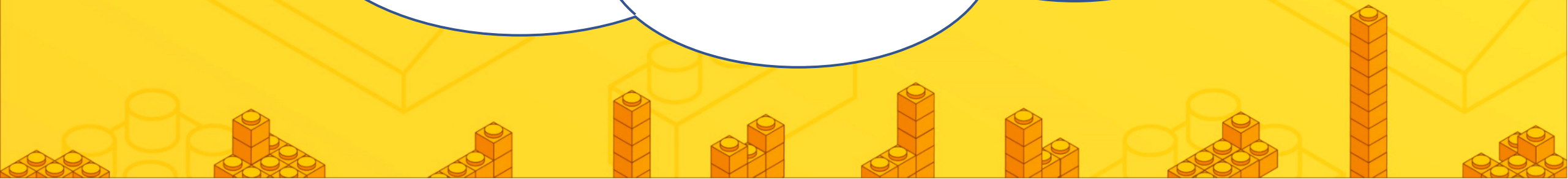


Stop At the Black Line

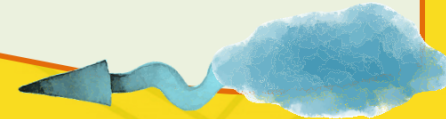


Target

- **Learn how to use the grayscale sensor for black line detection.**
- **Master the task of using the grayscale sensor to complete line-following tasks.**
- **Become proficient in the requirements for detecting black lines with the sensor.**



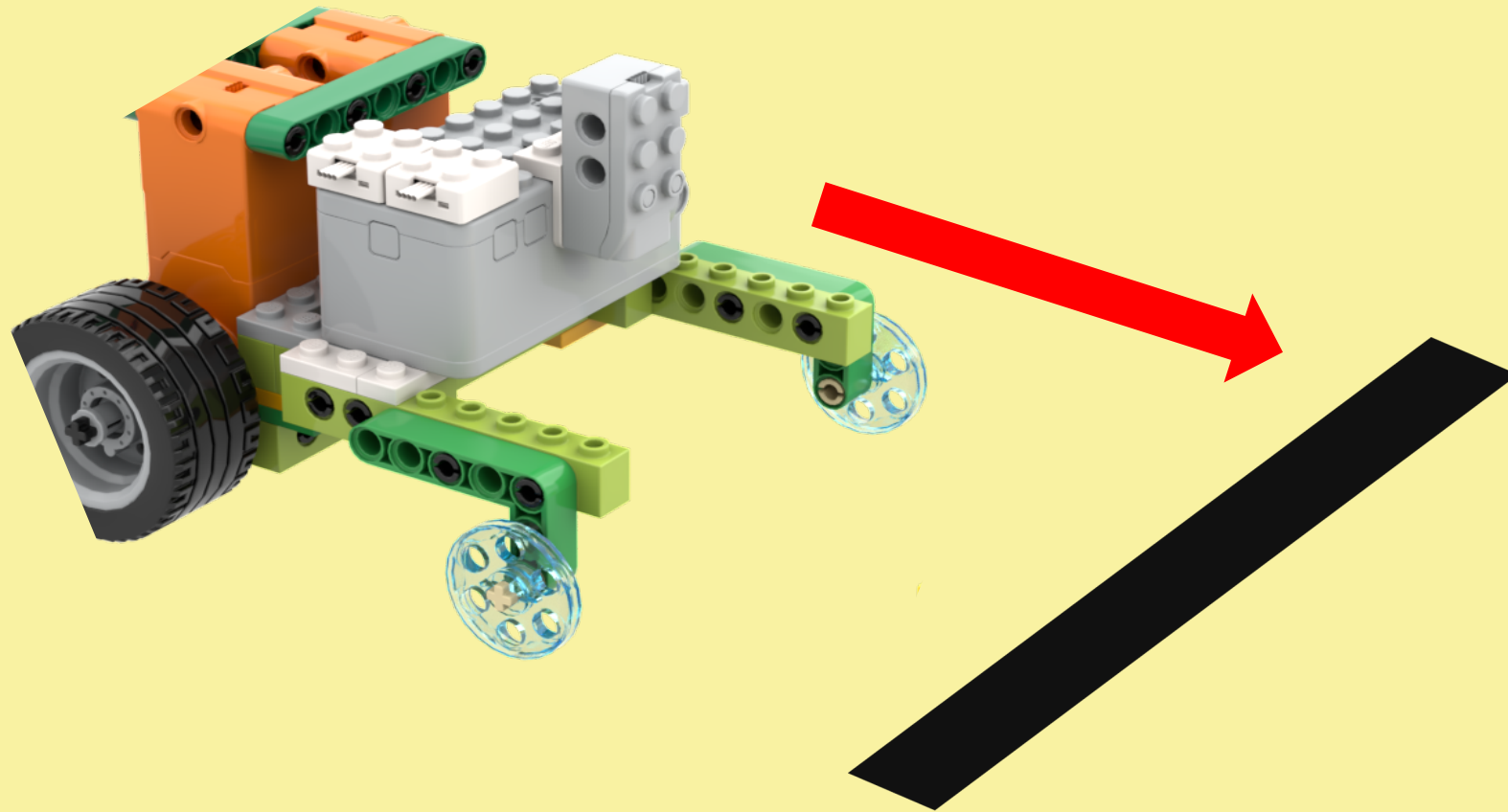
01 Task





Task

- **Task 1: Stop When the Grayscale Sensor Detects a Black Line**

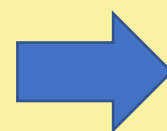
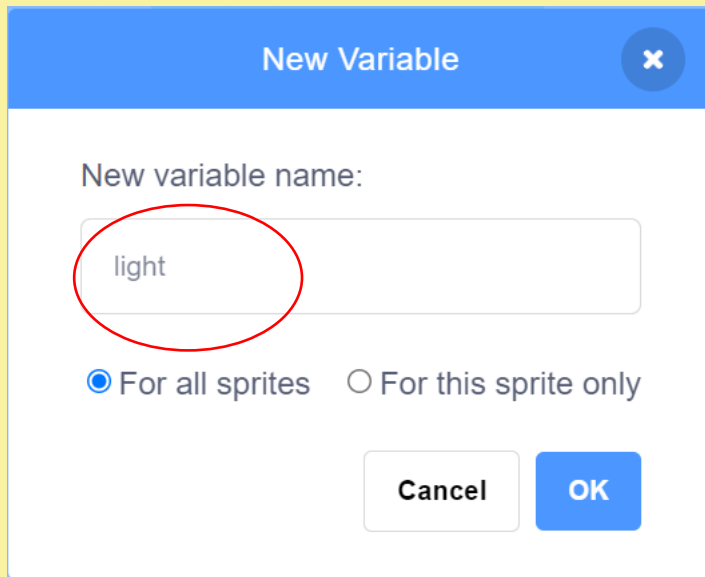
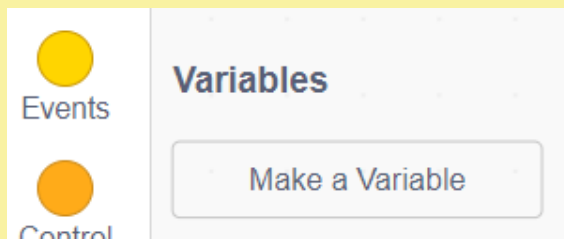




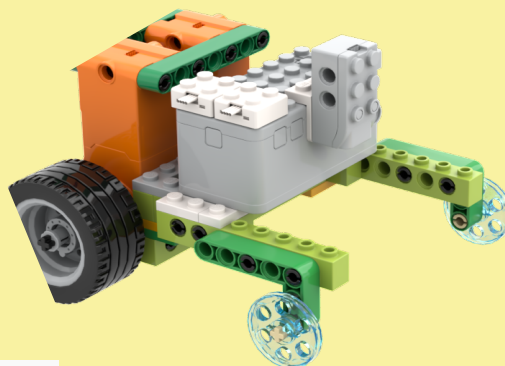
Coding Technique 1

Using Variables and Viewing Sensor Values

Note: Variable names should use only English letters.

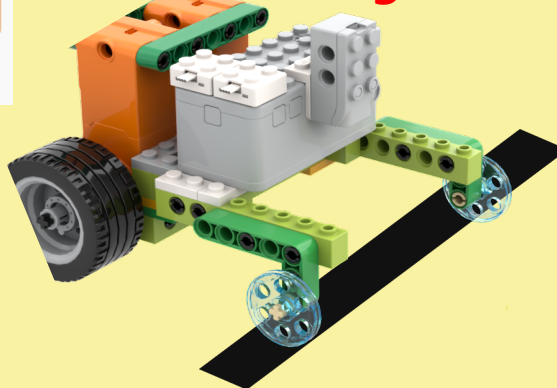


Coding Technique 1



light 18

Pay close attention to the difference between detecting the black line and not detecting it.



light 29

```
when clicked
  forever
    set light to 1# single channel line tracker's value
```



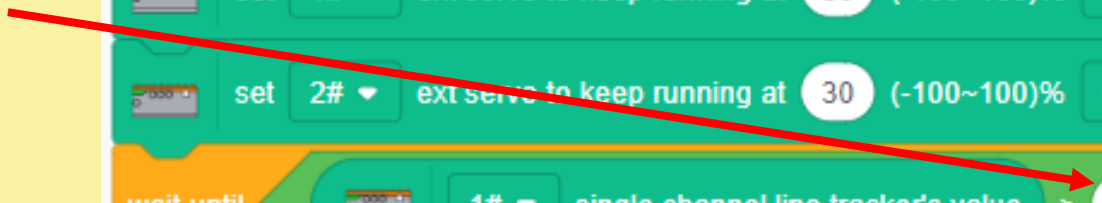


Task

Referrable Program

$$\text{Threshold} = \frac{(\text{black line value} + \text{white value})}{2}$$

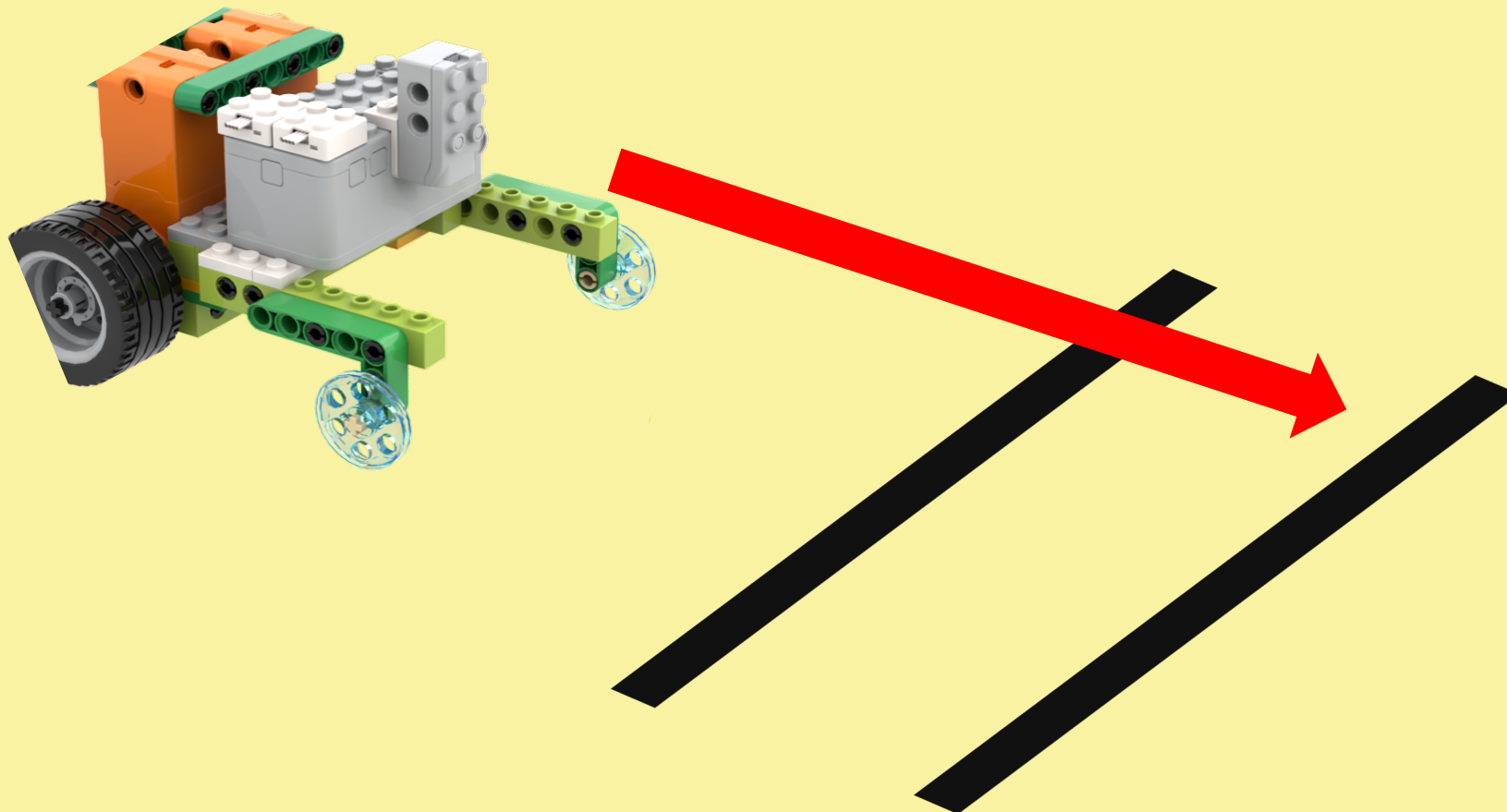
```
when clicked
  set 1# ext servo's origin
  set 2# ext servo's origin
  wait 0.3 seconds
  set 1# ext servo to keep running at 30 (-100~100)% speed on anticlockwise
  set 2# ext servo to keep running at 30 (-100~100)% speed on clockwise
  wait until 1# single channel line tracker's value > 23
  stop all ext motor(s)
```





Task

Task 2: Complete the Task of Stopping at the Second Black Line

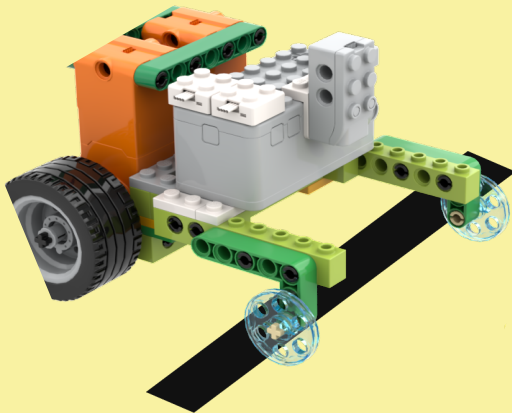


Coding Technique 2

The line-following task should involve two steps to be completed in one go.

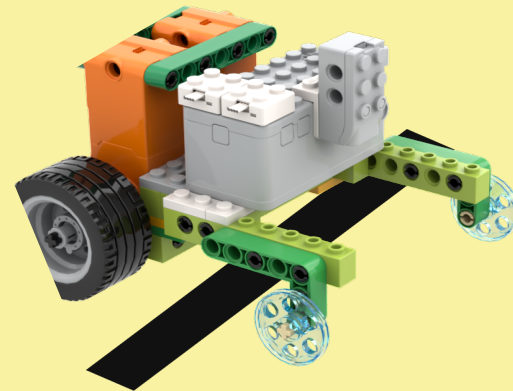
light 29

Detect the black line



light 18

Leave the black line



Task

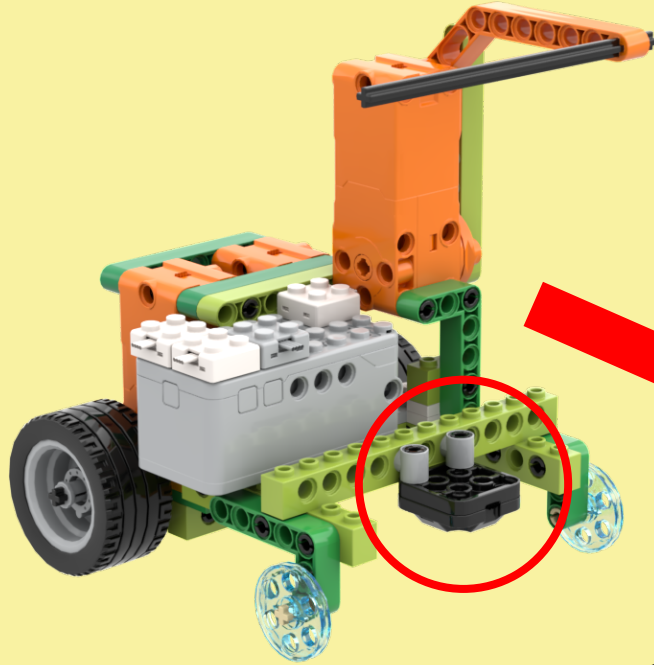
Referrable Program

The box outlines the criteria for completing a single line-following task.

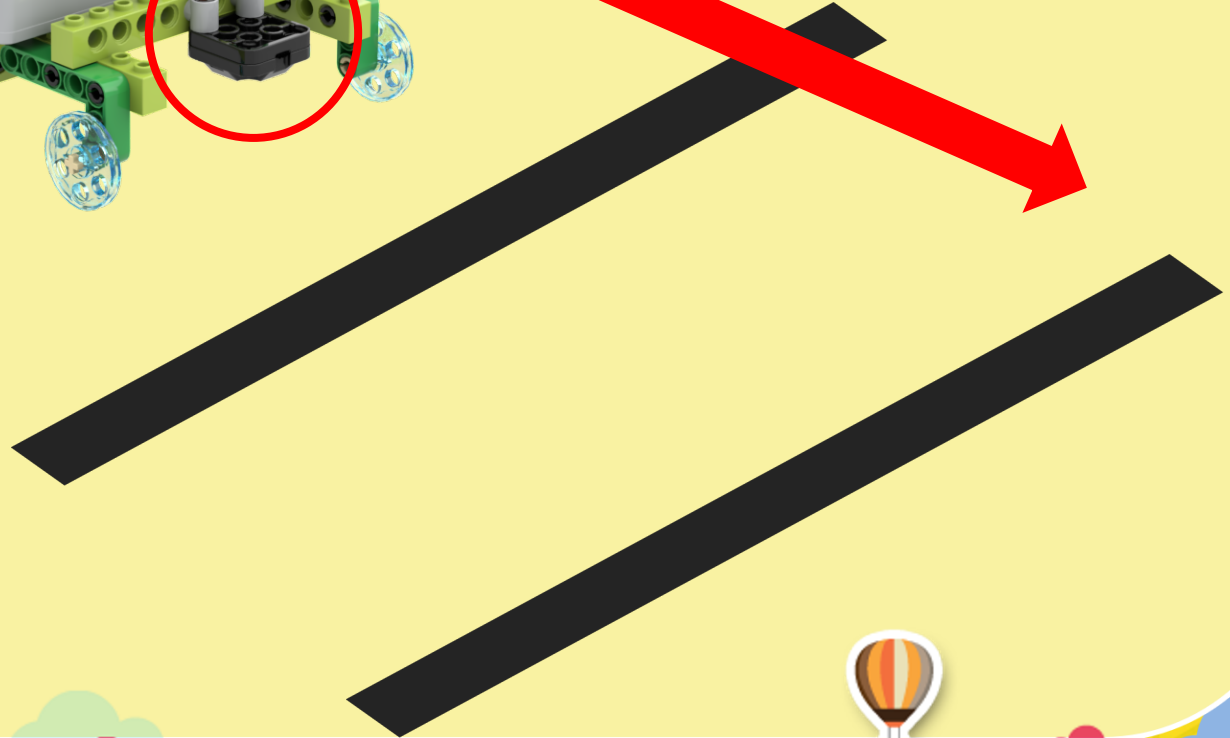
The image shows a Scratch script for a line-following task. The script starts with a 'when clicked' event block. It then sets two servo motors to their origin positions (1# and 2#). A 0.3-second wait block follows. The first servo (1#) is set to run at 30% speed in the anticlockwise direction, and the second servo (2#) is set to run at 30% speed in the clockwise direction. A red box highlights a loop of three blocks: a 'wait until' block for servo 1# to reach a value greater than 25, a 0.3-second wait block, and another 'wait until' block for servo 1# to reach a value less than 22. This loop repeats once more. The script ends with a 'stop all' block to stop the motors.

```
when clicked clicked
set 1# ext servo's origin
set 2# ext servo's origin
wait 0.3 seconds
set 1# ext servo to keep running at 30 (-100~100)% speed on anticlockwise
set 2# ext servo to keep running at 30 (-100~100)% speed on clockwise
wait until 1# single channel line tracker's value > 25
wait 0.3 seconds
wait until 1# single channel line tracker's value < 22
wait 0.3 seconds
wait until 1# single channel line tracker's value > 25
stop all ext motor(s)
```

Additional Task

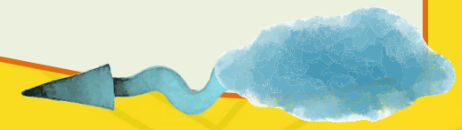


Use the color sensor in reflection mode to complete the task of stopping at the second black line.

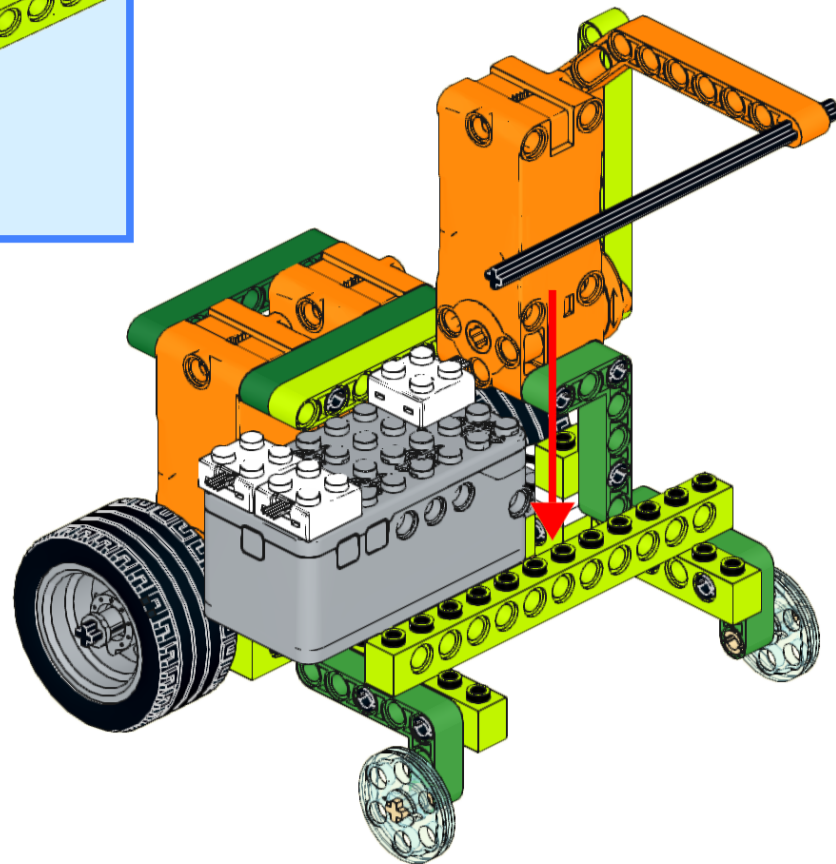
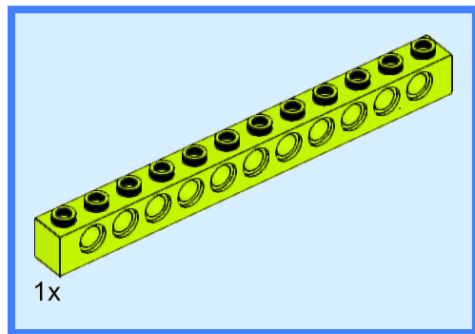




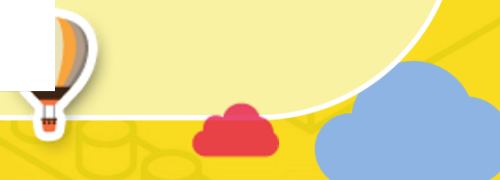
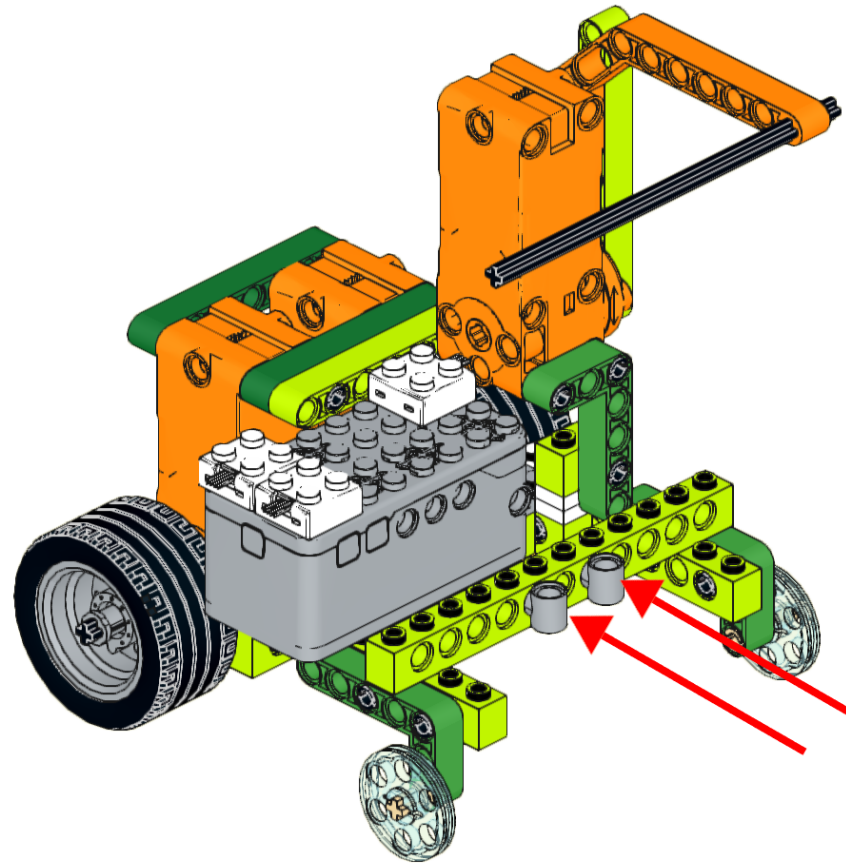
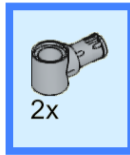
02 Assembly



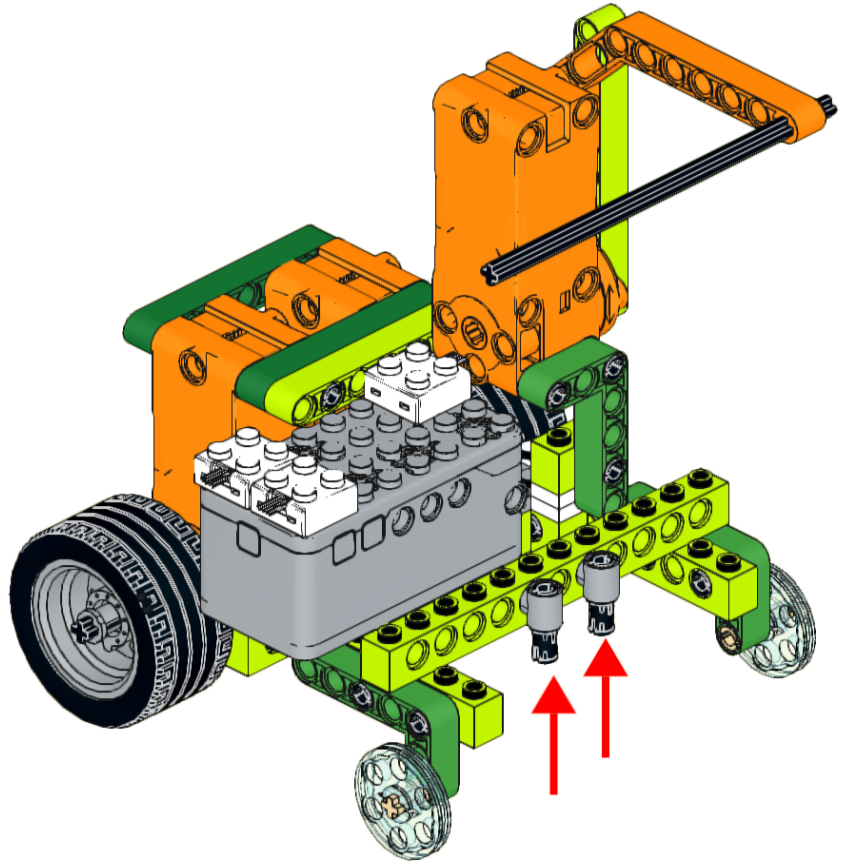
Additional Structure Assembly



Additional Structure Assembly



Additional Structure Assembly



Additional Structure Assembly

