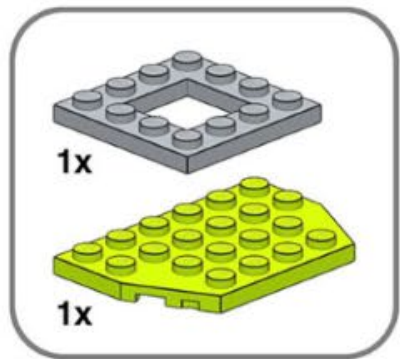
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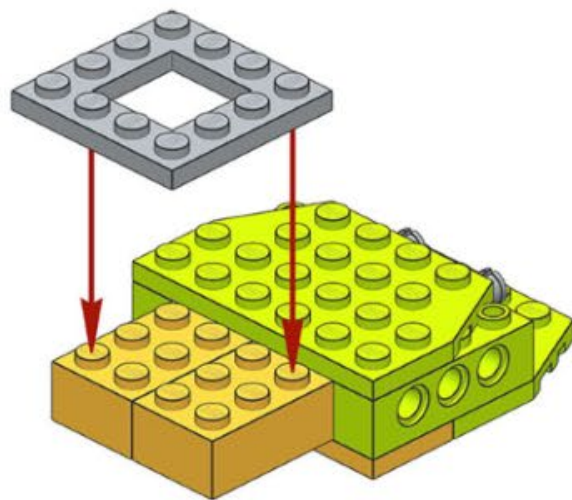


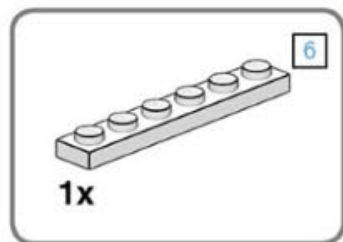
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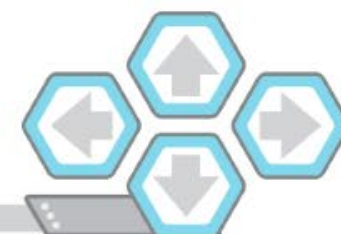
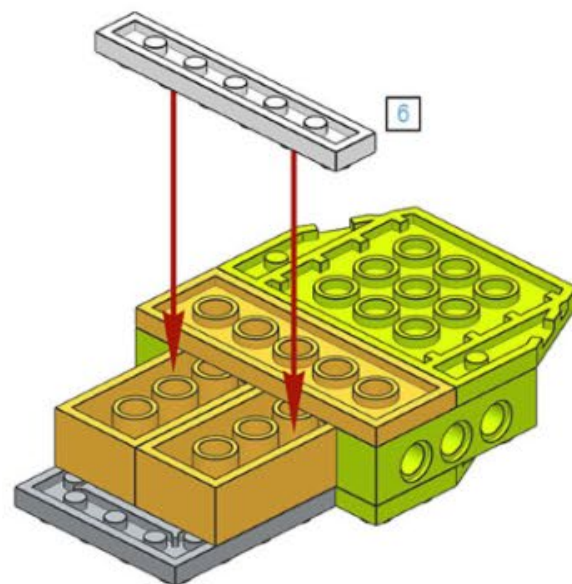


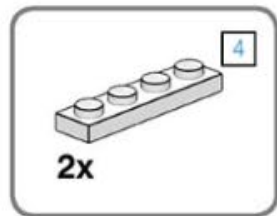
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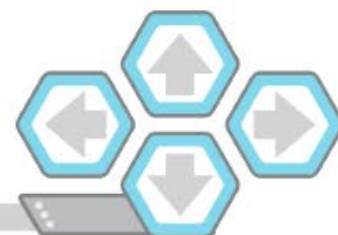
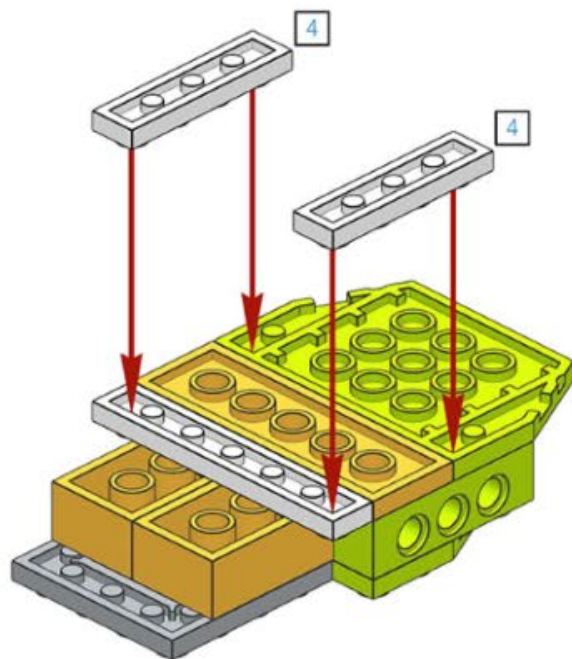


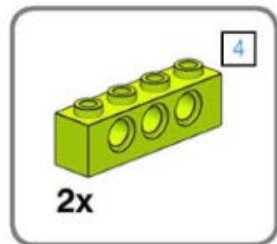
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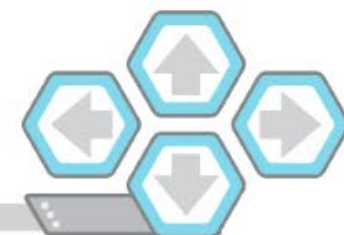
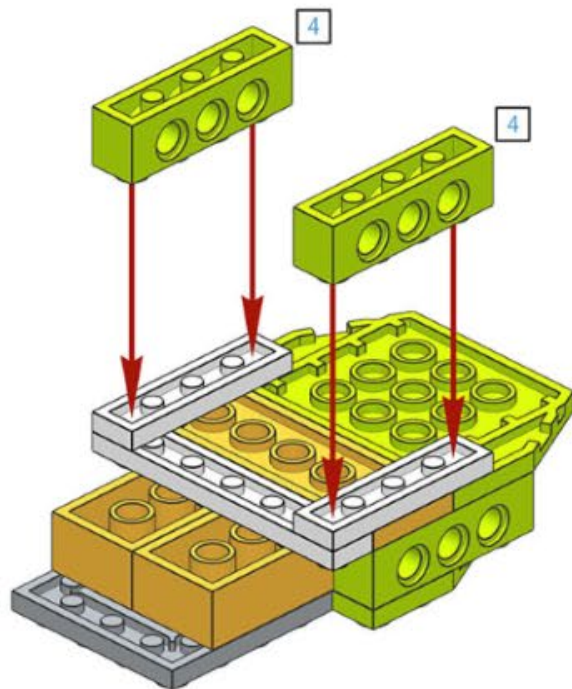


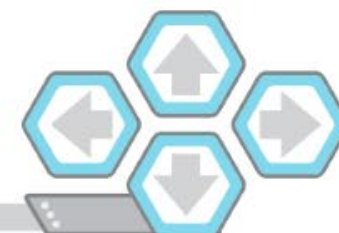
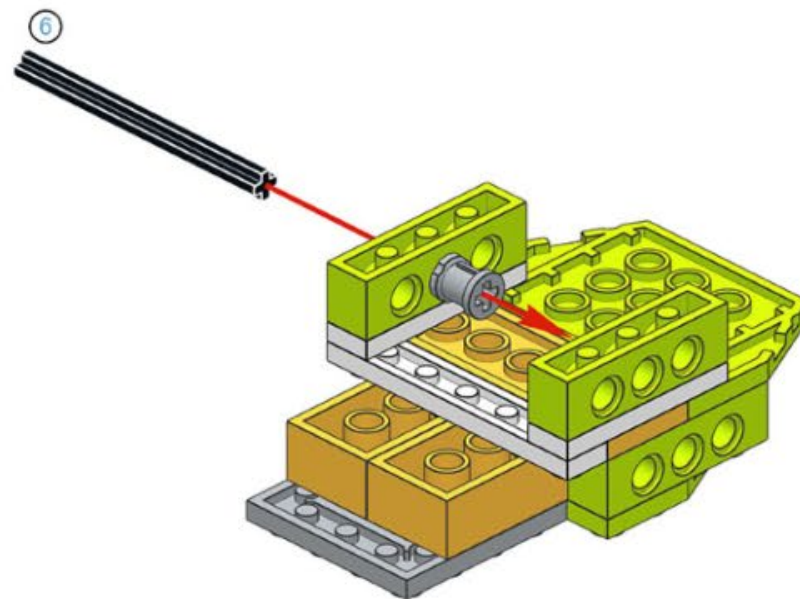
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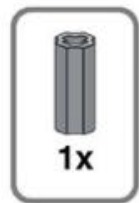




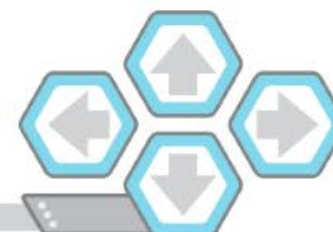
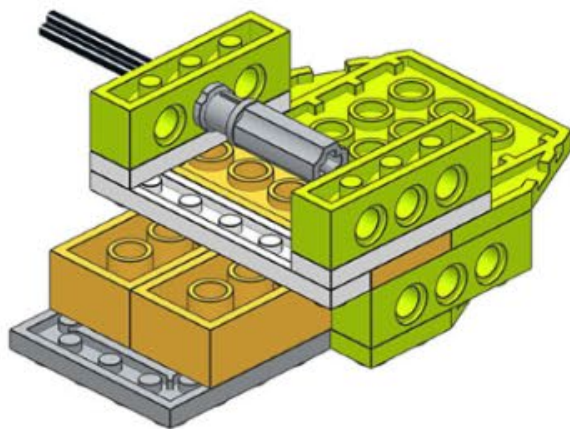
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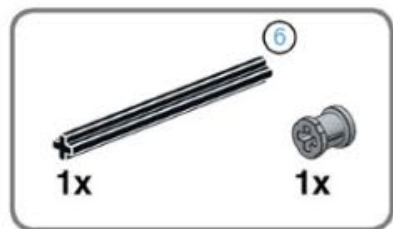




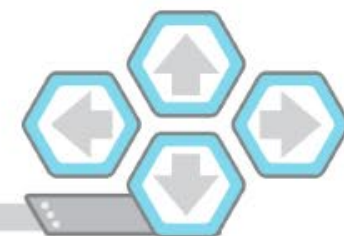
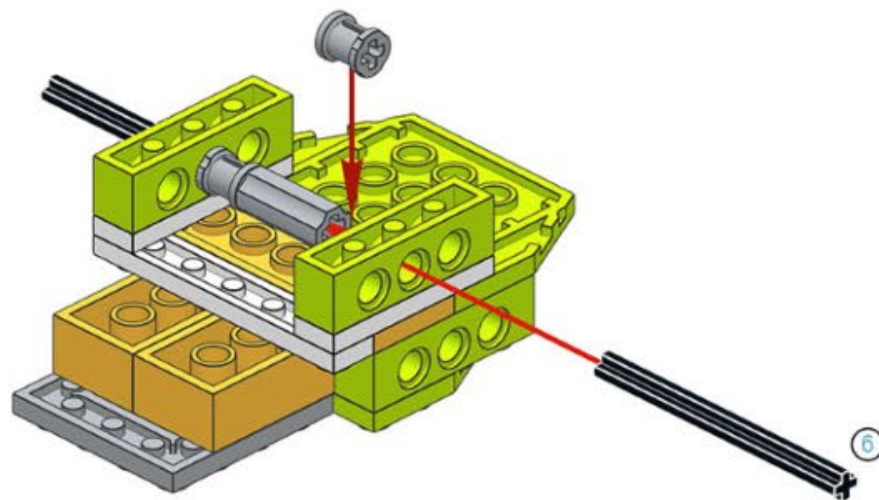


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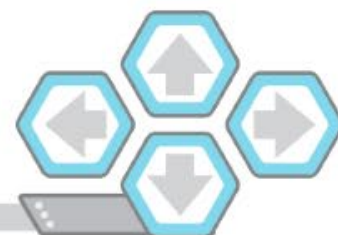
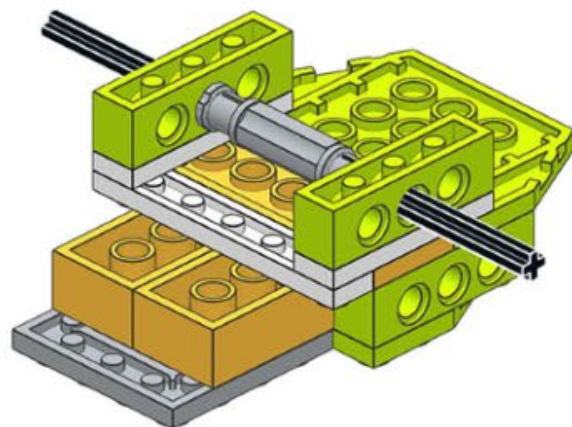


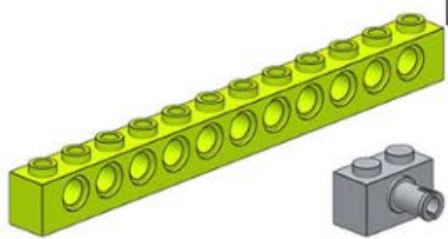
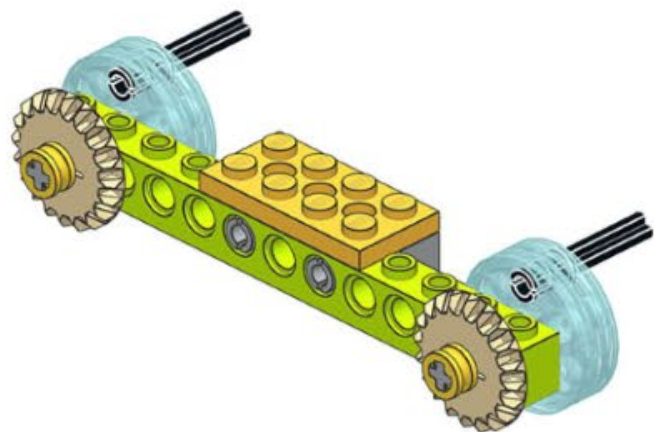


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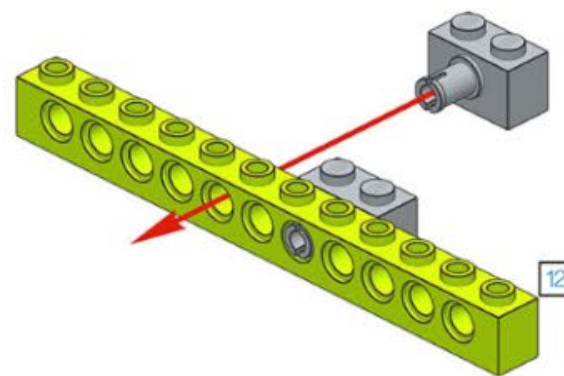


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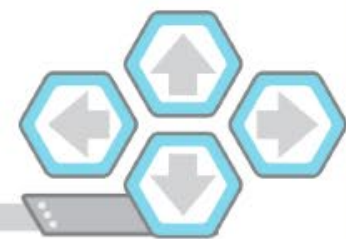
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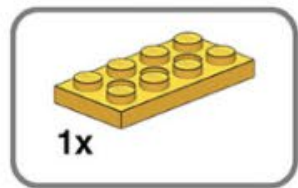
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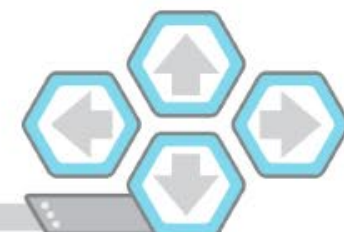
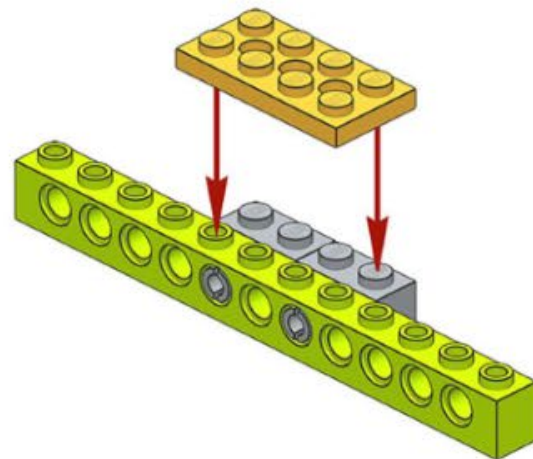


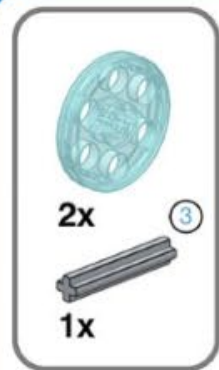
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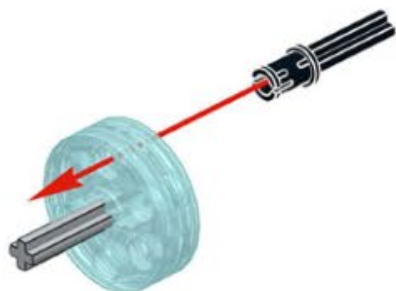
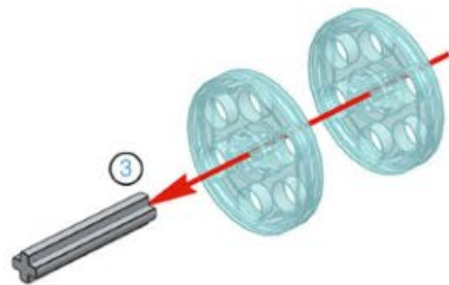




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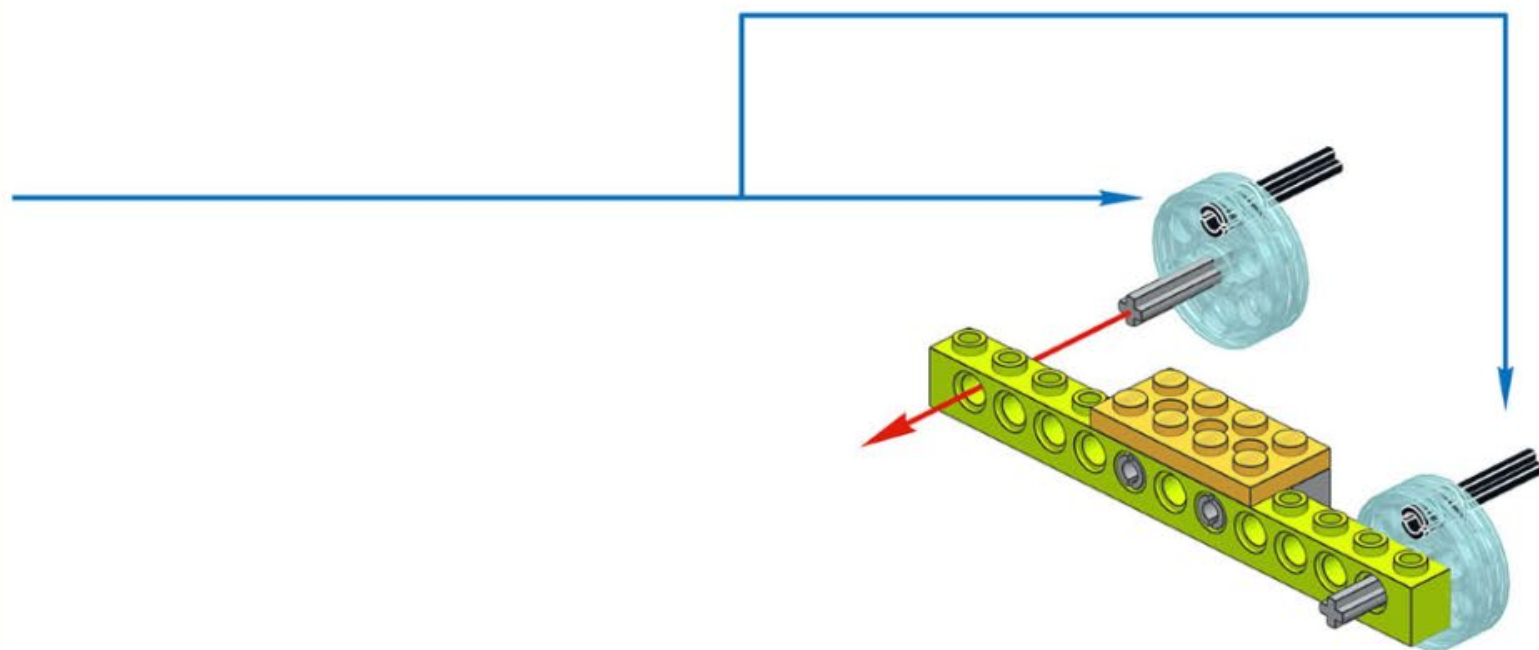
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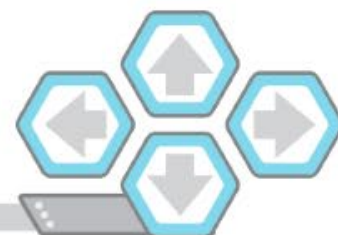
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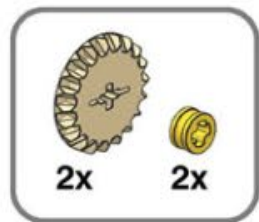


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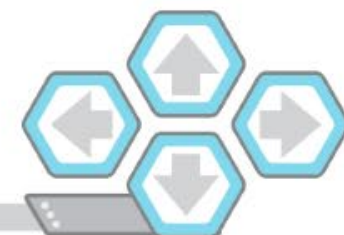
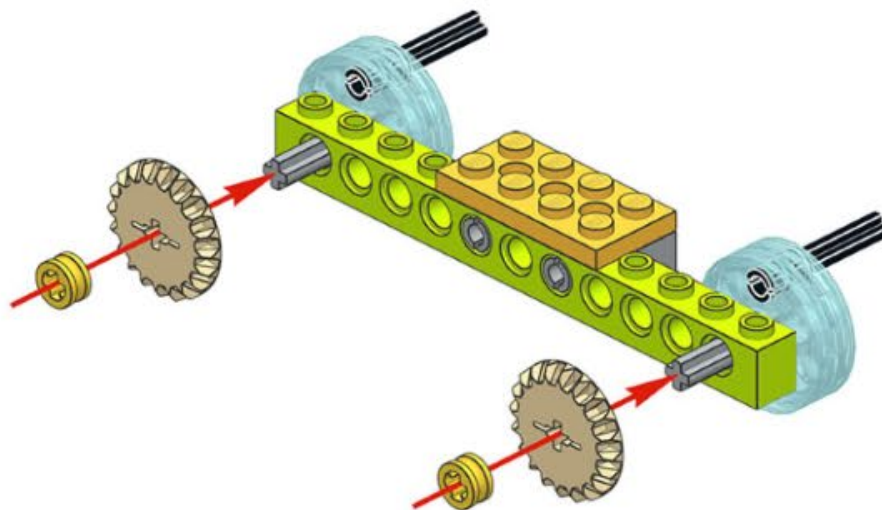
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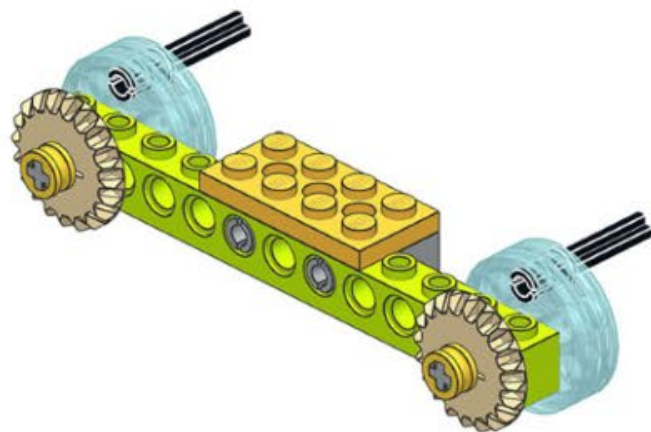




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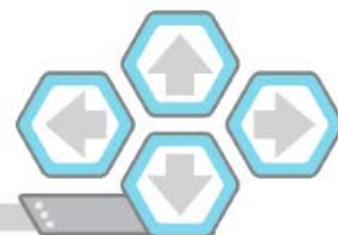
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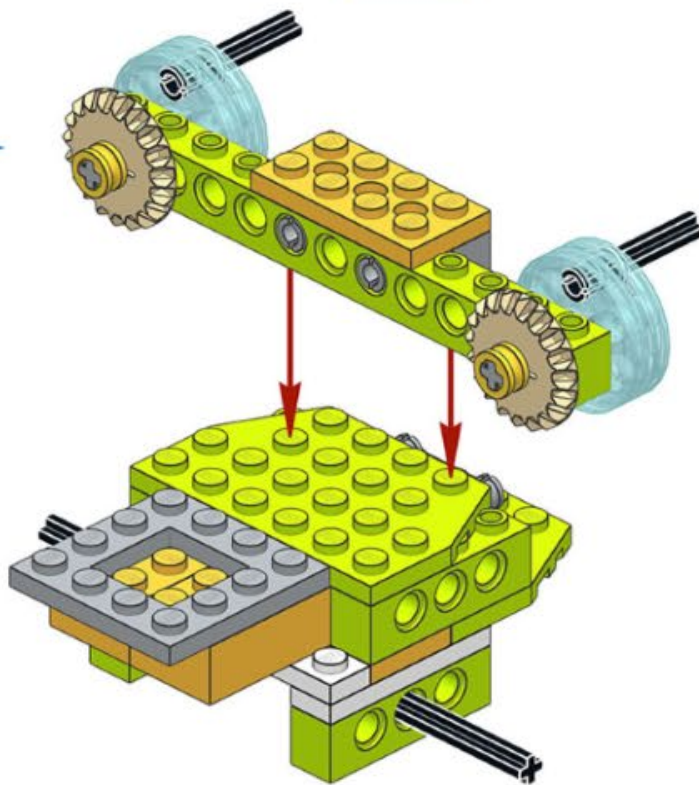
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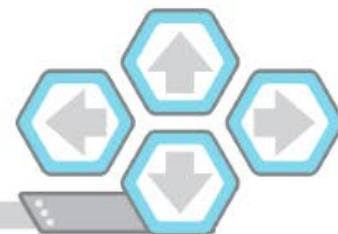
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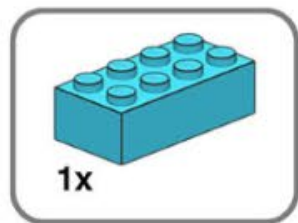


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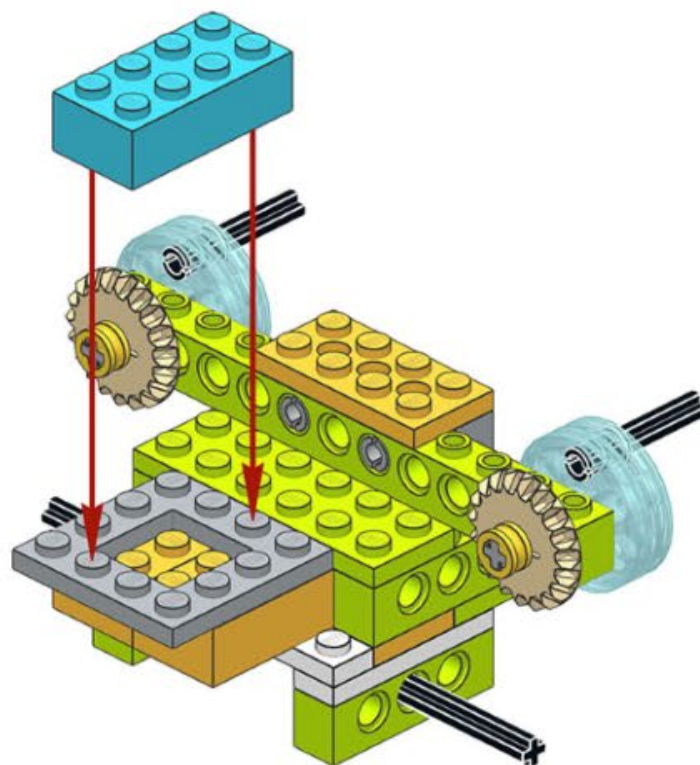
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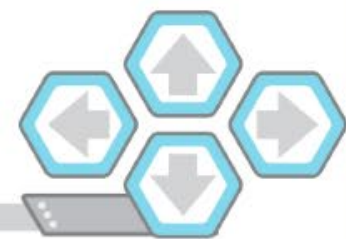
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19/66

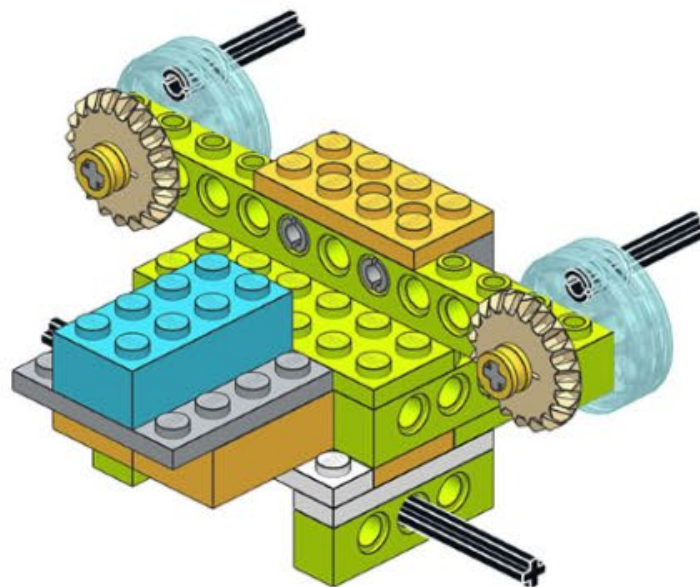
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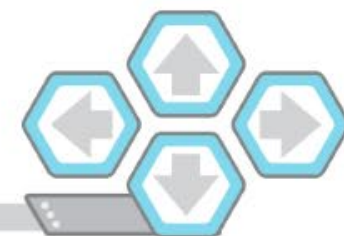
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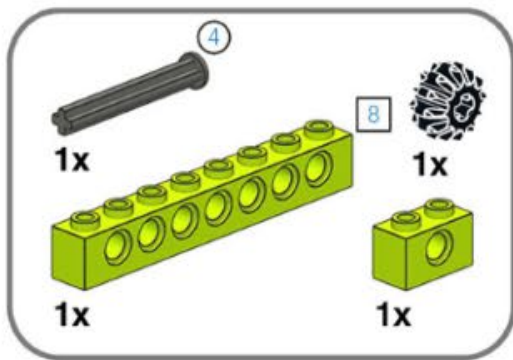
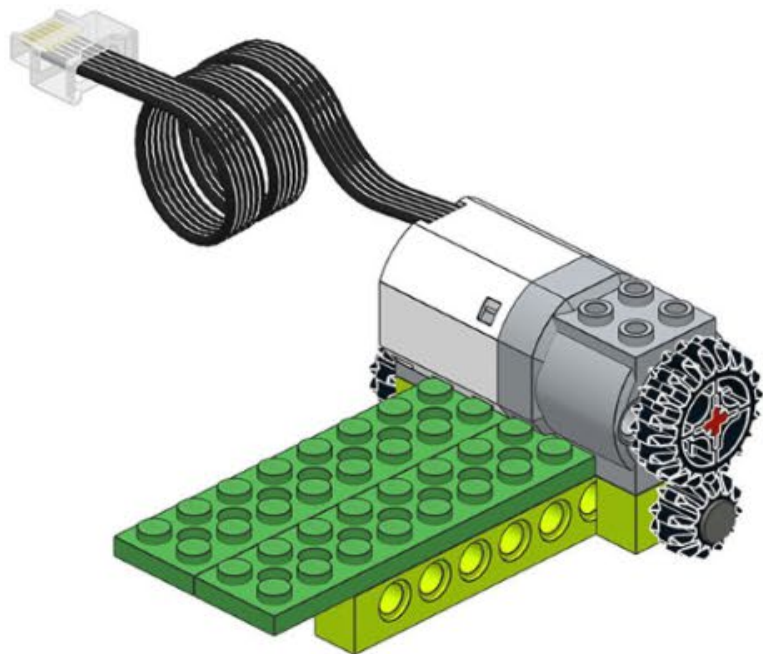


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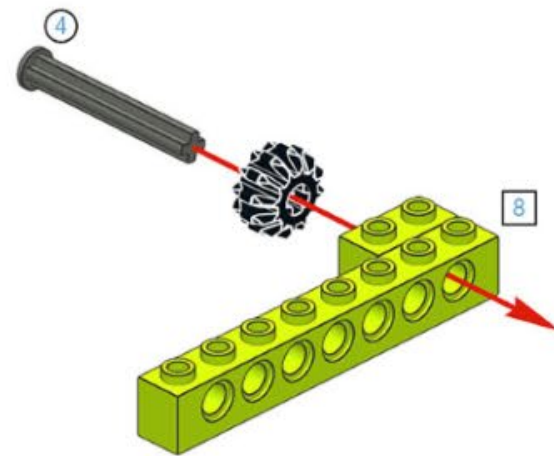
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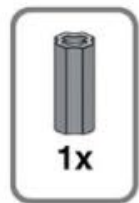
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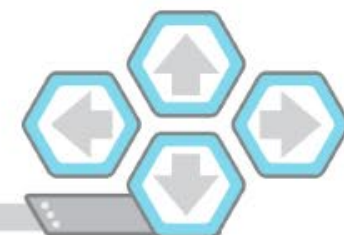
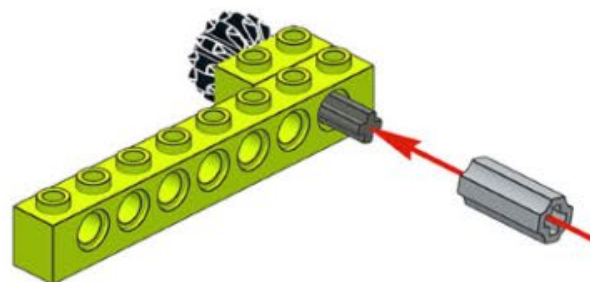


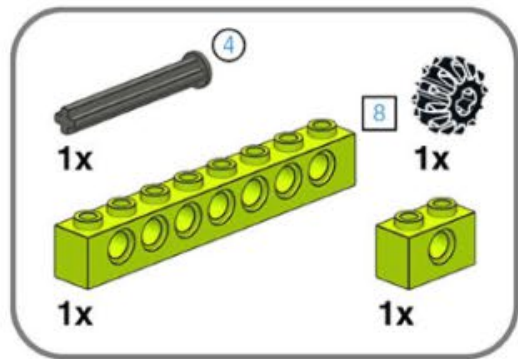
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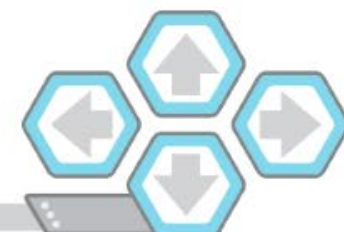
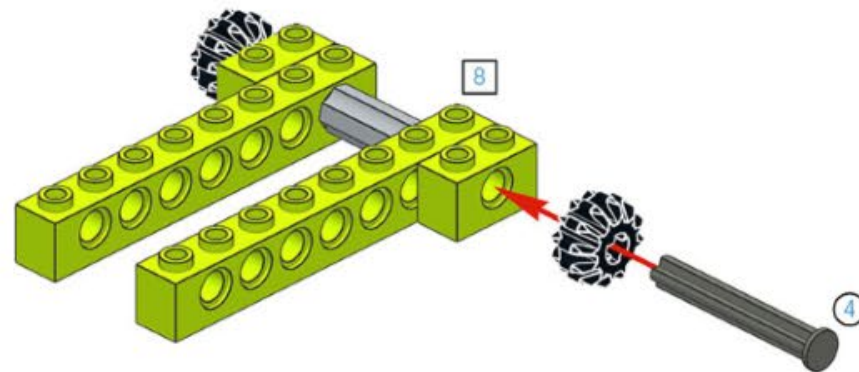


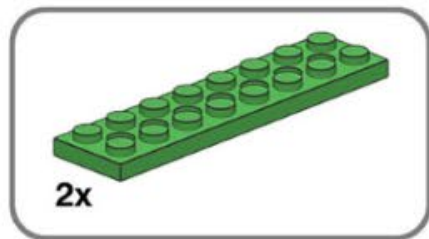
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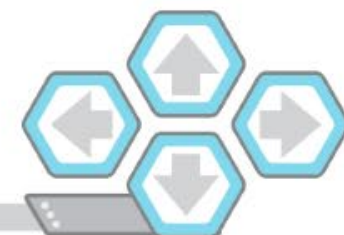
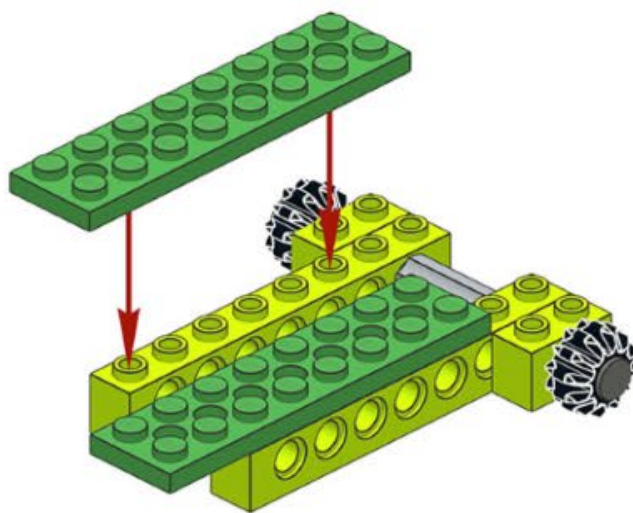


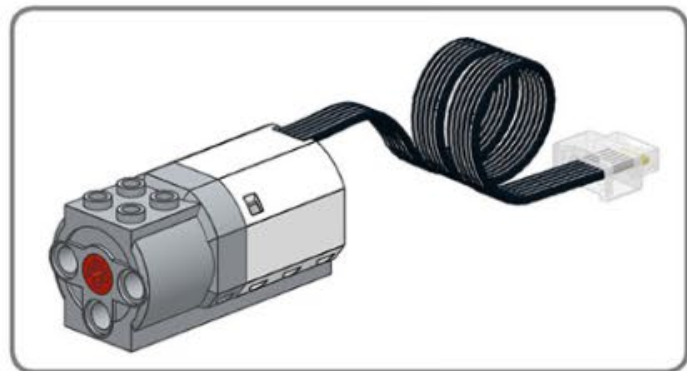
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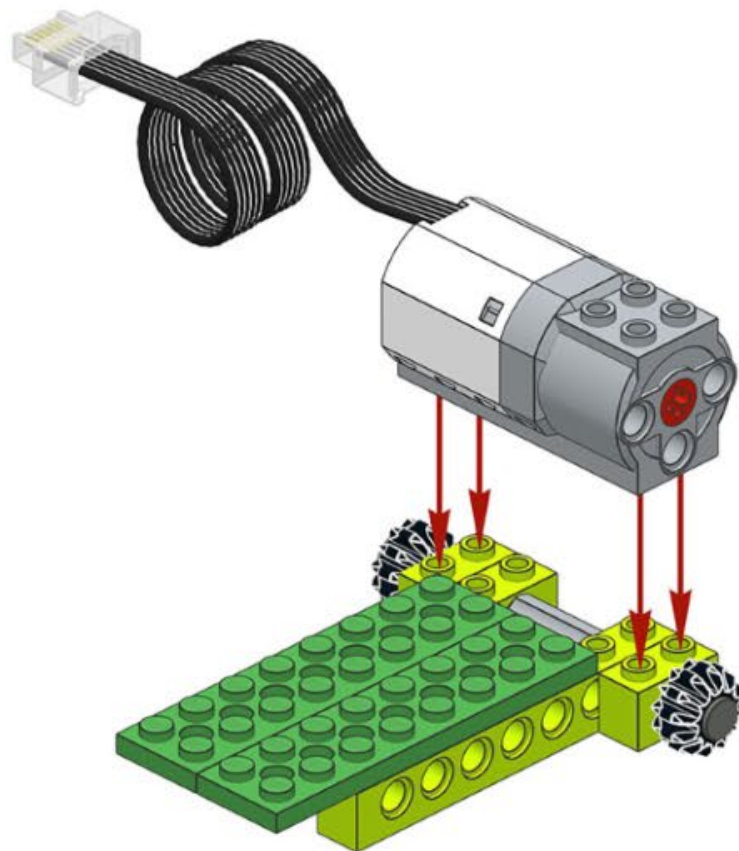


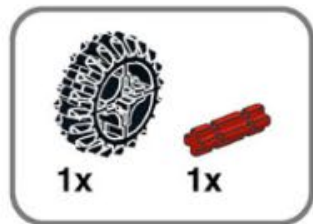
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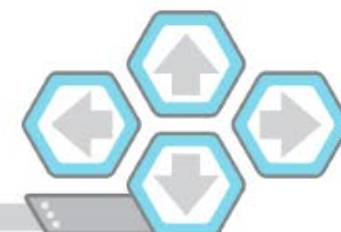
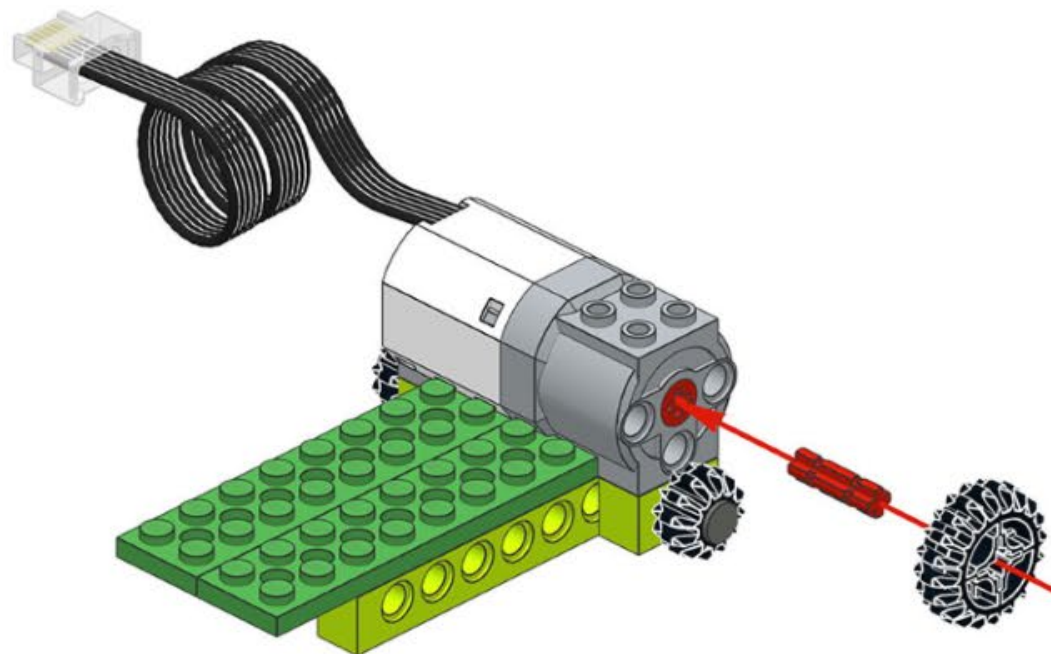


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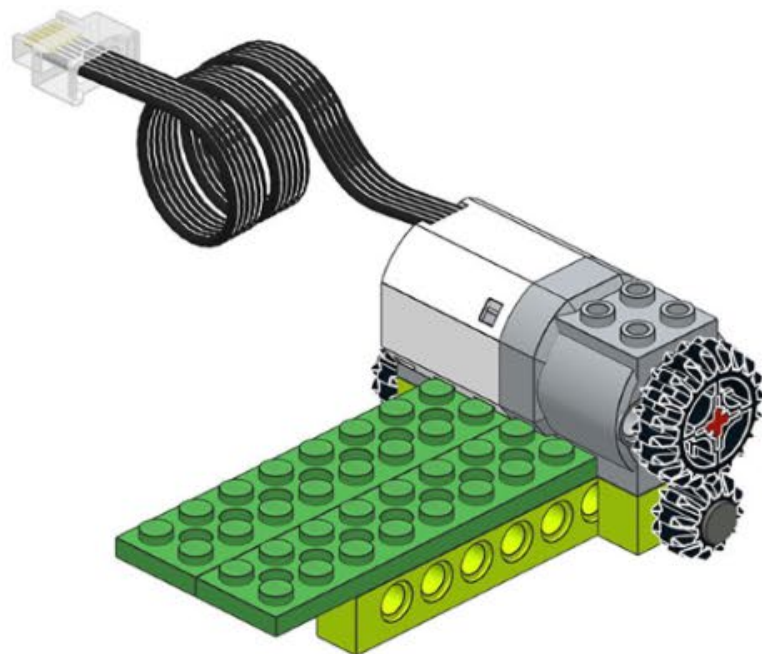




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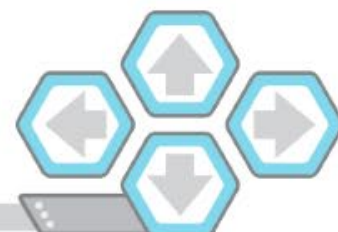
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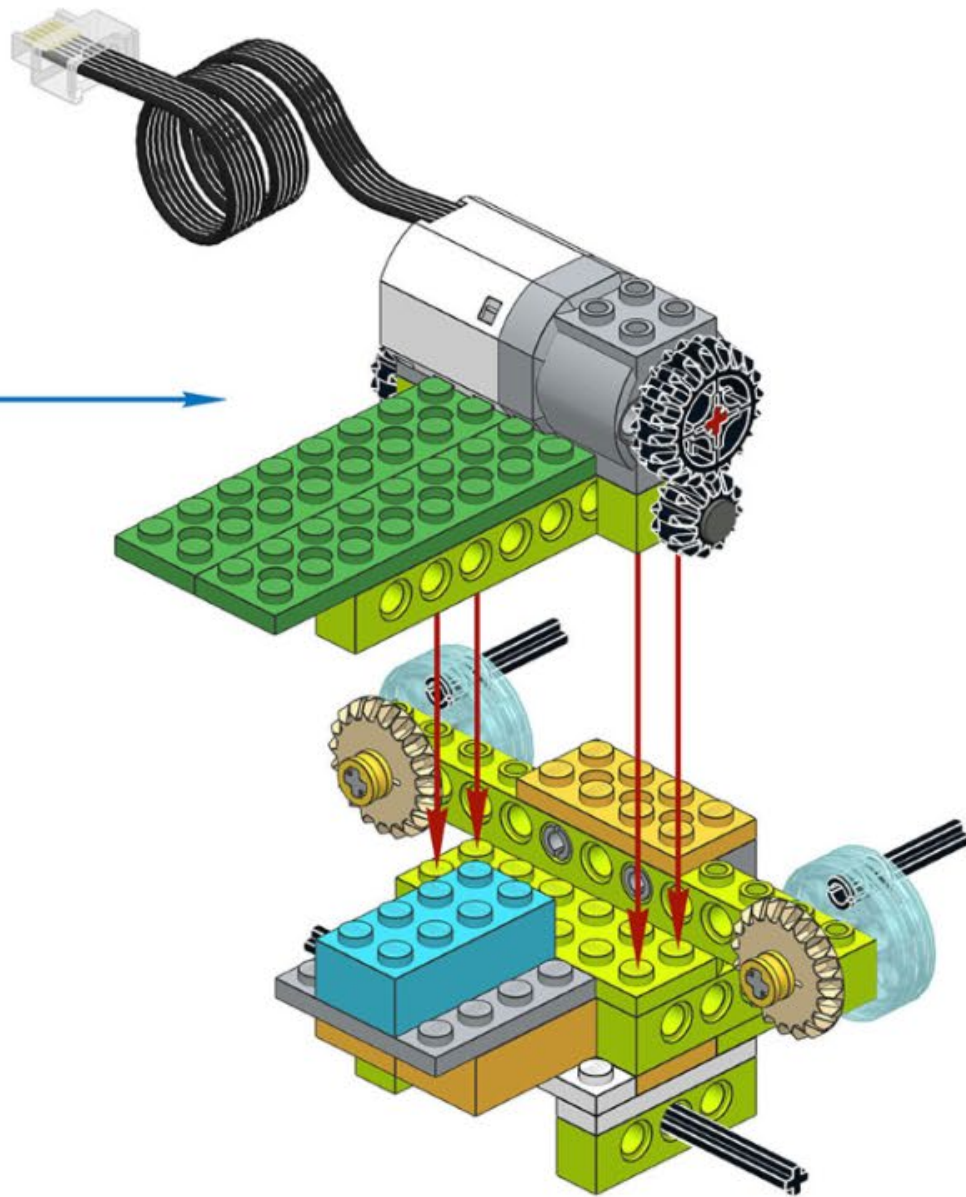
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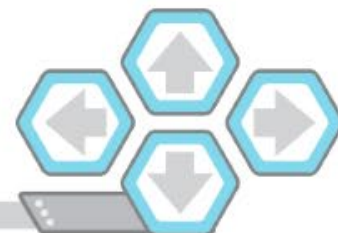
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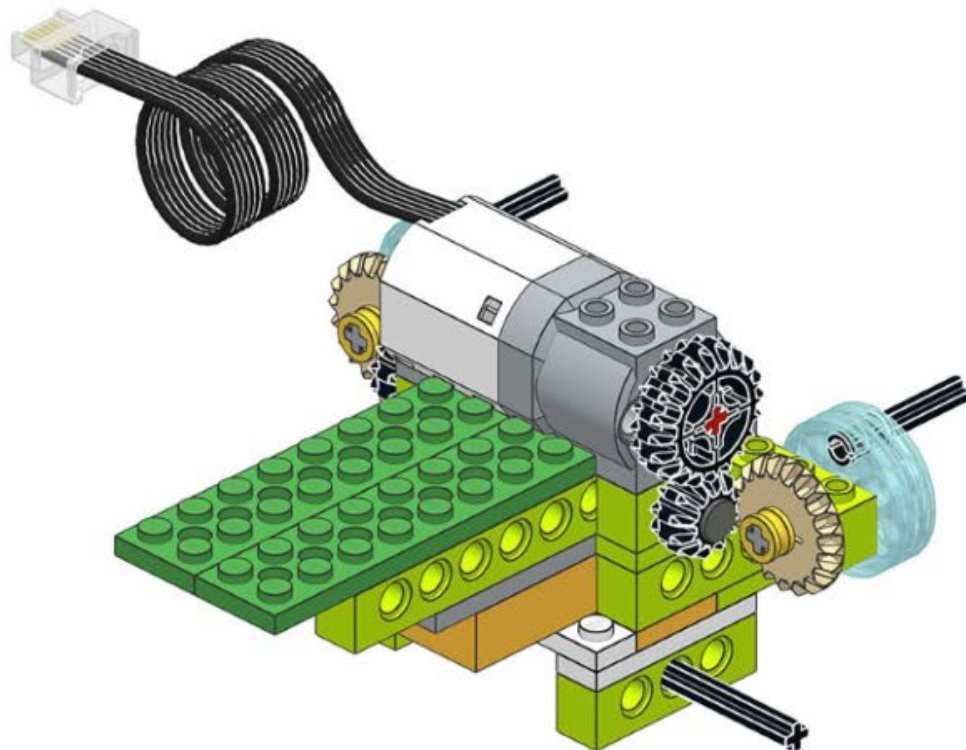
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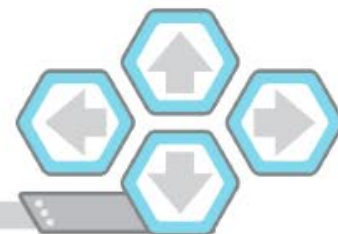
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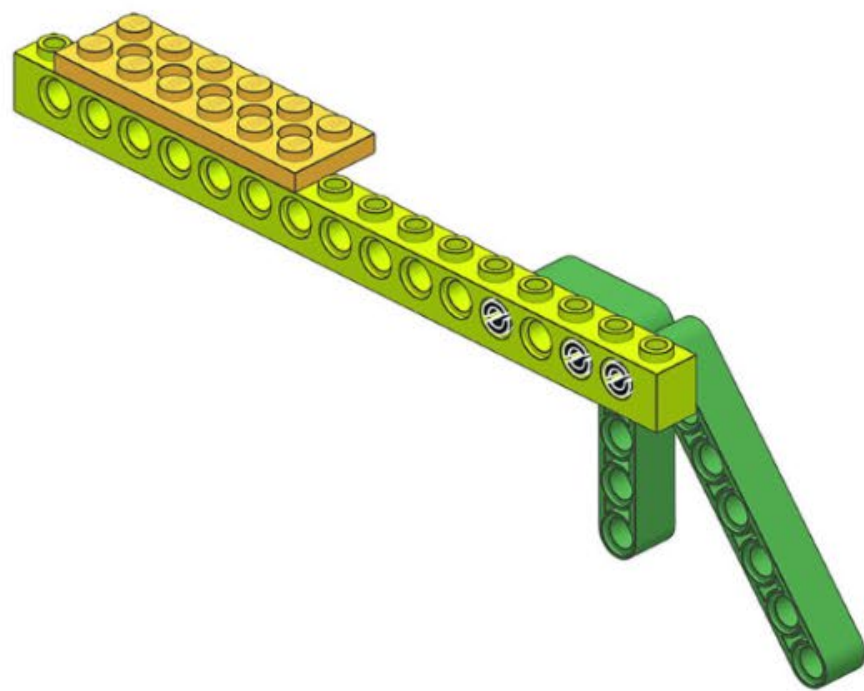


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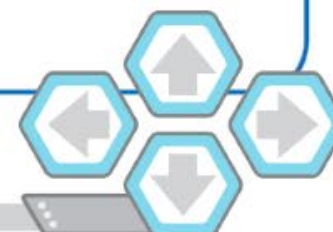


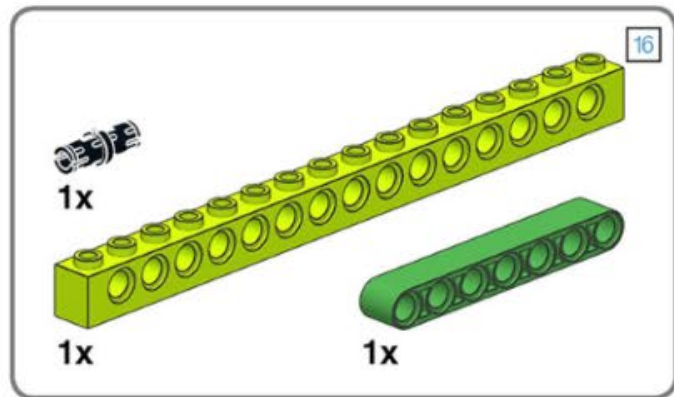


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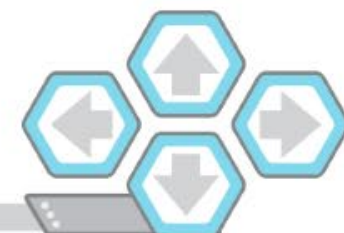
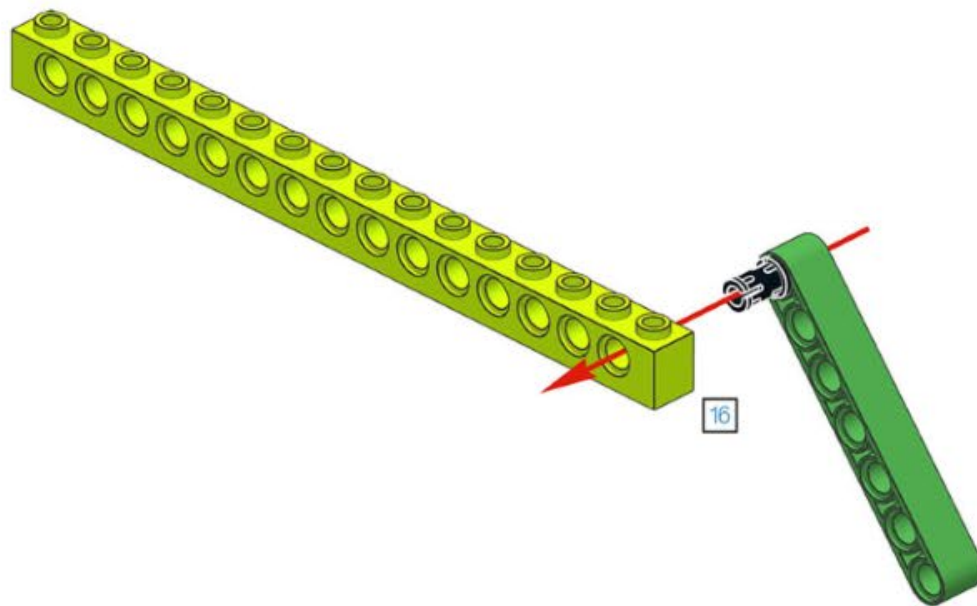
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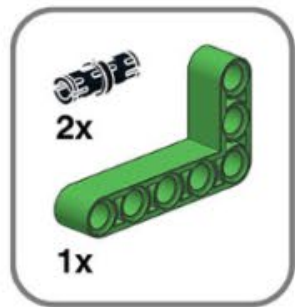
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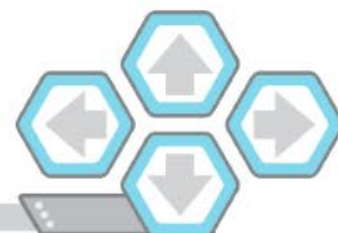
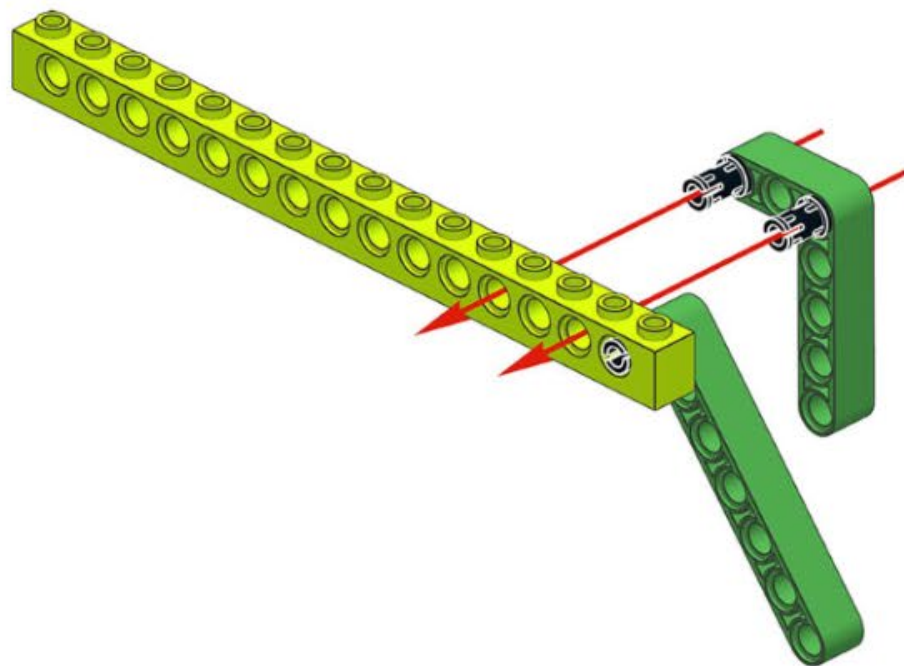


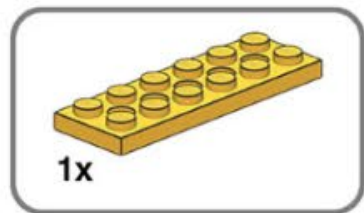
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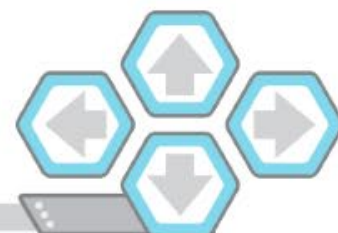
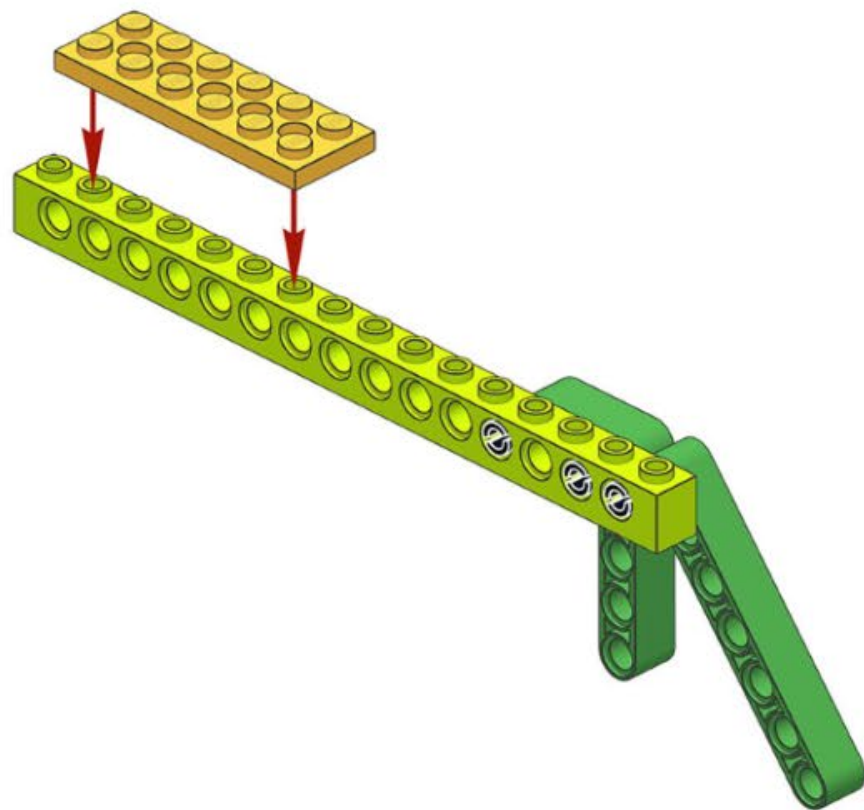


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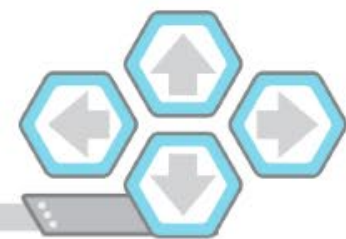
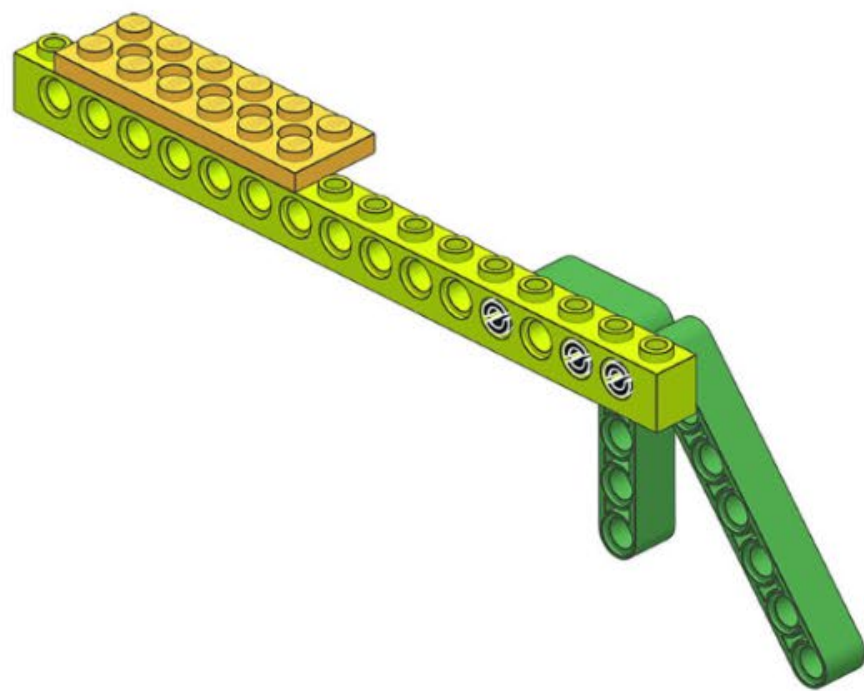




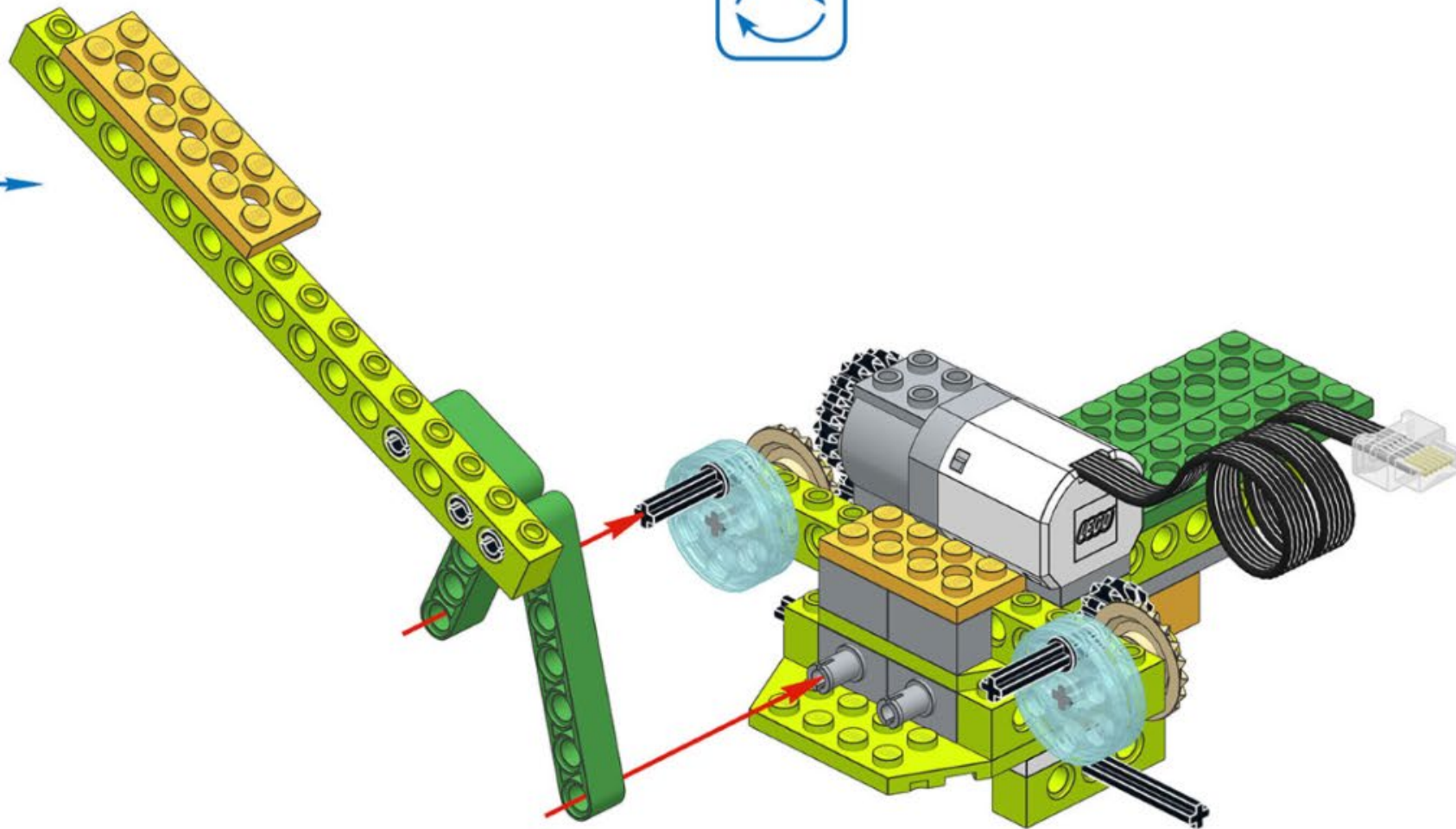
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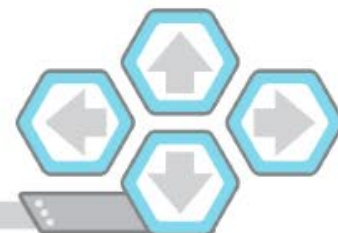
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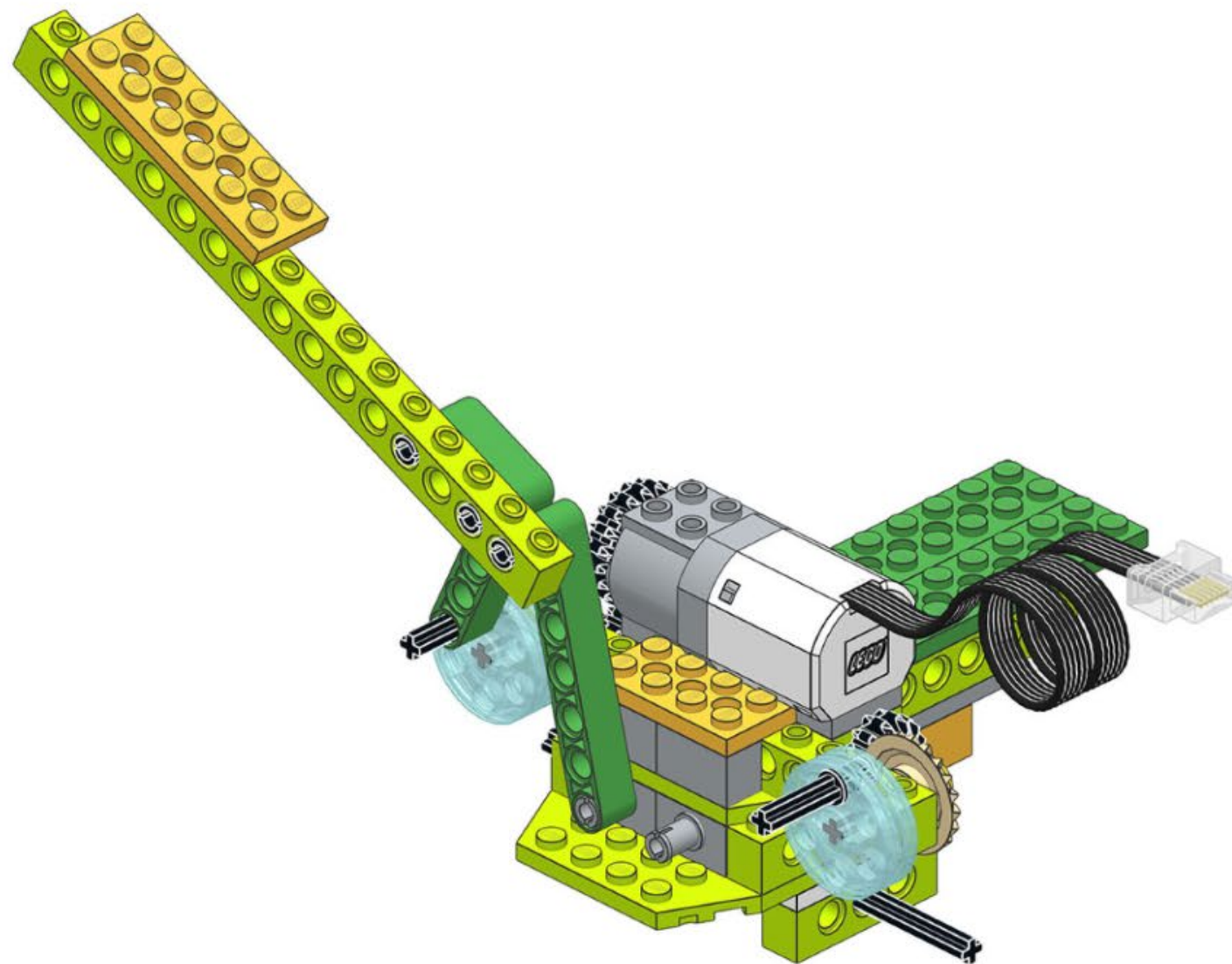
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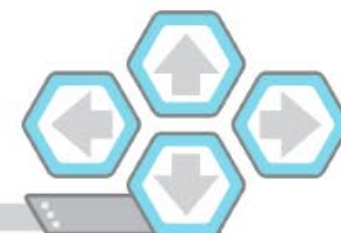
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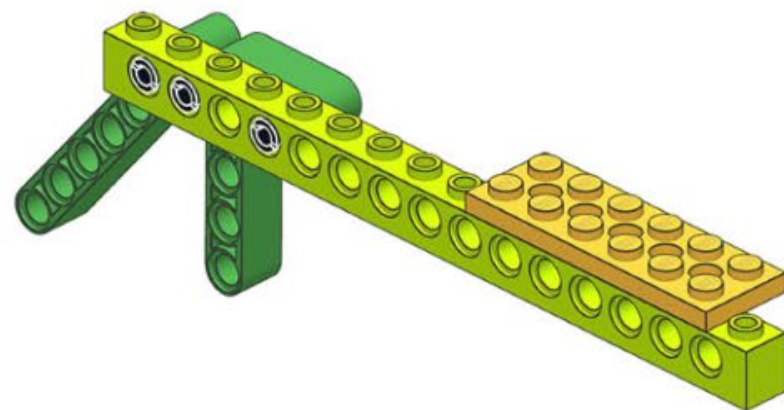


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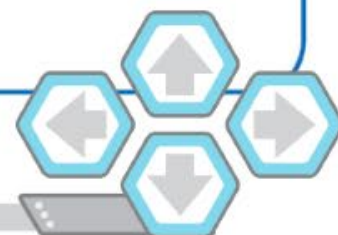


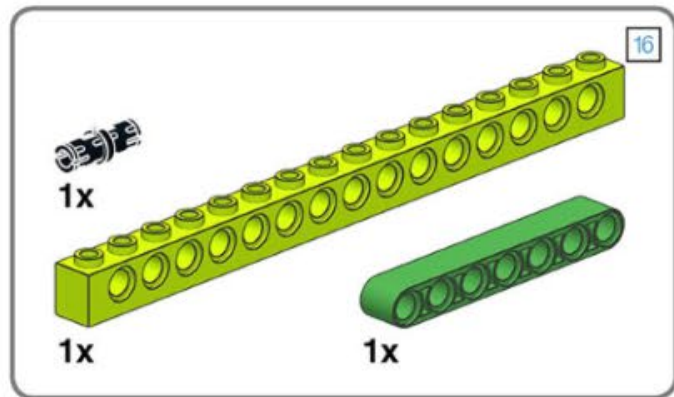


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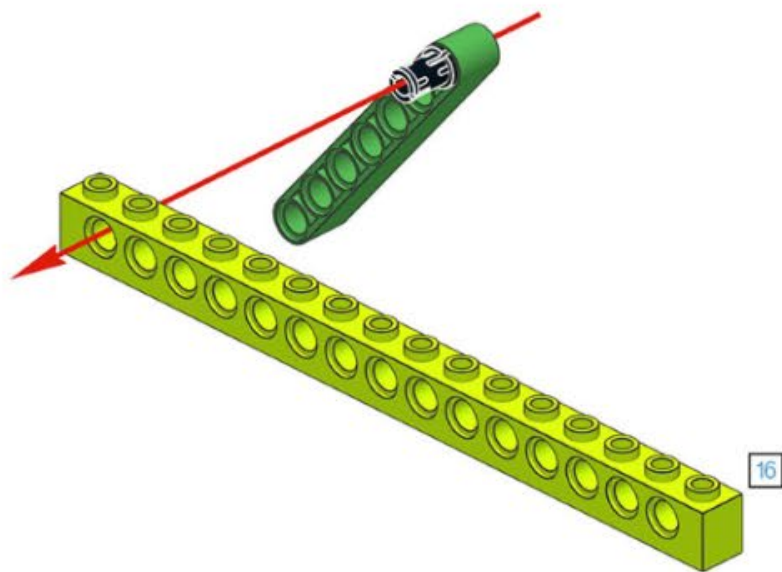
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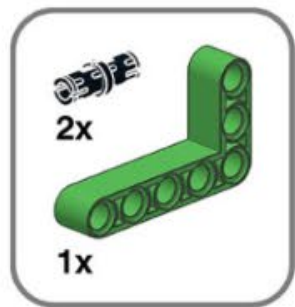
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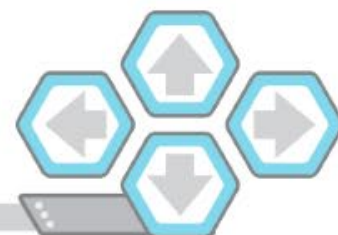
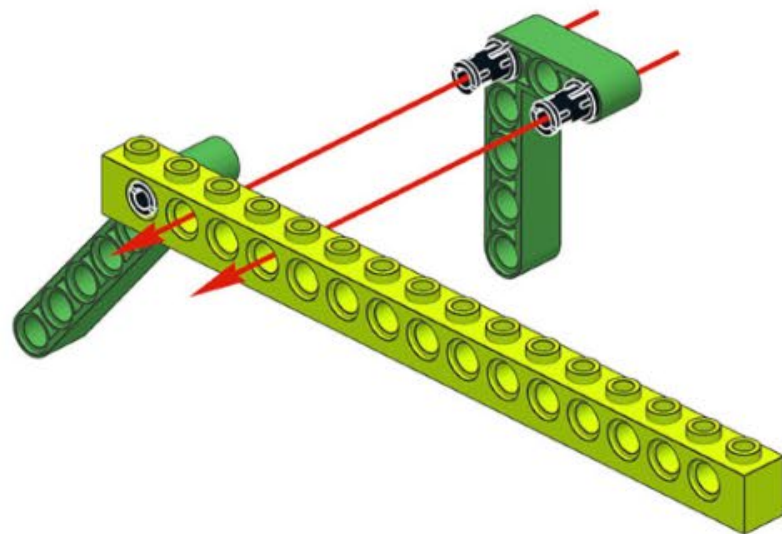


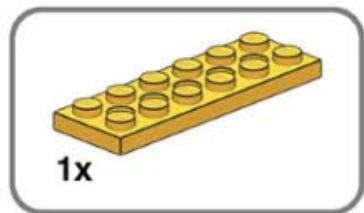
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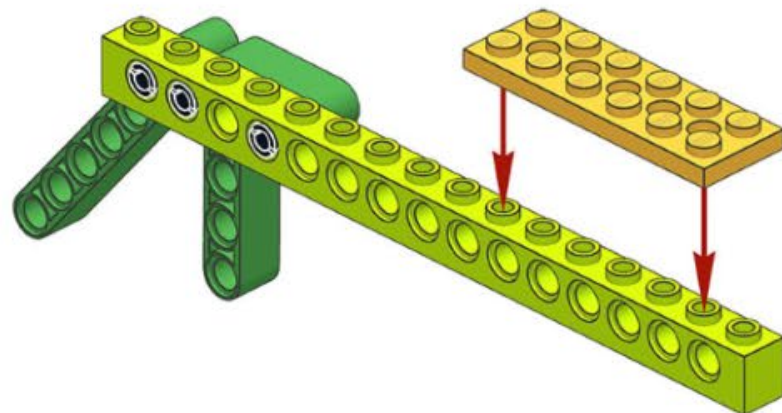


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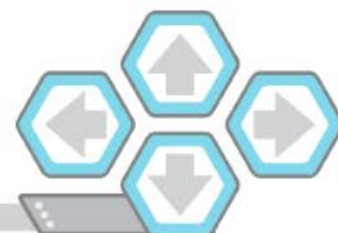
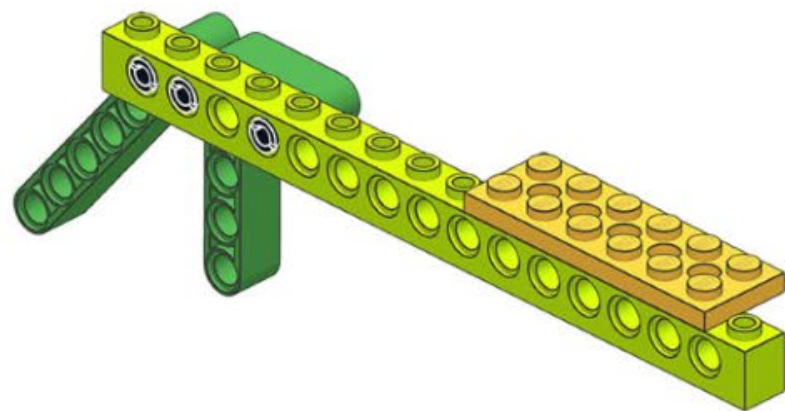


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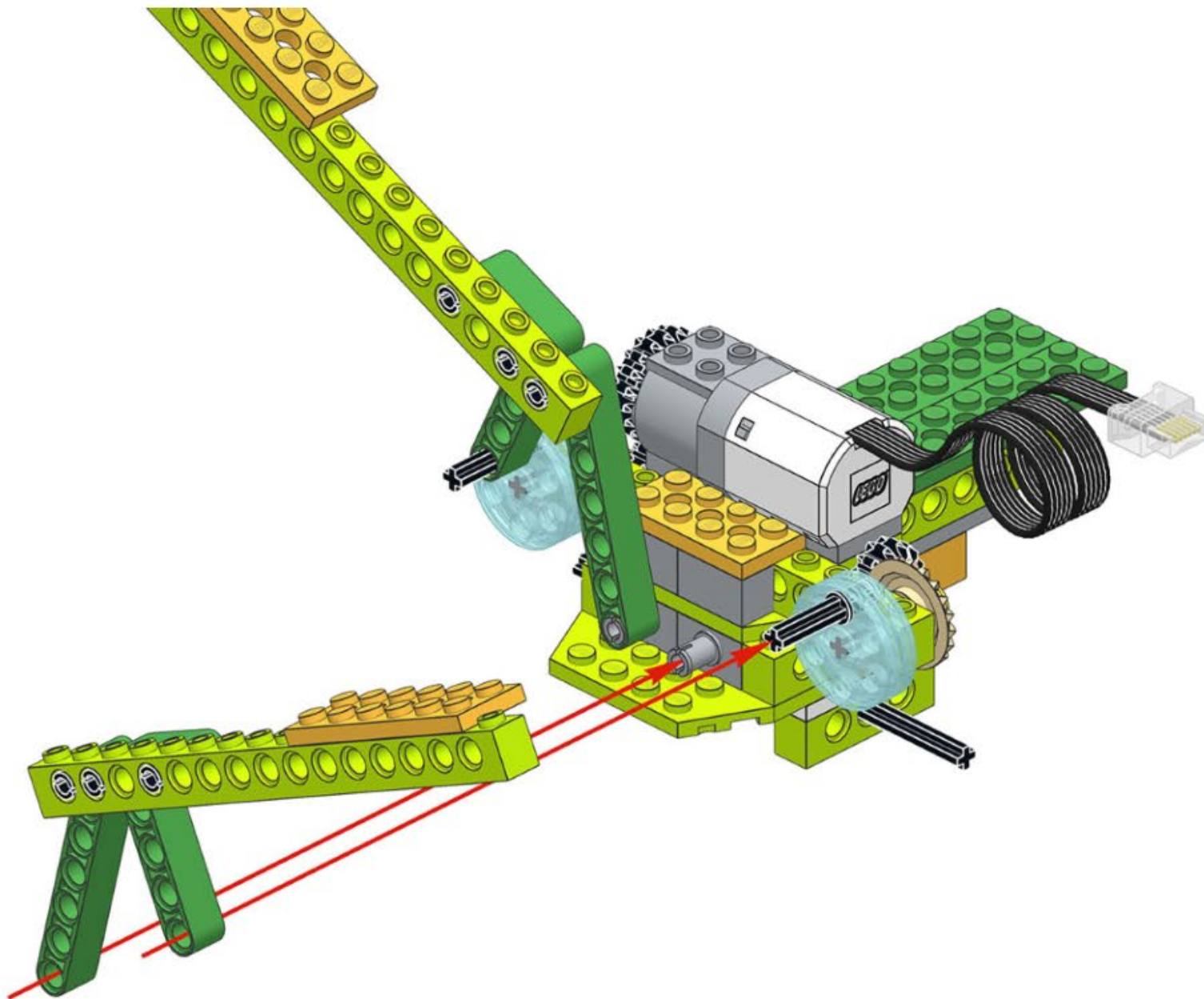




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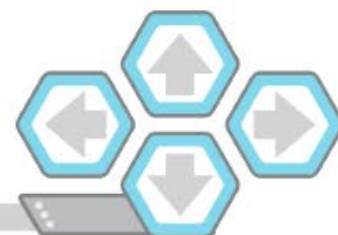
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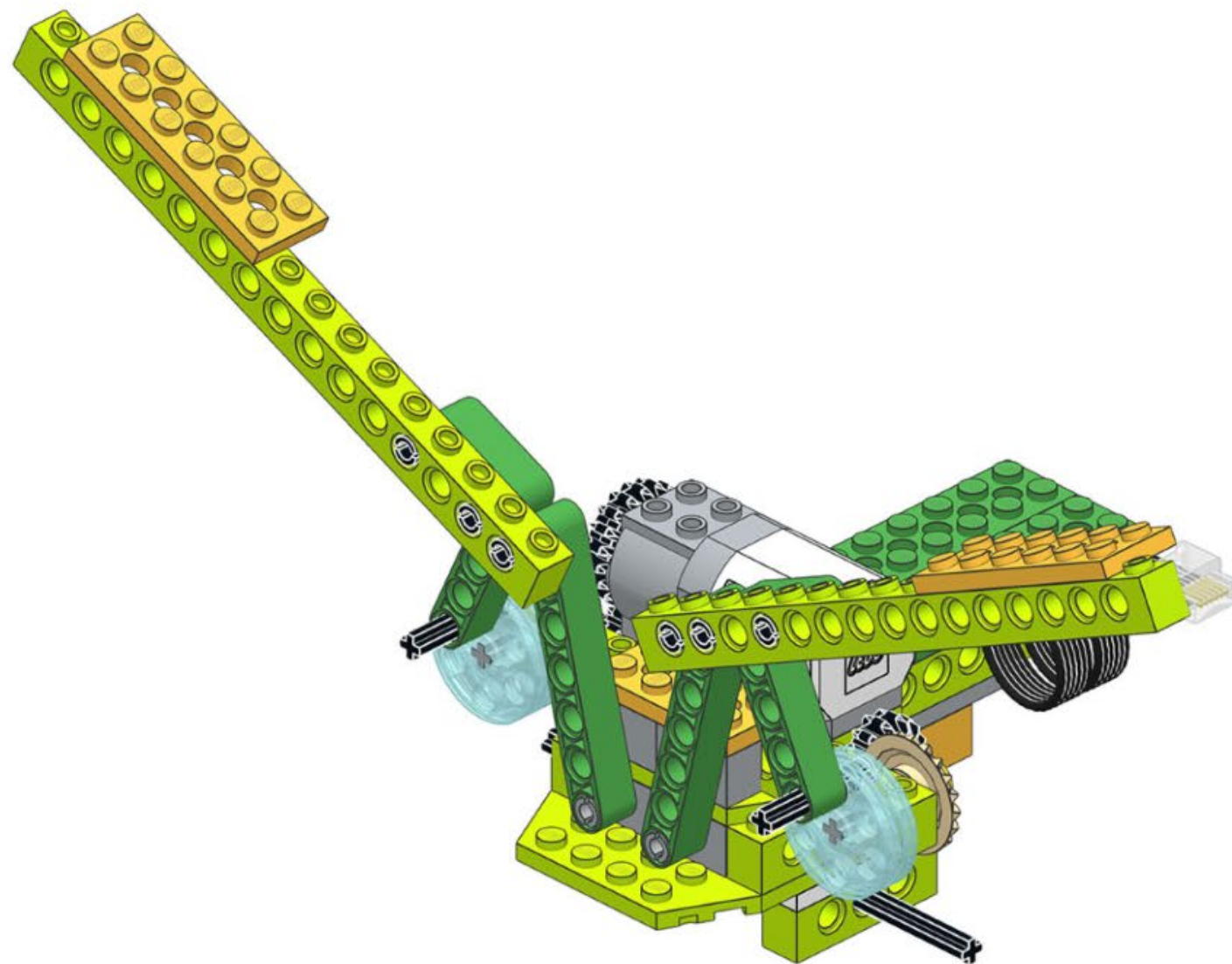
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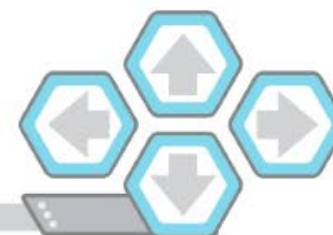
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70





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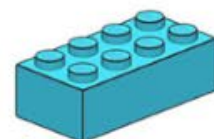
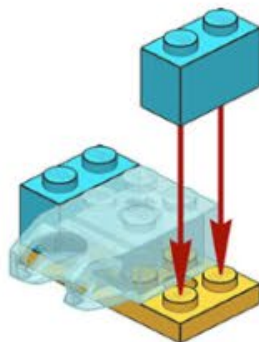


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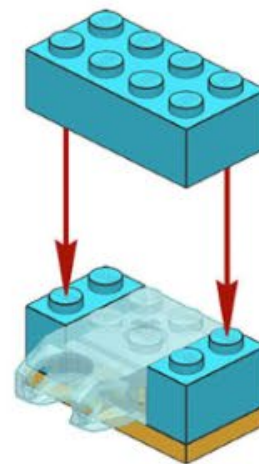
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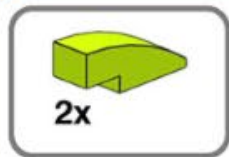
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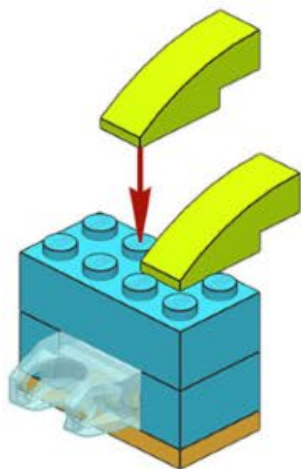
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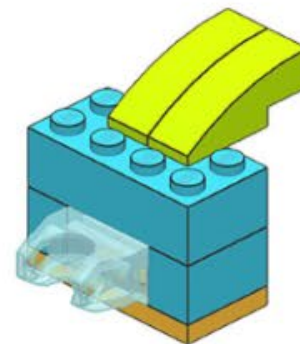




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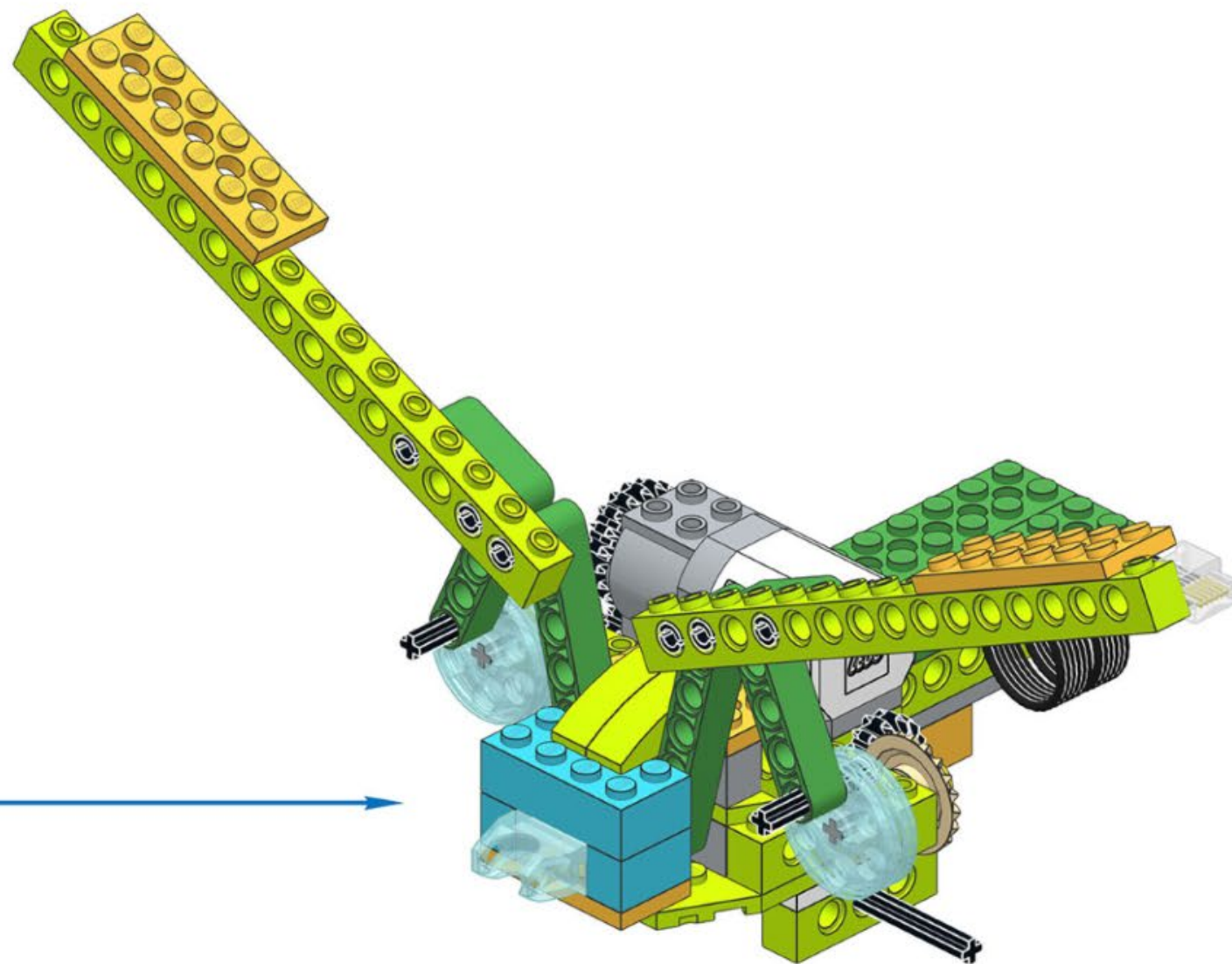


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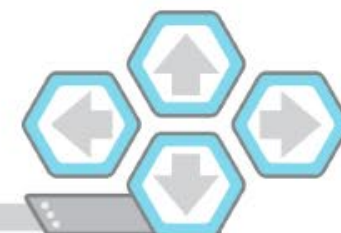
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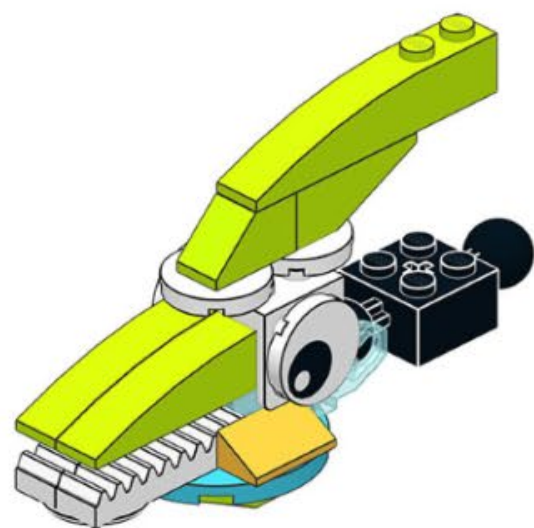


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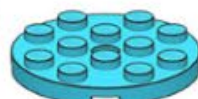
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73





1x



1x

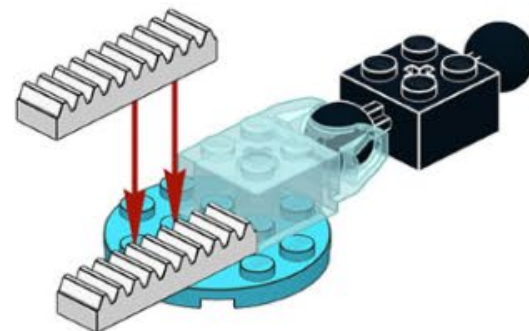


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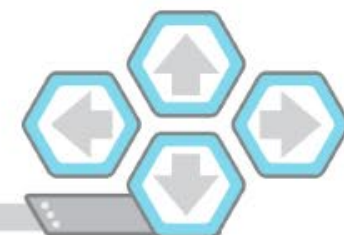
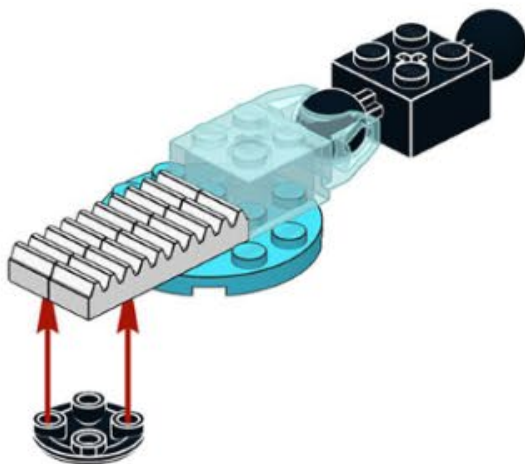
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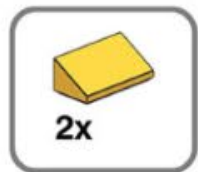
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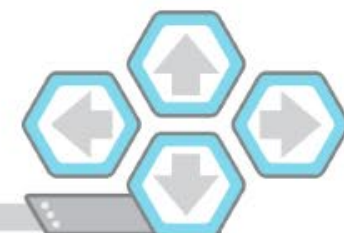
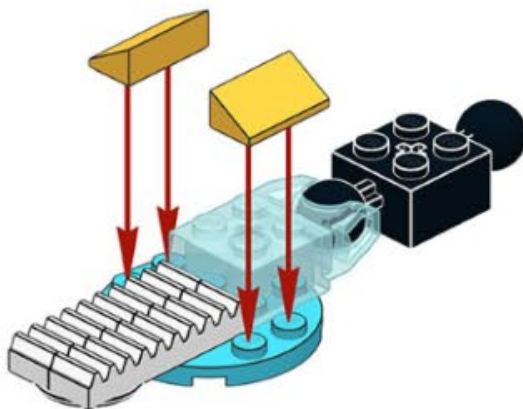


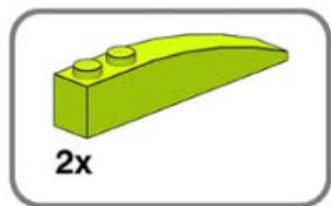
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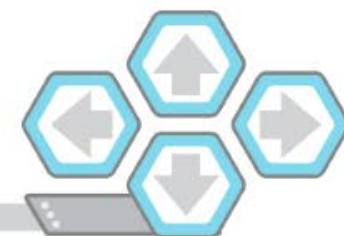
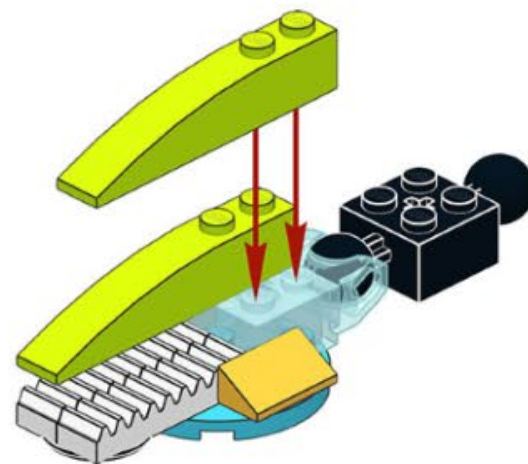


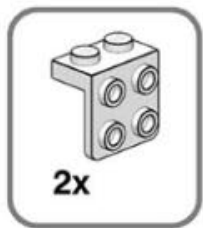
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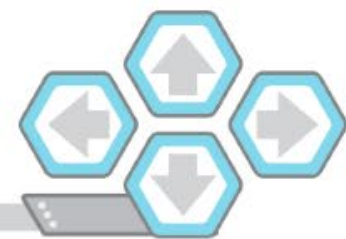
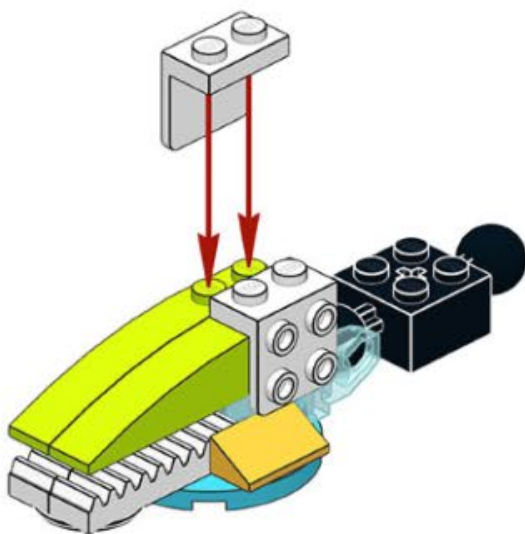


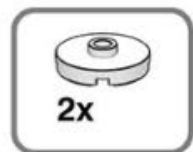
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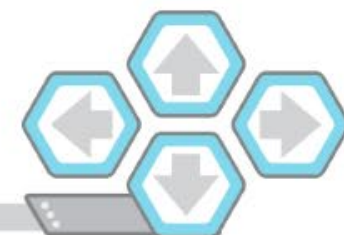
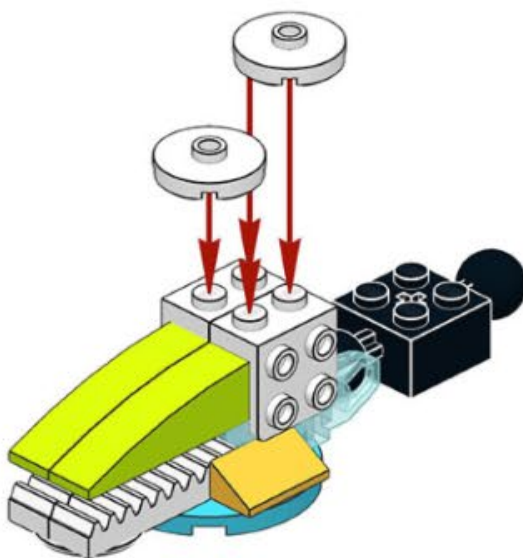


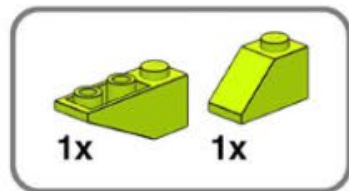
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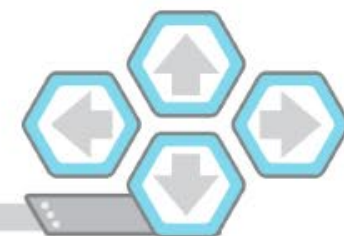
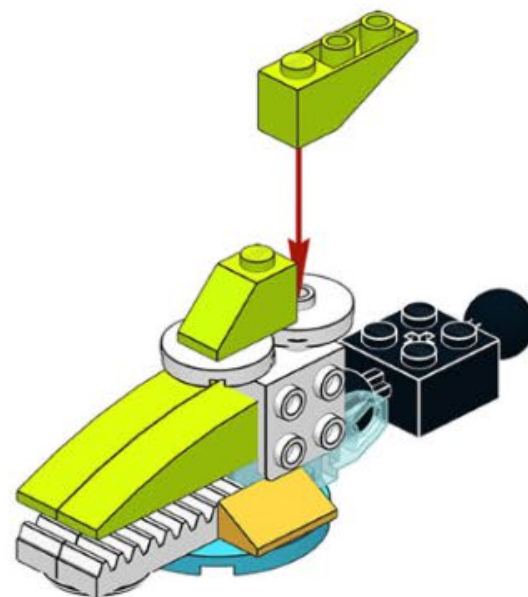


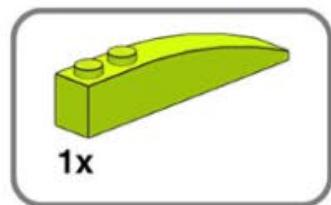
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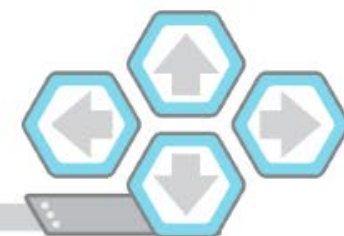
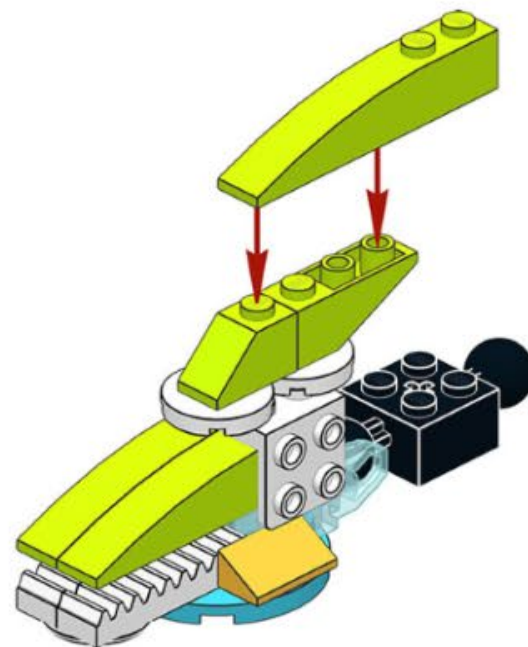


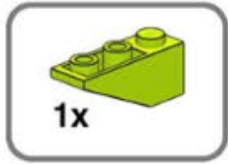
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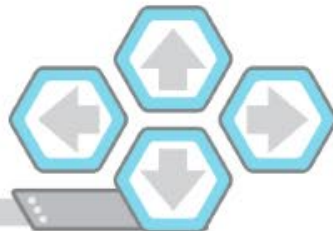
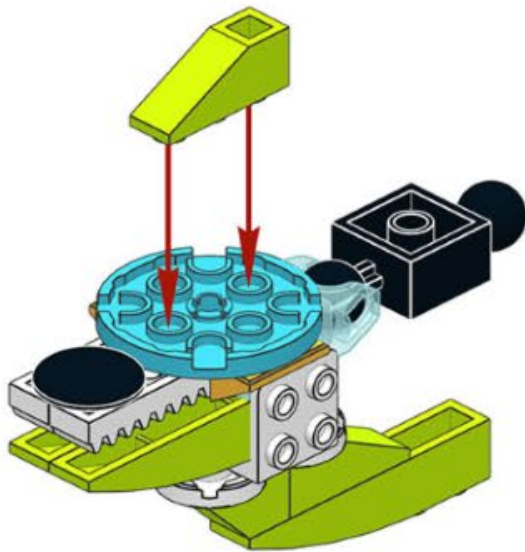


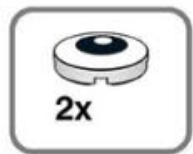
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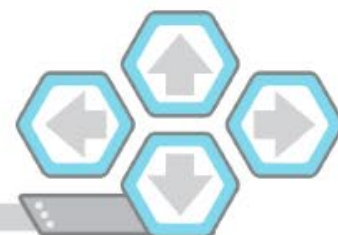
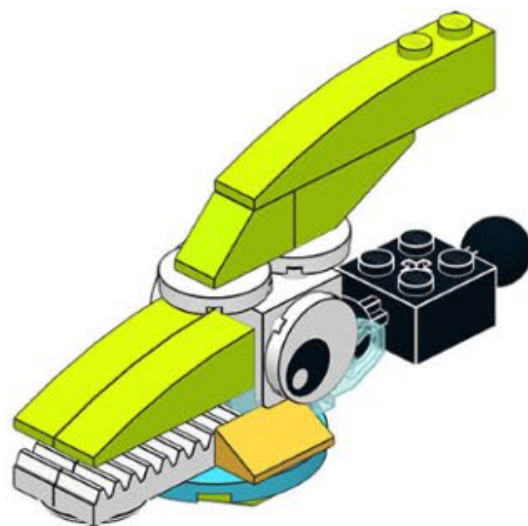


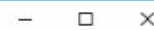
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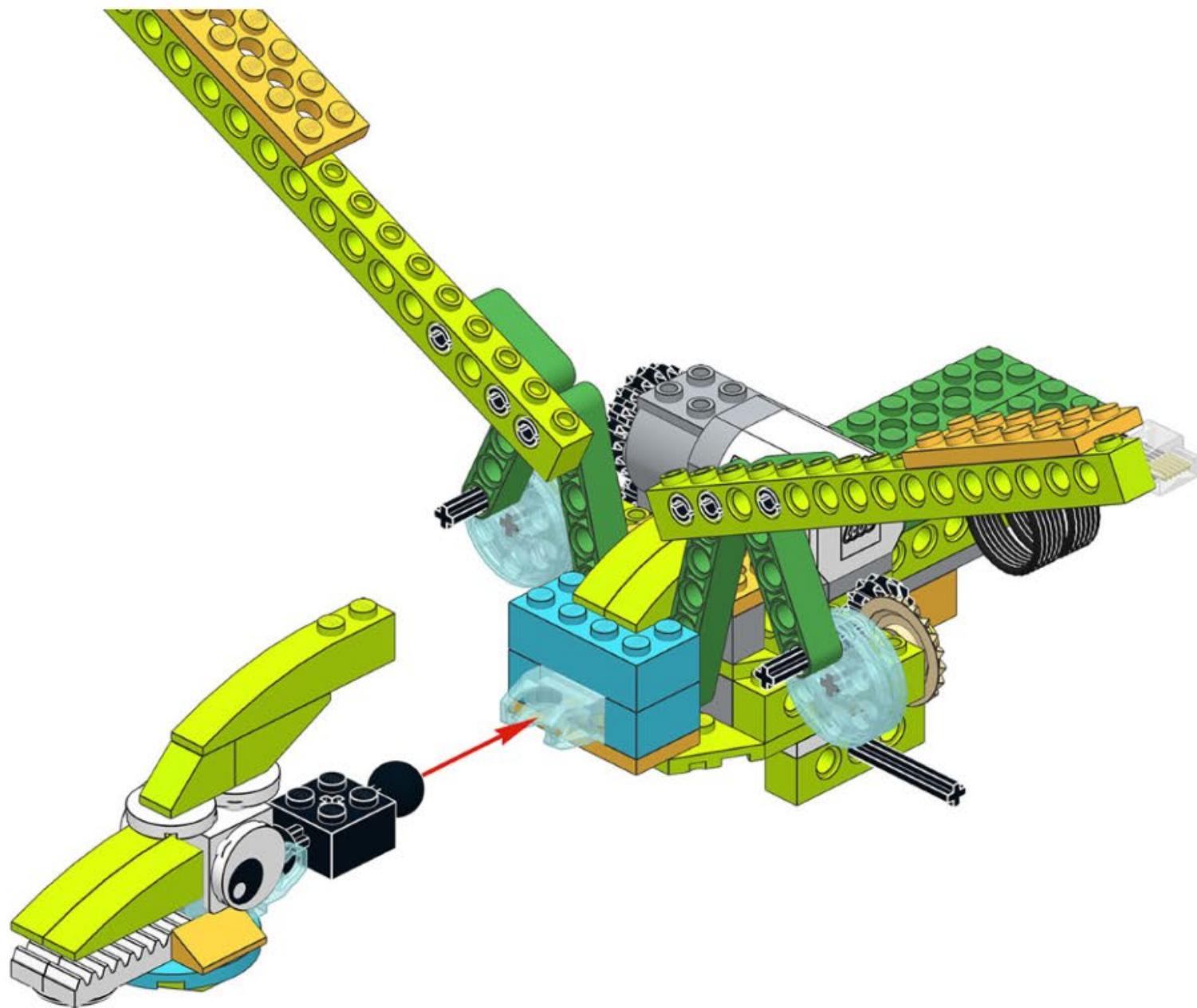


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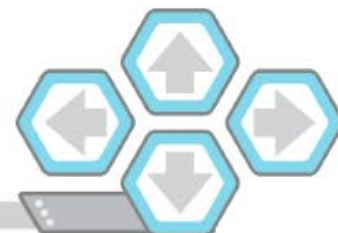
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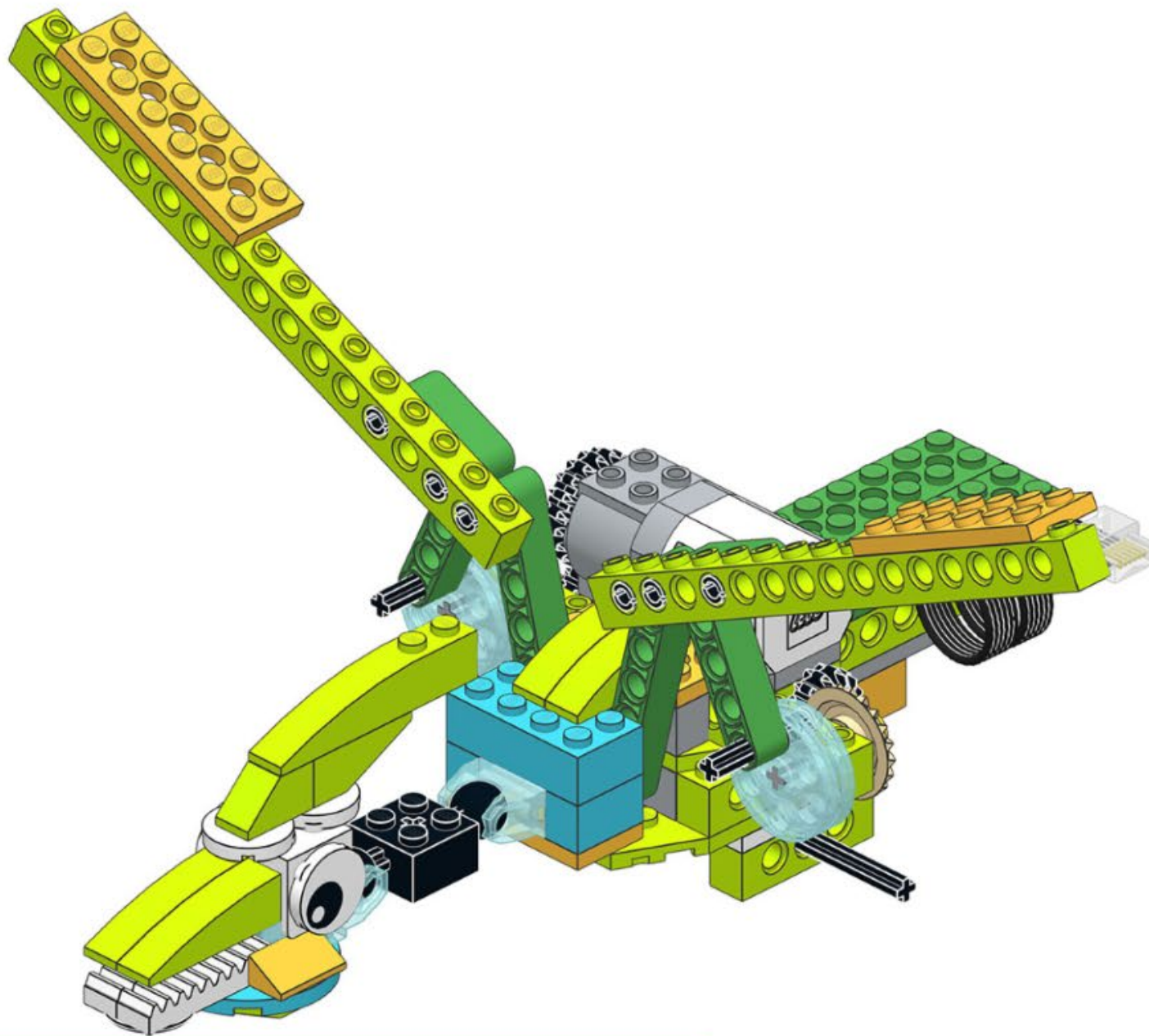
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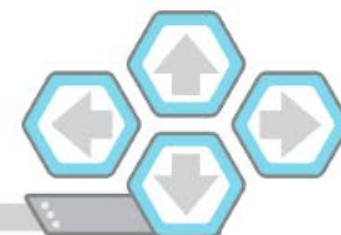
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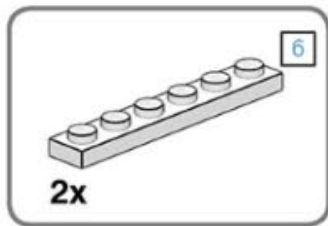


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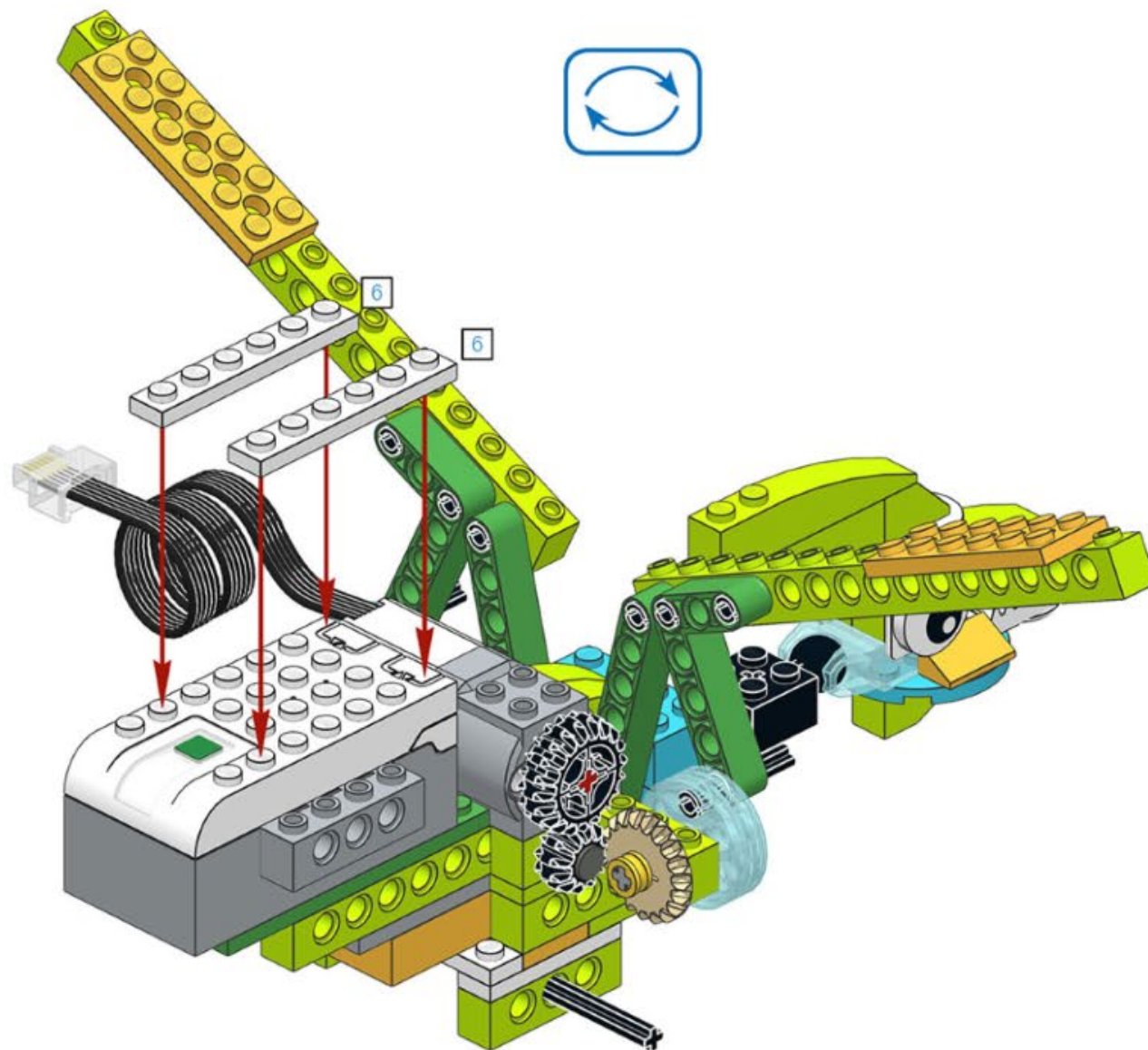
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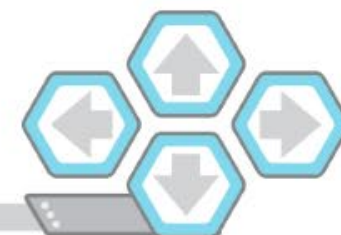
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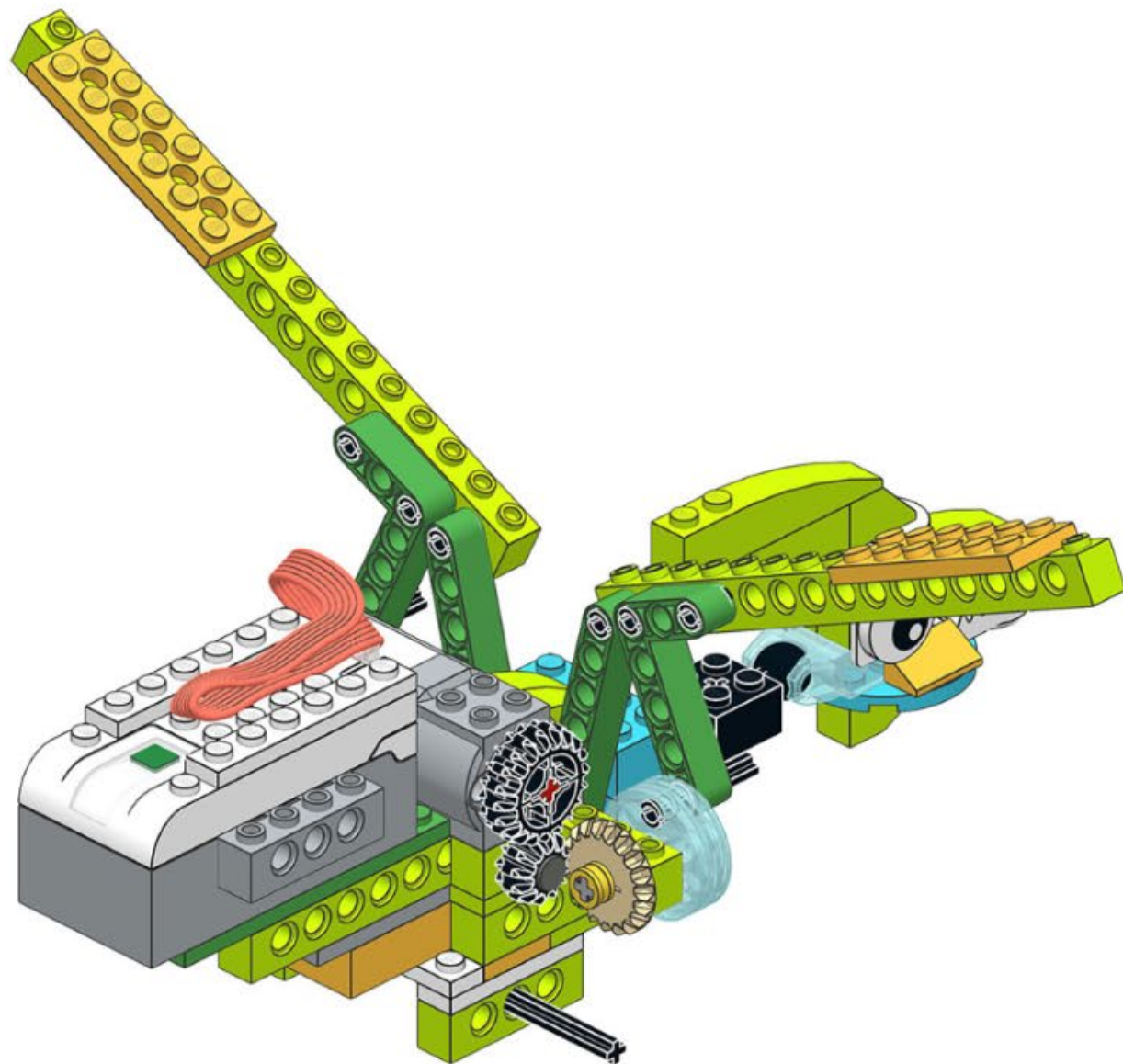
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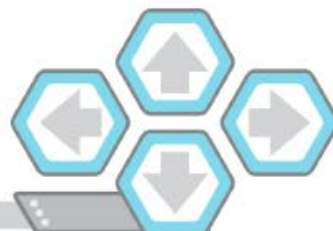
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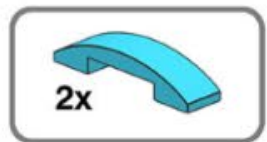


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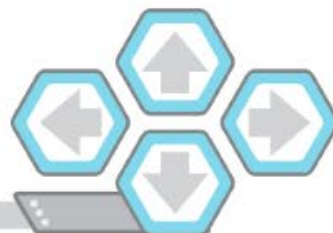
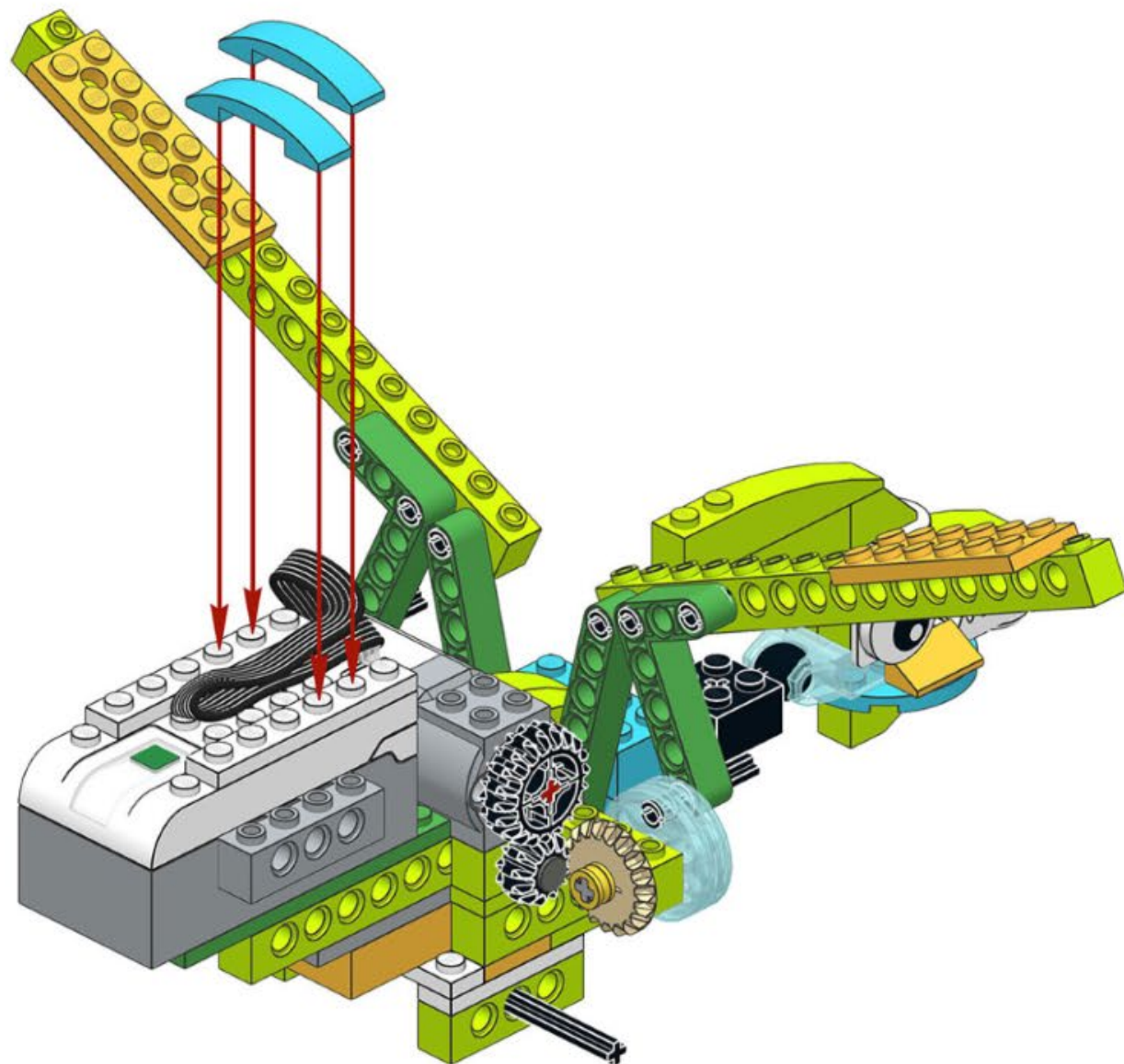
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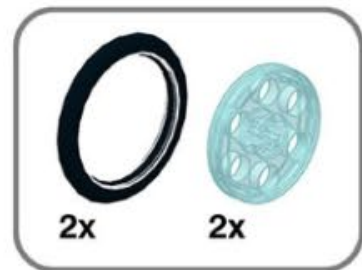
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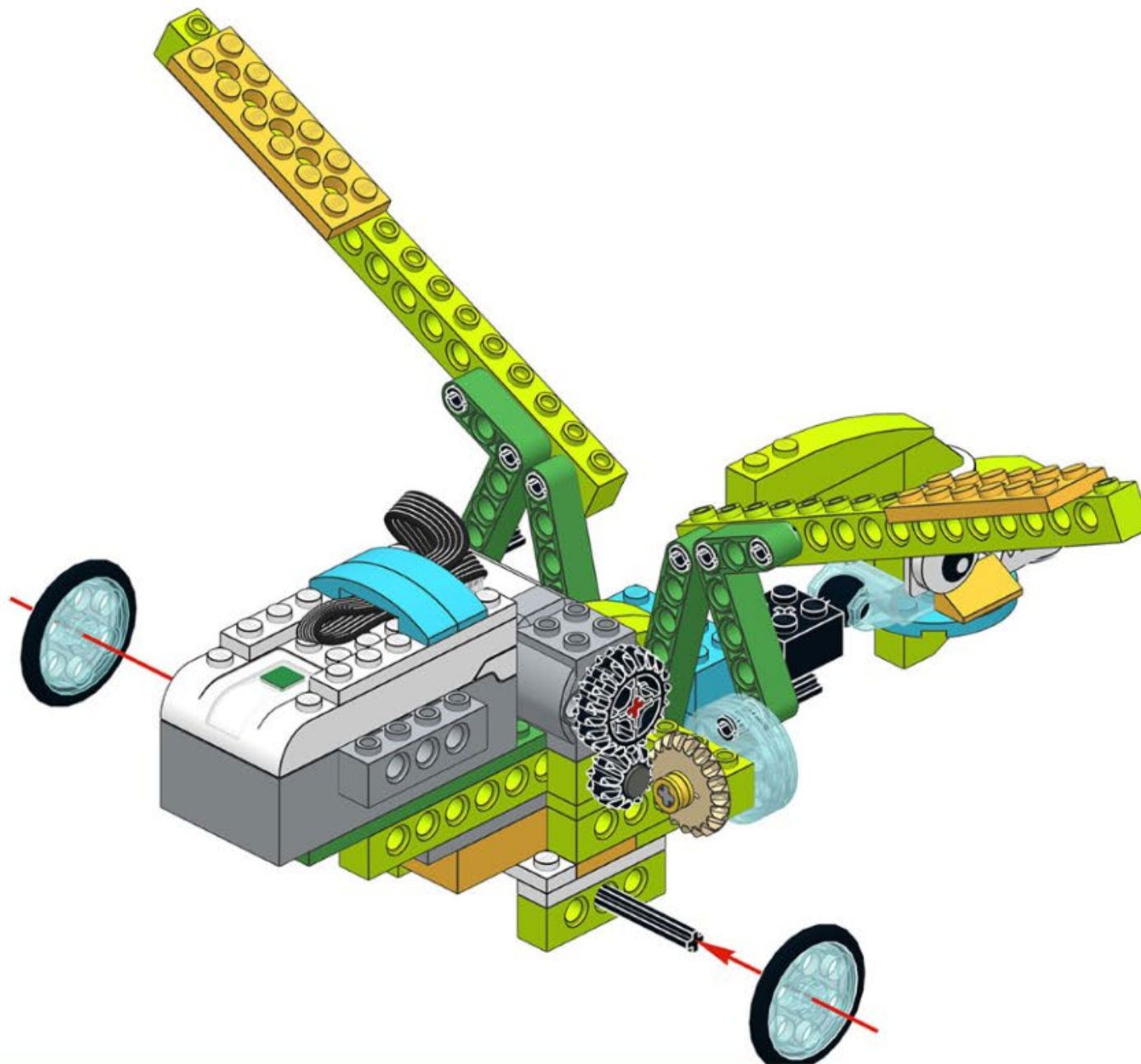
61/66

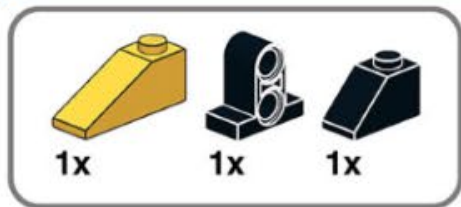
0

88

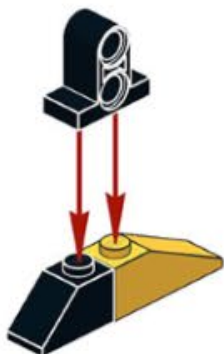


62

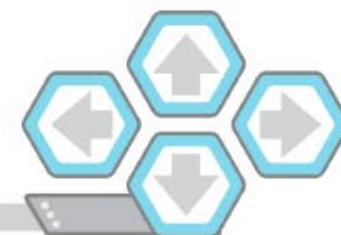
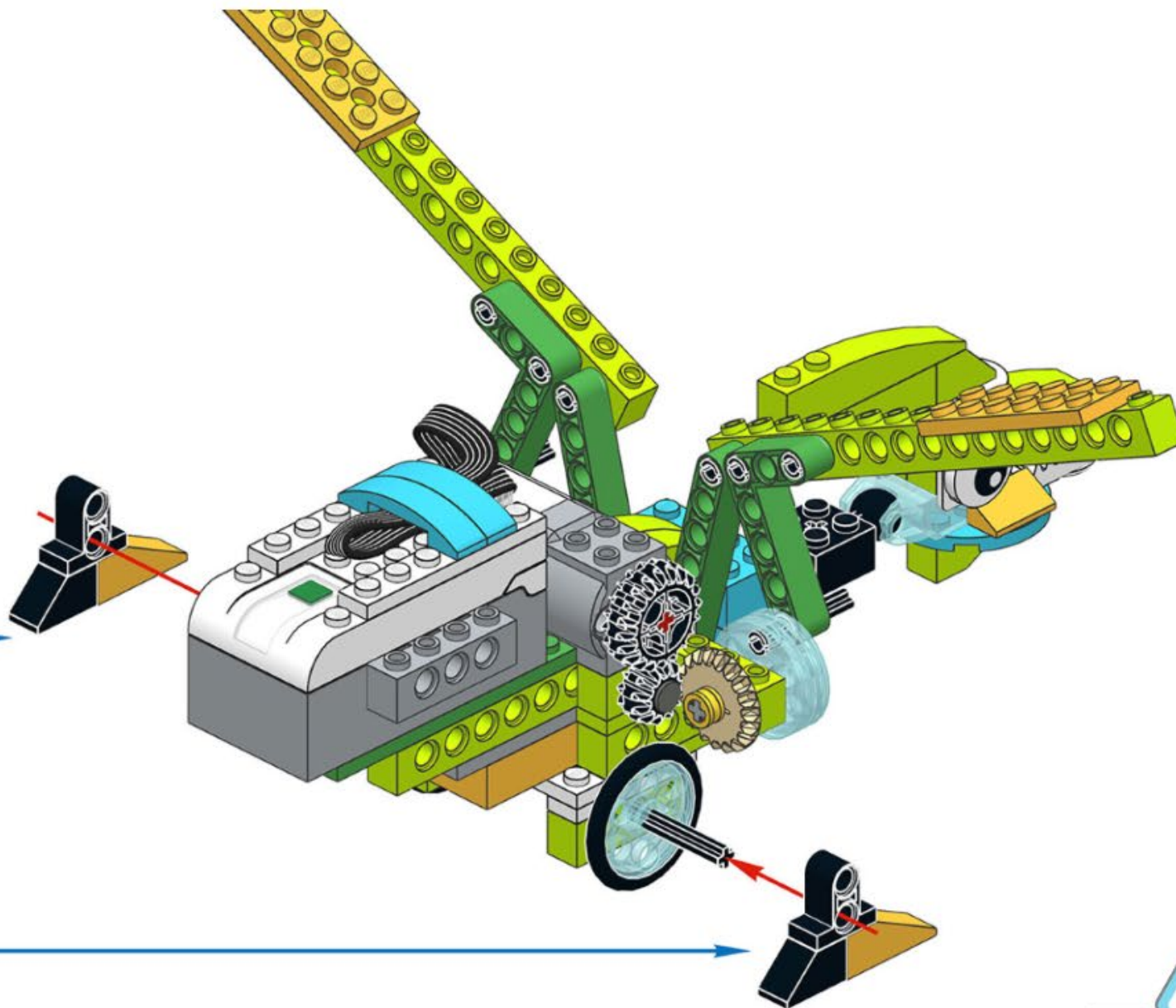




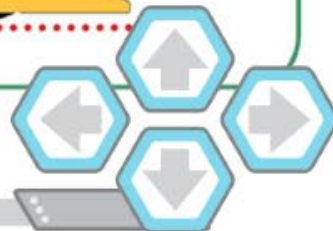
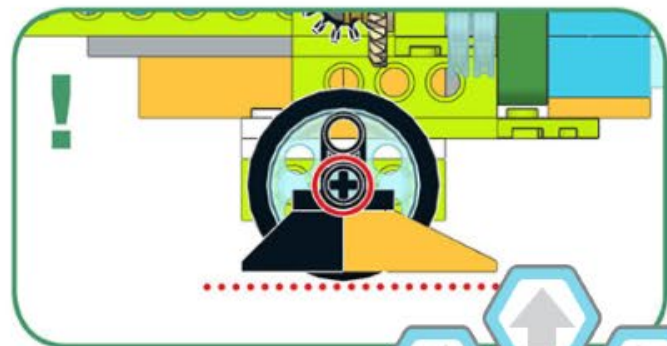
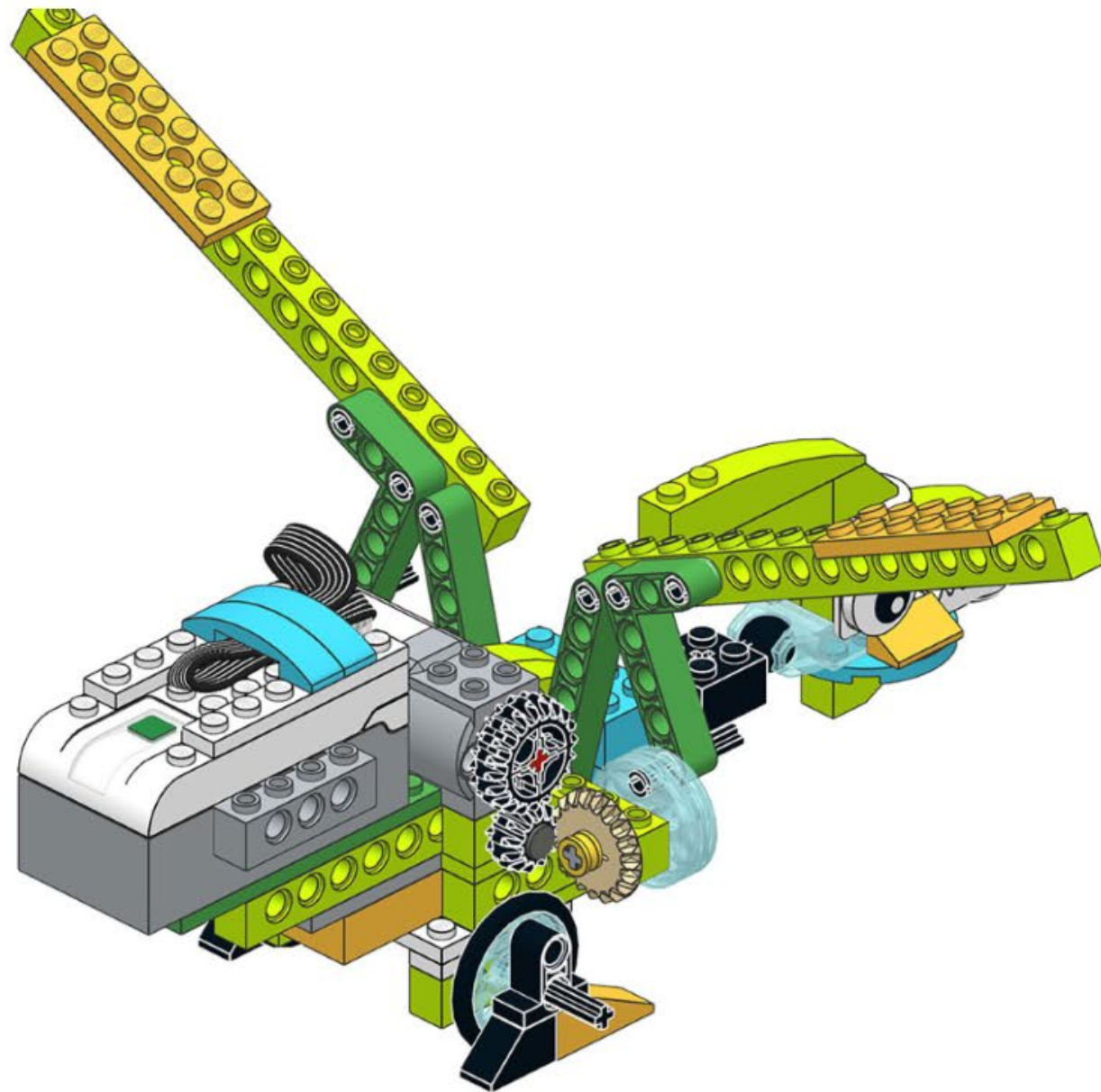
1



2



64



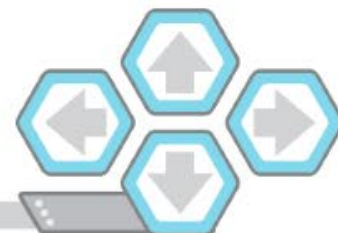
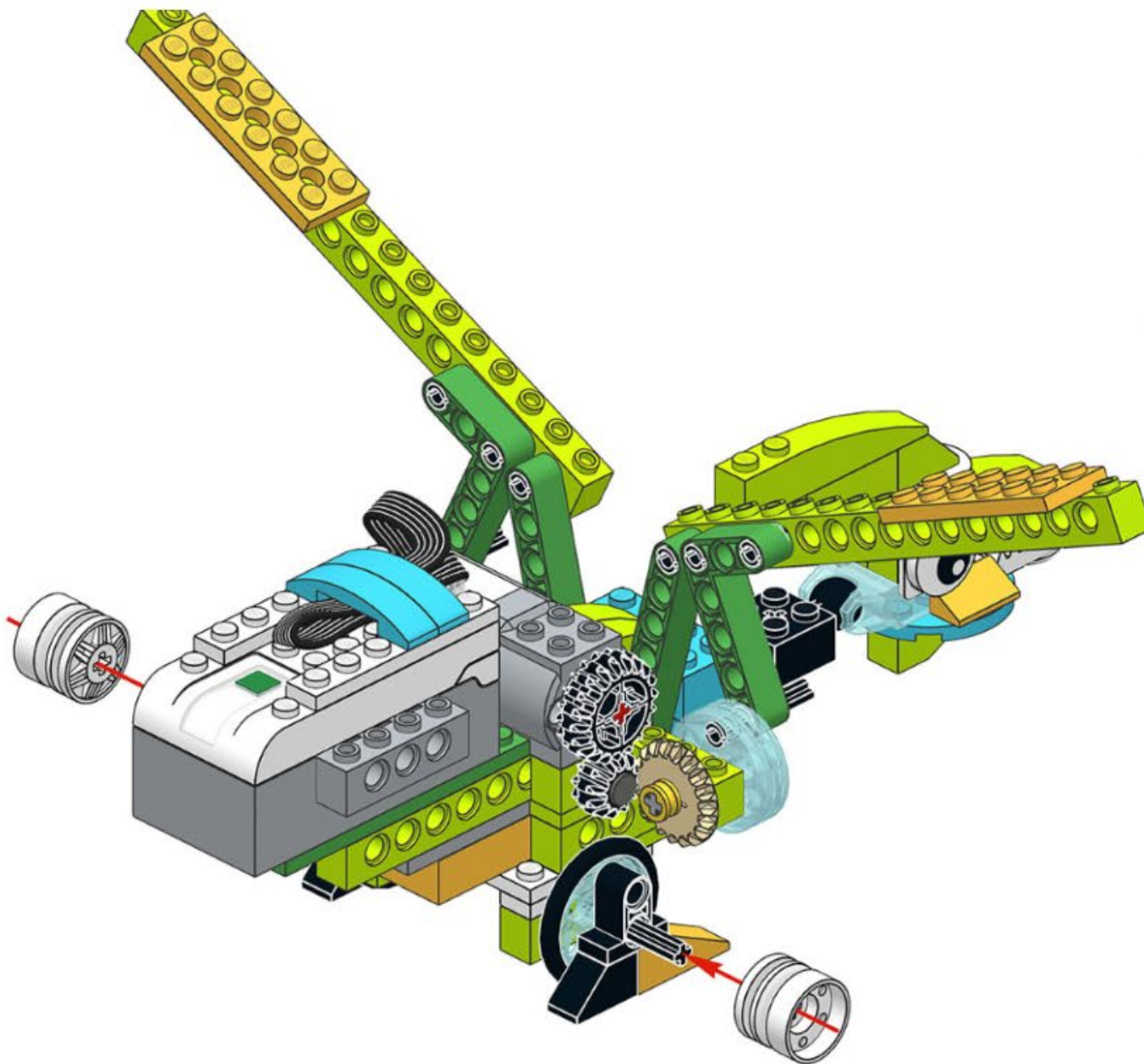
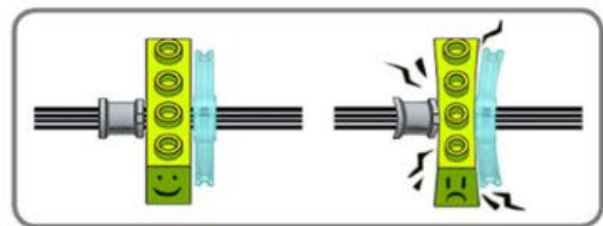
64/66

0

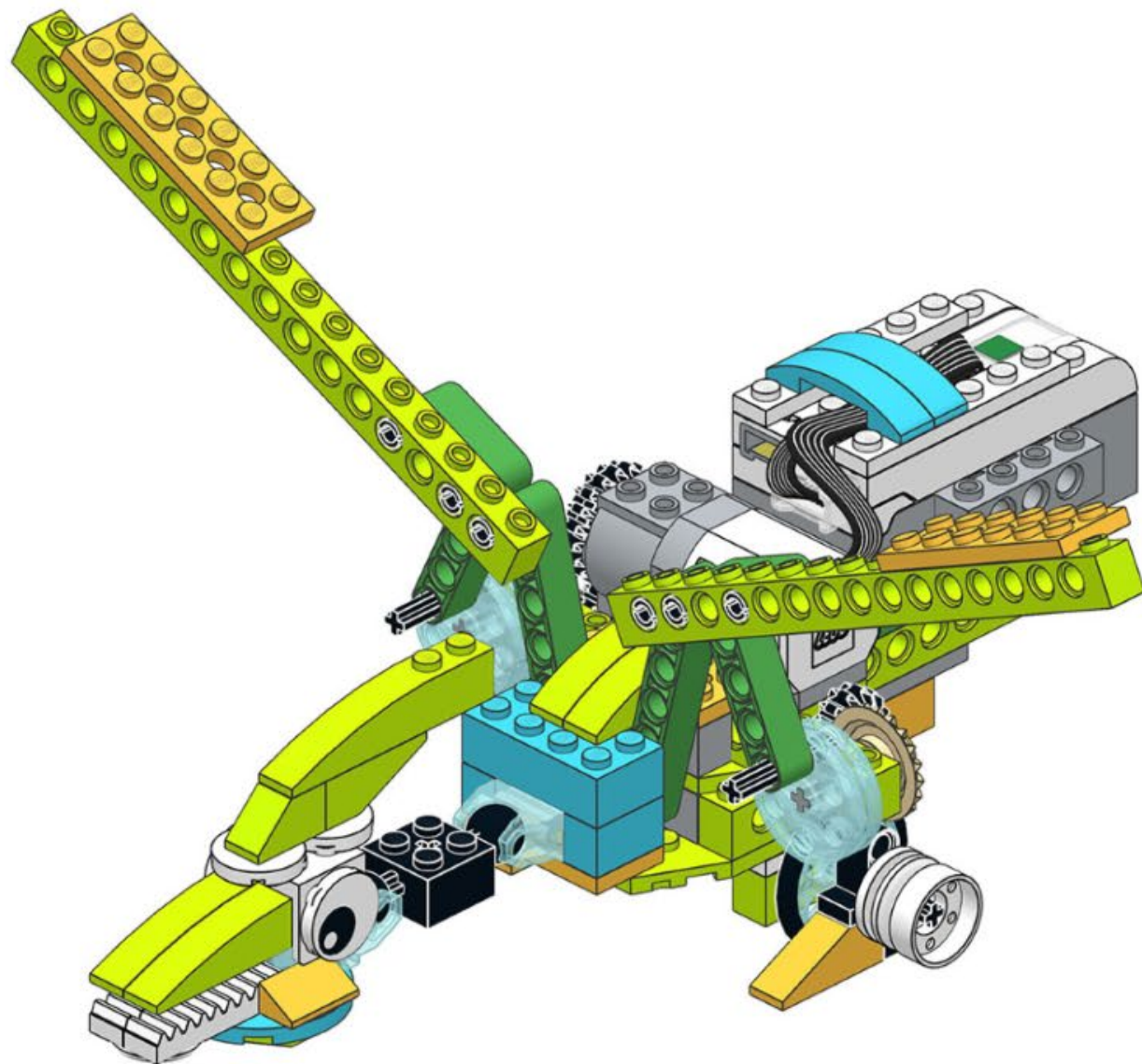
91



65



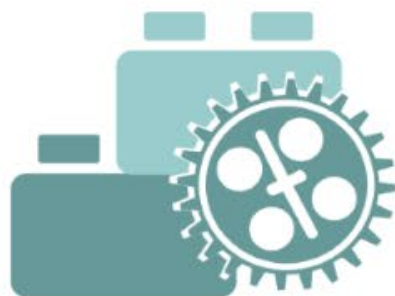
66





Доисторическая рыба

Соберите рыбу, на которую охотились
Птеранодоны.

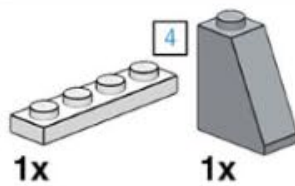
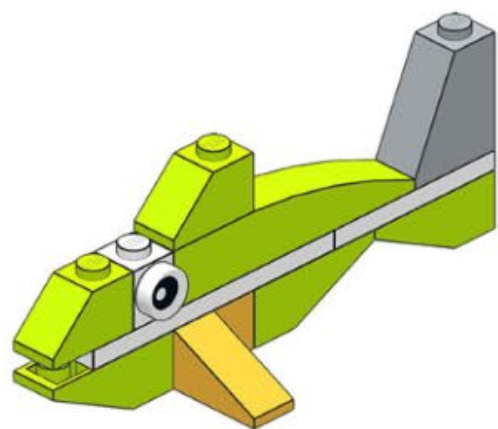


Pteranodon

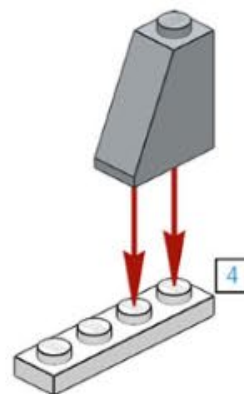


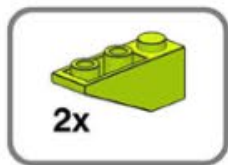
94



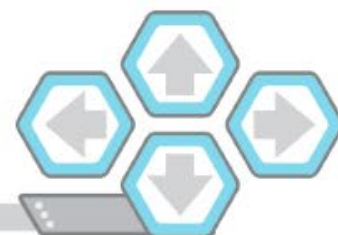
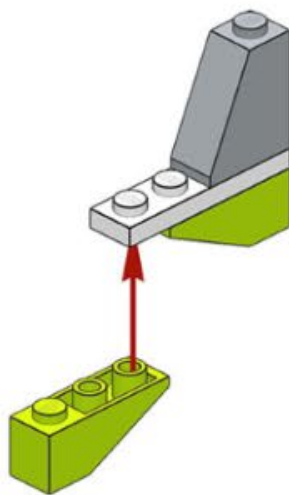


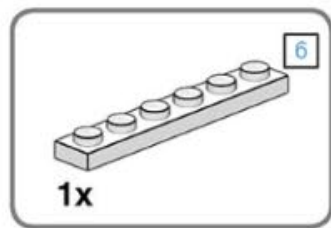
86



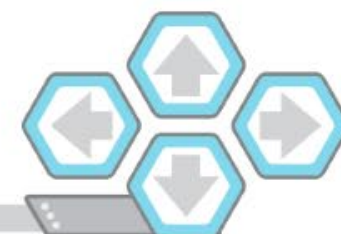
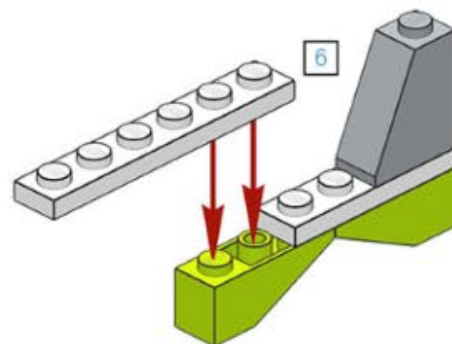


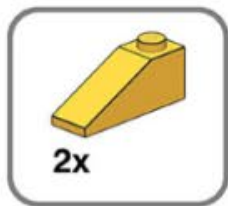
87



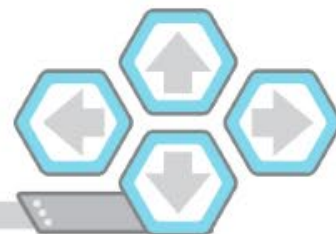
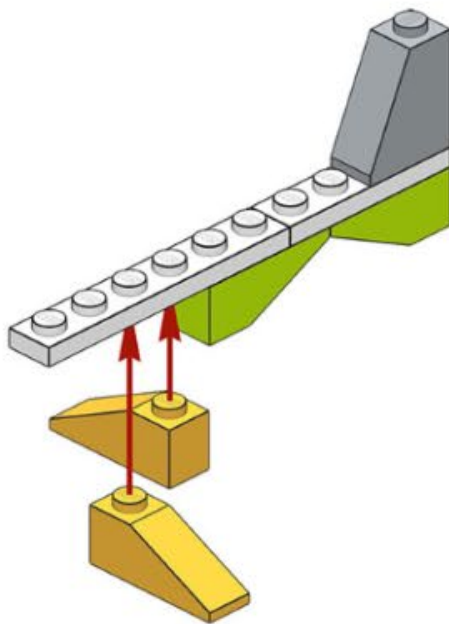


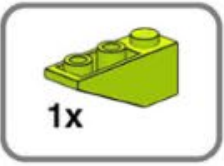
88



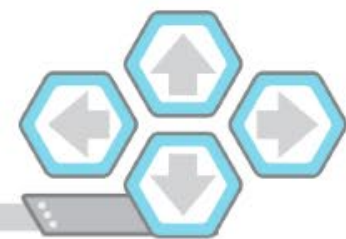
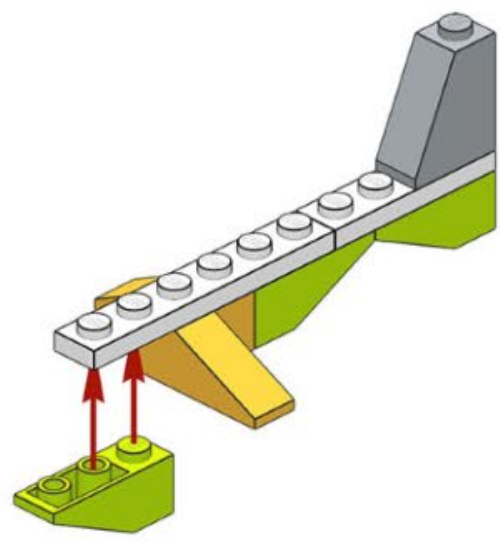


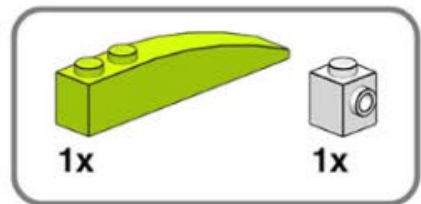
89



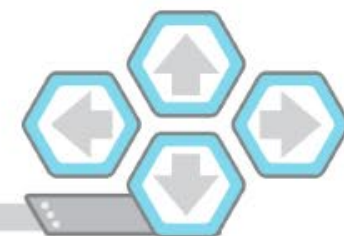
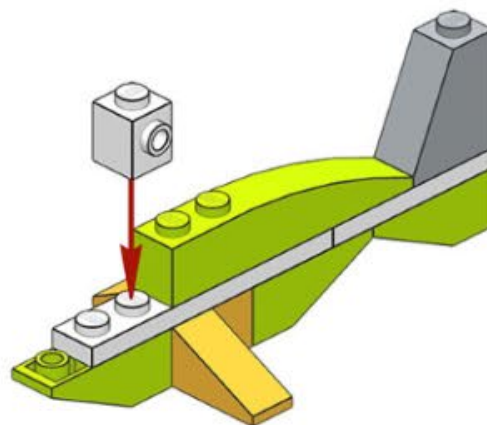


90



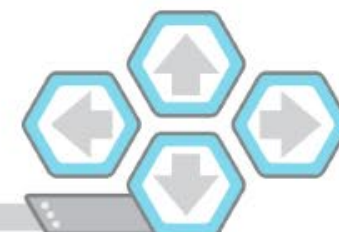
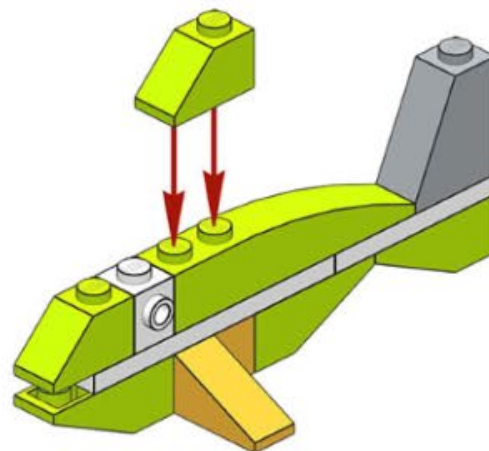


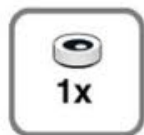
91



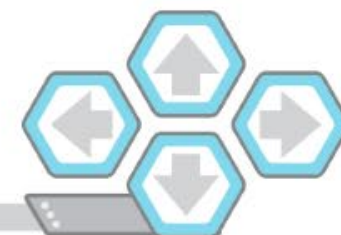
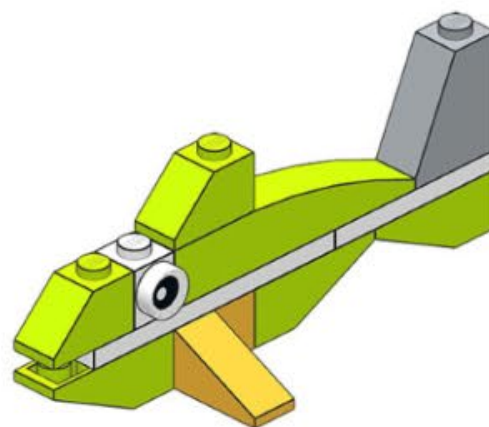


92

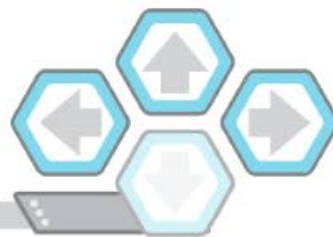
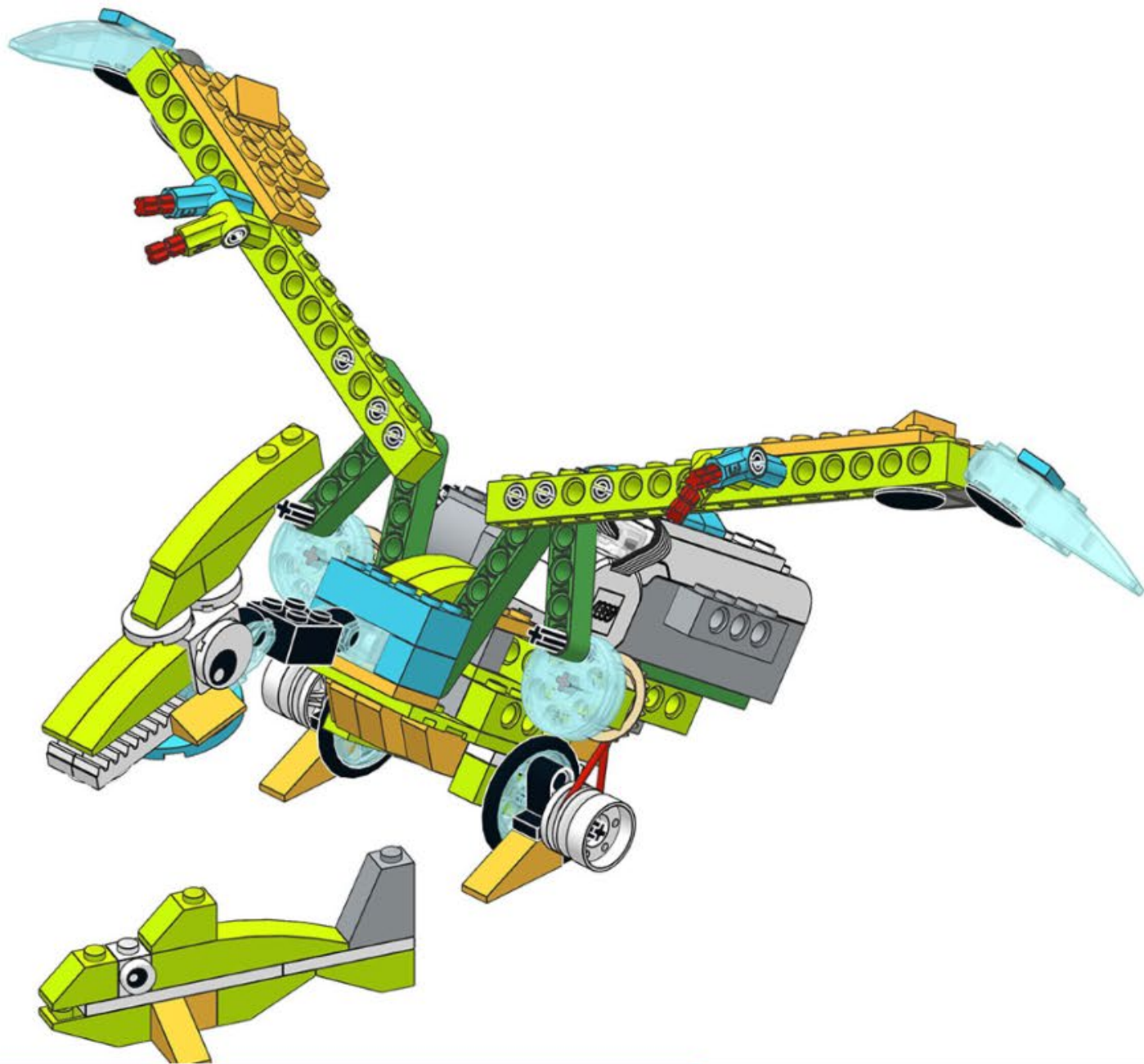




93



94

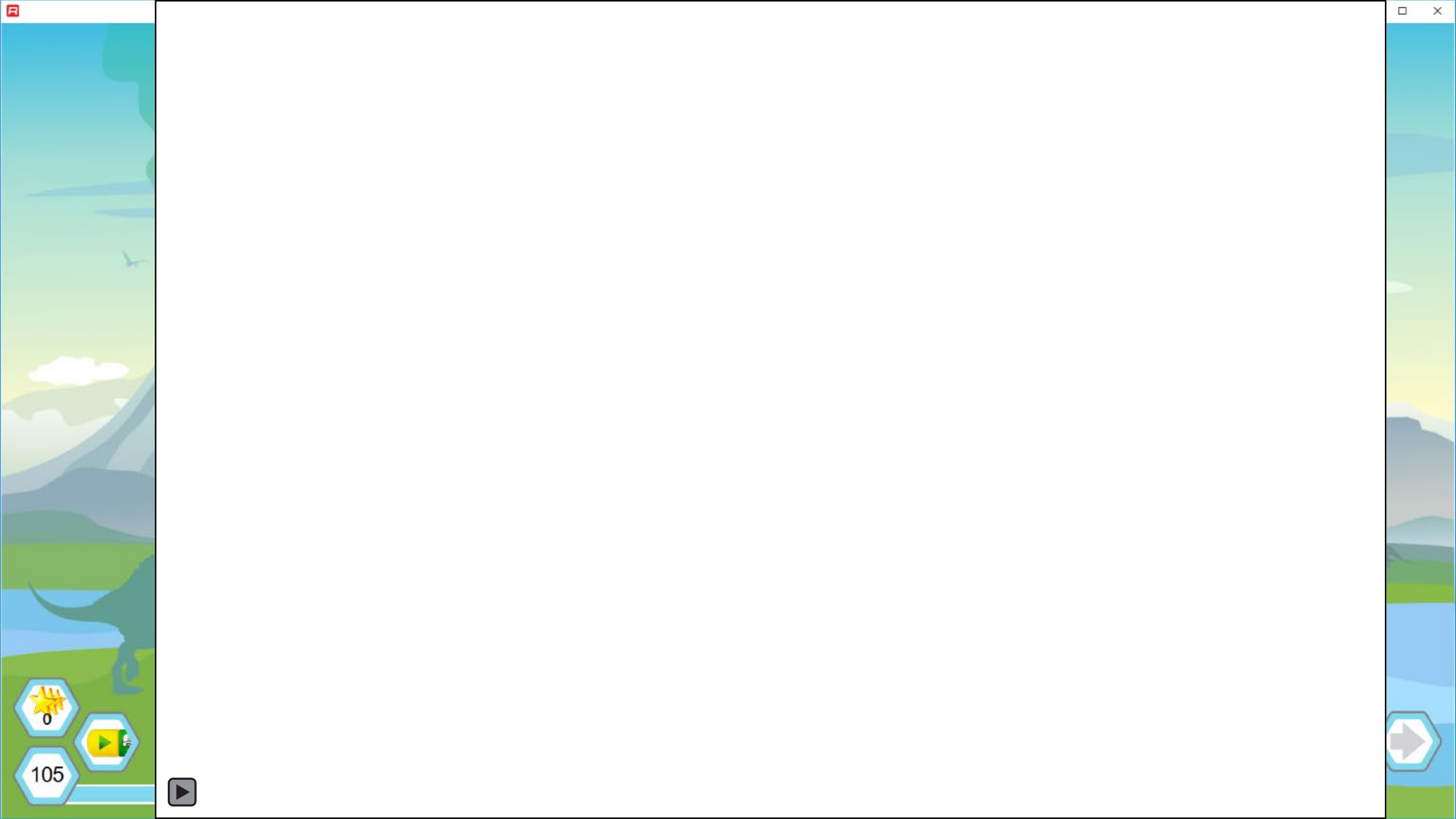




Проверьте!

При движении
робота кабели не
должны тереться!

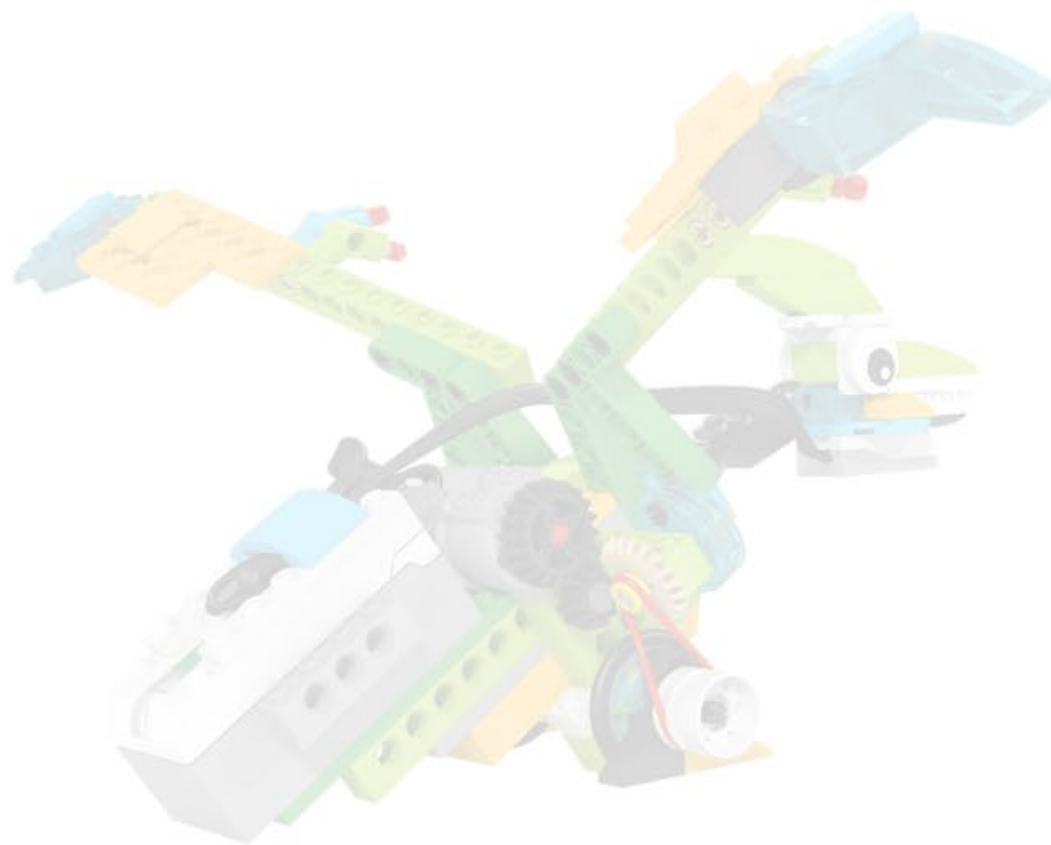






Задание

Разместите части робота на
правильные места



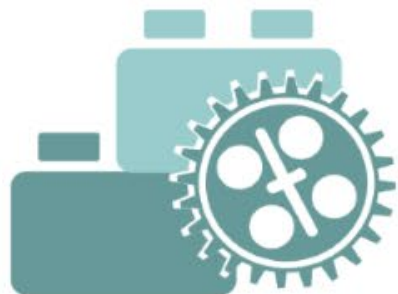






Расширенная версия

Добавьте кончики крыльев, когти, а также ременные передачи для привода ног.

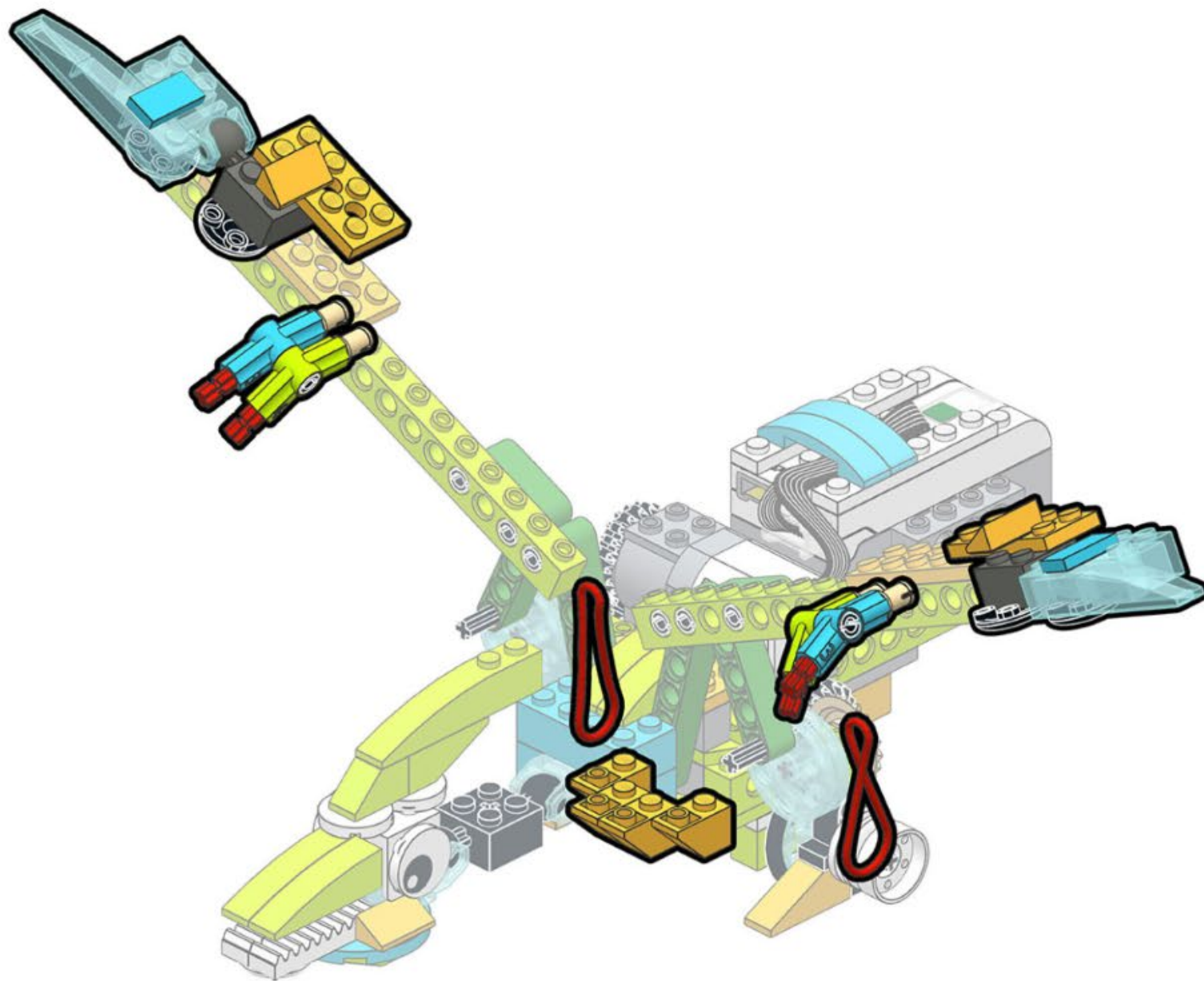


Pteranodon



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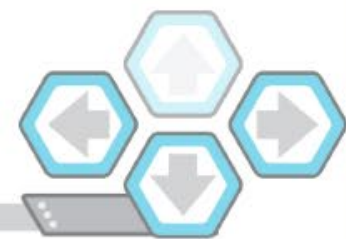


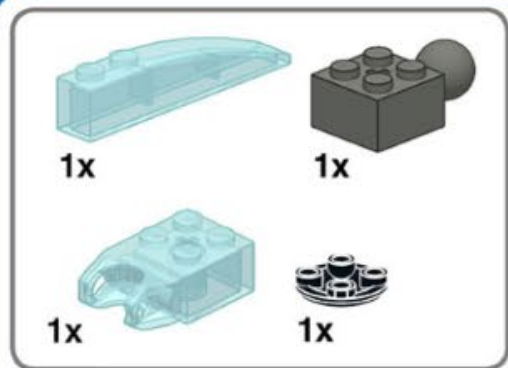


1/16

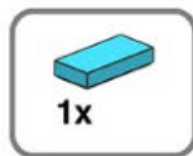
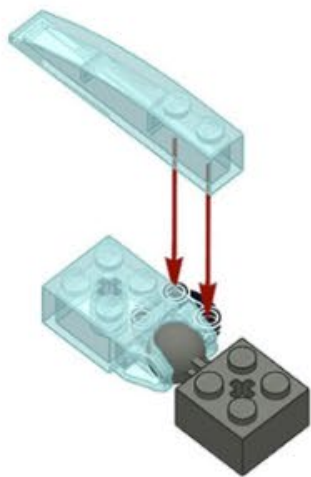
0

110

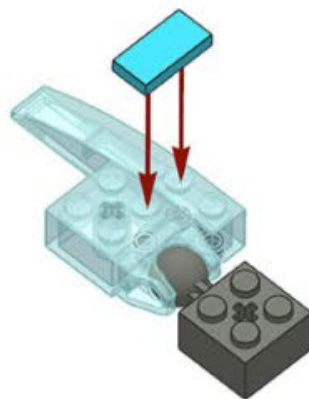




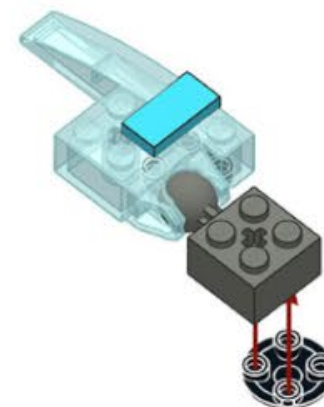
1



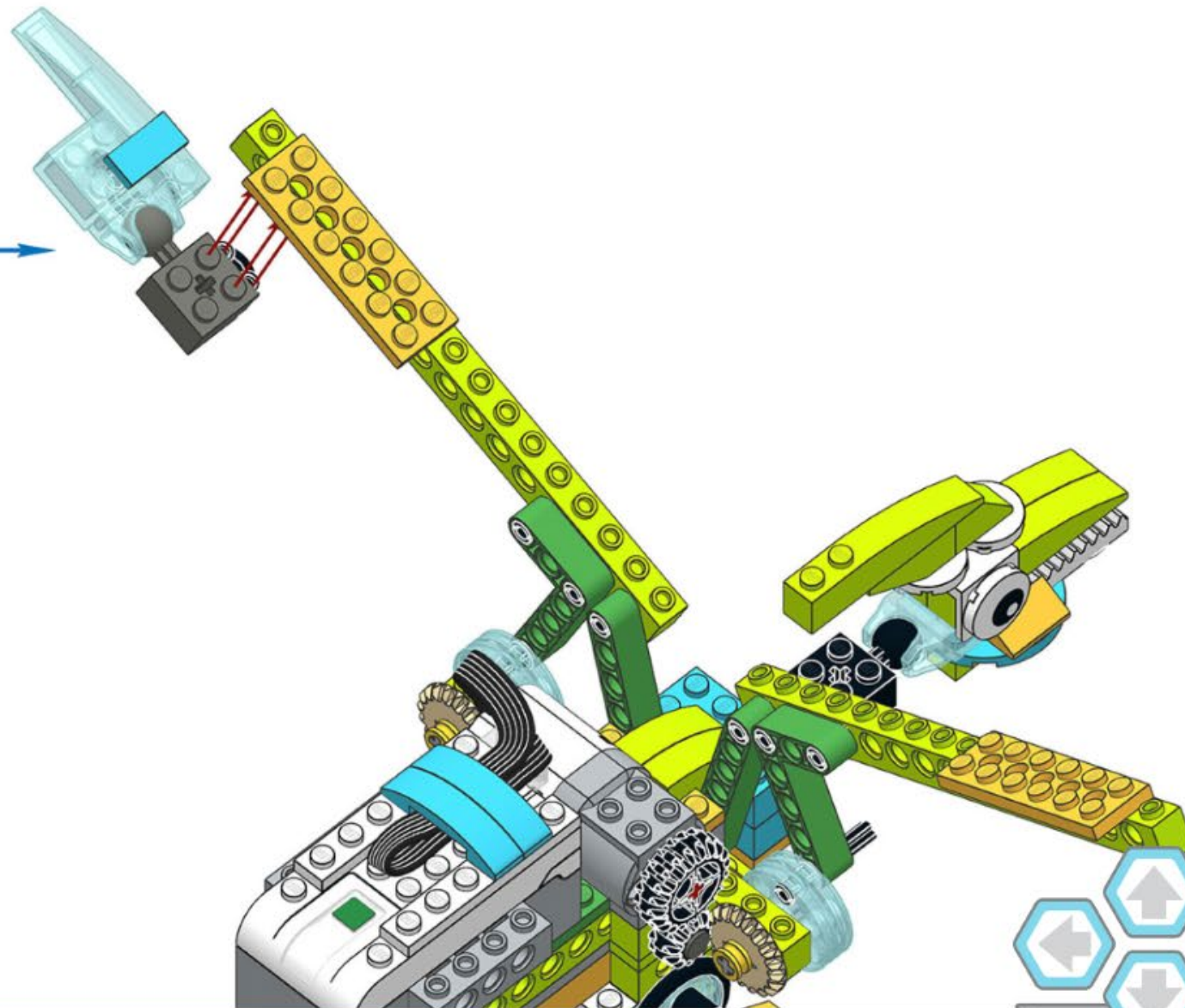
2



3



4

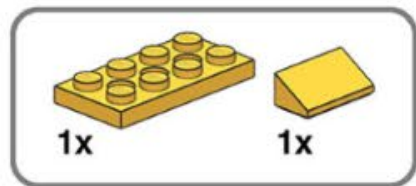


3/16

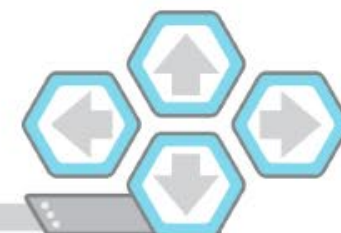
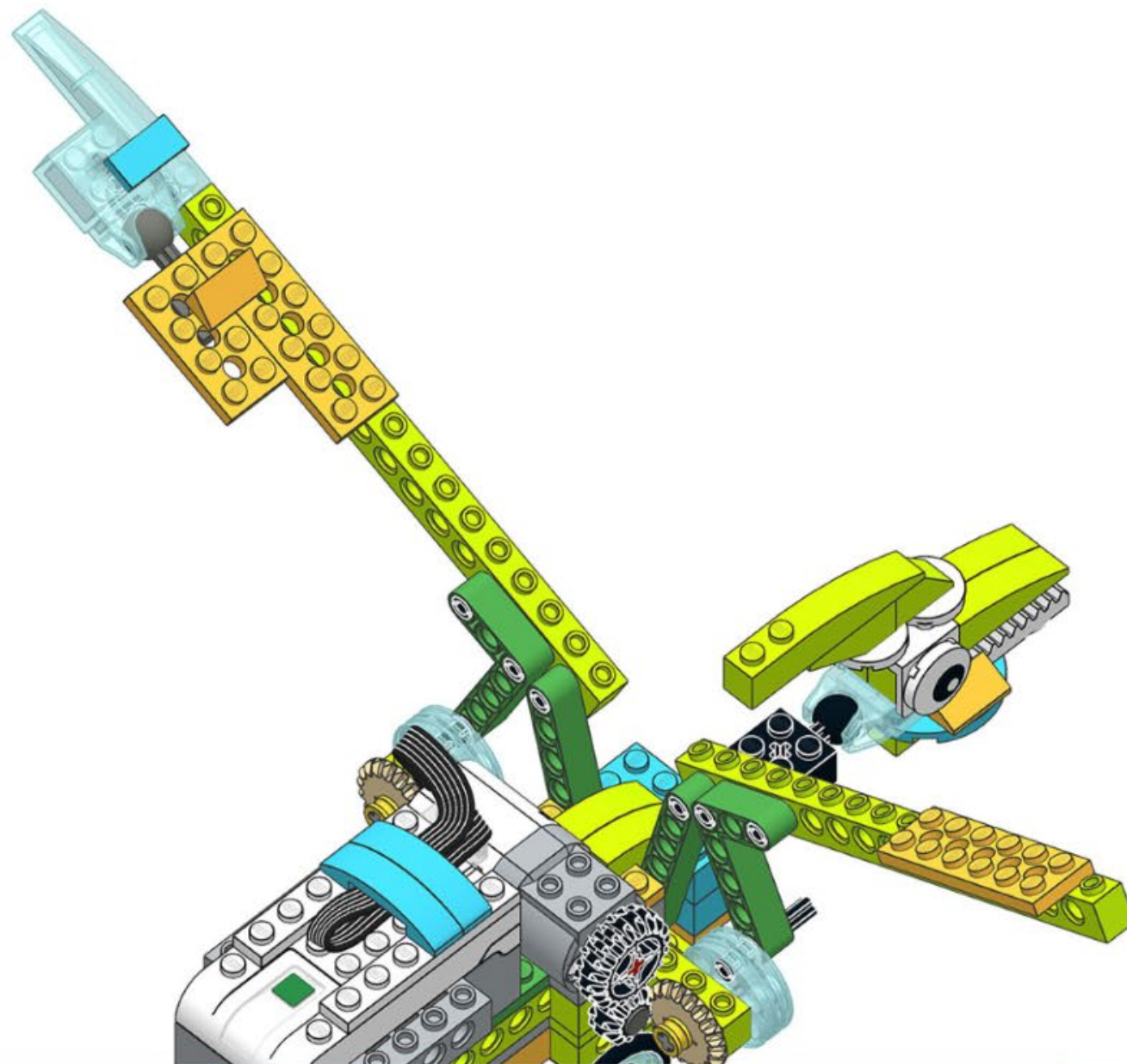
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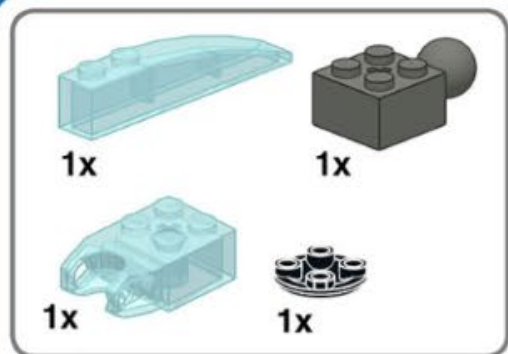
112



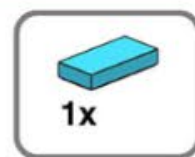
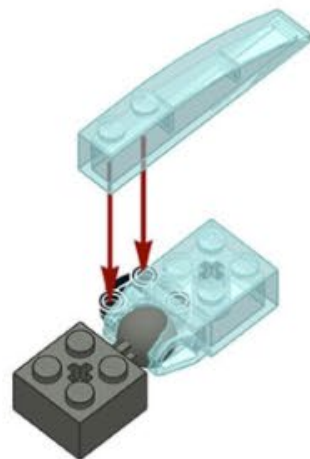


69

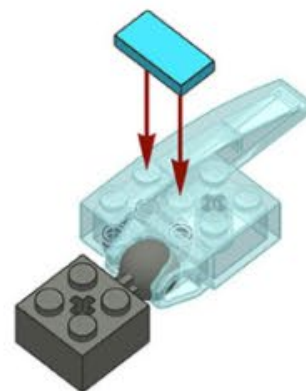




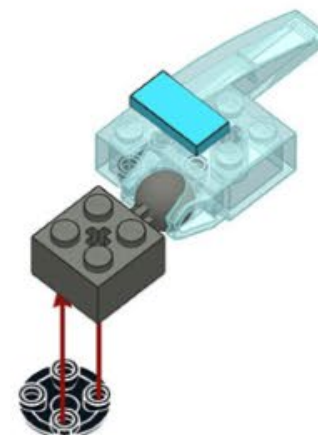
1



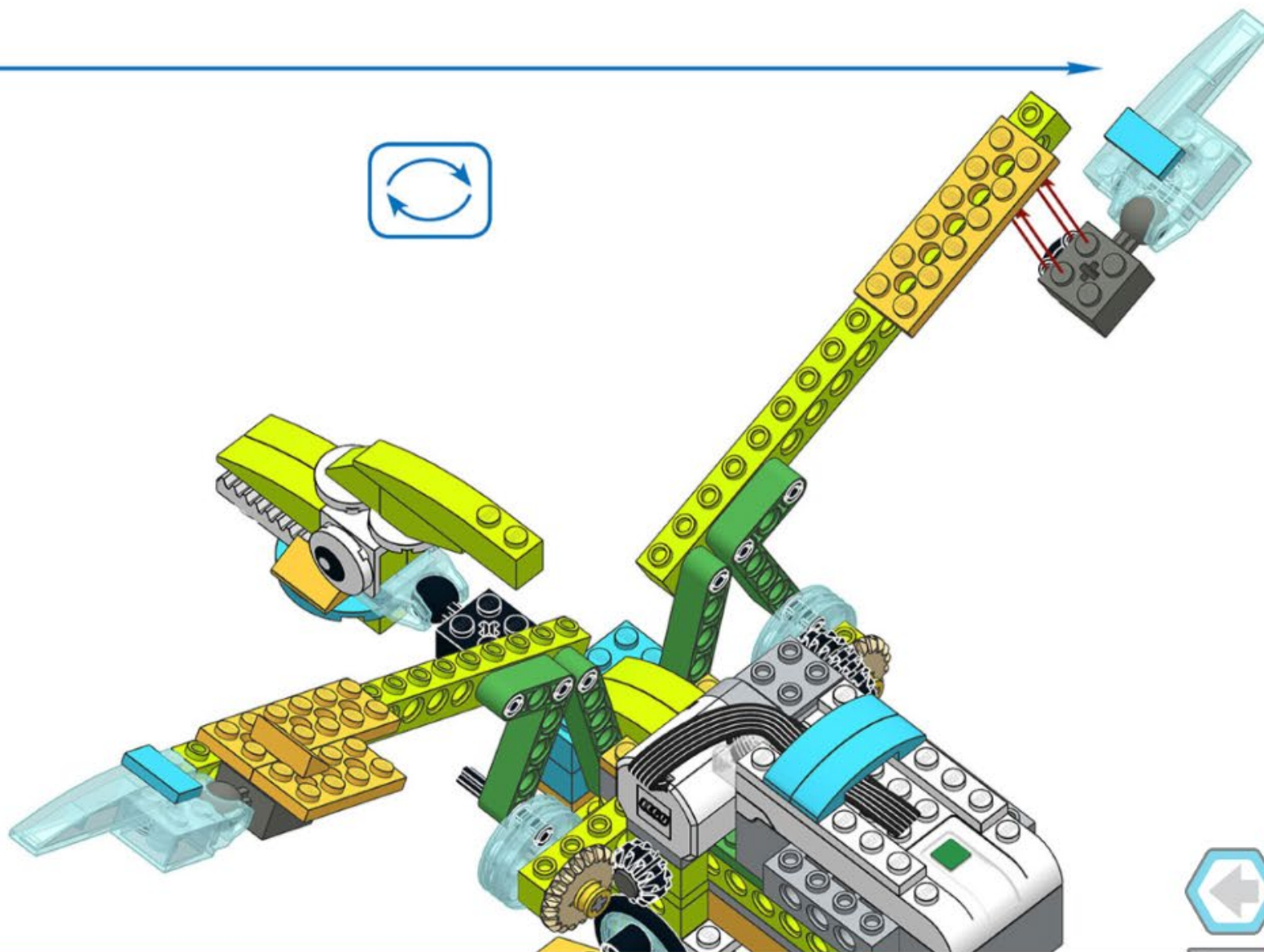
2



3



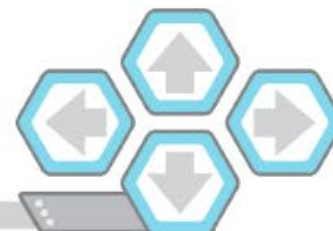
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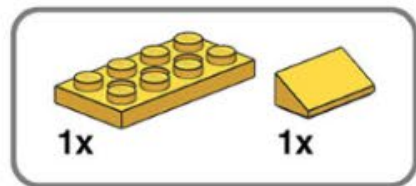


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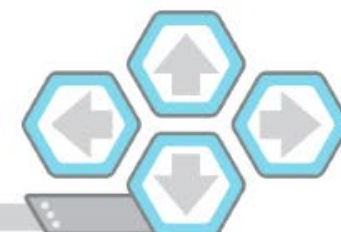
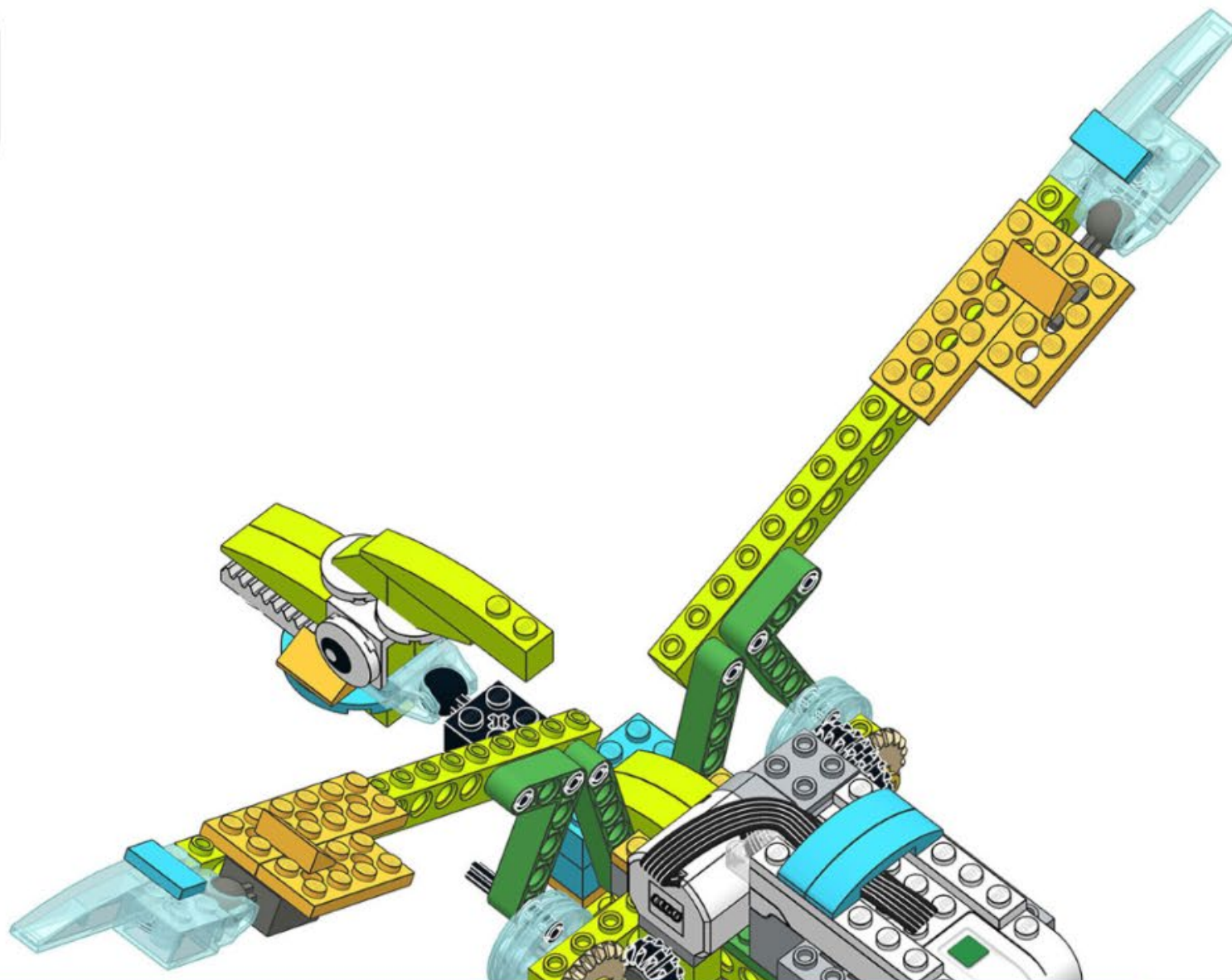
0

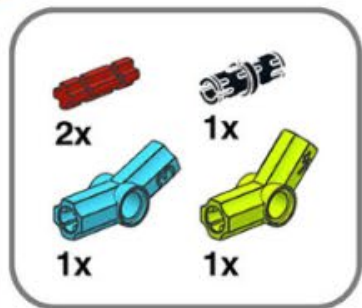
115





72



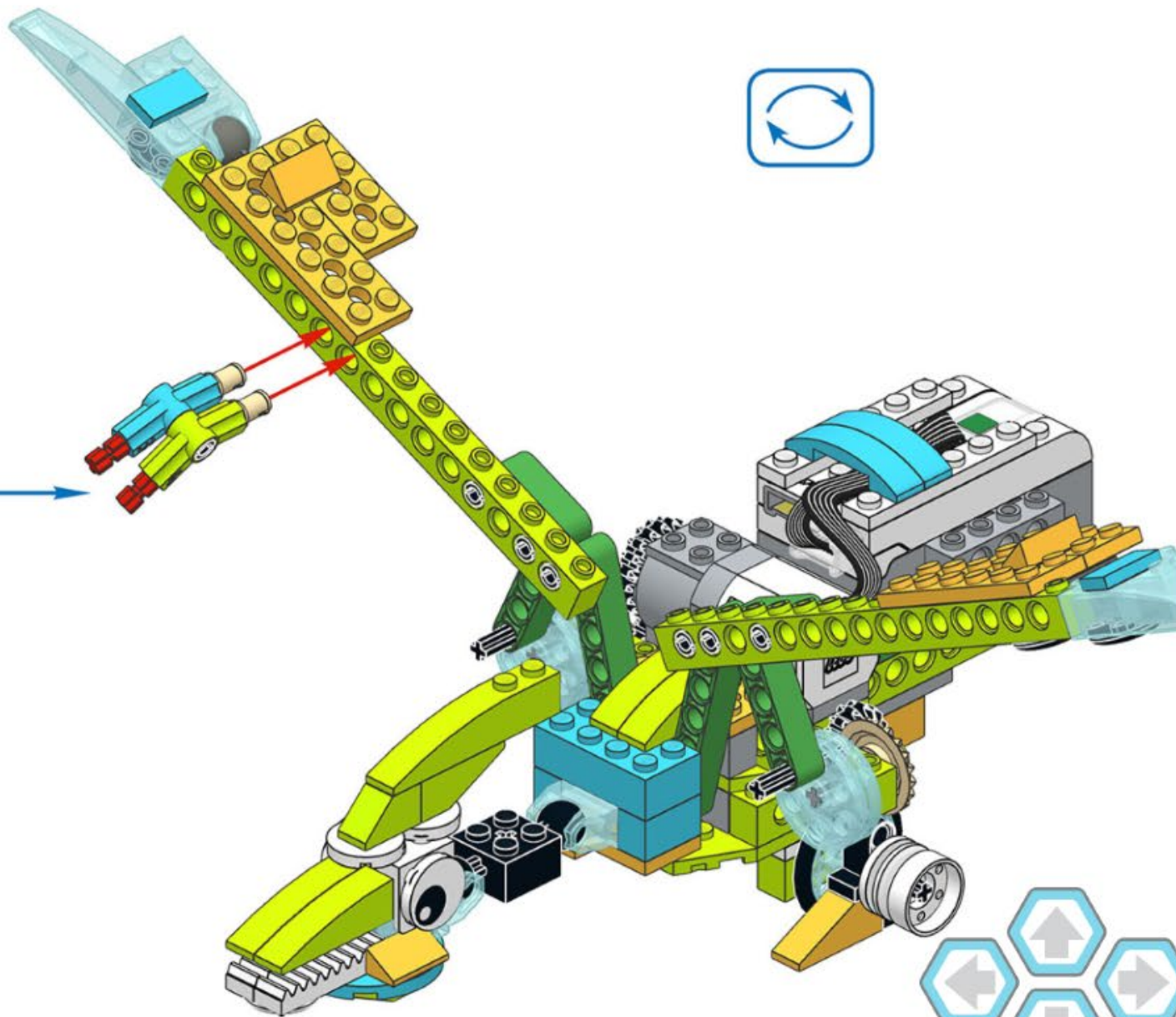
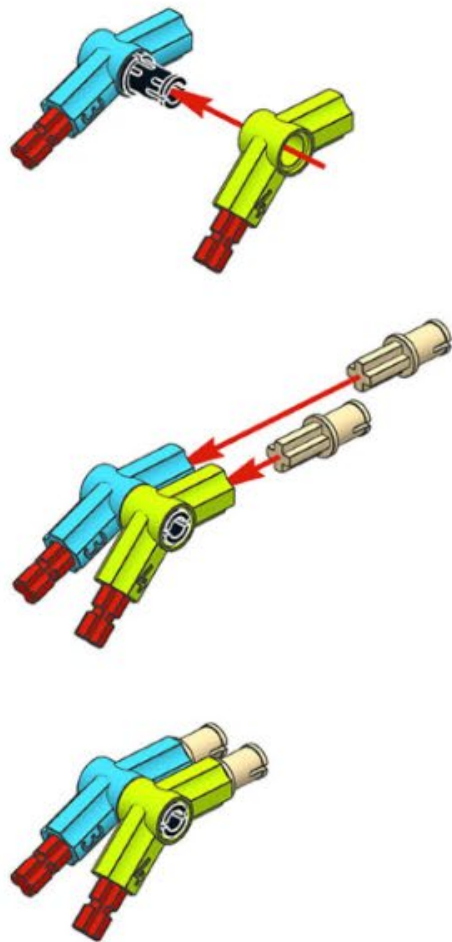


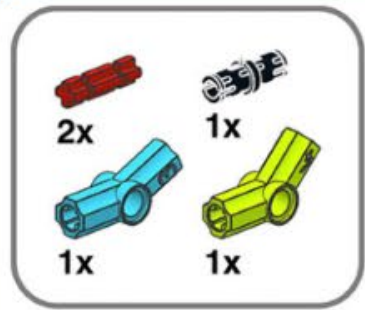
1



2

3



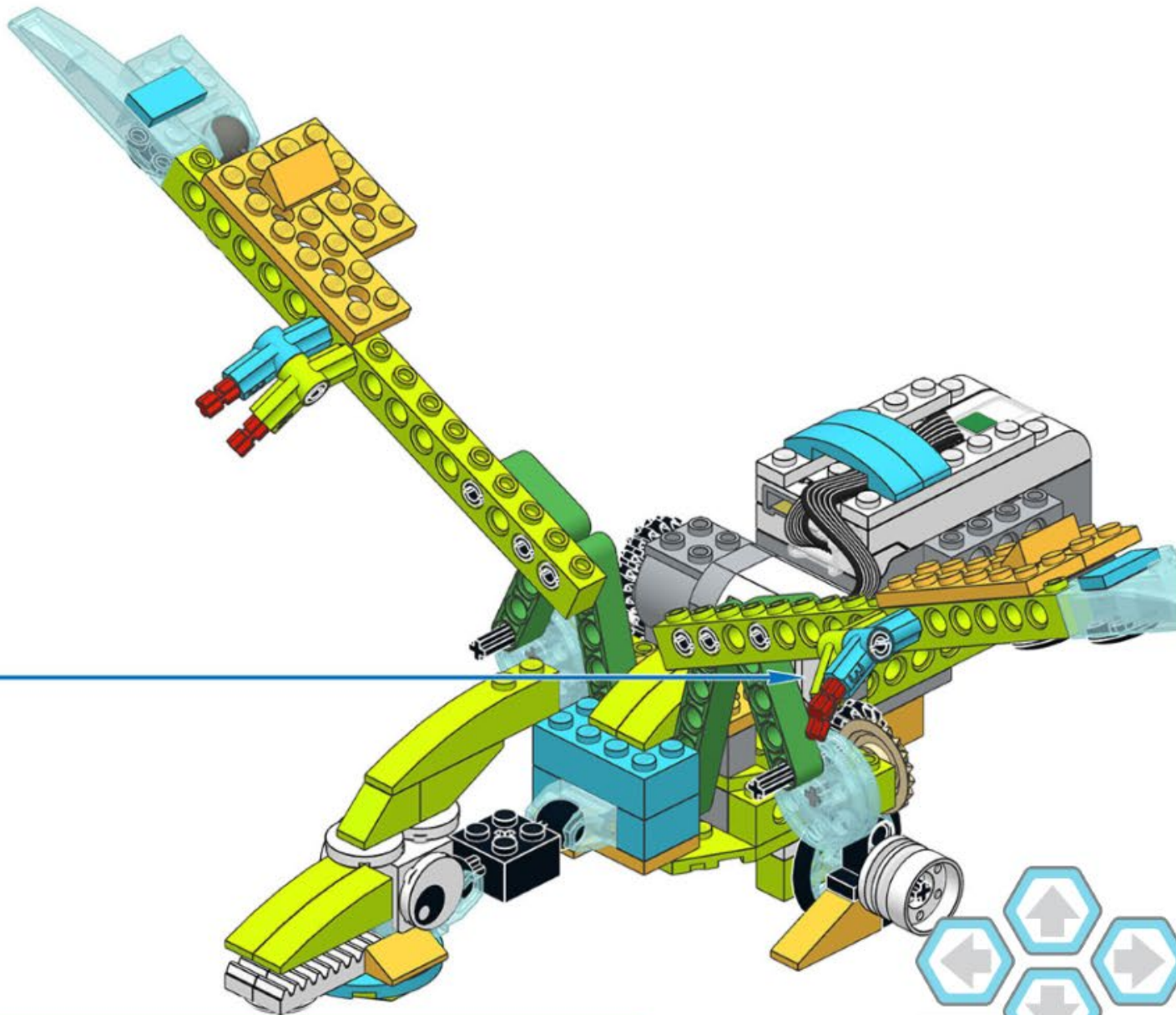
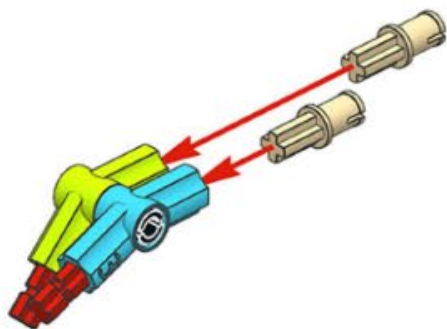
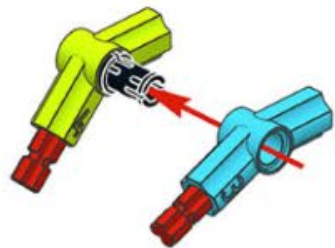


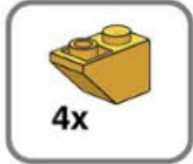
1



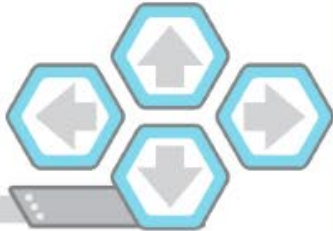
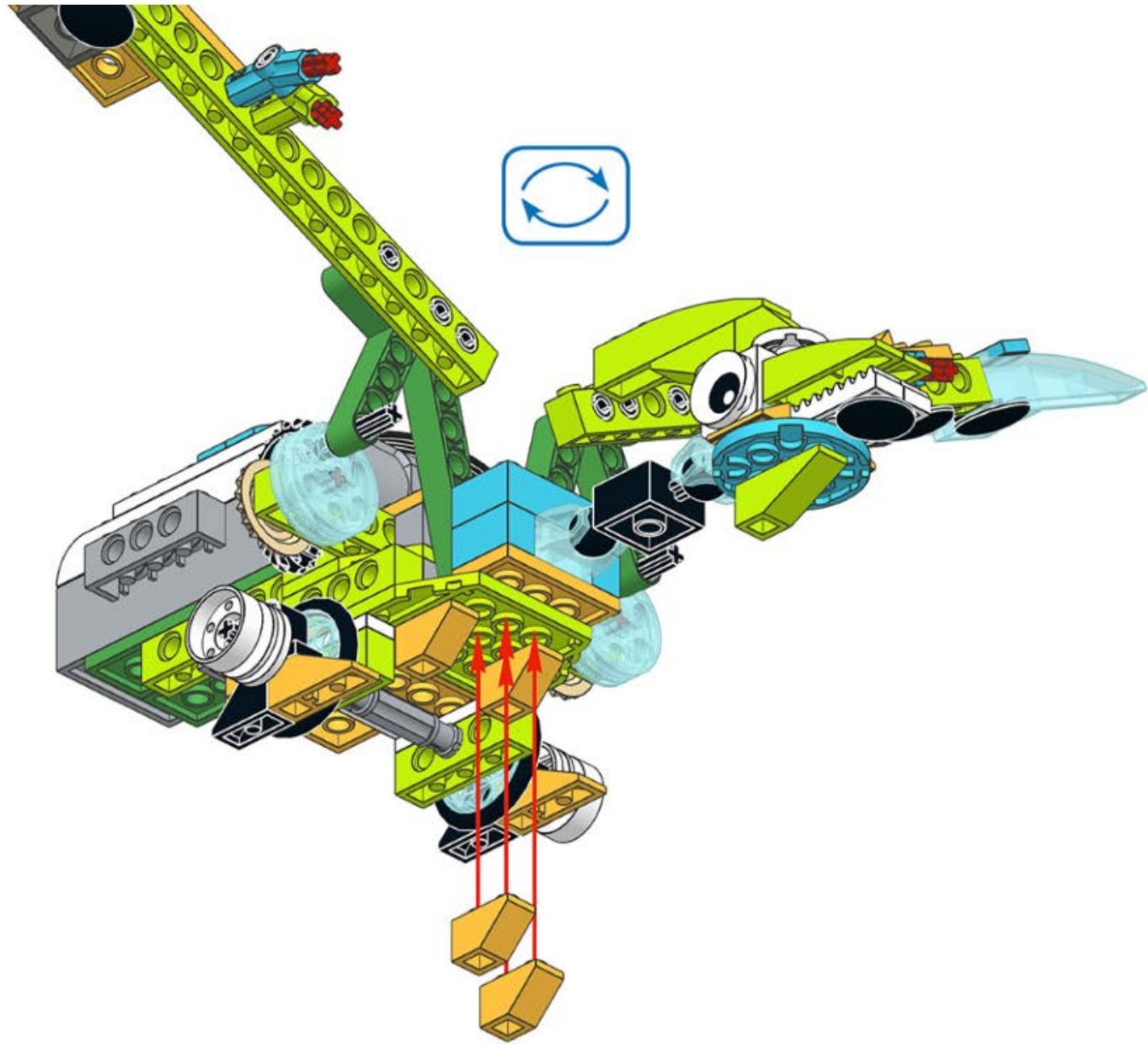
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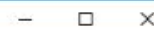
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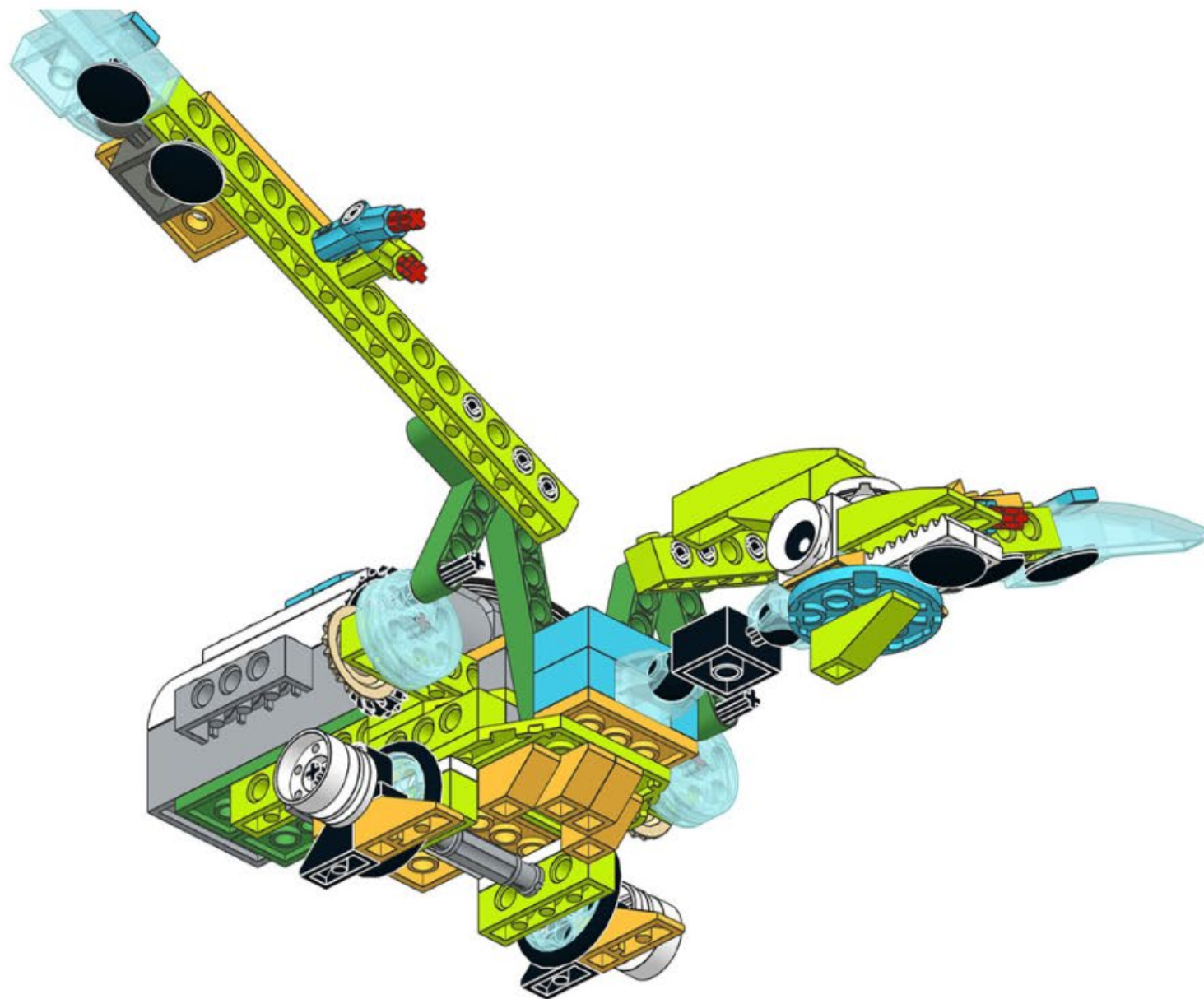


75





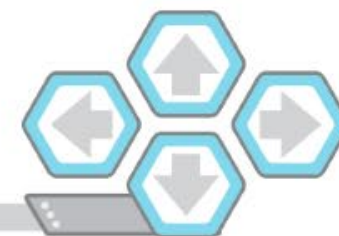
76

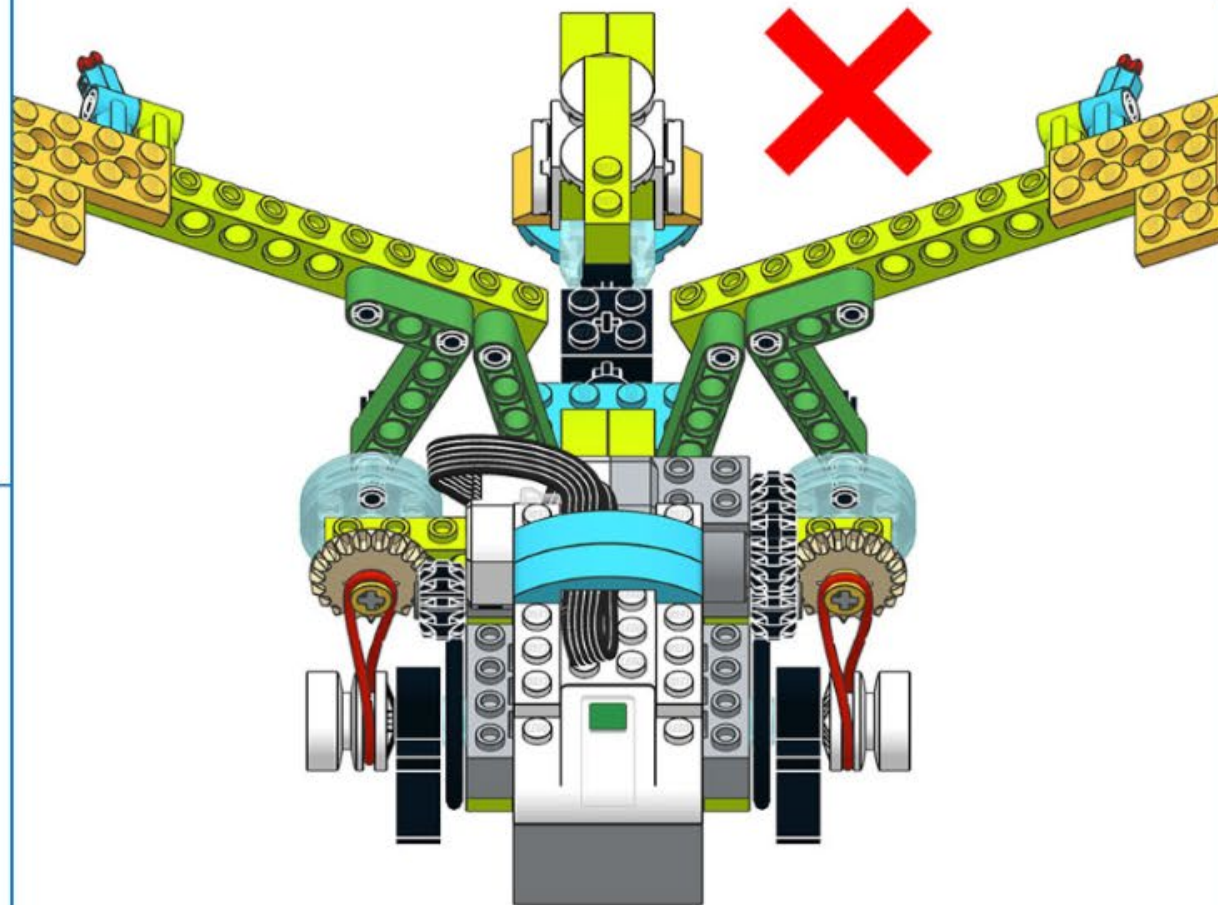
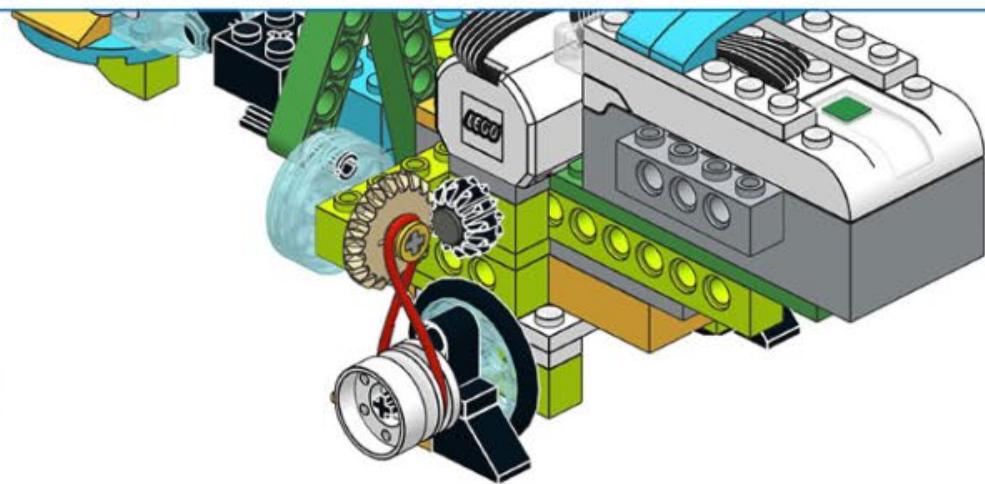
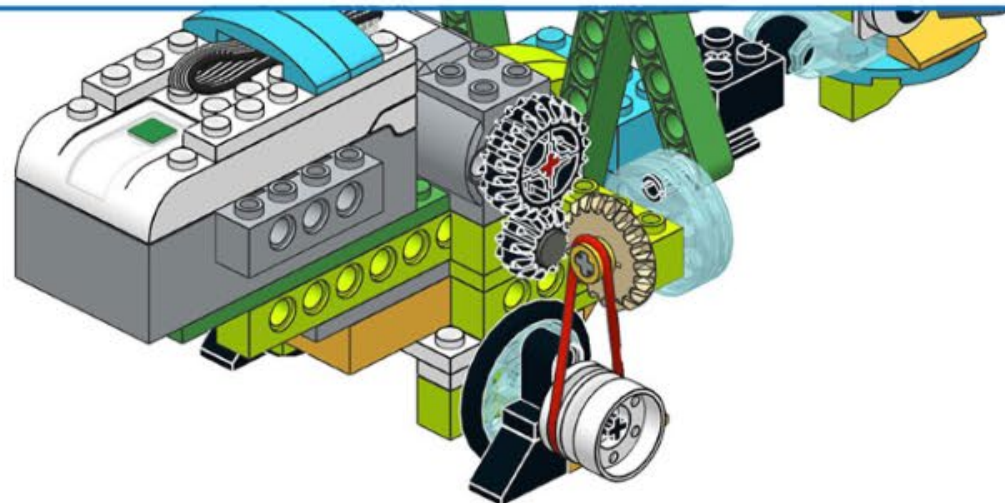


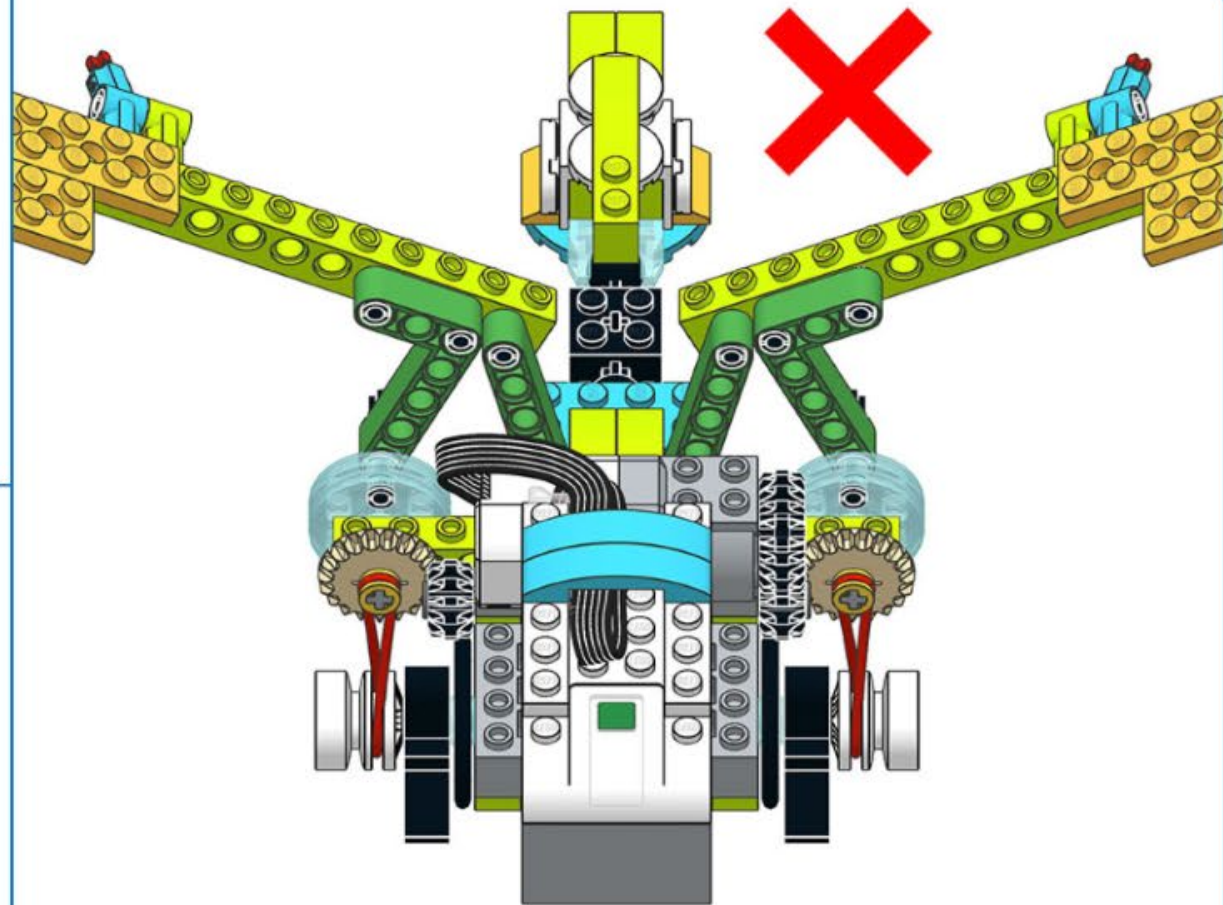
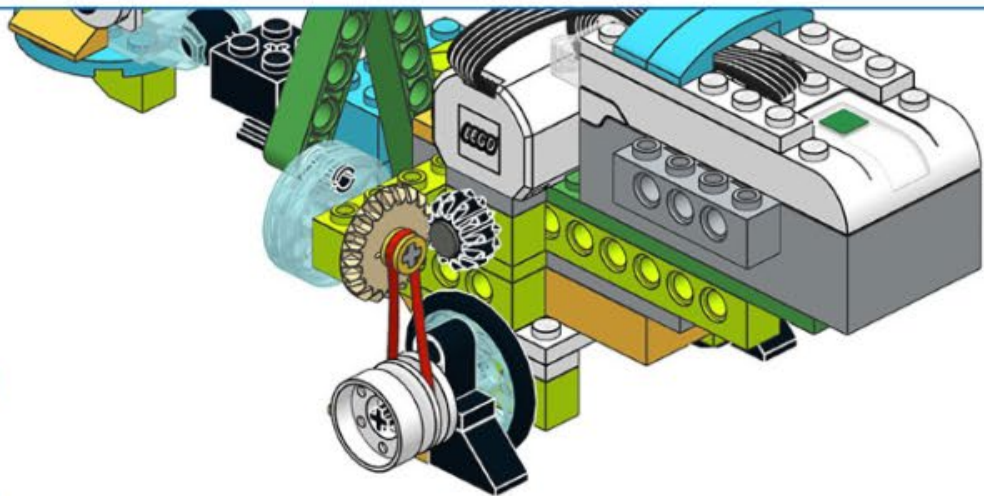
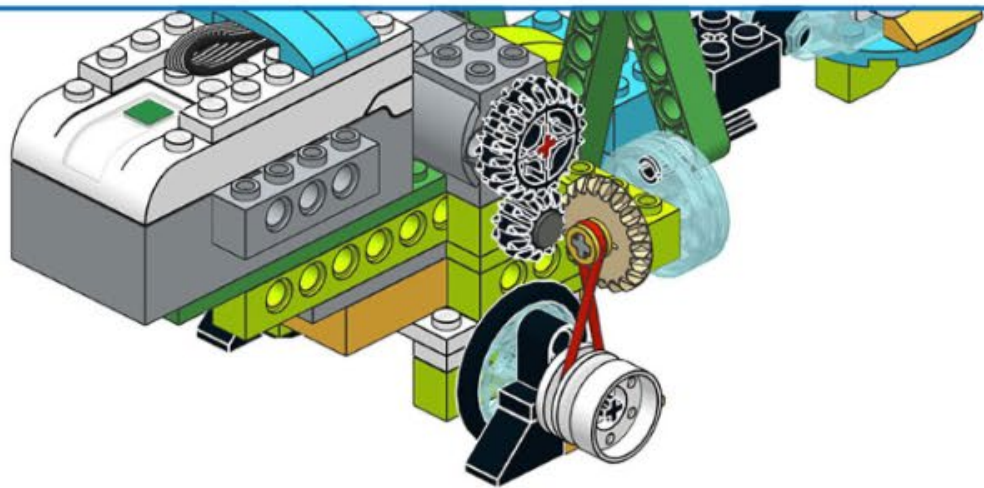
11/16

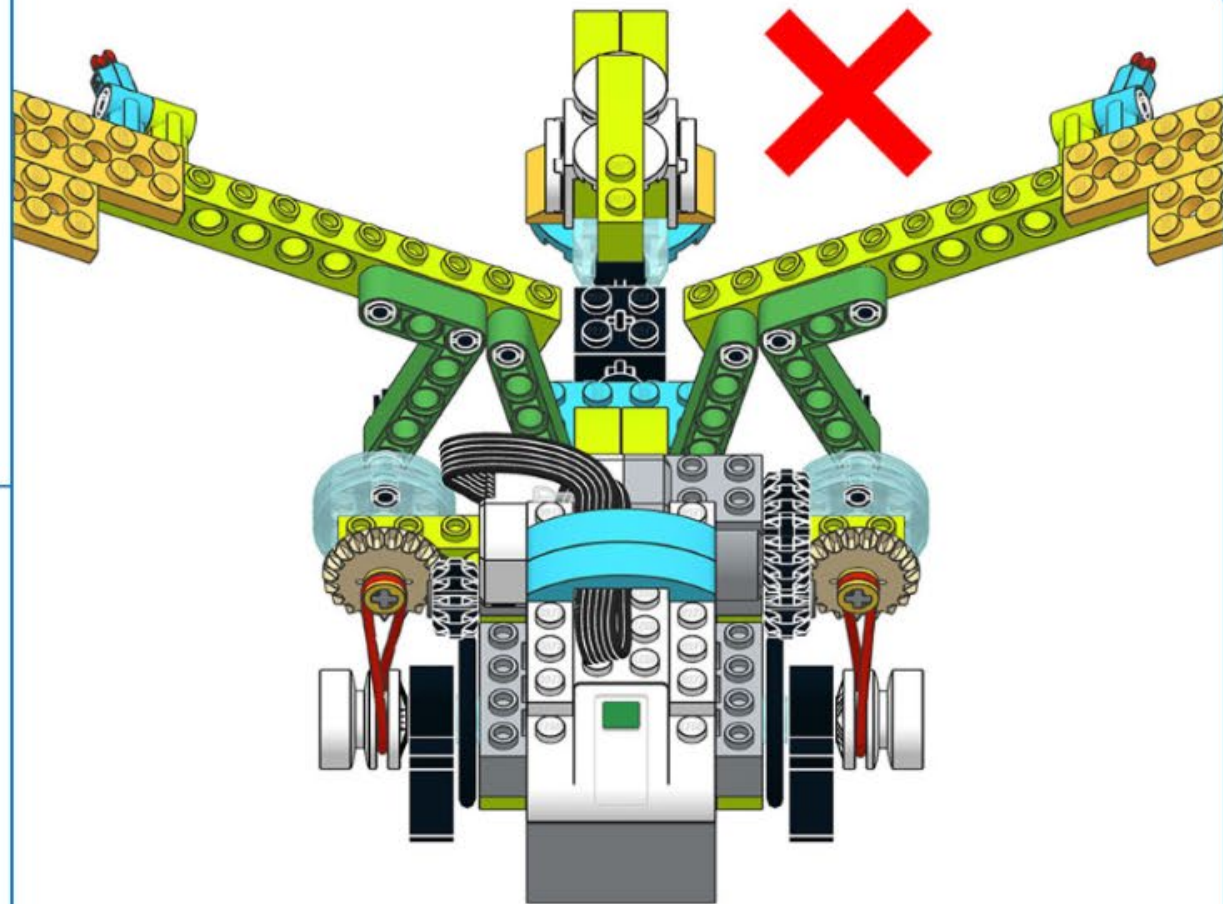
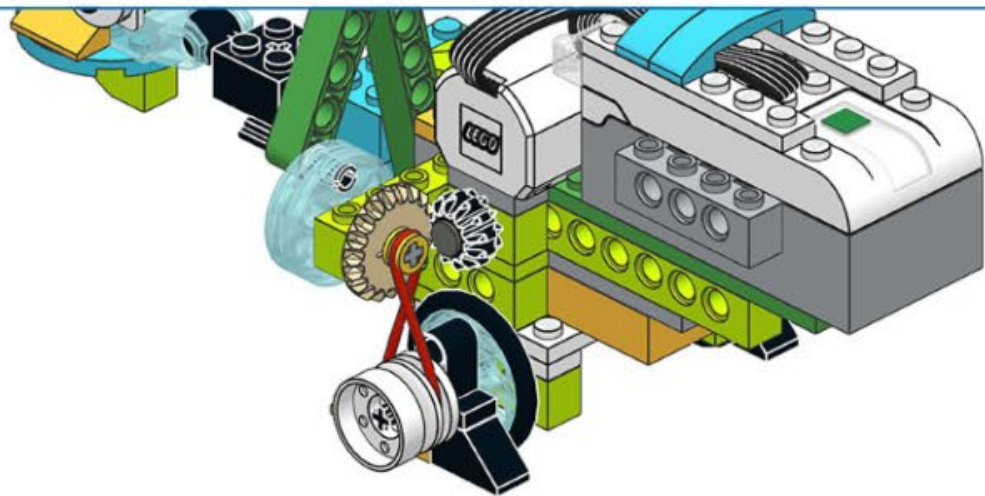
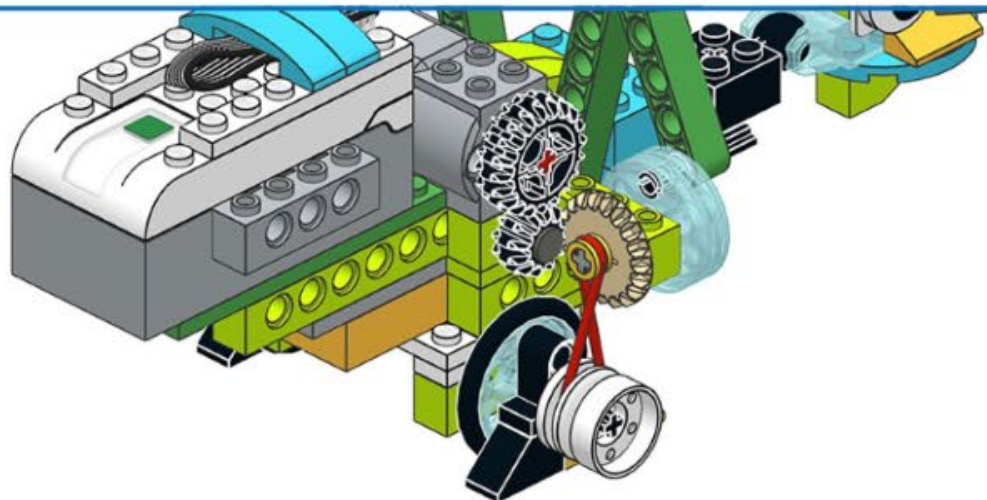
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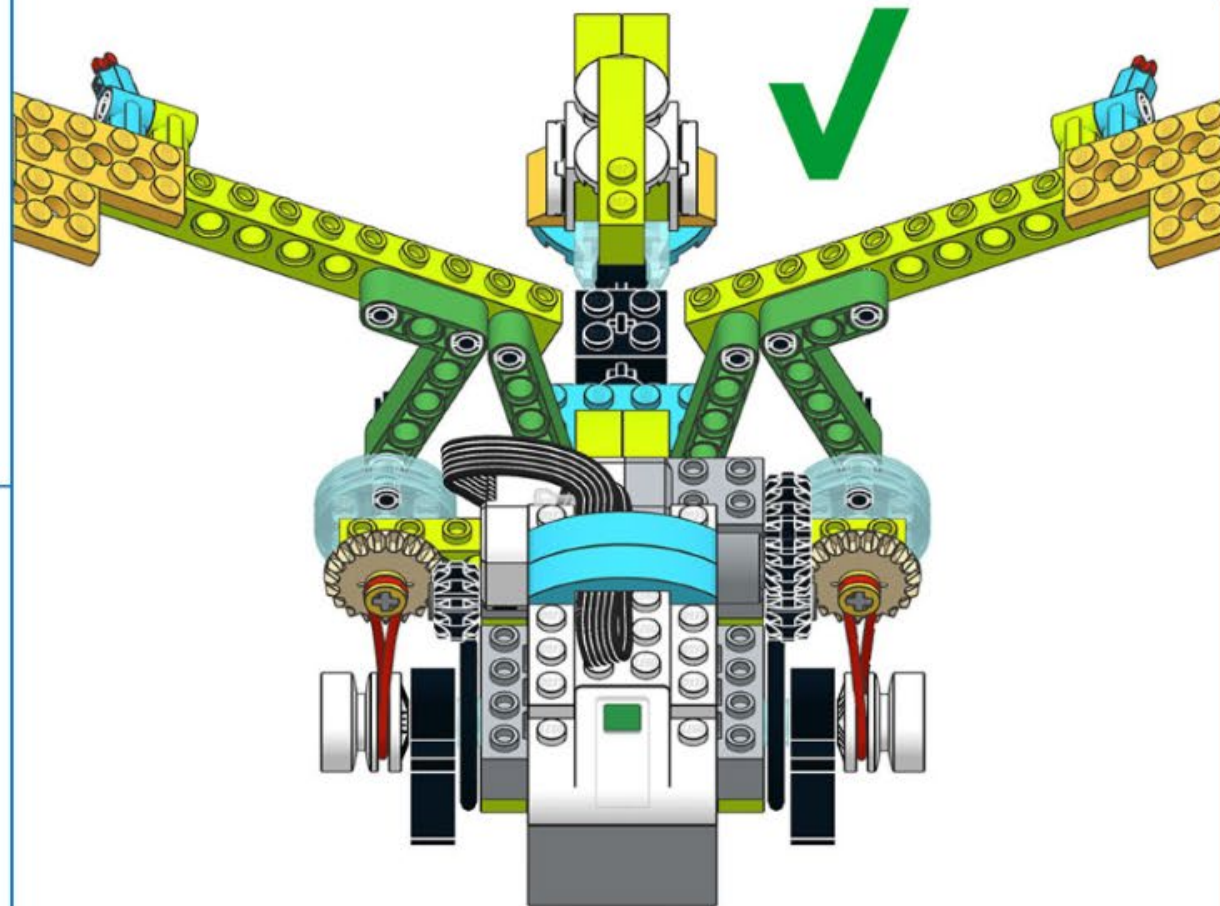
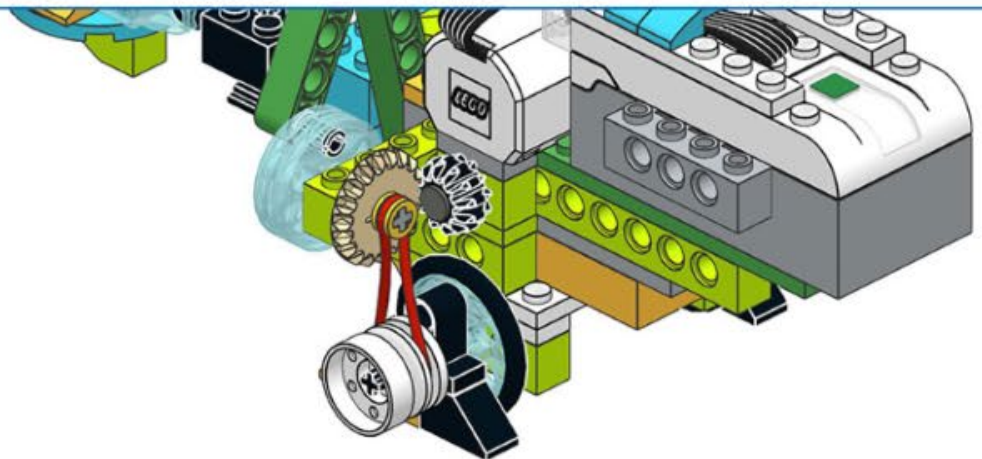
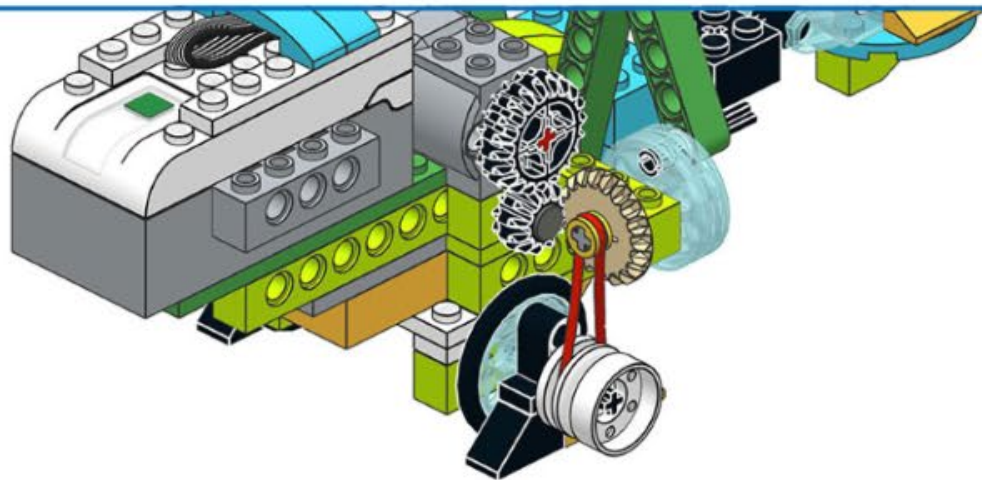
120



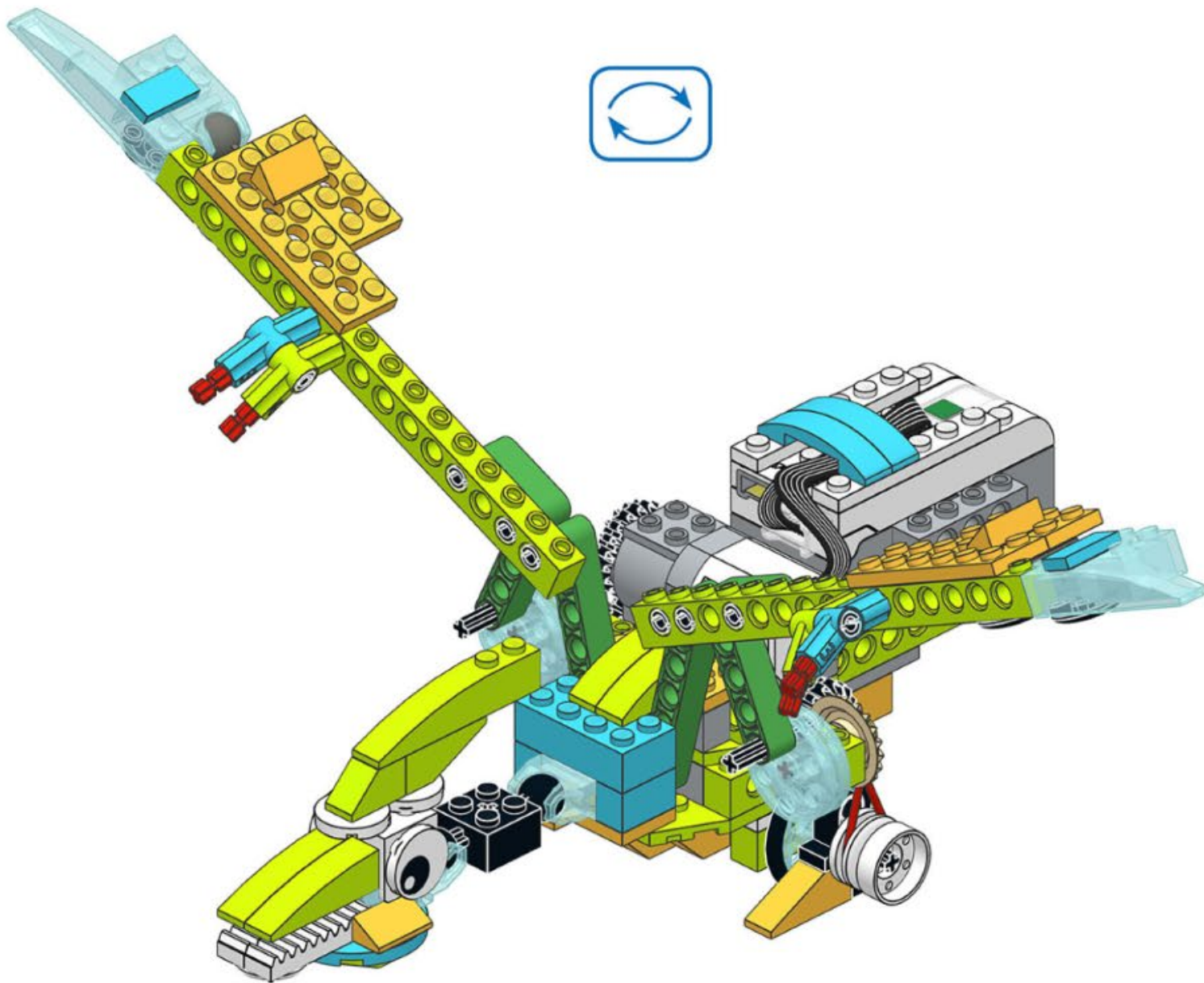








81

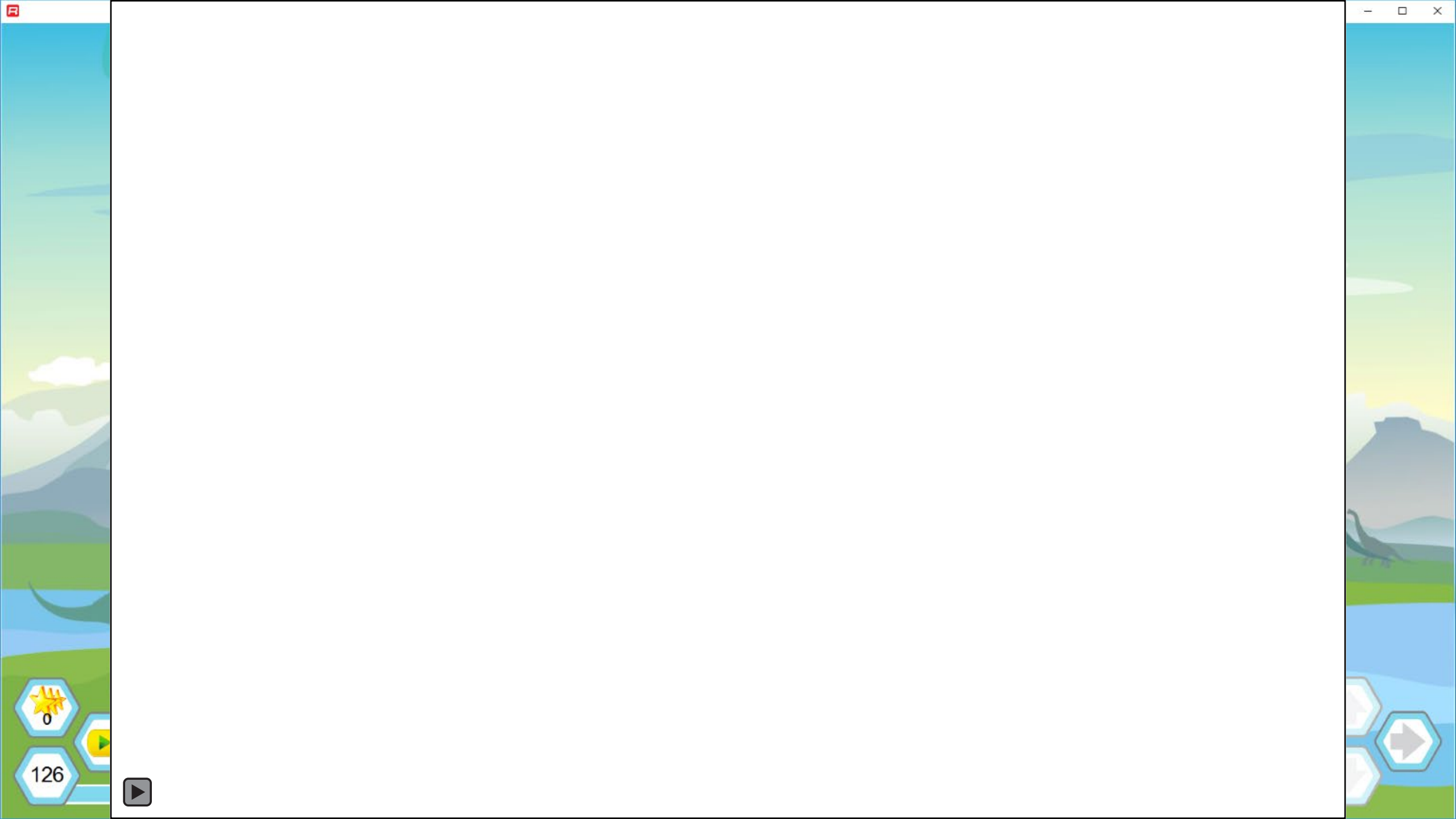


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0

125







Задание 3. Алгоритм

Программа должна работать по следующему алгоритму:





Задание 3. Программа

1

Ожидать громкий
звук



Шаг:



0



128





Задание 3. Программа

1

Ожидать

звук

2

Включить
мотор



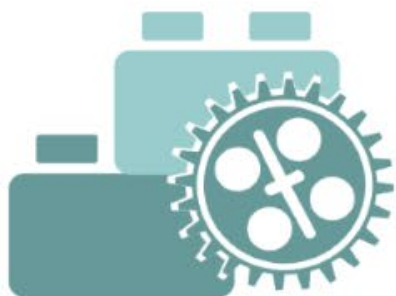
Шаг:





Дополнительный сенсор

Добавьте датчик движения для детектирования объектов перед роботом.

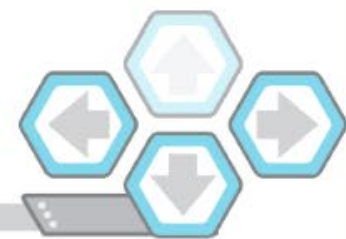
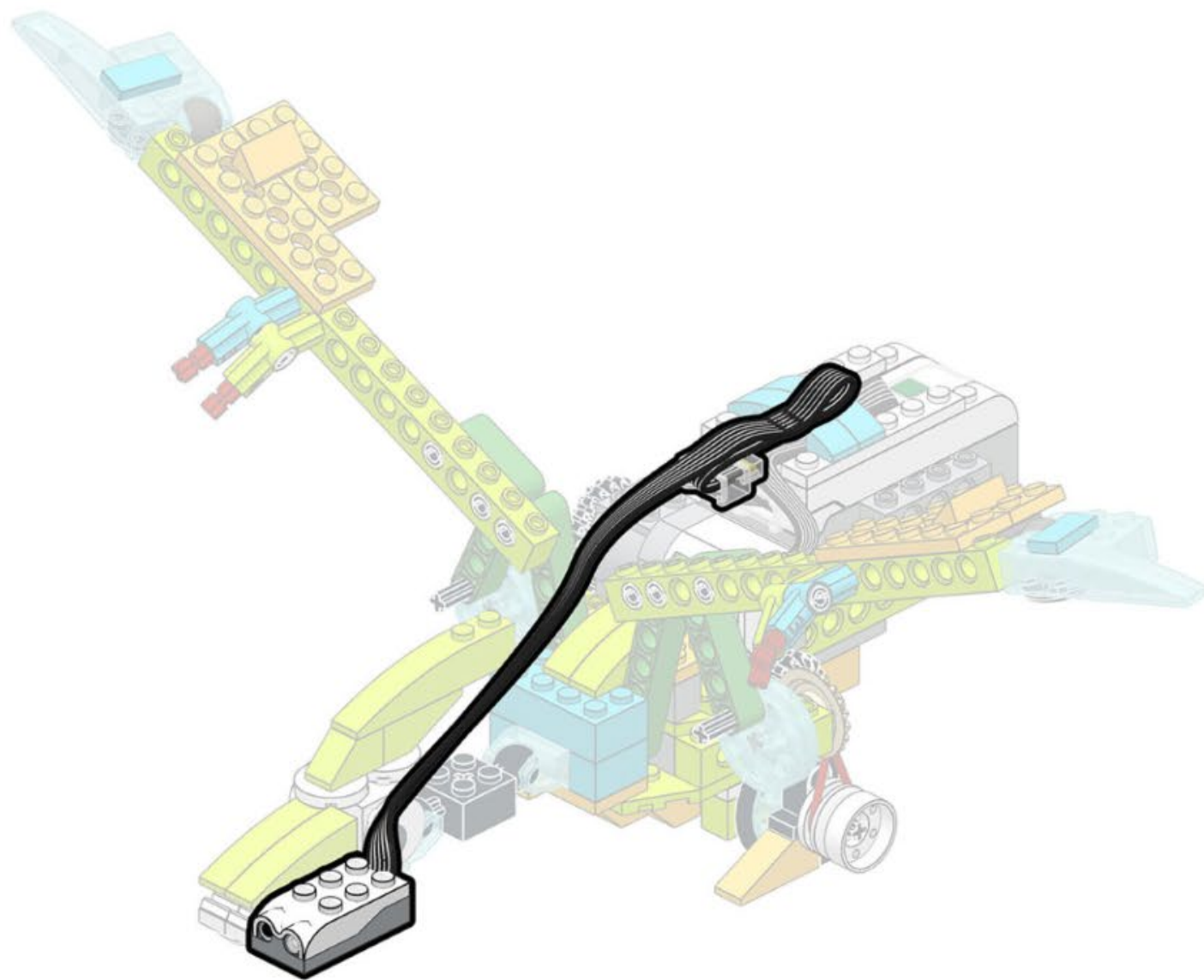


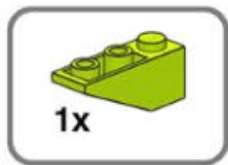
Pteranodon



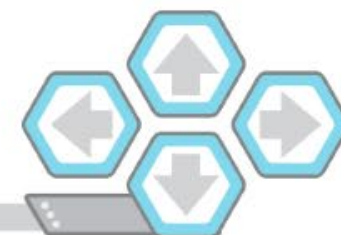
129

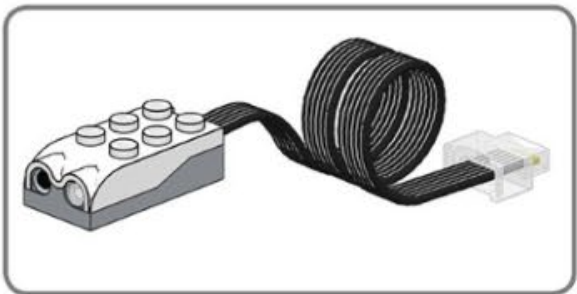




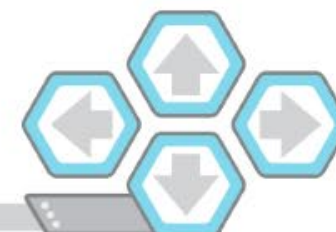
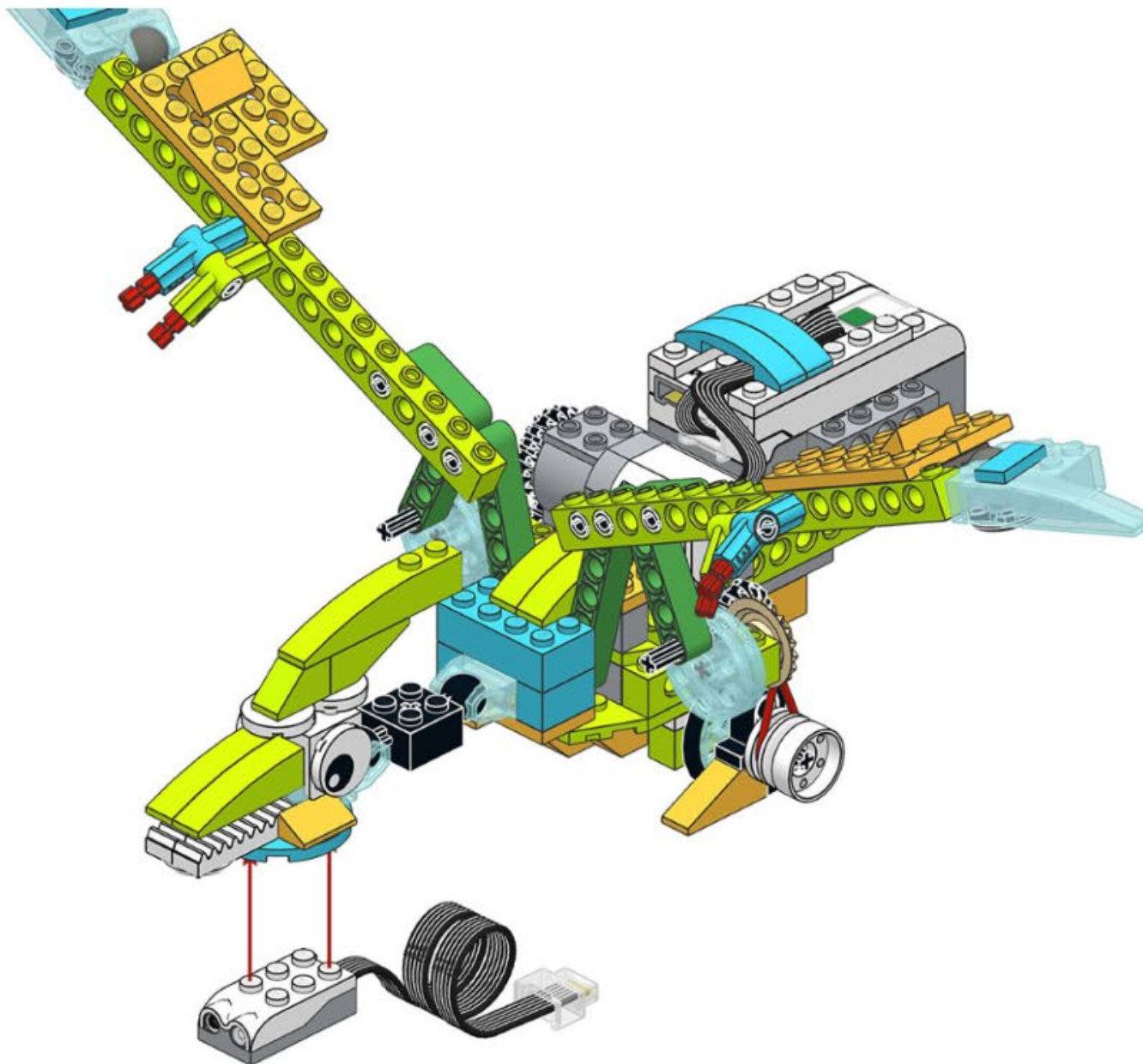


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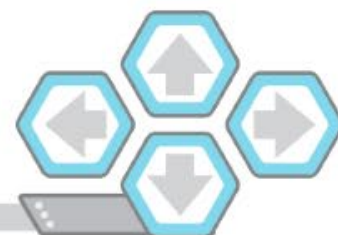
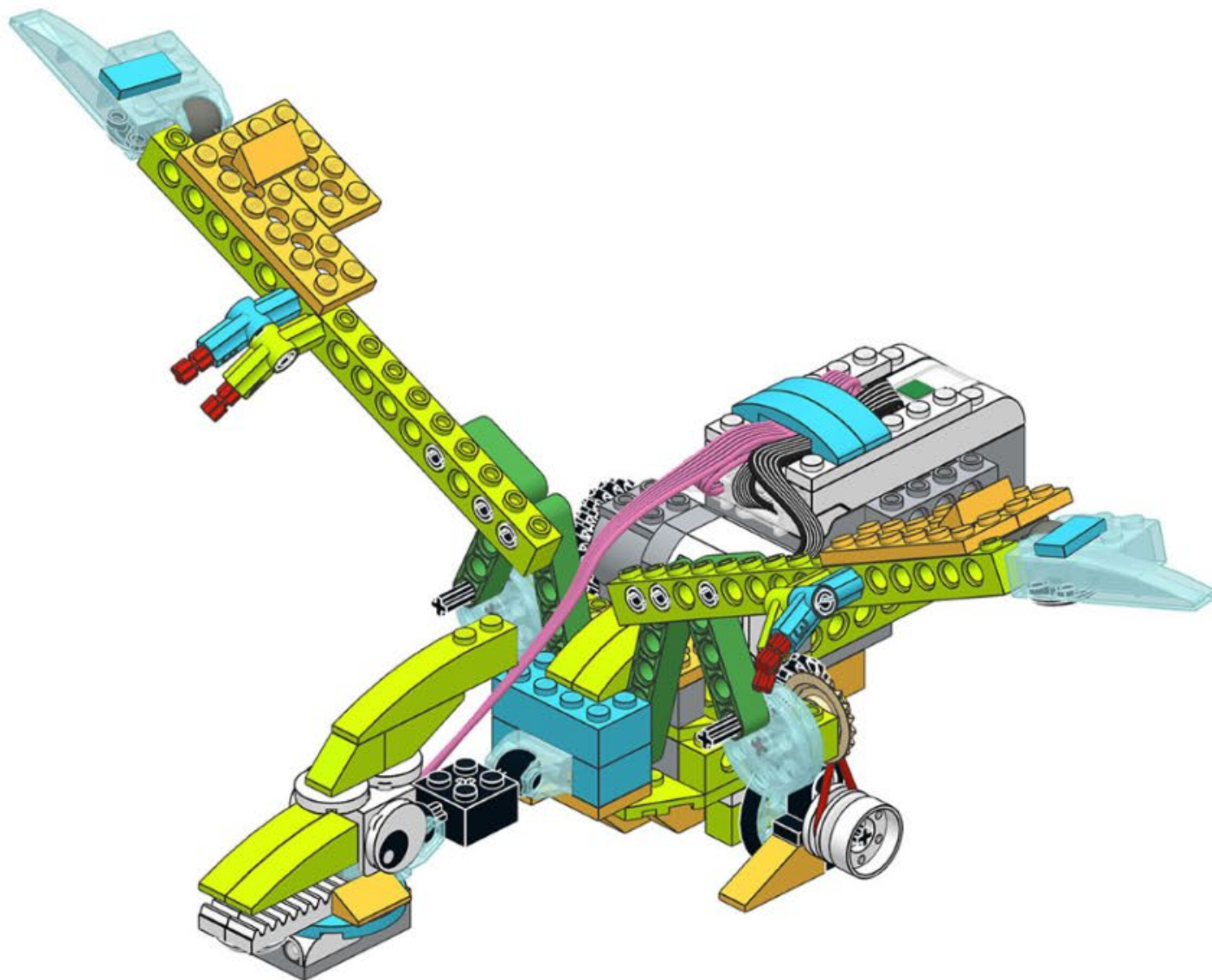




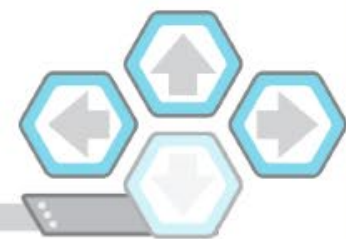
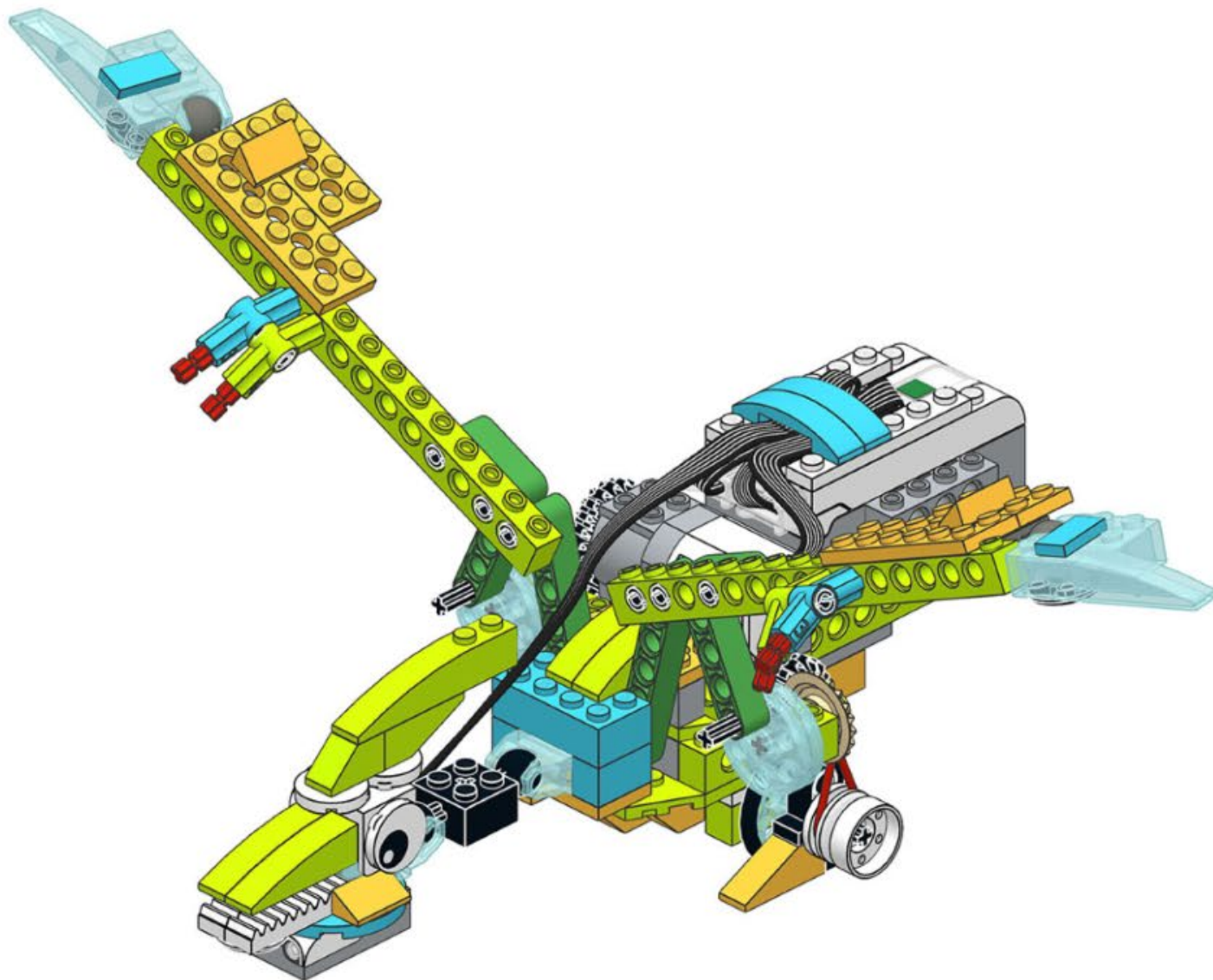
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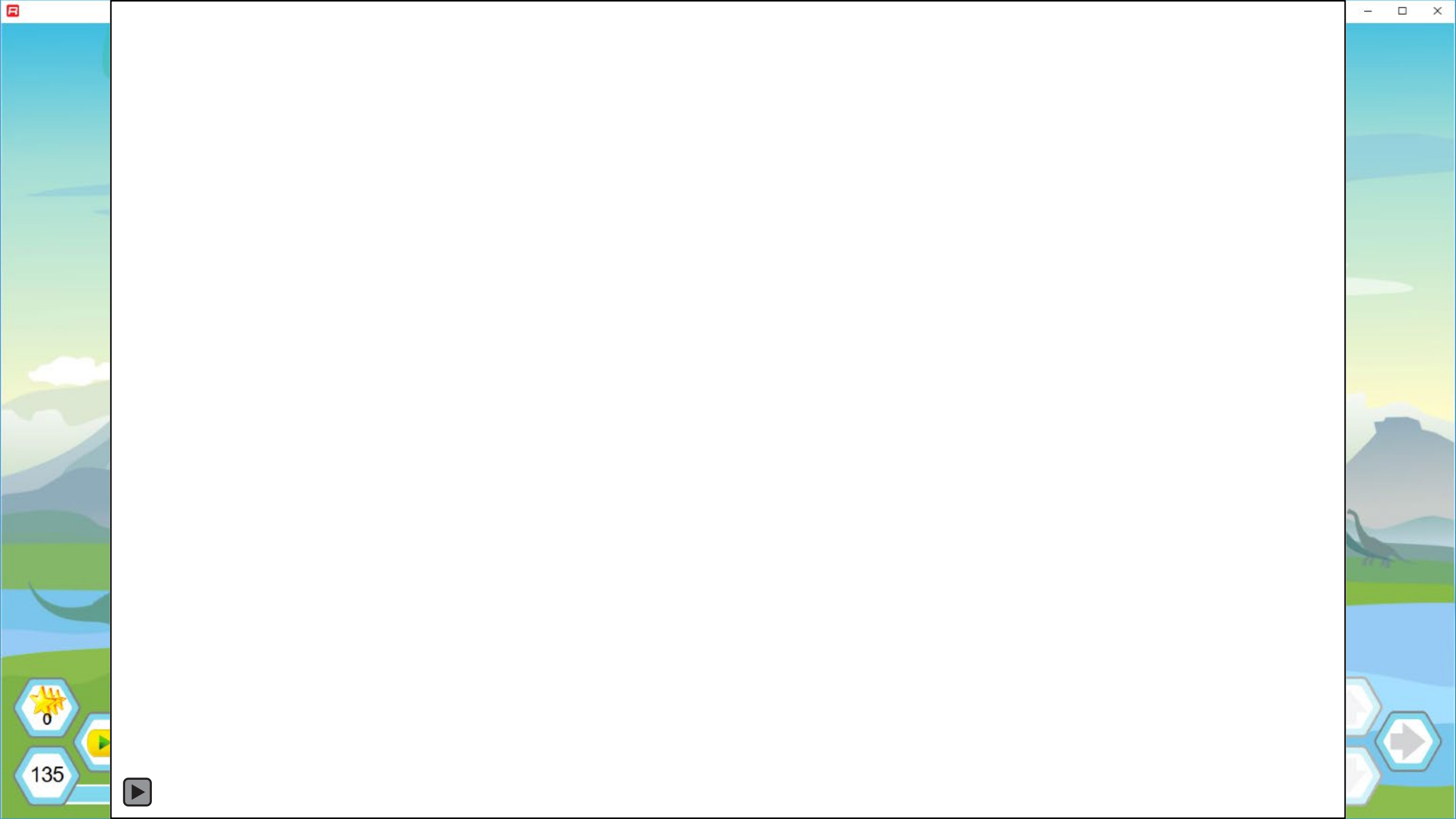


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Задание 4. Алгоритм

Программа должна работать по следующему алгоритму:





Задание 4. Программа

1

Ожидать рыбу



Шаг:

1

2

3



0

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Задание 4. Программа

1

Ожидати

2

Включить
мотор на 1 с



Шаг:





Задание 4. Программа

1

Ожидати

2

Включи
мотор

3

Воспроизвести
звук



Шаг:



0



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Задание 4. Вопрос

Какие программные блоки используются для настройки работы мотора?





Вопрос

Кто стал потомком Птерозавров?



Птицы

Насекомые

Ни одно из
современных
существ



0



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Вопрос

Которые из изображенных ниже существ были динозаврами? Щелкните на них.



Обсудите!

- ▶ Как были устроены крылья Птерозавров?
- ▶ Какие особенности скелета помогали им летать?
- ▶ Чем питались Птеранодоны?





Новый житель Парка

Птеранодон
90-71 млн. лет назад

