Teaching mBot to Drive by Itself

Overview

In this activity, students get their first experience writing code for mBot using the mBlock Blockly app. Coding movement into a program is required in many of the activities in this module. Ideally students will recognize that they can control mBot much more precisely with code than they can remotely using the Makeblock app.

Objectives

- Become familiar with the mBlock Blockly app (for iOS or Android).
- Write an mBot program using the mBlock Blockly app.
- Practice coding movement commands.
- Run a program on mBot.
- Practice troubleshooting when problems arise.

Computer Science Teachers Association (CSTA) Standards

1B-AP-08	Compare and refine multiple algorithms for the same task to determine which is the most appropriate.
1B-AP-15	Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Materials

Each group needs the following items:

- mBot with battery (Makeblock's 3.7 V rechargeable battery or 4 AA batteries)
- mBlock Blockly app on iOS or Android smartphone or tablet
- masking tape (or similar) to mark locations on the floor
- boxes, books, or other objects to act as buildings, warehouses, etc.

Tips

1. In the Electronic Resources you will find a PDF of the student activity. Print the PDF, distribute it to students electronically, or post it to a password-protected class web page or similar. Please do not post the content on a page that is accessible to the public. Sign in to your account at **vernier.com/account** to access the Electronic Resources.

2. Before using mBot and the mBlock Block app with students, verify that each mBot can connect to the mBlock Blockly app (visit **vernier.com/mblock** to download the app).

3. It is important to note that the Makeblock and mBlock Blockly apps each require a unique Bluetooth connection. You should always turn off your mBot before opening either of the apps to ensure you are making a fresh connection.

4. Encourage students to record observations, code, or information about mBot in a journal or on their student handouts. For example, they might want to record how far mBot travels when it drives forward for 2.0 seconds. Additional information can be found the Solution to Challenge Extension section below.

5. Additional tips about coding with mBot can be found in the Activity 1 Instructor Information.

Sample Program

First Drive

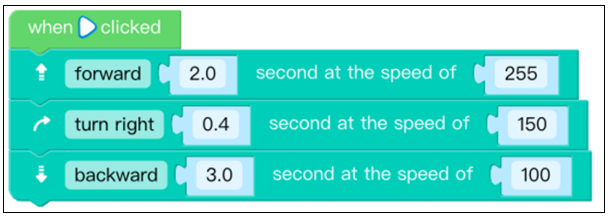

FIGURE 1

Solution to Challenge Extension

Students are challenged to plan the most efficient route for their mBot to deliver packages to four different locations. Most students will determine the times for each move/turn block simply through trial and error. You may suggest they create a table that lists how long mBot moves and how far it travels during that time. Then, when students need mBot to travel a certain distance, they can look up a similar distance in their table and use the corresponding movement time. We created the following example table based on data we collected for our mBot driving at "fast" speed (150) on carpet:

Time moving (seconds)	Distance traveled (cm)
1	18
2	36
3	56
4	74
5	93
6	112

An mBot running our sample solution will successfully deliver boxes to a the locations marked on the illustration in the student activity.

FIGURE 2 Example solution for the Challenge Extension