



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

<p>ST</p> 	Standard	Performance Elements	Sample Indicators
<p>ST 1</p>	<p>Apply engineering skills in a project that requires project management, process control and quality assurance.</p>	<p>1. Apply the skills and abilities in requirements analysis and configuration control while working plans, processes and projects as assigned.</p>	<ul style="list-style-type: none"> No Sample Indicators.
		<p>2. Use the skills required in project management to track and assess the progress of a plan, process, or project as assigned.</p>	<ul style="list-style-type: none"> No Sample Indicators.
		<p>3. Apply the skills in quality assurance as well as those in process management and development for appropriate applications of systems integration techniques to an assigned project.</p>	<ul style="list-style-type: none"> No Sample Indicators.
<p>ST 2</p>	<p>Use technology to acquire, manipulate, analyze and report data.</p>	<p>1. Use IT tools to manipulate data and create reports, plans, processes, or projects from data provided.</p>	<ul style="list-style-type: none"> Use statistical tools to analyze data. Query and extract information from data. Create knowledge from data.
		<p>2. Use modeling, simulation, or visual reproduction to effectively analyze, create and/or communicate to others regarding plans, projects, problems, issues, or processes.</p>	<ul style="list-style-type: none"> Apply techniques for modeling systems or problems. Apply techniques for scientific visualization and animation of complex physical systems or problems. Test different scenarios to multiple variables.
		<p>3. Apply a currently applicable computer programming language to a process, project, plan, or issue as assigned.</p>	<ul style="list-style-type: none"> Write a computer program, e.g., Java, C++. Execute a computer program, e.g., Java, C++.
		<p>4. Apply statistical tools that verify the reliability or validity of the data used or collected in the plan, project, process, or problem.</p>	<ul style="list-style-type: none"> Using a selected statistical tool, compute data reliability. Select and use the tools to analyze and synthesize data. Describe the meaning of probability and how it applies to a set of data.
		<p>5. Apply a technological, scientific, or mathematical concept (use of algorithms) when communicating with others on issues, plans, processes, problems, or concepts.</p>	<ul style="list-style-type: none"> Select the proper visualization tools. Use simulation, modeling and prototype techniques to solve problems. Communicate data visually.



COLLEGE AND CAREER READY

A WORLD-CLASS EDUCATION FOR MILITARY-CONNECTED STUDENTS

ST 	Standard	Performance Elements	Sample Indicators
ST 3	Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.	1. Apply appropriate safety and health practices when developing plans, projects, processes, or solving complex problems.	<ul style="list-style-type: none"> Exercise good safety practices. Follow various regulatory codes, such as EPA, FEMA, UL, OSHA, CSA. Reference and use material safety data sheets (MSDS). Encourage others to employ safe practices.
		2. Use appropriate safety techniques, equipment and processes in planning and /or project applications.	<ul style="list-style-type: none"> Demonstrate safe use of tools and equipment. Develop and implement emergency plans. Develop and implement workplace lab safety plan. Follow workplace regulations and record-keeping requirements. Demonstrate the use of safety equipment in the workplace. Demonstrate the use of eyewash and safety showers Accurately interpret safety signs, symbols and labels. Demonstrate basic first aid techniques.
		3. Identify potential and existing hazards to plans, projects, or processes where safety, health and environmental issues may be affected.	<ul style="list-style-type: none"> Discuss physical, chemical, toxicological, biological and radioactive hazards. Analyze environmental impacts. Conduct a safety audit.
ST 4	Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.	1. Describe the relationship between the STEM cluster and society.	<ul style="list-style-type: none"> No Sample Indicators.
		2. Describe the effect society and the economy have upon the STEM pathways.	<ul style="list-style-type: none"> No Sample Indicators.
		3. Understand STEM knowledge and skills to analyze and suggest solutions to human societal problems.	<ul style="list-style-type: none"> No Sample Indicators.



COLLEGE AND CAREER READY

A WORLD-CLASS EDUCATION FOR MILITARY-CONNECTED STUDENTS

ST 	Standard	Performance Elements	Sample Indicators
ST 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.	1. Research and match career opportunities based upon their fit with personal career goals.	<ul style="list-style-type: none"> • Locate and interpret career information for at least one career pathway within the cluster. • Identify job requirements for the career cluster/pathway. • Identify educational and credentialing requirements for careers within the cluster.
		2. Match personal interests and aptitudes to careers when researching opportunities within the pathways.	<ul style="list-style-type: none"> • Identify personal interests and aptitudes. • Identify job requirements and characteristics for selected careers. • Compare personal interests and aptitudes with job requirements and characteristics of the career selected. • Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.
		3. Develop a career plan for advancement in science, technology, engineering and mathematics careers.	<ul style="list-style-type: none"> • No Sample Indicators.
		4. Engage in STEM experiences where an individual can identify personal interests and expectations for career and personal development.	<ul style="list-style-type: none"> • List resources for researching funding sources for scientific projects and technology. • List careers that you have investigated, internships that you could apply for and job shadowing opportunities that you have identified. • Construct and maintain a portfolio of experiences and accomplishments.
ST 6	Demonstrate technical skills needed in a chosen STEM field.	1. (none available at this time)	<ul style="list-style-type: none"> • No Sample Indicators.



Engineering and Technology Career Pathway (ST-ET)

ST-ET 	Standard	Performance Elements	Sample Indicators
ST-ET 1	Use STEM concepts and processes to solve problems involving design and/or production.	1. Apply the core concepts of technology and recognize the relationships with STEM systems (e.g., systems, resources, criteria and constraints, optimization and trade-off and controls).	<ul style="list-style-type: none"> No Sample Indicators.
		2. Develop the active use of information technology applications.	<ul style="list-style-type: none"> No Sample Indicators.
		3. Use computer applications to solve problems by creating and using algorithms and through simulation and modeling techniques.	<ul style="list-style-type: none"> No Sample Indicators.
ST-ET 2	Display and communicate STEM information.	1. Select and use information technology tools to collect, analyze, synthesize and display data to solve problems.	<ul style="list-style-type: none"> No Sample Indicators.
		2. Read and create basic computer-aided engineering drawings.	<ul style="list-style-type: none"> No Sample Indicators.
ST-ET 3	Apply processes and concepts for the use of technological tools in STEM.	1. Use knowledge, techniques, skills and modern tools necessary for engineering practice.	<ul style="list-style-type: none"> No Sample Indicators.
		2. Describe the elements of good engineering practice (e.g., understanding customer needs, planning requirements analysis, using appropriate engineering tools, prototyping, testing, evaluating and verifying).	<ul style="list-style-type: none"> No Sample Indicators.
		3. Effectively use project management techniques (e.g., teamwork, appropriate time management practices, effective organizational skills, conduct analysis of cost, resources and production capacity and quality practices with continuous improvement).	<ul style="list-style-type: none"> No Sample Indicators.
		4. Illustrate the ability to characterize a plan and identify the necessary engineering tools that will produce a technical solution when given a problem statement.	<ul style="list-style-type: none"> No Sample Indicators.



ST-ET 	Standard	Performance Elements	Sample Indicators
ST-ET 4	Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.	1. Explain why and how the contributions of great innovators are important to society.	<ul style="list-style-type: none"> No Sample Indicators.
		2. Explain the elements and steps of the design process and tools or techniques that can be used for each step.	<ul style="list-style-type: none"> No Sample Indicators.
		3. Describe design constraints, criteria and trade-offs in regard to variety of conditions (e.g., technology, cost, safety, society, environment, time, human resources, manufacturability).	<ul style="list-style-type: none"> No Sample Indicators.
ST-ET 5	Apply the elements of the design process.	1. Apply the design process using appropriate modeling and prototyping, testing, verification and implementation techniques.	<ul style="list-style-type: none"> Exhibit an understanding of customer needs in the design process.
		2. Demonstrate the ability to evaluate a design or product and improve the design using testing, modeling and research.	<ul style="list-style-type: none"> No Sample Indicators.
		3. Demonstrate the ability to record and organize information and test data during design evaluation.	<ul style="list-style-type: none"> No Sample Indicators.
ST-ET 6	Apply the knowledge learned in STEM to solve problems.	1. Apply the use of algebraic, geometric and trigonometric relationships, characteristics and properties to solve problems.	<ul style="list-style-type: none"> Evaluate mathematical solutions for reasonableness. Using appropriate data collection and statistical analysis methods, display the data as a means to make a decision.
		2. Apply the process and concepts for science literacy relative to engineering and technology.	<ul style="list-style-type: none"> Identify, analyze and solve defined engineering technology problems. Conduct, analyze and interpret experiments.
		3. Exhibit the ability to select, apply and convert systems of measurement to solve problems.	<ul style="list-style-type: none"> Conduct standard tests and measurements. Apply scalar and vector quantities as applied to physical systems, such as the relationship between position, velocity and acceleration.
		4. Apply basic laws and principles relevant to engineering and technology.	<ul style="list-style-type: none"> No Sample Indicators.



COLLEGE AND CAREER READY

A WORLD-CLASS EDUCATION FOR MILITARY-CONNECTED STUDENTS

ST-ET 	Standard	Performance Elements	Sample Indicators
		5. Explain relevant physical properties of materials used in engineering and technology.	<ul style="list-style-type: none"> Describe the relationships between amplitude, wavelength, frequency, period and speed of a wave.
		6. Apply and create appropriate models, concepts and processes for an assigned situation and apply the results to solving the problem.	<ul style="list-style-type: none"> No Sample Indicators.
		7. Explain the impact of assumptions, initial conditions, boundary conditions and other constraints on solutions to the problem.	<ul style="list-style-type: none"> No Sample Indicators.
		8. Apply Newton's Laws of Motion to analyze static and dynamic systems with and without the presence of external forces.	<ul style="list-style-type: none"> Use the laws of conservation of energy, charge and momentum to solve a variety of problems involving mechanical, fluid, chemical, biological, electrical and thermal systems. Show how the relationships between energy, work and power can be used to solve a variety of problems involving mechanical, fluid, electrical and thermal systems. Apply the principles of ray optics to describe reflection and refraction of light.
		9. Explain the relationships between scientific theory, principles and laws in engineering and technology.	<ul style="list-style-type: none"> No Sample Indicators.