

# Unit 4.2: Introduction to Microcontrollers

Content Area: **Science**  
Course(s): **Digital Electro**  
Time Period: **Semester 2**  
Length: **3 weeks**  
Status: **Published**

## Standards

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TEC.9-12.8.2.12.F Resources for a Technological World  
TEC.9-12.8.2.12.G The Designed World

## Enduring Understandings

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### Understandings

*Students will understand that ...*

1. Microcontrollers are used to control many everyday products like robots, garage door openers, traffic lights, and home thermostats.
2. Microcontrollers manage inputs and outputs through a programming language and how the device is wired
3. A servo motor is one that delivers continuous motion at various speeds.
4. Microcontrollers can be programmed to sense and respond to outside stimuli.

## Essential Questions

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*Students will keep considering ...*

1. Why are microcontrollers such a valuable tool today in electronics?
2. What are the components and processes associated with programming microcontrollers to control real world systems?

## Knowledge and Skills

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### Knowledge

*Students will ...*

1. Identify everyday products that contain microcontrollers.
2. Know the key components to a programming language for a microcontroller.
3. Identify and describe a servo motor.
4. Know what Pulse Width Modulation (PWM) is and how it is used to control a motor.

### Skills

*Students will ...*

1. Program a microcontroller to control a servo.
2. Program and test a microcontroller to control a real system based on inputs.
3. Use mathematics to calculate programming values.

## **Resources**

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### **Technology Resources**

- National Instruments Multiim circuit design and simulation software
- Microsoft Office Applications

### **Electronics Resources**

- Electronics Trainers (power supply, function generator, breadboard)
- Electronics hand tools (diagonal cutters, needle-nosed pliers, wire strippers, etc.)
- Digital Multimeters
- Digital Transistor-Transistor Logic (TTL) integrated circuits
- TTL Chip Checker
- Dual Channel Oscilloscope
- Digital/Analog Function Generator
- BOEBOT Microcontroller Kit

## **Assessments**

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[https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9\\_BiAmONWbTcl/edit?usp=sharing](https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcl/edit?usp=sharing)

## **Modifications**

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<https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fit8XsUIe3K1VSG7nxuc4CpCec/edit?usp=sharing>