Teacher: Steve Sabaugh

Unit Plan: Functions, Booleans, and User Input on the micro:bit

Grade and Content: 9th-grade Engineering

Date: 5/31/2023 Day 1 of Functions Unit

Lesson: Intro to Programmer Defined Functions with the BBC micro:bit Microcontroller

Overall Goal/Objective of Lesson: Students will learn about modular programming. They will create their own functions and understand how functions improve program organization and allow for code reusability.

Content Objectives (nouns) -Students will understand the role of functions in programs -Students will understand that the role of parameters in functions -Students will understand the difference between void functions and those that return a value -Students will understand the concept of "hard coding" values for rapid algorithm testing	**Assessments** Call on students for review of key concepts
Skill Objectives (verbs/Common Core Standards) - Students will be able to define function, parameter and return - Students will be able to to create function definitions in micro:bit IDE - Students will be able to create a program that solves the Pythagorean Theorem using functions (with a return value and parameters). - Students will be able to create a void function that displays a simple animation	**Assessments** Students will create a program in the micro:bit IDE that creates two functions. One function will return the value of the length of the hypotenuse of a right triangle, a void function that displays a simple animation of a flashing hypotenuse of a triangle and then gives the length of the hypotenuse. Students will create 2 variables with hard coded values for 'base' and 'height.' They will call their two factions in a button event.

Key Content Vocabulary:
Function (subroutine and method are synonyms)
void
parameter (formal and real)
return statement

Materials

Chalk Board, Smartboard for projection, Chromebooks
'Assignments With Notes and Announcements' Google sheet
Students Flask web page

Time Allotment	Anticipatory Set	Plans for Differentiation/ Culturally Responsive Instruction
3	1. **Do Now:** Students will log into the google classroom. Get there 'Assignments With Notes and Announcements' doc open. Look on your website journal for Magic 8 Ball assignment's vocabulary list.	

	Mini-Lesson/Direct Instruction (with Modeling)	Plans for Differentiation/ Culturally Responsive Instruction
12	1. **Mini-Lesson:** Functions. Ask students to define function from previous lesson. Programmer Defined function. Morning routine, evening routine example. Formal parameters. Return statement. Pythagorean Theorem. Hard coded values.	-A guided lesson will be provide to all students. -Modeling is done so students can see how to use this strategy -Problems are dissected and explained in detail as I model the strategy
5	2. **Modeling:** I will demo how to create a function in micro:bit. How to add formal parameters. How to drag those parameters into their function definitions. Finally how to call a function either void or one that returns a value.	

	Independent Practice (with Teacher Monitoring)	Plans for Differentiation/ Culturally Responsive Instruction
20	1. **Independent Assessment:** Students will work independently on 'functions' program in micro:bit	-All students will have a step-by-step guide to work from including pictures. -myself and co-teacher are available for direct assistance

	Closure	Plans for Differentiation/ Culturally Responsive Instruction
5 minutes	1. **Share-Out:** Teacher will ask students to review concepts they have learned in their own words and explain the assessment for tomorrow's lesson	