TRUE ROBOTICS

TAKING OFF WITH PILOT

GRADES 3–5

This document lists the Alaska learning standards addressed by Taking Off with Pilot, True Robotics' grades 3–5 robotics curriculum. Standards are grouped by subject and grade level, with codes and wording as published by the Alaska Department of Education & Early Development.

27	6	6	39
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

27 STANDARDS

Based on the Alaska state standards

GRADE	CODE	STANDARD
3	3.OA.1	Interpret products of whole numbers (e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each).
3	3.OA.3	Use multiplication and division numbers up to 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem).
3	3.NBT.2	Use strategies and/or algorithms to fluently add and subtract with numbers up to 1000, demonstrating understanding of place value, properties of operations, and/or the relationship between addition and subtraction.
3	3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 10 x 60) using strategies based on place value and properties of operations.
3	3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3	3.NF.3d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions (e.g., by using a visual fraction model).
3	3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes or hours (e.g., by representing the problem on a number line diagram or clock).
3	3.MD.5	Measure and record lengths using rulers marked with halves and fourths of an inch. Make a line plot with the data, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

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GRADE	CODE	STANDARD
3	3.MD.9b	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
3	3.MD.10	Solve real world and mathematical problems involving perimeters of polygons, including: finding the perimeter given the side lengths, finding an unknown side length, exhibiting rectangles with the same perimeter and different areas, exhibiting rectangles with the same area and different perimeters.
3	3.G.1	Categorize shapes by different attribute classifications and recognize that shared attributes can define a larger category. Generalize to create examples or non-examples.
4	4.OA.1	Interpret a multiplication equation as a comparison e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 groups of 7 and 7 groups of 5 (Commutative property). Represent verbal statements of multiplicative comparisons as multiplication equations.
4	4.OA.4	Find all factor pairs for a whole number in the range 1–100. Explain the correlation/differences between multiples and factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.
4	4.NBT.4	Fluently add and subtract multi-digit whole numbers using any algorithm. Verify the reasonableness of the results.
4	4.NBT.5	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4	4.NBT.6	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4	4.NF.2	Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2). Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions (e.g., by using a visual fraction model).
4	4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
4	4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
4	4.G.2	Classify two-dimensional (plane) figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
5	5.NF.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.

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GRADE	CODE	STANDARD
5	5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators (e.g., by using visual fraction models or equations to represent the problem). Use benchmark fractions and number sense of fractions to estimate mentally and check the reasonableness of answers.
5	5.NF.6	Solve real world problems involving multiplication of fractions and mixed numbers (e.g., by using visual fraction models or equations to represent the problem).
5	5.MD.1	Identify, estimate measure, and convert equivalent measures within systems English length (inches, feet, yards, miles) weight (ounces, pounds, tons) volume (fluid ounces, cups, pints, quarts, gallons) temperature (Fahrenheit) Metric length (millimeters, centimeters, meters, kilometers) volume (milliliters, liters), temperature (Celsius), (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems using appropriate tools.
5	5.MD.7a	Estimate and find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Demonstrate the associative property of multiplication by using the product of three whole numbers to find volumes (length x width x height).
5	5.MD.7b	Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.
5	5.MD.7c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

SCIENCE

6 STANDARDS

Based on the Alaska state standards

GRADE	CODE	STANDARD
3–5	3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3	3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
3	3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
4	4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
4	4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
5	5-PS1-3	Make observations and measurements to identify materials based on their properties.

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COMPUTER SCIENCE

6 STANDARDS

Based on the Alaska state standards

GRADE	CODE	STANDARD
3–5	3-5.CC.1	Students recognize and utilize the features and functions of a variety of creation or communication tools.
3	3.AP.A.01	Create and follow algorithms to accomplish a simple task or solve a simple problem
3	3.AP.PD.01	Outline problems and potential solutions using a sequence of steps and conditional logic (e.g., if-then-else statements).
4	4.CS.D.01	Define and discuss how computer hardware and software work together as a system to accomplish tasks (e.g., input, output, processor, sensors, and storage).
4	4.AP.A.01	Create, compare & refine multiple algorithms for the same task.
4	4.AP.PD.01	Create and debug programs using variables, loops, functions that intake, store, and display data.

SOURCES & NOTES

- The official mathematics, science and computer science standards for Alaska, as published by the Alaska Department of Education & Early Development.
- 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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