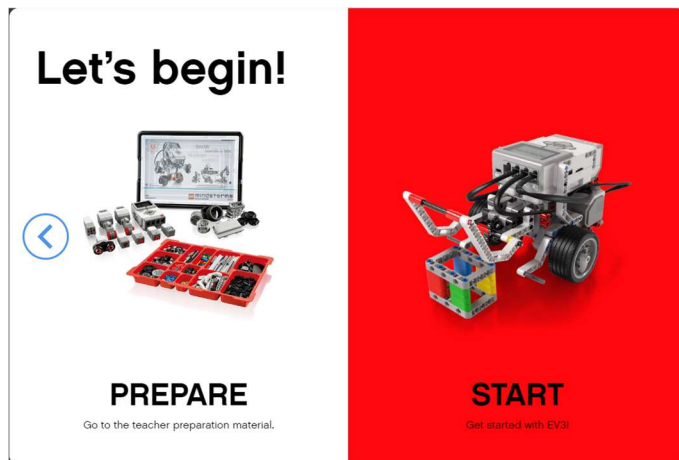


Tutorial: LEGO Mindstorms

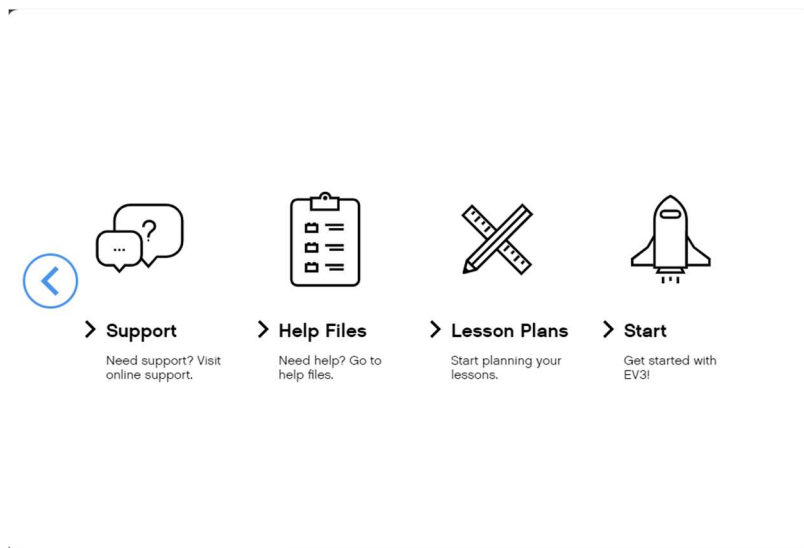
Overview:

LEGO Mindstorms is a computer program that allows its user to program their Mindstorms LEGO robotics kit to allow their robot to complete the program they wish. Teachers can use Mindstorms to teach children how to utilize the program or provide demonstration. Teachers can also have students download the program and work on projects at their own home. To download LEGO Mindstorms go to <https://education.lego.com/en-us/downloads/mindstorms-ev3/software>

Getting Started:

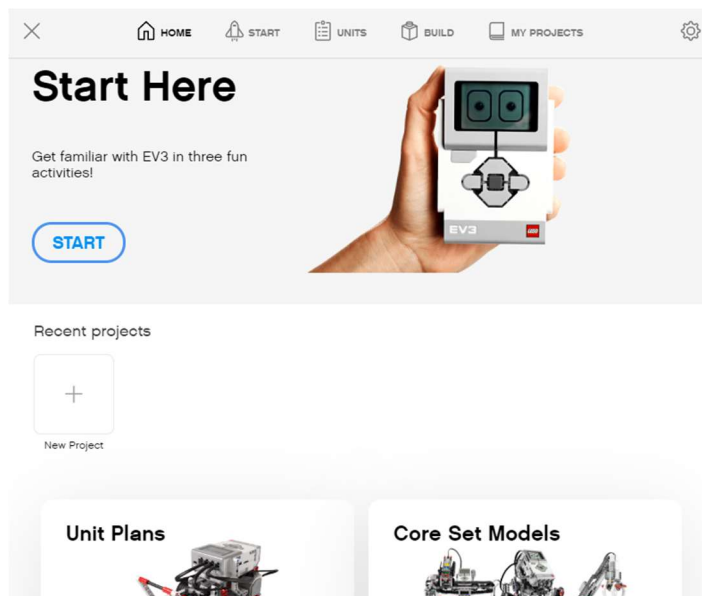


1. Following your download of the LEGO Mindstorms for education software you will be taken to a startup screen where you can choose from 2 pathways: Prepare and go through the teacher preparation process or start with the EV3 software.

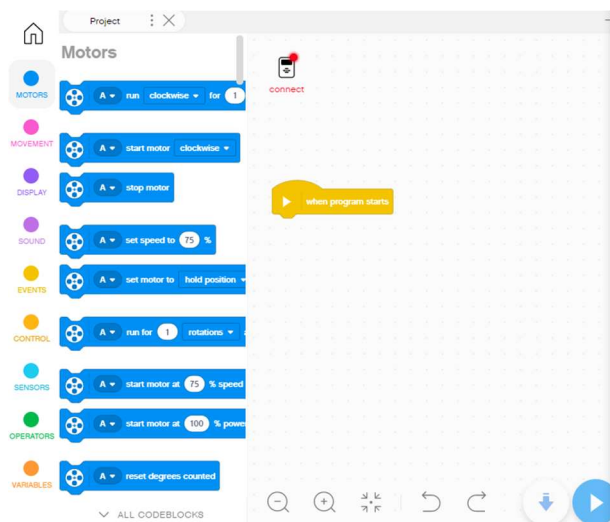


2. If you are a teacher though it is highly recommended to go through the preparation material. This will walk you through the process of organizing your materials and preparing the educational kits. At the end of the tutorial it will provide you with quick links that will help you along with a link to help you plan lessons.
3. To get started click on either the Start directory front the opening screen or the Start quick link following the teacher preparation material.
4. The Mindstorms Educational Classroom has premade programs to get started along with additional units. The getting started units can be found through the start directory, other additional premade units are found in the “Units” directory.

Starting a New Project:



1. From the Home Page directory, you may start a new project by clicking on the New Project logo underneath the start here banner.
2. To access any additional project, you have saved you may click on the “My Projects” directory



3. Once clicking on a new project, you will see the new project screen pop-up with all the code blocks to the left and the working stage to the right.
4. To save your working project click on file-> save as, and name and save your file in a desired directory on your computer.

Navigating the Mindstorms Program Builder:

1. All the code blocks are located on the left of stage organized by the types of blocks they are.
2. You will find the following directories Motors, Movement, Display, Sound, Events, Control, Sensors, Operators, and Variables
3. The Motor directory includes all blocks that will make any motors you add to your robot move, but you need to designate which motors you want to move in the block.
4. The Movement directory is in charge of the movement of the motors, but it is mainly used for the movement of wheels and other more precise movements.
5. The Display directory includes blocks that will allow the programmer to draw or display writing on the screen of the intelligence brick.
6. The Sound directory has blocks that are in charge of any sound emitting from the robot.
7. The Events directory has starting style blocks that programs can be build off of when certain events take place (i.e. touch sensors being pressed)
8. The Control directory includes loops and other if then style block to complete your programs.
9. The Sensors directory includes all controls for sensor related behaviors, like resetting and calibrating sensors to specific settings.
10. The Operations directory includes specific style block that can be used for inputs and other operations like arithmetic or and/or/not statements.
11. The Variables directory is where you can make custom blocks, variables or lists for inputs.
12. At the bottom of the stage you will notice the normal zoom, fullscreen, and undo/redo buttons for when you are building your program.
13. In the bottom right of the stage the white download button is located so the programmer can download the program onto their intelligence brick for later use.

14. In the lower right-hand corner of the stage there is a blue play button when you can play your program on your robot without actually downloading the program itself.

Tips and Tricks for Mindstorm Classroom:

- To learn how to use Mindstorms try and navigate the getting started units provided through the Mindstorms application
- For movement purposes use the movement directory for more precise ways to direct the movement of your robot.
- The code blocks used through the LEGO Mindstorms Classroom software resemble the style blocks used with Hour of Code/Scratch/Snap programs. Familiarizing yourself with the working of either programming will help ease the program creation with Mindstorms EV3 Classroom