

PAVING THE WAY WITH TREADS

GRADES K-3

This document lists the Virginia 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 Virginia Department of Education.

42

MATH

44

ELA

19

CS

6

SCIENCE

111

TOTAL STANDARDS

MATHEMATICS

42 STANDARDS

Based on the Virginia state standards

GRADE	CODE	STANDARD
K-3	Mathematical Problem Solving	Students will apply mathematical concepts and skills and the relationships among them to solve problem situations of varying complexities. Students also will recognize and create problems from real-world data and situations within and outside mathematics and then apply appropriate strategies to determine acceptable solutions.
K	K.NS.1a	Use one-to-one correspondence to determine how many are in a given set containing 30 or fewer concrete objects (e.g., cubes, pennies, balls), and describe the last number named as the total number of objects counted.
K	K.NS.1d	Count forward orally by ones from 0 to 100.
K	K.NS.1j	Group a collection of up to 100 objects (e.g., counters, pennies, cubes) into sets of ten and count by tens to determine the total (e.g., there are 3 groups of ten and 6 leftovers, 36 total objects).
K	K.CE.1f	Model and solve single-step contextual problems (join, separate, and part-part-whole) using 10 or fewer concrete objects.
K	K.MG.1	The student will reason mathematically by making direct comparisons between two objects or events using the attributes of length, height, weight, volume, and time.
K	K.MG.1a	Use direct comparisons to compare, describe, and justify the: i) lengths of two objects using the terms longer or shorter; ii) heights of two objects using the terms taller or shorter; iii) weights of two objects using the terms heavier or lighter; iv) volumes of two containers using the terms more or less; and v) amount of time spent on two events using the terms longer or shorter.
K	K.MG.2a	Identify and name concrete and pictorial representations of circles, triangles, squares, and rectangles regardless of their orientation in space.

GRADE	CODE	STANDARD
K	K.PS.1a	Sort and classify concrete objects into appropriate subsets (categories) based on one attribute (e.g., size, shape, color, thickness).
K	K.PS.1g	Analyze data represented in object graphs and picture graphs and communicate results: i) ask and answer questions about the data represented in object graphs and picture graphs (e.g., how many in each category, which categories have the greatest, least, or the same amount of data); and ii) draw conclusions about the data and make predictions based on the data.
1	1.NS.2d	Describe the number of groups of tens and ones when given a two-digit number and justify reasoning.
1	1.NS.2e	Compare two numbers between 0 and 120 represented pictorially or with concrete objects using the terms greater than, less than, or equal to.
1	1.CE.1f	Represent, solve, and justify solutions to single-step addition and subtraction problems (join, separate, and part-part-whole) within 20, including those in context, using words, objects, drawings, or numbers.
1	1.MG.1	The student will reason mathematically using nonstandard units to measure and compare objects by length, weight, and volume.
1	1.MG.1a	Use nonstandard units to measure the: i) lengths of two objects (units laid end to end with no gaps or overlaps) and compare the measurements using the terms longer/shorter, taller/shorter, or the same as; ii) weights of two objects (using a balance scale or a pan scale) and compare the measurements using the terms lighter, heavier, or the same as; and iii) volumes of two containers and compare the measurements using the terms more, less, or the same as.
1	1.MG.2c	Draw and name the plane figure (circle, square, rectangle, triangle) when given information about the number of sides, vertices, and angles.
1	1.MG.2d	Identify, name, and describe representations of circles, squares, rectangles, and triangles, regardless of orientation, in different environments and explain reasoning.
1	1.MG.2f	Compose larger plane figures by combining two or three simple plane figures (triangles, squares, and/or rectangles).
1	1.PS.1	The student will apply the data cycle (pose questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on object graphs, picture graphs, and tables.
1	Mathematical Reasoning	Students will use logical reasoning to analyze an argument and to determine whether conclusions are valid. In addition, students will use number sense to apply proportional and spatial reasoning and to reason from a variety of representations.
2	2.NS.2b	Read, write, and represent three-digit numbers in standard form, expanded form, and word form, using concrete or pictorial representations.
2	2.NS.2c	Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place (ones, tens, hundreds) and value of each digit in a three-digit whole number (e.g., in 352, the 5 represents 5 tens and its value is 50).
2	2.NS.2g	Compare two whole numbers, each 999 or less, represented concretely, pictorially, or symbolically, using words (greater than, less than, or equal to) and symbols (>, <, or =). Justify reasoning orally, in writing, or with a model.

GRADE	CODE	STANDARD
2	2.NS.3	The student will use mathematical reasoning and justification to solve contextual problems that involve partitioning models into equal-sized parts (halves, fourths, eighths, thirds, and sixths).
2	2.NS.4	The student will solve problems that involve counting and representing money amounts up to \$2.00.
2	2.CE.1b	Apply strategies (e.g., the use of concrete and pictorial models, place value, properties of addition, the relationship between addition and subtraction) to determine the sum or difference of two whole numbers where addends or minuends do not exceed 100.
2	2.CE.1c	Represent, solve, and justify solutions to single-step and multistep contextual problems (e.g., join, separate, part-part-whole, comparison) involving addition or subtraction of whole numbers where addends or minuends do not exceed 100.
2	2.MG.1	The student will reason mathematically using standard units (U.S. Customary) with appropriate tools to estimate, measure, and compare objects by length, weight, and liquid volume to the nearest whole unit.
2	2.MG.1b	Use U.S. Customary units to estimate, measure, and compare the two for reasonableness: i) the length of an object to the nearest inch, using a ruler; ii) the weight of an object to the nearest pound, using a scale; and iii) the liquid volume of a container to the nearest cup, using a measuring cup.
2	2.MG.4c	Given a concrete or pictorial model, name and describe the solid figure (sphere, cube, and rectangular prism) by its characteristics (e.g., number of edges, number of vertices, shapes of faces).
2	2.PS.1	The student will apply the data cycle (pose questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs.
3	3.NS.3a	Represent, name, and write a given fraction (proper or improper) or mixed number with denominators of 2, 3, 4, 5, 6, 8, and 10 using: i) region/area models (e.g., pie pieces, pattern blocks, geoboards); ii) length models (e.g., paper fraction strips, fraction bars, rods, number lines); and iii) set models (e.g., chips, counters, cubes).
3	3.NS.3b	Identify a fraction represented by a model as the sum of unit fractions.
3	3.CE.2a	Represent multiplication and division of whole numbers through 10×10 , including in a contextual situation, using a variety of approaches and models (e.g., repeated addition/subtraction, equal-sized groups/sharing, arrays, equal jumps on a number line, using multiples to skip count).
3	3.CE.2b	Use inverse relationships to write the related facts connected to a given model for multiplication and division of whole numbers through 10×10 .
3	3.CE.2c	Apply strategies (e.g., place value, the properties of multiplication and/or addition) when multiplying and dividing whole numbers.
3	3.CE.2e	Represent, solve, and justify solutions to single-step contextual problems that involve multiplication and division of whole numbers through 10×10 .
3	3.MG.1b	Estimate and measure: i) length of an object to the nearest U.S. Customary unit (1/2 inch, inch, foot, yard) and metric unit (centimeter, meter); ii) weight/mass of an object to the nearest U.S. Customary unit (pound) and metric unit (kilogram); and iii) liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and metric unit (liter).

GRADE	CODE	STANDARD
3	3.MG.2a	Solve problems, including those in context, involving area: i) describe and give examples of area as a measurement in contextual situations; and ii) estimate and determine the area of a given surface by counting the number of square units, describe the measurement (using the number and unit) and justify the measurement.
3	3.MG.4c	Identify and describe triangles, quadrilaterals, pentagons, hexagons, and octagons in various orientations, with and without contexts.
3	3.MG.4e	Classify and compare polygons (triangles, quadrilaterals, pentagons, hexagons, octagons).
3	3.PS.1	The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs.

ENGLISH

44 STANDARDS

Based on the Virginia state standards

GRADE	CODE	STANDARD
K	K.FFR.1.C	Demonstrate knowledge that spoken words are represented in print and separated by spaces.
K	K.FFR.2.B	Blend and segment one syllable words by onset and rime.
K	K.FFR.3.C	Discriminate between long and short sounds with common spellings for the five major vowels with open and closed syllables (e.g., short /e/ as in "pet", long /e/ as in "he").
K	K.FFR.3.H	Use letter-sound correspondences to read grade-level high frequency words, including decodable and irregular words, with automaticity and accuracy.
K	K.RV.1.A	Discuss meanings of words from a variety of texts and experiences.
K	K.RI.1.A	With prompting and support, ask and answer literal (who, what, when, where) or inferential (why, how) questions about what is read.
K	K.W.1.B	Use a combination of drawing, dictating, and writing to compose descriptive writing that identifies a topic and provides one or more relevant details.
K	K.LU	The student will use the conventions of Standard English when speaking and writing, differentiating between contexts that call for formal English and situations where informal discourse is more appropriate.
K	K.C.1.A.iii	Participate in a range of collaborative discussions (one-on-one, in groups, and teacher-led) on kindergarten topics and texts. This includes: Asking questions to seek help, get information, or clarify information for further understanding.
1	1.FFR.2.A	Isolate sounds in four and five phoneme words.
1	1.FFR.3	The student will apply phonetic principles to read and spell words.
1	1.FFR.3.A	Decode and encode words with short vowels to include blends with digraphs, closed syllables (CVC, CCVC, CVCC, CCVCC).
1	1.FFR.3.B	Decode and encode words with long vowels, open syllables, (CV, CCV) and vowel-consonant-e (CVCE, CCVCE).

GRADE	CODE	STANDARD
1	1.FFR.3.C	Use letter-sound correspondences to decode words containing common vowel teams and r-controlled vowels.
1	1.FFR.3.E	Read grade-level high-frequency words, including decodable and irregular words with automaticity and accuracy.
1	1.DSR.A	Use knowledge of letter-sound correspondences to read a variety of decodable and grade-level texts with accuracy, automaticity, appropriate rate, and meaningful expression in successive readings to support comprehension. Monitor while reading to confirm or self-correct word recognition and understanding, as necessary.
1	1.RI.1.A	Ask and answer literal (who, what, when, where) and inferential (why, how) questions about what is read, including demonstrating an understanding of the main topics.
1	1.LU	The student will use conventions of Standard English when speaking and writing, differentiating between contexts that call for formal English and situations where informal discourse is more appropriate.
1	1.C.2.A	Describe people, places, things, and events with relevant details and using appropriate vocabulary.
2	2.FFR.3.A	Decode and encode words with short vowels to include blends, digraphs, and trigraphs in closed syllables (CVCC, CCVC, CVCC, CCVCC, and CCVCCC) and open syllables (CV, CCV).
2	2.FFR.3.B	Decode and encode words with vowel teams and r-controlled vowels.
2	2.RV.1.A	Discuss meanings of new words or phrases acquired through conversations and literature.
2	2.RV.1.D	Use the context of a sentence to apply knowledge of homophones.
2	2.RI.1.B	Retell key details of texts that demonstrate an understanding of the main topics of texts.
2	2.W.1.A	Write narratives that recount a well-elaborated event or short sequence of events and include details about the events and characters and use of time-related words to signal the event sequence.
2	2.W.1.C	Write opinion pieces on topics or texts that support a point of view with reasons.
2	2.W.3.A	With guidance and support from adults, develop and strengthen writing as needed by revising for quality of ideas, organization, sentence fluency, and word choice.
2	2.W.3.B	With guidance and support from adults, edit writing for conventions (e.g., spelling, capitalization, usage, punctuation).
2	2.LU.1.C	Form and use regular and frequently occurring irregular plural nouns (e.g., men, teeth).
2	2.LU.1.H	Use contractions and singular possessives.
2	2.C.1.A.iv	Participate in a range of collaborative discussions (one-on-one, in groups, and teacher-led) on grade two topics and texts. This includes: Demonstrating active engagement when listening to a speaker and asking for clarification to ensure understanding.
2	2.C.2.A	Use topic specific language and vocabulary to communicate ideas.
2	2.C.2.C	Retell information in an organized manner, focused on a key topic or experience.

GRADE	CODE	STANDARD
2	2.C.3.A	Create a simple presentation using multimodal tools that enhance the topic or presentation.
3	3.FFR.3	The student will apply grade level phonics and word analysis skills to decode (read) unfamiliar words in grade level text.
3	3.DSR.C	When responding to texts through discussions and/or writing, draw several pieces of evidence from read alouds and grade-level complex texts to support claims, conclusions, and inferences, including quoting or paraphrasing from texts accurately and tracing where relevant evidence is located.
3	3.RV.1.G	Distinguish shades of meaning among verbs and adjectives.
3	3.RV.1.H	Use strategies to infer word meanings.
3	3.RL.1.A	Identify thematic topics of stories (e.g. friendship, survival, determination) and the lessons learned.
3	3.RL.1.B	Identify the central conflict and resolution using events from the plot to summarize the text.
3	3.RI.1.A	Determine the main idea of multi-paragraph texts as well as specific paragraphs within them.
3	3.W.1.B	Write personal or fictional narratives that organize event sequences that unfold naturally.
3	3.W.3.A	With guidance and support from peers and adults, develop and strengthen writing as needed by revising for quality of ideas, organization, sentence fluency, and word choice.
3	3.W.3.B	With guidance and support from peers and adults, edit writing for format and conventions such as capitalization, usage, punctuation, and spelling.

COMPUTER SCIENCE

19 STANDARDS

Based on the Virginia state standards

GRADE	CODE	STANDARD
K	K.AP.2a	Identify tasks that are completed using sequential step-by-step instructions.
K	K.AP.2c	Create a design document to illustrate thoughts, ideas, and stories in a sequential manner.
K	K.AP.2e	Create and test a sequential algorithm to accomplish a predetermined task.
K	K.CSY.1e	Demonstrate proper use of computing devices.
K	K.IC.1b	Identify how computing technologies are used in daily tasks.
K	K.IC.1c	Discuss healthy habits for using computing technologies.
K	K.IC.2a	Describe how computing technologies are used in various careers.
K	K.NI.1	The student will describe how people can communicate with others by using connected computing devices and the Internet.
2	2.AP.1a	Compare and contrast multiple ways to sort a set of objects.
2	2.AP.3a	Define program.

GRADE	CODE	STANDARD
2	2.AP.3d	Create and test a program that uses events and loops.
3	3.AP.2	The student will plan and implement algorithms that consist of events and conditional control structures using a block-based programming language.
3	3.AP.3	The student will use the iterative design process to create, test, and debug programs containing events, loops, and conditional structures in a block-based programming tool.
3	3.AP.3a	Create and test programs that consist of events, loops, and conditional structures.
3	3.AP.3b	Analyze and describe program results to assess validity of outcome.
3	3.AP.3c	Revise and improve programs to resolve errors or produce desired outcome.
3	3.CSY.1d	Model how a computing system works including input and output, processors, and sensors.
3	3.CYB.3c	Model safe and responsible behaviors when using computing technologies and online communication.
3	3.DA.1	The student will gather, store, and organize data to evaluate trends and identify patterns using a computing device.

SCIENCE

6 STANDARDS

Based on the Virginia state standards

GRADE	CODE	STANDARD
1	1.1a	The student will demonstrate an understanding of scientific and engineering practices by: asking questions and defining problems
1	1.1b	The student will demonstrate an understanding of scientific and engineering practices by: planning and carrying out investigations
2	2.1c	The student will demonstrate an understanding of scientific and engineering practices by: interpreting, analyzing, and evaluating data
3	3.1b	The student will demonstrate an understanding of scientific and engineering practices by: planning and carrying out investigations
3	3.1c	The student will demonstrate an understanding of scientific and engineering practices by: interpreting, analyzing, and evaluating data
3	3.1d	The student will demonstrate an understanding of scientific and engineering practices by: constructing and critiquing conclusions and explanations

SOURCES & NOTES

- The official mathematics, English language arts, computer science and science standards for Virginia, as published by the Virginia 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.