Unit 8: Computer Science and Coding

Content Area: **Technology**
Course(s): **Engineering Design 1**
Time Period: **April**
Length: **12 blocks**
Status: **Published**

Enduring Understandings

1. Computing enables people to use creative development processes to create solutions to problems.

2. Computers are the brains behind much of the technology we use today.

3. Coding is an essential skill for the 21st century.

4. Programmable and controllable robotics is the future of manufacturing and the production of goods.

Essential Questions

1. How are electrical circuits a part of everyday life?

2. How are eletrical circuits controlled manually?

3. How are electrical circuits controlled with programmable modules?

4. Where are programmable robots used?

5. How has system control technology and robotics systems change the way we manufacture products?

6. What are the ethical considerations in regards to robotic manufacturing?

Content

Vocabulary:

Binary, Variable, Block-based, Function, Command, Condition, Define, For loop, If-statement, Input, Output, Iteration, While-loop, Servo motor, Sensor, Port, Flow chart, Sequence

Skills

1. Describe the future of computing in regards to manufacturing.

2. Create a "flow chart" program that performs a simple task.

3. Create a program that utilizes an input to control an output.

4. Create a program that utilizes a variable inout to determine the value of a variable output.

5. Create a program that contains an "IF-THEN" statement.

6. Create a program that contains a "WHILE" loop.

7. Create a program that accomplishes a simple open-ended task.

8. Present a solution to an open-ended programming challenge to a group of peers for review.

Resources

Engineering drawing tools (various)

Engineering drawing paper

Calipers

Physical objects to be measured

Teacher presentation device

Document camera

Desktop computers

Research database access

2D & 3D CAD systems

3D printer

Laser cutter

Color laser printers

Large format printer

Prototyping equipment (hand-held and power tools)

Prototyping materials

Prototyping furniture

Presentation device

Standards

TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.2.12.B.4	Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.
TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
TECH.8.2.12.D.4	Assess the impacts of emerging technologies on developing countries.
TECH.8.2.12.D.CS1	Apply the design process.
TECH.8.2.12.D.CS3	Assess the impact of products and systems.