



SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW



Course Title: Introduction to Technology Grade Level(s): 9 Units of Credit: .25 Classification: Elective		Length of Course: 15 cycles Periods Per Cycle: 3 Length of Period: 43 minutes Total Instructional Time: 32.25 hours	
Course Description			
<p>This course will introduce a wide variety of technology education contents of study to the students. Introduction to technology will use a combination of class lecture, student projects, and cooperative student learning to study issues in the modern technological world. Topics of study will include the following: why technology is studied, explaining the impacts of technology, alternative energies, Computer-Aided Design and Drafting (CADD), engineering, electricity, electronics, and manufacturing technology.</p>			
Instructional Strategies, Learning Practices, Activities, and Experiences			
Cooperative Learning Experiences Formal Assessments	Critical Thinking/Problem Solving Teacher Demonstrations/Lessons SolidWorks Tutorials	Class Discussions Machine Safety Demonstrations/Lessons Hand and Power Tool Safety Demonstrations	
Assessments			
Constructed Response Formal Assessments	Presentations Summative Assessments	Cooperative Learning Projects Final Project Project Rubrics	
Materials/Resources			
Technology Education – Learning by Design	Hand/Power Tools	PowerPoint Presentations/SolidWorks	

Adopted: 8/18/2008

Revised: 5/18/2015; 5/21/18

Technology Concepts Unit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Components of the systems model B. Technological invention and an innovation C. Designing improvements for an existing technological device D. Negative and positive impacts of our use of technology</p> <p><u>Related Vocabulary:</u> systems model input output processes feedback invention innovation technological impacts</p>	<p>Science and Technology Standards 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. 3.4.12.A1 ~ Compare and contrast the rate of technological development over time. 3.4.10.B1 ~ Compare and contrast how the use of technology involves weighing the trade-offs between the positive and negative effects. 3.4.10.B2 ~ Demonstrate how humans devise technologies to reduce the negative consequences of other technologies. 3.4.10.B4 ~ Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention. 3.4.12.B1 ~ Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies. 3.4.10.D3 ~ Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. 3.4.12.E4 ~ Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.</p> <p>Writing in Science and Technical Subjects Standards CC.3.6.9-10.E ~ Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.</p>

Manufacturing Unit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Reading and interpreting blueprints B. Calculating material costs C. Safely using manufacturing machinery to conduct a mass-production activity D. Measuring to a tolerance of $\pm 1/16$" E. Converting fractions to decimal forms F. Using manufacturing equipment to machine materials to a tolerance of $\pm 1/16$" G. Using hand and power tools to fasten materials H. Identifying wood fasteners and explaining the appropriate applications</p> <p><u>Related Vocabulary:</u> blueprints board feet machine guards fasteners kerf</p>	<p>Science and Technology Standards 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.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.</p> <p>Mathematics Standards CC.2.1.HS.F.2 ~ Apply properties of rational and irrational numbers to solve real-world or mathematical problems. CC.2.1.HS.F.3 ~ Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. CC.2.1.HS.F.4 ~ Use units as a way to understand problems and to guide the solution of multi-step problems.</p>

Alternative Energy/Transportation Unit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Forms of transportation B. Fuels used in transportation C. Impacts of burning fossil fuels and their relationship to global warming D. Non-combustion engines versus the internal combustion engine E. Alternative fuels</p> <p><u>Related Vocabulary:</u> transportation fossil fuels global warming/climate change combustible engine</p>	<p>Science and Technology Standards 3.4.10.B1 ~ Compare and contrast how the use of technology involves weighing the trade-offs between the positive and negative effects. 3.4.12.A1 ~ Compare and contrast the rate of technological development over time. 3.4.10.B2 ~ Demonstrate how humans devise technologies to reduce the negative consequences of other technologies. 3.4.10.B4 ~ Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention. 3.4.12.B1 ~ Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies. 3.4.10.E5 ~ Analyze the development of transportation services and methods and their impact on society.</p> <p>English Language Arts Standards CC.1.3.9–10.D ~ Determine the point of view of the text and analyze the impact the point of view has on the meaning of the text. CC.1.4.9–10.C ~ Develop and analyze the topic with relevant, well-chosen, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic; include graphics and multimedia when useful to aiding comprehension.</p>

Electricity/Electronics Unit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Voltage, current, resistance, and power B. Solving for voltage, current, ohms, and watts C. Measuring volts, amps, ohms, and watts D. Ohm's Theory of Resistance E. Parts of a circuit F. Series, parallel, and series-parallel circuits G. Reading and interpreting schematics to identify electronic components H. Following a schematic diagram</p> <p><u>Related Vocabulary:</u> voltage current ohms power resistance load Source conductor/path control device circuits series parallel series-parallel schematics</p>	<p>Science and Technology Standards 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.E3 ~ Compare and contrast the major forms of energy: thermal, radiant, electrical, mechanical, chemical, nuclear and others.</p> <p>Mathematics Standards CC.2.1.HS.F.2 ~ Apply properties of rational and irrational numbers to solve real-world or mathematical problems. CC.2.1.HS.F.4 ~ Use units as a way to understand problems and to guide the solution of multi-step problems. CC.2.2.HS.D.8 ~ Apply inverse operations to solve equations or formulas for a given variable. CC.2.2.HS.D.10 ~ Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</p>

Engineering/Designing Unit	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>A. Converting scales B. Solving design problems C. 3-view drawings D. Tri-metric view</p> <p><u>Related Vocabulary:</u> conversion scale/ratio top view front view right side view dimensions tri-metric view extrude</p>	<p>Science and Technology Standards 3.4.10.A2 ~ Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems. 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.E7 ~ Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.</p> <p>Mathematics Standard CC.2.3.HS.A.13 ~ Analyze relationships between two-dimensional and three-dimensional objects. CC.2.1.HS.F.4 ~ Use units as a way to understand problems and to guide the solution of multi-step problems. CC.2.3.HS.A.13 ~ Analyze relationships between two-dimensional and three-dimensional objects.</p>