

# PAVING THE WAY WITH TREADS

## GRADES K-3

This document lists the Iowa learning standards addressed by Paving the Way with Treads, True Robotics' grades K-3 robotics curriculum. Standards are grouped by subject and grade level, with codes and wording as published by the Iowa Department of Education.

**42**

MATH

**40**

ELA

**11**

CS

**5**

SCIENCE

**98**

TOTAL STANDARDS

## MATHEMATICS

42 STANDARDS

Based on the Iowa state standards

| GRADE      | CODE            | STANDARD                                                                                                                                                                                                                                         |
|------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>K-3</b> | <b>SMP 1</b>    | Make sense of problems and persevere in solving them.                                                                                                                                                                                            |
| <b>K</b>   | <b>K.CC.A.1</b> | Count to 100 by ones and by tens.                                                                                                                                                                                                                |
| <b>K</b>   | <b>K.CC.B.4</b> | Demonstrate awareness of the principles of counting.                                                                                                                                                                                             |
| <b>K</b>   | <b>K.OA.A.1</b> | Represent addition and subtraction situations in a variety of ways.                                                                                                                                                                              |
| <b>K</b>   | <b>K.OA.A.2</b> | Add and subtract within 10 and solve word problems involving the different problem types listed below.                                                                                                                                           |
| <b>K</b>   | <b>K.MD.A.1</b> | Describe several measurable attributes (for example, length, width, weight) of objects by using words such as short, long, small, big, heavy, light.                                                                                             |
| <b>K</b>   | <b>K.MD.A.2</b> | Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute and describe the difference.                                                                                       |
| <b>K</b>   | <b>K.MD.B.3</b> | Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. Limit category counts to be less than or equal to 10.                                                                    |
| <b>K</b>   | <b>K.G.A.1</b>  | Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, besides, in front of, behind, and next to.                                                      |
| <b>K</b>   | <b>K.G.A.2</b>  | Correctly name shapes regardless of their orientations or overall size.                                                                                                                                                                          |
| <b>1</b>   | <b>SMP 2</b>    | Reason abstractly and quantitatively.                                                                                                                                                                                                            |
| <b>1</b>   | <b>1.OA.A.1</b> | Use addition and subtraction within 20 to solve word problems involving the problem types listed below, with unknowns in all positions, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |

| GRADE    | CODE             | STANDARD                                                                                                                                                                                                                                                                          |
|----------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>1.OA.A.2</b>  | Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.                                                                                                                                                                          |
| <b>1</b> | <b>1.NBT.B.2</b> | Understand that the two digits of a two-digit number represent amounts of tens and ones.                                                                                                                                                                                          |
| <b>1</b> | <b>1.NBT.B.3</b> | Compare two two-digit numbers based on meanings of the tens and ones digits, using phrases as greater than, less than or equal to, connecting to the use of $>$ , $=$ , and $<$ symbols.                                                                                          |
| <b>1</b> | <b>1.MD.A.1</b>  | Order three objects by length; compare the lengths of two objects indirectly by using a third object.                                                                                                                                                                             |
| <b>1</b> | <b>1.MD.A.2</b>  | Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. |
| <b>1</b> | <b>1.MD.C.4</b>  | Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.                                                    |
| <b>1</b> | <b>1.G.A.1</b>   | Distinguish between defining attributes (for example, triangles are closed and three-sided) versus non-defining attributes (for example, color, orientation, overall size); build and draw shapes to possess defining attributes.                                                 |
| <b>1</b> | <b>1.G.A.2</b>   | Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, rectangular prisms, cones and cylinders) to create a composite shape, and compose new shapes from the composite shape.         |
| <b>2</b> | <b>2.OA.A.1</b>  | Use addition and subtraction within 100 to solve one- and two-step word problems involving the problem types listed below, with unknowns in all positions, by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.               |
| <b>2</b> | <b>2.NBT.A.1</b> | Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.                                                                                                                                                                           |
| <b>2</b> | <b>2.NBT.A.3</b> | Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.                                                                                                                                                                                         |
| <b>2</b> | <b>2.NBT.B.5</b> | Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.                                                                                                                   |
| <b>2</b> | <b>2.MD.A.1</b>  | Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.                                                                                                                                           |
| <b>2</b> | <b>2.MD.A.3</b>  | Estimate lengths using units of inches, feet, centimeters, and meters.                                                                                                                                                                                                            |
| <b>2</b> | <b>2.MD.C.8</b>  | Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately.                                                                                                                                                          |
| <b>2</b> | <b>2.MD.D.9</b>  | Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.                  |
| <b>2</b> | <b>2.MD.D.10</b> | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple problems: put-together, take-apart, and compare, using information presented in a bar graph.                                                       |

| GRADE    | CODE            | STANDARD                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b> | <b>2.G.A.1</b>  | Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify two-dimensional shapes: triangles, quadrilaterals, rectangles, squares, trapezoids, pentagons, hexagons, circles, half-circles and quarter-circles, and three-dimensional figures: cubes, right rectangular prisms, right circular cones, and right circular cylinders.          |
| <b>2</b> | <b>2.G.A.3</b>  | Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.                                                                                                              |
| <b>3</b> | <b>3.OA.A.1</b> | Interpret products of whole numbers.                                                                                                                                                                                                                                                                                                                                                                                |
| <b>3</b> | <b>3.OA.A.3</b> | Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, with unknowns in all positions.                                                                                                                                                                                                                                         |
| <b>3</b> | <b>3.OA.A.4</b> | Be able to represent a word problem by writing an equation with a symbol for the unknown whole number and determine the unknown whole number in a multiplication or division equation relating to three whole numbers.                                                                                                                                                                                              |
| <b>3</b> | <b>3.OA.B.5</b> | Use properties of operations as strategies to multiply and divide.                                                                                                                                                                                                                                                                                                                                                  |
| <b>3</b> | <b>3.NF.A.1</b> | Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts; understand a fraction $a/b$ as the quantity formed by a part of size $1/b$ .                                                                                                                                                                                                                         |
| <b>3</b> | <b>3.NF.A.2</b> | Understand a fraction as a number on the number line; represent fractions on a number line diagram.                                                                                                                                                                                                                                                                                                                 |
| <b>3</b> | <b>3.MD.B.3</b> | Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.                                                                                                                                                                                          |
| <b>3</b> | <b>3.MD.B.4</b> | 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, or quarters.                                                                                                                                                                       |
| <b>3</b> | <b>3.MD.C.5</b> | Recognize area as an attribute of plane figures and understand concepts of area measurement.                                                                                                                                                                                                                                                                                                                        |
| <b>3</b> | <b>3.MD.C.6</b> | Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).                                                                                                                                                                                                                                                                                                           |
| <b>3</b> | <b>3.G.A.1</b>  | Understand that shapes in different categories (for example, rhombuses, rectangles, and others) may share attributes (for example, having four sides), and that the shared attributes can define a larger category (for example, quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. |

**ENGLISH LANGUAGE ARTS**

40 STANDARDS

Based on the Iowa state standards

| GRADE    | CODE    | STANDARD                                                                                                                                                                                                           |
|----------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>K</b> | RF.K.1c | Understand that words are separated by spaces in print.                                                                                                                                                            |
| <b>K</b> | RF.K.2e | Recognize and produce rhyming words.                                                                                                                                                                               |
| <b>K</b> | RF.K.3b | Associate the long and short sounds with common graphemes (spellings) for the five major vowels.                                                                                                                   |
| <b>K</b> | RF.K.3c | Read common high-frequency words with accuracy and automaticity (e.g., the, of, to, you, she, my, is, are, do, does).                                                                                              |
| <b>K</b> | SL.K.2  | Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood. |
| <b>K</b> | SL.K.5  | Add drawings or other visual displays to descriptions as desired to provide additional detail.                                                                                                                     |
| <b>K</b> | L.K.2   | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.                                                                                                 |
| <b>K</b> | L.K.5c  | Identify real-life connections between words and their use (e.g., note places at school that are colorful).                                                                                                        |
| <b>1</b> | RF.1.2a | Distinguish long from short vowel phonemes (sounds) in single-syllable words.                                                                                                                                      |
| <b>1</b> | RF.1.2c | Isolate and pronounce initial, medial vowel, and final phonemes (sounds) in spoken single-syllable words.                                                                                                          |
| <b>1</b> | RF.1.3  | Know and apply grade-level phonics, which includes word analysis skills to support decoding and encoding words.                                                                                                    |
| <b>1</b> | RF.1.3b | Decode and encode regularly spelled one-syllable words with closed syllables and consonant blends.                                                                                                                 |
| <b>1</b> | RF.1.3c | Decode and encode regularly spelled one-syllable words with final-e (VCe) patterns. Decode regularly spelled one-syllable words with common vowel team patterns that represent long vowel sounds.                  |
| <b>1</b> | RF.1.3g | Read grade-appropriate high frequency words with accuracy and automaticity.                                                                                                                                        |
| <b>1</b> | RF.1.4  | Read with sufficient accuracy and fluency to support comprehension.                                                                                                                                                |
| <b>1</b> | SL.1.2  | Ask and answer questions about the main topic and key details in a text read aloud or information presented orally or through other media.                                                                         |
| <b>1</b> | SL.1.4  | Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.                                                                                                          |
| <b>1</b> | L.1.2   | Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.                                                                                                 |
| <b>2</b> | RF.2.3a | Decode and encode long and short vowels in regularly-spelled one-syllable words.                                                                                                                                   |
| <b>2</b> | RF.2.3b | Decode and encode common vowel teams. With prompting and support, decode and encode additional vowel teams.                                                                                                        |

| GRADE    | CODE           | STANDARD                                                                                                                                                                                                                                                                      |
|----------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b> | <b>W.2.1</b>   | Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. |
| <b>2</b> | <b>W.2.3</b>   | Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.                                            |
| <b>2</b> | <b>W.2.5</b>   | With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.                                                                                                                                                   |
| <b>2</b> | <b>SL.2.1c</b> | Ask for clarification and further explanation as needed about the topics and texts under discussion.                                                                                                                                                                          |
| <b>2</b> | <b>SL.2.2</b>  | Describe the main topic and recount key details from a text read aloud, information presented orally, or other media.                                                                                                                                                         |
| <b>2</b> | <b>SL.2.4</b>  | Recount an experience or tell a story with appropriate facts and relevant, descriptive details, speaking clearly in complete sentences.                                                                                                                                       |
| <b>2</b> | <b>SL.2.5</b>  | Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.                                                                                           |
| <b>2</b> | <b>L.2.1a</b>  | Use collective nouns (e.g., group).                                                                                                                                                                                                                                           |
| <b>2</b> | <b>L.2.1b</b>  | Form and use frequently occurring irregular plural nouns (e.g., feet, children, teeth, mice, fish).                                                                                                                                                                           |
| <b>2</b> | <b>L.2.2c</b>  | Use an apostrophe to form contractions and frequently occurring possessives.                                                                                                                                                                                                  |
| <b>2</b> | <b>L.2.4a</b>  | Use sentence-level context as a clue to the meaning of a word or phrase.                                                                                                                                                                                                      |
| <b>2</b> | <b>L.2.5a</b>  | Identify real-life connections between words and their use (e.g., describe foods that are spicy or juicy).                                                                                                                                                                    |
| <b>3</b> | <b>RL.3.1</b>  | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.                                                                                                                                               |
| <b>3</b> | <b>RL.3.2</b>  | Recount and determine the central message, lesson, or moral of fables, folktales, and myths from diverse cultures and explain how it is conveyed through key details in the text.                                                                                             |
| <b>3</b> | <b>RF.3.3</b>  | Know and apply grade-level phonics and word analysis skills to support decoding and encoding words.                                                                                                                                                                           |
| <b>3</b> | <b>W.3.3</b>   | Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.                                                                                                                                 |
| <b>3</b> | <b>W.3.5</b>   | With scaffolding and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.                                                                                                                                              |
| <b>3</b> | <b>SL.3.2</b>  | Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.                                                                                                   |
| <b>3</b> | <b>L.3.4</b>   | Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.                                                                                                        |
| <b>3</b> | <b>L.3.5</b>   | Demonstrate understanding of word relationships and nuances in word meanings.                                                                                                                                                                                                 |

**COMPUTER SCIENCE**

11 STANDARDS

Based on the Iowa state standards

| GRADE      | CODE            | STANDARD                                                                                                                                                          |
|------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>K-2</b> | <b>1A-CS-01</b> | Select and operate appropriate software to perform a variety of tasks, and recognize that users have different needs and preferences for the technology they use. |
| <b>K-2</b> | <b>1A-AP-08</b> | Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.                                                 |
| <b>K-2</b> | <b>1A-AP-10</b> | Develop programs with sequences and simple loops, to express ideas or address a problem.                                                                          |
| <b>K-2</b> | <b>1A-IC-16</b> | Compare how people live and work before and after the implementation or adoption of new computing technology.                                                     |
| <b>3</b>   | <b>1B-CS-01</b> | Describe how internal and external parts of computing devices function to form a system.                                                                          |
| <b>3</b>   | <b>1B-DA-06</b> | Organize and present collected data visually to highlight relationships and support a claim.                                                                      |
| <b>3</b>   | <b>1B-AP-08</b> | Compare and refine multiple algorithms for the same task and determine which is the most appropriate.                                                             |
| <b>3</b>   | <b>1B-AP-10</b> | Create programs that include sequences, events, loops, and conditionals.                                                                                          |
| <b>3</b>   | <b>1B-AP-15</b> | Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.                                                                    |
| <b>3</b>   | <b>1B-AP-16</b> | Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development.          |
| <b>3</b>   | <b>1B-AP-17</b> | Describe choices made during program development using code comments, presentations, and demonstrations.                                                          |

**SCIENCE**

5 STANDARDS

Based on the Iowa state standards

| GRADE    | CODE            | STANDARD                                                                                                                                                                                                    |
|----------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>1-ETSI-1</b> | Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. |
| <b>1</b> | <b>1-ETSI-2</b> | Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.                                                          |
| <b>2</b> | <b>2-ETSI-3</b> | Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.                                                                     |
| <b>3</b> | <b>3-ETSI-2</b> | 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.                                                         |
| <b>3</b> | <b>3-ETSI-3</b> | Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.                                         |

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## SOURCES & NOTES

- The official mathematics, English language arts, computer science and science standards for Iowa, as published by the Iowa 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.
- Standards text remains the property of its publisher and is reproduced here for alignment reference only.
- A lesson-level crosswalk is available on request at [info@truerobotics.org](mailto:info@truerobotics.org).