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 II: Coding, Robotics, and Manufacturing Production
Course Description for Program of Studies	7th Grade Technology is an elective course designed to provide students further exploration and experience in career pathways. Students will delve deeper into the building blocks of society through coding and robotics, manufacturing, and an introduction to construction. Project based learning will guide students to develop a deeper insight of multiple career fields. The projects will also help students comprehend their individually unique skill sets in relation to industry and how their distinct skills are beneficial to industry and society.
Grade Level	7
Pre-requisites	None
Credit (if applicable)	

Table of Contents

Module 1: Coding

UNWRAPPED STANDARDS

Advance CTE/ISTE/STEL 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. ● Make a comparison from line coding to block coding. ● Using the design process to support the programming of a robot to meet a specific outcome. ● Building academic language around computer programming	● HTML ● Python ● Variables ● 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
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 6 History of Technology	● 6C. Compare various technologies and how they have contributed to human progress.		
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.		● function definition ● input ● 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
ISTE 1.5 Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.	● 1.5.a-Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions. ● 1.5.b-Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making. ● 1.5.c-Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. ● 1.5.d-Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.		

Module 1: Coding

Essential Questions:

- What careers require knowledge of coding?
- What is the difference between block and line coding?
- What are the advantages and disadvantages of using line code?
- How is line code used to complete an autonomous task?
- What coding opportunities are available to me at the high school level?

<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>Hyperlink standard code Advance CTE.</td><td>• I can explore various careers in coding and explain their importance.
• I can understand the opportunities in the Bristol region related to this career choice.
• I can understand the opportunities available coding at the high school level.</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>Lesson Progression and Standards Connection:
● 1K.Compare and contrast the contributions of science, engineering, and technology in the development of technological systems.</td><td>Mandatory Lessons/Activities:
● Students will research different careers in coding.
● Students will understand the computer science offerings available at the high school level.</td></tr>
<tr><td>Pacing:</td><td>1 block</td><td>CCSS Connections:
●</td><td>Assessments:
●</td></tr>
<tr><td>STEL
ISTE</td><td>● I can identify and explain the difference between line coding and block coding.
● I can explain why some code is best written in the line code format.</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>x</td><td>Observation (O)</td></tr></table></td><td>Lesson Progression and Standards Connection:
● 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.
● 1.5.c-Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.</td><td>Mandatory Lessons/Activities:
● Students will be given examples of line coding and block coding and asked to identify the differences.
● CER-Line Code vs Block Code</td></tr>
<tr><td>Pacing:</td><td>1 Blocks</td><td>CCSS Connections:
CCSS.ELA-LITERACY.RST.6-8.7</td><td>Assessments:
● CER</td></tr>
</table>

<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).
CCSS.ELA-LITERACY.RST.6-8.3
● Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.</td><td></td></tr>
<tr><td>STEL
ISTE</td><td>● I can utilize my knowledge of line coding to complete an identified task.</td><td rowspan="2"><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></td><td>Lesson Progression and Standards Connection:
● EP-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.</td><td>Mandatory Lessons/Activities:
● Students will complete a coding assignment utilizing line coding.</td></tr>
<tr><td>Pacing:</td><td>1 block</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.</td><td>Assessments:
● Completion of coding assignment</td></tr>
<tr><td>STEL
ISTE</td><td>● I can write a line code to accomplish an autonomous task.
● I can refine my code to complete a task more efficiently.</td><td rowspan="2"><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></td><td>Lesson Progression and Standards Connection:
● 1.5.c-Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
● 1.5.d-Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.</td><td>Mandatory Lessons/Activities:
● Students will complete a coding assignment utilizing line coding.</td></tr>
<tr><td>Pacing:</td><td>1 block</td><td>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).</td><td>Assessments:
● Completion of coding assignment.</td></tr>
</table>

<table>
<tr>
<td>STEL
ISTE</td>
<td>● I can record my learning on my google site portfolio.
● I can complete a reflection about the skill of coding and define my interest in future study of the topic.</td>
<td rowspan="2">
<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>
</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:
● Students will add an image of their completed code to their Google Site.
● Reflection Prompt</td>
</tr>
<tr>
<td>Pacing:</td>
<td>1 block</td>
<td>Assessments:
● Google Site Portfolio</td>
</tr>
</table>

Module 2: Robotics

UNWRAPPED STANDARDS

Advance CTE/ISTE/STEL 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 components of a robot. ● Understand the role of robotics in today's society. ● Understanding the roles and robotic responses related to various sensors. ● Programming robots to meet a specified task or variety of tasks. ● Computing procedures to advance a robot through a field of tasks.	● Acceleration ● Accuracy ● Active sensor ● Actuator ● Algorithm ● Android ● Autonomous robot ● Capacitor ● Closed loop control ● Controller ● Coordinates ● Degrees ● Degrees of freedom ● Electronics ● End effector ● Error ● Feedback ● Feedback loop ● Fuzzy logic ● Gain ● Gripper ● Hardware ● Infrared sensor ● Input device ● Instruction ● Joint ● Laser ● Light probe ● Linear motion ● Mechatronics ● Motor ● Optical encoder ● Photoelectric sensor ● Phototransister
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 6 History of Technology	● 6E. Verify how specialization of function has been at the heart of many technological improvements.		
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.		● Precision ● Robot ● Roll ● Sensor ● Signal ● Simulation ● Software
ISTE 1.5 Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.	● 1.5.a-Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions. ● 1.5.b-Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making. ● 1.5.c-Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. ● 1.5.d-Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.		

Module 2 Robotics

Essential Questions:

- What careers require knowledge of robotics?
- How have robotics impacted human efficiency?
- What are various forms of sensors used by robots? What is the function of each sensor?
- How are robots programmed to complete a task or variety of tasks?
- What robotics opportunities are available to me at the high school level?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL ISTE	● I can explore the careers in robotics and explain their importance relative to human efficiency. ● I can understand the opportunities in the Bristol region related to this career choice. ● I can understand the opportunities available for robotics at the high school level.		**Lesson Progression and Standards Connection:** ● *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.* ● *3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.* ● *6E. Verify how specialization of function has been at the heart of many technological improvements.*	**Mandatory Lessons/Activities:** ● *Students will research the different careers that utilize robotics and add to their portfolio.*
Pacing:	1 block		**CCSS Connections:** ●	**Assessments:** ● *Google Portfolio*
STEL ISTE	● I can identify the various sensors used by robots. ● I can explain how each sensor is used to control robot behavior.		**Lesson Progression and Standards Connection:** ● *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.*	**Mandatory Lessons/Activities:** ● *Sensor testing and exploration.*

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

	Selected Response (SR)
	Constructed Response (CR)
	Performance (P)

		x | Observation (O)	● *2R. Compare how different technologies involve different sets of processes.*	
Pacing:	● 1 Block		**CCSS Connections:** ●	**Assessments:** ●
STEL ISTE	● I can program a robot to complete a series of different tasks utilizing the different sensors.	 | | Selected Response | | Constructed Response X | Performance x | Observation	**Lesson Progression and Standards Connection:** ● *1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.* ● *1.5.a-Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.* ● *1.5.b-Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.* ● *1.5.c-Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.* ● *1.5.d-Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.* ● *2M. Differentiate between inputs, processes, outputs, and feedback in technological systems.*	**Mandatory Lessons/Activities:** ● *Students will complete a series of challenges using the different sensors.* ● *Video capture of at least one robotics challenge.*
Pacing:	6 blocks		**CCSS Connections:** ●	**Assessments:** ● *Completion of robotic challenges*
STEL ISTE	● I can video my robotics challenge. ● I can correctly add my video to my Google Site portfolio. ● I can complete a reflection about the skill of programming robots and define my interest in future study of the topic.	 | | Selected Response | | Constructed Response X | Performance | | 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*	**Mandatory Lessons/Activities:** ● *Students will add a video to their google site of the robot completing the challenge.* ● *Reflection Prompt*

Pacing:	1 block		*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.*	**Assessments:** ● *Successful upload to their Google Site.*

Module 3: Manufacturing			
UNWRAPPED STANDARDS			
Advance CTE/ISTE/STEL 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. ● Mimic an assembly line to manufacture a product in the makerspace	● 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 ● Finished goods ● Make to assemble ● Make to order ● Make to stock ● Operational technology
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.*		
1.7 Global Collaborator Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.	● *1.7.c-Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*		

Module 3: Manufacturing

Essential Questions:

- What are the different types of manufacturing careers?
- How does manufacturing support society in the 21st century?
- What are the safety protocols for the makerspace?
- Why do manufacturers complete a prototype before making a final product?
- Why is it important for each team member to follow specifications when working on a manufacturing line?
- How does a production line support the efficient construction of a product at the bulk scale?
- What manufacturing opportunities are available to me at the high school level?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL ISTE	● I can explore the careers in manufacturing and explain their importance to 21st century society. ● I can understand the opportunities in the Bristol region related to this career choice. ● I can understand the opportunities available for manufacturing at the high school level.		**Lesson Progression and Standards Connection:** ● *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.* ● *3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.* ● *6E. Verify how specialization of function has been at the heart of many technological improvements.*	**Mandatory Lessons/Activities:** ● *Students will research the various careers in manufacturing*
Pacing:	1 block		**CCSS Connections:** ●	**Assessments:** ● *Google Site Portfolio Addition*
STEL ISTE	● I can demonstrate safe behaviors and actions within the makerspace. ● I can explain and accomplish safety procedures in the event of an emergency. ● I can locate and describe how to		**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:** ● *Students will receive a review of the safety protocols necessary to work in the makerspace.* ● *Students will complete a safety contract.*

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

	Selected Response (SR)
	Constructed Response (CR)

	use the essential safety equipment in the makerspace.	☐ Performance (P) x Observation (O)		
Pacing:	1 Block		**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:** ● *Safety Contract completion and safety quiz*
STEL ISTE	● I can use a 3D modeling software to create a prototype of a product that I will manufacture. ● I can follow safety protocols when using tools and materials in the Makerspace.	☐ Selected Response ☐ Constructed Response x Performance (P) ☐ Observation	**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.*	**Mandatory Lessons/Activities:** ● *Students will use a 3D modeling software to create a prototype of a product that they will manufacture.*
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.* *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:** ● *Completion of 3D design*
STEL ISTE	● I can follow directions to complete a task to the proper specifications. ● I can safely follow instructions on how to properly use tools and materials in the Makerspace	☐ Selected Response ☐ Constructed Response X Performance	**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.* ● *7V. Improve essential skills necessary to*	**Mandatory Lessons/Activities:** ● *Students will follow directions to complete tasks/projects.*

		x Observation	*successfully design.*	
Pacing:	7 blocks		**CCSS Connections:** ●	**Assessments:** ● *Completion of project*
STEL ISTE	● I can explain how the efficiency of product production changes when a production line is created. ● I can work collaboratively to manufacture a product at the bulk scale. ● I can safely follow instructions on how to properly use tools and materials in the Makerspace	 Selected Response Constructed Response X Performance x Observation	**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.* ● *7U. Evaluate the strengths and weaknesses of different design solutions.* ● *7V. Improve essential skills necessary to successfully design.* ● *1.7.c-Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*	**Mandatory Lessons/Activities:** ● *Students will follow directions to complete an assignment.*
Pacing:	7 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:** ● *Completion of project*
STEL ISTE	● I can showcase my manufactured product at various stages in my portfolio. ● I can complete a reflection about the manufacturing production and define my interest in future study of the topic.	 Selected Response Constructed Response X Performance 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*	**Mandatory Lessons/Activities:** ● *Students will add images of a manufactured product at various stages to their google site portfolio.* ● *Reflection Prompt*
Pacing:	2 block			**Assessments:** ● *Successful upload to their Google Site.*

			intended audiences.	

Module 4: Introduction to Construction

UNWRAPPED STANDARDS

Advance CTE/ISTE/STEL Standards	Performance Elements	Key Concepts/Big Ideas	Academic Vocabulary
Advance CTE ACC01 Architecture and Construction	● ACC01.01.04 Use appropriate formulas to determine ratios, fractions, and proportion measures. ● ACC01.01.05 Use appropriate formulas to determine measurements of dimensions, spaces and structures.	● Understand the significance of measurement. ● Use design software to design a home ● Create a mock-up of the home design. ● Understand the basic process from plans to structure.	● Architecture ● Design ● Pre-construction ● Morph ● Edit ● Architect ● Architectural style ● Aesthetic ● Replication ● Functionality ● Functional ● Design ● Specification ● Structure ● Dimensions ● Prototype ● Enhance ● Scope ● Symbol
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.*		

Module 4: ESSENTIAL QUESTIONS

Essential Questions

- What are the careers in the architecture and construction fields?
- Why is precise measurement essential in architecture and construction?
- How do contractors and architects complete a prototype?
- What does it mean to have an architectural style?
- How do you translate from a set of plans to a finished product?
- What architecture and construction opportunities are available to me at the high school level?

CTE Standard	**Learning Targets:** I can	Summative Assessment Strategy	Lesson Progression and Connection to ELA/Math CCSS	Common Learning Experiences and Assessments
STEL ISTE	● I can explore the careers in construction and explain their importance. ● I can understand the opportunities in the Bristol region related to this career choice. ● I can understand the opportunities available for architecture and construction at the high school level.		**Lesson Progression and Standards Connection:** ● *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.* ● *3G. Explain how knowledge gained from other content areas affects the development of technological products and systems.* ● *6E. Verify how specialization of function has been at the heart of many technological improvements.*	**Mandatory Lessons/Activities:** ● *Students will research the various careers in construction.*
Pacing:	1 block		**CCSS Connections:** ●	**Assessments:** ●
STEL ISTE	● I can accurately measure utilizing a 16th scale.		**Lesson Progression and Standards Connection:** ● *ACC01.01.04 Use appropriate formulas to determine ratios, fractions, and proportion measures.* ● *ACC01.01.05 Use appropriate formulas to determine measurements of dimensions, spaces and structures.*	**Mandatory Lessons/Activities:** ● *Students will demonstrate they can accurately measure to within 1/16th of an inch.*

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

	Selected Response (SR)
	Constructed Response (CR)

Pacing:	1 block	<table><tr><td></td><td>Performance (P)</td></tr><tr><td>X</td><td>Observation (O)</td></tr></table>	**CCSS Connections:** *CCSS.ELA-LITERACY.RST.11-12.4* ● *Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.*	**Assessments:** ● *Proper measurements.*
STEL ISTE	● I can accurately identify components that comprise a residential framing structure.	<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-3 (making and doing)-Exhibits safe and effective ways of producing technological products, systems, and projects.*	**Mandatory Lessons/Activities:** ● *Students will be taught the different components of a residential framing structure*
Pacing:	3 blocks		**CCSS Connections:** *CCSS.ELA-LITERACY.RST.11-12.4* ● *Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.*	**Assessments:** ● *Students will label the components .*
STEL ISTE	● I can build a representative structure from a set of plans.	<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:** ● *7P. Illustrate the benefits and opportunities associated with different approaches to design.* ● *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.*	**Mandatory Lessons/Activities:** ● *Students will build a framing structure following a set of plans.*
Pacing:	1 block		**CCSS Connections:** *CCSS.ELA-LITERACY.RST.11-12.4* ● *Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.*	**Assessments:** ● *Completed structure*
STEL ISTE	● I can explain how a structure is defined as an architectural style.	<table><tr><td></td><td>Selected Response</td></tr></table>	**Lesson Progression and Standards Connection:** ● *7P. Illustrate the benefits and opportunities associated with different approaches to design.* ● *7T. Assess design quality based upon*	**Mandatory Lessons/Activities:** ● *Students will be shown different housing structures*

			established principles and elements of design. ● *7U. Evaluate the strengths and weaknesses of different design solutions.* ● *7V. Improve essential skills necessary to successfully design.*	
Pacing:	1 block		**CCSS Connections:** *CCSS.ELA-LITERACY.RST.11-12.4* ● *Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.*	**Assessments:** ●
STEL ISTE	● I can showcase my house design on my google portfolio. ● I can complete a reflection about the architecture and construction and define my interest in future study of the topic.		**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:** ● *Students will add images of a manufactured product at various stages to their google site portfolio.* ● *Reflection Prompt*
Pacing:	2 block			**Assessments:** ● *Successful upload to their home design and reflection to their Google Site portfolio.*

	Constructed Response
	Performance
x	Observation

	Selected Response
	Constructed Response
X	Performance
	Observation