SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Power Technology	Length of Course: 15 cycles
Grade Level(s): 9 - 12	Periods Per Cycle: 3
Units of Credit: .25	Length of Period: 43
Classification: Elective	Total Instructional Time: 32.25 hours

Course Description

This course will provide students with hands-on experiences in various ways we use energy and power. The students will gain an understanding of various energy sources and how they are used to produce power. Some lab activities include magnetic cars, electronic wiring, biodiesel and rocketry. Students must pay a lab fee for this course.

Instructional Strategies, Learning Practices, Activities, and Experiences

Teacher Demonstration	Formal Assessments	Bell Ringers
Online Tutorials/Resources	Guided Practice	Class Discussion
Critical Thinking		Flexible Groups

Assessments

Final Exam	Unit Projects	Skills Mastery Checklists
Student Portfolio	Design/Lesson Rubrics	

Materials/Resources

Web-Based Resources	SolidWorks Educational Package Installed on a Class Set of Computers	3D Printer Laser Cutter/Engraver

Adopted: 6/20/1990
Revised: 10/16/91; 8/18/08; 3/9/15; 5/21/18

Graphic Communications	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
A. Graphics B. Poster C. Page Layout D. Graphic Principles	The students will have the ability to design a simple graphic communication artifact such as a poster using computer graphic applications. The students will have the ability to critically examine the process when finished. 3.4.10.A3 ~ Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function. 3.4.10.B3 ~ Compare and contrast how a number of different factors, such as advertising, the strength of the economy, the goals of a company and the latest fads, contribute to shaping the design of and demand for various technologies. 3.4.10.B4 ~ Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention. 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. 3.4.10.D1 ~ Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.E4 ~ Evaluate the purpose and effectiveness of information and communication systems.

Computer Aided Design/Computer Aided Manufacturing (CAD/CAM)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
A. Parts B. Sketches C. Computer Aided Design (CAD) D. Computer Aided Manufacturing (CAM) E. Slicer F. 3D printer	The students will have the ability to design a simple part using computer aided design techniques and make the part into a physical object through computer aided manufacturing techniques. 3.4.10.A1 ~ Illustrate how the development of technologies is often driven by profit and an economic market. 3.4.10.A2 ~ Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems. 3.4.10.A3 ~ Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function. 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. 3.4.10.D1 ~ Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product.

Structural Design	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
A. Truss B. Structural Members C. Stresses	The students will have the ability to design and build a bridge structure using provided criteria. The students will test and analyze the structure and look at ways to make the structure stronger. 3.4.10.A2 ~ Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems. 3.4.10.A3 ~ Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function. 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. 3.4.10.C3 ~ Illustrate the concept that not all problems are technological and not every problem can be solved using technology. 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. 3.4.10.E6 ~ Illustrate how manufacturing systems may be classified into types such as customized production, batch production, and continuous production. 3.4.10.E7 ~ Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.

Rocketry	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	The students will understand the concepts, parts, and practices of model rocketry. The students will build and launch a small rocket. The students will have the ability to look critically at the process. 3.4.12.A1 ~ Compare and contrast the rate of technological development over time. 3.4.10.B4 ~ Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention. 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. 3.4.10.C3 ~ Illustrate the concept that not all problems are technological and not every problem can be solved using technology. 3.4.10.D2 ~ Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.10.E5 ~ Analyze the development of transportation services and methods and their impact on society.

Robotics	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
A. Design B. Operation C. Programming D. Artificial Intelligence *Enrichment and Expanded Opportunities: The students with a greater ability in this area will be expected and encouraged to apply knowledge and skills learned in this lesson by taking digital images according to guidelines. *Remediation and Intervention Strategies: The students with a lower ability in this area will receive greater assistance from the teacher and other students. The students will be offered assignments with a decreased level of difficulty. *Applies to Entire Course	At the end of the unit the students will understand, through experience, the following aspects of robotics: • Design • Operation • Programming • Artificial Intelligence 3.4.10.A1 ~ Illustrate how the development of technologies is often driven by profit and an economic market. 3.4.10.A2 ~ Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems. 3.4.10.A3 ~ Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function. 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. 3.4.10.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.