



Improving the Massachusetts Mathematics Standards: A Quick Reference Guide to Proposed Changes in 2017

In 2017 the Board of Elementary and Secondary Education will consider adopting changes to the Massachusetts mathematics standards in order to increase **coherence**, **focus**, **rigor**, and **clarity**.

A Brief History of Standards in Massachusetts

Massachusetts was one of the first states to implement standards-based reform and is considered a national leader in developing rigorous learning standards with clear expectations for how students build knowledge and skills over time. The Department of Elementary and Secondary Education (ESE) first worked with educators to develop learning standards in English language arts and literacy (ELA/literacy), mathematics, and other subjects in the mid-1990s.

Since that time, ESE has periodically brought together educators to revise the standards, such as in 2000–01, 2004, and 2007–10.

The current ELA/literacy and mathematics standards were adopted by the Board of Elementary and Secondary Education in 2010. These standards incorporate the Common Core State Standards (CCSS) used by many states and include additional standards unique to Massachusetts. Massachusetts educators and scholars were influential in the development of the CCSS.

Now, six years after the last update, educators are again working with ESE to take another look at the standards and to make recommendations for their improvement informed by over five years of use by teachers with students in our classrooms.

Goal	Example of Proposed Change
Coherence	<ul style="list-style-type: none"> Established a learning progression in the early grades related to recognizing patterns in numbers in order to lay a foundation for algebraic thinking.
Focus	<ul style="list-style-type: none"> Clarified the types of functions that are covered in the Model High School Algebra I course and those covered in the Algebra II course.
Rigor	<ul style="list-style-type: none"> Identified a pathway to compress the grade 6-8 standards to allow students to complete the Model Algebra I course in grade 8.
Clarity	<ul style="list-style-type: none"> Revised the descriptions of the Standards for Mathematical Practice to provide more specific examples of the practices at the PK-5, 6-8, and 9-12 grade spans.

Key Elements of the Proposed Changes

Element	Why is it important?	What will the proposed changes do?
Improving Learning Progressions Across Grades	Standards should always progress smoothly from grade to grade. For students to be successful, educators need to understand the pre-requisite knowledge and skills to what they teach and understand how what they teach connects to the knowledge and skills students will build in later years. The Mathematics standards represent a coherent progression for mathematics instruction overall. However, it is also important to examine learning progressions related to specific concepts.	<ul style="list-style-type: none"> The proposed changes provide stronger learning progressions related to developing conceptual understanding about specific topics. For example, the proposed revisions: <ul style="list-style-type: none"> Strengthen a learning progression related to building the knowledge and skills necessary to measure geometric shapes and figures by adding a clear set of standards at grade 7 about the properties of a circle, the terms related to circle measurement, the calculation of the circumference and area of circles, and the application of the formulas for circumference and area of a circle to solve problems. Add a learning progression spanning several early grades related to building number pattern recognition skills as a prerequisite to algebraic thinking that starts with “one more/one less” patterns in pre-kindergarten and progresses to recognizing patterns in odd and even numbers and skip counting by 5s, 10s, and 100s in grade 2.
Creating Multiple High School Pathways to Meet the Needs of all Students	Presenting a variety of course-taking pathway options encourages students to persist in their mathematical studies and make course-taking decisions that best support their interests and career and college goals. Including multiple example pathways in the Framework supports districts in making decisions about course offerings.	<ul style="list-style-type: none"> The proposed changes include a new section to support district level decision making about course sequences through presentation of multiple pathways, including: <ul style="list-style-type: none"> A pathway that compresses the standards for grade 6, 7, and part of grade 8, so students can complete Algebra I in grade 8. Pathways that organize high school courses in ways that allow students to take Calculus in grade 12. Pathways that culminate in other advanced courses such as Quantitative Reasoning, Statistics, Linear Algebra, and Discrete Mathematics.



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Helping Educators Connect the Standards for Mathematical Practice with the Standards for Mathematical Content	The eight Standards for Mathematical Practice describe ways in which students engage with mathematical content throughout their PK-12 mathematics instruction. They are designed to work with the Standards for Mathematical Content, which set grade-level expectations for what students should know and be able to do. Since the practice standards span PK-12 and the content standards are grade or course specific, educators wrestle with how best to make connections.	<ul style="list-style-type: none"> The proposed changes include descriptions of the eight Standards for Mathematical Practice at three grade spans: PK-5, 6-8, and 9-12. These more targeted and specific descriptions will help educators at all levels see the relevancy of these standards to the content they are responsible for teaching.

FAQs about the Proposed Changes

1. Do the proposed changes to the Mathematics standards change how students should be taught to engage with math?



The proposed changes build on the balance established in the current standards between conceptual understanding (making sense of the math), procedural fluency (knowledge of how to do the math), and real-world application (capacity to solve a range of problems in various contexts by reasoning with, thinking about, and applying math). This balance helps students develop a deep understanding of mathematics and an appreciation for how it is used across a range of industries and careers.

2. Why should districts consider multiple pathways for mathematics for middle and high school students?

There is no single course-taking sequence that will work well for all students. Students have different interests and goals related to college and career. They learn mathematics at different rates. A one-sized-fits-all approach would deny students opportunities to explore the breadth of concepts and applications that mathematics embody. The goal is to ensure that all students who graduate from a Massachusetts high school have had access to the mathematics courses they will need and are prepared to apply their mathematical knowledge wherever they choose to go next. This means for our students that proceed right to college, they are placed into credit-bearing mathematics courses for which they are well-prepared to succeed and, for our students who proceed right to a career, they have been exposed to advanced mathematical concepts and skills relevant to their industries.

3. Will districts have to develop new curriculum for the new standards?

Educators' comments on the current Framework from a variety of sources all signaled that the standards could be improved based on lessons learned and noted the importance of ongoing implementation support, including opportunities for educator collaboration in developing curricular materials. Encouragingly, 100 percent of principals and 83 percent of superintendents responding to the Views of Instruction, State Standards, Teaching, and Assessment (VISTA) survey in Spring 2016 agreed that the current Mathematics standards set appropriate expectations for learning. The proposed changes to the standards build on a solid foundation and offer an opportunity to strengthen curriculum, but will not necessarily require new instructional materials.

Learn More. Get Involved.

You can help make the Mathematics standards even better by reading the [Public Comment Draft](#) of the proposed new Massachusetts Curriculum Framework for Mathematics and responding to the Department's online survey. Your comments and suggestions will be taken into account in the final round of revisions, which will be presented to the Massachusetts Board of Elementary and Secondary Education in spring 2017.

The survey will be available from December 1, 2016 to February 17, 2017 at <http://sgiz.mobi/s3/Public-Comment-Draft-ELA-Literacy-Math-Frameworks-2016-2017>.

What are Student Learning Standards?

- Standards state what students should know and be able to do by the end of particular grades or courses.
- Standards are clear, specific, and measurable.
- Standards identify desired results rather than means. They leave room for educators and curriculum developers to determine how students will develop the skills and gain the knowledge expected.
- Standards are ambitious, providing a floor but not a ceiling for student learning.
- Standards progress logically and smoothly from grade to grade.
- Standards are coherent both within each subject area and across subject areas.