

MEDICAL ROBOTICS

GRADES 8–12

This document lists the Massachusetts learning standards addressed by Medical Robotics, True Robotics' grades 8–12 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).

15

STE

8

DLCS

23

TOTAL STANDARDS

SCIENCE, TECHNOLOGY & ENGINEERING

15 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
8	6.MS-LS1-3	Construct an argument supported by evidence that the body systems interact to carry out essential functions of life.
8	7.MS-ETS1-2	Evaluate competing solutions to a given design problem using a decision matrix to determine how well each meets the criteria and constraints of the problem. Use a model of each solution to evaluate how variations in one or more design features, including size, shape, weight, or cost, may affect the function or effectiveness of the solution.
8	7.MS-ETS1-4	Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.
8	7.MS-ETS1-7(MA)	Construct a prototype of a solution to a given design problem.
8	8.MS-PS2-2	Provide evidence that the change in an object's speed depends on the sum of the forces on the object (the net force) and the mass of the object.
9–12	HS-LS1-2	Develop and use a model to illustrate the key functions of animal body systems, including (a) food digestion, nutrient uptake, and transport through the body; (b) exchange of oxygen and carbon dioxide; (c) removal of wastes; and (d) regulation of body processes.
9–12	HS-LS1-3	Provide evidence that homeostasis maintains internal body conditions through both body-wide feedback mechanisms and small-scale cellular processes.
9–12	HS-ETS1-1	Analyze a major global challenge to specify a design problem that can be improved. Determine necessary qualitative and quantitative criteria and constraints for solutions, including any requirements set by society.
9–12	HS-ETS1-2	Break a complex real-world problem into smaller, more manageable problems that each can be solved using scientific and engineering principles.

GRADE	CODE	STANDARD
9–12	HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, aesthetics, and maintenance, as well as social, cultural, and environmental impacts.
9–12	HS-ETS1-5(MA)	Plan a prototype or design solution using orthographic projections and isometric drawings, using proper scales and proportions.
9–12	HS-ETS1-6(MA)	Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.
9–12	HS-ETS2-1(MA)	Determine the best application of manufacturing processes to create parts of desired shape, size, and finish based on available resources and safety.
9–12	HS-ETS3-1(MA)	Model a technological system in which the output of one subsystem becomes the input to other subsystems.
9–12	HS-ETS4-5(MA)	Explain how a machine converts energy, through mechanical means, to do work. Collect and analyze data to determine the efficiency of simple and complex machines.

DIGITAL LITERACY & COMPUTER SCIENCE

8 STANDARDS

Based on the Massachusetts state frameworks

GRADE	CODE	STANDARD
8	6-8.CS.a.5	Individually and collaboratively design and demonstrate the use of a device (e.g., robot, e-textile) to accomplish a task.
8	6-8.CS.a.6	Use a variety of computing devices [e.g., probes, sensors, handheld devices, Global Positioning System (GPS)] to individually and collaboratively collect, analyze, and present information for content-related problems.
8	6-8.CT.d.4	Implement problem solutions using a programming language, including all of the following: looping behavior, conditional statements, expressions, variables, and functions.
8	6-8.CT.d.6	Use an iterative approach in development and debugging to understand the dimensions of a problem clearly.
9–12	9-12.CT.b.2	Represent algorithms using structured language, such as pseudocode.
9–12	9-12.CT.d.1	Use a development process in creating a computational artifact that leads to a minimum viable product and includes reflection, analysis, and iteration (e.g., a data-set analysis program for a science and engineering fair, capstone project that includes a program, term research project based on program data).
9–12	9-12.CT.d.2	Decompose a problem by defining functions, which accept parameters and produce return values.
9–12	9-12.CAS.c.5	Analyze the beneficial and harmful effects of computing innovations (e.g., social networking, delivery of news and other public media, intercultural communication).

SOURCES & NOTES

- The official science and computer 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.
- 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.
- Medical Robotics addresses parts (b) and (d) of HS-LS1-2 and the body-wide feedback part of HS-LS1-3.