

## General Introduction

Mathematics is a basic component of every student's education. In today's ever-changing technological and global society we need citizens who can problem solve and think critically in order to be competitive and successful in the 21<sup>st</sup> century. Thus we must produce students who are capable of becoming life-long learners and responsible adults. Therefore, students must develop a deep understanding of mathematical concepts and possess a strong foundation of number sense in order to become proficient in mathematics. The Nevada Mathematics Standards are intended to provide the framework for a comprehensive K-12 mathematics program and are intended to guide curriculum, instruction, and assessment as well as other policies and practices that affect student learning. They will serve as a foundation for teachers and curriculum specialists as they create curriculum and adopt teaching practices relevant to the needs, strengths, and diversity of Nevada's students and communities. The standards will also provide clear direction for meaningful pre-service and in-service professional development. In essence, the standards will help Nevada's school districts build cohesive and comprehensive systems for ensuring that all students achieve at high levels.

The newly revised Nevada Mathematics Standards connect the Process and Content Standards. The Process Standards describe the process in which students should learn mathematics and engage in mathematical thinking. The Content Standards outline the big mathematical ideas that all students should know and be able to do at each grade level. The relationship between the Process and Content Standards is critical. It is the combination of these two standards that will give students mathematical power. Neither will develop mathematically proficient students when used in isolation. The standards emphasize the importance of teaching mathematics within the context of its application so students can compute and use computational skills to reason and problem solve. Teachers are expected to use instructional practices that provide opportunities for students to experience both Process and Content Standards on a regular basis.

The **Nevada Process Standards** include Problem Solving, Mathematical Communication, Mathematical Reasoning, and Mathematical Connections. The **Nevada Content Standards** include Numbers, Number Sense and Computation; Patterns, Functions and Algebra; Measurement; Spatial Relationships, Geometry and Logic; and Data Analysis.

The goal of the 2006 Nevada State Board adopted Mathematics Standards is to provide ***all*** students the opportunity to develop the ability to solve problems, communicate ideas and strategies, and to apply these skills to real world situations. The implementation of a standards-based math curriculum will support this overarching goal of assuring that all children have high quality educational experiences that prepare them to fully participate as informed, productive citizens in the 21<sup>st</sup> century.

## Introduction for the Nevada Mathematics Achievement Indicators

The Nevada Achievement Indicators in Mathematics are intended to supplement and expand the understanding of the Content and Process Standards. The standards in the individual subject areas are intended to provide a description of the knowledge and skills that all students in the state should know and be able to do by the time they graduate from high school in Nevada. The Achievement Indicators (previously called the Performance Standards) are intended to provide descriptions of what the work of proficient students looks like relative to the content benchmarks.

The descriptions found in the Achievement Indicators documents are organized around the framework provided by the content standards and grade level theme indicators. For each of the standards and grade level theme indicators, the descriptions of student work are separated into four general categories of proficiency based on the reporting categories used in the state's accountability reporting system. For each content standard within a grade level (i.e., 3, 4, 5, 6, 7, 8, 9-12) the achievement indicators are arrayed in a table with 5 columns: the first column contains the content grade level theme indicator, the other columns describe student work at the four levels of achievement: Emergent/Developing, Approaching Standard, Meeting Standard, and Exceeding Standards. An example of the tables found in the Achievement Indicators is included below:

<u>Content Standard 3.0</u>				
Students will use appropriate tools and techniques of measurement to determine estimate, record, and verify direct and indirect measurements to solve problems, communicate, reason and make connections within and beyond the field of mathematics.				
Content Benchmark	Work at the <b>Emergent/Developing</b> level may indicate ...	Work at the <b>Approaches</b> level may indicate ...	Work at the <b>Meets</b> level demonstrates ...	Work at the <b>Exceeds</b> level demonstrates ...
3.4.3 Define and determine the perimeter of polygons and the area of rectangles, including squares.	difficulty understanding the concepts of perimeter and area.	an ability to recognize a difference between perimeter and area of rectangles, including squares.	ability to define and determine the perimeter of polygons and the area of rectangles, including squares (with a grid).	ability to define and determine the perimeter of polygons and the area of rectangles without the use of a grid.

## **Achievement Level Definitions**

Nevada state-level assessments measure the knowledge and skills of students by sampling identified standards within mathematics at the grade level assessed. Achievement level definitions describe the quality of a student's response on the Nevada state-level assessments in relation to the Nevada Mathematics Standards. Evidence includes responses to a combination of multiple-choice items and items requiring student-created responses (Constructed Responses) in an "on demand" setting. The following are the general definitions of the Nevada Achievement Levels:

**Exceeds** – The student's work demonstrates in-depth understanding of essential concepts in mathematics, including the ability to make multiple connections among central ideas. The student's responses demonstrate the ability to synthesize information, analyze and solve difficult or unfamiliar problems, and apply complex concepts.

**Meets** – The student's work demonstrates an understanding of essential concepts in mathematics, including the ability to make connections among central ideas. The student's responses demonstrate the ability to reason, analyze and solve problems, and apply concepts.

**Approaches** – The student's work demonstrates incomplete understanding of essential concepts in mathematics and inconsistent connections among central ideas. The student's responses demonstrate some ability to analyze and solve problems, and apply concepts.

**Emergent/Developing** – The student's work demonstrates limited understanding of essential concepts in mathematics and infrequent or inaccurate connections among central ideas. The student's responses demonstrate minimal ability to solve problems and/or apply concepts.

### **Special Notes:**

1. **Glossary Note:** At the end of the grade level explanations on the web there is an expanded mathematics glossary. The same word from the standards are included with the addition of terms used to describe student work and the grade level mathematical terms all students should be familiar and have an understanding of their definition and use in mathematical communication. The Glossary will be added by April 2008.
2. **Student Work:** At the current time, the Nevada Department of Education is collecting student work samples to be assembled in a binder for districts to use in professional development trainings and workshops. Once this is completed the four RPDP sections and each individual district math content leader will receive notification.
3. **Grade K – 2:** Description and student work is being collected and completed by committee members currently and should be available by Fall 2008.