TRUE ROBOTICS

INTRODUCTION TO ROBOTICS WITH AXLE

GRADES 6–8

This document lists the Oregon 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 Oregon Department of Education.

30	8	38
MATH	SCIENCE	TOTAL STANDARDS

MATHEMATICS

30 STANDARDS

Based on the Oregon state standards

GRADE	CODE	STANDARD
6	6.AEE.B.4	Understand solving an equation or inequality as a process of answering which values from a specified set, if any, make the equation or inequality true. Use substitution to determine which number(s) in a given set make an equation or inequality true.
6	6.AEE.B.5	Use variables to represent numbers and write expressions when solving problems in authentic contexts.
6	6.AEE.B.6	Write and solve equations of the form x + p = q and px = q in problems that arise from authentic contexts for cases in which p, q and x are all nonnegative rational numbers.
6	6.AEE.C.8	Use variables to represent and analyze two quantities to solve problems in authentic contexts. Including those that change in relationship to one another; write an equation to express one quantity in terms of the other quantity.
6	6.NS.A.1	Represent, interpret, and compute quotients of fractions to solve problems in authentic contexts involving division of fractions by fractions.
6	6.NS.C.8	Graph points in all four quadrants of the coordinate plane to solve problems in authentic contexts. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
6	6.GM.A.1	Find the area of triangles, quadrilaterals, and other polygons by composing into rectangles or decomposing into triangles and other shapes. Apply these techniques to solve problems in authentic contexts.
6	6.GM.A.2	Find the volume of a right rectangular prism with fractional edge lengths by filling it with unit cubes of appropriate unit fraction edge lengths. Connect and apply to the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths to solve problems in authentic contexts.

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GRADE	CODE	STANDARD
6	6.GM.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures, including those from authentic contexts.
6	6.DR.A.1	Formulate and recognize statistical investigative questions as those that anticipate changes in descriptive data related to the question and account for it in the answers.
6	6.DR.B.2	Collect and record data with technology to identify and describe the characteristics of numerical data sets using quantitative measures of center and variability.
6	6.DR.C.3	Analyze data representations and describe measures of center and variability of quantitative data using appropriate displays.
7	7.AEE.B.3	Write and solve problems in authentic contexts using expressions and equations with positive and negative rational numbers in any form. Contexts can be limited to those that can be solved with one or two-step linear equations.
7	7.RP.A.1	Solve problems in authentic contexts involving unit rates associated with ratios of fractions.
7	7.RP.A.2	Recognize and represent proportional relationships between quantities in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Identify the constant of proportionality (unit rate) within various representations.
7	7.RP.A.3	Use proportional relationships to solve ratio and percent problems in authentic contexts.
7	7.NS.A.1	Apply and extend previous understandings of addition, subtraction and absolute value to add and subtract rational numbers in authentic contexts. Understand subtraction as adding the additive inverse, $p - q = p + (-q)$.
7	7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Interpret operations of rational numbers solving problems in authentic contexts.
7	7.GM.A.1	Solve problems involving scale drawings of geometric figures. Reproduce a scale drawing at a different scale and compute actual lengths and areas from a scale drawing.
7	7.GM.B.3	Understand the relationship between area and circumference of circles. Choose and use the appropriate formula to solve problems with radius, diameter, circumference and area of circles.
7	7.GM.B.5	Solve problems in authentic contexts involving two- and three-dimensional figures. Given formulas, calculate area, volume and surface area.
8	8.AEE.B.5	Graph proportional relationships in authentic contexts. Interpret the unit rate as the slope of the graph, and compare two different proportional relationships represented in different ways.
8	8.AEE.C.8	Find, analyze, and interpret solutions to pairs of simultaneous linear equations using graphs or tables.
8	8.AFN.A.3	Understand and identify linear functions, whose graph is a straight line, and identify examples of functions that are not linear.
8	8.AFN.B.4	Construct a function to model a linear relationship in authentic contexts between two quantities.
8	8.NS.A.1	Know that real numbers that are not rational are called irrational.

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GRADE	CODE	STANDARD
8	8.NS.A.2	Use rational approximations of irrational numbers to compare size and locate on a number line.
8	8.GM.B.7	Apply the Pythagorean Theorem in authentic contexts to determine unknown side lengths in right triangles.
8	8.GM.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8	8.GM.C.9	Choose and use the appropriate formula for the volume of cones, cylinders, and spheres to solve problems in authentic contexts.

SCIENCE

8 STANDARDS

Based on the Oregon state standards

GRADE	CODE	STANDARD
6	MS.ETS1.1	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	7.PS1.4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
8	8.PS2.1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
8	8.PS2.2	Plan 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.
8	8.PS3.1	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	8.PS4.1	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.
8	8.PS4.2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
8	8.PS4.3	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

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SOURCES & NOTES

- The official mathematics and science standards for Oregon, as published by the Oregon Department of 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.
- Standards text remains the property of its publisher and is reproduced here for alignment reference only.
- A lesson-level crosswalk is available on request at info@truerobotics.org.
- Oregon publishes no computer science standards for grades 6–8, so that section is omitted.

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