Fairfax Collegiate
2026 Summer Program
MicroBit Lab Course Syllabus
Rising Grades 4-6

Course Description

Discover hardware and coding.

Use a block-based language to program the MicroBit, a tiny computer.

Create animations, music, mini-games, digital nametags, and LED dice.

Learn about variables, boolean logic, conditional statements, and loops.

Students develop their interest in programming, electronics, and games and gain a gentle introduction to how computer devices sense and respond to the world. Instruction combines guided practice with project-based exploration as students work through a sequence of beginner-friendly activities.

Using the MakeCode platform, students create animations, text displays, and simple games, then expand into motion-based programs, music projects, and interactive tools powered by sensors. They experiment with variables, logic, randomness, and even beginner-level Python as they take on challenges like activity pickers, reaction-time tests, step counters, and environmental trackers. Fairfax Collegiate provides laptops and MicroBit circuit boards for students to use.

At the end of the course, students can access their MakeCode account at home to view and continue customizing their projects, or to keep exploring coding and electronics on their own.

Learning Objectives

Course Goals	**What Is a Microcontroller?:** Students learn what a microcontroller is and identify parts of the micro:bit. **Coding Basics With MakeCode:** Students learn how to use block-based programming to create visual outputs. **Inputs, Outputs, and Sensors:** Students explore how devices take input and give output using buttons, lights, and sensors.

	Programming With Logic: Students learn programming concepts like variables, conditions, and loops. **Exploring Real-World Applications:** Students apply sensors and inputs to real-life uses of computers and microcontrollers. **Introduction to Non-Block Coding:** Students are introduced to Python and understand the link between block coding and practical languages.
Course Topics	**Getting to Know Micro:bit:** Students explore the micro:bit and identify its key components. **Intro to MakeCode & LEDs:** Students create simple LED animations while learning the MakeCode language. **Buttons and Inputs:** Students build programs that respond to physical input / button presses. **Displaying Text:** Students learn how to display and animate text on the micro:bit. **Games and RNG:** Students start to make simple games, especially utilizing randomness. **Motion and Tilt Sensors:** Students use the accelerometer to detect shaking, tilting, and movement. **Sound and Music:** Students use the music blocks to play tones and songs on the micro:bit. **Variables and Score Keeping:** Students learn to store and update information dynamically using counters. **If/Else Logic:** Students use conditions to control the micro:bit's behavior. **Python on the Micro:bit:** Students explore the Python version of simple MakeCode programs. **Real-World Sensors & Data:** Students explore temperature and light sensors to monitor environments. **Machine Learning:** Students train simple learning models to recognize patterns in data.

Course Schedule

Class Meeting 1	**Introductions & Exploring the MicroBit:** Students get to know each other with basic information about themselves and any coding/tech experience. Instructor then guides students in learning the parts of a MicroBit. **Starting Up the MicroBit:** Students connect the micro:bit to a computer, navigate MakeCode, and write their first program to light up a shape on the LED grid. **Animating With LEDs:** Students use the MakeCode loop and LED blocks to animate a face that changes expression, learning how forever and pause blocks work.
Class Meeting 2	**Coding Concepts and Syntax Overview:** Students learn what several of the most important code blocks do so that they have a foundation for future activities.

	Interactive Name Badge: Students build a scrolling text badge that shows their name and a symbol when buttons are pressed. They customize it to reflect their personality. **Activity Picker:** Students build an activity selector: press button A to randomly choose from a set of student-defined options, using variables and branching logic. **Rock, Paper, Scissors Game:** Students create a random number generator with the micro:bit and map it to rock, paper, or scissors icons. They test it by playing against classmates.
Class Meeting 3	**Shake, Tilt, and Move:** Students use the accelerometer to detect motion. They program outputs based on shaking or tilting the micro:bit and explore how motion changes behavior. **Micro:bit Step Counter:** Students track how many times they shake the device using variables. They experiment with making a basic fitness tracker.
Class Meeting 4	**MakeCode Music Lab:** Students use sound blocks and plug in buzzers to create songs with MakeCode. They play back tones based on button inputs. **Micro:bit Music Box:** Students create a personalized song or sound sequence and add visual effects to accompany the music using LEDs.
Class Meeting 5	**Scoreboard & Timer:** Students learn to track score and time using variables and logic. They learn to provide feedback via the LED display. **Button Quiz Game:** Students use input buttons, variables, and conditions to build a simple quiz game where the player must press A or B to answer questions.
Class Meeting 6	**Reaction Time Tester:** Students design a game that measures how fast a player can press a button after a random delay, using loops, variables, and conditionals. **LED Chase Game:** Students make a “chasing light” game where users must press a button at the right time to win. They enhance it with scorekeeping.
Class Meeting 7	**Intro to Python:** Students explore how block-based MakeCode translates into Python. They write simple Python scripts and run equivalent versions of previous projects.
Class Meeting 8	**Real-World Sensors:** Students collect data from the micro:bit's temperature and light sensors and display readings on the LED screen. They compare results across the room. **Weather Station Project:** Students build a basic weather station or environmental tracker using light and temperature sensors, with visual cues for different conditions.
Class Meeting 9	**Simple AI Exercise Timer:** Students use micro:bit's CreateAI feature to train a machine learning model that detects “active” vs. “inactive” exercising motions. **Final Project Brainstorming:** Students brainstorm for the final project, including what inputs, outputs, and logic will be used. Ideas must be approved before starting to code.
Class	**Final Project:** Students develop their interactive program/game with support from the instructor.

Meeting 10	Students test and play each other's games once finished.