TRUE ROBOTICS

TAKING OFF WITH PILOT

GRADES 3–5

This document lists the Arkansas 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 Arkansas Division of Elementary & Secondary Education.

31	6	6	43
MATH	SCIENCE	CS	TOTAL STANDARDS

MATHEMATICS

31 STANDARDS

Based on the Arkansas state standards

GRADE	CODE	STANDARD
3	3.NPV.5	Compare two fractions with the same numerator or denominator by reasoning about their size based on the same whole; use symbols (<, =, >) and justify the conclusion using visual fraction models, concrete objects, or words.
3	3.NPV.8	Identify and represent a unit fraction as a number on the number line.
3	3.NPV.9	Identify and represent a non-unit fraction as a number on the number line, including fractions greater than one.
3	3.CAR.1	Use computational fluency to add and subtract three-digit whole numbers, using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3	3.CAR.4	Use strategies to multiply one-digit numbers by multiples of 10 ranging from 10-90; strategies are based on place value and properties of operations (e.g., 9 · 80, 5 · 60).
3	3.CAR.6	Solve real-world problems using multiplication and division within 100 involving equal groups, arrays, partitive and measurement division.
3	3.GM.1	Understand that quadrilaterals in different categories may share attributes; those attributes (e.g., four equivalent sides) can define a larger category (e.g., quadrilaterals) or subcategory (e.g., rhombus and square).
3	3.GM.3	Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, identifying and/or drawing examples of quadrilaterals that do not belong to any of these subcategories.
3	3.GM.4	Measure lengths of objects to the nearest half and quarter inch, using a ruler.
3	3.GM.7	Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems.

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GRADE	CODE	STANDARD
3	3.GM.10	Tell and write time to the nearest minute, using analog clocks.
3	3.GM.11	Solve word problems involving addition and subtraction of time intervals in minutes.
3	3.DA.1	Represent a data set with multiple categories, using a scaled picture graph, scaled bar graph, and a line plot.
4	4.NPV.5	Compare two fractions with different numerators and different denominators using symbols (<, =, >) to record the results of comparisons (e.g., by creating common denominators or numerators or by comparing to a benchmark of 0, ½, 1).
4	4.CAR.1	Find the factor pairs for a given number in the range of 1-100, identifying whether a number is prime or composite; determine whether a given whole number in the range of 1-100 is a multiple of a given one-digit number.
4	4.CAR.2	Use computational fluency to add and subtract whole numbers up to 1,000,000 by using strategies and algorithms, including the standard algorithm, with mastery by the end of fourth grade.
4	4.CAR.3	Use strategies based on place value and the properties of operations to multiply four-digit by one-digit whole numbers and two two-digit whole numbers.
4	4.CAR.4	Use strategies based on place value, the properties of operations, and the relationship between multiplication and division to divide whole numbers with four-digits by one-digit divisors; quotients should be with and without whole number remainders.
4	4.CAR.7	Solve real-world problems involving multiplicative comparison, using drawings and/or equations with a symbol for the unknown number, and distinguish between multiplicative comparison and additive comparison.
4	4.GM.5	Classify two-dimensional figures based on the presence or absence of parallel lines, perpendicular lines, or angles of a specified size, involving quadrilaterals and triangles.
4	4.GM.7	Apply the area and perimeter formulas for rectangles and figures composed of two or more rectangles in real-world situations.
4	4.GM.9	Solve real-world problems involving time intervals that may cross the hour.
4	4.GM.11	Solve real-world problems involving distances, liquid volume, and masses of objects, including problems that require expressing measurements given in a larger unit in terms of a smaller unit.
5	5.CAR.5	Add and subtract fractions with like and unlike denominators by using equivalent fractions {a/b = (n · a)/(n · b)} to create common denominators; include real-world problems.
5	5.CAR.6	Interpret and solve fractions as division problems, (a/b = a ÷ b), where a and b are natural numbers.
5	5.CAR.10	Solve real-world problems involving the division of natural numbers leading to answers in the form of fractions or mixed numbers using visual models and equations.
5	5.GM.2	Find the area of a rectangle with fractional and/or mixed number side lengths by using models and multiplying the fractional side lengths showing that both strategies produce the same area.
5	5.GM.3	Measure volumes by counting unit cubes using cubic cm (cm^3), cubic in (in^3), cubic ft (ft^3), and improvised units (u^3).

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GRADE	CODE	STANDARD
5	5.GM.4	Solve real-world and mathematical problems involving the volume of rectangular prisms with whole number side lengths by applying the formulas (V = l · w · h or V = B · h) and the properties of operations.
5	5.GM.5	Solve real-world problems by calculating volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts.
5	5.GM.6	Convert among different-sized standard measurement units within the same system, including both the metric and customary systems, and solve multi-step, real-world problems using conversions.

SCIENCE

6 STANDARDS

Based on the Arkansas state standards

GRADE	CODE	STANDARD
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-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-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.

COMPUTER SCIENCE

6 STANDARDS

Based on the Arkansas state standards

GRADE	CODE	STANDARD
3–5	2.3.2	Use block based coding to create programs that include using variables, user input, arithmetic operators (+, -, /, *).
4	2.2.1	Design multi-step algorithms that utilize decision-making structures.
4	3.1.2	Explain how digital sensors (e.g., thermometer, pulse sensor, light sensor, caliper) can be used as tools to gather data.
4	4.1.1	Differentiate between external components(monitor, keyboard, mouse) and the main unit that houses internal components(CPU tower, laptop body).
4	4.3.1	Identify examples of Internet of Things (IoT) devices (e.g., thermostat, security cameras, refrigerator, doorbell, kitchen appliances, digital assistant, robot vacuum, outlets, lightbulbs).

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GRADE	CODE	STANDARD
5	2.1.4	Review your own problem-solving process (e.g., what did you do, what would be better).

SOURCES & NOTES

- The official mathematics, science and computer science standards for Arkansas, as published by the Arkansas Division of Elementary & Secondary 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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