2015

DRAFT

Oklahoma Academic Standards for Mathematics Frequently Asked Questions

Frequently Asked Questions

Oklahoma Academic Standards for Mathematics (OAS) Frequently Asked Questions and Answers will be updated as edits to OAS edits occur. This will include the Overview of Process, Legislative Requirements from 70 O.S. 11-103.6a. and other stakeholder questions. Each revised document will be dated to ensure the most current information is known.

Oklahoma State Department of Education
Academic Affairs and Planning
7/2/2015

WRITING OF NEW OKLAHOMA ACADEMIC STANDARDS
MATHEMATICS - 2015
FREQUENTLY ASKED QUESTIONS AND ANSWERS

LEGISLATION

Under House Bill 3399, which was signed into law by Governor Mary Fallin in June 2014, Oklahoma is required to create new Oklahoma Academic Standards in English language arts and mathematics by 2016. (70 O.S. § 11-103.6a. B.1.)

"On or before August 1, 2016, the State Board of Education, in consultation with the State Regents for Higher Education, the State Board of Career and Technology Education and the Oklahoma Department of Commerce, shall adopt subject matter standards for English Language Arts and Mathematics which are college- and career-ready and will replace current standards. To be considered college- and career-ready, the standards shall be evaluated by the State Department of Education, the State Regents for Higher Education, the Department of Commerce and be determined to be such that the standards will address the goals of reducing the need for remedial coursework at the postsecondary level and increasing successful completion of postsecondary education The subject matter standards and corresponding student assessments for English Language Arts and mathematics shall be solely approved and controlled by the state through the State Board of Education."

OVERVIEW

The new Oklahoma Academic Standards are being created to ensure students are prepared for higher education and the workforce that reflect Oklahoma values and principles. The standards writing process is designed to be inclusive and comprehensive, encouraging the spirit of collaboration and a healthy exchange of ideas. These standards are being created by Oklahomans for Oklahomans.

PROCESS

1. **What is the process for creating Oklahoma Academic Standards?**
   In February 2015, the Oklahoma Academic Standards Steering Committee heard testimony from three experts who shared processes for creating high-quality academic standards. These experts were:
   - Dr. Larry Gray
     - Professor of Mathematics, School of Mathematics, University of Minnesota
   - Dr. Jane F. Schielack
     - Associate Dean for Assessment and Pre-K-12 Education, College of Science, Texas A & M
   - Dr. Sandra Stotsky
     - Professor of Education Reform, Department of Education Reform, University of Arkansas

Guiding Assumptions were established:

- Follow legislative mandates (HB 3399)
- Create standards that are clear, concise, objective, measurable, and grade-level appropriate
- Recognize that standards do not require a specific teaching methodology or curriculum
- Gather input from diverse stakeholder groups

Characteristics and Outcomes of New Standards

- Prepare students for success in a college general education mathematics course
- Prepare students for success in a college entry level English language arts course
- Create standards to be assessable
- Create standards that demonstrate vertical alignment from one grade level to the next and horizontal alignment to ensure appropriate grade level placement

Criterion for a Determination of a High-Quality Standard

- Cognitive Rigor
- Horizontal and Vertical Alignment
- Concise
- Appropriate to Grade Level
- Consideration of Depth of Knowledge
- Readiness Standards (Include Foundational Content and Skills)
- Authenticity - Provide Content with Real-Life Purpose
- User friendly so that Teachers are able to implement standards effectively in the classroom

STEERING COMMITTEE

2. **Who are the members of the Oklahoma Academic Standards Steering Committee?**
   The Committee Members include:
   - General Leo J. Baxter, OSDE Board of Education member
   - Mrs. Barbara Bayless, Reading Specialist at James Griffith Intermediate in Choctaw
   - Mrs. Cathryn Franks, OSDE Board of Education member
   - State Superintendent Joy Hofmeister, Steering Committee Chair
     State Superintendent of Public Instruction
     State Board of Education Chair
     State Career Technology Board Chair
     Regional University System of Oklahoma Regent
   - Mrs. Elaine Hutchison, mathematics teacher for Fairview Public Schools
   - Chancellor Glen D. Johnson, (Juris Doctorate) Chancellor for the Oklahoma State Regents for Higher Education
   - Ms. Mautra Jones, Parent, Oklahoma City Public Schools
   - Dr. Cindy Koss, OSDE Deputy Superintendent for Academic Affairs and Planning
   - Dr. Marcie Mack, State Director of Oklahoma Career and Technology Education
   - Mr. Don Raleigh, Superintendent of Pryor Public Schools

- Ms. Deby Snodgrass, Oklahoma Secretary of Commerce and Tourism

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Dr. William Radke, Executive Director of Oklahoma Academic Standards Writing for English Language Arts and Mathematics

STANDARDS WRITING TEAMS

3. **What is the starting point for writing the Oklahoma Academic Standards?**
   The starting point for writing the Oklahoma Academic Standards is PASS 2010 which was certified by the Oklahoma State Regents for Higher Education in November, 2014.

4. **Whom do the writing teams represent?**
   The writing teams represent Oklahoma Institutions of Higher Education, classroom teachers, curriculum directors, and instructional coaches. The writing teams are experienced classroom teachers, curriculum directors, instructional coaches and representatives from Institutions of Higher Education. These individuals know and understand current standards related to what students should know and are able to do, as well as how to clearly define for teachers high-quality, rigorous standards that are user friendly. In addition, these individuals possess the knowledge of the research-based practices for effective teaching and learning, including research-based trajectories that identify what is developmentally appropriate for students. The insight and knowledge of these educators provides the foundation for developing standards so that students to be college and career ready by 12^{th} grade.

5. **What is the configuration of the writing teams?**
   The writing teams are led by co-chairs. One chair represents an Institution of Higher Education and one chair represents PK-12 education. The writing team is divided into grade bands: PK-4; 5-8; 9-12. Within the grade bands, there is a chair from an Institution for Higher Education and three to four PK-12 educators. In addition, there is a scribe for mathematics and a scribe for English language arts who collates the writing of the teams. Also, each writing group – mathematics and English language arts - has an individual from an Institution of Higher Education to provide input related to the assessment of the standards.

MATHEMATICS STANDARDS

6. **What are the vision and the guiding principles for the Oklahoma Academic Standards for Mathematics?**
   These standards envision all students in the Oklahoma will become mathematically proficient and literate through a strong mathematics program that emphasizes and engages them in problem solving, communicating, reasoning and proof, making connections, and using representations. Developing mathematical proficiency and literacy for Oklahoma students depends in large part on a clear, comprehensive, coherent, and developmentally appropriate set of standards to guide curricular decisions. The

understanding and implementation of these standards throughout the PK-12 mathematics experience for students is based on the following guiding principles:

Guiding Principle 1: *Excellence in mathematics education requires equity--high expectations and strong support for all students.*

All students, regardless of their personal characteristics, backgrounds, or physical challenges, must have opportunities to study—and support to learn—mathematics. Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students.

Guiding Principle 2: *Mathematical ideas should be explored in ways that stimulate curiosity, create enjoyment of mathematics, and develop depth of understanding.*

Students need to understand mathematics deeply and use it effectively. To achieve mathematical understanding, students should be actively engaged in doing meaningful mathematics, discussing mathematical ideas, and applying mathematics in interesting, thought provoking situations. Student understanding is further developed through ongoing reflection about cognitively demanding and worthwhile tasks.

Tasks should challenge students in multiple ways. Short- and long-term investigations that connect procedures and skills with conceptual understanding are integral components of an effective mathematics program. Activities should build upon curiosity and prior knowledge, and enable students to solve progressively deeper, broader, and more sophisticated problems. Mathematical tasks reflecting significant mathematics should generate active classroom talk, promote the development of conjectures, and lead to an understanding of the necessity for mathematical reasoning.

Guiding Principle 3: *An effective mathematics program focuses on problem solving and requires teachers who have a deep knowledge of mathematics as a discipline.*

Mathematical problem solving is the hallmark of an effective mathematics program. Skill in mathematical problem solving requires practice with a variety of mathematical problems as well as a firm grasp of mathematical techniques and their underlying principles. Armed with this deeper knowledge, the student can then use mathematics in a flexible way to attack various problems and devise different ways of solving any particular problem. Mathematical problem solving calls for reflective thinking, persistence, learning from the ideas of others, and going back over one's own work with a critical eye. Success in solving mathematical problems helps to create an abiding interest in mathematics.

Guiding Principle 4: *Technology is essential in teaching and learning mathematics.*

Technology enhances the mathematics curriculum in many ways. Technology enables students to communicate ideas within the classroom or to search for needed information. It can be especially helpful in assisting students with special needs in regular and special classrooms, at home, and in the community.

Technology changes what mathematics is to be learned and when and how it is learned. Tools such as measuring instruments, manipulatives (such as base ten blocks and fraction pieces), scientific and graphing calculators, and computers with appropriate software, if properly used, contribute to a rich learning environment for developing and applying mathematical concepts. Appropriate use of calculators is essential; calculators should not be used as a replacement for basic understanding and skills. Although the use of a graphing calculator can help middle and secondary students to visualize properties of functions and their graphs, graphing calculators should be used to enhance their understanding and skills rather than replace them.

7. **What is the standards overview for the Oklahoma Academic Standards for mathematics?**

   The Oklahoma Academic Standards for Mathematics 2015 specify what students should know and be able to do as learners of mathematics at the end of each grade level or course. Students are held responsible for learning standards listed at earlier grade levels as well as their current grade level.

   Throughout the Oklahoma Academic Standards mathematics document, the standards are written to allow time for study of additional material at every grade level. The order of the standards at any grade level is not meant to imply a sequence of topics and should be considered flexible for the organization of any course. The document provides standards for PK-7, Pre-Algebra, Algebra I, Geometry, Algebra II with Algebra I as the pre-requisite for both Geometry and Algebra II.

   The Oklahoma Academic Standards for Mathematics are developed around both content and process strands. The four main content strands: Algebraic Reasoning and Algebra, Number and Operations, Geometry and Measurement, and Data and Probability (Descriptions **Forthcoming**) organize the content standards throughout PK-7 and Pre-Algebra. The standards for Algebra I, Algebra II, and Geometry are fundamentally organized around these strands as well.

STAKEHOLDER INPUT

8. **What is available for stakeholder input for the writing of the new Oklahoma Academic Standards?**

   As required by State law, there will be many opportunities for stakeholder input. "Upon the effective date of this act, the State Board of Education shall begin the process of adopting the English Language Arts and Mathematics standards and shall provide reasonable opportunity, consistent with best practices, for public comment on the revision of the standards, including but not limited to comments from students, parents, educators, organizations representing students with disabilities and English language learners, higher education representatives, career technology education representatives, subject matter experts, community-based organizations, Native American tribal representatives and business community representatives." 70 O.S. 11-103.6a.B.2.

April and May 2015

- Prior to the writing teams beginning the writing process, there was a survey of the current PASS 2010 standards in mathematics and English language arts. These surveys were available on the Oklahoma State Department of Education Web page - Oklahoma DRAFT Standards. In addition, the surveys were sent to the education, business and community stakeholder groups for their comments. These comments were provided to the writing teams for their consideration in the writing of the new Oklahoma Academic Standards.

June 2015

- As defined by the Oklahoma Standards Steering Committee process, initial review of standards by the Oklahoma State Regents for Higher Education, Department of Career and Technology and the Department of Commerce were provided an opportunity for feedback of initial standards document.

July 2015

- Oklahoma Standards Writing Committee co-chairs for English language arts and mathematics present DRAFT standards to the Oklahoma Standards Steering Committee Meeting on July 2, 2015
- Oklahoma State Department of Education Town Hall July 7, 2015 (as part of the Engage OK Conference) at the Cox Convention Center
- OSDE Engage OK Summer Conference
- Sessions on July 8, 2015 presented by Co-Chairs for English language arts and mathematics at Cox Convention Center
- Ongoing opportunity throughout the Engage OK Summer Conference for stakeholder feedback to respond to online survey that presents DRAFT standards
- DRAFT Standards survey available on the OSDE Web site
- DRAFT Standards survey link sent to stakeholder groups throughout the State

August – December 2015

- Continuous opportunity for stakeholder feedback through surveys, presentations to diverse stakeholder groups and other means of gathering public comment as required.

STANDARDS REVIEW INFORMATION

9. **How are the standards different from the 2010 Priority Academic Student Skills?**
   The 2010 Priority Academic Student Skills provided a starting point for the development of the new high-quality, rigorous, vertically aligned standards.
   The final document for the new Oklahoma Academic Standards will include the standards by grade level, as well as providing charts with the vertical alignment within grade bands and transition grade bands.

The mathematics standards provide:
Mathematical Actions and Processes that apply to all grade levels and content areas

Concise Standards in the following areas:

- Vertical Alignment PK-12 (Based on grade bands and transition grades)
- Includes research that supports the standards

10. How are the standards different from the Common Core State Standards?

Oklahoma's Mathematics Standards were written by Oklahomans for Oklahomans. Standards identify learning required in the content areas. Similarities exist (or share content required for student success in learning) in many ways to other standards in different states and the Common Core State Standards. For example, fractions exist in all standards; multiplication and division; linear equations exist in all standards. The writing teams for the new Oklahoma Academic Standards are Oklahoma educators knowledgeable not only in content but also appropriate scaffolding of standards that builds a strong foundation for learning from PK – 12th grades.

11. How will the standards ensure that students are College and Career Ready?

The standards will identify what a student should know and be able to do to be prepared for college and career. The standards define the progression of learning from PK-12th grade that builds a foundation and progressions necessary for student success and preparation.

"To be considered college- and career-ready, the standards shall be evaluated by the State Department of Education, the State Regents for Higher Education, the State Board of career and Technology Education and the Oklahoma Department of Commerce and be determined to be such that the standards will address the goals of reducing the need for remedial coursework at the postsecondary level and increasing successful completion of postsecondary education." 70 O.S. § 11-103.6a.B.1.

CURRICULUM AND INSTRUCTION

12. What is the research base for the standards?

In addition to the practical experience and deep content knowledge of the committee members, intentional use of research for the content learning and grade level appropriateness are used. In addition, research experts and the Oklahoma Standards Committees will review and provide suggestions for the Oklahoma Academic Standards document.

The Oklahoma Academic Standards for Mathematics writing team drew on the work of the National Council of Teachers of Mathematics (NCTM) standards documents; the National Research Council's report *Adding It Up*; and the Oklahoma Priority Academic Standards (PASS) and other states' standards documents and curriculum framework

guides (e.g., Minnesota, Virginia, and Massachusetts). Please see the reference list at the end of this document for a more complete list of all resources consulted.

13. How will teachers know what curriculum to use?

The standards do not prescribe a curriculum. The local school district determines the curriculum. The local school district may use a variety of curriculum resources that support what students should know and be able to do.

"School districts shall exclusively determine the instruction, curriculum, reading lists and instructional materials and textbooks, subject to any applicable provisions or requirements as set forth in law, to be used in meeting the subject matter standards." 70 O.S. § 11-103.6a F.

14. What professional development will be provided for teachers to effectively implement the standards?

The Oklahoma State Department of Education (OSDE) will provide regional professional development in the areas of English language arts and mathematics for educators. In addition, there will be information available on the OSDE Web pages for resources and *PD on Your Plan* where Oklahoma teachers sharing best practices for implementing the Oklahoma Academic Standards.

ASSESSMENT

15. How will the new Oklahoma Academic Standards be assessed?

After standards are written, there will be input from the Oklahoma Technical Advisory Committee (TAC); Oklahoma State Regents for Higher Education; the Office of Educational Quality and Accountability (OEQA); Oklahoma State Department of Education representatives; and the Education Coalition for the next steps in determining the appropriate assessments for the new Oklahoma Academic Standards that will measure college and career readiness.

16. How will the standards be aligned to assessments?

Testing blueprints and performance level descriptors will be provided.

TIMELINE

17. What is the timeline for adopting new Oklahoma Academic Standards and aligned assessments?

"On or before the 2017-2018 school year, the State Board of Education, in consultation with the State Regents for Higher Education, the State Board of Career and Technology Education and the Oklahoma Department of Commerce, shall direct the process of the development of annual high-quality statewide student assessments for English Language Arts and Mathematics as provided for in Section 1210.508 of this title (Title 70) that

align with the college- and career-ready subject matter standards developed pursuant to subsection B of this section." 70 O.S. § 11-103.6a.C.

Year	Oklahoma Standards and Assessments Timeline
2014-2015	Priority Academic Student Skills (PASS-2010) Implemented
2014-2015	Measured Progress Assessments 3-8 OCCT and EOIs
2014-2015	Dynamic Learning Maps for Most Severely Cognitively Disabled Students
2015-2016	Oklahoma Standards Steering Committee – Chaired by State Superintendent of Public Instruction and includes Chancellor for Higher Education and State Director of Career Technology Centers
2015	Create new College- and Career-Ready Oklahoma Academic Standards in reading/language arts and mathematics
2015 (December)	Oklahoma State Board of Education approves new Oklahoma Academic Standards in English language arts and mathematics
2015-2016	Priority Academic Student Skills (PASS – 2010) Implemented
2015-2016	Oklahoma State Regents for Higher Education **Certify** new CCR Oklahoma Academic Standards
2016	Legislative Approval of new CCR Oklahoma Academic Standards
2016-2017	Implement new CCR Oklahoma Academic Standards
2016-2017	Assessments for PASS (2010) continues and Field Test aligned assessment items to newly created CCR Oklahoma Academic Standards
2017-2018	Implement new CCR Oklahoma Academic Standards
2017-2018	Aligned Assessments to new CCR Oklahoma Academic Standards

MATHEMATICAL ACTIONS AND PROCESSES

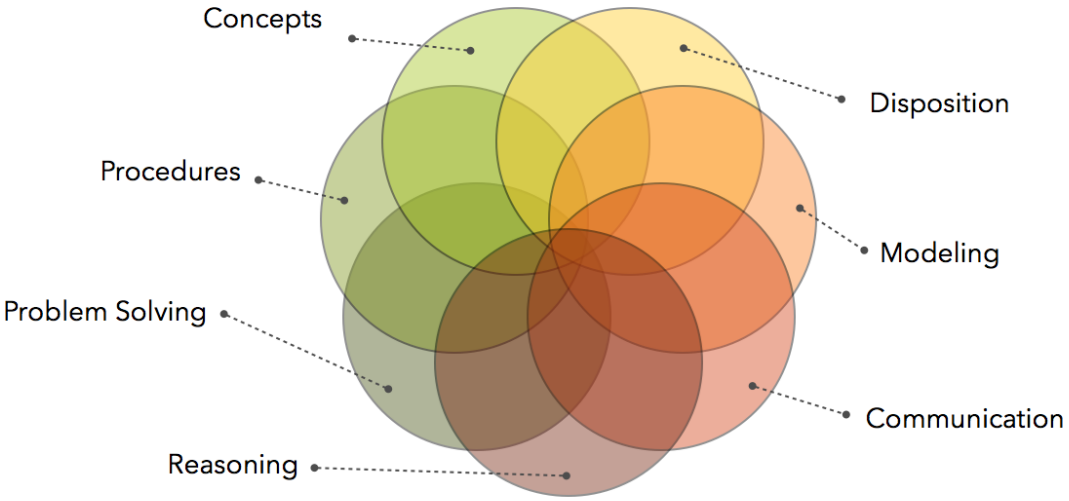
18. How are mathematical processes addressed in the new Oklahoma Academic Standards?

The Priority Academic Student Skills have long utilized the Mathematical Processes laid out in Principles and Standards for School Mathematics (2000). These Process Standards include Problem Solving, Reasoning and Proof, Communication, Connections, and Representations.

In 2001, the National Research Council release their landmark report, "Adding it Up: Helping Children Learn Mathematics," where they identified the expertise, competence, knowledge, and faculty that define what it means to be mathematically proficient. They argued that mathematical proficiency has five strands: (1) conceptual understanding, (2) procedural fluency, (3) strategic competence, (4) adaptive reasoning, and (5) productive disposition.

In consideration of how Adding it Up has informed the mathematics community on the significance of not only the processes, but also the student actions that lead to a developed mathematical proficiency, the new Mathematics Actions and Processes combine both into one set of standards for all Oklahoma students. These Mathematical

Actions and Processes are all connected to one another, as shown in the image below. To highlight their critical importance in the new Oklahoma Academic Standards, they are restated on each page and the image is used as a reminder throughout.



Throughout their PK-12 education experience students, mathematically literate students will:

Develop a Deep and Flexible *Conceptual* Understanding
Pursue a deep and flexible conceptual understanding of mathematical concepts, operations, and relations while making mathematical and real-world connections.

Develop Accurate and Appropriate *Procedural* Fluency
Pursue efficient procedures for various computations and repeated processes based on a strong sense of numbers. They will develop a sophisticated understanding of the development and application of algorithms and procedures.

Develop Strategies for *Problem Solving*
Analyze the parts of complex mathematical tasks and identify entry points to begin the search for a solution. They will select from a variety of problem solving strategies and use corresponding multiple representations (verbal, physical, symbolic, pictorial, graphical, tabular) when appropriate. They will pursue solutions to various tasks from real-world situations and applications that are often interdisciplinary in nature. They will find methods to verify their answers in context and will always question the reasonableness of their solutions.

Develop Mathematical *Reasoning*
Explore and communicate a variety of reasoning strategies to think through problems. They will apply their logic to critique the thinking and strategies of others to develop and evaluate mathematical arguments, including making arguments and counterarguments and making connections to other contexts.

Develop a Productive Mathematical *Disposition*
Hold the belief that mathematics is sensible, useful and worthwhile. They will develop the habit of looking for and making use of patterns and structures. They will persevere and become resilient problem solvers.

Develop the Ability to Make Conjectures, *Model,* and Generalize
Make predictions and conjectures and draw conclusions throughout the problem solving process based on patterns and the repeated structures in mathematics. They will create, identify, and extend patterns as a strategy for solving and making sense of problems.

Develop the Ability to *Communicate* Mathematically
Develop the ability to communicate mathematically. They will discuss, write, read, interpret and translate ideas and concepts mathematically. As they progress, students' ability to communicate mathematically will include their increased use of mathematical language and terms and analysis of mathematical definitions.