

Goodheart-Willcox Publisher
Correlation of
***Technology Engineering Our World* © 2020**
to Maryland Department of Education

Course: Middle School Technology & Engineering Grades 6-9



Standards	Correlating Textbook Pages
Standard 1: The Nature of Technology -Students will develop an understanding of the nature of technology.	
<i>Characteristics and Scope of Technology</i>	
Differentiate between technological inventions and innovations.	92
Identify the need for technological invention and innovation.	61-62
Describe how marketing and advertising is used to create demand for technological products (STL, 3I).	597-599
<i>Core Concepts of Technology</i>	
Describe the components of a technological system.	74-93
Design a model that demonstrates how subsystems and system elements interact within systems.	85-93
Select or design a technological system to perform a task based on specific requirements.	85-93
Assemble and operate simple technological systems.	85-93
Analyze the performance of a feedback control system.	92-93
Troubleshoot a malfunctioning system (STL, 10F).	93
Use tools, materials, and machines safely to diagnose, adjust and repair systems (STL, 12I).	92-93
Provide examples of optimization and trade-offs for products, processes, and systems.	92-93
<i>Connections Between Technology and Other Fields of Study</i>	
Analyze how knowledge gained from other fields of study has impacted the development of technological products and systems (STL, 3F).	8-10
Describe how patents protect intellectual property (STL, 3I).	61-62
Assess the limitations of open source technology.	61-62
Standard 2: Impacts of Technology -Students will evaluate the impact of technology.	
<i>Effects of Technology</i>	
Discriminate between responsible and irresponsible use of technology.	11-12
Analyze the cultural, social, economic, political and environmental effects of technology.	11-12
Describe legal and ethical concerns resulting from the development and use of technology (STL, F).	552-553, 600
Explain that decisions about the use of technology involve trade-offs between positive and negative effects (STL, 4I).	11-12
Assess the impact of technology transfer from one society to another (STL, 4K).	11-12
Evaluate the advantages and disadvantages of technology.	11-12

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Role of Society in the Development and Use of Technology	
Describe how new technologies have evolved as a result of combining existing technologies.	16-20
Assess the impact that technological invention and innovation has on the needs and wants of a society (STL, 4E).	11-12, 16-20
Explain how technological advances have impacted the nature of work.	11-12, 16-20
Standard 3: Engineering Design and Development -Students will demonstrate knowledge of and apply the engineering design process to develop solutions to problems.	
Explain how the design process is an iterative, systematic approach to problem solving that includes collaboratively:	
Defining a problem -students will be able to employ technical reading and writing skills to develop concise problem statement.	74-79
Brainstorming -students will be able to apply team brainstorming rules and techniques	43, 82-83
Researching and Generating Ideas -students will be able to conduct research to assess prior solutions to the problem.	80-89
Identifying Criteria and Specifying Constraints -students will be able to assess the criteria (guidelines) and prioritize constraints (limitations) of the problem. This includes people, time, materials, capital, energy, etc	85-89
Exploring Possibilities -students will conduct research and explore possibilities for potential solutions.	85-89
Selecting an Approach -students will be able to employ a decision matrix to select the best approach to solve the problem.	85-89
Developing a Design Proposal -students will be able to create a plan of action that details the specifics of the project.	85-89
Making a Model or a Prototype -students will be able to develop conceptual, mathematical, or physical models and/or a prototype that performs the final solution and can be used for testing/evaluating. This includes the creation of two and three dimensional scale drawings.	90-92
Testing and Evaluating Design Using Specifications students will be able to use establish specifications to assess their design product.	92-93
Refining a Design -student will employ data- driven decision making to improve their product.	92-93
Creating or Making the Product -students will be able to produce the design product	92-93
Communicate Processes and Results -students will be able to communicate throughout the design process demonstrating application of the essential skills and knowledge presented in Maryland's College and Career Ready Disciplinary Literacy Standards .	74-93

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Apply the design process to develop solutions to real-world problems.	74-93
Document the design process and solutions in a journal, notebook, or portfolio.	74-93
Assess the reliability and validity of researched information.	80-89
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of a problem (MS-ETS1-2).	88-89
Discriminate between ethical and unethical engineering practices.	552-553, 600
Standard 4: Core Technologies and The Designed World -Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.	
Analyze the function of select core technologies in the designed world.	
Medical Technologies	
Explore the function and application of several medical technologies.	7, 566- 574
Correlate advances in medical technologies to improvements in the length and quality of life for multicellular organisms.	7, 566- 574
Describe ethical considerations involved in the development and application of medical technologies.	7, 566- 574
Agricultural Technologies	
Explore the function and application of a variety of technological processes, equipment, and systems used in agriculture (e.g. agroforestry, irrigation, global positioning systems).	541-542, 560-566, 572-574
Design, develop, use, manage, maintain, and assess a closed system that supports living organisms (e.g. terrarium, hydroponics station).	560-566
Evaluate the positive and negative effects of technological solutions to agricultural problems.	541 – 542, 560-566, 572-574
Describe techniques used to provide long-term storage of food and reduce the health risk caused by tainted food (STL, 15J).	
Biotechnology	
Explore applications of biotechnology.	572-574
Examine positive and negative impacts of biotechnology.	572-574
Analyze ethical, societal, and legal issues that arise from biotechnology applications.	572-574
Energy and Power Technologies	

Standards	Correlating Textbook Pages
Analyze how power systems are used to drive and provide propulsion to other technological products and systems (STL, 16H).	11, 57, 415-428, 434
Design, construct, and test a device that either minimizes or maximizes energy transfer (MS-PS3-3).	11, 57, 415-428, 434
Explore ways to conserve energy.	11, 57, 415-428, 434
Assess advantages and disadvantages of different forms of renewable and nonrenewable energy.	11, 57, 415-428, 434
Information and Communication Technologies	
Assess the application and functionality of the parts of a communication system (source, encoder, transmitter, receiver, decoder, and destination) (STL, 17H).	492-493
Explore different steps in the communication process (encode message, encoded message is transmitted or switched through a channel, message is received and decoded by the receiver).	492-496
Design and send messages using various types of communication systems.	493-512
Design and develop a simple communications system.	493-512
Transportation Technologies	
Investigate the functionality of various methods of transportation for land, water, air, and space.	372-396
Assess processes necessary for an entire transportation system to operate efficiently (e.g. receiving, holding, storing, loading) (STL, 18I).	372-396
Analyze the interdependence of transportation systems.	372-396
Design and develop models of subsystems in a transportation system (structural, propulsion, suspension, guidance, control, and support).	372-396
Design and develop a model of a new energy efficient vehicle to be use on land, in the sea, in the air, or in space.	372-396
Describe how governmental regulations influence the design and operation of transportation system.	372-396
Manufacturing Technologies	
Identify the components of a manufacturing system.	208-225
Identify resources required for manufacturing systems to operate properly (e.g. raw materials, finances, people, tools, machines, time).	208-209
Examine the mechanical and chemical processes of manufacturing.	210-211, 231-232
Analyze the development, production, application, marketing, acquisition, and disposal of manufactured products.	208-225
Assess the impact that technology (e.g. computer-aided design, automation, robots, assembly lines) has on the manufacturing process.	212-218



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Assess the impact that the manufacturing process has on people and the environment.	224-225
Classify manufactured goods according to their longevity.	208-225
Assess a variety of manufacturing methodologies.	208-225
Construction Technologies	
Analyze the type of and purpose for a variety of structures.	291-298, 304-318, 322-324
Analyze factors used in the selection of designs for structures (e.g. laws, codes, style, cost, climate, function) (STL, 20F).	304-324
Examine different subsystems within buildings. Analyze the maintenance of structures and subsystems.	304-324
Assess the role that community planning, laws, and regulation have in the development and maintenance of structures.	304-324
Design, use, and assess building material.	304-324
Design and create models of structures.	304-324
Analyze the type of and purpose for a variety of structures.	304-324
Standard 5: Computational Thinking and Computer Science Applications -Students will be able to apply computational thinking skills and computer science applications as tools to develop solutions to engineering problems.	
Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.	74-93
Use the basic steps in algorithmic problem solving to design solutions to problems.	8-10, 586
Use modeling and simulation to represent and understand natural phenomena.	503-505
Implement problem solutions using a programming language.	503-505
Use productivity technology tools for individual and collaborative writing, communication, presentation, and/or publishing activities.	492-512
Apply responsible legal and ethical behaviors in the use of technology systems and software.	552-553, 600
Analyze how computational thinking and computer programming can be used as tools for problem solving.	503-505