

Lesson: Temperature Indicator #2 (Thermometer)

Big Picture

This lesson will introduce built in sensors while allowing students to be more acquainted with the BBC micro:bit microcontroller hardware and Makecode *Blocks Editor* software tool. The students will create a program that will convert the temperature from Celsius to Fahrenheit and display the Fahrenheit temperature onto the micro: bit screen once button A is pressed on the microcontroller.

Objectives

Students will be able to:

- Define Variable
- Define Sensor
- Define temperature sensor

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

Micro:bit Temperature Sensing: <https://youtu.be/mrHn8eZ9eqg>

Preparation

- Temperature indicator2_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>*

- Source of heat or cooling (ex. Fan), useful if you would like to test by changing temperature quickly (optional)

Vocabulary and Concepts

Variable: An element, feature, or factor that is liable to change; in a programming language, a symbolic representation of some state or property of the program.

Sensor: An input device that reads or measures a physical property and converts it to a numerical value.

Temperature Sensor: a sensor that measures the temperature in degrees Celsius (scientific units)

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.

Activity (40 mins)

The class is now ready to create their micro:bit with the sensor . Use your chosen method to demonstrate how to complete the activity. Make sure students are having the temperature displayed after button A is pressed. Once students get a temperature displayed on the screen, allow them time to experiment with the micro:bit with warmer or colder temperatures by using a source of heat or cooling to quickly change the temperature. Encourage students to share their temperatures with the class. 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.

Variable: An element, feature, or factor that is liable to change; in a programming language, a symbolic representation of some state or property of the program.

Sensor: An input device that reads or measures a physical property and converts it to a numerical value.

Temperature Sensor: a sensor that measures the temperature in degrees Celsius (scientific units)