



SPRING GROVE AREA SCHOOL DISTRICT



PLANNED COURSE OVERVIEW

Course Title: Electricity/Electronics Grade Level(s): 10-12 Units of Credit: .25 Classification: Elective	Length of Course: 15 cycles Periods Per Cycle: 3 periods Length of Period: 43 minutes Total Instructional Time: 32.25 hours
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Course Description

This course will provide an overview of electricity and electronics within our society. Basic electrical and electronic concepts, typical applications, safe practices, and related consumer information are included. Practice applications include bread boarding, use of test equipment, and assembly of printed circuit boards and electronic projects. Emphasis will be placed on electronic components and their functions, operations, specifications, and circuit applications. The students will pay a lab fee for this course.

Instructional Strategies, Learning Practices, Activities, and Experiences

Bell Ringers Teacher/Student Discussion Demonstrations	Working with Test Equipment Posted Objectives and Agenda Problem Solving Activities	Student Project Based Activities Guided Individual Practice
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Assessments

Group Laboratory Experiments Computer-Based Training Troubleshooting Activities	Constructive Response Independent Projects Final Exam	Ability to Measure Voltage, Current, and Resistance in a Lab Ability to Follow a Schematic Lab
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Materials/Resources

Electronics Lab Web-Based Research	Testing Equipment Tech Ed Resource Library	Computer Tutorials Basic Hand Tools
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Adopted: 9/16/92

Revised: 8/18/08; 5/21/18

Basic Electrical Concepts and Safety Requirements	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Equipment Safety B. Energy Concepts and Electrons C. Measuring Voltage, Current and Resistance</p>	<p>3.4.12.A2 ~ Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 ~ Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 ~ Apply the components of the technological design process. 3.4.10.C2 ~ Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 ~ Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 ~ Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 ~ Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 ~ Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 ~ Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Ohm's Law Calculations	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. AC and DC Voltage B. Resistance and Current C. Types of Wire and Insulators</p> <p><u>Related Vocabulary:</u> voltage current resistance polarity multi-meter circuit</p>	<p>3.4.12.A2 ~ Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 ~ Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 ~ Apply the components of the technological design process. 3.4.10.C2 ~ Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 ~ Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 ~ Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 ~ Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 ~ Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 ~ Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Magnetism and Motors	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Magnetic Force B. Coils</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Speakers and Voice Coils	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Sound Waves B. Frequency C. Cycles Per Second</p> <p><u>Related Vocabulary:</u> amplitude hertz wavelength amplifier polarity</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Wire Types and Connectors	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Wire Gage B. Outlets and Switches C. Safety Procedures</p> <p><u>Related Vocabulary:</u> voltage current resistance polarity multi-meter circuit</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Electronic Safety	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Static Electricity B. Heat Sink C. Working With Soldering Irons</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Identify and Place Components in a Circuit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Resistor Color Code B. Series and Parallel Circuits C. Digital Logic Circuits</p> <p><u>Related Vocabulary:</u> heat sink de-solder</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Schematic and Soldering Components	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Reading and Following Schematics Drawings B. Safe Soldering Procedures C. Component Care and Handling</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>

Principles of Electronic Troubleshooting	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Safety When Trouble Shooting B. Test Equipment C. Problem Solving Sequences</p> <p><u>Related Vocabulary:</u> resistor capacitor transistor diode</p>	<p>3.4.12.A2 - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3 - Demonstrate how technological progress promotes the advancement of science, technology, engineering, and mathematics (STEM). 3.4.10.C1 - Apply the components of the technological design process. 3.4.10.C2 - Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.12.C2 - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3 - Apply the concept that many technological problems require a multi-disciplinary approach. 3.4.10.D1 - Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2 - Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.12.E6 - Compare and contrast the importance of science, technology, engineering, and math (STEM) as it pertains to the manufactured world.</p>