

# Lesson: Soil Moisture#4

## Big Picture

This lesson will allow students to build a program that will read the soil moisture value and display that value onto the LCD screen with a loop by using a given soil moisture sensor.

## Objectives

Students will be able to:

- Connect a soil moisture sensor and read a value while using a loop.
- Connect LCD screen and display data onto the LCD 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.

3c (Ninth Grade): Distinguish when a problem solution requires decisions to be made among alternatives, such as selection constructs, or when a solution needs to be iteratively processed to arrive at a result, such as iterative “loop” constructs or recursion.

## 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\_Moisture4\_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
- Flexible Qwiic cable
- LCD screen
- Edge I/O Adapter
- Breadboard

### **Vocabulary and Concepts**

- **Soil Moisture Sensor:** sensor that estimate volumetric water content
- **Iteration (loop):** A repetitive action or command typically created with programming action of doing something repeatedly.
- **LCD (Liquid Crystal Display ):** A type of flat panel display that can let light go through it, or can block the light

### **Teaching Guide**

#### Getting started (10 mins)

Tell the class that they will create a program with a soil moisture sensor and displaying data to the LCD screen. 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 with the LCD screen. 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 and micro:bit by messing with the x and y coordinates, displaying different text, or turning on and off the backlight.

#### Wrap Up (5 mins)

Review the vocabulary terms

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

**Iteration (loop):** A repetitive action or command typically created with programming action of doing something repeatedly.

**LCD (Liquid Crystal Display):** A type of flat panel display that can let light go through it, or can block the light

**Ask the students what they think the advantages of the LCD screen**