

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT



Sparks and Circuits

Board Approval Date: November 21, 2024	Course Length: 1 Semester
Grading: A-F	Credits: N/A
Proposed Grade Level(s): 6, 7, 8	Subject Area: Elective Elective Area (if applicable): Science
Prerequisite(s): None	Corequisite(s):
CTE Sector/Pathway: Engineering and Architecture/Engineering Technology	
Intent to Pursue 'A-G' College Prep Status: No	
A-G Course Identifier:	
Graduation Requirement: No	
Course Intent: Program (if applicable):	
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COURSE DESCRIPTION:

In the Sparks and Circuits course, students delve into the intricacies of electricity, investigating the behavior and components of atoms, alongside the mechanics of sensing devices, all through interactive and immersive projects. They gain comprehensive knowledge and skills in fundamental circuitry design and explore the profound impact of electricity on the surrounding world. Furthermore, this class will integrate into the CTE Industry Sector of Engineering and Architecture and the CTE Pathway for Engineering Technology offered in high school.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. What is Electricity?	How do electric charges interact, and what are the fundamental principles underlying their behavior? How is electricity generated, and what are the various methods used to produce it on a large scale?	*Test conductivity of various substances *Describe the difference between static and current electricity *Describe how atomic structure affects electrical properties	*Build an electromagnet and DC Motor
2. Electronics and Circuits	What are the basic components of an electrical circuit, and how do they contribute to the flow of electricity?	*Build series, parallel, and combination circuits *Read the value of resistors *Demonstrate Ohm's Law	*Simulate and build a working night light circuit
3. What is CTE?	What are the industry sectors and pathways in CTE? What careers are of interest and match my aptitudes? Why is it important to plan for high school, college and a future career? What skills and behaviors do employers expect?	*Research outlines and flow charts *Research the Career Technical Student Organization (CTSO) SkillsUSA and identify middle school offerings and competitions	*Career exploration research project to identify areas of interest, aptitudes, skills and education requirements using online resources (i.e., California Career Zone and CalCRN)
4. California's Career Technical Education - Industry Sector Standard	What is the <u>Engineering and Architecture</u> industry sector? What is the sub-pathway <i>Engineering Technology</i> about? What career opportunities are there locally and globally?	*Research outlines and flow charts *Research local and global job markets and college opportunities.	*Deeper dive into a project about a career and the skill sets needed for a particular area of the <i>Engineering Technology</i> career pathway.

ESSENTIAL STANDARDS:

Middle School NGSS Science Standards

Middle School NGSS Engineering Design Standards

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impact on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they met the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces

MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):

Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.

<https://www.cde.ca.gov/be/st/ss/documents/finaelacssstandards.pdf>

<https://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf>

Link to Framework (if applicable):

Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

Link to Subject Area Content Standards (if applicable):

Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.

California Career Technical Education Model Curriculum Standards - Engineering B3.0 Identify the fundamentals of the theory, measurement, control, and applications of electrical energy, including alternating and direct currents. B4.0 Understand the concepts of physics that are fundamental to engineering technology. B5.0 Understand how the principles of force, work, rate, power, energy, and resistance relate to mechanical, electrical, fluid, and thermal engineering systems.

Link to Program Content Area Standards (if applicable):

Program Content Area Standards apply to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

Link to Career Readiness Practice - Pages 18-19

[Career Technical Education Model Curriculum Standards](#)

Link to California Industry Sector Standards - Pages 9 - 11

Engineering and Architecture <https://www.cde.ca.gov/ci/ct/sf/documents/enginearchit.pdf>

TEXTBOOKS AND RESOURCE MATERIALS:**Textbooks**

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
		N/A				