

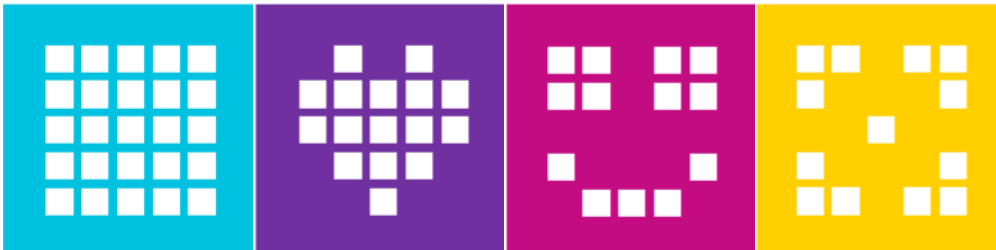
# SPIKE PRIME LESSONS

By the Creators of EV3Lessons



## INTRODUCTION TO HUB & SOFTWARE

BY SANJAY AND ARVIND SESHAN



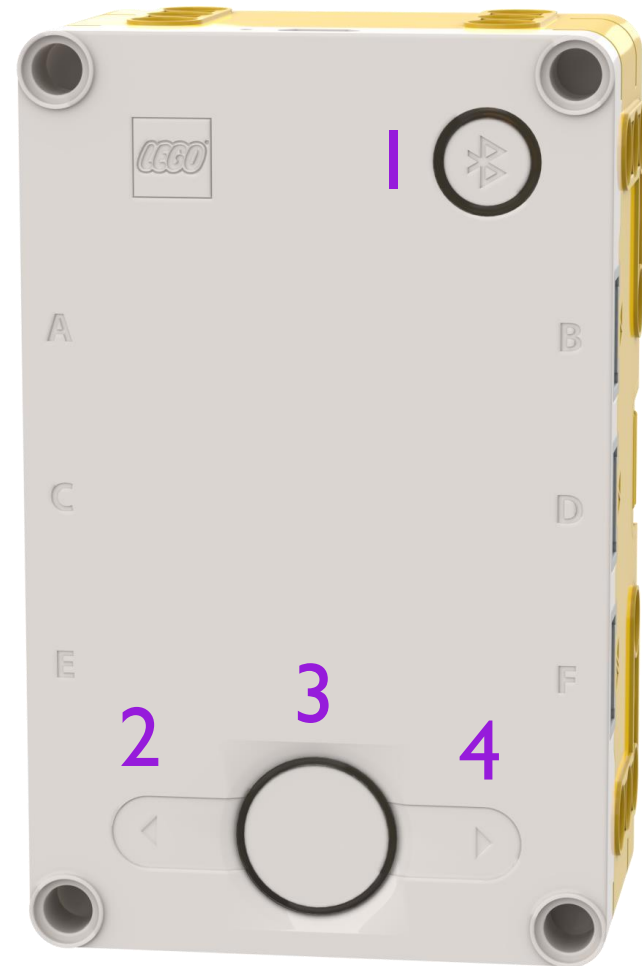
# LESSON OBJECTIVES

- Learn how the SPIKE Prime Hub operates
- Learn about the main components of the SPIKE Prime Software
- Learn how to connect your Hub



# THE HUB BUTTONS

1. Put Hub in Bluetooth pairing mode
2. Left button for program navigation in home menu
3. Select program or exit program when running. Hold down for 5 seconds to power off. Turns on Hub.
4. Right button for program navigation



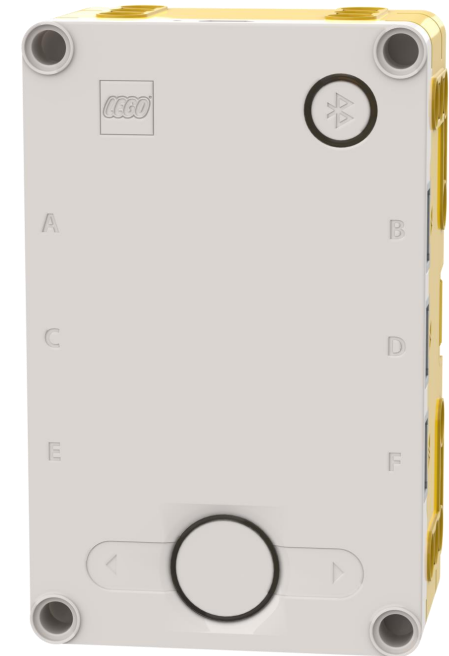
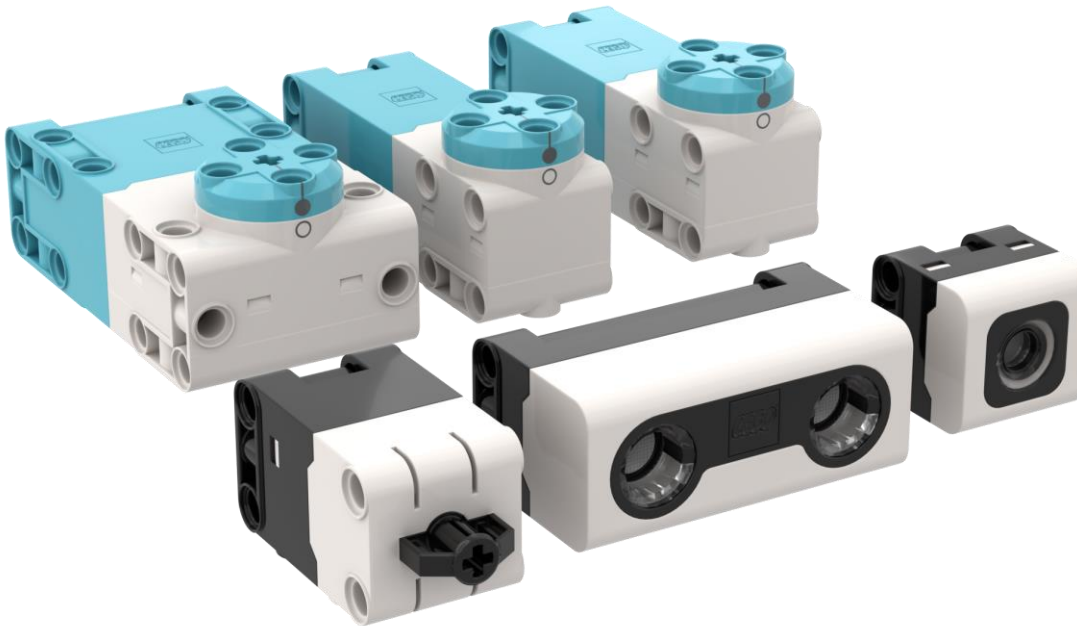
# THE HUB SCREEN

- 5x5 LED pixel matrix can be used to make designs, but also pick programs
- Patterns onscreen represent different programs
- Use the arrows and center button to navigate/launch programs
- You can have a maximum of 20 programs

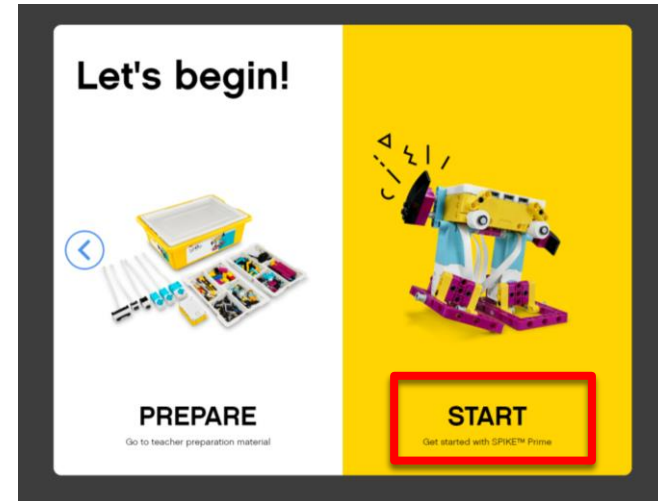
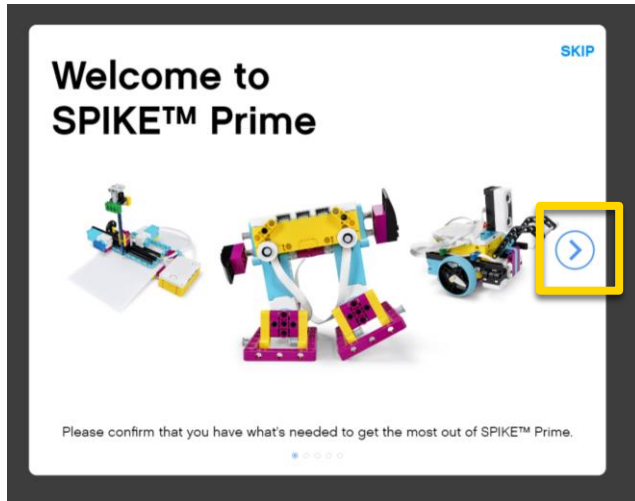


# PORTS, MOTORS AND SENSORS

- The hub has 6 built-in ports (A-F)
- Any port can be used for any motor or sensor
- The basic SPIKE PRIME set comes with 1 Large Motor and 2 Medium Motors, 1 Force Sensor, 1 Distance Sensor, 1 Color Sensor, and a built-in 6-axis Gyro Sensor

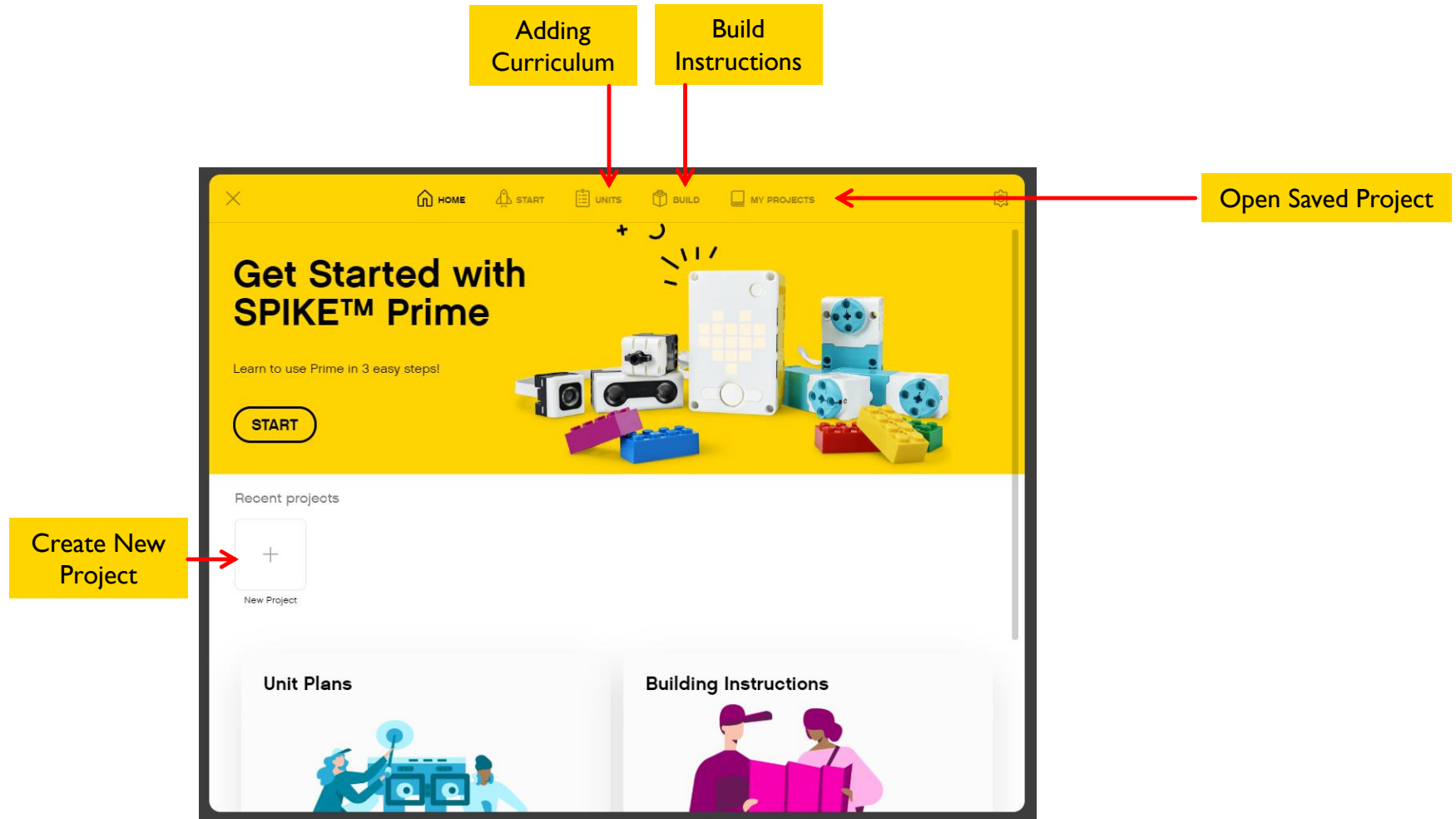


# GETTING STARTED



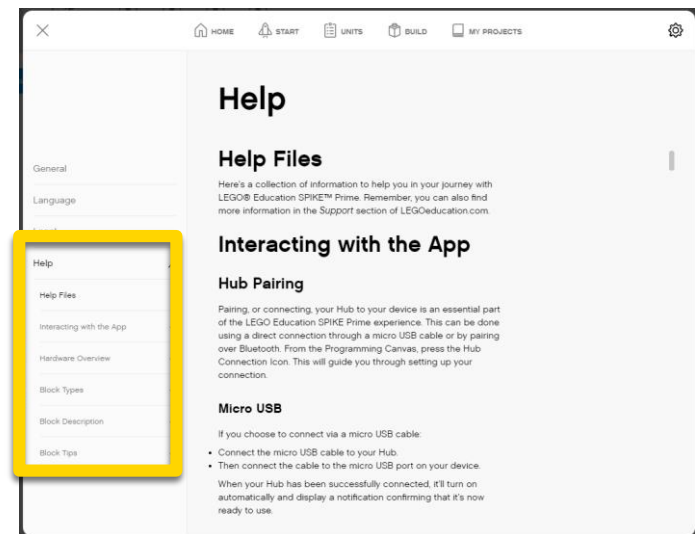
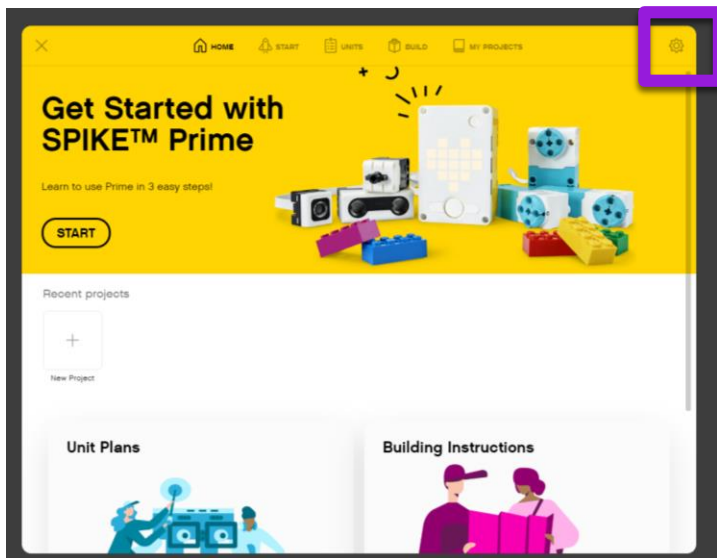
Follow the onscreen steps and then click “START” to access the programming environment

# HOME MENU



# ACCESSING THE HELP MENU

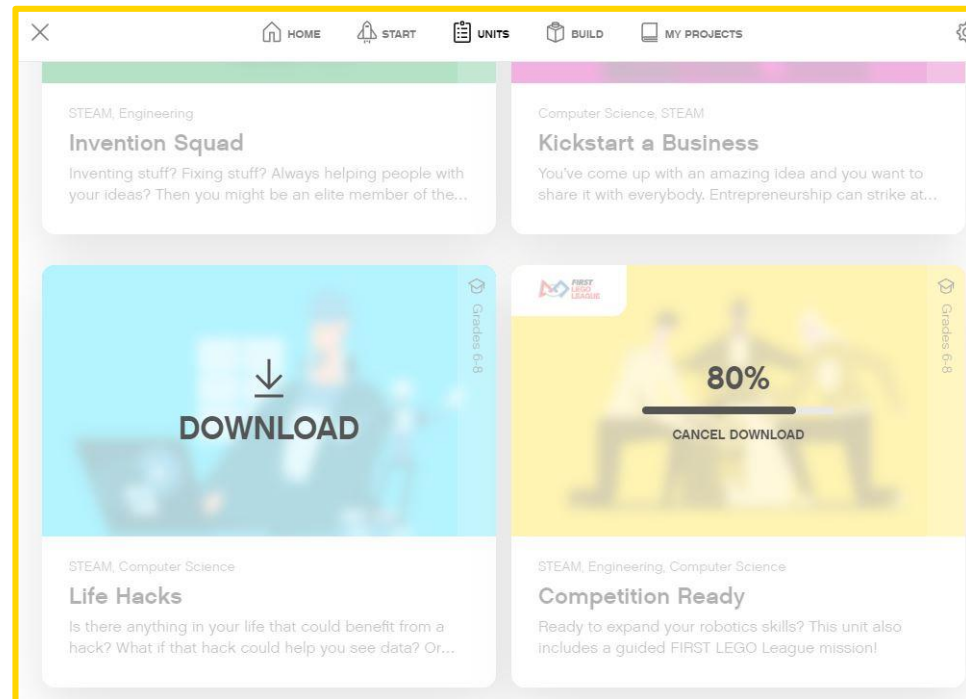
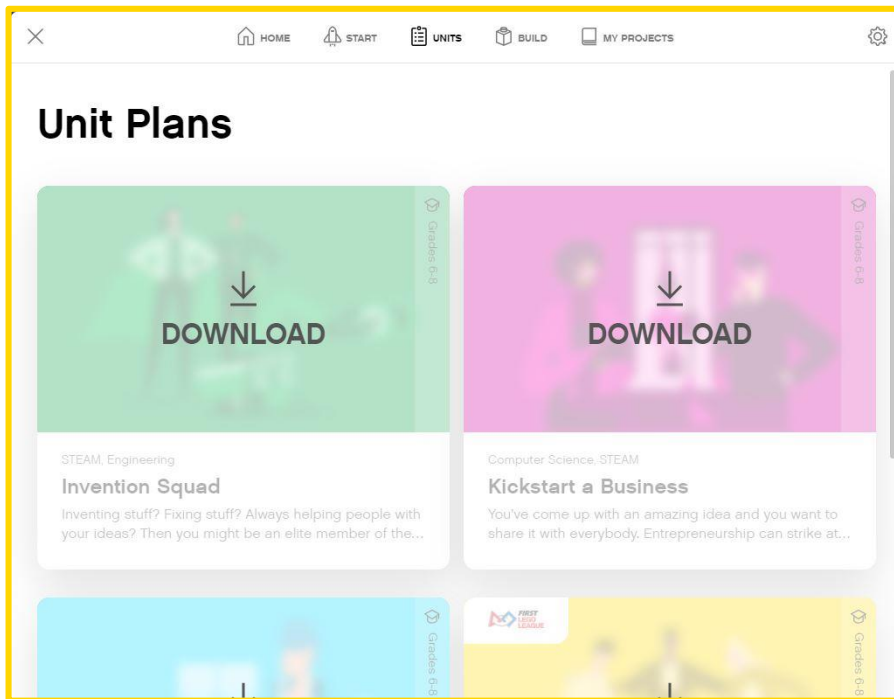
1. Click the Settings icon in the Home screen
2. Navigate to Help on the left hand column





# ADDING CURRICULUM - UNITS

- Lesson Plans can be found in the Units Section from the Home Menu.
- Section which unit you want to add and hit Download
- The FIRST LEGO League Curriculum is called “Competition Ready”



# PROGRAMMING CANVAS ESSENTIALS

The screenshot shows the SPIKE Prime software interface. On the left is a sidebar with categories: MOTORS, MOVEMENT, LIGHT, SOUND, EVENTS, CONTROL, SENSORS, Movement, OPERATORS, VARIABLES, MY BLOCKS, MORE MO..., and WEATHER. The main area is the Programming Canvas, which is a large grid for building programs. At the top, there's a project manager showing 'Project 3', 'Project 2', and 'Project 1'. Annotations with red arrows point to various features:

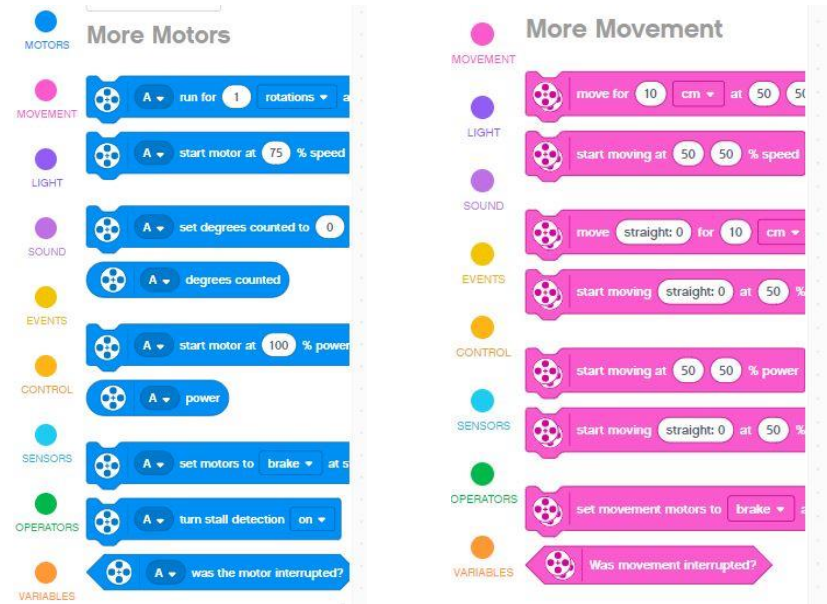
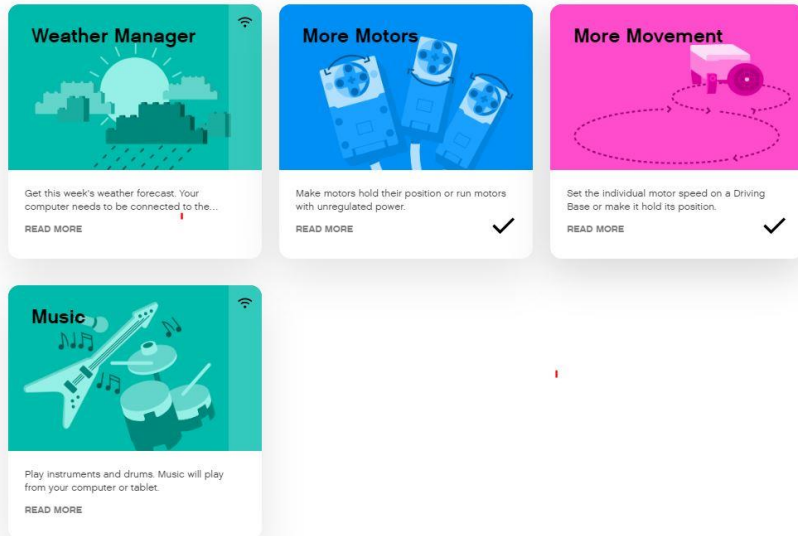
- Back to Home**: Points to the home icon in the top left of the project manager.
- New Project**: Points to the plus icon in the top right of the project manager.
- Project Properties Rename Project or Move File to new location (i.e. Save as)**: Points to the three-dot menu icon next to 'Project 3'.
- Opened Project**: Points to the 'Project 3' tab.
- Programming Canvas**: A large blue box in the center of the main workspace.
- Extensions**: Points to the extensions icon (a book with a plus) in the bottom left of the sidebar.

# EXTENSIONS: ADDING MORE BLOCKS

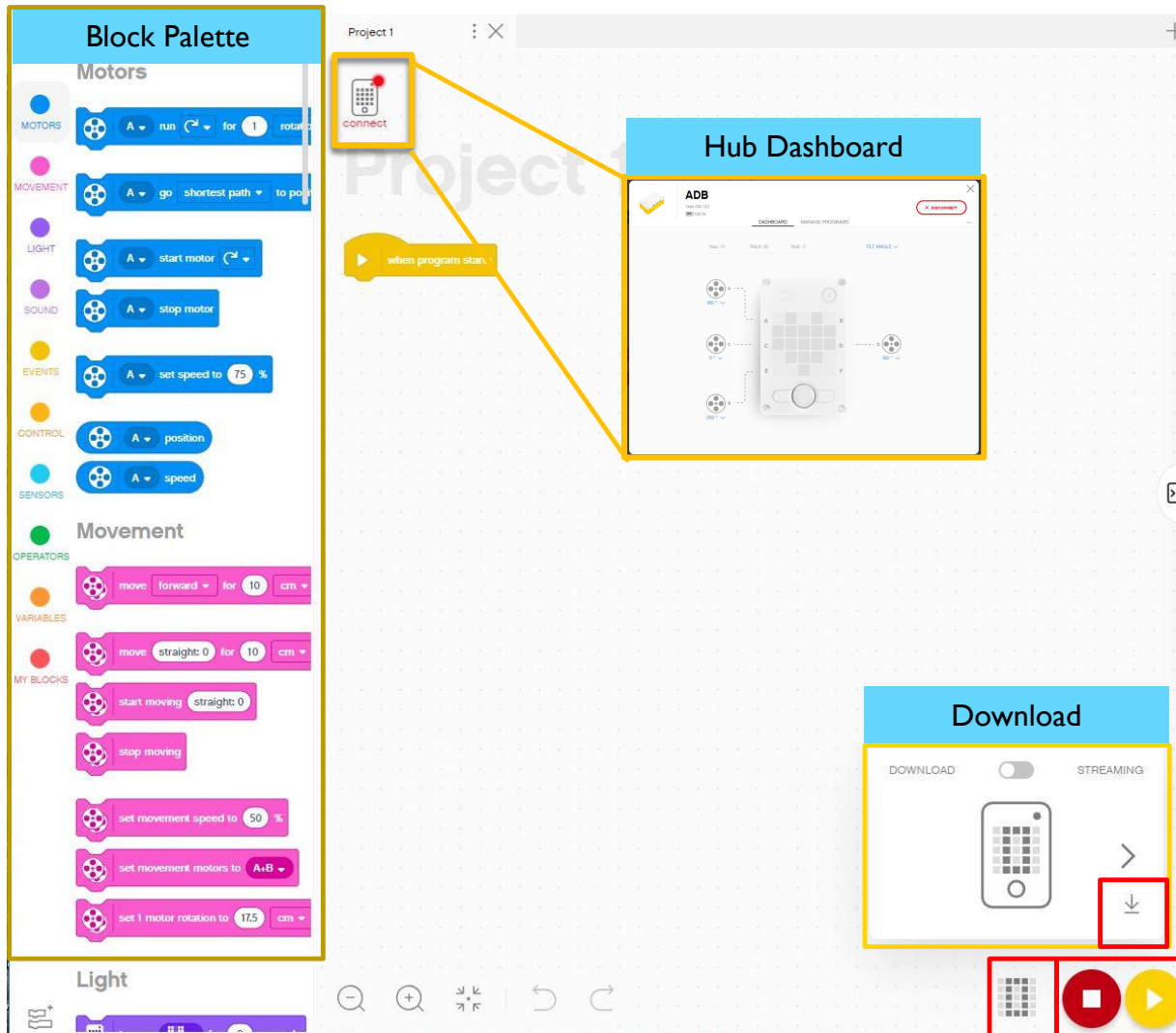


- When you open the software, not all available blocks are enabled.
- Click on the Extensions icon at the bottom of the Block Palette panel
- In our lessons, we will use “More Motors” and “More Movement” often
- These blocks will show up as separate tabs in the programming palette once downloaded.

## Extensions



# PROGRAMMING CANVAS





















- The main programming canvas is where you will create each program (called 'Project')
- All the programming blocks are on the Block pallet on the left
- The Connect Icon lets you access the Hub Dashboard
- The Download/Run Icon lets you pick the mode to download

Download

Stop and Play

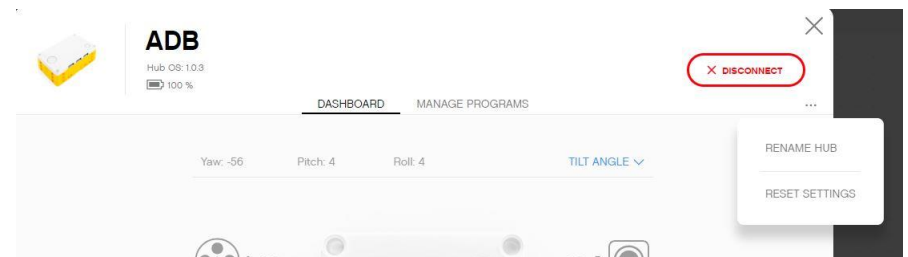
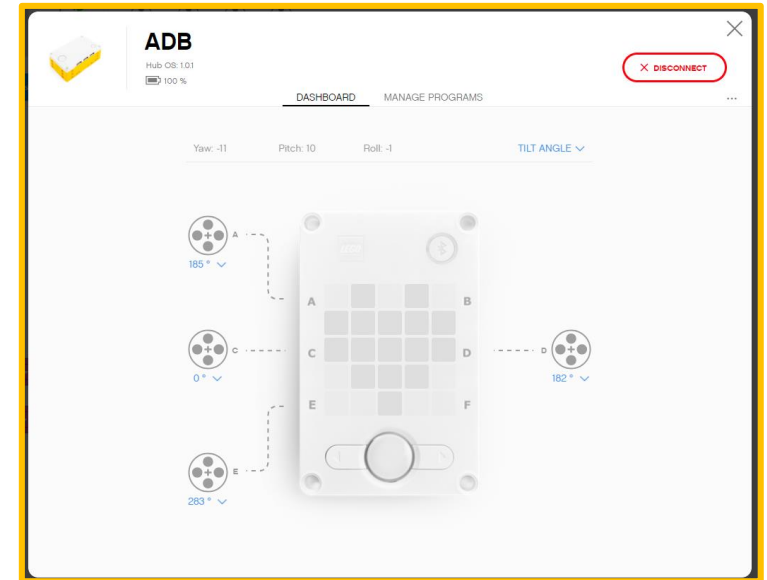
# BLOCK PALETTE OVERVIEW

-  **Motors** – Control an individual motor
-  **Movement** – Control two motors at a time with synchronization
-  **Light** – Program the 5X5 matrix
-  **Sound** – Play a sound
-  **Events** – Run actions based on events (e.g. sensor or timer)
-  **Control** – Loops, if/else statements, etc.
-  **Sensors** – Read a sensor value
-  **Operators** – Mathematics and logic
-  **Variables** – Store data in a variable or list
-  **My Blocks** – Custom defined blocks
-  **More Movement** – Additional movement block 
-  **More Motors** – Additional motor blocks 
-  **Weather** – Access weather information and forecasts 
-  **Music** – Play musical notes and select instrument 

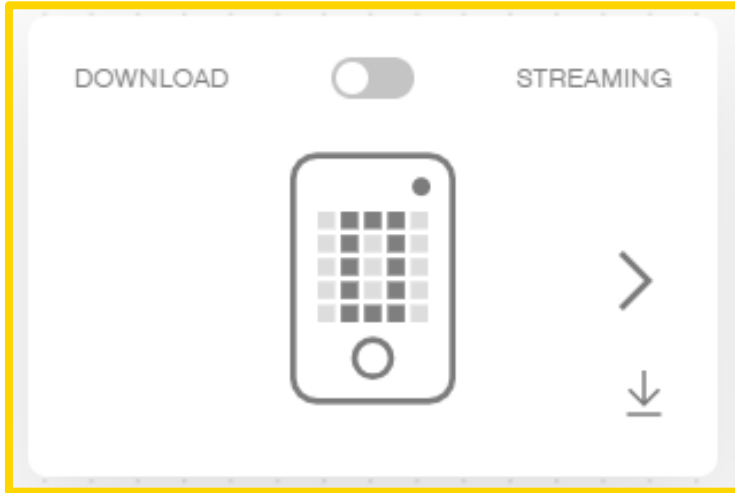
# HUB DASHBOARD



- You must connect your Hub to access this section
- This section is very useful for:
  - Checking battery level
  - Hub OS version
  - Gyro Sensor Values
  - See which motors and sensors are connected
  - Get real time values from the motors and sensors
- You can also rename your Hub in this panel by clicking on the three dots (...)
- The Manage Programs has a list of all programs on the Hub (maximum of 20). Use this section to change the order of the programs.

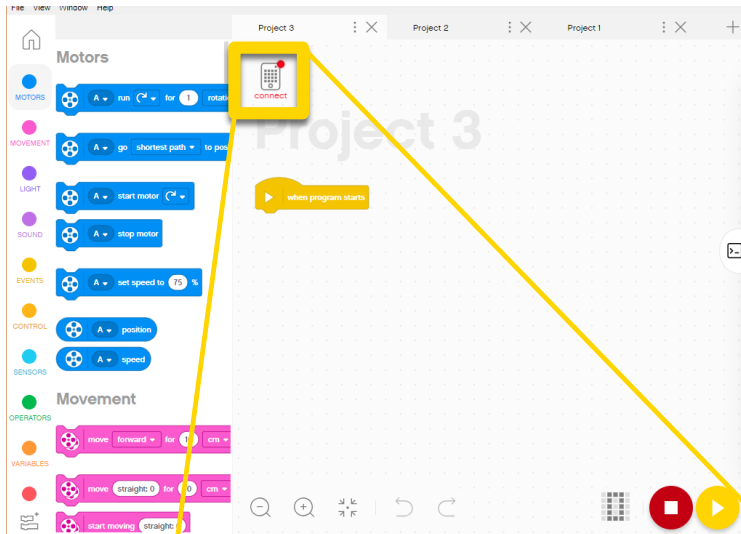


# DOWNLOAD VS. STREAMING MODE

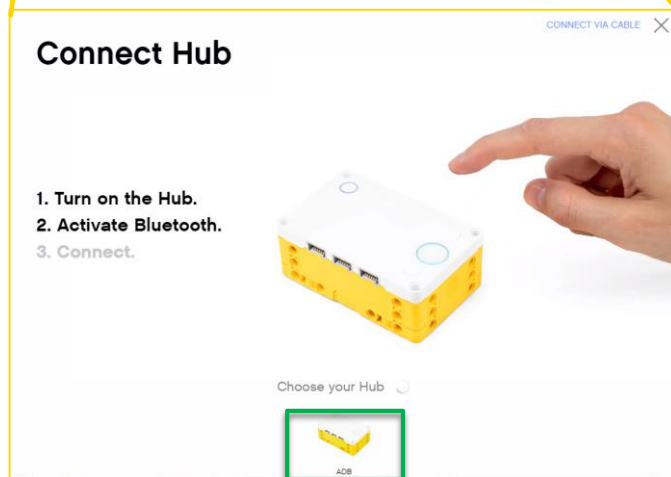


- Download: The program runs on the hub and can be run at any time with or without your PC
- Streaming: The program runs on your PC and controls the robot's motors
  - This tends to cause slower response times for the robot, but it allows you to use IOT (Internet of Things) features, such as weather readings
- Note: FIRST LEGO League Teams must use Download mode in competition

# CONNECTING TO BRICK



- The software will auto-connect to the brick if you are using USB
- To connect over Bluetooth, click the connect icon in the software.
- Enable Bluetooth by pressing the Bluetooth button on the brick.
- Your brick will show up in the list at the bottom. Click connect on your hub





# CREDITS

- This lesson was created by Sanjay Seshan and Arvind Seshan for SPIKE Prime Lessons
- More lessons are available at [www.primelessons.org](http://www.primelessons.org)



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