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/mrHn8eZ9eqg>

**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?**