RoboBlocky Math

Intervention and Enrichment Curriculum

Semester and Full Academic Year

www.roboblocky.com/curriculum

Contact: service@barobo.com

Introduction

The **RoboBlocky Math Intervention and Enrichment Curriculum** provides flexible, hands-on mathematics courses for elementary, middle, and high school students. The curriculum supports **both intervention and enrichment**, with differences primarily in **pacing, instructional emphasis, and depth of exploration**.

- **Intervention implementations** focus on strengthening foundational mathematical understanding through guided instruction, additional practice, and extended instructional time.
- **Enrichment implementations** use an accelerated pace and extended problem-solving experiences to deepen conceptual understanding and application.

Courses may be offered during the school day, afterschool, or in summer programs.

The **RoboBlocky Math Intervention Curriculum** provides dynamic, hands-on intervention courses for elementary, middle, and high school students who need additional support in strengthening their mathematics foundation. These courses develop essential math skills through engaging, experiential learning. **They can be offered during the school year, afterschool, or summer programs.**

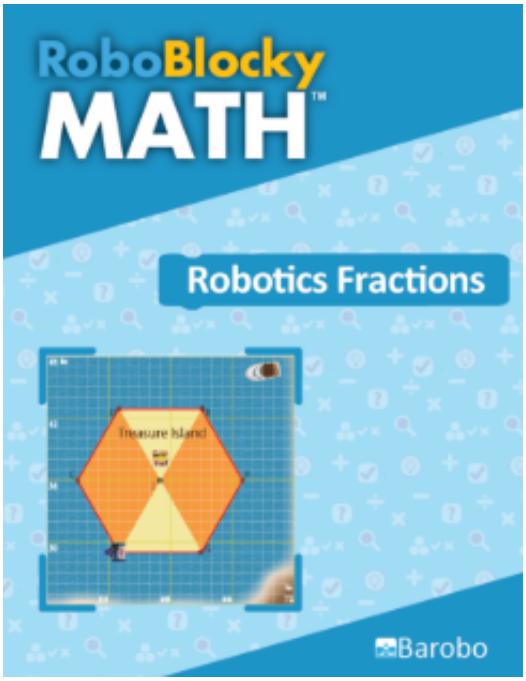
Through activities such as **RoboParade**, **RoboToss**, and the **RoboPlay Challenge Competition**, students engage in meaningful, project-based learning that integrates coding and robotics. This approach deepens understanding of core mathematical concepts while fostering problem-solving, critical thinking, collaboration, and real-world application.

Course Title	Grade Level	Duration
Robotics Fractions	Elementary School	One semester
Robotics Pre-Algebra	Middle school	One semester
Robotics Algebra	High school	One semester
Sensor-Based Robotics Geometry	High School	One Semester
Math Exploration with Coding and Robotics	Middle School	Full year
Math Lab with Coding and Robotics	High School	Full year

All courses emphasize essential mathematical concepts, build student confidence, and prepare learners for success in future mathematics and STEM pathways.**One-semester courses support intervention or enrichment, while full-year courses are designed for intervention.**

Semester Courses

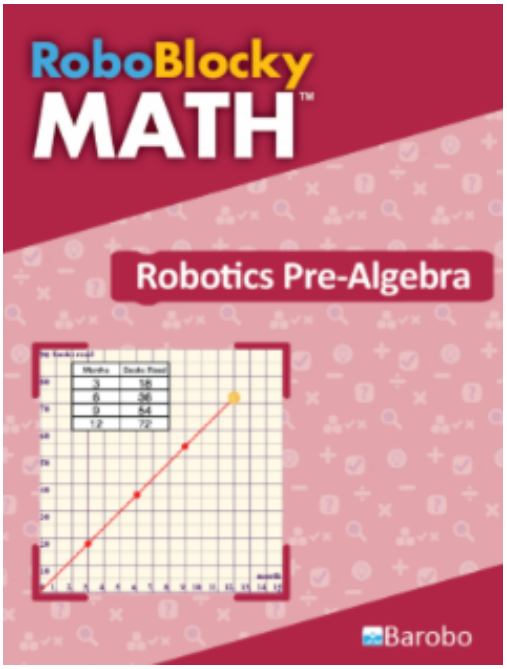
Robotics Fractions



Grade levels: Rising 5th and 6th Graders
Duration: 3 weeks in the summer or a semester during the academic year

Course Description:
The **Robotics Fractions** course provides a rigorous introduction to fraction concepts through structured, hands-on learning experiences incorporating coding and robotics. Students will utilize robotics to model fraction representation and computation. Projects include the RoboParade, during which students will plot fractional parade routes and program robots to navigate them. Students will also participate in a RoboPlay Challenge Competition, where they will utilize hardware Linkbots to solve competitive challenges involving fractions.

Robotics Pre-Algebra



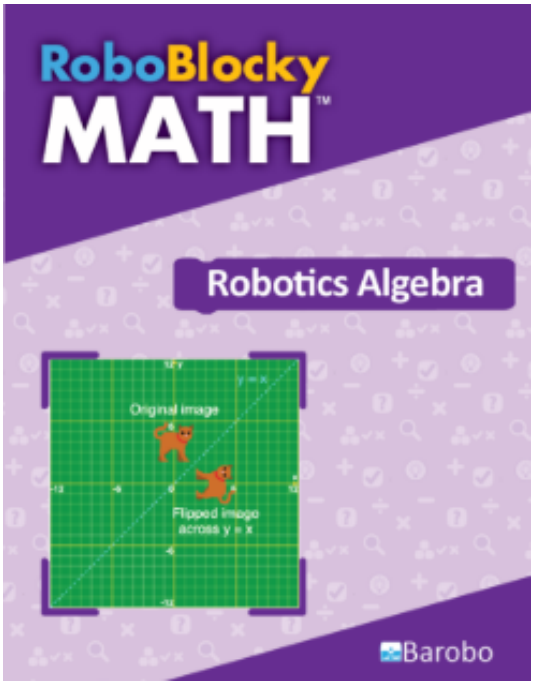
Grade levels: Rising 7th and 8th Graders

Duration: 3 weeks in the summer or a semester during the academic year

Course Description:

The **Robotics Pre-Algebra** course develops foundational pre-algebra skills through interactive coding and robotics activities. It provides a collaborative, project-based environment that fosters problem-solving, critical thinking, and real-world applications of mathematical concepts. Course topics include arithmetic operations with integers and fractions; expressions and equations. Hands-on activities, such as RoboParade, help students strengthen problem-solving and critical thinking skills, build confidence, and prepare for success in future mathematics courses.

Robotics Algebra



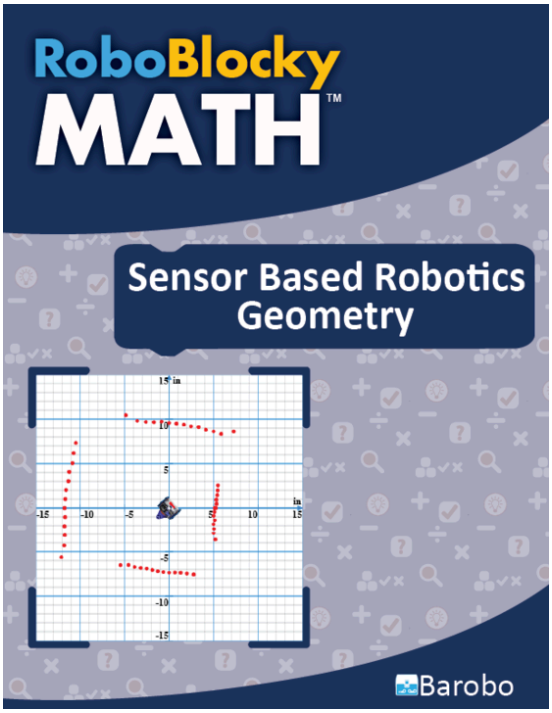
Grade levels: Rising 9th Graders

Duration: 3 weeks in the summer or a semester during the academic year

Course Description:

The **Robotics Algebra** course strengthens core algebraic concepts through applied, hands-on experiences with coding and robotics. Through the integration of coding and robotics, students investigate how mathematical relationships inform real-world systems and robotic behaviors. In a collaborative, project-based environment, students investigate solving one-variable equations (single- and multi-step); how to represent, analyze, and solve linear equations; and systems of equations. Through coding challenges and robotics projects, they discover how algebra powers control, prediction, and decision-making in machines. By the end of the course, students will have strengthened their understanding of linear relationships, built confidence in problem-solving, and developed the mathematical reasoning needed for success in high school mathematics and beyond. Through engaging, project-based learning, students gain foundational skills in electronics, coding, and robotics engineering.

Sensor-Based Robotics Geometry

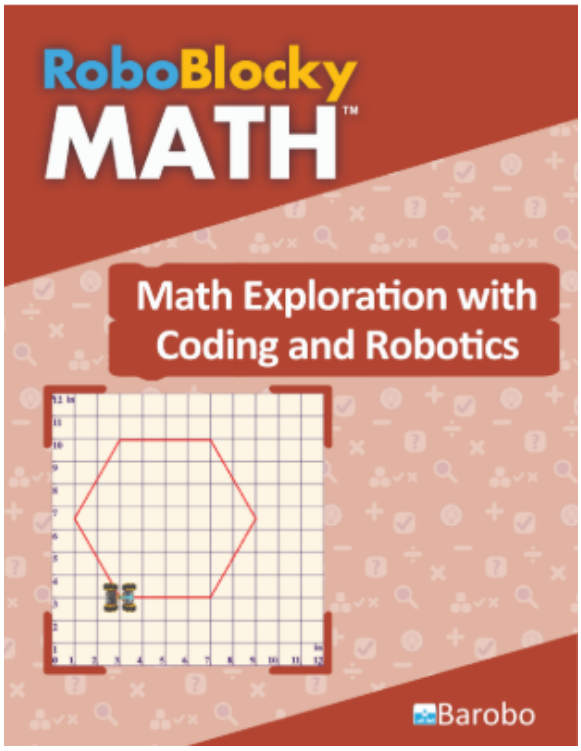


Grade levels: Rising 10th to 12th Graders
Prerequisites: Passed Algebra 1
Duration: 3 weeks in the summer or a semester during the academic year

Course Description:
The **Sensor-Based Robotics Geometry** course strengthens students' understanding of geometric concepts through hands-on experiences with coding, robotics, and sensor technology. Students program and control Linkbot robots while exploring key geometry topics such as angles, geometric constructions, transformations, triangle relationships, and trigonometry. As the course progresses, students are introduced to Arduino microcontrollers and sensors, learning to program LEDs and use ultrasonic sensors to collect and respond to real-world data. Using sensor-based robots, students explore how geometry supports robotic movement and navigation. Students are also introduced to the application of geometry through Simultaneous Localization and Mapping (SLAM) with robots.

Full Academic Year Courses

Math Exploration with Coding and Robotics

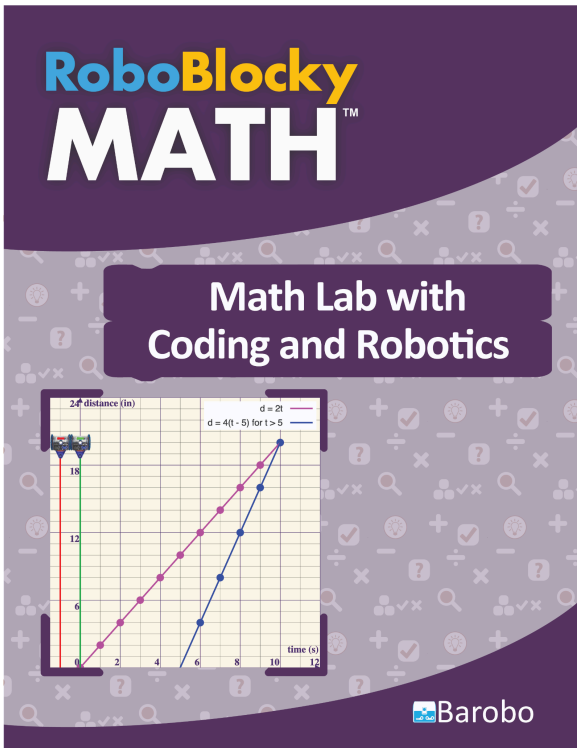


Grade Levels: 7th and 8th Graders

Course Description:

This year-long middle school course builds essential math skills through hands-on, engaging learning experiences. By integrating coding and robotics, it provides a collaborative, project-based environment that fosters problem-solving, critical thinking, and real-world applications of mathematical concepts. Course topics include arithmetic operations with integers, fractions, and decimals; ratios, rates, and proportions; operations and expressions; and measurements. Hands-on activities, such as RoboParade, RoboToss, and the RoboPlay Challenge Competition, strengthen problem-solving and critical thinking skills, help students build confidence, and prepare them for more advanced mathematics courses.

Math Lab with Coding and Robotics



Grade levels: 9th to 12th Graders
Course Description: This foundational high school mathematics course strengthens essential skills through engaging, hands-on learning experiences. By integrating coding and robotics, it creates a collaborative, project-based environment that promotes problem-solving, critical thinking, and real-world application of mathematical concepts. Course topics include arithmetic operations with whole numbers, fractions, and decimals; ratios and rates; proportions and percents; solving one-variable equations (single- and multi-step); linear equations; systems of linear equations; geometric transformations (translations, rotations, and reflections); and probability. Hands-on projects, including RoboParade, RoboToss, and the RoboPlay Challenge Competition, help students strengthen their mathematical understanding, build confidence, and prepare for success in advanced mathematics and STEM courses.