Unit 3: Introduction to Electronics

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **10 days**
Status: **Published**

Summary

In this unit students will learn about the basics of electronics including components, resistors, breadboards, current, resistance, and circuitry. Students will design and operate circuits using a variety of components that will modify and affect the output while making connections to the electronic and digital devices that they interact with at home and in school.

Revised: July 2026

5.2	Utilize positive communication and social skills to interact effectively with others
TECH.K-12.1.4.c	develop, test and refine prototypes as part of a cyclical design process.
TECH.K-12.1.5.c	break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
8.2.8.ED.5	Explain the need for optimization in a design process.
8.2.8.ED.7	Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).

Essential Questions/Enduring Understandings

Essential Questions:

How do electronic devices impact our lives?

Why is sequence so important when working with a circuit?

How do components affect a circuit's output?

Enduring Understandings:

Technology is developed and improved through systems, components, and processes that work together to meet human needs, including electrical and electronic systems.

Technology can have both positive and negative impacts on people, society, and the environment.

Objectives

Students will know that electronics is the branch of technology concerned with the design of circuits.

Students will know the definition of resistance and how it is measured.

Students will know the definition of current and how it is measured.

Students will know the parts of an atom.

Students will know what an LED (light-emitting diode) is and how it is used in a circuit.
Students will know that technology changes based on our wants and needs.

Students will know the difference between a series circuit and a parallel circuit.

Students will be skilled at building a successful circuit using a variety of components, including potentiometers, resistors, speakers, photoresistors, and diodes.

Students will be skilled at designing, testing, and refining circuits to meet specific criteria and constraints.

Students will be skilled at safely assembling, testing, and evaluating electrical circuits using a variety of components.

Learning Plan

Electronics Introduction: Students will be introduced to the foundations of electrical circuits through videos, readings, diagrams, and guided activities. Students will learn key concepts, including atoms, current, voltage, resistance, power, and basic circuit design. Instruction will include direct teaching, vocabulary development, and visual supports such as demonstrations and resistor color code instruction.

Introduction to Tinkercad Electronics: Students will be introduced to the Tinkercad Circuits platform and learn how to access the class workspace, create new circuits, add and connect components, and simulate and save designs. Students will develop foundational skills in digital circuit construction and testing.

Basic Circuitry Projects:

- Resistor Circuit: Students will build and simulate a simple resistor circuit using a fixed resistor. Students will observe how resistance affects circuit performance and record observations through guided notes.
- Potentiometer Circuit: Students will construct a circuit using a potentiometer to explore variable resistance. Students will analyze how adjusting resistance impacts circuit output.
- Photoresistor Circuit: Students will design a circuit using a photoresistor to investigate how light affects resistance and circuit behavior.
- Speaker Circuit: Students will build a basic speaker circuit and explore how electrical signals produce sound. Extension opportunities may include exploring tone generation using integrated circuits.
- Diode Circuit: Students will construct a diode circuit and investigate how polarity affects current flow. Students will test circuit directionality through simulation.

Playdough Circuit: Students will extend their understanding of circuits by building conductive playdough circuits. Students will construct simple series and parallel circuits using LEDs, batteries, and conductive materials. Through hands-on experimentation, students will compare digital (Tinkercad) and physical circuit behavior, analyze conductivity, and troubleshoot design issues. Students will observe how circuit connections and material properties affect performance.

Micro:bits: Students will be introduced to the Micro:bit as a programmable microcontroller used in modern electronic systems. Students will explore block-based coding to create simple programs that control LEDs, sounds, and inputs such as buttons or sensors. Through guided challenges, students will design, test, and modify programs to understand how coding connects to real-world electronic systems.

Micro:bits-Applied Challenges: Students will apply coding and circuit knowledge to design interactive Micro:bit projects such as animations, sensors, or simple response-based systems. Students will test, debug, and refine their programs to improve functionality.

Assessment

Formative Assessments:

Google Forms

Guided notes

Class questioning and discussion

Benchmark Assessments:

Structured circuit-building (Tinkercad and/or physical circuits)

Skill-based circuit challenges (resistor, potentiometer, photoresistor, diode, speaker)

Summative Assessment:

Circuit results and observations documents

Final circuit design and analysis project (build, test, and explain circuit performance using data/observations)

Alternate Assessments:

Teacher observation checklists (lab skills, collaboration, safety, process use)

Structured questioning and verbal explanations of circuit function

Materials

Guided note packets/Google Docs (teacher developed)

Technology (student & teacher laptops, SmartBoard)

Google Slides/PowerPoints

Worksheets/notes

YouTube links

Micro:bits

Electrical circuitry kits and accessories

Integrated Accommodation and Modifications

See attached document:

https://docs.google.com/spreadsheets/d/1elkfGwG4CoxIRxyxZ6eem_INsnuGIXXiG4CkOug9_wg/edit?usp=sharing