Florida CTE

Engineering & Technology Education (2023-24): Exploration of Aerospace Technology and Career Planning (8600052)

Demonstrate an understanding of the characteristics and scope of technology.--The student will be able to: 1

1. **Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative.** 1.01
2. **Explain how technology is closely linked with creativity, which has resulted in innovation.** 1.02
3. **Demonstrate how corporations can often create demand for a product by bringing it onto the market and advertising it.** 1.03
4. **Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative.** 1.04

Demonstrate an understanding of the core concepts of technology.--The student will be able to: 2

1. **Describe technological systems including input, processes, output, and, at times, feedback.** 2.01
2. **Apply systems thinking, involving considering how every part relates to others.** 2.02
3. **Identify control systems having no feedback path and requiring human intervention, and control systems using feedback.** 2.03
4. **Explain how technological systems can be connected to one another.** 2.04
5. **Repair malfunctions of any part of a system that may affect the function and quality of the system.** 2.05
6. **Compare and contrast requirements or parameters placed on the development of a product or system.** 2.06
7. **Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors.** 2.07

	8 Describe different technologies that involve different sets of processes. 2.08
	9 Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. 2.09
	10 Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. 2.1
Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.--The student will be able to: 3.0	1 Modify the way technological systems interact with one another. 3.01
	2 Apply a product, system, or environment developed for one setting in another setting. 3.02
	3 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. 3.03
Demonstrate an understanding of the cultural, social, economic, and political effects of technology.--The student will be able to: 4	1 Identify the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. 4.01
	2 Explain that technology, by itself, is neither good nor bad; but decisions about the use of products and systems can result in desirable or undesirable consequences. 4.02
	3 Identify ethical issues associated with the development and use of technology. 4.03
	4 Identify the economic, political, and cultural issues that are influenced by the development and use of technology. 4.04
Demonstrate an understanding of the effects of technology on the environment.--The student will be able to: 5	1 Describe the management of waste produced by technological systems as an important societal issue. 5.01
	2 Describe how technologies can be used to repair damage and to break down waste from the use of various products and systems. 5.02
	3 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. 5.03
Demonstrate an understanding of the role of society in the development and use of technology.--The	1 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. 6.01
	2 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. 6.02

student will be able to: .6.0	3	Understand social and cultural priorities and values that are reflected in technological devices. 6.03
	4	Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. 6.04
Demonstrate an understanding of the influence of technology on history.--The student will be able to: 7	1	Identify inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. 7.01
	2	Explain how the specialization of function has been at the heart of many technological improvements. 7.02
	3	Identify the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. 7.03
	4	Investigate how, that in the past, an invention or innovation was not usually developed with the knowledge of science. 7.04
Demonstrate an understanding of the attributes of design.--The student will be able to: 8	1	Use design as a creative planning process that leads to useful products and systems. 8.01
	2	Explain why there is no perfect design. 8.02
	3	Evaluate criteria and constraints that are requirements for a design. 8.03
Demonstrate an understanding of engineering design.--The student will be able to: 9	1	Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. 9.01
	2	Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. 9.02
	3	Model, test, evaluate and modify designs to transform ideas into practical solutions. 9.03
Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.--The student will be able to: 10	1	10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. 10.01
	2	10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. 10.02
	3	10.03 Identify technological problems that are best solved through experimentation. 10.03

Demonstrate the abilities to apply the design process.--The student will be able to: 11	1 **Apply a design process to solve problems in and beyond the laboratory-classroom.** 11.01
	2 **Specify criteria and constraints for the design.** 11.02
	3 **Make two-dimensional and three-dimensional representations of the designed solution.** 11.03
	4 **Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.** 11.04
	5 **Make a product or system and document the solution.** 11.05
Demonstrate the abilities to use and maintain technological products and systems.--The student will be able to: 12	1 **Use information provided in manuals, protocols, or by experienced people to see and understand how things work.** 12.01
	2 **Use tools, materials, and machines safely to diagnose, adjust, and repair systems.** 12.02
	3 **Use computers and calculators in various applications.** 12.03
	4 **Operate and maintain systems in order to achieve a given purpose.** 12.04
Demonstrate the abilities to assess the impact of products and systems.--The student will be able to: 13	1 **Design and use instruments to gather data.** 13.01
	2 **Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology.** 13.02
	3 **Identify trends and monitor potential consequences of technological development.** 13.03
	4 **Interpret and evaluate the accuracy of the information obtained and determine if it is useful.** 13.04
Demonstrate an understanding of and be able to select and use information and communication technologies.--The student will be able to: 17	1 **Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination (e.g. phonetic alphabet).** 17.01
	2 **Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas (e.g. airport symbols and signs).** 17.02
Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.-	1 **Follow classroom/laboratory safety rules and procedures.** 21.01
	2 **Demonstrate good housekeeping at workstations within a classroom/laboratory.** 21.02

-The student will be able to: 21	3 Conduct classroom/laboratory activities and equipment operations in a safe manner. 21.03
	4 Exercise care and respect for all tools, equipment, and materials. 21.04
	5 Select appropriate tools, machines, and equipment to accomplish a given task. 21.05
	6 Identify color-coding safety standards. 21.06
	7 Safely use hand tools and power equipment. 21.07
	8 Explain fire prevention and safety precautions and practices for extinguishing fires. 21.08
	9 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment. 21.09
Exhibit positive human relations and leadership skills.--The student will be able to: 22	1 Perform roles in a student personnel system or in a career and technical student organization (CTSO). 22.01
	2 Work cooperatively with others. 22.02
Describe the influences that societal, economic, and technological changes have on employment trends and future training. 24.0	24 Describe the influences that societal, economic, and technological changes have on employment trends and future training. 24.0
Develop skills to locate, evaluate, and interpret career information. 25.0	25 Develop skills to locate, evaluate, and interpret career information. 25.0
Identify and demonstrate processes for making short and long term goals. 26.0	26 Identify and demonstrate processes for making short and long term goals. 26.0
Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship. 27.0	27 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship. 27.0

Understand the relationship between educational achievement and career choices/postsecondary options. 28.0	**28** Understand the relationship between educational achievement and career choices/postsecondary options. 28.0
Identify a career cluster and related pathways through an interest assessment that match career and education goals. 29.0	**29** Identify a career cluster and related pathways through an interest assessment that match career and education goals. 29.0
Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals. 30.0	**30** Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals. 30.0
Demonstrate knowledge of technology and its application in career fields/clusters. 31.0	**31** Demonstrate knowledge of technology and its application in career fields/clusters. 31.0
Discuss educational and training requirements as they relate to various aerospace careers.--The student will be able to: 39	**1** Research and identify various aerospace career choices. 39.01 **2** Discuss individual interests related to a career. 39.02 **3** List occupations, job requirements, and job opportunities in aerospace technology. 39.03 **4** List occupational training programs and academic programs at the secondary/postsecondary levels in aerospace technology. 39.04
Demonstrate an understanding of and be able to select and use aerospace technologies.--The student will be able to: 40.0	**1** Describe subsystems of aerospace vehicles, such as structural, propulsion, suspension, guidance, control, and support that must function together for a system to work effectively. 40.01 **2** Employ processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. 40.02
Demonstrate knowledge of the basic principles of	**1** Define terminology associated with aerostatics and aerodynamics. 41.01

aerostatics and aerodynamics.--The student will be able to: 41.0	2	**Explain how buoyancy principles affect an object in a fluid.** 41.02
	3	**Explain how Bernoulli's Principle applies to an object in flight.** 41.03
	4	**Identify and describe basic forces acting on an object in flight.** 41.04
	5	**Build an aerostatic vehicle.** 41.05
	6	**Build an aerodynamic vehicle.** 41.06
Identify and demonstrate knowledge of both liquid and solid propellant rocket propulsion systems.--The student will be able to: 42	1	**Define technical terminology associated with propulsion systems.** 42.01
	2	**Identify parts of a solid-propellant rocket engine.** 42.02
	3	**Identify parts of a liquid-propellant rocket engine.** 42.03
	4	**Discuss the principles of rocket propulsion.** 42.04
	5	**Construct a solid- or liquid- propellant model rocket.** 42.05
Define and describe the stages and forms of interference in basic satellite systems.--The student will be able to: 43	1	**Describe the basic functions and advantages of a communications satellite.** 44.01
	2	**Describe the basic functions and advantages of a weather satellite.** 44.02
	3	**Describe the basic functions and advantages of a navigation satellite.** 44.03
Become familiar with the basic information provided by a sectional chart.--The student will be able to: 44	1	**Extract and utilize information from an aeronautical chart legend.** 44.01
	2	**Identify locations on an aeronautical chart using latitude and longitude** 44.02
	3	**Differentiate between statute and nautical miles.** 44.03
	4	**Determine a course and distance between two points on an aeronautical chart using a navigational plotter.** 44.04
Describe and define different categories of aviation.--The student will be able to: 45	1	**Describe military aviation and be able to identify military aircraft types and missions.** 45.01
	2	**Define general aviation (including business and executive) and be able identify general aviation aircraft types.** 45.02
	3	**Define air carrier and be able identify air carrier aircraft types.** 45.03