TRUE ROBOTICS

TAKING OFF WITH PILOT

GRADES 3–5

This document lists the New York 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 New York State Education Department.

31	6	12	49
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

31 STANDARDS

Based on the New York state standards

GRADE	CODE	STANDARD
3	NY-3.OA.1	Interpret products of whole numbers.
3	NY-3.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
3	NY-3.NBT.2	Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3	NY-3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 using strategies based on place value and properties of operations.
3	NY-3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line.
3	NY-3.NF.3d	Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.
3	NY-3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve one-step word problems involving addition and subtraction of time intervals in minutes.
3	NY-3.MD.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
3	NY-3.MD.7b	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.

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GRADE	CODE	STANDARD
3	NY-3.MD.8a	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths or finding one unknown side length given the perimeter and other side lengths.
3	NY-3.MD.8b	Identify rectangles with the same perimeter and different areas or with the same area and different perimeters.
3	NY-3.G.1	Recognize and classify polygons based on the number of sides and vertices (triangles, quadrilaterals, pentagons, and hexagons). Identify shapes that do not belong to one of the given subcategories.
4	NY-4.OA.1	Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations.
4	NY-4.OA.4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its 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	NY-4.NBT.4	Fluently add and subtract multi-digit whole numbers using a standard algorithm.
4	NY-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	NY-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	NY-4.NF.2	Compare two fractions with different numerators and different denominators. 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.
4	NY-4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.
4	NY-4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
4	NY-4.G.2a	Identify and name triangles based on angle size (right, obtuse, acute).
4	NY-4.G.2b	Identify and name all quadrilaterals with 2 pairs of parallel sides as parallelograms.
4	NY-4.G.2c	Identify and name all quadrilaterals with four right angles as rectangles.
5	NY-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.
5	NY-5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
5	NY-5.NF.3	Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.

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GRADE	CODE	STANDARD
5	NY-5.NF.4b	Find the area of a rectangle with fractional side lengths by tiling it with rectangles of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5	NY-5.MD.1	Convert among different-sized standard measurement units within a given measurement system when the conversion factor is given. Use these conversions in solving multi-step, real world problems.
5	NY-5.MD.5a	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.
5	NY-5.MD.5b	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	NY-5.MD.5c	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 New York 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 AND DIGITAL FLUENCY

12 STANDARDS

Based on the New York state standards

GRADE	CODE	STANDARD
3	2-3.IC.3	Discuss and explain how computing technology can be used in society and the world.
3	2-3.CT.6	Create two or more algorithms for the same task.
3	2-3.CT.8	Identify steps within a task that should only be carried out under certain precise conditions.
3	2-3.CT.9	Identify and debug errors within an algorithm or program that includes sequencing or repetition.
3	2-3.NSD.1	Describe and demonstrate several ways a computer program can receive data and instructions (input) and can present results (output).
3	2-3.DL.4	Use a variety of digital tools and resources to create digital artifacts.
4–5	4-6.IC.1	Describe computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.
4–5	4-6.CT.6	Compare two or more algorithms and discuss the advantages and disadvantages of each for a specific task.
4–5	4-6.CT.8	Develop algorithms or programs that use repetition and conditionals for creative expression or to solve a problem.
4–5	4-6.CT.9	Explain each step of an algorithm or program that includes repetition and conditionals for the purposes of debugging.
4–5	4-6.NSD.2	Model how computer hardware and software work together as a system to accomplish tasks.
4–5	4-6.DL.4	Use a variety of digital tools and resources to create and revise digital artifacts.

SOURCES & NOTES

- The official mathematics, science and computer science standards for New York, as published by the New York State Education Department.
- 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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