GRADE LEVEL: 7/8 **SUBJECT: Advanced Engineering** **DATE: 2/23/17 2016-2017**

GRADING PERIOD: 1 and 3 **MASTER COPY: 3/24/17**

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS					
• Safety and procedures • Tools • Equipment	**ETE-1.4:** Demonstrate safe practices and procedures with tool and equipment.	• Wear safety glasses when appropriate. • Demonstrate safe procedures when using tools and other equipment.	• Teacher observation • All VEX project builds	• Hex driver • Bolt cutters • Metal files • Impalement	Critical
• Knowledge & Skills - Science - Math - Language Arts - Fine Arts - Social Studies • Engineering • Technology	**ETE-2.2:** Apply knowledge and skills learned in science, mathematics, language arts, fine arts, and social studies classes when completing engineering and technology-based assignments.	• Present design solutions orally. • Calculate gear ratios and adjust design for appropriate speed and torque. • Decorate VEX builds with paper and cardboard artwork.	• Windmill VEX build • Survival Challenge VEX build • Pull Toy VEX build	• Gear Ratio • Friction • Leverage • Torque • Speed	Important

ENGINEERING DESIGN AND DEVELOPMENT					
• Design Process	**ETE-4.1:** Apply the steps of the design process.	• Produce VEX designs by using a formal design process.	• Windmill VEX build • Pull Toy VEX build • Survival Challenge VEX build	• Design process steps	Critical
• Design Process • Product • Real World	**ETE-4.2:** Use the design process to create a product that addresses a real world problem.	• Produce a solution to an open-ended design problem by utilizing all steps of the formal design process. • Solve real-world problems by using the engineering design process. Build a prototype of a design solution given limited materials.	• Survival Challenge VEX build	• Concept • Prototype	Important
• Mechanical Systems	**ETE-5.3:** Design a working prototype or mechanical system to solve a pre-designed task.	• Design, build, and modify a working prototype that uses mechanisms but not motors to perform a given task.	• Windmill VEX build • Pull Toy VEX build • Survival Challenge VEX build.	• Mechanical • Mechanism	Critical

GRADE LEVEL: 7/8 **SUBJECT: Advanced Engineering** **DATE: 3/23/17 2016-2017**

GRADING PERIOD: 2 and 4 **MASTER COPY: 3/24/17**

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS					
• Universal Systems • Engineering • Technology	**ETE-1.3:** Apply the universal systems model when studying areas of engineering and technology.	• Create functional RobotC program that utilizes "if" statements and feedback loop.	• Tek Rocks bridge VEX build	• Universal systems • Output • Process • Input • Feedback • "if" statement	Additional
• Safety and procedures • Tools • Equipment	**ETE-1.4:** Demonstrate safe practices and procedures with tools and equipment.	• Wear safety glasses when appropriate. • Demonstrate safe procedures when using tools and other equipment.	• Teacher observation • All VEX project builds	• Hex driver • Bolt cutters • Metal files • Impalement	Critical

• Knowledge & Skills - Science - Math - Language Arts - Fine Arts - Social Studies • Engineering • Technology	**ETE-2.2:** Apply knowledge and skills learned in science, mathematics, language arts, fine arts, and social studies classes when completing engineering and technology-based assignments.	• Present design solutions orally. • Calculate gear ratios and adjust design for appropriate speed and torque. • Decorate VEX builds with paper and cardboard artwork.	• Robot Drag Racer • Spinning Sign • Tech Rox Bridge • Factory Simulation	• Gear Ratio • Friction • Leverage • Torque • Speed	Important
ENGINEERING DESIGN AND DEVELOPMENT					
• Design Process	**ETE-4.1:** Apply the steps of the design process.	• Produce VEX designs by using a formal design process.	• Robot Drag Racer • Spinning Sign • Tech Rox Bridge • Factory Simulation	• Design process steps	Critical
• Design Process • Product • Real World	**ETE-4.2:** Use the design process to create a product that addresses a real world problem.	• Produce a solution to an open-ended design problem by utilizing all steps of the formal design process. • Solve real-world problems by using the engineering design process. • Build a prototype of a design solution given limited materials.	• Tech Rox Bridge	• Limit Switch • Potentiometer	Important

• Functions - Motors - Gears - Sensors - Wheels - Control Systems	**ETE-5.1:** Differentiate between the functions of motors, gears, sensors, wheels and control systems.	• Create a functional prototype that uses motors, gears, sensors, wheels, and controller appropriately.	• Robot Drag Racer • Spinning Sign • Teck Rox Bridge • Factory simulation	• Touch sensor • Cortex • Gear • Sprocket • Screw • Bolt	Critical
• Technical Document	**ETE-5-2:** Interpret a technical document to build a working prototype of an automated system.	• Utilize proper engineering documentation in order to communicate between design team members.	• VEX build team communication document	• Mechanical engineer • Computer programmer • Electrical engineer	Important
• Mechanical Systems	**ETE-5.3:** Design a working prototype or mechanical system to solve a pre-designed task.	• Design, build, and modify a working prototype that uses mechanisms, motors , sensors, and a programmable control system to perform a given task.	• Robot Drag Racer • Spinning Sign • Teck Rox Bridge • Factory simulation	• Control system • Mechanism	Critical

• Computer Coding • Automation and Robotics	**ETE-5-4:** Utilize the principles of computer science and information technologies by developing applications and codes applying to automation and robotics.	• Create programs that work effectively to control a mechanical system in solving a task.	• Robot Drag Racer • Spinning Sign • Teck Rox Bridge • Factory simulation	• Code • Pseudocode • Compile	Critical
PRODUCING AND USING TECHNOLOGY					
• Transportation Types - Land - Sea - Air - Space - Intermodal	**ETE-6.1:** Compare and contrast the different types and uses of land, sea, air, space, and intermodal transportation.	• Compare types and uses of land, sea, air, space, and intermodal transportation.	• Powerpoint presentation	• Intermodal	Additional
• Vehicle Subsystems - Propulsion - Structural - Suspension - Control - Information - Support	**ETE- 6.2:** Differentiate between the technical sub-systems common of all vehicles, including propulsion, structural, suspension, control, information, and support systems.	• Contrast between the technical sub-systems of all vehicles.	• Powerpoint presentation	• Sub-system • Propulsion • Structural • Suspension • Control • Information • Support	Additional

• Transportation System	**ETE-6.3:** Design, develop, and evaluate transportation systems.	• Create a powered rolling vehicle that stops at a defined distance. • Create a conveyor belt that stops and starts according to sensor inputs.	• Robot drag racer • Assembly line	• Light sensor • Sonar proximity sensor	Additional
• Manufacturing Systems Types - Continuous - Batch - Custom	**ETE-8.1:** Investigate various types of manufacturing systems including continuous, batch, and custom.	• Describe the three types of manufacturing systems.	• Discussion	• Continuous • Batch • Custom	Additional
• Manufacturing Systems Utilization	**ETE-8.2:** Utilize appropriate designs, techniques, tools, materials, and processes for manufacturing systems.	• Plan manufacturing systems that use appropriate designs, tools, materials, and processes.	• Assembly line	• Process	Additional
• Manufacturing Systems Prototypes	**ETE-8.3:** Produce simulations, models, and/ or prototypes for specific manufacturing systems.	• Create a prototype to perform a machining operation on a widget.	• Assembly line	• Manufacturing System • Simulation	Important
• Logistical Paths	**ETE-8.4:** Describe and create a logistical path a product takes from its point of origin to its destination.	• Document the path that a specific product takes from creation to destination.	• Powerpoint presentation	• Logistical path • Origin • Destination	Additional