



# Gateway: Automation & Robotics 6<sup>th</sup>-7<sup>th</sup> Grade

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COURSE TITLE: Gateway – Automation and Robotics

GRADE LEVEL: 6<sup>th</sup> Grade – 7<sup>th</sup> Grade

CONTENT AREA: Career and Technical Education

### Course Description:

Students trace the history, development, and influence of automation and robotics as they learn about mechanical systems, energy transfer, machine automation, and computer control systems. Students use the VEX Robotics platform to design, build, and program real world objects such as traffic lights, toll booths, and robotic arms.

*Taken from [www.pltw.org](http://www.pltw.org)*

### Course Rationale:

Through topics like robotics, flight and space, and DNA and crime scene analysis, middle school students engage their natural curiosity and imagination in creative problem solving. PLTW's Gateway program is a strong foundation for further STEM learning in high school and beyond, challenging students to solve real-world challenges, such as cleaning oil spills and designing sustainable housing solutions. Using the same advanced software and tools as those used by the world's leading companies, students learn how to apply math, science, technology, and engineering to their everyday lives.

*Taken from [www.pltw.org](http://www.pltw.org)*

### Course Scope and Sequence

Unit 1: What is Automation and Robotics? (7 days)	Unit 2: Mechanical Systems (12 days)	Unit 3: Automated Systems (26 days)

### Essential Terminology/Vocabulary

**Unit 1:** algorithm, automation, controller, computer program, debug, economics, electric, end effector, ethical, factory, hydraulic, impact, limitation, maintenance, manipulators, power supply, pneumatic, programmer, reprogram, robot, robotics, society, trade off, troubleshoot, workforce, work envelope

**Unit 2:** belt and pulley, bevel gear, cam and follower, crank and slider, crown and pinion, drive gear, driven gear, energy, force, gear, gear ratio, idler gear, input, inverse, lead screw, linear motion, mechanism, oscillate, output, pitch, rack and pinion, ratio, reciprocating, rotary motion, simple gear train, torque, universal joint, work, worm and wheel

**Unit 3:** analog signal, automation, CAM, CIM, closed loop system, digital signal, efficiency, electromagnet, experimentation, feedback, flexible manufacturing system, flowchart, fluid power, fuel cell, hydraulics, icon, innovation, input, interface, invention, malfunction, normally closed, normally open, NTC resistor, open loop system, output, photocell, pneumatics, program, reed switch, sensor, software, solar cell, switch, system, threshold, troubleshoot, while loop

### **Approved Course Materials and Resources:**

- Gateway to Engineering: Rogers, Wright, Yates, ©2010 ISBN-13: 978-1-4180-6178-4
- Project Lead the Way's *Learning Management System (LMS)*
- Gateway VEX Kit