SUBJECT: PLTW Automation and Robotics		GRADE: 7
Unit Title: Introduction to STEM and Engineering		**Time Frame: 10 Days**
UNIT OVERVIEW		
Within this unit students will learn about the four parts of STEM, and about different types of engineering. By the end of this unit, students will have completed assignments about STEM and Engineering through the building and coding of a basic car.		

LRG SKILLS AND DISPOSITIONS	**PA STANDARDS**
Digital Literacy and Technological Proficiency	**1A-IC-18:** Keep login information private and log off devices appropriately. **1B-DA-06:** Organize and present collected data visually to highlight relationships and support a claim. **1B-IC-18:** Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices. **1B-IC-21:** Use public domain or creative commons media, and refrain from copying or using material created by others without permission. **2-IC-20:** Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options. **3A-IC-24:** Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.

COMPETENCIES	**LEARNING TARGETS**
I can demonstrate an understanding of many digital devices.	● I can create and use different types of data. ● I can collect and interpret data to understand different problems.
I can use best practices while programming	● I can manage my files. ● I can make sure my project meets the requirements

SUBJECT: PLTW Automation and Robotics		GRADE: 7
Unit Title: Programming		**Time Frame: 10 Days**
UNIT OVERVIEW		

Within this unit students will learn the basics of how to program the robots using VEX V5 and VEX VR. By the end of this unit, students will have completed projects to explore the robot's basic movement.

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
Critical Thinking and Problem Solving	**1A-AP-08:** Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks. **1A-AP-09:** Model the way programs store and manipulate data by using numbers or other symbols to represent information. **1A-AP-10:** Develop programs with sequences and simple loops, to express ideas or address a problem. **1A-AP-12:** Develop plans that describe a program's sequence of events, goals, and expected outcomes. **1A-AP-14:** Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops. **1B-AP-08:** Compare and refine multiple algorithms for the same task and determine which is the most appropriate. **1B-AP-09:** Create programs that use variables to store and modify data. **1B-AP-10:** Create programs that include sequences, events, loops, and conditionals. **1B-AP-15:** Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended. **2-AP-12:** Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. **2-AP-17:** Systematically test and refine programs using a range of test cases.
COMPETENCIES	**LEARNING TARGETS**
I can code a program to express an idea or solve a problem.	● I can use appropriate code to solve problems ● I can create and edit variables. ● I can create algorithms to complete repetitive tasks
I can approach a challenge with computational thinking.	● I can think in sequential steps. ● I can break problems down into smaller steps ● I can use the iterative process to solve a problem ● I can create programs by creating and testing code in an incremental approach ● I can change and improve code that already exists ● I can describe the purpose of a section of code.
I can demonstrate an understanding of many digital devices.	● I can understand that computers process information quickly

	● I can collect and interpret data to understand different problems
I can use best practices while programming.	● I can use correct terminology ● I can test code frequently to assure that it is working correctly. ● I can use good programming practices to make code more readable

SUBJECT: PLTW Automation and Robotics	GRADE: 7
Unit Title: Mechanisms and Machines	Time Frame: 10 Days

UNIT OVERVIEW
Within this unit students will learn about mechanisms and machines. By the end of this unit, students will know the simple machines by building and coding projects using the mechanisms.

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
Continual Learning and Growth Mindset	**3.4.5.B4:** Identify how the way people live and work has changed history in terms of technology. **3.6.4.C:** Identify and experiment with simple machines used in transportation systems. **3.6.7.C:** Identify and explain the workings of several mechanical power systems.

COMPETENCIES	LEARNING TARGETS
I can explain the history of technology and its impact on the world.	I can compare various technologies and how they have contributed to human progress.
I can explain that Technology and Engineering are influenced and advanced by other fields in the world.	I can apply a product, system, or process developed for one setting to another setting.

SUBJECT: PLTW Automation and Robotics	GRADE: 7
Unit Title: Building Challenges and Final Project	Time Frame: 15 Days

UNIT OVERVIEW

Within this unit students will learn how to build mechanisms using the VEX robotics kits. By the end of this unit, students will have built complex mechanical assemblies, culminating in a final project. Within this unit students will learn how to combine 2 or 3 mechanisms to create a device of their own choosing. By the end of this unit, students will have built their own device.

LRG SKILLS AND DISPOSITIONS	PA STANDARDS
Critical Thinking and Problem Solving Creativity and Innovation Adaptability and Flexibility	**3.4.6.B4:** Demonstrate how new technologies are developed based on people's needs, wants, values, and/or interests. **3.4.7.B4:** Explain how many inventions and innovations have evolved by using deliberate and methodical processes of tests and refinements. **3.4.7.C3:** Describe how troubleshooting as a problem-solving method may identify the cause of a malfunction in a technological system. **3.4.6.C3:** Explain why some technological problems are best solved through Experimentation **3.4.5.D1:** Identify ways to improve a design solution. **3.4.5.A1:** Explain how people use tools and techniques to help them do things. **3.4.7.A1:** Explain how technology is closely linked to creativity, which has resulted in innovation and invention.
COMPETENCIES	**LEARNING TARGETS**
I can translate my design concepts into a problem-solving solution.	● I can illustrate the benefits and opportunities associated with different approaches to design. ● I can apply the technology and engineering design process. ● I can refine design solutions to address criteria and constraints.