Grade: 6th
Course: STEM (Project Lead the Way – Automation and Robotics)
Year: 2025
Credits: .25 Credits, Related Arts

Pacing:	Goals:	Connection to Vision of a Lakewood Ranger:	Learning and Performance Expectations:	Vocabulary:	Assessment of Learning Options:	Resource Options:
10 days	• Build a mechanism using VEX parts.	• Collaboration • Growth Mindset	**Activity 1.0 Building Mechanisms** Students work in teams to build various mechanisms using VEX parts to experience the various types of motion.	• Rotary Motion • Linear Motion • Reciprocating Motion • Oscillating Motion	Activity 1.0 Mechanism Checkpoint	VEX Kit
4 days	• Build a simple gear train using VEX parts. • Explain the input movement and output movement of a mechanical system.	• Communication	**Activity 1.1 Welcome Interns!** Students build a simple structure to create a gear train with 3 gears, driven by a hand crank. Students are presented with two challenges where they explore how changing the input gear affects the output movements.	• Drive Gear • Driven Gear • Idler Gear	Activity 1.1 Student Document	VEX Kit

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	• Explore careers in automation and robotics.					
4 days	• Build and program a motor to spin a gear train. • Identify the inputs and outputs through a system. • Assemble, wire, and program a system to complete a task.	• Communication	**Activity 1.2 On the Move** Using the structure they built in the previous activity, students replace the hand crank with a motor to drive the gears and control the motor using a program in VEXcode.	• Autonomous • CamelCase • Event Handler • Input • Output	Activity 1.2 Student Document	VEX Kit
5 days	• Build a four-wheel vehicle using VEX parts. • Practice the	• Communication • Collaboration • Global Awareness/	**Activity 1.3 Rescue Mission** Students use the motorized structure from the previous activity to build a chassis for a 4-wheel rescue vehicle prototype. They attach the VEX Brain to the vehicle to make it	• Comment • Autonomous	Activity 1.3 Student Document	VEX Kit

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	habit of troubleshooting when issues arise. ● Apply programming best practices, such as using comments and testing code frequently. ● Explore a variety of applications for autonomous robots and vehicles.	Citizens	autonomous.			
2 days	● Plan a program using appropriate strategies such as	● Collaboration ● Communication	**Activity 1.4 Robot Shuffle** Students add a bumper or limit switch to the four-wheel vehicle they created in the previous activity. They develop a program to make the robot move along a line and change	● Algorithm ● Driver ● Event	Activity 1.4 Student Document	VEX Kit

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	flowcharting. ● Create appropriate event handlers to respond to runtime events, such as the push of a bumper switch. ● Demonstrate successful collaboration within a team to meet development goals.		directions based on physical inputs.	● Event Handler ● Flowchart ● Navigator ● Pair Programming		
2 days	● Create algorithms that use loops. ● Generate ideas or build upon other	● Communication	**Activity 1.5 Looping Shuffles** Students add loops to their programs from the previous activity to create more elaborate dance sequences with programmed actions.	● Loop	Activity 1.5 Student Document	VEX Kit

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	ideas to innovate.					
2 days	• Calculate the gear ratio of a system. • Describe the relationship between gear size, speed, and torque in a gear train.	• Communication	**Activity 1.6 Time to Switch Gears** Students explore the relationship of the size of the gears and changes to speed and torque in a simple gear train.	• Gear Ratio • Ratio • Torque	Activity 1.6 Student Document	VEX Kit
10 days	• Follow a design process to effectively develop a design solution. • Use a decision matrix to evaluate potential solutions.	• Collaboration • Communication • Critical & Creative Thinking • Global Awareness/ Citizen • Growth Mindset	**Project 1.9 Purposeful Design** Students apply their knowledge and skills from Lesson 1 to the end-of-lesson project. The project choices include creating a pet entertainment center for a humane shelter that is short on people volunteers, creating a spinning sign to make a dangerous crosswalk safer, or creating a robot drag racer for a fun drag race contest.	• Automation • Decision Matrix • Iterative	Activity 1.9 Student Document Activity 1.9 Project Rubric	VEX Kit

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	● Demonstrate successful collaboration within a team to meet design requirements. ● Explore careers in automation and robotics.					
1-2 days	● Consider accessibility when designing and creating solutions. ● Build a system that uses input from an optical sensor and output from an LED. ● Create simple	● Communication	**Activity 2.1 Makes Sense** Students explore an optical sensor and further their programming skills to include conditional statements within loops.	● Condition	Activity 2.1 Student Document	VEX Kit

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	algorithms that involve conditionals and loops. ● Explore careers in automation and robotics.					
1-2 days	● Decompose a problem into smaller parts. ● Create a step-by-step process to complete a task. ● Create simple algorithms that involve conditionals and loops.	● Communication	**Activity 2.2 Color Coded** Students detect color as an input with an optical sensor as they continue to create more complex programs with conditional statements and loops.	● Sensor ● Conditional ● Loop	Activity 2.2 Student Document	VEX Kit