Bristol Public Schools

Office of Teaching & Learning

Department	Career and Technical Education (CTE)
Department Philosophy	Bristol schools believe in providing students with rich opportunities to ensure career and college readiness. These opportunities include development of skills, practices, and exploration within several career clusters and pathways, beginning at the middle school level. Each CTE curriculum enables students to acquire and strengthen leadership, literacy, numeracy, decision-making, computer skills, and technology skills through 11 career clusters and pathways: (1) architecture and construction, (2) business management, (3) education and training, (4) finance, (5) health science, (6) hospitality and tourism, (7) information technology, (8) manufacturing, (9) marketing, (10) transportation, distribution and logistics, and (11) STEM. Each career cluster provides students with access to hand-on experiences that will allow for students development of skills that will support successful transition to their post secondary experiences.
Course	Technology I: An introduction to Technology
Course Description for Program of Studies	The 6th grade Introduction to Technology class is an exploratory course designed to expose and inspire students to multiple career pathways. Students will be introduced to career pathways and the building blocks of society through project based learning content in Robotics & Coding, Digital Communications & Graphic Design, and Engineering & Technology. Students will gain knowledge and understanding of the world we live in and how their personal skill sets are invaluable and where they fit into society.
Grade Level	6th grade
Pre-requisites	None
Credit (if applicable)	

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Module 1: MS CTE Google Site Portfolio Development			
UNWRAPPED STANDARDS			
Advance CTE/ISTE/STEL Standards	**Performance Elements**	**Key Concepts/Big Ideas**	**Academic Vocabulary**
ISTE-Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.	● *(3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.*	Create an online portfolio using Google Sites that will be used throughout their middle school years. 1. Online portfolio 2. Graphic Design 3. Organization of Google Drive	● *Portfolio* ● *Graphic design* ● *Organize* ● *Balance* ● *Digital Footprint*
ISTE-Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.	● *(6A)-Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.* ● *(6B)-Students create original works or responsibly repurpose or remix digital resources into new creations.* ● *(6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.* ● *(6D)-Students publish or present content that customizes the message and medium for their intended audiences.*	Graphic design of a web page. 1. Professional looking page 2. Proper use of tools available	● *Insert* ● *Theme* ● *Embed*
ISTE-Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals,	● *(1a)-Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning*	Learning how to organize and collect pieces of work that can be digitally collected.	● *Page* ● *Subpage*

informed by the learning sciences.	*outcomes.*		
		Navigation of Google Sites	● *Table of Contents* ● *Link*

UNIT 1: MS CTE Google Site Portfolio Development

Essential Questions

- How can I use Google Sites to organize and build a technology education exploration portfolio?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

<table>
<tr><th>CTE Standard</th><th>Learning Targets: I can</th><th>Summative Assessment Strategy</th><th>Lesson Progression and Connection to ELA/Math CCSS</th><th>Common Learning Experiences and Assessments</th></tr>
<tr><td>ISTE</td><td>● I can organize my Google Drive to ensure that my assignments are easily located.
● I can create an online portfolio using Google Sites to track my progress throughout my middle school career.</td><td rowspan="2"><table><tr><td></td><td>Selected Response (SR)</td></tr><tr><td></td><td>Constructed Response (CR)</td></tr><tr><td>X</td><td>Performance (P)</td></tr><tr><td></td><td>Observation (O)</td></tr></table></td><td rowspan="2">Lesson Progression and Standards Connection:
● Each of the above standards should be found throughout the unit sequences.
● (1a)-Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.</td><td>Mandatory Lessons/Activities:
● Organize Google Drive
● Introduction to Sites
● Create a Google Site-General Components</td></tr>
<tr><td>Pacing:</td><td>1 block</td><td>Assessments:
● Organization of the Google Drive
● Creation of Google Sites</td></tr>
<tr><td>ISTE</td><td>● I can organize my content on a Google Site in a meaningful way.</td><td rowspan="2"><table><tr><td></td><td>Selected Response (SR)</td></tr><tr><td>x</td><td>Constructed Response (CR)</td></tr><tr><td>x</td><td>Performance (P)</td></tr><tr><td></td><td>Observation (O)</td></tr></table></td><td rowspan="2">Lesson Progression and Standards Connection:
● (3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
● (6A)-Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.</td><td>Mandatory Lessons/Activities:
● Create a Google Site-Add Pages and Organizational Features</td></tr>
<tr><td>Pacing:</td><td>0.5 Blocks</td><td>Assessments:
● Google Site Organization and Construction</td></tr>
<tr><td>ISTE</td><td>● I can use the building tools provided in Google Sites to</td><td></td><td>Lesson Progression and Standards Connection:
● (3c)-Students curate information from digital</td><td>Mandatory Lessons/Activities:
● Task-Navigating the Google</td></tr>
</table>

	organize and display my products.		*resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.* ● *(6A)-Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.* ● *(6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.* ● *(6D)-Students publish or present content that customizes the message and medium for their intended audiences.*	*Sites Building Tools, Build the portfolio framework for Grade 6 (include subpages for each module).*
Pacing:	0.5 blocks			**Assessments:** ● *Google Site Portfolio Framework-Rubric (attach link)*

	Selected Response
	Constructed Response
x	Performance (P)
	Observation

Module 2: Introduction to Technology and Engineering			
UNWRAPPED STANDARDS			
Advance CTE/ISTE/ITEE Standards	**Performance Elements**	**Key Concepts/Big Ideas**	**Academic Vocabulary**
STEL 1 Nature and Characteristics of Technology and Engineering	● 1J. Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants. ● 1K. Compare and contrast the contributions of science, engineering, mathematics, and technology in the development of technological systems. ● 1L. Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations. ● 1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	● Reverse engineer current technologies ● Understand the steps to the engineering design process. ● Apply the engineering design process ● Identify how the engineering design cycle is used in careers.	● Engineering design cycle ● Criteria ● Development ● Testable ● Limitation ● Impact ● Specification ● Consideration ● Replica ● Prototype ● Priority ● Model ● Trade-off ● Test results ● Redesign process ● Design system ● Element ● Iterative ● Optimal
STEL 5 Influence of Society on Technological Development	● 5F. Analyze how an invention or innovation was influenced by its historical context. ● 5G. Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.		
STEL 6 History of Technology	● 6C. Compare various technologies and how they have contributed to human progress. ● 6D. Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements. ● 6E. Verify how specialization of function has been at the heart of many technological improvements.		
STEL 7 Design in Technology and	● 7P. Illustrate the benefits and opportunities		

Engineering Education	associated with different approaches to design. ● 7Q. Apply the technology and engineering design process. ● 7R. Refine design solutions to address criteria and constraints. ● 7S. Create solutions to problems by identifying and applying human factors in design. ● 7T. Assess design quality based upon established principles and elements of design. ● 7U. Evaluate the strengths and weaknesses of different design solutions. ● 7V. Improve essential skills necessary to successfully design.		
STEL 8 Applying, Maintaining, and Assessing Technological Products and Systems	● 8H. Research information from various sources to use and maintain technological products or systems. ● 8K. Design methods to gather data about technological systems.		

UNIT 2: Introduction to Technology and Engineering

Essential Questions:

- How does technology change?
- What is the impact of the engineering design cycle on past and present technologies?
- How does the iterative process of engineering design improve outcomes?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

CTE Standard	Learning Targets: I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL	● I can compare technology from the past to current/future technology. ● I can predict how the changes were made/designed to advance the technology.		**Lesson Progression and Standards Connection:** ● *5F. Analyze how an invention or innovation was influenced by its historical context.* ● *5G. Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.* ● *1L. Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations.* ● *1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.*	**Mandatory Lessons/Activities:** ● *Task-Improving Technology Over Time*
Pacing:	2 block			**Assessments:** ● *Formative-Task Discussion and Technology Analysis*
STEL	● I can understand the components of the engineering design cycle. ● I can apply the components of the engineering design cycle to solve a problem. ● I can use the engineering design cycle to solve a problem. ● I can assess and iterate my design to support a better solution.		**Lesson Progression and Standards Connection:** ● *7P. Illustrate the benefits and opportunities associated with different approaches to design.* ● *7Q. Apply the technology and engineering design process.* ● *7R. Refine design solutions to address criteria and constraints.* ● *7S. Create solutions to problems by identifying and applying human factors in design.* ● *7T. Assess design quality based upon established principles and elements of design.*	**Mandatory Lessons/Activities:** ● *Engineering Design Cycle Activity* ● *Performance Task: Lego Engineering and Iterations for Improved Success*
Pacing:	5 Blocks			**Assessments:**

	Selected Response (SR)
X	Constructed Response (CR)
X	Performance (P)
	Observation (O)

	Selected Response (SR)
x	Constructed Response (CR)
x	Performance (P)
	Observation (O)

<table>
<tr><td></td><td></td><td></td><td>● 7U. Evaluate the strengths and weaknesses of different design solutions.
● 7V. Improve essential skills necessary to successfully design.</td><td>● Student self assessment and design iteration
● Student Journal/Reflection</td></tr>
<tr><td>ISTE</td><td>● I can develop a Google Slide presentation to show the engineering cycle in action.
● I can describe a career that uses the engineering design cycle.
● I can showcase my work and reflect on my MS Technology Portfolio.</td><td rowspan="2"><table><tr><td></td><td>Selected Response</td></tr><tr><td>X</td><td>Constructed Response</td></tr><tr><td>x</td><td>Performance (P)</td></tr><tr><td></td><td>Observation</td></tr></table></td><td rowspan="2">Lesson Progression and Standards Connection:
● (3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
● (6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
● (6D)-Students publish or present content that customizes the message and medium for their intended audiences.</td><td>Mandatory Lessons/Activities:
● Google slides creation demonstrating their knowledge of the engineering design cycle.
● Identify connecting high school pathways and course offerings.</td></tr>
<tr><td>Pacing:</td><td>1 block</td><td>Assessments:
● Creation of Google Slides presentation
● Portfolio Post-Engineering Design Reflection</td></tr>
</table>

Module 3: Introduction to Graphic Design			
UNWRAPPED STANDARDS			
Advance CTE/ISTE/ITEE Standards	**Performance Elements**	**Key Concepts/Big Ideas**	**Academic Vocabulary**
STEL 2 Core Concepts of Technology and engineering	● 2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used. ● 2Q. Predict outcomes of a future product or system at the beginning of the design process. ● 2S. Defend decisions related to a design problem.	Use design thinking to create a product. Understand the elements of design and their relationship to the outcome of the produce Use computer skills and software to develop and construct a product. Understand the connection between graphic design and marketing.	Elements of Design Line Shape Color Texture Type Space Image Balance Contrast Emphasis Proportion Pattern Rhythm Unity Variety
STEL 7 Design in Technology and Engineering Education	● *7Q. Apply the technology and engineering design process.* ● 7R. Refine design solutions to address criteria and constraints. ● 7T. Assess design quality based upon established principles and elements of design. ● 7V. Improve essential skills necessary to successfully design.		
Technology and Engineering Practices	● TEP-2 (creativity)-Exhibits innovative and original ideas in the context of design-based activities. ● TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects. ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*		

UNIT 3: Introduction to Graphic Design

Essential Questions:

- What is graphic design?
- What are the elements of graphic design?
- How are the elements in graphic design used in marketing?
- How can you recreate famous pieces by focusing on the elements of design?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

CTE Standard	Learning Targets: I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL	● I can describe the seven elements of graphic design.		**Lesson Progression and Standards Connection:** ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*	**Mandatory Lessons/Activities:** ● *Lesson-Introduction to graphic design*
Pacing:	.5 block		**CCSS Connections:** ● CCSS.ELA-LITERACY.RST.6-8.7 ● Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	**Assessments:** ●
STEL	● I can identify and describe the seven elements of graphic design in a product.		**Lesson Progression and Standards Connection:** ● *7Q. Apply the technology and engineering design process.* ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*	**Mandatory Lessons/Activities:** ● *Task-Explorations/Explanation of the elements of graphic design.*
Pacing:	.5 Blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.7* ● *Integrate quantitative or technical information expressed in words in a text with a version of*	**Assessments:** ●

	Selected Response (SR)
	Constructed Response (CR)
	Performance (P)
X	Observation (O)

			that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	
STEL	● I can work collaboratively to recreate a professional advertisement using graphic design. ● I can define marketing. ● I can explain how the advertisement meets the goals of marketing.	<table><tr><td></td><td>Selected Response</td></tr><tr><td></td><td>Constructed Response</td></tr><tr><td>X</td><td>Performance (P)</td></tr><tr><td></td><td>Observation</td></tr></table>	**Lesson Progression and Standards Connection:** ● *TEP-2 (creativity)-Exhibits innovative and original ideas in the context of design-based activities.* ● *TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects.* ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.* ● *7T. Assess design quality based upon established principles and elements of design.* ● *7V. Improve essential skills necessary to successfully design.*	**Mandatory Lessons/Activities:** ● *Students will work collaboratively to recreate a famous piece using graphic design.*
Pacing:	2 Blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.3* ● *Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.*	**Assessments:** ● *Completion of graphic design*
STEL	● I can apply the elements of graphic design to meet a real-world need.	<table><tr><td></td><td>Selected Response</td></tr><tr><td></td><td>Constructed Response</td></tr><tr><td>X</td><td>Performance</td></tr><tr><td></td><td>Observation</td></tr></table>	**Lesson Progression and Standards Connection:** ● *7T. Assess design quality based upon established principles and elements of design.* ● *7V. Improve essential skills necessary to successfully design.* ● *2Q. Predict outcomes of a future product or system at the beginning of the design process.* ● *2S. Defend decisions related to a design problem.*	**Mandatory Lessons/Activities:** ● *Students will complete an assignment creating an infographic.*
Pacing:	2 Blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.7* ● *Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).*	**Assessments:** ● *Infographic*
STEL	● I can use the elements of design to create an advertisement for a career in graphic design.	<table><tr><td></td><td>Selected Response</td></tr></table>	**Lesson Progression and Standards Connection:** ● *7T. Assess design quality based upon established principles and elements of design.*	**Mandatory Lessons/Activities:** ● *Elements of Design Project-Advertisement for*

<table>
<tr><td></td><td></td><td rowspan="2"><table><tr><td></td><td>(SR)</td></tr><tr><td></td><td>Constructed Response (CR)</td></tr><tr><td>x</td><td>Performance (P)</td></tr><tr><td></td><td>Observation (O)</td></tr></table></td><td>● 7V. Improve essential skills necessary to successfully design.
● 2Q. Predict outcomes of a future product or system at the beginning of the design process.
● 2S. Defend decisions related to a design problem.</td><td>Favorite Product</td></tr>
<tr><td>Pacing:</td><td>1 Block</td><td>CCSS Connections:
●</td><td>Assessments:
●</td></tr>
<tr><td>ISTE</td><td>● I can research and describe a career that uses the elements of design.
● I can showcase my work and reflect on my MS Technology Portfolio.</td><td rowspan="2"><table><tr><td></td><td>Selected Response</td></tr><tr><td>X</td><td>Constructed Response</td></tr><tr><td>x</td><td>Performance (P)</td></tr><tr><td></td><td>Observation</td></tr></table></td><td rowspan="2">Lesson Progression and Standards Connection:
● (3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
● (6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
● (6D)-Students publish or present content that customizes the message and medium for their intended audiences.</td><td>Mandatory Lessons/Activities:
● Google (slide, doc, etc) creation demonstrating their knowledge of the elements of design and the related career opportunities.
● Identify connecting high school pathways and course offerings.</td></tr>
<tr><td>Pacing:</td><td>1 block</td><td>Assessments:
● Portfolio Post-Elements of Design Reflection</td></tr>
</table>

Module 4: Introduction to Tools and Materials

UNWRAPPED STANDARDS

Advance CTE/ISTE/ITEE Standards	Performance Elements	Key Concepts/Big Ideas	Academic Vocabulary
STEL 2 Core Concepts of Technology and engineering	● 2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used. ● 2Q. Predict outcomes of a future product or system at the beginning of the design process. ● 2R. Compare how different technologies involve different sets of processes. ● 2S. Defend decisions related to a design problem.	● Students will learn the safety rules for working in the makerspace. ● Students will understand the importance of following directions. ● Personal safety ● Safe use of hand tools ● Safe use of power tools ● Reading a plan to create a product. ● Reading measurement tools. ● Measuring and manipulating materials to devise a final product.	● Design ● Develop ● Evaluate ● Production ● Power tools ● Vice ● Hand tools ● Electrical safety ● Maker ● Making ● Makerspace ● Innovation
STEL 3 Integration of Knowledge, Technologies, and Practices	● 3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.		
STEL 7 Design in Technology and Engineering Education	● 7Q. Apply the technology and engineering design process. ● 7T. Assess design quality based upon established principles and elements of design. ● 7V. Improve essential skills necessary to successfully design.		
Technology and Engineering Practices	● TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects. ● TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects. ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*		

Module 4: Introduction to Tools and Materials

Essential Questions:

- What are the safety requirements in the MakerSpace?
- What tools are used in the makerspace, and what is the function of each tool?
- What types of materials can be manipulated in a MakerSpace?
- How is a design plan used to create a project with an intended outcome?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL	• I can demonstrate safe behaviors and actions within the makerspace. • I can accomplish safety procedures in the event of an emergency • I can locate and describe how to use essential safety equipment in the makerspace	☐ Selected Response (SR) ☐ Constructed Response (CR) ☐ Performance (P) ☐ Observation (O)	**Lesson Progression and Standards Connection:** • *TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects.* • *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*	**Mandatory Lessons/Activities:** • *Safety presentation* • *Tour of makerspace and location safety tools* • *Signed safety contract*
Pacing:	2.0 Blocks		**CCSS Connections:** • CCSS.ELA-LITERACY.RST.6-8.7 • Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	**Assessments:** • *Safety quiz*
STEL	• I can design a poster to describe the safety protocols in the makerspace.	☐ Selected Response (SR) ☐ Constructed Response (CR)	**Lesson Progression and Standards Connection:** • *TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects.* • *7Q. Apply the technology and engineering design process.* • *7T. Assess design quality based upon established principles and elements of design.*	**Mandatory Lessons/Activities:** • *Design poster on safety*

		☐ Performance (P) ☐ Observation (O)	● *7V. Improve essential skills necessary to successfully design.*	
Pacing:	1 Blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.7* ● *Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).*	**Assessments:** ● *Creation of safety poster*
STEL	● I can identify and describe tools and materials for a career. ● I can follow safety instructions in order to demonstrate safe use of tools and materials in the Makerspace. ● I can accurately measure using a 1/16” scale measurement tool ● I can create a finished product using a set of plans	☐ Selected Response ☐ Constructed Response ☐ Performance (P) ☐ Observation	**Lesson Progression and Standards Connection:** ● *2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used.* ● *2Q. Predict outcomes of a future product or system at the beginning of the design process.* ● *2R. Compare how different technologies involve different sets of processes.* ● *2S. Defend decisions related to a design problem.* ● *3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.*	**Mandatory Lessons/Activities:** ● *Presentation of tools and materials* ● *Introduction to various careers* ● *Project: Build a Product in makerspace following a plan*
Pacing:	12 Blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.3* ● *Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.* ● *CCSS.ELA-LITERACY.RST.6-8.7* ● *Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).*	**Assessments:** ●
ISTE	● I can research and describe a career that uses a makerspace. ● I can describe the tools used by individuals in this career and their purpose in developing a product. ● I can showcase my work and reflect on my MS Technology	☐ Selected Response X Constructed Response x Performance (P)	**Lesson Progression and Standards Connection:** ● *(3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.* ● *(6C)-Students communicate complex ideas*	**Mandatory Lessons/Activities:** ● *Google (slide, doc, etc) creation demonstrating their knowledge of the makerspace tools and materials and the related career opportunities.* ● *Identify connecting high*

	Portfolio.	☐ Observation	*clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.* ● *(6D)-Students publish or present content that customizes the message and medium for their intended audiences.*	*school pathways and course offerings.*
Pacing:	1 block			**Assessments:** ● *Portfolio Post-Makerspace Reflection*

Module 5: Introduction to Manufacturing

UNWRAPPED STANDARDS

Advance CTE/ISTE/ITEE Standards	Performance Elements	Key Concepts/Big Ideas	Academic Vocabulary
STEL 2 Core Concepts of Technology and engineering	● 2M. Differentiate between inputs, processes, outputs, and feedback in technological systems. ● 2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used. ● 2Q. Predict outcomes of a future product or system at the beginning of the design process. ● 2R. Compare how different technologies involve different sets of processes. ● 2S. Defend decisions related to a design problem.	● Students will learn to use a 3D modeling software ● Students will use the software to create a model that will be 3D printed. ● Understand the differences between additive and subtractive manufacturing. ● Investigate the career opportunities in manufacturing.	● 3 Axis(X,Y,Z) ● Extrude ● Degrees ● Width ● Height ● Filament ● Additive manufacturing ● Subtractive manufacturing ● Manufacturing ● CAD ● CAM ● Prototyping ● Digital fabrication ● Automation ● Production ● Flow chart ● Assembly line ● Defect
STEL 3 Integration of Knowledge, Technologies, and Practices	● 3F. Apply a product, system, or process developed for one setting to another setting. ● 3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.		
STEL 4 Impacts of Technology	● 4M. Devise strategies for reducing, reusing, and recycling wasted caused from the creation and use of technology.		
STEL 6 History of Technology	● 6C. Compare various technologies and how they have contributed to human progress. ● 6E. Verify how specialization of function has been at the heart of many technological improvements.		
STEL 7 Design in Technology and Engineering Education	● 7P. Illustrate the benefits and opportunities associated with different approaches to design. ● 7Q. Apply the technology and engineering design process. ● 7R. Refine design solutions to address criteria and constraints.		

	● 7T. Assess design quality based upon established principles and elements of design. ● 7U. Evaluate the strengths and weaknesses of different design solutions. ● 7V. Improve essential skills necessary to successfully design.		
Technology and Engineering Practices	● TEP-2 (creativity)-Exhibits innovative and original ideas in the context of design-based activities. ● TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects. ● TEP-5 Critiques technological products and systems to identify areas of improvement. ● TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects. ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*		

UNIT 5: Introduction to Manufacturing

Essential Questions:

- What is manufacturing?
- What are the types of manufacturing?
- What types of products are manufactured in Connecticut?
- How can we use our makerspace to manufacture goods?
- What technologies are used in manufacturing?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL	● I can use 3D modeling software to create a prototype of a finished product using additive manufacturing. ● I can describe a career that uses manufacturing to create a product.		**Lesson Progression and Standards Connection:** ● *TEP-2 (creativity)-Exhibits innovative and original ideas in the context of design-based activities.* ● *TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects.* ● *TEP-5 Critiques technological products and systems to identify areas of improvement.* ● *TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects.* ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.* ● *4M. Devise strategies for reducing, reusing, and recycling wasted caused from the creation and use of technology.*	**Mandatory Lessons/Activities:** ● *3D modeling software instruction* ● *Creation of Prototype*
Pacing:	3 Blocks		**CCSS Connections:** ● CCSS.ELA-LITERACY.RST.6-8.3 ● Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. ● CCSS.ELA-LITERACY.RST.6-8.7	**Assessments:** ● *Creation of 3D modeling design prototype.*

	Selected Response (SR)
x	Constructed Response (CR)
x	Performance (P)
	Observation (O)

<table>
<tr><td></td><td></td><td></td><td>● Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).</td><td></td></tr>
<tr><td>STEL</td><td>● I can use computer aided design (CAD) software to create a product using subtractive manufacturing.
● I can describe a career that uses manufacturing to create a product.</td><td rowspan="2"><table><tr><td></td><td>Selected Response (SR)</td></tr><tr><td></td><td>Constructed Response (CR)</td></tr><tr><td></td><td>Performance (P)</td></tr><tr><td></td><td>Observation (O)</td></tr></table></td><td>Lesson Progression and Standards Connection:
● TEP-2 (creativity)-Exhibits innovative and original ideas in the context of design-based activities.
● TEP-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects.
● TEP-5 Critiques technological products and systems to identify areas of improvement.
● TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects.
● TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.
● 4M. Devise strategies for reducing, reusing, and recycling wasted caused from the creation and use of technology.</td><td>Mandatory Lessons/Activities:
● CAD/CAM software instruction
● Creation of Prototype</td></tr>
<tr><td>Pacing:</td><td>3 Blocks</td><td>CCSS Connections:
● CCSS.ELA-LITERACY.RST.6-8.3
● Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
● CCSS.ELA-LITERACY.RST.6-8.7
● Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).</td><td>Assessments:
● Creation of Finished Product</td></tr>
<tr><td>ISTE</td><td>● I can research and describe a career in manufacturing.
● I can describe the tools and technologies used by individuals in this manufacturing and their purpose in developing a product.
● I can showcase my work and reflect on my MS Technology Portfolio.</td><td><table><tr><td></td><td>Selected Response</td></tr><tr><td>X</td><td>Constructed Response</td></tr><tr><td>x</td><td>Performance (P)</td></tr><tr><td></td><td>Observation</td></tr></table></td><td>Lesson Progression and Standards Connection:
● (3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
● (6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations,</td><td>Mandatory Lessons/Activities:
● Google (slide, doc, etc) creation demonstrating their knowledge of the manufacturing and the related career opportunities.
● Identify connecting high school pathways and course offerings.</td></tr>
</table>

Pacing:	1 block		*models or simulations.* ● *(6D)-Students publish or present content that customizes the message and medium for their intended audiences.*	**Assessments:** ● *Portfolio Post-Manufacturing a prototype*

Module 6: Introduction to Coding/Robotics

UNWRAPPED STANDARDS

Advance CTE/ISTE/ITEE Standards	Performance Elements	Key Concepts/Big Ideas	Academic Vocabulary
STEL-1 Nature and Characteristics of Technology and Engineering	● 1K.Compare and contrast the contributions of science, engineering, and technology in the development of technological systems. ● 1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	● Understanding the basic components of block programming. ● Using the design process to support the programming of a robot to meet a specific outcome. ● Building academic language around computer programming and robotics ● Make a connection between the careers in robotics and knowledge of coding.	● abstraction ● accessibility ● algorithm ● binary ● binary alphabet ● bit ● block-based programming language ● Blockly ● bug ● byte ● click ● code ● command ● computational thinking ● computer science ● conditionals ● data ● debugging ● decompose ● define (a function) ● digital footprint ● DNS (domain name service) ● double-click ● drag ● drop ● event ● event handler ● fiber optic cable ● for loop ● function ● function call ● function definition ● input
STEL 2 Core Concepts of Technology and engineering	● 2M. Differentiate between inputs, processes, outputs, and feedback in technological systems. ● 2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used. ● 2Q. Predict outcomes of a future product or system at the beginning of the design process. ● 2R. Compare how different technologies involve different sets of processes. ● 2S. Defend decisions related to a design problem.		
STEL 3 Integration of Knowledge, Technologies, and Practices	● 3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.		
STEL 4 Impacts of Technology	● 4M. Devise strategies for reducing, reusing, and recycling wasted caused from the creation and use of technology.		
STEL 6 History of Technology	● 6C. Compare various technologies and how they have contributed to human progress. ● 6D. Engage in a research and development process to simulate how inventions and innovations have evolved through systematic		

	tests and refinements. ● 6E. Verify how specialization of function has been at the heart of many technological improvements.		● Internet ● IP address ● iteration ● loop ● online ● output ● packets ● pattern matching ● Parameter ● persistence ● pixel ● program ● programming ● repeat ● run program ● search engine ● servers ● toolbox ● trustworthy ● URL (universal resource locator) ● username ● variable ● website ● while loop ● Wi-Fi ● workspace
Technology and Engineering Practices	● TEP-1 Uses system models to show how parts of a technological system work together. ● TEP-5 Critiques technological products and systems to identify areas of improvement. ● TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects. ● TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.		

UNIT 6: Introduction to Coding and Robotics

Essential Questions:

- What are the core features of programming languages?
- How does programming enable creativity and individual expression?
- What practices and strategies will help me as I write programs?
- What is the relationship between coding and robotics?
- What are the functions of robots in today's society?
- What are the skills needed to work with robots?

Throughout the course:

- What are the types of technology education offered by Bristol Public Schools?
- What careers are associated with each of the technology education pathways offered at Bristol Schools?
- What skills are required for entry into each career pathway explored?
- How can I use this portfolio to make decisions about my academic path through middle, high school and beyond?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL	• I can understand the core features of computer coding. • I can make sense of the terms used in coding. • I can create the proper sequence of block code to complete a task.	☐ Selected Response (SR) ☒ Constructed Response (CR) ☒ Performance (P) ☐ Observation (O)	**Lesson Progression and Standards Connection:** • *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.* • *3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.* • *1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.*	**Mandatory Lessons/Activities:** • *Demonstration of instructions* • *Demonstration of how block coding works.* • *Construct an infographic about the essential vocabulary related to coding.*
Pacing:	3 blocks		**CCSS Connections:** • CCSS.ELA-LITERACY.RST.6-8.7 • Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	**Assessments:** • *Finished product*
STEL	• I can research and describe a career that uses computer programming. • I can describe how robots are	☐ Selected Response (SR)	**Lesson Progression and Standards Connection:** • *6C. Compare various technologies and how they have contributed to human progress.* • *6D. Engage in a research and development*	**Mandatory Lessons/Activities:** • *Presentation of various careers that use computer programming and robotics.*

	used in the real world and their career applications. ● I can identify the relationship between coding and robotics.	x Constructed Response (CR) x Performance (P) Observation (O)	*process to simulate how inventions and innovations have evolved through systematic tests and refinement.*	
Pacing:	1 Block		**CCSS Connections:** ●	**Assessments:** ● *Presentation*
STEL	● I can explain the 3 main categories of robotics and what makes them different. ● I can use a block program to get a robot to complete a specific task.	Selected Response x Constructed Response x Performance Observation	**Lesson Progression and Standards Connection:** ● *TEP-1 Uses system models to show how parts of a technological system work together.* ● *TEP-5 Critiques technological products and systems to identify areas of improvement.* ● *TEP-6 (collaboration)-Demonstrated productive teamwork in design-based projects.* ● *TEP-7 (communication)-Exhibits effective technical, writing, graphic, and oral communication skills.*	**Mandatory Lessons/Activities:** ● *Students will be shown how to use the Sphero robots* ● *Students will be presented with information on various types of Robotics.*
Pacing:	4 blocks		**CCSS Connections:** ● *CCSS.ELA-LITERACY.RST.6-8.3* ● *Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.*	**Assessments:** ● *Students will be given a performance task to complete with the Sphero Robots.*
ISTE	● I can research and describe a career in coding/robotics. ● I can describe the tools and technologies used by individuals in that code and their purpose in developing a product. ● I can showcase my work and reflect on my MS Technology Portfolio.	Selected Response X Constructed Response x Performance (P) Observation	**Lesson Progression and Standards Connection:** ● *(3c)-Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.* ● *(6C)-Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.* ● *(6D)-Students publish or present content that customizes the message and medium for their intended audiences.*	**Mandatory Lessons/Activities:** ● *Google (slide, doc, etc) creation demonstrating their knowledge of coding/robotics and the related career opportunities.* ● *Identify connecting high school pathways and course offerings.*
Pacing:	1 block			**Assessments:** ● *Portfolio Post-Coding and Robotics*