2013 – 2014

Arkansas Department of Career Education
Model Framework

Course Title: **Introduction to Technology and Engineering-(ETE 1)**

Career Cluster: **Science, Tech, Engineering & Mathematics**

Secondary – School Improvement	
Course Number	399150
CIP Number	15.9999
Grade Level	7-8
Course Type	Foundation
Teacher Certification	212
CTSO	TSA
Facility Requirements	http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx
Industry Certifications	

Purpose: This 18 week course is designed to provide 7th and 8th grade students with an introduction and comprehensive overview of the fields of information and communication, construction, manufacturing, energy, power, and transportation technologies. Students will also develop an understanding of the history of technology and how the design loop is used to solve technological problems. Emphasis will be placed on the exploration of principles and concepts as well as the application of technological concepts and practices through the completion of experiments, learning exercises, field trips, writing activities, and design projects.

Program Structure
This program has seven unit sections.

Laboratory Activities

Students will accurately measure in both imperial and metric units in Unit2; Students will accurately measure in both imperial and metric units and Students will design and test a bridge, truss, or tower with specific constraints both in Unit4;

Special Notes
Microsoft Office software tools, Technology Portfolio, appropriate supporting videos, and Internet access. Measuring Devices. Recycled materials for modeling, concrete or mud for brick or stepping stone design, materials to build a mold, West Point Bridge Designer, materials to construct structures (balsa, basswood, etc.) structural tester, Microsoft Office, Materials to create manufacturing project. Tools for vehicular design. Safety signs, Safety tests and study materials, Machines and tools to demonstrate safe operation, Personal Protection Equipment

Career and Technical Student Organization (CTSO)
Technology Student Association (TSA) would apply here

Standards
ST-ET

Common Core State Standards Grades 9-12

ELA Speaking and Listening Standards Grades 9-10

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. **SL9-10.1**
    a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL9-10.1a**
    b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. **SL9-10.1b**
    c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. **SL9-10.1c**
    d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **SL9-10.1d**
2. Integrate multiple sources of information presented in diverse media or format(e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **SL9-10.2**

3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **SL9-10.3**
4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. **SL9-10.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL9-10.5**

ELA Speaking and Listening Standards Grades 11-12

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. **SL11-12.1**
    a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL11-12.1a**
    b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. **SL11-12.1b**
    c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. **SL11-12.1c**
    d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task. **SL11-12.1d**
2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. **SL11-12.2**
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used. **SL11-12.3**
4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks. **SL11-12.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL11-12.5**

ELA Language Grades 9-10

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. **L9-10.4**
   a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L9-10.4a**
   b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy). **L9-10.4b**
   c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. **L9-10.4c**
   d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). **L9-10.4d**
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L9-10.6**

ELA Language Grades 11-12

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies. **L11-12.4**
   a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L11-12.4a**
   b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable). **L11-12.4b**
   c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. **L11-12.4c**
   d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary **L11-12.4d**
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L11-12.6**

Reading Standards for Literacy in Science and Technical Subjects Grades 9-10

1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **R9-10.1**
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **R9-10.2**

3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **R9-10.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. **R9-10.4**
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). **R9-10.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. **R9-10.6**
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **R9-10.7**
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. **R9-10.8**
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. **R9-10.9**
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **R9-10.10**

Reading Standards for Literacy in Science and Technical Subjects Grades 11-12

1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. **R11-12.1**
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. **R11-12.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. **R11-12.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. **R11-12.4**
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **R11-12.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. **R11-12.6**
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. **R11-12.7**
8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. **R11-12.8**
9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **R11-12.9**

10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently. **R11-12.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9-10

1. Write arguments focused on discipline-specific content. **W9-10.1**
   a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. **W9-10.1a**
   b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. **W9-10.1b**
   c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W9-10.1c**
   d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.1d**
   e. Provide a concluding statement or section that follows from or supports the argument presented. **W9-10.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W9-10.2**
   a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W9-10.2a**
   b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W9-10.2b**
   c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. **W9-10.2c**
   d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. **W9-10.2d**
   e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.2e**
   f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). **W9-10.2f**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W9-10.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
   W9-10.4
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W9-10.5**
6. 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. **W9-10.6**

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W9-10.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **W9-10.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W9-10.9**
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W9-10.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 11-12

1. Write arguments focused on discipline-specific content. **W11-12.1**
    a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. **W11-12.1a**
    b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. **W11-12.1b**
    c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W11-12.1c**
    d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W11-12.1d**
    e. Provide a concluding statement or section that follows from or supports the argument presented. **W11-12.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W11-12.2**
    a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W11-12.2a**
    b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W11-12.2b**
    c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. **W11-12.2c**

   d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. **W11-12.2d**
   e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic). **W11-12.2e**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W11-12.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W11-12.4**
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W11-12.5**
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. **W11-12.6**
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W11-12.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. **W11-12.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W11-12.9**
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W11-12.10**

Common Career Technical Core

Science, Technology, Engineering & Mathematics Career Cluster™ (ST)

1. Apply engineering skills in a project that requires project management, process control and quality assurance.
2. Use technology to acquire, manipulate, analyze and report data.
3. Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
4. Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career ClusterTM and the role of STEM in society and the economy.
5. Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.
6. Demonstrate technical skills needed in a chosen STEM field.

Engineering & Technology Career Pathway (ST-ET)

1. Use STEM concepts and processes to solve problems involving design and/or production.
2. Display and communicate STEM information.
3. Apply processes and concepts for the use of technological tools in STEM.
4. Apply the elements of the design process.
5. Apply the knowledge learned in STEM to solve problems.
6. Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.

Science & Mathematics Career Pathway (ST-SM)

1. Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.
2. Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
3. Analyze the impact that science and mathematics has on society.
4. Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.

Common Career and Technical Core Career Ready Practices (CCTC CRP)

1. Act as a responsible and contributing citizen and employee. **CRP1**
2. Apply appropriate academic and technical skills. **CRP2**
3. Attend to personal health and financial well-being. **CRP3**
4. Communicate clearly, effectively, and with reason. **CRP4**
5. Consider the environmental, social and economic impacts of decisions. **CRP5**
6. Demonstrate creativity and innovation. **CRP6**
7. Employ valid and reliable research strategies. **CRP7**
8. Utilize critical thinking to make sense of problems and persevere in solving them. **CRP8**
9. Model integrity, ethical leadership, and effective management. **CRP9**
10. Plan education and career path aligned to personal goals.**CRP10**
11. Use technology to enhance productivity. **CRP11**
12. Work productively in teams while using cultural/global competence. **CRP12**

2013 – 2014

Arkansas Department of Career Education
Student Performance Standards

Course Title: **Introduction to Technology and Engineering-(ETE 1)**

Course Number: **399150**

Course Credit: **.5**

Introduction to Technology and Engineering-(ETE 1) Indicators: At the completion of this course the student will be able to…

1.0 History of Technology

1.1 Describe technology and the role that technology plays in society, culture and history.

1.2 Define technology and technological literacy and describe how a society can become more technologically proficient.

1.3 Identify and describe the unintended consequences of technology.

1.4 Describe the core concepts and essential characteristics of technology.

1.5 Describe the innovations and contributions of significant inventors and innovators.

2.0 The Engineering Design Process

2.1 Understand the importance of the design process.

2.2 Identify the steps in the design process.

2.3 Recognize the importance of sketching in the design process.

2.4 Understand the importance of measuring accurately.

2.5 Demonstrate the ability to apply the steps of the design process to an invention, innovation or design problem.

3.0 Introduction to Information and Communication Technologies

3.1 Understand information and communication technologies using a systems model that includes inputs, processes, and outputs.

3.2 Explain that technological knowledge and processes are communicated using symbols, measurements, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.

3.3 Demonstrate the ability to communicate effectively using multiple types of media.

3.4 Utilize a Technology Portfolio to record ideas, projects, presentations, and other written work.

4.0 Introduction to Construction Technologies

4.1 Identify and describe the core concepts of human-built structures.

4.2 Identify materials used in construction.

4.3 Identify and describe civil structural systems.

4.4 Create a structural model, test a design, and optimize a design.

5.0 Introduction to Manufacturing Technologies

5.1 Understand that modern manufacturing technologies produce quality goods at low prices; therefore, enhancing the quality of life for many people.

5.2 Classify manufacturing systems as customized production and mass production.

5.3 Describe the core materials used in manufacturing.

5.4 Design and construct a class manufacturing project.

6.0 Energy, Power and Transportation Technologies

6.1 Define energy and power.

6.2 Differentiate between kinetic and potential energy.

6.3 Identify and describe common sources of renewable and non-renewable energy.

6.4 Understand the role that transportation plays in the operation of other technologies.

6.5 Identify and describe different modes of transportation.

6.6 Design and Construct an air-powered vehicle.

7.0 Safety

7.1 Describe the need for safe work environments in the Engineering and Technology Educational classroom and laboratory.

7.2 Describe specific procedures such as reporting illness, injuries, safety violations etc.

7.3 Use appropriate and required personal protection equipment.

7.4 Describe machine and tool safety practices and procedures.

Standard 1.0 History of Technology			
Performance Indicator 1.1 Describe technology and the role that technology plays in society, culture, and history	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.1.1 Comprehends ideas and concepts related to technology	View a video and participate in discussions to describe technology and how it effects daily life	W 8.3 W 7.2	ST-3,4, ST-SET 6, CRP 3,4
1.1.2 Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Develop an historical timeline illustrating the major milestones and development of famous inventions and innovations	W 7.7 W 8.7	ST 4, CRP 4
Performance Indicator 1.2 Define technology and technological literacy and describe how a society can become more technologically proficient	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.2.1 Comprehends ideas and concepts related to technology and technological literacy	Participate in discussions concerning technology and technological literacy	SL 7.1 SL 8.1	ST 3-6, ST-ET 2, ST-SM 3
1.2.2 Organizes information into an appropriate format	Develop a Technology Portfolio that demonstrates technological literacy	W 7.10 W 8.10	ST-1,3,6, ST-ET 1-5, ST-SM 2, CRP 2,4
Performance Indicator 1.3 Identify and describe the unintended consequences of	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

technology			
1.3.1 Analyzes and applies what has been read to specific task	View a video and participate in discussions concerning unintended consequences of technology	SL 7.2 SL 8.2	ST 3,4, ST-ET 6, ST-SM 2,3 CRP 3.4
1.3.2 Comprehends ideas and concepts related to the unintended consequences of technology	Participate in readings concerning unintended consequences of technology	RI 7.1 RI 8.1	ST 3,4, ST-ET 6, ST-SM 2, CRP 3,4
Performance Indicator 1.4 Describe the core concepts and essential characteristics of technology	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.4.1 Analyzes and applies what has been read to specific task	Participate in discussions concerning the core concepts and essential characteristics of technology	SL 7.4 SL 8.4	ST 4,6, ST-ET 1-3, ST-SM 2
1.4.2 Comprehends ideas and concepts related to the core concepts and characteristics of technology	Participate in readings concerning the core concepts and essential characteristics of technology	RI 7.2 RI 8.2	ST 4,6, ST-ET 1-3, ST-SM 2
Performance Indicator 1.5 Describe the innovations and contributions of significant inventors and innovators	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
1.5.1 Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Develop a presentation on a famous inventor	W 7.7 W 8.7	

1.5.2 Prepares presentation based on subject research	Continue developing a Technology Portfolio	W 8.8 W 7.8	

Standard 2.0 The Engineering Design Process			
Performance Indicator 2.1 Understand the importance of the design process	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.1.1 Comprehends ideas and concepts related to the design process	View a video and participate in discussions concerning the design process	SL 7.2 RL 8.2	
2.2.2 Uses available resources to acquire new skills or improve skills	Students will compare and contrast trial and error and the concept of using a systematic process in problem solving	WHST 6-8.1	ST 1, ST-ET 1-6, ST-SM 4, CRP 2,4
Performance Indicator 2.2 Identify the steps in the design process	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.2.1 Applies/Uses technical words and concepts	Students will list and describe the ten steps in the design process	W 7.2 W 8.2	ST-ET 4-6, CRP 4
2.2.2 Applies rules and principles to a new situation	Students will correctly order the steps in the design process and understand the importance of sequential steps	W 7.2 W 8.2	ST-ET 1-6, CRP 4
Performance Indicator 2.3 Recognize the importance of sketching in the design process	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.3.1 Uses basic geometric symbols, terms, principles, and formulas	Students will identify the correct orientation and relationship between the views of an object	7 GA 3 8GA 2 8GA 3	ST 1,6
2.3.2 Organizes and processes images – symbols, pictures, graphs, objects,	Students will develop orthographic projections and pictorial sketches	7 GA 2	ST 1,6

etc.			
Performance Indicator 2.4 Understand the importance of measuring accurately	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.4.1 Calculates different units of measurement. Reads measurements from common measuring devices. Applies new knowledge and skills to the design process	Students will accurately measure in both imperial and metric units.	L 7.6 L 8.6	ST 1,6, ST-SM 1-3, CRP 2,11
Performance Indicator 2.5 Demonstrate the ability to apply the steps of the design process to an invention, innovation, or design problem	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
2.5.1 Applies knowledge to complete a practical task. Comprehends ideas and concepts related to the design process.	Students will create and invention or innovation using the steps of the design process and specific criteria	RST 6-8.3	ST 1,2,3,6,ST-ET 1-6, ST-SM 1-4, CRP 2,4,6,7,8,11
2.5.2 Creates new design by applying specified criteria	Students will complete a design log for an invention or innovation	WHST 6-8.2	ST 1, ST-ET 2,4,5,ST-SM 4, CRP 2,4,8

Standard 3.0 Introduction to Information and Communication Technologies			
Performance Indicator 3.1 Understand information and communication technologies using a systems model that includes inputs, processes, and outputs	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.1.1 Comprehends ideas and concepts related to technology. Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Participate in discussions and readings concerning information and communication systems	RST 6-8.4	ST-4, CRP 4
3.1.2 Comprehends ideas and concepts related to technology	Students will complete a systems model outline for a given communication scenario	WHST 6-8.1	ST 1,6, ST-ET 1,2, CRP 4.11
Performance Indicator 3.2 Explain that technological knowledge and processes are communicated using symbols, measurements, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

3.2.1 Comprehends ideas and concepts related to Technology. Communicates thoughts, ideas, or facts in written form in a clear, concise manner. Interprets charts, tables, graphs, and working drawings.	Participate in discussions and readings concerning information and communication systems	RST 6-8.9	ST 4, CRP 4
3.2.2 Interprets charts, tables, graphs, and working drawings. Comprehends ideas and concepts related to technology	Students will create a chart that outlines and categorizes the four distinct types of communication	RST 6-8.7	ST 4, ST-ET 2, CRP 4
Performance Indicator 3.3 Demonstrate the ability to communicate effectively using multiple types of media	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
3.3.1 Organizes information into an appropriate format	Students will create and present a multi-media presentation on a form of communication technology	WHST 6-8.6	ST 4,6, ST-ET 2, CRP 2,4,6,7,11
3.3.2 Communicates a thought, idea, or fact in spoken form. Prepares presentation based on subject research	Students will evaluate their peers on the use of effective communication	WHST 6-8.7	CRP 4
Performance Indicator 3.4 Utilize a Technology Portfolio to record	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

ideas, projects, presentations, and other written work			
3.4.1 Communicates thoughts, ideas, or facts in written form in a clear, concise manner. Uses logic to draw conclusions from available information	Students will develop a Technology Portfolio that demonstrates their understanding of information and communication systems and their importance in career choices	WHST 6-8.8	

Standard 4.0 Introduction to Construction Technologies			
Performance Indicator 4.1 Identify and describe the core concepts of human-built structures	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.1.1 Comprehends ideas and concepts related to technology	View a presentation and participate in discussions about human built structures	SL 7.2 SL 8.2	ST 4, CRP 4,5
4.1.2 Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Discuss the primary types of housing in which people live	SL 7.4 SL 8.4	CRP 4, ST4
Performance Indicator 4.2 Identify materials used in construction	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.2.1 Listens to and follow directions. Draws to scale. Visualizes a finished product	Students will sketch and label a standard section-view of a residential structure, identifying the building materials commonly used in construction	7GB 6, SHG-CO A2, HSG-CO A5	ST 1,2,3, ST-ET 1,2, ST-SM 2, CRP 2,4,5
Performance Indicator 4.3 Identify and describe civil structural systems	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.3.1 Comprehends ideas and concepts related to Technology. Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Students will participate in discussions about civil structural systems	SL 7.1 SL 8.1	ST 4, ST-ET 2, ST-SM 3
4.3.2 Comprehends ideas and concepts related to	Students will work in groups to conduct research on important civil structural systems in their community, state, and	SL 7.4 SL8.4	

technology	region and then present their findings to the class		
Performance Indicator 4.4 Create a structural model, test a design, and optimize a design	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
4.4.1 Draws to scale. Reads measurements from common measuring devices	Students will accurately measure in both imperial and metric units	L 7.6 L 8.6	
4.4.2 Constructs model to depict basic concept of construction. Creates new design by applying specified criteria	Students will design and test a bridge, truss, or tower with specific constraints	RST 6-8.3	ST ET4

Standard 5.0 Introduction to Manufacturing Technologies			
Performance Indicator 5.1 Understand that modern manufacturing technologies produce quality goods at low prices; therefore, enhancing the quality of life for many people	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.1.1 Comprehends ideas and concepts related to manufacturing. Communicates thoughts, ideas, or facts in written form in a clear, concise manner	Participate in discussions and readings concerning manufacturing technologies	RST 6-8.2 RI 7.4 RI 8.4	CRP 5
5.1.2 Applies information and concepts derived from printed materials. Comprehends ideas and concepts related to manufacturing	Students will create a lifecycle of a manufactured good or product	RST 6-8.8	CRP 2,6,7,11
Performance Indicator 5.2 Classify manufacturing systems as customized production and mass production	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

5.2.1 Comprehends ideas and concepts related to manufacturing. Applies information to new situations. Evaluates information/data to make best decision.	Students will compare and contrast different products, classifying them as customized or mass-produced	RST 6-8.9	CRP 4
Performance Indicator 5.3 Describe the core materials used in manufacturing.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.3.1 Comprehends ideas and concepts related to manufacturing. Applies information to new situations.	Students will participate in discussions and readings that examine specific uses of plastics, woods, metals, and composites in manufacturing	RSTS 6-8.1	CRP 4,5
5.3.2 Comprehends ideas and concepts related to manufacturing.	Students will compare and contrast different products, categorizing them in relation to their base materials	RST 6-8.9	CRP 4
Performance Indicator 5.4 Design and construct a class manufacturing project	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
5.4.1 Applies knowledge to complete a practical task. Uses equipment and techniques appropriate in the field of manufacturing. Applies new knowledge and skills to	Students will design and produce a manufacturing project	RST 6-8.3	CRP 2,6,7,8,11

manufacturing. Contributes to group with ideas, suggestions, and effort. Works effectively with others to reach a common goal.			

Standard 6.0 Energy, Power and Transportation Technologies			
Performance Indicator 6.1 Define energy and power	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.1.1 Comprehends ideas and concepts related to energy and power. Communicates thoughts, ideas, or facts in written form in a clear, concise manner. Applies information and concepts derived from printed materials.	Students will participate In discussions and readings Concerning energy and power	SL 7.1 RI 7.2 SL 8.1 RI 8.2	CRP 4,5,8
6.1.2 Comprehends ideas and concepts related to energy and power	Students will create a table That categorizes types of energy And power	RST 6-8.7	CRP 2,6,11
Performance Indicator 6.2 Differentiate between kinetic and	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**

Potential energy			
6.2.1 Comprehends ideas and concepts related to energy and power. Performs experiment as specified. Tracks and evaluates results.	Students will conduct experiments using both kinetic and potential energy	RST 6-8.7	CRP 2,6,7,11
Performance Indicator 6.3 Identify and describe common sources of renewable and non-renewable energy	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.3.1 Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. Comprehends ideas and concepts related to energy and power.	Students will participate in discussions concerning renewable and non-renewable energy and where the energy in their home is produced	SL 7.6 SL 8.6	CRP 4,8
6.3.2 See relationship between two or more ideas, objects, or situations.	Students will design a flowchart that identifies their personal use of energy	RST 6-8.7	CRP 2,4,6,11
Performance Indicator 6.4 Understand the role that transportation plays in the operation of other technologies	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.4.1 Comprehends ideas and concepts related to energy and power.	Students will participate in discussions and readings concerning transportation and its relationship to other technologies	RL 7.2 RL 8.2	CRP 4,5,7

Communicates thoughts, ideas, or facts in written form in a clear, concise manner. Applies information and concepts derived from printed materials.			
Performance Indicator 6.5 Identify and describe different modes of transportation	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.5.1 Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. Contributes to group with ideas, suggestions, and effort. Combines ideas or information in a new way.	Students will work in groups to create an advertisement for a freight company that provides all modes of transportation	W 7.5 W 8.5	CRP 2,4,6,7,11,12
Performance Indicator 6.6 Design and Construct an air-powered vehicle	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
6.6.1 Applies scientific principles related to transportation. Calculates different units of measurement. Creates new design by applying specified criteria.	Students will design an air-powered vehicular system with specific constraints	RST 6-8.3	7RPA 1 CRP 2,6,11
6.6.2 Demonstrates logical reasoning in reaching a conclusion.	Students will calculate and evaluate their designs' rate, speed and velocity	RST 6-8.3	7RPA 1 CRP 2,11

Draws conclusions from observations, evaluates conditions, and gives possible solutions.			

Standard 7.0 Safety			
Performance Indicator 7.1 Describe the need for safe work environments in the Engineering and Technology Educational classroom and laboratory	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.1.1 Imagines the flow of work activities from narrative descriptions. Applies new knowledge and skills to industrial safety.	Maintain personal safety, workplace safety, hazard avoidance, safety information systems, protective clothing, fall protection, first aid	RI 7.4 RI 8.4	ST 3 CRP 1,3
7.1.2 Makes connections between seemingly unrelated ideas.	Explore implemented safety procedures and discuss classroom and laboratory safety	SL 7.1 SL 8.1	ST 3 CRP 1,3
Performance Indicator 7.2 Describe specific procedures such as reporting illness, injuries, safety violations etc.	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.2.1 Listens and follows directions.	Demonstrate understanding of specific procedures such as reporting illness, injuries and safety	L 7.6 L 8.6	ST 3 CRP 1,3

Performance Indicator 7.3 Use appropriate and required personal protection equipment	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.3.1 Devises and implements a plan of action to resolve a problem.	Practice using appropriate and required personal protection equipment (eye protection, ear protection etc.)	RST 6-8.4	ST 3 CRP 1
Performance Indicator 7.4 Describe machine and tool safety practices and procedures	**Recommended Application/Activity**	**CCSS Standards**	**CCTC Standards**
7.4.1 Demonstrates decision-making skills. Comprehends written specifications and applies them to a task.	Demonstrate the ability to safely use common tools and machines found in given industrial settings	RST 6-8.3	ST 3 CRP 1,11
7.4.2 Reads and follows instructions to operate technical equipment.	Demonstrate the ability to pass given safety tests that show evidence of personal safety competence on given tools and machinery	RST 6-8.3	ST 3 CRP 1,11
7.4.3 Uses standard occupational resource materials. Follows safety guidelines.	Participate in a discussion concerning securing machinery, securing guards and safety devices, slipping hazards, eye and ear protection, adequate space around machinery, machine vibration, hand feeding and retrieval tools, power transmission parts, blade and cutter safety, worker position safety, safe procedures for adjusting or repairing machinery, shear points, falling objects, flying objects, rotating parts.	L 7.6 L8.6	ST 3 CRP 4,11

7.4.4 Participates in conversation, discussion, and group presentations.	Design and post a set of rules for machine safety, personal safety, hazard safety issues, rules for horseplay, materials safety, combustible materials, etc.	SL 7.1 SL 8.1	ST 3 CRP 2,4,11
7.4.5 Comprehends ideas and concepts related to machine and tool safety.	Operate tools and equipment in a safe and hazard free manner to the satisfaction of the course instructor	RST 6-8.10	ST 3 CRP 1,11