



## Course Description:

Throughout the lesson sequence, students explore hands-on automation and manufacturing concepts such as programming, sensors, motors, assembly lines, and more! By the end of the course, students will use a Micro:bit and a suite of sensors, motors, and conveyors to program a completely autonomous manufacturing process.

## Equipment, Curriculum, and Training Available:

- 15 Lesson Hours
- Curriculum and supporting materials
- Ongoing product and curriculum support
- Professional development
- Facilitation by a trained STEM instructor (optional)

Lesson	Learning Target Examples
1: Introduction to Automation Controllers	Learn about controllers used to control automation processes.
2: Introduction to Automation Programming	Make connections between the code blocks and automation programming languages.
3: Micro:bit Driver Expansion Board	Learn to install extensions on the MakeCode coding platform.
4: Variables in Programming	Learn about and use variables in a program.
5: Conditionals in Programming	Learn about and use conditionals (If-Then, If Else-if Else), comparators, and Boolean logic.
6: Looping in Programming	Learn when it is appropriate/useful to use a loop in a program.
7: Wireless Communication	Use the radio code blocks to send data wirelessly to a second Micro:bit microcontroller.
8: Servos Part 1	Create a code to control the servo in conjunction with an ultrasonic sensor.
9: Servos Part 2	Create a code to control the servo using a collision switch sensor.
10: Extensions: SEN-Color	Use machine learning to program/calibrate a color sensor.
11: Color Sensor Servo Sort	Program the color sensor in conjunction to control a servo to sort blocks.
12: Auto-Hopper Servo Sort	Learn about automation of a sorting line and controlling multiple outputs.
13: Conveyor Motor Calibration	Actively calibrate the conveyor belt motor to understand speed, timing, and direction to be used in the automation processes.
14: Automatic Color Block Sorter	Build a device which will automatically detect and sort three different colored blocks into respective bins.
15: Automation with Radio Communication	Use radio communication between the two Micro:bits to create a more functional, autonomous sorting machine.