

## EV3 Robots Introduction to Programming

### Getting started with programming an EV3 robot

The goal for this introductory programming is to get the robots to dance.

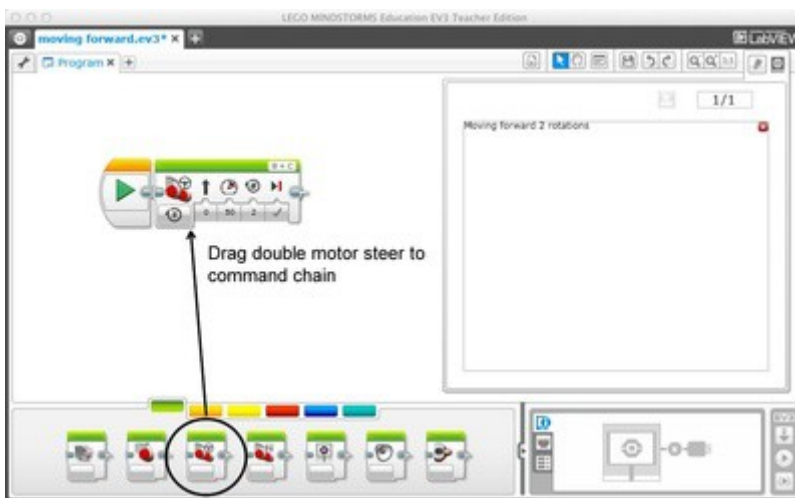
By learning how to make their robot dance, students will learn some basic programming skills including moving, turning, and looping.



First have the students build the robot in the instruction manual. The robot in the manual is a great start because it is strong and turns well. The instruction manual has instructions for programming the robot brick without a computer. The following instructions use the Lego Mindstorms Education EV3™ software.

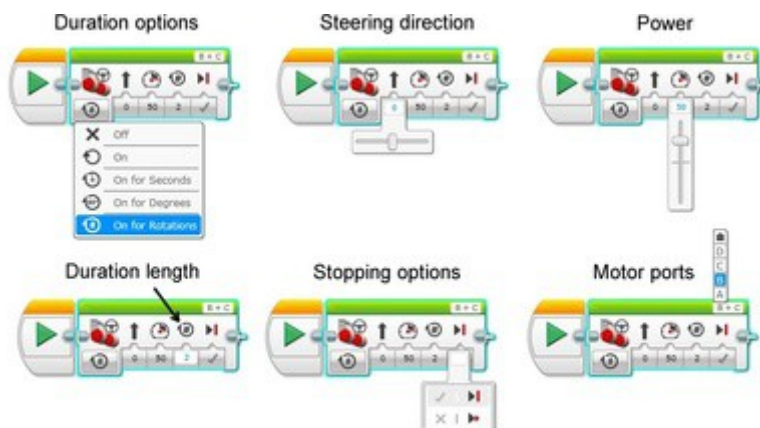
### Mini Task 1: Moving forward and turning

#### Step 1 Moving Forward



Drag and drop the double motor steering block from the green tab/set on the lower menu bar to the command programming chain.

#### Step 1.1 Select Options for Motor Block



There are five Duration options:

- <Off> Turns the motor off
- <On> Turns the motor on indefinitely
- <On for Seconds> Turns the motor on for the time specified in Duration length
- <On for Degrees> Rotates the motor the number of degrees specified in Duration length
- <On for Rotations> Rotates the motor the number of rotations specified in Duration length

**Steering direction:** To change the Steering direction, slide the slider right or left. This changes the relative speed of the wheels. Dragging it all the way to one side will cause the robot to spin on the spot without moving forward.

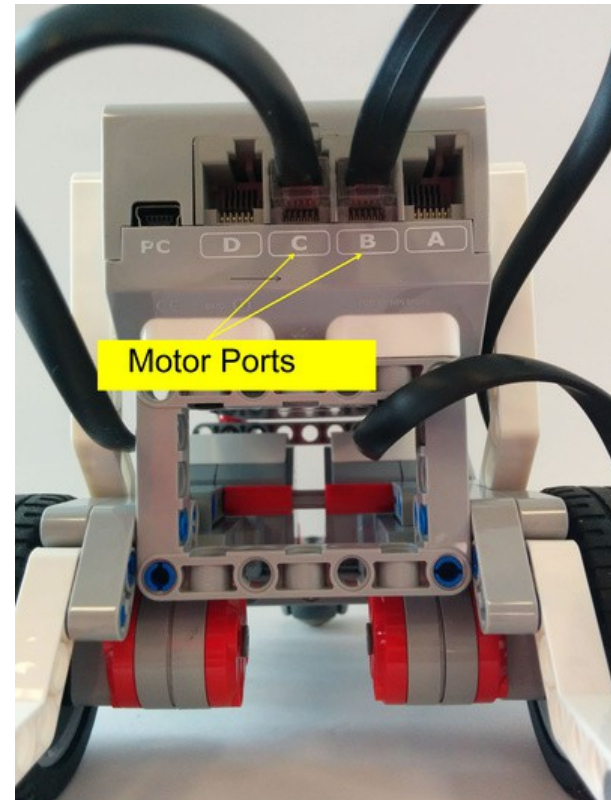
**Power:** To change the Power, move the slider up or down. Sometimes you will need slow careful precision. Other times you may need brute force. Negative Power will move the robot in the opposite direction.

**Duration length:** Duration length corresponds directly to the Duration option chosen: time, degrees, or rotations. This option relates to the wheels, not the robot.

**Stopping options:** Upon completion of the command, the wheels can either brake or coast depending on the Stopping option selected.

**Motor ports:** Double check that your motors are plugged in to the robot as the same Motor ports as selected in the program. If they are not correct, the robot will not move as desired.

This is a key element for troubleshooting.



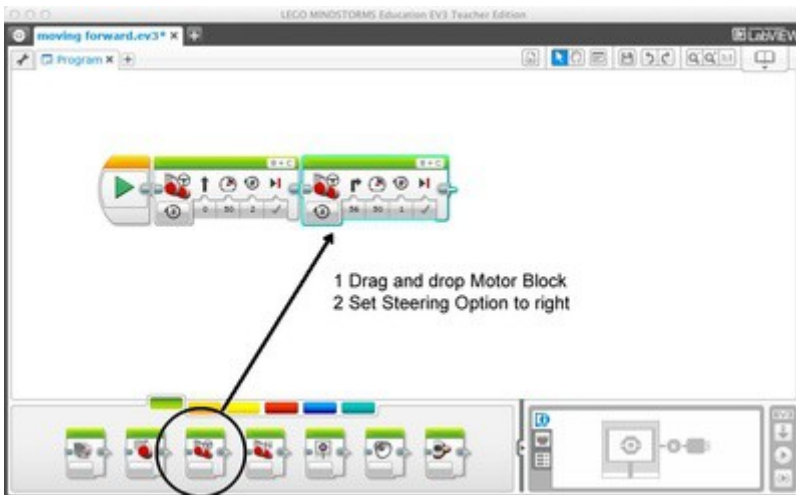
**Mathematics Curriculum connection**

How far will the robot travel in 2 rotations? Answer: 2 times the circumference of the wheel. The wheel is the tire and the rim.



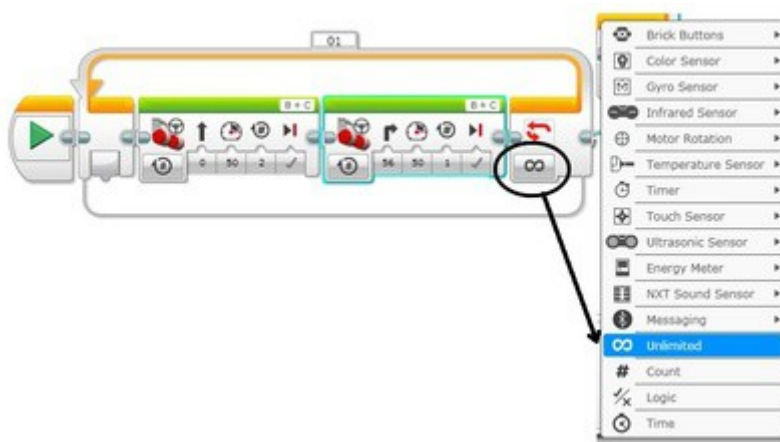
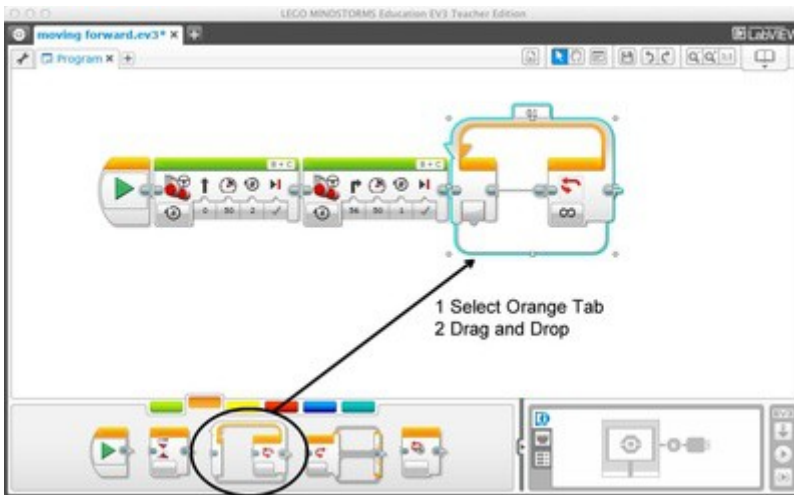
### Step 2 Turning

Drag another Double Motor Block on to the command programming chain. Set the Steering option by dragging the slider as shown in Step 1.1 above.



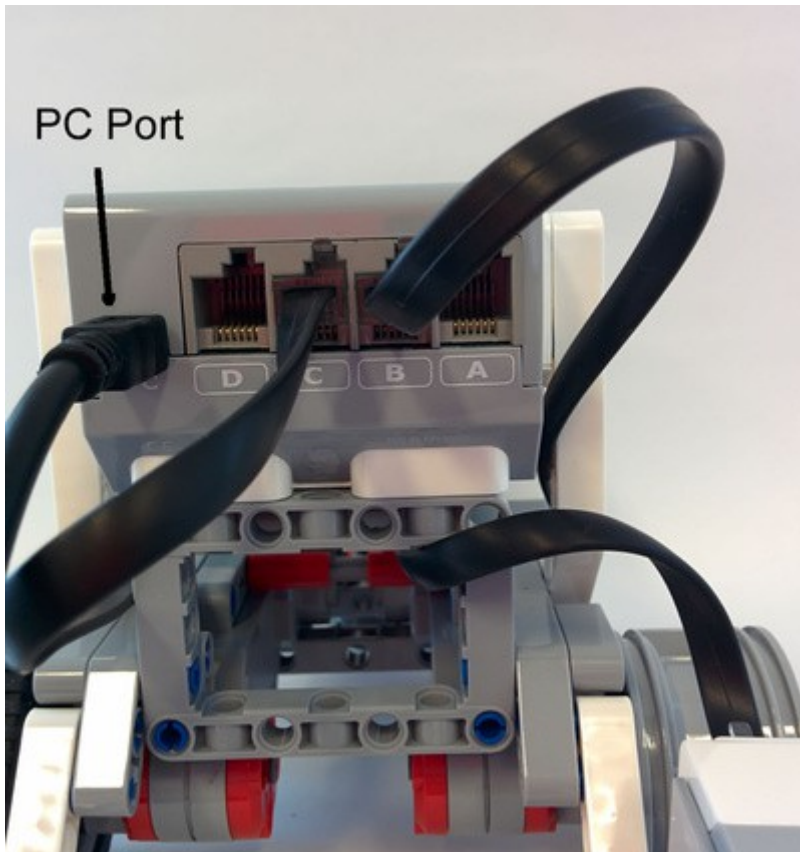
### Step 3 Loops

Loops are useful for repeating a sequence of steps, such as dance moves. To create a loop, select the Orange tab on the lower menu bar. Then Drag the Loop to command programming chain.



Then drag your sequence of blocks into the loop. Make sure they are attached to the chain and in the correct order. There are many options for how long the loop repeats, which can be found by clicking the infinity symbol.

#### Step 4 Uploading the program to the robot



Plug the USB cord into the PC port of the robot. Make sure the EV3 is turned on. Figure 9: PC Port is beside the motor ports Press to compile, upload and run the program. Conversely, the same button will stop the program when it is plugged in and running. You can now unplug the robot.



Press play to compile, upload and run program By creating loops with various steps for movement, the robot can be programmed to dance.

### Step 5 Make the robot dance

Ask your students to create some dance moves for their robots. This is their chance for some creativity.

Then, put on some music and let everyone show of their robots moves.