

# Cubelets Quick Start Guide

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  - 2 Knob Blocks
- 14 Colorful “Think” Blocks
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- 1 Carrying case for kit chargers
- 1 Set of Legos with yellow carrying case
- 1 Quick Start guide



## What do the Blocks Do?

Each block in the kit has its own function or “program.”

**In order to build a robot, you must use at least three different types of blocks; one battery block, one sense block, and one act block.**

These blocks interact in different ways to create a robot. Below is a picture of the different blocks in the kit next to a brief outline of what the block does.

### 1. Dark Blue Battery Block

- a. The battery blocks are necessary for any robot. In order to make your robot work you will need one blue battery block.
- b. To turn in on simply flip the switch on the side. You know it is on when the light is green.
- c. When you plug it in to charge the light is orange/yellow.
- d. When it is finished charging the light will turn off.



### Black “Sense” Blocks:

#### 2. Brightness Block

- a. Detects the amount of light hitting its sensor.
- b. Expect values near zero in a dark room, and values near one when the sensor is in front of a bright light.



#### 3. Distance Block

- a. It will detect how far away it is from an object.
- b. It uses infrared light and is accurate between 10 and 80 cm.
- c. The sensor is directional, so it outputs the distance to the object in front of the sensor.
- d. At 10cm, the block will output values near 1, and toward 80cm it will output values near 0.



#### 4. Knob Block

- a. It has a turning knob on one of the faces of the cube.
- b. When the knob is turned all the way counterclockwise it has an output of 0, which is full stop.
- c. When it is turned fully clockwise, it has an output of 1, which is all go.



### Colorful “Think” Blocks:

#### 1. Red “Inverse” Block

- a. This block gives the opposite of what it receives from the think block to the act block.
- b. Low values become high, and high values become low.



#### 2. Light Green “Passive” Block

- a. These two light green blocks act like a building brick. It does not move, sense, or change the data in any way.



- b. It carries power and data from its neighbors, but it acts like a smart brick.
3. Dark Green “Blocker” Block

- a. A basic building block that "blocks" data from its neighbors.
- b. It still passes power, but effectively stops communication and can insulate one side of a robot from another.



4. Orange “Threshold” Block

- a. It will output a value of zero until its inputs exceed the threshold set by the knob.
- b. Above this threshold, data will flow normally.
- c. Use this Cubelet to create robots that react suddenly, gate data flow, or exhibit binary behavior.



### White “Act” Blocks:

1. 8 Drive Blocks

- a. Contains a motor and roller wheels for moving on a horizontal surface.

2. The Drive Cubelet only moves in one direction, slowing to a stop with a value of zero and moving faster with higher input values.



3. 2 Bar Graph Block

- a. Displays the block's value as a light-up bar graph.
- b. The value is normalized to the number of points on the bar graph so that a maximum value results in a fully lit bar graph.



4. 4 Flashlight Blocks

- a. The block emits a focused beam of light from a powerful white LED.
- b. Off with a value of 0, the light becomes brighter with higher input values.



5. 4 Rotate Blocks

- a. One face spins at a rate corresponding to the block's input values.
- b. The higher the input, the faster it spins.



### Other Kit Components:

1. Bluetooth Hat

- a. Cap your robot constructions with the Bluetooth Hat to quickly and easily pair with any Bluetooth-enabled wireless device.



- b. Get the apps here: <https://www.modrobotics.com/cubelets/apps/>

## 2. Brick Adapters

- a. These yellow adapters allow Cubelets to connect with Lego Bricks.
- b. Each adapter has a “Stud” half and a “Socket” half.



### Kit Cleaning Basics

- General disinfecting wipes (such as Lysol or Clorox wipes) can be used to wipe clean the plastic pieces and the Cubelets.
- How to clean and disinfect Legos:
  - If the Legos have stickers, you will need to carefully hand clean them with wipes or Q-tips, so as not to get the stickers wet.
  - Legos without stickers can simply be washed using warm water and dish soap, then set out on a towel to dry.
  - If you wish to disinfect the Legos, you may add a mild bleach ratio of 1 TBSP per gallon of water. Let soak for 10-20 minutes, then carefully rinse the Legos to remove any chemical residue, before allowing the pieces to air-dry.

### Helpful Links:

For a full getting started guide: <https://tinyurl.com/reu75qy>

For a Cubelets getting started video: <https://tinyurl.com/y9q4bo6r>

For videos for inspiration or on what to build: <https://tinyurl.com/s7up5wf>

Free educational resources such as lesson plans and activity cards:

<https://www.modrobotics.com/education/>

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