Unit 4.2: Introduction to Microcontrollers

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

Standards

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

Enduring Understandings

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

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

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

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

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit?usp=sharing