

Course Title:	Robotics and Computer Science
Grade(s):	8th semester class ~ (45) x 45-minute classes every other day

Course Description
In this course, students will: • Apply physics and science in robotics applications and movements • Learn how to work with an engineering notebook as they cycle through the engineering design process • Apply basic knowledge on a drive train, including wheel, axle, motor, and gears, in building a robot drive train displaying the difference in torque and speed • Apply computer science knowledge to program robots, including loops, conditionals, functions, and other terms • Follow & develop multi-step procedures in building robots, a necessary drive train, and adding motors for other actions • Compete in a course challenge, developing and modifying their robots for successful competition
Approved Curricular Materials/Textbook(s)
VEXIQ site connection REC foundation

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Introduction	Learning Target: • Students will receive an introduction to the class content • Students will review safety information for emergency responses as needed • Students will log in to computers and ensure Google Classroom is connected to the course and the student	Class 1 (45 min)
Unit 1: Physics	Learning Target: • Students will understand the connection of our robots to physics terms in 8th-grade science at an introductory level • Students will demonstrate knowledge of terms learned through application	Class 2

	in robot movements Students will learn why an engineering notebook is important when creating within the engineering design process	
Unit 2: Engineering Design Process	Learning Target: Students will engage in an introduction to the engineering design process, utilizing engineering notebooks	Class 3
Unit 2: Engineering Design Process	Learning Target: - Students will engage in a drive train build, demonstrating knowledge of torque vs speed gear configuration - Students will build and modify their robots and track information, drawings, and notes in their engineering notebooks to demonstrate understanding	Class 3
Unit 3: Build	Learning Target: - Students will have robots assigned in groups of 2 - Students to disassemble as needed - Students to begin builds on assigned robot kit - Students will work through multistep procedure instructions and modify as desired within groups - Students will create a basic drivetrain to start and learn programming prior to final build of the claw - Students to ensure sensors are in place on the drive train to begin	Classes 4-8
Unit 3b: Test	Learning Target: - Students will build a basic drivetrain and remotely operate it to verify that the motors and equipment are functioning correctly - Students will demonstrate programming the robot for movement - Students will demonstrate effective use of the sensors, including distance, gyro, LED light, and color sensor	Classes 9-10
Unit 4: Build Claw	Learning Target: - Students will continue their build work and add a claw for activities to come - Students will continue programming robots using the sensors already tested	Classes 11-14

Unit 5: Computer Science	Learning Target: Students will review computer science terms, including sequencing, loops, conditionals, and functions, through Code.org in preparation for robot programming for autonomous driving	Classes 16-18
Unit 6: Robot Program	Learning Target: - Students will apply knowledge from the computer science review to PROGRAM DRIVE robots. The program will be built at codeIQ.VEX.com and connection demonstrated from the computer to the robot for programming - Students will PROGRAM the robots for Block delivery, engage the robot claw to pick up the block and deliver / stack as necessary <i>[These activities are scaffolding learning for the culminating class activity]</i>	Classes 19-20
Unit 7: Robot Modification	Learning Target: Students will review the final activity: the HIGH RISE Challenge. The 2014-15 VEXIQ competition will be reviewed, and students will revisit engineering notebooks and modify and test robots as desired, tracking all details in their engineering notebooks.	Classes 21-22
Unit 8: Competition	Learning Target: Students will compete against classmates, in groups, in the 2014-15 VEXIQ challenge event, High Rise Challenge, to determine which robot is the most advanced engineering marvel	Classes 23-24
Unit 10: New Beginning	Learning Target: Students will be introduced to the next competition, MIX & MATCH, the 2025-26 robotics competition challenge	Class 25
Unit 11: Robot Modification	Learning Target: Students will review the engineering design process and engineering notebooks to modify builds as desired within their robot build kits	Classes 26-27
Unit 12: Competition	Learning Target: Students will begin the MIX & MATCH competition within the rules of the 2025-26 activity	Classes 28-30

	Students will track progress and continue note-taking in their engineering design notebooks	
Unit 13: Storage	Learning Target: Students will disassemble MOST if not all robots to their kits in preparation for the next class opportunity to work on these robots and cycle the progress unit progression	Classes 31-32
Unit 14: Game Design	Learning Target: Students will transition from robotics to designing and developing a computer science game design	Classes 33-45