PAVING THE WAY WITH TREADS

GRADES K–3

This document lists the Massachusetts 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 Massachusetts Department of Elementary and Secondary Education (DESE).

42	39	25	4	110
MATH	ELA	DLCS	STE	TOTAL STANDARDS

MATHEMATICS

42 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
K–3	MP.1	Make sense of problems and persevere in solving them.
K	K.CC.A.1	Count to 100 by ones and by tens.
K	K.CC.B.4	Understand the relationship between numbers and quantities; connect counting to cardinality.
K	K.OA.A.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
K	K.OA.A.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
K	K.MD.A.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
K	K.MD.A.2	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.
K	K.MD.B.3	Classify objects into given categories; count the numbers of objects in each category (up to and including 10) and sort the categories by count.
K	K.G.A.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
K	K.G.A.2	Correctly name shapes regardless of their orientation or overall size.
1	1.NBT.B.2	Understand that the two digits of a two-digit number represent amounts of tens and ones.
1	1.NBT.B.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

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GRADE	CODE	STANDARD
1	1.OA.A.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations (number sentences) with a symbol for the unknown number to represent the problem.
1	1.OA.A.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
1	1.MD.A.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.
1	1.MD.A.2	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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
1	1.MD.C.4	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.
1	1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes that possess defining attributes.
1	1.G.A.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
1	MP.2	Reason abstractly and quantitatively.
2	2.NBT.A.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.
2	2.NBT.A.3	Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.
2	2.NBT.B.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2	2.OA.A.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
2	2.MD.A.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2	2.MD.A.3	Estimate lengths using units of inches, feet, centimeters, and meters.
2	2.MD.C.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies (up to $10), using $ and ¢ symbols appropriately and whole dollar amounts.

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GRADE	CODE	STANDARD
2	2.MD.D.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Organize and record the data on a line plot (dot plot) where the horizontal scale is marked off in whole-number units.
2	2.MD.D.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems, using information presented in a bar graph.
2	2.G.A.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, squares, rectangles, rhombuses, trapezoids, pentagons, hexagons, and cubes.
2	2.G.A.3	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.
3	3.OA.A.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in five groups of seven objects each.
3	3.OA.A.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
3	3.OA.A.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3	3.OA.B.5	Apply properties of operations to multiply.
3	3.NF.A.1	Understand a fraction 1/b as the quantity formed by 1 part when a whole (a single unit) is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.
3	3.NF.A.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3	3.MD.B.3	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.
3	3.MD.B.4	Generate measurement data by measuring lengths of objects using rulers marked with halves and fourths of an inch. Record and show the data by making a line plot (dot plot), where the horizontal scale is marked off in appropriate units—whole numbers, halves, or fourths.
3	3.MD.C.5	Recognize area as an attribute of plane figures and understand concepts of area measurement.
3	3.MD.C.6	Measure areas by counting unit squares (square cm, square m, square in., square ft., and non-standard units).
3	3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Compare and classify shapes by their sides and angles (right angle/non-right angle). Recognize rhombuses, rectangles, squares, and trapezoids as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

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ENGLISH LANGUAGE ARTS & LITERACY

39 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
K	RF.K.1c	Understand that words are separated by spaces in print.
K	RF.K.2a	Recognize and produce rhyming words.
K	RF.K.3b	Associate the long and short sounds with common spellings (graphemes) for the five major vowels.
K	RF.K.3c	Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does).
K	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.
K	SL.K.5	Add drawings or other visual displays to descriptions as desired to provide additional detail.
K	L.K.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
K	L.K.5c	Identify real-life connections between words and their use (e.g., note places at school that are colorful).
1	RF.1.2a	Distinguish long from short vowel sounds in spoken single-syllable words.
1	RF.1.2c	Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words.
1	RF.1.3	Know and apply grade-level phonics and word analysis skills in decoding words.
1	RF.1.3b	Decode regularly spelled one-syllable words.
1	RF.1.3c	Know final -e and common vowel team conventions for representing long vowel sounds.
1	RF.1.3g	Recognize and read grade-appropriate irregularly spelled words.
1	RF.1.4	Read with sufficient accuracy and fluency to support comprehension.
1	SL.1.2	Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
1	SL.1.4	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly and using appropriate vocabulary.
1	L.1.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
2	RF.2.3a	Distinguish long and short vowels when reading regularly spelled one-syllable words.
2	RF.2.3b	Know spelling-sound correspondences for additional common vowel teams.
2	L.2.1c	Use collective nouns and frequently occurring irregular plural nouns.
2	L.2.2d	Use an apostrophe to form contractions and frequently occurring possessives.

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GRADE	CODE	STANDARD
2	L.2.4a	Use sentence-level context as a clue to the meaning of a word or phrase.
2	L.2.5a	Identify real-life connections between words and their use (e.g., describe foods that are spicy or juicy).
2	W.2.1	Write opinion pieces that 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.
2	W.2.3	Write narratives in prose or poem form that recount a well-elaborated event or experience, or a set of events or experiences; include details and dialogue to show actions, thoughts, and feelings; use temporal words to signal order where appropriate; and provide a sense of closure.
2	W.2.5	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.
2	SL.2.1c	Ask for clarification and further explanation as needed about the topics and texts under discussion.
2	SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
2	SL.2.4	Tell a story, recount an experience, or explain how to solve a mathematical problem with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences and using appropriate vocabulary.
2	SL.2.5	Create audio recordings of stories or poems; add drawings or other visual displays to stories or descriptions of experiences when appropriate to clarify ideas, thoughts, and feelings.
3	L.3.4	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.
3	L.3.5	Demonstrate understanding of word relationships and nuances in word meanings.
3	RL.3.1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
3	RL.3.2	Retell stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in a text.
3	RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding words.
3	SL.3.2	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.
3	W.3.3	Write narratives in prose or poem form to develop experiences or events using effective literary techniques, descriptive details, and clear sequences.
3	W.3.5	Develop and strengthen writing as needed by planning, revising, and editing.

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DIGITAL LITERACY & COMPUTER SCIENCE

25 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
K–2	K-2.CAS.a.2	Use electrical devices safely and in moderation (e.g., unplug devices by pulling the plug rather than the cord, do not mix water/food and electric devices, avoid gaming and walking).
K–2	K-2.CAS.a.3	Care for devices appropriately (e.g., handling devices gently, completely shutting down devices when not in use, storing devices in the appropriate container).
K–2	K-2.CAS.c.5	Identify and describe how people (e.g., students, parents, police officers) use many types of technologies in their daily work and personal lives.
K–2	K-2.DTC.a.1	Operate a variety of digital tools (e.g., open/close, find, save/print, navigate, use input/output devices).
K–2	K-2.DTC.a.3	Create a simple digital artifact.
K–2	K-2.DTC.b.1	Collaboratively use digital tools and media resources to communicate key ideas and details in a way that informs, persuades, and/or entertains.
K–2	K-2.CS.a.4	Operate a variety of computing systems (e.g., turn on, use input/output devices such as a mouse, keyboard, or touch screen; find, navigate, launch a program).
K–2	K-2.CT.b.1	Define an algorithm as a sequence of defined steps.
K–2	K-2.CT.b.2	Create a simple algorithm, individually and collaboratively, without using computers to complete a task (e.g., making a sandwich, getting ready for school, checking a book out of the library).
K–2	K-2.CT.b.3	Enact an algorithm using tangible materials (e.g., manipulatives, your body) or present the algorithm in a visual medium (e.g., storyboard).
K–2	K-2.CT.d.1	Define a computer program as a set of commands created by people to do something.
K–2	K-2.CT.d.2	Explain that computers only follow the program's instructions.
K–2	K-2.CT.d.3	Individually or collaboratively, create a simple program using visual instructions or tools that do not require a textual programming language (e.g., "unplugged" programming activities, a block-based programming language).
3	3-5.DTC.b.1	Communicate key ideas and details individually or collaboratively in a way that informs, persuades, and/or entertains using digital tools and media-rich resources.
3	3-5.DTC.b.2	Collaborate through online digital tools under teacher supervision.
3	3-5.CS.a.3	Demonstrate an appropriate level of proficiency (connect and record data, print, send command, connect to Internet, search) in using a range of computing devices (e.g., probes, sensors, printers, robots, computers).
3	3-5.CT.b.1	Define an algorithm as a sequence of instructions that can be processed by a computer.
3	3-5.CT.b.2	Recognize that different solutions exist for the same problem (or sub-problem).
3	3-5.CT.b.3	Use logical reasoning to predict outcomes of an algorithm.
3	3-5.CT.b.4	Individually and collaboratively create an algorithm to solve a problem (e.g., move a character/robot/person through a maze).

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GRADE	CODE	STANDARD
3	3-5.CT.b.5	Detect and correct logical errors in various algorithms (e.g., written, mapped, live action, or digital).
3	3-5.CT.c.2	Individually and collaboratively collect and manipulate data to answer a question using a variety of computing methods (e.g., sorting, totaling, averaging) and tools (such as a spreadsheet) to collect, organize, graph, and analyze data.
3	3-5.CT.d.1	Individually and collaboratively create, test, and modify a program in a graphical environment (e.g., block-based visual programming language).
3	3-5.CT.d.2	Use arithmetic operators, conditionals, and repetition in programs.
3	3-5.CT.d.3	Use interactive debugging to detect and correct simple program errors.

SCIENCE, TECHNOLOGY & ENGINEERING

4 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
1	1.K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change that can be solved by developing or improving an object or tool.
1	1.K-2-ETS1-2	Generate multiple solutions to a design problem and make a drawing (plan) to represent one or more of the solutions.
2	2.K-2-ETS1-3	Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.
3	3.3-5-ETS1-2	Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.

SOURCES & NOTES

- The official mathematics, English language arts, computer science and science standards for Massachusetts, as published by the Massachusetts Department of Elementary and Secondary Education (DESE).
- 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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