Lesson: Soil Moisture#3

Big Picture

This lesson will allow students to build a program that will read the soil moisture value and display that value onto the screen by using a given soil moisture sensor. The students will also keep track of the data by logging the data to an SD card.

Objectives

Students will be able to:
- Connect a soil moisture sensor and read a value
- Collect and log data to an SD card

Alabama Standards Alignment

8 (Fifth Grade): Demonstrate the programs require known starting values that may need to be updated appropriately during the execution of programs

- Examples: create a program that sets a variable to an initial value then later updates (changes) the value of the variable.

21 (eighth grade): Data

- Examples: Differentiate types of data storage and apply most efficient structure.

20 (sixth grade): Identify data transferring protocols, visualization, and the purpose of data and methods of storage

- Examples: Using an online collection tool or form to collect data that is then stored in a spreadsheet or database.

17 (Fourth Grade): Demonstrate an appropriate level of proficiency in performing tasks using a range of digital devices.

-Examples: Collect and record data, print, use send command, connect to internet, or search; Use probes, sensors, printers, robots, or computers.

7 (Fifth Grade): Identify Variables.

- Examples: Determine if a variable is required for use later in the program.

Links to Resources

Online Moisture Sensor tutorial: https://youtu.be/S8NppVT_paw

SparkFun gator:log Hookup Guide: https://learn.sparkfun.com/tutorials/sparkfun-gatorlog-hookup-guide/hardware-overview

Preparation

The following files will be needed:
- Soil_Moisture3_student_handout: Tutorial handout found on lesson page

Choose a presentation method:
- Instructor can walk the students through using the student tutorial handout

- Students can work at their own pace using the tutorial handout. You may also post the video and tutorial locally and allow students to choose.

Materials Required

Each student (or pair of students) requires:

- Tutorial handout
- micro:bit kit
- USB cable
- Internet connected computer with modern browser
  Note: Browsers known to work with micro:bit software includes Firefox, Chrome, Safari, and Microsoft Edge
    - *For a complete list, visit this page:* https://makecode.microbit.org/browsers
- gator:soil - micro:bit Accessory Board
- gator:log -micro:bit Accessory Board
- gator:bit v2.0 – micro:bit carrier board
- MicroSD card
- MicroSD USB reader
- Eight Crocodile Clips

Vocabulary and Concepts

- Soil Moisture Sensor: sensor that estimate volumetric water content
- Portability – The ability of a user to export data, information, or software entered into or created by a software application or computing platform so it may be used in other applications or platforms.

Teaching Guide

Getting started (10 mins)

Tell the class that they will be logging data today. Before they start programming, everyone needs to learn a few new vocabulary words and concepts that are important for makers of digital artifacts.

Activity (40 mins)

The class is now ready to create their soil moisture logging program. Use your chosen method to demonstrate how to complete the activity. After students get the soil moisture values into a file, allow them time to experiment with the software and micro:bit.

Wrap Up (5 mins)

Review the vocabulary terms

Soil Moisture Sensor: sensor that estimate volumetric water content.

Portability: The ability of a user to export data, information, or software entered or created by a software application or computing platform so it may be used in other applications or platforms.

Ask the Students why would we need to save the information/data into a SD?

- Increased storage
- Cost effective
- SD is removable and portable