Adopted CTE Course Blueprint of Essential Standards

8210 Technology Engineering and Design
(Recommended hours of instruction: 135-150)

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Foundations of Technology, Third Edition
Technology, Engineering, and Design

Course Assessment Blueprint
Interpretation of Columns on EbD™ STEM Course Blueprints

No.	Heading	Column information
1	*STL* Standard/ Benchmark	The standard and benchmark addressed from *Standards for Technological Literacy* (e.g., 1A). The primary source is the appropriate column in the ***Standards Responsibility Matrix***.
2	*STL* Depth of Coverage	This is a number from 1-4, with 4 representing the greatest depth of coverage, a benchmark that is addressed to sufficient depth that it must be assessed.
3	NCTM Standard/ Enabling Statement	The **High School** NCTM Standard/Enabling Statement designation is derived from *Principles and Standards for School Mathematics* (NCTM, 2000). It is a combination of **numbers and letters** (e.g., 1A) from the **Mathematics Standards Matrix**.
4	NCTM Depth of Coverage	This is a number from 1-4, with 4 representing the greatest depth of coverage, a benchmark that is addressed to sufficient depth that it must be assessed.
5	AAAS Standard	The **High School** AAAS designation is derived from *Benchmarks for Science Literacy* (AAAS, 1993/2009). It is a combination of **numbers and letters** (e.g., 1A) from the **Science Standards Matrix**.
6	AAAS Depth of Coverage	This is a number from 1-4, with 4 representing the greatest depth of coverage, a benchmark that is addressed to sufficient depth that it must be assessed.
7	Unit Titles and Objective Statements	Statements of unit titles and specific objective. Each objective begins with an action verb and makes a complete sentence when combined with the stem "Students will learn to. . ." (The stem appears once in Column 7.) Outcome behavior in each objective statement is denoted by the verb plus its object.
8	Course Weight	Shows the relative importance of each objective and unit. Course weight is used to help determine the percentage of total class time that is spent on each objective.
9	RBT Designation (If Included)	Classification of outcome behavior in competency and objective statements in Dimensions according to the *Revised Bloom's Taxonomy*. (Cognitive Process Dimension: 1 Remember, 2 Understand, 3 Apply, 4 Analyze, 5 Evaluate, 6 Create) (Knowledge Dimension: A Factual Knowledge, B Conceptual Knowledge, C Procedural Knowledge)

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STL		NCTM		AAAS				
STL Standard/ Benchmark	*STL* Depth of Coverage	NCTM Standard/ Enabling Statement	NCTM Depth of Coverage	AAAS Chapter/ Section/ Grade	AAAS Depth of Coverage	**Unit Titles and Objective Statements (Students will learn to:)**	**Course Weight (Total = 100%)**	**RBT Designation**
1	2	3	4	5	6	7	8	9
N/A	N/A	N/A	N/A	N/A	N/A	**Unit 1:** Technological Innovations and Inventions	**10%**	
2-CC	4					Discuss how new technologies are used to create new processes. 1.2 Explain how the introduction of a new technology would change the current process used in creating a product. 1.2	1.5%	
7-G	4			3C/H6	4	Support the statement that most technological development has been evolutionary, the result of a series of refinements to a basic invention, through an electronic presentation. 1.1 Present the evolutionary history of a technological device, specifically mentioning the original invention and the series of refinements to that invention that led up to the given technological device. 1.1 Support the statement that the human ability to shape the future comes from a capacity for generating knowledge and developing new technologies—and for communicating ideas to others. 1.1	4%	
6-J	4					Support the statement that 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. 1.3 Identify how advertising, the strength of the economy, the goals of the company, and the fads of the time period contribute to the design of the product and the success or failure of the product, given various	2%	

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						technological innovations. 1.3		
10-I	4					Illustrate that research and development is a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace by researching a specific company within the local vicinity. 1.4 Present how a company's research and development department uses specific problem-solving approaches to prepare devices and systems for the marketplace, using a specific company within the local community. 1.4	2%	
		Alg 7F	4			Approximate and interpret rate of change from graphical and numerical data. 1.1	.5%	

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N/A	N/A	N/A	N/A	N/A	N/A	**Unit 2:** History of Technology	**8%**	
2-X	4					Describe two systems that are embedded within larger technological, social, and environmental systems. 2.1	1%	
7-J	4					Explain that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. 2.1	1.5%	
7-K	4					Compare and contrast early steel and iron tools from the Iron Age with earlier bronze and stone tools. 2.2	1%	
7-L	4					Research a technological device from the Middle Ages that produced long-lasting effects on technology and society. 2.2	1%	
7-M	4					Describe one of Leonardo da Vinci's devices that is the basis for a technological device used today. 2.2	1%	
7-N	4			3C/ M4	4	Explain that the Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. 2.2 Describe societal events from the 1900s that led to progress in science and invention. 2.2 Select one of the following areas of technology and explain how technology changed the way people live and work; agriculture, manufacturing, sanitation and medicine, warfare, transportation, information processing, and communications.	1.5%	

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						2.2		
7-O	4					Demonstrate how Information Age devices are used to process and exchange information. 2.2	1%	

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N/A	N/A	N/A	N/A	N/A	N/A	**Unit 3:** Systems	**10%**	
12-M	4			11A/H2	4	Diagnose a system that is malfunctioning and distinguish tools, materials, machines, and knowledge to repair it. 3.4 Use tools, materials, machines, and knowledge to repair a system or product that is malfunctioning. 3.4 Identify an opportunity for redesign of a product and choose to reverse engineer the design flaw. 3.3 Define a system by identifying its subsystems, their relationship to other systems, and the intended input and output of the system. 3.3 Troubleshoot common mechanical and electrical systems, checking for possible causes of malfunction, and decide whether to fix it or get help from an expert. 3.4	3%	
12-N	4			12C/H1*	4	Design a troubleshooting diagram and manual for another user to maintain the safe and proper operation of a system or product. 3.2 3.4 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. 3.4 Follow instructions in manuals or seek help from an experienced user to learn how to operate new mechanical or electrical devices. 3.4	3%	
12-O	4					Operate systems so that they function in the way they were designed. 3.2	1%	

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						Identify the safe procedures and directions so a new user can recognize the input, process, output, feedback components of, and operate two different systems. 3.2		
2-X	4			3B/M3a	4	Explain that systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems. 3.1 3.2 Use systems in the design and development of technology. 3.1 3.2 Differentiate between larger technological, social or environmental systems from smaller components and subsystems. 3.1 3.2 Identify the various systems embedded within the larger system (technological, social, or environmental), using the language of the core technologies (input, process, output, feedback). 3.1 3.2	3%	

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N/A	N/A	N/A	N/A	N/A	N/A	**Unit 4:** Design	**22%**	
8-H	4	Geo11X	4			Apply the steps of the design process including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing, and communicating results. 4.2, 4.6 Analyze the cross sections of three-dimensional objects and spaces from different perspectives. 4.2	3%	
9-I	4	Geo11AA	4			Identify the design principles used in a current design, collect data on the effectiveness of the design principles used, and propose a redesign using a design process. 4.1 Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture. 4.4	3%	
11-N	4					Distinguish the criteria and constraints and reflect on how the criteria and constraints affected their final solution. 4.3 Identify pertinent information needed to solve a given problem on two or more case studies. 4.3	2%	
11-O	4	Geo11X Geo11AA	4 4			Use prototypes and models to ensure quality, efficiency, and productivity of their final product. 4.4 Analyze the cross sections of three-dimensional objects and spaces from different	4%	

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						perspectives. 4.6 Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture. 4.4		
11-R	4	Geo8M Geo11X Geo11W	4 4 4			Communicate their observations, processes, and results of the entire design process and the final solution, using appropriate verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. 4.6 Analyze properties and determine attributes of two- and three-dimensional objects. 4.6 Analyze the cross sections of three-dimensional objects and spaces from different perspectives. 4.6 Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools. 4.6	4%	
12-P	4					Collect data and information and use computers and calculators to organize, process, and present the collected data and information. 4.5	2%	
12-L	4					Present their completion of the design process through a presentation with two target audiences, using appropriate oral and written techniques. 4.6	2%	
13-J	4					Collect information and evaluate its quality. 4.5	2%	

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N/A	N/A	N/A	N/A	N/A	N/A	**Unit 5:** The Designed World	**40%**	
15-K Lesson 5	4					Identify, for a specific food, fiber, fuel, chemical, or other agriculture product, the systems individuals, corporations, financial institutions, and government use to produce and regulate the specific product. 5.5	3%	
1-J Lesson 1	4					Identify technology and processes designed for specific functions of a given system. 5.1	3%	
18-J Lesson 5	4			8C/H2	4	Identify the transportation utilized within a given system such as manufacturing, construction, communication, health and safety, or agricultural. 5.5 Describe the advantages and disadvantages to consider when selecting fuels to be used in a transportation system. 5.5	4%	
16-K Lesson 1	4			4BH8	4	Categorize examples given by the teacher into the major forms: thermal, radiant, electrical, mechanical, chemical, and nuclear. List three natural resources that are readily renewable, three that are renewable only at great cost, and three that are not renewable at all. 5.1 Trace the conversion of energy from one form to another within an electronic device. 5.1 Describe how energy is conserved within an electronic device. 5.1	4%	
16-J Lesson 1	4			4B/H8	4	Diagram how a power plant converts energy from one form to another while conserving energy. 5.1 Explain that the earth has many natural resources of great importance to human life. List three natural resources that are readily	4%	

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						renewable, three that are renewable only at great cost, and three that are not renewable at all. 5.1		
17-L Lesson 4	4					Identify the inputs, processes, and outputs associated with a given information and communication system. 5.4	3%	
17-M Lesson 4	4					Identify examples of how information and communication systems allow information to be transferred from human to human, human to machine, machine to human, and machine to machine. 5.4	3%	
17-O Lesson 4	4					Identify the function of the source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination for information and communication systems. 5.4	3%	
19-M Lesson 2	4					Classify materials as natural, synthetic, or mixed based on the mechanical, thermal, and electrical properties of the material. 5.2	3%	
20-K Lesson 3	4					Identify the appropriate assembly procedures to create a structure based on the supplied resources, the given budget of the project, and the skills of the workers. 5.3	3%	
20-J Lesson 3	4					Identify the components of the infrastructure that assists in the function of the school within the student's local community. 5.3	3%	
14-L Lesson 6	4			6E/H3a	4	Identify the medicine, telecommunications, virtual presence, computer engineering, informatics, artificial intelligence, robotics, materials science, and perceptual psychology that integrate to complete the problem solution to a given case study scenario. 5.6 Provide examples of new medical techniques and efficient health care delivery systems	4%	

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						that allow human beings a better chance of staying healthy. 5.6 Analyze the dietary and sanitation needs of an area that has just experienced a natural disaster such as an earthquake, tsunami, or flood. 5.6		

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N/A	N/A	N/A	N/A	N/A	N/A	**Unit 6:** Integrated Transportation Systems (NASA)	**10%**	
2X Lesson 3	4					Apply systems-thinking principles to the engineering design process. 6.3	.5%	
Lesson 3				11A/H3	4	Describe two examples of feedback in the successful operation of the NASA Transportation Cycle. 6.3	1%	
2CC Lesson 1	4	Meas12M	4			Describe the basic operating principles behind the Ares V in transporting cargo to the lunar surface. 6.1 Describe the basic operating principles behind the Ares I in transporting crew members to the lunar surface and back to Earth. 6.1 Make decisions about units and scales that are appropriate for problem situations involving measurement. 6.1	1%	
2EE Lesson 4	(Adv HS)			3B/H1	4	Explain that the management of transportation systems includes the process of planning, organizing, and controlling the transportation cycle. 6.4 Use a mathematical modeling aid to simulate how a proposed system would behave. 6.4	1%	
Lesson 4		Geo11W Meas12M	4 4			Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools. 6.4 Make decisions about units and scales that are appropriate for problem situations involving measurement. 6.4	1.5%	
11R Lesson 4	4	Geo11W	4			Evaluate a design by using conceptual, physical, and mathematical models. 6.4	1.5%	

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						Draw and construct representations of two- and three-dimensional geometric objects, using a variety of tools. 6.4		
12O Lesson 4	4			11A/H3	4	Operate systems so they function the way they were designed. 6.4 Identify the feedback from successful operation of a designed system. 6.4	1.5%	
18J Lesson 2	4					Explain that transportation plays a vital role in the operation of other technologies, such as manufacturing, construction, communications, health, safety, and agriculture. 6.2 Describe examples for each mode of transportation, such as highways, waterways, railways, and space, which are integrated to move people and goods. 6.2	1%	
18K Lesson 2	(Adv HS)					Describe that intermodalism is the use of various modes of transportation as parts of an interconnected system to move people and goods. 6.2 Describe the specific intermodal forms of transportation NASA uses to move goods and people. 6.2 Describe how one component within the NASA transportation system can impact a NASA mission. 6.2 Explain how the NASA transportation cycle contributes to NASA achieving the mission. 6.2	1%	

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