TAKING OFF WITH PILOT

GRADES 3–5

This document lists the Minnesota 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 Minnesota Department of Education.

25	6	3	34
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

25 STANDARDS

Based on the Minnesota state standards

GRADE	CODE	STANDARD
3	3.1.1.3	Collect and organize data to answer a statistical question using various tools and addressing missing or incomplete data. Represent data in a variety of ways including technology.
3	3.2.3.1	Measure lengths to the nearest fourth when measuring with standard units.
3	3.2.3.3	Calculate the perimeter of a polygon with whole number side lengths.
3	3.2.4.1	Create representations of regular and irregular polygons with a given number of sides, including triangles, quadrilaterals, pentagons, hexagons and octagons.
3	3.3.5.5	Use a range of strategies and algorithms based on knowledge of place value and equality to flexibly add and subtract within 1,000. Strategies may include decomposition, expanded notation and partial sums and differences. Explain how the strategies work using place value and the properties of operations.
3	3.3.5.6	Represent and solve contextual situations involving multiplication, measurement division and partitive division with single digit factors using visual models.
3	3.3.5.8	Multiply one-digit whole numbers by multiples of 10 and 100 using strategies such as decomposition of factors of ten, place value language, repeated addition and properties of operations.
3	3.3.5.9	Partition a whole into halves, thirds, fourths and eighths. Wholes can be circles, rectangles and the distance between 0 and 1 on a number line.
3	3.3.5.12	Compare and order unit fractions using visual models and describe how the size of the fraction changes as the denominator changes.
4	4.2.3.4	Determine the perimeter and area of two-dimensional figures and label with appropriate units.

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GRADE	CODE	STANDARD
4	4.2.3.6	Explain why the area of a rectangle can be calculated by multiplying the length by the width and use the formula A = l x w to calculate the area of rectangles with whole number side lengths.
4	4.2.4.2	Create representations of triangles given the relationships among the sides (scalene, isosceles, equilateral) and the angles (acute, right, obtuse).
4	4.2.4.3	Sort and classify quadrilaterals in a hierarchy, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
4	4.3.5.7	Flexibly decompose numbers into addends or factors to multiply two two-digit numbers with a one-digit number, by and up to a four-digit number. Justify the strategy using equations, rectangular arrays and area models.
4	4.3.5.8	Solve contextual situations using division with dividends up to the thousands place and using one-digit divisors. Strategies may include using visual models, partial quotients, the commutative, associative and distributive properties and repeated subtraction.
4	4.3.5.9	Solve multi-step contextual situations requiring the use of addition, subtraction and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of technology and the context of the situation to assess the reasonableness of results.
4	4.3.5.10	Read, write, represent and plot on a number line fractional values between 0 and 3, including mixed numbers and fractions greater than 1 with denominators of 2, 3, 4, 5, 6, 8, 10 and 12. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers.
4	4.3.5.13	Compare and order fractions between 0 and 3 and justify reasoning using pictures, position on a number line and selecting, when appropriate, among the strategies such as using a common numerator, referencing a benchmark and using a common denominator.
4	4.3.7.2	Use words to write a rule for multiplicative patterns to solve contextual situations. Compare and contrast pattern rules that are additive and multiplicative, using a variety of strategies including tables, drawings and algebraic equations with a symbol for the unknown number to represent the situation.
5	5.2.3.4	Use various strategies to measure the volume and surface area of three-dimensional shapes made of a collection of unit cubes.
5	5.2.3.5	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes. Show that the volume is the same by unit cubes as by multiplying the edge lengths (l x w x h) or by multiplying the height by the area of the base.
5	5.3.5.2	Divide multi-digit numbers by a one-digit or two-digit divisor using efficient and generalizable procedures based on knowledge of place value and the properties of operations that may include partial quotients and standard algorithms. Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction, a mixed number or a decimal.
5	5.3.5.10	Estimate sums and differences of fractions and mixed numbers to the nearest half. Justify reasoning using benchmarks.
5	5.3.5.11	Fluently add and subtract fractions with unlike denominators (including mixed numbers) and justify using equivalent fractions, visual models and the number line.

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GRADE	CODE	STANDARD
5	5.3.5.13	Solve contextual situations using addition and subtraction of positive rational numbers represented as fractions (including mixed numbers) or decimals using visual models, equations and properties of operations.

SCIENCE

6 STANDARDS

Based on the Minnesota state standards

GRADE	CODE	STANDARD
4	4P.1.1.2.1	Define a simple design problem that can be solved by applying scientific ideas about magnets.
4	4E.3.2.2.1	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
4	4E.4.2.2.1	Obtain and combine multiple sources of information about ways individual communities, including Minnesota American Indian Tribes and communities and other cultures, use evidence and scientific principles to make decisions about the uses of Earth's resources.
5	5P.1.1.1.1	Ask investigatable questions and predict reasonable outcomes about the changes in energy, related to speed, that occur when objects interact.
5	5P.1.2.1.2	Evaluate appropriate methods and tools to identify materials based on their properties prior to investigation.
5	5P.3.2.1.1	Construct an explanation based on evidence relating the speed of an object to the energy of that object.

COMPUTER SCIENCE (INTEGRATED BENCHMARKS)

3 STANDARDS

Based on the Minnesota state standards

GRADE	CODE	STANDARD
3	3E.2.2.1.1	Organize and electronically present collected data to identify and describe patterns in the amount of daylight in different times of the year.
3	3.3.3.2	Create and share work, using self-selected digital tools, and critique effectiveness of chosen tool regarding the task, purpose and audience, demonstrating understanding of digital footprint.
5	5L.3.1.1.3	Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.

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SOURCES & NOTES

- The official mathematics, science and computer science standards for Minnesota, as published by the Minnesota 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.
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