

11 Introduction to Electronics and Programming

Content Area: **Technology**
Course(s):
Time Period: **Full Year**
Length: **4 Weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

This full year honors course continues to emphasize the application of integrated STEM (Science, Technology, Engineering and Mathematics) principles and the design method to invent solutions to real world problems through robotic applications. Students will identify problems, research, design and fabricate solutions. Problem solving, critical thinking and design skills are taught through a variety of activities. Hands-on themes include structural and robotic systems, as well as system control technology. This course provides all students with valuable skills such as: problem solving, design, creative thinking, systems thinking, team work, documentation, programming and computer applications.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand how to create and power circuits utilizing electronics components, and how to write basic code using a programming language, and integrate it into electronic hardware, for the purpose of solving a problem.

CONTENT AREA STANDARDS

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.CS1	Apply the design process.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CCSS.Math.Practice.MP1	Make sense of problems and persevere in solving them.
CCSS.Math.Practice.MP3	Construct viable arguments and critique the reasoning of others.
CCSS.Math.Practice.MP4	Model with mathematics.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP11	Use technology to enhance productivity.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- They must be able to create and power circuits utilizing electronics components.
- They are required to write basic code using a programming language, and integrate it into electronic hardware, for the purpose of solving a problem.
- Identifying and describing a variety of electronic components including: breadboards, resistors, LEDs, jumpers, switches, motors and transistors, is essential to creating working circuits.
- There are a variety of programming languages, and they should be able to assess the problem to solve before choosing a programming solution.

Procedural Knowledge

Students will be able to:

- Duplicate and explain simple electronic circuits.
- Duplicate and write code for electronic circuits.
- Redesign electronic circuits and code in order to problem solve.

EVIDENCE OF LEARNING

Formative Assessments

- Component quiz
- Resistor value quiz
- Electronic Activities Worksheet #1
- Electronic Activities Worksheet #2
- Coding Activities Worksheet #1
- Transistor Quiz

Summative Assessments

- Transistor Coding Design Problem
- Unit Test

RESOURCES (Instructional, Supplemental, Intervention Materials)

- Teacher notes and quizzes: electronic components and resistor values.
- Teacher produced electronic and coding worksheets.
- www.tinkercad.com
- Transistor Coding Design Problem Rubric
- Arduino Projects Book

INTERDISCIPLINARY CONNECTIONS

- Modeling with Mathematics and Make sense of problems and persevere in solving them.

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.