

# Lesson: Soil Moisture#1

## **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.

## **Objectives**

Students will be able to:

- Connect a soil moisture sensor to read a value and display to the micro:bit screen.

## **Alabama Standards Alignment**

7 (Fifth Grade): Identify Variables.

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

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.

## **Links to Resources**

Online Moisture Sensor tutorial: [https://youtu.be/S8NppVT\\_paw](https://youtu.be/S8NppVT_paw)

## **Preparation**

The following files will be needed:

- Soil\_Moisture1\_student\_handout: Tutorial handout found on lesson page

The following file is optional:

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 EdgeFor a complete list, visit this page: <https://makecode.microbit.org/browsers>*

- gator:soil - micro:bit Accessory Board
- Three Crocodile Clips
- Dry soil and wet soil
- Container for the soil

### **Vocabulary and Concepts**

- **Soil Moisture Sensor:** sensor that estimate volumetric water content.

### **Teaching Guide**

#### Getting started (10 mins)

Tell the class that they will create a program with a soil moisture sensor. 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 sensor program. Use your chosen method to demonstrate how to complete the activity. After students get the soil moisture value displaying on the screen, allow them time to experiment with the software on their own by letting them change the button or pin values. Let students record their results and share with the class.

#### Wrap Up (5 mins)

Review the vocabulary terms

**Soil Moisture Sensor:** sensor that estimate volumetric water content.

**Tell the students on how the sensor determines if the soil is dry or wet:**

The soil itself has some electrical resistance which depends on the amount of water and nutrients in it. It acts like a variable resistor in an electronic circuit. The water is not conductive, but the nutrient content is. The combination of water and soil nutrients makes the soil have some conductivity. So, the more water there is, combined with the nutrients, the less the soil will have electrical resistance.