

Overview

Sunshine State Standards: Mathematics

History

The Sunshine State Standards were first approved by the State Board of Education in 1996 as a means of identifying academic expectations for student achievement in Florida. These original standards were written in several subject areas and were divided into four separate grade clusters (PreK-2, 3-5, 6-8, 9-12). This format was chosen to provide flexibility to school districts in designing curriculum based on local needs.

As Florida moved toward greater accountability for student achievement at each grade level, the Sunshine State Standards were further defined with specific “Grade Level Expectations” added over time. As time went on, two realities appeared that magnified the need to increase the level of rigor, coherence, and clarity in Florida’s academic standards. First, it was recognized that the level of rigor in the 1996 standards was inadequate to address the increased levels of achievement registered by our students. Second, ample evidence from both national and international measures of student achievement indicated the urgent need for higher levels of challenge for all our students. This could not occur without a serious effort to increase the level of rigor and expectations across the board for all Florida students.

The Department of Education recognized the need for a systematic approach to review and revise all of the academic standards, and on January 17, 2006, the State Board of Education adopted a six-year cycle that set forth a schedule of the regular review and revision of all K-12 content standards. (<http://www.flstandards.org>) This move went far beyond increasing the rigor of the standards; however, it included this alignment of the new standards with assessments, instructional materials, professional development, and teacher licensure exams. This way, the new standards and their higher levels of rigor will be fully integrated into the entire culture of K-12 instruction. This move sets the stage for higher levels of rigor and higher academic achievement for years to come.

A Commitment to Excellence

In 2006, the Florida legislature boldly stated its commitment to higher and more challenging standards for Florida’s children by passing HB 7087. Florida law now reads:

§1001.03(1) ...The state board shall establish a schedule to facilitate the periodic review of the standards to ensure adequate rigor, relevance, logical student progression, and integration of reading, writing, and mathematics across all subject areas.

This is a commitment that is shared by educators across Florida, as evidenced by the overwhelming level of public feedback to this revision process. Our goal now is to move forward with confidence and a sense of purpose as we begin implementing these higher and more rigorous standards.

Many people were involved in the review and revision of the mathematics standards. We extend our thanks to all of the teachers and members of the public for their active interest in this important area of work, and we look forward to continuing to work with them as partners in implementing these higher expectations for all of Florida's students.

Jeanine Blomberg
Commissioner of Education

Mathematics Standards Revision Process

In September 2006, the Office of Math and Science convened a committee to consider the framework for the revision of the Sunshine State Standards for mathematics. Taking into account research in mathematics education, a major goal of the revision of the Sunshine State Standards would be to strive for consensus amongst content experts, educational experts, researchers, parents, teachers, and members of the business and workforce community.

Experts in national and international mathematics curriculum articulated their analyses of the 1996 Sunshine State Standards for mathematics benchmarks and grade level expectations to the framers. These experts also presented research on the standards used by other states and the countries that lead the world in student achievement. There was agreement by all reviewers that Florida's standards fit the description of "a mile wide and an inch deep" and lacked coherence. The content of these presentations may be found online at www.flstandards.org. Combined with their own expertise in mathematics curriculum, the framers used this information to define the structure and provide recommendations that would become the guiding principles for the writers of the standards to follow.

From October 2006 to January 2007, the writers committee met to write the new standards and benchmarks according to the structure that the framers set. This was an iterative process, with the framers reviewing the work and providing comments to the writers. Responding to calls for clarity, coherence, and minimal redundancy, the numbers of K-8 grade level expectations were reduced from an average of more than 80 per grade to an average of less than 20 benchmarks per grade. High school benchmarks went from 9-12 grade bands in the 1996 standards to specific benchmarks for content including, for the first time, Calculus, Discrete Math, Trigonometry, and Financial Literacy standards.

From February 2007 to March 2007, the drafts of the standards were provided to the public via online sources and through public forums in various counties in the state of Florida. Online reviewers were able to rate the benchmarks and provide comment. Online reviewers provided 43,025 ratings of 504 draft standards and benchmarks. Of these reviewers, 1,391 interested persons completed the visitor profile. These reviewers identified themselves, in descending order of numbers of reviewers, as teachers, administrators, district staff, other interested persons, parents, and no response. Additionally, experts in mathematics and mathematics curriculum were gathered to provide an in-depth review of the drafts for comment and revision.

From April 2007 to June 2007, the benchmarks were revised based on the considerable input from the committees and other reviewers. The names of the framers, speakers, writers, and expert review panelists are included in the Acknowledgments section of this document.

Access Points for Students with Significant Cognitive Disabilities

As part of the revision to the Sunshine State Standards, access points for students with significant cognitive disabilities have been developed. These access points are expectations

written for students with significant cognitive disabilities to access the general education curriculum. Embedded in the Sunshine State Standards, access points reflect the core intent of the standards with reduced levels of complexity. The three levels of complexity include participatory, supported, and independent with the participatory level being the least complex. The new Florida Alternate Assessment will measure achievement on the Access Points.

The Access Points for the Mathematics Sunshine State Standards were developed through the cooperative efforts of writing teams composed of Florida educators and parents under the direction of staff from the Accommodations and Modifications for Students with Disabilities Project, the Accountability and Assessment for Students with Disabilities Project, and the Florida Department of Education

Structure of the Standards Documents

The new world-class Sunshine State Standards for mathematics are organized by grade level for grades K-8 and by Bodies of Knowledge for grades 9-12. This structure was determined by the Framers Committee based on review of the issues presented by experts and research in curriculum standards. The Bodies of Knowledge do not comprise courses. Standards and benchmarks will be pulled from the various Bodies of Knowledge to write specific courses in mathematics at the secondary level.

The model for writing the standards for the K-8 standards was provided by a 2006 document from the National Council of Teachers of Mathematics (NCTM) entitled Curriculum Focal Points: A Quest for Coherence.

Standards at each of the K-8 grade levels are termed Big Ideas and Supporting Ideas. The set of standards for each grade level consists of three Big Ideas and varying numbers of Supporting Ideas. Supporting Ideas are not meant to be subordinate to Big Ideas, but rather they serve to provide connections between topics at different grade levels.

At the high school level, the mathematics standards are organized into familiar Bodies of Knowledge such as Algebra, Geometry, Trigonometry, Calculus, Probability, and Statistics. There are two Bodies of Knowledge that may not be recognized as the traditional mathematics curriculum. They are Discrete Mathematics and Financial Literacy.

Discrete Mathematics consists of many of the topics in mathematics that are becoming more and more important in the modern era. For example, all computer and electronic applications of mathematics are necessarily discrete. Some of the topics in Discrete Math include set theory, graph theory, matrix algebra, recursive functions, and more.

Florida is introducing a Body of Knowledge in mathematics entitled Financial Literacy. This Body of Knowledge has been created in response to the combination of a long history of financial matters in mathematics education, the near-universal relevance of financial matters and mathematics in people's lives, and the development of financial mathematics programs at university levels. The standards and benchmarks in the Financial Literacy Body of Knowledge involve high-level, complex mathematics applications. The Financial Literacy

Body of Knowledge is intended to provide students with an opportunity to learn and use mathematics in an applied manner, thereby supporting their understanding of mathematics, their own financial well-being, and the health of the economic system in which we all operate.

With people from many aspects of the education community involved with writing, reviewing, and revising the standards, the 2007 revision of the Sunshine State Standards for mathematics are truly the stakeholder's standards. The Office of Math and Science is incredibly grateful for the intensity of the work that was performed in writing these standards.

Mary Jane Tappen
Executive Director of Florida's Office of Math and Science

Acknowledgments

The Office of Math and Science gratefully acknowledges the cooperation and assistance received from individuals and groups throughout Florida in this revision process. Without such cooperation, these revisions would not have been possible.

We would like to express special thanks to the many local educators, parents, and business people who participated in the current revision process by serving on curriculum committees and reacting to draft documents as well as those who took the time to review and rate the drafts online. These people include, but are not limited to the following:

Mathematics Standards Framers Committee

- Thomasenia Adams
Associate Professor of Mathematics, University of Florida
- Norma Agras
Chair, Department of Mathematics, Miami Dade College
- Janet Boatman
Middle School Math Supervisor, Hillsborough County
- Sue Burns
PTA Representative, Seminole County
- Maureen Carll
Family/Community Involvement Chairperson, Florida PTA
- Paula Cifuentes
Professor of Mathematics, Lake City Community College
- Michael Hynes
College of Education, University of Central Florida
- Elizabeth Jakubowski
Associate Professor, Florida State University
- Christine Johnson
Associate in Research, FSU Learning Systems Institute
- Nancy Kinard
President, Florida Council of Teachers of Mathematics
- Michael Mears
Dean of Instruction, Mathematics, Manatee Community College
- Elesea Page
Mathematics Education, St. Lucie County
- Emily Peterek
Mathematics Education Doctoral Student, University of Florida
- Walter G. Secada
Department of Teaching and Learning, University of Miami
- Hui Fang "Angie" Su
Professor of Mathematics Education, Nova Southeastern University
- Norm Thagard
Professor of College Relations at FAMU/FSU College of Engineering

- Denisse Thompson
Professor of Mathematics Education, University South Florida
- Vince Verges
FCAT Mathematics Coordinator
- Sharon Vandeventer
Math Coordinator, Lee County
- Dorett Wade
Curriculum Supervisor, Exceptional Student Education, Broward County

National Experts who Presented Research to the Framers

- Kaye Forgione
Achieve.org, Mathematics Benchmarking Initiative
- Alan Ginsburg
US Department of Education
- R. James Milgram
Professor, Stanford University
- Barbara Reys
Center for the Study of Mathematics Curriculum
- Jane Schielack
NCTM, Professor of Mathematics at Texas A&M University

Mathematics Standards Writing Committee

- Patricia Casey
Mathematics Teacher, Florida State University
- Sandra Cook
Mathematics Teacher, Vernon High School
- Robert Davis
K-12 Curriculum and Instruction Specialist, Charlotte County
- Juli Dixon
Associate Professor of Mathematics Education, UCF
- Marita Eng
Former Mathematics Supervisor
- Deirdre Englehart
UCF Instructor in Early Childhood
- Jean Giarrusso
Secondary Mathematics Administrator, Palm Beach County
- Sherry Hallman
Mathematics Instructor, Bronson High School
- Gladis Kersaint
Mathematics Education Facility, University South Florida
- Charlene Kincaid
Mathematics Specialist, FCTM Board of Directors
- Chuck Lindsey
Associate Professor of Mathematics, Florida Gulf Coast University

- Jan McKay
ESE Specialist, Florida State University
- Andy Reeves
Mathematics Educator, University South Florida
- Denise M. Snure
Mathematics Specialist, St. Lucie County
- Nancy Stokely
ESE Specialist, Florida State University
- Angie Su
Professor of Mathematics Education, Nova Southeastern University
- Vince Verges
FCAT Mathematics Coordinator for Florida Department of Education
- Kristin Weller
K-8 Mathematics Methods Instructor, University of Florida
- Dee Ann Wilson
Mathematics Program Specialist, Lake County
- Janet Wizda
Language Development K-5/ Reading
- Melissa Young
Secondary Mathematics Specialist, Orange County
- Robert Young
Assistant Professor of Mathematics, Brevard Community College
- Ana Zuniga
ELL, Mathematics Teacher Coral Gables High School

Mathematics Access Point Writing Team

- Patricia Bedford
Suntree Elementary School Mathematics Teacher, Brevard County
- Paul Bennett
Dixie County High School Mathematics Teacher, Dixie County
- Jill Brookner
District Alternate Assessment Coordinator, Miami-Dade County
- Donna Vacarro Collins
Parent, Leon County
- Conney Dahn
High School ESE Teacher (Florida Teacher of the Year), Martin County
- Susan Dunbar
Parent, Leon County
- Jane Floyd-Bullen
Principal of Gretchen Everhart School, Leon County
- Debbie Gibson,
Swift Creek Middle School Mathematics Teacher, Leon County
- Debbie Green
Curriculum Specialist, Paul B. Stevens School, Pinellas County

- Monica Griffey
Middle School ESE Teacher, Florida School for the Deaf and Blind
- Peggy Harter
Local Assistive Technology Specialist, FDLRS Miccosukee
- Michelle Hoolsema
Merritt Island High School, ESE Mathematics Teacher, Brevard County
- Gina Horton
Instructional Support Teacher, Orange County
- Mark Koorland
Professor, Exceptional Student Education, University of South Florida
- Joyce Lubbers
Project Connect, Transition Center, University of Florida
- Dave Meharg
Middle School ESE Teacher, Florida School for the Deaf and Blind
- Linda Oaksford,
Elementary Mathematics Specialist, Florida Assessment Center
- Jan Oberschlake
Human Resource Development, FDLRS Miccosukee
- Miriam Showalter
Middle School Teacher, Students with Autism, Sarasota County
- Jeris Simmons
Instructional Program Specialist, Duval County
- Jessica Sidler
High School Teacher, Gretchen Everhart School
- Becky Stack
Instructional Support Teacher, Orange County
- Frances Towk
Resource Specialist, Mathematics, Alachua County
- Jessica Webb
Lee Elementary School Teacher, Madison County
- Stacie Whinnery
Professor, Exceptional Student Education, University of West Florida

Mathematics Standards Expert Review Panelists

Florida Center for Research in Science, Technology, Engineering, and Math (FCR-STEM):

- Christine Johnson
Facilitator
- Philip Bowers
Professor of Mathematics
- Joseph Calhoun
Associate Director, Economic Education
- Kathy Clark
Assistant Professor of Mathematics Education
- James Gwartney
Professor of Economics

- Monica Hurdal
Associate Professor of Mathematics
- Elizabeth Jakubowski
Associate Professor of Mathematics Education
- Alec N. Kercheval
Associate Professor of Mathematics
- Moana Karsteter
Professor of Mathematics
- Steve Ramsier
Associate Professor of Statistics
- Robert Schoen
Doctoral Student, Mathematics Education

Individual Expert Reviewers:

- Nancy Dorff-Pennea
Mathematics Teacher, Palm Beach County
- James Milgram
Professor of Mathematics, Stanford University
- William McCallum
Professor of Mathematics, University of Arizona
- Ira Papick
Professor of Mathematics, University of Missouri
- Jae-Boon Lee
Research Fellow, Korean Educational Development Institute

Workforce/Industry Reviewers:

- Nirmala Ramlakhan
Facilitator, Workforce Central Florida
- Dawn Cavaliere
Human Resources, Conmed-Linvatec
- Lyle Conn
Systems Engineer, Adaptec, Inc.
- Mark Dawson
City President, Wachovia
- Bob Fisher
Jabil
- Glenn E. Forrest President
Glenn E. Forrest, P. E., Inc.
- Floyd Freeman Jr.
Technical Project Manager, Sprint
- Thomas J. King
Citi
- Howard Ludwig
Sr. Staff Engineer, Lockheed Martin Missiles and Fire Control
- Tim Madhanagopal
Engineer, Orange County Utilities

- Asif Rafiq
RF Engineer, Sprint
- Kim Robinson
Senior Performance Engineer, Adaptec, Inc.
- Eric Zimmer,
Franklin Templeton Investments

FLORIDA MATHEMATICS STANDARDS

K-8 GRADE-LEVEL STANDARDS

Big Ideas

Big Ideas are standards that are aligned with the *Curriculum Focal Points* released by the National Council of Teachers of Mathematics (NCTM). They include standards which should be the primary focus of mathematics instruction for each grade level, K-8. Establishing proficiency with these standards at each successive grade level will prepare a strong foundation for learning mathematics in subsequent grades.

There are three Big Ideas for each grade. The Big Ideas do not address the same topics for each grade, recognizing that at each level there are certain skills which must be honed to prepare students for more rigorous instruction as they move to the next grade. The order of the Big Idea standards does not determine the order of instruction nor does it indicate that one idea requires greater instructional emphasis. The Big Ideas are assigned numbers 1, 2, or 3 without regard to the content in each of them.

Supporting Ideas

Supporting ideas are standards which are fundamental to sound mathematics instruction. Also aligned with the *Curriculum Focal Points*, Supporting Ideas are not less important than the Big Ideas but are key components to a structurally sound mathematics education.

Supporting Ideas are standards that serve one or more of the following purposes:

- 1) Establishing connections to and between the strands of mathematics as defined by NCTM (Probability has been extracted from Data Analysis and stands alone.);
- 2) Preparing students for future mathematics teaching and learning by focusing on conceptual understanding of concepts; and
- 3) Addressing gaps in instruction that may appear insignificant but are important to the understanding, fluency, and application of mathematics ideas to problem solving. The

Benchmark Coding Scheme

MA.	5.	A.	1.	1
Subject	Grade Level	Body of Knowledge	Big Idea / Supporting Idea	Benchmark

Body of Knowledge Key:

- A ~ Algebra
- C ~ Calculus
- D ~ Discrete Mathematics
- F ~ Financial Literacy
- G ~ Geometry
- P ~ Probability
- S ~ Statistics
- T ~ Trigonometry

Access Points Coding Scheme

MA.	5.	A.	1.	In.a
Subject	Grade Level	Body of Knowledge	Big Idea / Supporting Idea	Access Point

Access Points Key:

- In ~ Independent
- Su ~ Supported
- Pa ~ Participatory

