ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

DEPARTMENT

Grade 5 Technology

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BOARD OF EDUCATION INITIAL ADOPTION DATE: September, 2017

Course Philosophy

The Technology program focuses on every individual developing technology problem solving skills, technological literacy, and 21st century skills through hands-on activities integrating Science, Technology, Engineering, and Mathematics (STEM). The Technology education program is dedicated in providing experiences that prepare students to be successful in their transition through secondary education and into post secondary careers. Teaching technological literacy, will help students develop the skills necessary to be lifelong learners and successfully contribute and function in a technological society.

Course Description

In 5th grade, Technology is an activity based course that introduces students to technology by examining Design and Engineering Transportation technology. Students will study and apply the problem solving procedures, 21st century computer skills, technical drawing, physical laws of motion, aerospace engineering, structural engineering, and the engineering design process. Students will have a variety of projects and activities in the Design and Engineering Tech lab related to transportation technology. Students will work in teams and individually to complete required classroom and lab assignments. A STEM approach is used to integrate Science, Technology, Engineering, and Mathematics concepts in a student lead classroom environment.

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Curriculum Map

(This is a worksheet intended to support the development of the overall document. It should be submitted to the supervisors if appropriate but it will not be included in the final board-approved document)

5th Grade Technology- Transportation Technology and Design

Relevant Standards	Standards Unpacked Skill / Concept / Process?	Enduring Understandings / Unit Goals	Essential Questions	Unit Title / Suggested Timeline
Common Core ELA/Literacy W.5.7 W.5.8 W.5.9 **Mathematics** MP.2 MP.4 MP.5 **NGSS:** 3-5-ETS1-1. 3-5-ETS1-2. **Common Core Technology: The characteristics and scope of technology.** 8.2.5.A.1 8.2.5.A.2	**ELA/Literacy - W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. **3-5-ETS1-1.** Define a simple design problem reflecting a need or a want Influence of Science, Engineering, and Technology on Society and the Natural World **3-5-ETS1-2.**Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.	• Technology is anything humanmade or designed • The purpose of technology is to solve problems and make life easier • The Engineering Design Process, or Design Loop, is a set of sequential steps and the driving force behind invention and innovation • The Design Loop is an iterative process constantly improving on itself	• How does technology impact society? • How does the design loop affect innovation and invention in society?	Technology & The Design Loop Timeline: 120 Minutes (two class periods) introduce and practices will be embedded within all units

The core concepts of Technology. 8.2.5.A.3 8.2.5.A.5 **The attributes of design.** 8.2.5.C.1 8.2.5.C.2 8.2.5.C.3 **The application of engineering design.** 8.2.5.C.4 8.2.5.C.5 **The role of troubleshooting , research and development, invention and innovation and experimentation in problem solving** 8.2.5.C.6 8.2.5.C.7 **D. Abilities for a Technological World: The designed world is the product of a design process that**	**The core concepts of Technology.** **8.2.5.A.3** Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints. **The attributes of design.** **8.2.5.C.3** Research how design modifications have lead to new products. **8.2.5.C.4** Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. **8.2.5.C.5** Explain the functions of a system and subsystems. **8.2.5.D.4** Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. **8.2.5.D.5** Describe how resources such as material, energy, information, time, tools, people and			

provides the means to convert resources into products and systems. **Apply the design process.** 8.2.5.D.1 8.2.5.D.2 **Use and maintain technological products and systems.** 8.2.5.D.3 8.2.5.D.4 8.2.5.D.5	capital are used in products or systems.			
Unit #2: Transportation Technology **Common Core ELA/Literacy W.5.7, W.5.8 W.5.9** **Mathematics** MP.2 MP.4 MP.5 **NGSS:** 3-5-ETS1-1 3-5-ETS1-2.	**ELA/Literacy - W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. **3-5-ETS1-1.** Define a simple design problem reflecting a need or a want Influence of Science, Engineering, and Technology on Society and the Natural World	• Transportation Technology is a category of technology involved in the process of moving people and goods from one place to another • The Design Loop is followed when creating pieces of Transportation Technology • Engineers must work within specific constraints when designing and building	• Explain how technology and the design loop prcocess can impact society. • How does the design loop allow us to develop our ideas efficiently? • How does collaborating with peers help provide the best results while solving a problem and evaluating solutions? • Why does the placement of materials and safety features within the vehicle play a role	Transportation Technology (17 hours)

Common Core Technology: **The characteristics and scope of technology.** 8.2.5.A.1 8.2.5.A.2 **The core concepts of Technology.** 8.2.5.A.3 8.2.5.A.5 **The attributes of design.** 8.2.5.C.1 8.2.5.C.2 8.2.5.C.3 **The application of engineering design.** 8.2.5.C.4 8.2.5.C.5 **The role of troubleshooting , research and development, invention and innovation and experimentation**	**3-5-ETS1-2.**Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. **The core concepts of Technology.** **8.2.5.A.3** Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints. **The attributes of design.** **8.2.5.C.3** Research how design modifications have lead to new products. **8.2.5.C.4** Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models. **8.2.5.C.5** Explain the functions of a system and subsystems. **8.2.5.D.4** Explain why human-designed systems, products, and environments need to be		in protecting the passenger and cargo?	

in problem solving 8.2.5.C.6 8.2.5.C.7 **Apply the design process.** 8.2.5.D.1 8.2.5.D.2 **Use and maintain technological products and systems.** 8.2.5.D.3 8.2.5.D.4 8.2.5.D.5	constantly monitored, maintained, and improved. **8.2.5.D.5** Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.			

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Scope, Sequence, and Assessment

Technology, Grade 5

Unit Title	Unit Understandings and Goals	Recommended Duration	Assessments		
			Diagnostic (before)	Formative (during)	Summative (after)
Technology & The Design Loop	• Technology is anything humanmade or designed • The purpose of technology is to solve problems and make life easier • The Engineering Design Process, or Design Loop, is a set of sequential steps and the driving force behind invention and innovation • The Design Loop is an iterative process constantly improving on itself	120 minutes (2 class periods)	Do Now: Turn & talk Share out "What is Technology?" "What is the purpose of Technology?" "What do you think the Engineering Design Process refers to?"	• Class Discussions • Exit Tickets • Peer check of collaboration skills and accountability using rubric • Self assessment of collaboration skills and accountability using a rubric	• Quiz • Reflection of project outcomes • Peer Project Assessment (rubric based)
Transportation Technology	• Transportation Technology is a category of technology involved in the process of moving people and goods from one place to another • The Design Loop is followed when creating pieces of Transportation Technology • Engineers must work within specific constraints when designing and building • Blueprints are an essential part of planning that must follow specific guidelines	18 hours (18 class periods)	Class Discussion: "What is Transportation Technology? Give examples." "How has it changed over time?"	• Class Discussions • Project journals (Peer, Self, and Teacher check given with feedback) • Teacher Conferences • Exit Tickets	• Inquiry based, problem based projects • STEM Design Challenges focused around problem solving for, real world issues, based on

	• Safety procedures must be followed when working among peers in the classroom • Cares continue to be made safer due to the logical placement of safety features, improved technology, and the design loop.		"How do we protect passengers and cargo?"	• Project planning evaluation and revision (teacher check) • Checks for Understanding • Peer check of collaboration skills and accountability using rubric • Brainstorms • Blueprints • Hot Glue Gun Safety Quiz	transportation technology. • Performance based assessments (testing of the product and evaluating the products ability to meet goal of design challenges.) • (Group and individual) presentation of product(s) from design challenge

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Unit #1: Technology & The Design Loop

Enduring Understandings:	**Essential Questions:**
• The design loop is an iterative process used to invent and improve products that impact our daily lives.	• How does technology impact society? • How does the design loop affect innovation and invention in society?

Guiding / Topical Questions with Specific Standards		**Content, Themes, Concepts, and Skills**	**Teaching Strategies**	**Instructional Resources and Materials**	**Assessment Strategies**
ELA/Literacy -W.5.7 (3-5-ETS1-1) **W.5.8** (3-5-ETS1-1) **W.5.9** (3-5-ETS1-1)	What is technology? What is the purpose of technology? How does the design loop	• Technology is anything humanmade or designed • The purpose of technology is to solve problems and make life easier • The Engineering Design Process, or Design Loop, is a set of sequential steps and the	• Mini lesson/lecture • Project based learning • Cooperative Learning • Hands-On Activities • Input/Output stations • Independent work • Socratic Seminar	• Internet resouces • Content Resource manuals • Tech Lab tools and materials (wood cutters, hot glue, scissors, tape,	Formative: • Check for understanding questions will be utilized during large group instruction. • Exit tickets

Mathematics - MP.2 (3-5-ETS1-1) MP.4 . (3-5-ETS1-1) MP.5(3-5-ETS 1-1) **The characteristics and scope of technology.** 8.2.5.A.1 8.2.5.A.2 **The core concepts of Technology.** 8.2.5.A.3 8.2.5.A.5 **The attributes of design.** 8.2.5.C.1 8.2.5.C.2 8.2.5.C.3 **The application of engineering design.** 8.2.5.C.4 8.2.5.C.5 **The role of**	maximize efficiency when creating something new or revamping an existing product?	driving force behind invention and innovation ● The Design Loop is an iterative process constantly improving on itself	● STEM design challenge projects ● Class discussion ● Large Group Demos ● Small Group Instruction ● Individualized Instruction ● Multimedia Presentations ● Interactive Comp. Software ○ Webquests ● Journal Writing	calculators, safety equipment) ● PowerPoint Presentation ● Google software suit ● Design Software ● Tools and Materials Student workstations MS Software ● Tech Lab Equipments and Design Tools ● 3D printers ● CO_2 Laser ● Band saw	● Temperature guages ● Students will be asked open ended questions during small group and individualized instruction to check for understanding ● Students will complete Project journals that will be reviewed for accountability and understanding. ● Students will complete Self-evaluation/reflection rubric after group and independent work. Summative: ● Quizzes/Tests ● Inquiry based, problem based projects and investigations. ● Performance based

troubleshooting, research and development, invention and innovation and experimentation in problem solving 8.2.5.C.6 8.2.5.C.7 **Apply the design process.** 8.2.5.D.1 8.2.5.D.2 **Use and maintain technological products and systems.** 8.2.5.D.3 8.2.5.D.4 8.2.5.D.5					assessments- results of investigation or design challenge ● Accountability assessment of self directed learning. (assessed through rubric)

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Unit #2: Transportation Technology

Enduring Understandings:	**Essential Questions**
● Transportation technology impacts how people and goods are moved from one place to another and has been improved throughout history through the design loop.	● Explain how technology and the design loop prcocess can impact society. ● How does the design loop allow us to develop our ideas efficiently? ● How does collaborating with peers help provide the best results while solving a problem and evaluating solutions? ● Why does the placement of materials and safety features within the vehicle play a role in protecting the passenger and cargo?

Guiding / Topical Questions with Specific Standards		**Content, Themes, Concepts, and Skills**	**Teaching Strategies**	**Instructional Resources and Materials**	**Assessment Strategies**
ELA/Literacy W.5.7 W.5.8 W.5.9 **Mathematics** MP.2 MP.4 . (3-5-ETS1-1) MP.5(3-5-ETS1-1) **The characteristics and scope of technology.** 8.2.5.A.1 8.2.5.A.2 **The core concepts of Technology.**	How does each step of the design loop contribute to the creation or improvement of a product?	● Transportation Technology is a category of technology involved in the process of moving people and goods from one place to another ● The Design Loop is followed when creating pieces of Transportation Technology ● Engineers must work within specific constraints when designing and building ● Blueprints are an essential part of planning that must follow specific guidelines ● Safety procedures must be followed when working among peers in the classroom	● Mini lesson/lecture ● Project based Learning ● Cooperative Learning ● Hands-On Activities ● Input/Output stations ● Independent work ● Socratic Seminar ● STEM design challenge projects ● Class discussion ● Large Group Demos ● Small Group Instruction ● Individualized Instruction ● Multimedia Presentations ● Interactive Comp. Software ○ Webquests ● Journal Writing ● Accountabilty assessment of self drected learning	● Internet resouces ● Content Resource manuals ● Tech Lab tools and materials (wood cutters, hot glue, scissors, tape, calculators, safety equipment) ● PowerPoint Presentation ● Google software suit ● Design Software	**Formative:** ● Check for understanding questions will be utilized during large group instruction. ● Exit tickets ● Temperature guages ● Students will be asked open ended questions during small group and individualized instruction to check for understanding

8.2.5.A.3
8.2.5.A.5
 	
The attributes of design.
8.2.5.C.1
8.2.5.C.2
8.2.5.C.3
 	
The application of engineering design.
8.2.5.C.4
8.2.5.C.5
 	
The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving
8.2.5.C.6
8.2.5.C.7
 	
Apply the design process.
8.2.5.D.1
8.2.5.D.2
 	
Use and maintain technological
				• Tools and Materials Student workstations MS Software
				
				• Tech Lab Equipments and Design Tools
				  • 3D printers
				  • CO_2 Laser
				  • Band saw
					• Students will complete Project journals that will be reviewed for understanding.
					• Students will complete Self-evaluation/ reflection of their work after group and independent work.
					Summative:
					• Quizzes/Tests
					• Projects

products and systems. 8.2.5.D.3 8.2.5.D.4 8.2.5.D.5					