TRUE ROBOTICS

INTRODUCTION TO ROBOTICS WITH AXLE

GRADES 6–8

This document lists the Missouri learning standards addressed by Introduction to Robotics with Axle, True Robotics' grades 6–8 robotics curriculum. Standards are grouped by subject and grade level, with codes and wording as published by the Missouri Department of Elementary and Secondary Education.

40	7	8	55
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

40 STANDARDS

Based on the Missouri state standards

GRADE	CODE	STANDARD
6	6.NS.A.1	Compute and interpret quotients of positive fractions.
6	6.EEI.B.4	Use substitution to determine whether a given number in a specified set makes a one-variable equation or inequality true.
6	6.EEI.B.5	Understand that if any solutions exist, the solution set for an equation or inequality consists of values that make the equation or inequality true.
6	6.EEI.B.6	Write and solve equations using variables to represent quantities, and understand the meaning of the variable in the context of the situation.
6	6.EEI.B.7	Solve one-step linear equations in one variable involving non-negative rational numbers.
6	6.EEI.C.9	Identify and describe relationships between two variables that change in relationship to one another.
6	6.GM.A.1	Find the area of polygons by composing or decomposing the shapes into rectangles or triangles.
6	6.GM.A.2	Find the volume of right rectangular prisms.
6	6.GM.A.3	Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane.
6	6.GM.A.4	Solve problems using nets.
6	6.DSP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
6	6.DSP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape.

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GRADE	CODE	STANDARD
6	6.DSP.B.5c	Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context of the data.
7	7.RP.A.1	Compute unit rates, including those that involve complex fractions, with like or different units.
7	7.RP.A.2	Recognize and represent proportional relationships between quantities.
7	7.RP.A.2b	Identify and/or compute the constant of proportionality (unit rate).
7	7.RP.A.2c	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.
7	7.RP.A.3	Solve problems involving ratios, rates, percentages and proportional relationships.
7	7.NS.A.1a	Add and subtract rational numbers.
7	7.NS.A.1d	Understand subtraction of rational numbers as adding the additive inverse.
7	7.NS.A.1e	Determine the distance between two rational numbers on the number line is the absolute value of their difference.
7	7.NS.A.2a	Multiply and divide rational numbers.
7	7.NS.A.3	Solve problems involving the four arithmetic operations with rational numbers.
7	7.EEI.B.4b	Write and/or solve two-step equations of the form px + q = r and p(x + q) = r, where p, q and r are rational numbers, and interpret the meaning of the solution in the context of the problem.
7	7.GM.A.1	Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.
7	7.GM.A.4	Understand concepts of circles.
7	7.GM.A.4a	Analyze the relationships among the circumference, the radius, the diameter, the area and Pi in a circle.
7	7.GM.A.4b	Know and apply the formulas for circumference and area of circles to solve problems.
7	7.GM.B.6	Understand the relationship between area, surface area and volume.
8	8.NS.A.1	Explore the real number system.
8	8.NS.A.2	Estimate the value and compare the size of irrational numbers and approximate their locations on a number line.
8	8.EEI.B.5	Graph proportional relationships.
8	8.EEI.C.8	Analyze and solve systems of linear equations.
8	8.EEI.C.8b	Explain why solution(s) to a system of two linear equations in two variables correspond to point(s) of intersection of the graphs.
8	8.EEI.C.8d	Solve systems of two linear equations.
8	8.GM.B.7	Use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two- and three-dimensional contexts.

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GRADE	CODE	STANDARD
8	8.GM.B.8	Use the Pythagorean Theorem to find the distance between points in a Cartesian coordinate system.
8	8.GM.C.9b	Understand the concepts of volume and find the volume of pyramids, cones and spheres.
8	8.F.A.3	Investigate the differences between linear and nonlinear functions.
8	8.F.B.4	Use functions to model linear relationships between quantities.

SCIENCE

7 STANDARDS

Based on the Missouri state standards

GRADE	CODE	STANDARD
6	6-8.PS4.A.1	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
6	6-8.PS4.A.2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
6	6-8.ETS1.A.1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
7	6-8.PS3.A.1	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
8	6-8.PS1.A.4	Develop a model that describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
8	6-8.PS2.A.1	Apply physics principles to design a solution that minimizes the force of an object during a collision and develop an evaluation of the solution.
8	6-8.PS2.A.2	Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

COMPUTER SCIENCE

8 STANDARDS

Based on the Missouri state standards

GRADE	CODE	STANDARD
6–8	6-8.CS.HS.01	Design projects that combine hardware and software to collect and exchange data.
6–8	6-8.NI.NCO.01	Model the different ways that data is transferred across a network and the protocols used to transmit the data.
6–8	6-8.AP.V.01	Create clearly named variables to store and manipulate information.
6–8	6-8.AP.C.01	Design and develop combinations of control structures, nested loops and compound conditionals.
6–8	6-8.AP.M.01	Decompose problems and subproblems into parts to facilitate the design, implementation and review of programs.

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GRADE	CODE	STANDARD
6–8	6-8.AP.M.02	Create procedures with parameters to organize code and to make it easier to reuse.
6–8	6-8.AP.PD.04	Test and refine programs using a range of test cases.
6–8	6-8.IC.C.01	Compare tradeoffs associated with computing technologies that have impacted people's activities, careers and lives when solving global problems using the power of computing.

SOURCES & NOTES

- The official mathematics, science and computer science standards for Missouri, as published by the Missouri Department of Elementary and Secondary Education.
- Codes and standard wording are reproduced from the official standards documents. Clarification statements, examples and assessment boundaries are omitted.
- Grade shows the grade level at which True Robotics lessons address each standard. A range (for example K–2) marks a standard written for a grade band.
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- A lesson-level crosswalk is available on request at info@truerobotics.org.

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