

Lesson: Sunlight Sensor

Big Picture

This lesson will introduce UV sensors and extend student's knowledge of the BBC micro:bit microcontroller hardware and *Javascript Blocks Editor* software tool. Students will create a program that contains a function which will read a value using the UV sensor and log that value to a csv file.

Objectives

Students will be able to:

- Define UV sensor
- Define Function
- Define Initialize

Alabama Standards Alignment

1 (Eighth Grade): Design a function using a programming language that demonstrates abstraction

-Example: Create a program that utilizes functions in an effort remove repetitive sequences of steps

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

Micro:bit Temperature Sensing: <https://youtu.be/mrHn8eZ9egg>

Preparation

- Light_Sensor_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
- MakeCode editor

- 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>*

- UV sensor
- Data logger and SD card
- Gator board
- Alligator wires

Vocabulary and Concepts

UV Sensor: a device that measure ultraviolet light from the sun

Function: A named piece of code that can be called over and over again, sometimes called procedures or methods; a segment of code that includes the steps performed in a specified process.

Initialize: To set something (such as a computer program counter) to a starting position, value, or configuration.

Teaching Guide

Getting started (10 mins)

Tell the class that they will create a micro:bit program with a Temperature Sensor today. Before they start programming, everyone needs to learn the new vocabulary terms. The terms and ideas are explained in a short video (Introduction to microbit.mp4) that ends with an overview of the micro:bit hardware.

Activity (40 mins)

The class is now ready to create their micro:bit with the light sensor . Use your chosen method to demonstrate how to complete the activity. Students should be able to start the program and the uv light sensor should read a value and store that value into a separate file. Make sure setting the UV and writing to the file is in a function and the function is called. Let the students experiment with the program. It is important to build a sense of accomplishment early in CS Making so that students will be engaged quickly and are more likely to persevere when projects become more challenging.

Wrap Up (5 mins)

Review the 3-vocabulary words.

UV Sensor: a device that measure ultraviolet light from the sun

Function: A named piece of code that can be called over and over again, sometimes called procedures or methods; a segment of code that includes the steps performed in a specified process.

Initialize: To set something (such as a computer program counter) to a starting position, value, or configuration.

If time permits, ask the students what are the advantages of writing to a file?