

Vision and Guiding Principles

These standards envision all students in 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. Mathematically proficient and literate students can confidently and effectively use mathematics concepts, computation skills, and numbers to problem-solve, reason and analyze information. 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 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 and engage students in mathematics 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.

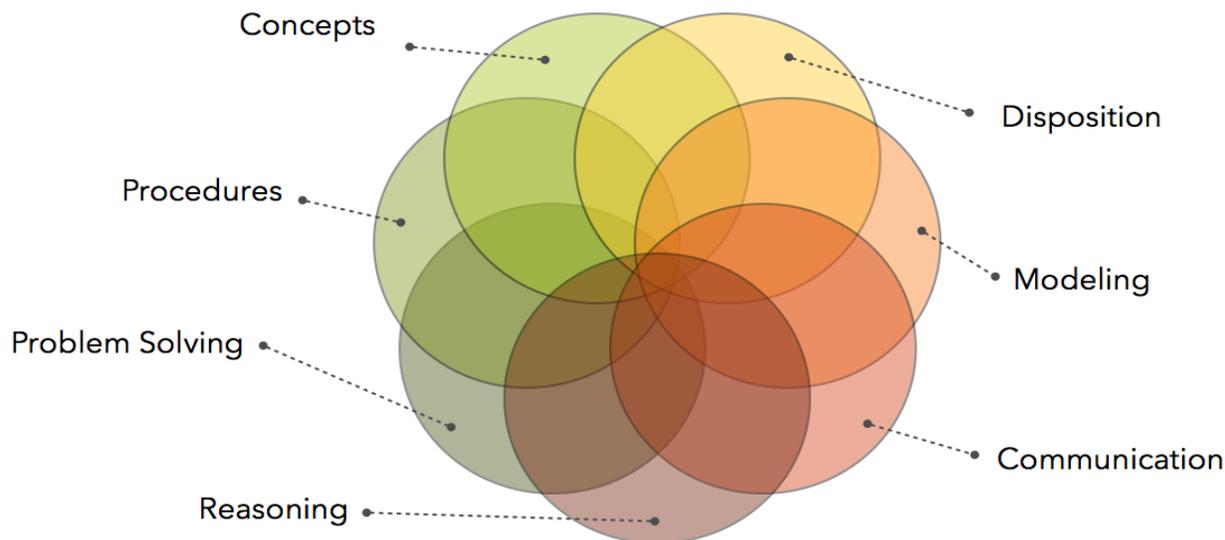
Mathematical problem solving is the hallmark of an effective mathematics program. Skill in mathematical problem solving requires practice with a variety of mathematical problems as well as a firm grasp of mathematical techniques and their underlying principles. Students who possess a deeper knowledge of mathematics 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.



Mathematical Actions & Processes



Throughout their Pk-12 education experience, 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 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 mathematical structures. They will persevere and become resilient, effective 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.

