**MassCore**

MassCore is a state-recommended program of study intended to align high school coursework with college and workforce expectations.

MassCore increases the likelihood that high school graduates will meet admission requirements for the Commonwealth’s four-year public colleges and the University of Massachusetts, as well as improve their chances of admission to private colleges.

All Massachusetts public high school students, including students with disabilities and English learners, should have the opportunity to complete MassCore. The 22 units, or courses, included in MassCore should be rigorous, engaging, and based on appropriate grade level standards in the Massachusetts Curriculum Frameworks and beyond.

Email ccte@mass.gov for more information!

**Questions and Answers**

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# GENERAL QUESTIONS

1. **What is MassCore?**

Adopted by the Board of Elementary and Secondary Education (BESE) in 2007 and amended in 2018, MassCore is a state-recommended program of study intended to align high school coursework with college and workforce expectations.

The program of studies includes the successful completion of four units of English, four units of mathematics, three units of a lab-based science, three units of history, two units of the same world language, one unit of the arts, and five additional "core" courses. Certain computer science courses can substitute for either a mathematics course or a laboratory science course.

1. **Why was MassCore developed?**

MassCore was developed to increase the likelihood that high school graduates meet admission requirements for the Commonwealth’s four-year public colleges and the University of Massachusetts, as well as improve their chances of admission to private colleges.

1. **Who developed MassCore?**

A committee comprised of secondary and postsecondary educators, high school students, guidance counselors, members of the business community, and staff from the Department of Elementary and Secondary Education (DESE) and the Department of Higher Education (DHE) met through fall and winter of 2006-2007 to identify the courses and the determine the number of units. In June 2018, BESE and the Board of Higher Education (BHE) amended MassCore to allow certain computer science courses to substitute for either a mathematics course or a laboratory science course. In January 2019, BESE approved an initial set of 12 courses.

1. **Is MassCore for all students?**

Yes. All Massachusetts public high school students, including students with disabilities and English learners, should have the opportunity to complete MassCore. The 22 units included in MassCore are expected to be rigorous, engaging, and based on appropriate grade level standards in the [Massachusetts Curriculum Frameworks](http://www.doe.mass.edu/frameworks/current.html) and beyond.

1. **Is MassCore a state requirement?**

No. MassCore outlines a recommended minimum program of high school study while maintaining flexibility for districts to set additional graduation requirements. Students may take more rigorous coursework, including honors and AP classes, advanced classes that exceed the grade level standards in the Massachusetts Curriculum Frameworks, early college or dual enrollment classes, or participate in an International Baccalaureate (IB) program.

1. **Does MassCore only apply to high schools?**

Not necessarily. Districts have the flexibility to decide whether students will be awarded high school credit for courses taken in middle school, provided they are equivalent to high school courses and address the relevant high school grade level standards in the Massachusetts Curriculum Frameworks.

1. **Does MassCore apply to students enrolled in career technical high school programs?**

Yes. Students enrolled in career technical high school programs should have the opportunity to complete MassCore. For information about college admissions for students in these programs, refer to the [Undergraduate Admissions Standards for the Massachusetts State University System and the University of Massachusetts](http://www.mass.edu/foradmin/admissions/documents/DHEAdmissionsStandardsReferenceGuide%20June%202016.pdf).

1. **What’s the difference between state graduation requirements and MassCore?**

Currently, the state high school graduation requirements include aspects of U.S. history and civics, physical education, and earning a “competency determination” [passing scores on the Grade 10 English language arts and mathematics and high school level science and technology/engineering Massachusetts Comprehensive Assessment System (MCAS) tests].[[1]](#footnote-1) All other graduation requirements are determined by districts.

1. **Does MassCore retain local decision-making?**

Yes. All districts establish local graduation requirements. As a result, the number of core courses and total units required to earn a high school diploma varies widely throughout the state. For example, some districts require students to earn the equivalent of 16 units to graduate, while others require 22 units or more. MassCore establishes a common, minimum set of recommendations for all districts.

1. **How does MassCore relate to the Massachusetts Curriculum Frameworks?**

All MassCore courses should be rigorous and based on the appropriate grade-level standards in the Massachusetts Curriculum Frameworks. Districts have flexibility in designing teaching and learning around the standards.

1. **Does DESE report MassCore completion rates?**

Yes. DESE uses information collected through the Student Information Management System (SIMS) to report [MassCore completion rates](http://profiles.doe.mass.edu/state_report/masscore.aspx) for districts, schools, and student groups. Additional validations are done using Student Course Schedule (SCS) data.

1. **In the context of MassCore, is a “unit” the equivalent of a yearlong course?**

A unit represents a full academic year of study or its equivalent in a subject, but it does not mean that students must “be seated” in a class for specific number of hours to receive credit for the course; rather, students demonstrate mastery of the knowledge and skills represented by a unit of instruction. Students may also earn credit for “testing out of,” recovering, or accelerating a course, depending upon individual district policies.

1. **Does MassCore have implications for the 4x4 block schedule?**

A 4x4 block schedule may enable students to earn up to 32 units (as opposed to 24/28 units in more conventional 6/7-period schedules). Such districts may increase the number of required courses beyond the minimum established by MassCore.

1. **Does MassCore change the state’s physical education requirements?**

No. MassCore reflects the legal requirement that physical education be taught as a required subject in all grades. However, districts have considerable flexibility in designing their physical education program, including the hours of instruction for physical education, and whether and how a student (particularly at the high school level) can meet the requirement through an organized program of instructional physical activity, including but not limited to: participation in interscholastic athletics, skating or swimming lessons through a private instructor or a community program, or independent study. This discretion is consistent with the authority to permit a student to fulfill academic course requirements by taking a course elsewhere that they deem to be equivalent.

1. **Is MassCore sufficiently rigorous for students applying to highly selective colleges and universities?**

As the name implies, MassCore outlines the minimum “core” coursework most students should take in high school. Students considering applying to highly competitive colleges and universities should take even more rigorous coursework, including honors courses, Advanced Placement® courses, early college or dual enrollment courses, or participate in an International Baccalaureate (IB) program.

1. **If a student completes MassCore, will he or she also meet the admissions standards of the Massachusetts State University System and the University of Massachusetts?**

In general, yes (see table below). Due to the growing competitiveness of those schools, higher education officials recommend students go beyond MassCore, particularly for competitive majors that expect or require more advanced study.

|  | ***MassCore*** | ***Minimum 4-Year State Admissions Standards[[2]](#footnote-2)*** |
| --- | --- | --- |
| **English Language Arts** | 4 units | 4 courses[[3]](#footnote-3) |
| **Mathematics** | 4 units; including completion of algebra II or the integrated math equivalent. A math course during senior year is recommended for all students. Students may substitute 1 unit of **Computer Science** that includes rigorous mathematical concepts and aligns with the DLCS standards for a mathematics course.  | 4 courses (including algebra I and II and geometry or trigonometry, or comparable coursework) including math in senior year. **Computer Science** courses may be considered a mathematics course based on the inclusion of rigorous mathematical concepts and topics. |
| **Science** | 3 units of lab-based science; coursework in technology/engineering courses may also count for MassCore science credit. Students may substitute 1 unit of **Computer Science** that includes rigorous scientific concepts and aligns with the DLCS standards for a laboratory science course. | 3 courses of lab-based science (drawn from natural science and/or physical science and/or technology/engineering). **Computer Science** courses may be considered a science course based on the inclusion of rigorous science concepts and topics. |
| **History & Social Science** | 3 units, including U.S. History and World History | 2 courses, including U.S. History |
| **World Language** | 2 units of the same language  | 2 courses of the same language |
| **Physical Education** | As required by law | - |
| **Arts** | 1 unit | - |
| **Additional Core Courses** | 5 units | 2 courses (from the above subjects or from the arts and humanities or computer sciences) |

1. **Does fulfilling MassCore impact student success?**

Yes. Research is clear that educational and economic attainment are closely linked. Graduates of four-year colleges earn an average $1.4 million more than high school dropouts. Students who take a challenging program of study like MassCore in high school are more likely to enroll in college, forego academic remediation, and earn a college degree.[[4]](#footnote-4) MassCore helps students acquire the knowledge, skills and experiences necessary for success in economically viable career pathways in a 21st century economy.



# COMPUTER SCIENCE

1. **Why is computer science included in MassCore?**

It’s the Commonwealth’s responsibility to ensure that all of today's students are not only passive information consumers but understand and are proficient in the skills and manner of thinking that are the foundation of our technological world. The ability to effectively use and create technology to solve complex problems is an essential literacy skill. Recognizing the importance of these competencies, Massachusetts was among the first states to adopt Digital Literacy and Computer Science standards in June 2016.

1. **Which computer science courses can be substituted for either a laboratory science course or for a mathematics course?**

A working group consisting of representatives from secondary and higher education with expertise in mathematics, science and technology/engineering, and computer science identified the following initial set of courses:

* **#10019 Advanced Placement® Computer Science Principles:** Advanced Placement® Computer Science Principles is not a single course; rather, schools and organizations submit curricular materials to the College Board for audit to ensure they meet or exceed the College Board's expectations as articulated in the [AP® Computer Science Principles Curriculum Framework](https://apcentral.collegeboard.org/pdf/ap-computer-science-principles-course-and-exam-description.pdf). A listing of ready to use curricula approved by College Board, including preapproved syllabi, lesson plans, formative assessments, and professional development can be found here: <https://apcentral.collegeboard.org/courses/ap-computer-science-principles/classroom-resources/curricula-pedagogical-support>.
* **#10011 Computer Science Principles:** Based on the AP® Computer Science Principles Curriculum Framework, CSP can be taught as a non- AP® course. A listing of ready to use curricula approved by College Board, including preapproved syllabi, lesson plans, formative assessments, and professional development can be found here: <https://apcentral.collegeboard.org/courses/ap-computer-science-principles/classroom-resources/curricula-pedagogical-support>.
* **#10012 Exploring Computer Science (1 course):** Exploring Computer Science is an open source curriculum developed by UCLA and the University of Oregon. Exploring Computer Science was explicitly designed to expand participation in computing by traditionally underrepresented students in terms of enrollment, access, knowledge and skills, problem-solving, and attitudes. Exploring Computer Science is pedagogically and conceptually aligned to the AP® Computer Science Principles Curriculum Framework: <http://www.exploringcs.org/>.
* **#10090 Computational Thinking and Problem Solving (1 course):** Computational Thinking and Problem Solving (CTPS) presents computational thinking in the framework of a team-based, workplace-oriented project based learning course. CTPS  introduces an array of CS and IT competencies through a problem-based approach for students to apply learning in more relevant ways through authentic industry problems. CTPS is pedagogically and conceptually aligned to the AP® Computer Science Principles Curriculum Framework: <https://www.csforma.org/computer-science-education/curriculum/ct-ps/>
1. **What criteria did the working group use to identify the computer science courses that can be substituted for a mathematics or laboratory science course?**
2. **Alignment with Admissions Requirements for the State's Public Colleges and Universities:** BHE's [Undergraduate Admissions Standards for the Massachusetts State University System and the University of Massachusetts](http://www.mass.edu/foradmin/admissions/documents/DHEAdmissionsStandardsReferenceGuide_June2016.pdf) permit the crediting of a high school computer science course as a mathematics or laboratory science course based on the inclusion of rigorous mathematical or science concepts and topics. To meet this criterion, the working group determined that a computer science course must provide substantial opportunities for students to apply the Standards for Mathematical Practice for high school described on pages 16-18 of the [2017 Mathematics Curriculum Framework](http://www.doe.mass.edu/frameworks/math/2017-06.pdf) (if substituting for a mathematics course), or the Science and Engineering Practices for high school as described on pages 66-67 of the [2016 Science and Technology/Engineering Curriculum Framework](http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf) (if substituting for a laboratory science course). These practices, each of which emphasizes the application of skills, knowledge, and dispositions characteristic of expert mathematicians or scientists in their respective fields, are amply represented in the [2016 Digital Literacy and Computer Science (DLCS) Curriculum Framework](http://www.doe.mass.edu/frameworks/dlcs.pdf) for grades 9-12. Therefore, a high school computer science course aligned to the 2016 DLCS Curriculum Framework for grades 9-12 also aligns to the Standards for Mathematical Practice and the Science and Engineering Practices for grades 9-12.
3. **Alignment with the 2016 DLCS Curriculum Framework for Grades 9-12:** To meet this criterion, a computer science course must substantially align to the standards in each of the four strands of the framework. For example, the initial set of 12 courses identified as substitutions address 88 percent of the framework, but would cover 100 percent with minimal modifications.
4. **Sufficient Course Rigor, Quality, and Student Preparedness for College:** To meet this criterion, a computer science course must be conceptually and pedagogically aligned to the College Board's expectations for introductory computer science courses, specifically the learning objectives delineated in the AP® Computer Science Principles Curriculum Framework.
5. **Equivalent to a Full Year of Learning:** To meet this criterion, a computer science course must be considered a full year course, but it would not mean that students must be "seated" in a class for a specific number of hours to receive credit for the course. Districts have the authority to award credit to students who "test out of," recover, or accelerate a course, depending on individual district policies. Further, competency-based courses, in which students advance and earn credit upon demonstrated mastery, would also be eligible.
6. **Aligned to P-16 Math Pathways:** DHE’s P-16 Math Pathways framework proposes organizing introductory college mathematics courses around four mathematics pathways aligned to the appropriate math for a major: calculus for STEM majors, college algebra for elementary education, quantitative reasoning, and statistics. While none of the proposed pathways prohibit high school students from substituting, a student in the first pathway (calculus for STEM majors) may elect to take a full complement of mathematics and sciences courses in addition to computer science (i.e., as an elective).

DESE will identify additional courses on a rolling basis.

1. **How can districts implement the substitution option?**

The working group recommends that when substituting a computer science course for a mathematics course, students, parents/guardians, guidance counselors, and teachers consider the following:

* All students should continue to take algebra I and algebra II;
* Students should consider taking computer science following geometry and prior to algebra II; and
* All students should take a mathematics course in their senior year.

Students interested in pursuing STEM majors in college should consider taking a full complement of math and science courses in addition to a computer science course (i.e., as an elective). Ultimately, districts retain local decision-making over whether students can substitute.

# MATHEMATICS

1. **Why does MassCore recommend 4 units of mathematics, including the completion of Algebra II?**

Studies show students taking the equivalent of four years of challenging mathematics are more likely to graduate from college. For many students, Algebra II is a key gateway course to completion of a credited college level mathematics course.

1. **Is there a recommended mathematics course sequence?**

While MassCore does not recommend a sequence of mathematics courses, the [2017 Massachusetts Curriculum Framework for Mathematics](http://www.doe.mass.edu/frameworks/current.html) represents an opportunity to revisit course sequences in middle and high school mathematics. Districts should work with stakeholders, including middle and high school teachers, guidance counselors, external partners including institutes of higher education and parents/guardians, to examine the full range of courses and sequencing options in light of these revised standards and requirements of higher education and the workforce.

1. **Should students take mathematics in their senior year?**

Yes. Studies show that such students are more likely to pass their first mathematics course in college, less likely to require remedial coursework that does not carry college credit, and less likely to require re-training by their employers after college.

1. **What mathematics courses count toward the MassCore recommendations?**

MassCore mathematics courses should be: at the algebra I level and above, meet the definition of a unit, based on the 2017 Massachusetts Curriculum Framework for Mathematics or beyond (for example, college level coursework), and eligible for mathematics high school credit.

1. **Can a science course substitute for one of the four mathematics courses?**

No.

1. **Does a computer science course count as a mathematics course?**

Certain computer science courses can substitute for a mathematics course. For details, see the computer science section.

1. **Can DESE recommend mathematics options for students to take in their senior year?**

Yes. The 2017 Massachusetts Curriculum Framework for Mathematics provides different high school course options for students.

1. **Do semester-length electives in statistics or business mathematics in the senior year meet the "four year" mathematics standard?**

No. A student must take and pass a “full year of study, or its equivalent *in a specific subject*” to meet the standard of a unit of study as defined in MassCore. It may include a combination of semester courses that equal a full year course.

# SCIENCE

1. **Why does MassCore emphasize laboratory-based science courses?**

Such courses are essential to developing scientific literacy because they provide students opportunities to develop scientific reasoning and inquiry skills while mastering rigorous content, including formulating testable questions, designing investigations, using instruments safely, employing tools and materials to collect and analyze data, and discussing findings.

1. **Does a technology/ engineering course count as a science course?**

Yes, if the courses align with the appropriate standards in 2016 Science and Technology/Engineering Framework. These courses have an academic focus: students are engaged in conceptual learning of knowledge related to the standards and develop skills related to the engineering design process; they have an experiential, hands-on element (a laboratory component) that enhances student learning of content and process skills; and they develop scientific and technological literacy.

1. **Does a computer science course count as a science course?**

Certain computer science courses can substitute for a laboratory science course. For details, see the computer science section.

1. **Must science courses align to the Massachusetts Curriculum Frameworks? For example, can a school offer a lab-based environmental science course?**

This is a local decision. While districts should take the standards under consideration, the standards do not address the full range of possible science offerings, particularly advanced coursework taken as electives.

# ADDITIONAL COURSEWORK

1. **Must students enrolled in career technical high school programs take arts and world language?**

While students enrolled in career technical high school programs should have the opportunity to complete MassCore, they can fulfill MassCore without taking arts and world language. For information about college admissions for students in these programs, refer to the [Undergraduate Admissions Standards for the Massachusetts State University System and the University of Massachusetts](http://www.mass.edu/foradmin/admissions/documents/DHEAdmissionsStandardsReferenceGuide%20June%202016.pdf).

1. **Can districts designate students with demonstrated fluency and literacy in language(s) other than English as meeting the MassCore recommendations?**

Districts may designate students with demonstrated fluency and literacy in language(s) other than English as meeting the MassCore recommendations for world language

1. **Which art classes meet MassCore recommendations?**

The course should meet the definition of a unit and be based on the [2019 Massachusetts Arts Curriculum Framework](https://www.doe.mass.edu/frameworks/arts/2019-08.docx). Generally, the study of the arts includes dance, music, theatre, and the visual arts.

# CAREER AND COLLEGE PREPARATION

1. **How does MassCore prepare students for STEM careers (science, technology, engineering, and mathematics)?**

The demand for workers who can engage in logical and abstract thinking, data analysis, creative problem solving, troubleshooting, and collaboration is continuing to increase dramatically. In response, BESE and BHE voted in June 2018 to include computer science as an option in MassCore. Whether students decide to become full-fledged computer scientists or pursue other STEM careers, computer science knowledge and skills are foundational for a well-rounded education in the twenty-first century.

1. **Does MassCore provide flexibility to students seeking to take multiple electives and/or additional coursework to fill specific interests or follow specific career pathways?**

Yes. In addition to the recommended core courses, students have the flexibility to take 5 or more additional courses in STEM, arts and humanities, career and technical education, and/or other areas of interest. Further, MassCore outlines the minimum “core” of coursework that most students should take in high school. Districts should provide flexible options and opportunities for students to go beyond MassCore.

1. **Does MassCore prepare students for standardized college entrance exams?**

The best preparation for standardized pre-college assessments is a rigorous, standards-based course of study, particularly in English and mathematics. MassCore helps this preparation.

# ADDITIONAL LEARNING OPPORTUNITIES

1. **What additional learning opportunities should students engage in beyond MassCore?**

Fulfilling MassCore is just a start. Students should also engage in a full range of additional learning opportunities to learn about careers and contribute to the community they live in. Examples include:

* *Advanced Placement®,* which lets students take college-level courses while still in high school; 37 AP courses exist in 22 subject areas.
* *Capstones or Senior Projects* are student-directed learning experiences that help them develop, design or create a product, service, system or event to better them for further studies or employment after high school. Strong projects demonstrate skills such as critical thinking, reading comprehension, and effective communication.
* *Dual Enrollment or early college coursework* lets high school students simultaneously earn credits toward a high school diploma and a postsecondary degree or certificate.
* *Online Courses* for high school or college credit help prepare students for success in 21st century work and life. In addition to building important digital literacy skills, online courses provide greater flexibility in what, where, and how students learn, and at what pace.
* *Service Learning* integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities.
* *Work-based Learning,* work experience that connects classroom learning to work. At the highest level, academic and career occupational curriculum are fully integrated with work site experience.
* *Clubs and other student organizations* that line up with students’ interests and provide opportunities to develop leadership and communication skills.
* *Varsity and intramural athletics* build fitness, teamwork, perseverance, responsibility, commitment, time management, and social and emotional health.
* *Part-time employment*, in which students form good work habits and acquire new skills, including communication, interpersonal, and job application and interview skills.
1. For students who do not pass an MCAS test, educators develop an Educational Proficiency Plan (EPP) for the subject(s). MassCore may meet or exceed local course requirements as well as ensure students meet course requirements for an EPP. [↑](#footnote-ref-1)
2. Refer to DHE’s [Admission Standards](https://www.mass.edu/shared/documents/admissions/admissionsstandards.pdf) for more details and answers to frequently asked questions. [↑](#footnote-ref-2)
3. While DHE refers to “courses” instead of “units”, the meaning (equivalent to one full school year of study) is the same. [↑](#footnote-ref-3)
4. Source: Current Population Survey, U.S. Department of Labor, U.S. Bureau of Labor Statistics, 2017. [↑](#footnote-ref-4)