

Unit Overview:

In this unit, students will apply the knowledge they have gained from previous Kid Spark learning experiences as they develop creative solutions to a series of robotics and coding challenges.

Recommended Grade Level:

6 - 8

Kid Spark STEM Lab:

 Engineering Pathways OR
 STEM Pathways

Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the International Society for Technology in Education Standards (ISTE).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young students.
- ⚙️ ISTE standards are designed to prepare students to thrive in a constantly evolving technological landscape. [Click here](#) to view ISTE standards.

Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	ISTE
Challenge 1: Automated Gate Challenge (120+ Min.) In this challenge, teams will develop an automated gate that is controlled using the ROKduino programmable robotics controller and a Bump Sensor.	Engineering design	Planning & carrying out investigations	Cause & effect; mechanism & explanation	Innovative designer, Computational thinker
Challenge 2: Roadway Redirect Challenge (120+ Min.) In this challenge, teams will develop a section of bridge roadway that can rotate 90° on command. Teams will utilize the Angle Sensor and serial monitor to observe real-time data that will be directly applied to the challenge.	Engineering design	Analyzing & using data	Systems & system models	Innovative designer, Computational thinker
Challenge 3: Retractable Field Challenge (120+ Min.) In this challenge, teams will create a retractable sports field that can move inside and outside of a stadium on command. Teams will utilize Light Sensors to position the field inside or outside of the stadium.	Engineering design	Using mathematics & computational thinking	Stability & change	Innovative designer, Computational thinker
Challenge 4: Movable Bridge Challenge (120+ Min.) In this challenge, teams will create an automated, movable bridge. Teams will be required to utilize a pair of light gates (using transmitters and receivers) to complete the challenge.	Engineering design	Developing & using models	Structure & function	Innovative designer, Computational thinker
Challenge 5: Smart Vault Challenge (120+ Min.) In this challenge, teams will develop an automated smart vault that is used to protect valuable items on display in the city museum.	Engineering design	Asking questions & defining problems	Scale, proportion, & quantity	Innovative designer, Computational thinker

Prerequisite Kid Spark Units

We highly recommend students complete the following Kid Spark units prior to starting this unit.

Elementary Program Units

Applied Mathematics

Robotics & Coding 101

Exploring Sensors

Middle School Program Units

Kid Spark Basics

Simple Machines

Compound Machines

Loops & Variables

Note: Make sure students can access prior Kid Spark units/lessons. Students may need to re-visit past learning experiences or utilize example programs/sketches they can apply to new robotics challenges and projects.



Get Engaged!

Visit our community page at KidSparkEducation.org/Community for new project ideas, lesson insights, and to see how other educators are using Kid Spark materials and resources in their classrooms.