

# Tulsa Public Schools Plan for Improving Student Achievement in Math

## *Tulsa COUNTS!*

### Executive Summary

While the *Tulsa Model for School Improvement* is the overall framework for improving student achievement in Tulsa Public Schools, *Tulsa COUNTS!* defines specific strategies and approaches that will improve student achievement in mathematics. This district-wide math initiative will provide the opportunity for all students to receive high-quality mathematics learning experiences every day.

*Tulsa COUNTS!* involves the following priorities:

- Improve the academic performance of all students;
- Standardize the comprehensive mathematics program to meet the needs of a mobile and diverse student population;
- Standardize assessment as part of the comprehensive mathematics program;
- Provide teacher training grounded in research-based best practices; and
- Promote parental involvement and community support.

Instruction will begin with grade-appropriate basic skills in the early years and build toward mastery of more complex skills, problem-solving, and conceptual understanding in the latter years. Four grade-related stages have been identified for establishing instructional goals and standards in mathematics.

Tulsa Public Schools offers a resource to teachers, called the Aligned Teaching Units (ATUs) for required reading and math courses for all grade levels. ATUs provide the pacing guidelines for instruction, and correlate to the progress-monitoring TPS Benchmark Tests administered throughout the school year to students in reading and math. The ATUs also provide indicators for instructional resource options that align with the tested PASS objectives found in both the TPS Benchmark Tests as well as the end-of-year criterion-referenced tests required by the State of Oklahoma for all public school students at designated grade levels.

#### Pre-Kindergarten through Grade Two

- The concepts and skills related to numbers and operations are a major emphasis at this level.
- Teachers will help students strengthen their sense of number, moving from basic counting techniques to a high level of understanding about the size of numbers, number relationships, operations, and place value.
- Students' work with numbers will be connected to their work with other mathematics topics.
- Teachers will encourage students to demonstrate and deepen their understanding of numbers and operations by solving interesting, contextualized problems and by discussing the representations and strategies they use.
- All students will benefit from the use of high-quality programs that include mathematics presented in a manner that respects both the subject and the developmental nature of children.

### **Grades Three through Five**

- By the end of this time period, students will be computing fluently with whole numbers.
- As students move from third to fifth grade, they will consolidate and practice a small number of computational algorithms for addition, subtraction, multiplication, and division that they understand well and can use routinely.
- Teachers will create classroom environments that will help students learn to work together as part of a mathematical community of learners, valuing students' ideas and encouraging the learning of mathematics with meaning. Mistakes will be viewed as opportunities for learning.
- The teacher lays the groundwork for students to be respectful listeners, valuing and learning from one another's ideas.

### **Grades Six through Eight**

- In the middle grades, students will continue to develop and improve the operations of addition, subtraction, multiplication, and division, using increasingly difficult materials.
- The overriding goal of mathematics problem-solving activities incorporated into the curriculum is to foster active, engaged, and independent thinkers.
- Students will learn significant amounts of algebra and geometry and will see them as interconnected with each other and with other content areas in the curriculum.

### **Grades Nine through Twelve**

- Students will develop an understanding of the system of real and complex numbers, will understand the difference between rational and irrational numbers, and will understand the development of imaginary numbers and their use in science exploration.
- Students will be able to explore new systems such as vectors and matrices, and will be able to determine a suitable strategy for computation from a variety of methods and types of results.
- Students will learn more varied and sophisticated problem-solving techniques, including the concepts of statistics and probability, providing them ways to think critically about a wide range of issues that have important social implications.
- Students will develop increased abilities for justifying claims, proving conjectures, and using symbols in reasoning.
- Students will develop facility with such technological tools as electronic spreadsheets, data-gathering devices, computer algebra systems, and graphing utilities, all of which will help students interpret, analyze, and evaluate data.

Schools and classrooms in which high quality mathematics instruction is taking place will have the following elements present:

Students will:

- Be actively engaged in the learning process
- Use existing mathematical knowledge to make sense of the task
- Make connections among mathematical concepts
- Reason and make conjectures about the problem
- Communicate their mathematical thinking orally and in writing
- Listen and react to others' thinking and solutions to problems
- Use a variety of representations, such as pictures, tables, graphs, and words, for their mathematical thinking
- Use mathematical and technological tools, such as physical materials calculators, and computers, along with textbooks and other instructional materials
- Build new mathematical knowledge through problem solving.

Teachers will:

- Use the Standard District Curriculum (ATUs) to guide their unit and lesson planning
- Use the TargetFundamentals™, TargetStrategies™, and PAL Packets™ as appropriate
- Choose “good” problems-ones that invite exploration of an important mathematical concept and allow students the chance to solidify and extend their knowledge
- Assess students’ understanding by listening to discussions and asking students to justify their responses
- Use questioning techniques to facilitate learning
- Encourage students to explore multiple solutions
- Challenge students to think more deeply about the problems they are solving and to make connections with other ideas within mathematics
- Create a variety of opportunities, such as group work and class discussions, for students to communicate mathematically
- Model appropriate mathematical language and a disposition for solving challenging mathematical problems
- Create a classroom climate built on the expectation of high achievement by all students
- Help families understand the goals of the curriculum and instructional strategies being utilized in the classroom
- Engage in sustained and ongoing professional development that is tied to the curriculum and that increases the teacher’s mathematics and pedagogical knowledge
- Promote the importance of learning mathematics with understanding to families and students

The principal will:

- Create a school climate build on the expectation of high achievement by all students
- Ensure Standard District Curriculum (ATUs) along with TargetFundamentals™, TargetStrategies™, and PAL Packets™ as appropriate are the guiding document in teachers’ unit and lesson planning
- Energize teachers and students in ways that challenge current expectations
- Evaluate the processes for placing students in mathematics classes to ensure that groups of students are not being excluded from a challenging mathematics program
- Work with teachers to select instructional materials, establish processes that involve teachers and teacher-leaders and that provide for a careful analysis of these materials
- Set up a program in the school to allow for articulation across the grades as well as from elementary school to middle school to high school
- Help families understand the goals of the curriculum
- Provide access to resources and instructional materials that support the curriculum
- Support sustained and ongoing professional development that is tied to the curriculum and that increases the teachers’ mathematical and pedagogical knowledge
- Support teachers in self-evaluation and in analyzing, evaluating, and improving their teaching with colleagues and supervisors
- Arrange teachers’ work schedule so that meaningful collaboration with colleagues is part of the school day
- Establish teacher leaders or mathematics specialists who can mentor and support teachers
- Spend time observing mathematics classrooms
- Recruit qualified teachers of mathematics
- Make teaching assignments on the basis of the qualifications of teachers
- Promote and support your teachers attendance at professional conferences

- Attend professional development sessions designed to help administrators understand the goals of mathematics instruction
- Ensure that sufficient time is allocated for mathematics instruction
  - Elementary school students should study mathematics for at least an hour a day under the guidance of teachers who enjoy mathematics and are prepared to teach it well
  - Middle school and high school students should study the equivalent of a full year of mathematics in each grade
- Promote the importance of learning mathematics with understanding to teachers and families
- Develop a plan to identify and support students who are struggling in mathematics.

Note: The above information is taken from:

Mirra, Amy J. *Administrator's Guide: How to Support and Improve Mathematics Education in Your School*. NCTM and ASCD: Reston, 2003.