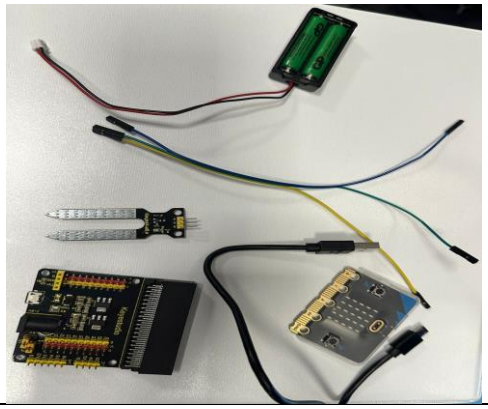
Activity
Lesson Plan

Activity Name	Lesson Name	Lesson #
Soil Moisture	Micro:Bit Soil Moisture Sensor Reading	2

Lesson Description:	In this lesson, the students will learn how to connect and program a soil moisture sensor with the micro:bit V2. The micro:bit will display live moisture values on its LED grid when the sensor is inserted into soil. This activity demonstrates how to use external hardware with micro:bit and introduces students to real-world IoT-style applications.

Lesson Objective(s):	The learner will create a soil moisture sensor system that displays soil hydration values (0-100) on the micro:bit LED display, while exploring the use of sensors, wiring, and coding with MakeCode.

Equipment & Supplies	• 1 x micro:bit (V2 recommended) • 1 x Soil Moisture Sensor • 1 x micro:bit Sensor Shield V2 • 3 x Jumper Wires • 2 AAA batteries and a micro:bit battery holder • 1 USB-C Cable • Access to a computer with internet access and a running camera • Small cup/pot of soil for testing

Room Preparation & Materials Setup	The stations for the attendees need to include a computer for each with the whole kit (micro:bit, sensor shield, soil moisture sensor, jumper wires, USB-C cable, battery pack). A small soil sample should be available at each station for testing. You will need a large screen connected to your computer so attendees can follow the code and wiring demonstration comfortably. 

Instructional Steps	Facilitation Tips:
1. Firsty, we need to access our GitHub repository. Open the the github repository WestHoustonInstitute/Introduction-to-Electronics-on-microbit on your own screen first and confirm all attendees are in the correct repository: *2-Microbit_Soil-Moisture_Sensor_w_3D-Printable-Case* 2. Now they have two options, they can either download the .hex file like the first lesson(Microbit Name Badge), or they can build the program using the .pdf guide in the repository, it is up to you to decide. You can ask them which they prefer. Show attendees where the *1-)Software_Setup* folder is and guide them to download the *.hex* file. Point out the download button location. 3. If they have choose to create the code following the instructions, they will open a blank MakeCode project. If they choose to import it from the .hex file, demonstrate how to import the *.hex* file into the MakeCode editor on your screen before asking participants to do it. 4. In this step, participants will wire the soil moisture sensor cables to the micro:bit shield. While participants wire the soil moisture sensor, walk around to check they connect **VCC → 3V, GND → GND, SIG → Pin 0** correctly. 5. Now, everything should be ready to use the sensor. Remind participants to press **Button A** after inserting the probe into soil to see the readings. 6. Encourage testing in both dry and wet soil samples for comparison.	The best setting to do this module activity is a "computer lab" where each participant has their own computer and the instructor also has a computer connected to a large screen that every participant can follow comfortably. The best way to track the success of the participant is to go and see their screen after each instruction step if it is doable (the number of attendees matter in this).

Lesson Reflections	Future Actions