

Overview

Sunshine State Standards: Science

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 attained 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 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 for the regular review and revision of all K-12 content standards. This action went beyond increasing the rigor of the standards; 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 for this revision process. Our goal is to move forward with confidence and a sense of purpose as we begin implementing these revised rigorous science content standards.

Many people were involved in the review and revision of the science standards. We extend our thanks to all of the educators and members of the public for their active interest in this important work. We look forward to continuing to work with all stakeholders as partners in implementing these higher expectations for all Florida students.

Dr. Eric J. Smith
Commissioner of Education

Science Standards Revision Process

In May 2007, the Office of Mathematics and Science convened a committee of framers to consider the framework for the revision of the Sunshine State Standards for science content. Taking into account research in science and science education, a major goal of the revision of the Sunshine State Standards was to strive for consensus among content experts, educational experts, researchers, parents, teachers, and members of the business and workforce community.

Experts in national and international science curriculum provided their analyses of the 1996 Sunshine State Standards for science benchmarks and grade level expectations to the framers. These experts also presented research on the content standards used by other states and countries that lead the world in student achievement for science. 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 can be found online at www.flstandards.org. Combined with their own expertise in science and science education, the framers used the research presented to define the structure and provide recommendations that would become the guiding principles for the writers of the science content standards to follow.

From June 2007 to October 2007, the writers committee met to write the new standards and benchmarks according to the structure set by the framers. This was an iterative process, with the framers reviewing the work and providing comments back to the writers. Responding to calls for clarity, coherence, and minimal redundancy, the number of K-8 grade level expectations was reduced from an average of more than 65 per grade to an average of about 30 benchmarks per grade. High school benchmarks went from a 9-12 grade band in the 1996 standards to specific benchmarks for content in four Bodies of Knowledge: Nature of Science, Life Science, Earth Science, and Physical Science.

From October 2007 to January 2008, the drafts of the standards were provided to the public via online sources and through public forums in various locations around the state. Online reviewers were able to rate the benchmarks and provide comment. Online reviewers provided 262,524 ratings of 480 draft standards and benchmarks. Of these reviewers, 10,017 interested persons completed the visitor profile. These reviewers identified themselves, in descending order of numbers of reviewers, as teachers, parents, other interested persons, district staff, and administrators. Additionally, experts in science and science education provided an in-depth review of the drafts and made comments and proposed revisions.

In January 2008, 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 Acknowledgment 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 Science 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 science 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 used from the various Bodies of Knowledge to write specific science courses at the secondary level.

Several documents were used by the writers in drafting the new science content standards including: 2009 Framework for the Science portion of the National Assessment for Educational Progress (NAEP); the Atlas of Science Literacy from the American Association for the Advancement of Science (AAAS); the Science Benchmarks from Project 2061 of the AAAS; the National Research Council's National Science Education Standards; and Science Curriculum Standards from Massachusetts, Singapore, South Carolina, and Indiana (K-8).

Eighteen Big Ideas thread throughout all grade levels and build in rigor and depth as students advance. Each grade level includes benchmarks from the four Bodies of Knowledge (Nature of Science, Life Science, Earth Science, and Physical Science). With people from many aspects of the education, business, and research communities involved with writing, reviewing, and revising the science content standards, this 2008 revision is truly the work of Florida stakeholders. The Office of Mathematics and Science is incredibly grateful for the intensity of the work that was performed in writing these content standards.

Mary Jane Tappen
Executive Director, Florida Department of Education's Office of Mathematics and Science

Acknowledgments

The Office of Mathematics and Science gratefully acknowledges the cooperation and assistance received from individuals and groups throughout Florida during 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:

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FLORIDA SCIENCE STANDARDS

K-8 GRADE-LEVEL STANDARDS

Big Ideas

The revised science standards include big ideas that flow throughout all grade levels and build in rigor as students move to higher grade levels. The eighteen big ideas used throughout this document are organized as follows:

Body of Knowledge: The Nature of Science

Big Idea 1: The Practice of Science

Big Idea 2: The Characteristics of Scientific Knowledge

Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models

Big Idea 4: Science and Society

Body of Knowledge: Earth and Space Science

Big Idea 5: Earth in Space in Time

Big Idea 6: Earth Structures

Big Idea 7: Earth Systems and Patterns

Body of Knowledge: Physical Science

Big Idea 8: Properties of Matter

Big Idea 9: Changes in Matter

Big Idea 10: Forms of Energy

Big Idea 11: Energy Transfer and Transformations

Big Idea 12: Motion of Objects

Big Idea 13: Forces and Changes in Motion

Body of Knowledge: Life Science

Big Idea 14: Organization and Development of Living Organisms

Big Idea 15: Diversity and Evolution of Living Organisms

Big Idea 16: Heredity and Reproduction

Big Idea 17: Interdependence

Big Idea 18: Matter and Energy Transformations

The numbering for the big ideas is consistent throughout the document. Not all big ideas are addressed at each grade level, so the numbering scheme is not consecutive for each grade level.

Benchmark Coding Scheme

SC.	5.	N.	1.	1
Subject	Grade Level	Body of Knowledge	Big Idea	Benchmark

Body of Knowledge Key:

N ~ Nature of Science

E ~ Earth and Space Science

P ~ Physical Science

L ~ Life Science

Access Points Coding Scheme

SC.	5.	P.	1.	In.a
Subject	Grade Level	Body of Knowledge	Big Idea	Access Point

Access Points Key:

In ~ Independent

Su ~ Supported

Pa ~ Participatory