TRUE ROBOTICS

TAKING OFF WITH PILOT

GRADES 3–5

This document lists the North Carolina 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 North Carolina Department of Public Instruction.

27	5	7	39
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

27 STANDARDS

Based on the North Carolina state standards

GRADE	CODE	STANDARD
3	NC.3.OA.1	For products of whole numbers with two factors up to and including 10: • Interpret the factors as representing the number of equal groups and the number of objects in each group. • Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.
3	NC.3.OA.3	Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
3	NC.3.NBT.2	Add and subtract whole numbers up to and including 1,000.
3	NC.3.NBT.3	Use concrete and pictorial models, based on place value and the properties of operations, to find the product of a one-digit whole number by a multiple of 10 in the range 10–90.
3	NC.3.NF.2	Interpret fractions with denominators of 2, 3, 4, 6, and 8 using area and length models. • Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction. • Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0.
3	NC.3.NF.4	Compare two fractions with the same numerator or the same denominator by reasoning about their size, using area and length models, and using the >, <, and = symbols. Recognize that comparisons are valid only when the two fractions refer to the same whole with denominators: halves, fourths and eighths; thirds and sixths.
3	NC.3.MD.1	Tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals within the same hour.

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GRADE	CODE	STANDARD
3	NC.3.MD.2	Solve problems involving customary measurement. • Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit. • Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds. • Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.
3	NC.3.MD.7	Relate area to the operations of multiplication and addition.
3	NC.3.MD.8	Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.
3	NC.3.G.1	Reason with two-dimensional shapes and their attributes. • Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals. • Recognize and draw examples and non-examples of types of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids.
4	NC.4.OA.1	Interpret a multiplication equation as a comparison. Multiply or divide to solve word problems involving multiplicative comparisons using models and equations with a symbol for the unknown number. Distinguish multiplicative comparison from additive comparison.
4	NC.4.OA.4	Find all factor pairs for whole numbers up to and including 50 to: • Recognize that a whole number is a multiple of each of its factors. • Determine whether a given whole number is a multiple of a given one-digit number. • Determine if the number is prime or composite.
4	NC.4.NBT.4	Add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.
4	NC.4.NBT.5	Multiply a whole number of up to three digits by a one-digit whole number, and multiply up to two two-digit numbers with place value understanding using area models, partial products, and the properties of operations. Use models to make connections and develop the algorithm.
4	NC.4.NBT.6	Find whole-number quotients and remainders with up to three-digit dividends and one-digit divisors with place value understanding using rectangular arrays, area models, repeated subtraction, partial quotients, properties of operations, and/or the relationship between multiplication and division.
4	NC.4.NF.2	Compare two fractions with different numerators and different denominators, using the denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. 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 by: • Reasoning about their size and using area and length models. • Using benchmark fractions 0, ½, and a whole. • Comparing common numerator or common denominators.
4	NC.4.MD.1	Know relative sizes of measurement units. Solve problems involving metric measurement.
4	NC.4.MD.2	Use multiplicative reasoning to convert metric measurements from a larger unit to a smaller unit using place value understanding, two-column tables, and length models.
4	NC.4.MD.3	Solve problems with area and perimeter. • Find areas of rectilinear figures with known side lengths. • Solve problems involving a fixed area and varying perimeters and a fixed perimeter and varying areas. • Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

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GRADE	CODE	STANDARD
4	NC.4.MD.4	Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
4	NC.4.G.2	Classify quadrilaterals and triangles based on angle measure, side lengths, and the presence or absence of parallel or perpendicular lines.
5	NC.5.NF.1	Add and subtract fractions, including mixed numbers, with unlike denominators using related fractions: halves, fourths and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths. • Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. • Solve one- and two-step word problems in context using area and length models to develop the algorithm. Represent the word problem in an equation.
5	NC.5.NF.3	Use fractions to model and solve division problems.
5	NC.5.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers. • Use area and length models to multiply two fractions, with the denominators 2, 3, 4. • Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number. • Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
5	NC.5.MD.1	Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.
5	NC.5.MD.5	Relate volume to the operations of multiplication and addition.

SCIENCE

5 STANDARDS

Based on the North Carolina state standards

GRADE	CODE	STANDARD
3	PS.3.2.1	Carry out investigations to infer changes in speed or direction resulting from forces acting on an object.
4	PS.4.2.1	Ask questions to identify basic forms of energy (light, sound, heat, and electrical) that cause motion or create change.
4	PS.4.2.3	Carry out investigations on common materials to classify them as insulators or conductors of electricity.
4	ESS.4.2.1	Carry out investigations to classify minerals using tests for the physical properties of hardness, color, luster, cleavage and streak.
5	PS.5.2.1	Carry out investigations to explain how factors such as gravity, friction, and change in mass affect the motion of objects.

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COMPUTER SCIENCE

7 STANDARDS

Based on the North Carolina state standards

GRADE	CODE	STANDARD
3–5	35-CS-01	Evaluate the features available on digital devices to perform a variety of classroom tasks.
3–5	35-CS-02	Model how computer hardware and software work together as a system to accomplish tasks.
3–5	35-AP-01	Create multiple algorithms for the same task to determine which is the most accurate and efficient.
3–5	35-AP-04	Construct programs using simple loops.
3–5	35-AP-05	Construct programs that implement conditionals.
3–5	35-AP-08	Apply an iterative process to the development of a program by including diverse perspectives and considering user preferences.
3–5	35-AP-10	Identify and debug errors in an algorithm or program to ensure it runs as intended.

SOURCES & NOTES

- The official mathematics, science and computer science standards for North Carolina, as published by the North Carolina 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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