Scope and Sequence Technology Education

7-8 Scope & Sequence

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Grade 7	Introduction to Engineering	Bridge Building	$C0_2$ Crash Cars	Layered Animal Project	Tic- Tac-Toe Boards	Rube Goldberg Project
Grade 8	Introduction to Tools and Safety	Wooden Dovetail Box	Scroll Saw Project	Wooden Cooling Rack & Oven Push Pull Stick	Laser Engraving	Careers & Portfolio

Grade Level Scope & Sequence

Content Area:	Technology Education	**Grade Level:**	7th Grade
Date Created:	August 2019	**Author(s):**	Scaramellino
Date Revised:		**Timeframe:**	45 Classes

Introduction
Technology/engineering education is the discipline devoted to the study of human invention and innovation and their influence on our natural and human-made environment. https://www.education.nh.gov/career/career/documents/tech_ed_curr_guide.pdf

Overview/Class Description:
Technology/engineering works in conjunction with science to expand our capacity to understand the world. Science investigates the natural world. The goal of engineering is to solve practical problems through the development or use of technologies, based on the scientific knowledge gained through investigation. Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs. Students will be exposed to various areas of engineering and will complete as many projects as possible. All of which are hands on and engaging. Throughout the course students will gain the knowledge and experience to complete the projects as they go.

	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**	**Unit 7**
Unit Title	Introduction to Engineering	Bridge Building	$C0_2$ Crash Cars	Layered Animal Project	Marble Tic-Tac-Toe Game Board	Rube Goldberg Project	(Students will create a Google Drive to Showcase the projects they have completed

							throughout the class. There will be a checklist of what they need to have in the folder.)
Time: class periods/weeks	12	10	10	13	13	30 (At home Project)	
Purpose: *Why is this topic and skill set important for students? Consider the value of the content...*	The purpose of this introductory unit is to introduce basic concepts and areas of engineering. Students will complete a series of hands on activities to problem solve their way through a particular challenge. Students will work in small groups to communicate different possibilities to solve the problem	Students will learn about the forces and loads that are associated with bridge design and construction. Students will design and construct a model of a truss bridge that will be designed meeting criteria.	Students will create a safe vehicle for a passenger(an egg) that will be involved in a head on collision.	Students will select a layered animal to make out of pine. Students will communicate with the art department to have their project painted.	Students will understand how to lay out a plan and how to read a ruler. Students will successfully lay out a Tic-Tac-Toe Board.	Students will create a Rube Goldberg Project at home using materials they have. A **Rube Goldberg machine** is a machine intentionally designed to perform a simple task in an indirect and overcomplicated fashion. Often, these machines consist of a series of simple devices that are linked together to produce a domino effect, in which each device triggers the next one, and the original goal is achieved	

						only after many steps.	
Goals & Outcomes: *In 2-4 sentences, describe the desired results for students to have by the end of the unit.* *"Students will read/listen to ___ in order to ___"* *"Students will show learning by using writing and/or speaking to ____"*	Students will solve the challenge of the Mystery Tube by creating a working prototype. Students will design and build and object that can float in a wind tube for a certain amount of time, using materials provided. Students will develop a better understanding for what the engineering design process is and how we use it everyday. Students will understand that technological problem solving requires the application of the design process.	Students will design and build a bridge to span a certain distance that can withstand a given load. Students will learn about compression through the paper tower activity. Students will learn about tension through the paper bridge activity. Students will design and build and test a truss style bridge. Students will learn to distinguish the different views of a working drawing. Students will use cutting tools	Students will design and build a crash test $C0_2$ Car that will save the Egg Passenger. Students will need to pass a down hill test and a $C0_2$ test. Students will use proper measurements device such as a ruler, protractor and compass. Students will be able to use a Drill Press, Band Saw, Scroll Saw and Sander Safety. Students will need to pass Safety tests. Students may have the time to paint their crash test vehicles and or use the	Students will take a safety test on the drill press band saw, and scroll saws and hand tools. Students will carefully follow their plans and procedure to cut out and make the layered animal. Students will glue the animal up in the correct order of pieces. Students will have a wooden layered animal to take home once they have completed a self assessment report.	Students will make a Tic-Tac-Toe Board that can store its game pieces. Students will use a Drill press and Router to make the game design. Students will be able to follow a set of plans. Students will be able to sand their projects using the proper equipment. Students will apply tung oil finish to their Projects. Students will have a wooden Tic-tac-toe board to take home once they have completed a self assessment.	Students may work in small groups or individually to record a Rube Goldberg Video. Students will develop a complex series of tasks to solve a simple problem. Students will have some time to work in class on this, and they will have checkpoints they need to meet. But the majority of this will be completed at home.	

		safely. Students will follow the glueing procedure.	laser engraver on them.				
Priority-Level Standards: *List only the standards which will be explicitly taught and assessed.*	A, B, C, D, E, F, G	A, B, C, D, E, F, G	A,B,C,D,E,F,G	A,B,C,D,E,F,G	A,B,C,D,E,F,G	A,B,C,D,E,F,G	A, B, C, D, E, F, G
Key Resources: *List 2-3 authentic and relevant resources that students will read and/or listen to. Include tests, videos, etc.*	https://www.education.nh.gov/career/career/documents/tech_ed_curr_guide.pdf https://www.youtube.com/watch?v=YPuES6ayCw0	http://www.pbs.org/wgbh/buildingbig/bridge/index.html https://stem.northeastern.edu/programs/ayp/fieldtrips/activities/wpbd/ Paper Tower Doc Paper Bridge Doc Bridge Model Spec Doc Bridge Model Drawings	How Seatbelts Work Video and Worksheet How Air Bags Work Video and Worksheet How Crash Testing Works Video and Worksheet	Teacher Demonstration Following their plan and procedure. Passing the safety tests.	Teacher Demonstration Following the plan and procedure. Passing the safety tests.	Rube Goldberg Doc Youtube Group Members/ Parents	

Grade Level Scope & Sequence

Content Area:	Technology Education	**Grade Level:**	8th grade
Date Created:	April 2019	**Author(s):**	Scaramellino
Date Revised:		**Timeline:**	45 classes

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Students will have more than one project going on at once. They will be shown how to complete each step of the project they need to complete. During work days, students should take advantage of the time in the shop to work on their projects.

	Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 6 (As needed)**	**Unit 5**
Unit Title	Intro to Tools and Safety	Dovetail Box	Scroll Saw	Wooden Cooling Rack & Oven Push Pull Stick	Custom Laser Engraved Name Sign/ Engraved Cutting Board	Careers & Portfolio
Time: class periods/weeks **(Students will have multiple projects to work on)**	30 (As projects progress, students will learn how to use more of the equipment they need.)	15	8	8	8	45 (Students will create a Google Drive to Showcase the projects they have completed throughout the class) (Students will also complete a career presentation.)
Purpose: *Why is this topic and skill set important for students? Consider the value of the content...*	Students will learn how to safely and properly operate machinery, equipment and other tools throughout the course. Students will be able to apply their knowledge and gain hands on experience using the equipment.	Students will be able to follow a set of plans and procedures to make an appealing and functioning dovetail box. Students will need to use correct measurements and processes to create the box.	Students will select a pattern that they will follow to create a scroll saw project.	Students will follow a set of plans to create a Cooling Rack. This is made to hold hot plates. Students will use the laser engraver to customize their projects.	Extra Projects if necessary. Students who have completed the required projects, can pick between these projects to create.	Students will create a presentation on a career of their choosing. Students will turn in a completed portfolio, meeting the requirements discussed in class.

Goals & Outcomes: *In 2-4 sentences, describe the desired results for students to have by the end of the unit.* *"Students will read/listen to ___ in order to ___"* *"Students will show learning by using writing and/or speaking to ____"*	Students will need to pass a safety test in order to use the equipment. Students will apply this knowledge and complete a performance assessment using the equipment. Students will be able to apply their knowledge and understanding of the practices demonstrated, taught and tested on to complete the required projects for the course.	Students will pass the required safety tests for the equipment they need to use to create the box. Students will have a visually appealing and function work of art. Students will laser engrave the box to customize their project. Students will complete a bill of materials to determine how much the project costs. Students will learn how to finish their projects properly. Students will gain experience using equipment that they will help them with other projects.	Students will complete a bill of materials to determine how much the project costs. Students will learn how to finish their projects properly. Students will gain experience using equipment that they will help them with other projects.	Students will layout their projects properly. Students will setup and use the equipment needed properly. Students will gain experience using equipment that they will help them with other projects. Students will learn how to set up the laser engraver using the software and the laser engraved itself.	Extra project ideas for students if time is allowed.	Students will research a career that they are interested in and create a presentation. The career should be something in STEM or the Trades. The presentation will meet the requirements and needed criteria.

Priority-Level Standards: *List only the standards which will be explicitly taught and assessed.*	A, B, C, D, E, F, G	A, B, C, D, E, F, G	A, B, C, D, E, F, G	A, B, C, D, E, F, G	A, B, C, D, E, F, G	A, B, C, D, E, F, G, E
Key Resources: *List 2-3 authentic and relevant resources that students will read and/or listen to. Include tests, videos, etc.*	Youtube Sources Handouts Study Guides Teacher Demos Performance Safety Tests	Project Plans. Directions. Attention to detail. Demo's Google Classroom	Project Plans. Directions. Attention to detail. Demo's Google Classroom	Project Plans. Directions. Attention to detail. Demo's Google Classroom	Project Plans. Directions. Attention to detail. Demo's Google Classroom	Directions. Handouts and criteria. Google Drive & Google Classroom

Standards Matrix

	Goals (Standards) Technology/Engineering Education will contribute to the development of all students by:	**Unit 1**	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**	**Unit 6**
Standard A	**Providing opportunities to develop safe and appropriate skills and awareness in a wide range of traditional and contemporary technologies.**	7, 8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard B	**Providing opportunities to plan, develop, operate, control, and maintain a variety of technological systems such as medical, agricultural, biological, energy and power, information and communication, transportation, manufacturing, construction, and engineering.**	7, 8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard C	**Preparing students to recognize, use and prepare technical information in order to engineer solutions to problems related to a variety of technological systems.**	7, 8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard D	**Encouraging those habits of mind necessary to a lifelong learner such as the ability to question, investigate, design, experiment, and evaluate.**	7,8	7, 8	7, 8	7, 8	7, 8	7, 8

Standard E	**Promoting an appreciation for the interdependency of technology and other disciplines.**	7,8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard F	**Increasing understanding of the relationships between technology, individuals, and society.**	7,8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard G	**Providing an introduction to the impact technology has on society and the environment.**	7,8	7, 8	7, 8	7, 8	7, 8	7, 8
Standard H	**Encourage the development of leadership abilities through participation in extracurricular activities such as the Technology Student Association and projects that support their communities.**	8	8	8	7, 8	7, 8	7, 8