7th-8th Grade Project Lead the Way Pacing Guide (Semester Course)

What is Engineering? (4 weeks)

Priority Standard	**T1**	**Understand the impact of engineering solutions in a global, economic, environmental, and societal context.**
Supporting Standards	T2	Function on a multidisciplinary team.
	K1	Describe the relationship between science, technology, engineering, and math.
	K2	Identify the differences between invention and innovation.
	K3	Describe impacts that technology has had on society.
	S1	Utilize standard procedures to use and maintain an engineering notebook.
	S2	Use guidelines for developing and maintaining an engineering notebook to evaluate and select pieces of one's own work for inclusion in a portfolio.
	S3	Operate as an effective member of a team to complete an investigation.
	S4	Describe engineering and explain how engineers participate in or contribute to the invention and innovation of products.

What is Automation and Robotics? (6 Weeks)

Priority Standard	**K1**	**Describe the purpose of automation and robotics and its effect on society.**
Supporting Standards	K2	Describe positive and negative effects of automation and robotics on humans in terms of safety and economics.
	S1	Summarize ways that robots are used in today's world and the impact of their use on society.
	S2	Provide examples of STEM careers and the need for these professionals in our society.

Mechanical Systems (4 Weeks)

Priority Standard	**T1**	**Apply knowledge of mathematics, science, and engineering to design and build mechanisms.**
	T2	**Design a mechanical system that meets desired needs within realistic constraints.**
Supporting Standards	K1	Use ratios to solve mechanical advantage problems.
	K2	Use numerical and algebraic expressions and equations to solve real-life problems, such as gear ratios.
	S1	Use the characteristics of a specific mechanism to evaluate its purpose and applications.
	S2	Apply knowledge of mechanisms to solve a unique problem for speed, torque, force, or type of motion.

Automated Systems (4 weeks)

Priority Standard	**T1**	**Apply knowledge of mathematics, science, and engineering to design robotic systems that solve a problem.**
	T2	**Use the techniques (design process), skills (mechanisms), and modern engineering tools (VEX and Programming Software) necessary for engineering practice.**
Supporting Standards	K1	Know the seven technological resources and how they are integrated into an open and closed loop system
	K2	Describe the purpose of pseudocode and comments within a computer program.
	K3	Know how to use ratio reasoning to solve mechanical advantage problems.
	K4	Explain the roles and responsibilities of mechanical, electrical, and computer engineers who solve robotic problems.
	S1	Design, build, wire, and program both open and closed loop systems.
	S2	Use motors and sensors appropriately to solve robotic problems.
	S3	Troubleshoot a malfunctioning system using a methodical approach.