TRUE ROBOTICS

TAKING OFF WITH PILOT

GRADES 3–5

This document lists the Wisconsin 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 Wisconsin Department of Public Instruction.

28	8	8	44
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

28 STANDARDS

Based on the Wisconsin state standards

GRADE	CODE	STANDARD
3	M.3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each.
3	M.3.OA.A.3	Use multiplication and division within 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	M.3.NBT.A.2	Flexibly and efficiently add and subtract within 1,000 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
3	M.3.NBT.A.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.
3	M.3.NF.A.2	Understand and represent a fraction as a number on the number line.
3	M.3.NF.A.3.d	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. Justify the conclusions by using a visual fraction model (e.g., tape diagram or number line) and describe the result of the comparison using words and symbols (>, =, and <).
3	M.3.MD.A.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, e.g., by representing the problem on a number line.
3	M.3.MD.B.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, fourths.

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GRADE	CODE	STANDARD
3	M.3.MD.C.7.b	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	M.3.MD.D.8	Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
3	M.3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
4	M.4.OA.A.1	Interpret a multiplication equation as a multiplicative comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
4	M.4.OA.B.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	M.4.NBT.B.4	Flexibly and efficiently add and subtract multi-digit whole numbers using strategies or algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
4	M.4.NBT.B.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	M.4.NBT.B.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	M.4.NF.A.2	Compare fractions with different numerators and different denominators while recognizing that comparisons are valid only when the fractions refer to the same whole. Justify the conclusions by using visual fraction models (e.g., tape diagrams and number lines) and by reasoning about the size of the fractions, using benchmark fractions (including whole numbers), or creating common denominators or numerators. Describe the result of the comparison using words and symbols (>, =, and <).
4	M.4.MD.A.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 a number line that feature a measurement scale.
4	M.4.MD.A.3	Apply the area and perimeter formulas for rectangles in real-world and mathematical problems.
4	M.4.G.A.2	Classify two-dimensional 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.

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GRADE	CODE	STANDARD
5	M.5.NF.A.1	Add and subtract fractions and mixed numbers using flexible and efficient strategies, including renaming fractions with equivalent fractions. Justify using visual models (e.g., tape diagrams or number lines) and equations.
5	M.5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
5	M.5.NF.B.3	Interpret a fraction as an equal sharing division situation, where a quantity (the numerator) is divided into equal parts (the denominator). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, by using visual fraction models (e.g., tape diagrams or area models) or equations to represent the problem.
5	M.5.NF.B.4.b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares 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	M.5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.
5	M.5.MD.C.5.a	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. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
5	M.5.MD.C.5.b	Apply the formulas V = l x w x h and V = B x 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	M.5.MD.C.5.c	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

8 STANDARDS

Based on the Wisconsin state standards

GRADE	CODE	STANDARD
3–5	SCI.SEP1.B.3-5	Students use prior knowledge to describe and define simple design problems that can be solved through the development of an object, tool, process, or system. They include several criteria for success and constraints on materials, time, or cost.
3	SCI.SEP6.B.3-5	Students use evidence to create multiple solutions to design problems. This includes the following: Apply scientific ideas to solve design problems. Generate multiple solutions to a problem and compare how well they meet the criteria and constraints.
3	SCI.PS2.A.3	Qualities of motion and changes in motion require description of both size and direction. The effect of unbalanced forces on an object results in a change of motion. Patterns of motion can be used to predict future motion.

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GRADE	CODE	STANDARD
3	SCI.ETS1.B.3-5	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.
4	SCI.LS1.A.4	Plants and animals have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.
4	SCI.PS3.A.4	Moving objects contain energy. The faster the object moves, the more energy it has.
4	SCI.PS3.C.4	When objects collide, contact forces transfer energy so as to change objects' motions.
5	SCI.PS1.A.5	Matter exists as particles that are too small to see. Matter is always conserved even if it seems to disappear. Measurements of a variety of observable properties can be used to identify particular materials.

COMPUTER SCIENCE

8 STANDARDS

Based on the Wisconsin state standards

GRADE	CODE	STANDARD
3–5	ALG.1.c.e.1	Write the steps in algorithms that include sequence, events, iteration, and selection to complete a task or solve a problem using everyday language.
3–5	ALG.3.a.e.2	Compare different sets of steps to see which works better or faster.
3–5	PRO.1.a.e.1	Create code from an algorithm that includes sequence, events, and iteration to express ideas or complete a task.
3–5	PRO.2.c.e.1	Use variables to store, compare, and modify data.
3–5	PRO.3.a.1.e	Analyze and debug a program, which includes sequencing, events, loops, conditionals, and variables.
3–5	CSS.1.a.e.1	Identify and explain the function of basic hardware components in a computing system (such as the display, system unit, keyboard, and other input/output devices).
3–5	CSS.1.b.e.1	Use technology tools (tablets, computers, or apps) in safe and appropriate ways to help complete tasks or solve problems.
3–5	FUT.2.b.e.1	Identify everyday technologies and discuss how people use them to meet needs and how they affect daily life.

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SOURCES & NOTES

- The official mathematics, science and computer science standards for Wisconsin, as published by the Wisconsin Department of Public Instruction.
- 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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