SPIKE PRIME LESSONS

By the Creators of EV3Lessons

INTRODUCTION TO COLOR SENSOR

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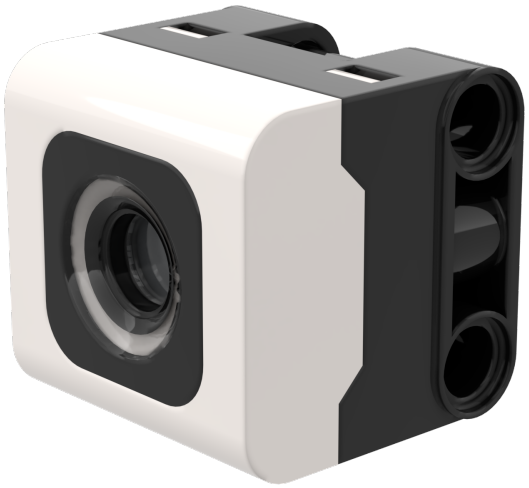
LESSON OBJECTIVES

- Learn how to use the Color Sensor
- Learn how to use the Wait Functions



WHAT IS A COLOR SENSOR?

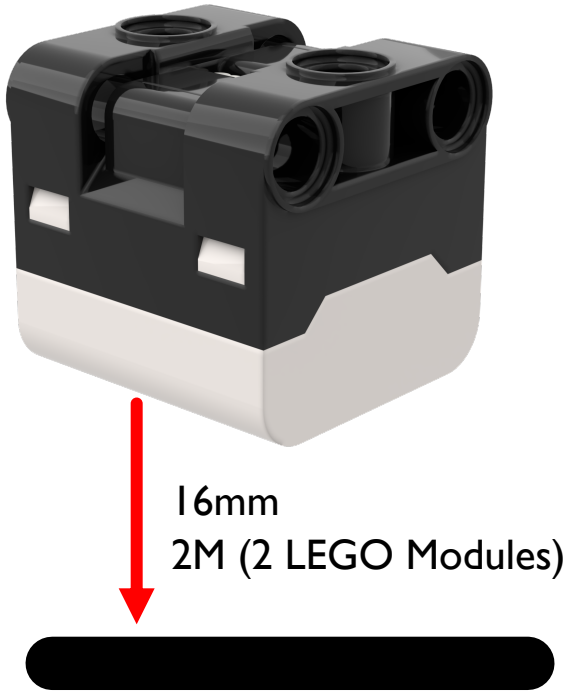
- In the software, the sensor can detect color or reflectivity
- Unlike the EV3, reflectivity is with white light, not a red light.
- The sensor can detect 8 colors and no color
- Optimal reading distance according to the specs: 16 mm (depending on object size, color, and surface)

Detectable Colors
Black (0)
Violet (1)
Blue (3)
Cyan (4)
Green (5)
Yellow (7)
Red (9)
White (10)
No Color (-1)

```
'black'
'violet'
'blue'
'cyan'
'green'
'yellow'
'red'
'white'
None
```

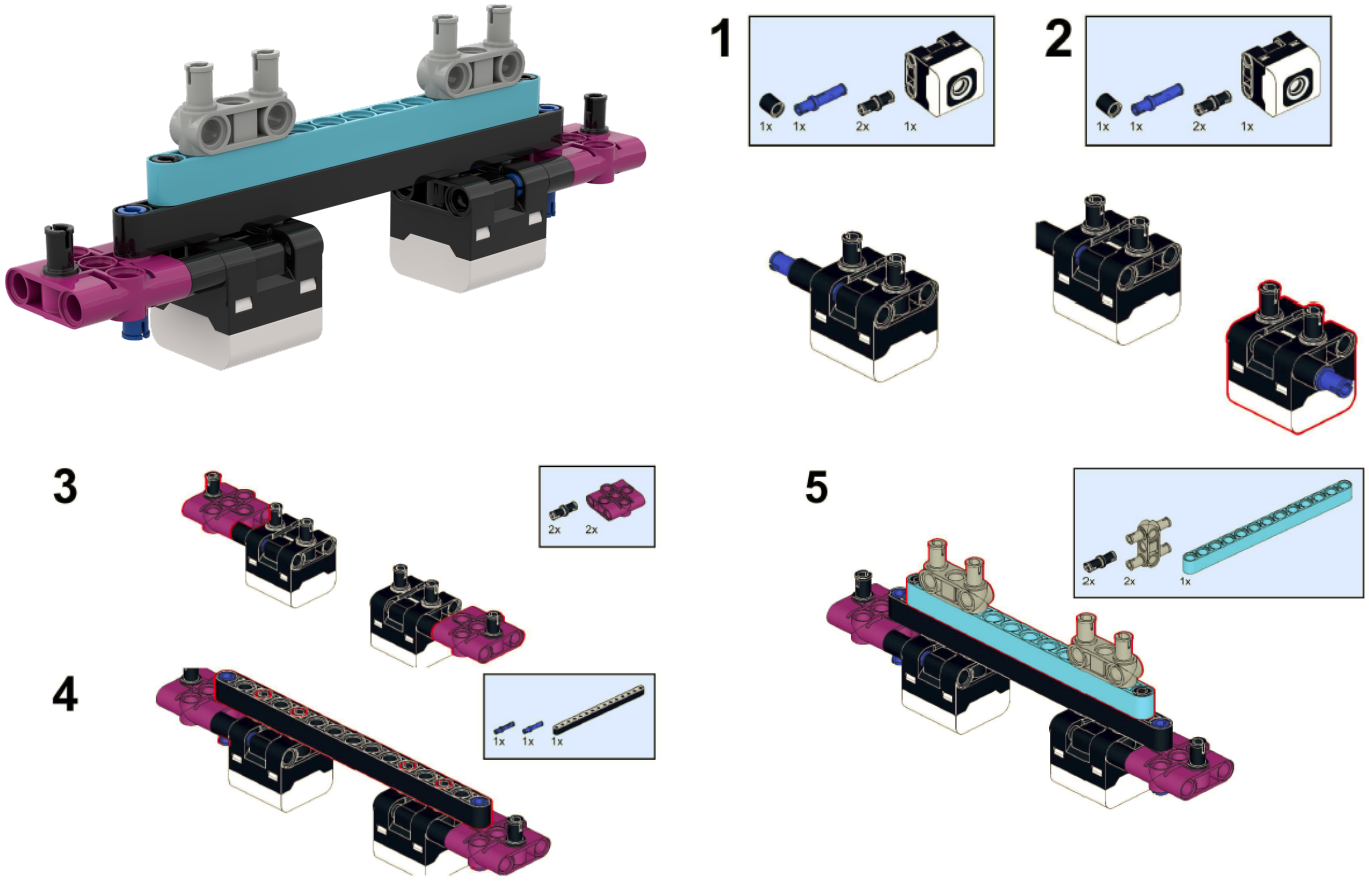
NOTE: ADB AND SENSING COLOR

- *The color sensor on ADB is mounted at about 8mm off the ground, but the optimal distance for mounting the sensor according to the specs is 16mm.*
- When using this robot design, Black does not read correctly in Color Mode using electrical tape lines or a FIRST LEGO League challenge mat.
- See the next slide for modifications. The build instructions are also provided as a separate file on our site.



MODIFICATIONS TO ADB

- Build instructions for modifying the front bumper of ADB so that the color sensors are raised one LEGO module up are included on this website



HOW DO YOU PROGRAM WITH A COLOR SENSOR?

- Before using the sensor, it must be initialized

```
color = ColorSensor('B')
```

Name for the sensor

Port

- The two modes you can program the color sensor in: Color Mode and Reflected light mode
- We will use color mode in this lesson

```
color.wait_until_color(color)
```

CHALLENGE 1

- Program your robot to move straight until the color sensor sees black
- You will need to use the Wait For block and the Boolean block of the color sensor

```
color.wait_until_color('black')
```

- **Basic steps:**
  - Set the **movement motors** for your robot (A and E for Droid Bot IV and ADB robot)
  - Set the **stop action** to brake
  - Set the **% speed** for your robot
  - **Initialize** the color sensor
  - Start **moving straight**
  - Use the **wait_until_color() function** to detect when the color sensor sees black
  - **Stop moving**

CHALLENGE 1: SOLUTION

In previous lessons, you learnt how to configure your robot. (See Configuring Your Robot Lesson)

```
motor_pair = MotorPair('A', 'E')
motor_pair.set_stop_action('brake')
motor_pair.set_default_speed(30)
color = ColorSensor('B')
motor_pair.start()
color.wait_until_color('black')
motor_pair.stop()
```

Configure robot

Start moving

Wait until the color sensor sees black

Stop moving

CREDITS

- This lesson was created by Arvind Seshan for SPIKE Prime Lessons
- More lessons are available at www.primelessons.org