# TAKING OFF WITH PILOT

GRADES 3–5

This document lists the Alabama 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 Alabama State Department of Education.

| 30 | 6 | 6 | 42 |
|---|---|---|---|
| MATH | SCIENCE | CS | TOTAL STANDARDS |

## MATHEMATICS

30 STANDARDS

Based on the Alabama state standards

| GRADE | CODE | STANDARD |
|---|---|---|
| 3 | MA19.3.1 | Illustrate the product of two whole numbers as equal groups by identifying the number of groups and the number in each group and represent as a written expression. |
| 3 | MA19.3.3 | Solve word situations using multiplication and division within 100 involving equal groups, arrays, and measurement quantities; represent the situation using models, drawings, and equations with a symbol for the unknown number. |
| 3 | MA19.3.11 | Use various strategies to add and subtract fluently within 1000. |
| 3 | MA19.3.12 | Use concrete materials and pictorial models based on place value and properties of operations to find the product of a one-digit whole number by a multiple of ten (from 10 to 90). |
| 3 | MA19.3.14 | Interpret a fraction as a number on the number line; locate or represent fractions on a number line diagram. |
| 3 | MA19.3.15b | Compare two fractions with the same numerator or with the same denominator by reasoning about their size (recognizing that fractions must refer to the same whole for the comparison to be valid). Record comparisons using <, >, or = and justify conclusions. |
| 3 | MA19.3.17 | Measure lengths using rulers marked with halves and fourths of an inch to generate data and create a line plot marked off in appropriate units to display the data. |
| 3 | MA19.3.18 | Tell and write time to the nearest minute; measure time intervals in minutes (within 90 minutes.) |
| 3 | MA19.3.22 | Relate area to the operations of multiplication using real-world problems, concrete materials, mathematical reasoning, and the distributive property. |
| 3 | MA19.3.24 | Construct rectangles with the same perimeter and different areas or the same area and different perimeters. |

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| GRADE | CODE | STANDARD |
|---|---|---|
| 3 | MA19.3.25 | Solve real-world problems involving perimeters of polygons, including finding the perimeter given the side lengths and finding an unknown side length of rectangles. |
| 3 | MA19.3.26 | Recognize and describe polygons (up to 8 sides), triangles, and quadrilaterals (rhombuses, rectangles, and squares) based on the number of sides and the presence or absence of square corners. |
| 4 | MA19.4.1 | Interpret and write equations for multiplicative comparisons. |
| 4 | MA19.4.4 | For whole numbers in the range 1 to 100, find all factor pairs, identifying a number as a multiple of each of its factors. |
| 4 | MA19.4.10 | Use place value strategies to fluently add and subtract multi-digit whole numbers and connect strategies to the standard algorithm. |
| 4 | MA19.4.11 | Find the product of two factors (up to four digits by a one-digit number and two two-digit numbers), using strategies based on place value and the properties of operations. |
| 4 | MA19.4.12 | Use strategies based on place value, properties of operations, and/or the relationship between multiplication and division to find whole-number quotients and remainders with one-digit divisors and up to four-digit dividends. |
| 4 | MA19.4.14 | Compare two fractions with different numerators and different denominators using concrete models, benchmarks (0, ½, 1), common denominators, and/or common numerators, recording the comparisons with symbols >, =, or <, and justifying the conclusions. |
| 4 | MA19.4.22 | Use the four operations to solve measurement word problems with distance, intervals of time, liquid volume, mass of objects, and money. |
| 4 | MA19.4.23 | Apply area and perimeter formulas for rectangles in real-world and mathematical situations. |
| 4 | MA19.4.28 | Identify 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. |
| 5 | MA19.5.9 | Model and solve real-word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, 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 | MA19.5.10 | Add and subtract fractions and mixed numbers with unlike denominators, using fraction equivalence to calculate a sum or difference of fractions or mixed numbers with like denominators. |
| 5 | MA19.5.11 | Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. |
| 5 | MA19.5.12c | Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. |
| 5 | MA19.5.12d | Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths to show that the area is the same as would be found by multiplying the side lengths. |
| 5 | MA19.5.17 | Convert among different-sized standard measurement units within a given measurement system and use these conversions in solving multi-step, real-world problems. |

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| GRADE | CODE | STANDARD |
|---|---|---|
| 5 | MA19.5.19a | Use the associative property of multiplication to find the volume of a right rectangular prism and relate it to packing the prism with unit cubes. Show that the volume can be determined by multiplying the three edge lengths or by multiplying the height by the area of the base. |
| 5 | MA19.5.19b | 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 | MA19.5.19c | Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the two parts, applying this technique to solve real-world problems. |

## SCIENCE

6 STANDARDS

Based on the Alabama state standards

| GRADE | CODE | STANDARD |
|---|---|---|
| 3 | 3.1 | Conduct investigations to explain the effects of balanced and unbalanced forces exerted on an object, varying the size, number, and direction of the forces. |
| 3 | SC23.3.4 | Apply scientific ideas about magnetic interactions to solve a problem using the engineering design process. |
| 3 | 3.15 | Obtain and communicate information on the effectiveness of existing solutions designed to reduce the impact of weather-related hazards. |
| 4 | 4.1 | Use evidence to explain the relationship between the speed of an object and its energy. |
| 4 | 4.2 | Plan and carry out investigations to answer questions regarding changes in energy when objects collide, and predict reasonable outcomes based on observed patterns. |
| 5 | 5.2 | Analyze data collected through observations and measurements to identify materials based on their properties, including color, hardness, and reflectivity. |

## DIGITAL LITERACY AND COMPUTER SCIENCE

6 STANDARDS

Based on the Alabama state standards

| GRADE | CODE | STANDARD |
|---|---|---|
| 3 | DLCS25.3.1 | Develop and document an algorithm that outlines specific steps to complete a project for other learners to follow. |
| 3 | 3.5 | Create a working program using sequencing and events in a visual programming environment, working in collaboration with others. |
| 3 | 3.17 | Select and use multiple digital tools to complete a project. |
| 4 | 4.6 | Create a working program using conditional statements and loops in a visual programming environment, working in collaboration with others. |
| 4 | 4.13 | Describe how hardware and software work together as a system to accomplish tasks. |

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| GRADE | CODE | STANDARD |
|---|---|---|
| 5 | 5.1 | Compare two or more algorithms and discuss each one's advantages and disadvantages for a specific task. |

## SOURCES & NOTES

- The official mathematics, science and computer science standards for Alabama, as published by the Alabama State 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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