



**Vision for  
Mathematics P-12  
2006 to 2011**

*Boulder Valley School District*

*October 15, 2006*



## INTRODUCTION

“The vision of the Boulder Valley School District is to graduate students in the New Century who have the knowledge, skills and personal characteristics that will prepare them for the challenges they will encounter as adults. In addition to skills and knowledge in reading, mathematics, writing, and speaking, New Century Graduates will possess a multicultural and global perspective, including bilingual competencies. New Century Graduates’ personal characteristics will include respect for others, initiative, creativity, ethical behavior and other characteristics that will enable them to become contributing members to society.” (Boulder Valley Schools, 2002)

This vision statement for the New Century Graduate, representing the collective perspective of the Boulder Valley community, identifies the skills, knowledge and personal characteristics that represent the expectation for all Boulder Valley School District (BVSD) graduates. The identification of “mathematical knowledge and skills” in this vision affirms the high value that the community places on mathematical proficiency for our students. In particular, the vision states that New Century Graduates will “demonstrate basic math computational skills and understand higher-level mathematical concepts and reasoning.”

With the inception of a Mathematics Department in BVSD in 2005-06, an opportunity arose to express a more specific vision for the mathematical proficiencies and dispositions of Boulder Valley graduates, along with the core beliefs in which this vision is rooted. This vision was built from the collective perspective of teachers, principals, district leadership, and representatives from the community. It was informed by research and literature from national leaders and organizations committed to the improvement of mathematics education.

This document is intended to express that vision in order to clarify the expectations BVSD has for the mathematical competencies of all its graduates. It is also intended to provide a framework for the actions needed to attain these expectations.

## METHODOLOGY

The BVSD Mathematics Department initiated a collective inquiry into a vision for mathematics teaching and learning in October 2005. The inquiry was designed to seek input from teachers, administrators, and the community, while at the same time gathering information on research and current directions in mathematics education nation-wide and world-wide.

Inquiry began with a process by which all school-based mathematics teacher leaders and building principals K-12 analyzed the current reality in their schools around the goals of increasing student achievement and reducing the achievement gap in mathematics K-12. They did so by identifying the most important successes and most critical challenges they faced in meeting these goals. They also explored these key areas further to reveal some of the underlying factors to consider when setting a district-wide direction in mathematics.

Following this initial inquiry, the BVSD Mathematics Department engaged in a visioning process to identify key values to guide the teaching and learning of mathematics in BVSD. Value statements were adapted and combined from a variety of

publications from national leaders and leadership organizations in mathematics education\* and then prioritized based on common and recurring themes from the initial inquiry of principals and teacher leaders. The Mathematics Department further identified vision statements for each of these values to answer the question, “What will this value look like when it is fully implemented into practice within five years?”

These values and vision statements were then brought back to teacher leaders and principals for review and revision to ensure they captured the key values defined in the initial inquiry.

Finally, the Mathematics Department identified a set of action priorities to provide district-wide support in mathematics based on the values and goals that were established. For each action priority, a more detailed set of specific strategies was developed to further clarify support that the Mathematics Department would provide. The overall vision was further informed and refined by input from the larger Boulder Valley community through a community engagement process facilitated by the Mathematics Education Collaborative in the fall of 2006.

This visioning process represented an adaptation of the Tools of Inquiry for Equitable Schools (TIES) model for continuous improvement that is being implemented in each BVSD school. In each subsequent year following the development of this five-year vision, the Mathematics Department will engage in a structured TIES process to develop an annual Department Improvement Plan with specific goals and timelines for the school year. The values and action priorities from this document will be instrumental in that annual process.

## MATHEMATICS VISION FOR BOULDER VALLEY GRADUATES

Boulder Valley graduates will demonstrate proficiency in five intertwining strands that constitute mathematical proficiency (National Research Council, 1999):

1. *Conceptual understanding – comprehension of mathematical concepts, operations, and relations*
2. *Procedural fluency – skill in carrying out procedures flexibly, accurately, efficiently, and appropriately*
3. *Strategic competence – ability to formulate, represent, and solve mathematical problems*
4. *Adaptive reasoning – capacity for logical thought, reflection, explanation, and justification*
5. *Productive disposition – habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy*

Graduates will also understand the role that mathematics plays in nature, society, and culture. As a result, they will be able to act on that mathematical understanding with well-founded, ethical judgment in their personal lives, occupational lives, social lives, and as constructive, creative, concerned, and reflective citizens. (de Lange, 1999)

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\* Note: Value statements were adapted from the National Council of Teachers of Mathematics (NCTM, 2000), National Research Council (NRC, 2001; NRC, 2002), TERC (Mokros, Russell & Economopoulos, 1995), Mathematics Education Collaborative (Parker, 1993), and the Education Development Center (Goldsmith, Mark & Kantrov, 1998).

**Framework for  
BVSD Mathematics Support P-12  
2006-2011**



## CORE VALUES ABOUT MATHEMATICS IN BVSD

The vision of mathematical proficiency for Boulder Valley graduates is built on the foundation of a core set of beliefs about mathematics education in BVSD. These beliefs focus on equity, teaching and learning, collaboration, and curriculum as related to mathematics instruction. They are rooted in the specific needs and realities in the Boulder Valley School District identified by teachers and administrators as well as the research-based findings set forth by the National Council of Teachers of Mathematics (NCTM), the National Research Council (NRC), TERC, the Mathematics Education Collaborative (MEC), and the Educational Development Center (EDC) (see footnote on page 2).

Associated with each of these core values is a vision for a “desired state,” which will guide the work of all stakeholders over the next five years. With a common vision for what is possible in our district, in our schools, and with our students, we can focus our work together on these shared goals. As such, all district initiatives and school-based work can be built around a common, coherent plan of improvement for the teaching and learning of mathematics P-12, with the ultimate goals of improving student achievement and reducing the achievement gap in our district.

### **Value #1: Equity**

*All students can learn mathematics as a result of high expectations and strong support designed to meet the needs of individual learners.*

<b>Vision of Equity</b>
1. A common understanding of high expectations guides teachers to engage all students at the highest level of mathematics possible for all students.
2. Instruction is differentiated so that all students can build proficiency in the same set of standards.
3. Teachers engage in opportunities to build their knowledge, skills, and capacity to meet the needs of <i>all</i> learners, including students with special needs, English language learners, and Hispanic English-home-language students.

### **Value #2: Collaboration**

*Learning is enhanced in a dynamic, collaborative culture that encourages reflection, analysis, risk-taking, and mathematical capacity building.*

<b>Vision of Collaboration</b>
1. The math community of teachers, administrators, parents, students, and the public share a set of common beliefs about the teaching and learning of mathematics, and work together to meet the needs of the 21 <sup>st</sup> Century Graduate.
2. Built-in, consistent structures exist for reflection, analysis, planning, and professional development around the teaching and learning of mathematics.
3. Collaboration builds a coherent mathematics program within grade-levels, within schools, and vertically across grade levels P through 12.

### **Value #3: Learning with Understanding**

*Learning mathematics with understanding occurs when students are challenged to actively build new concepts from prior knowledge while engaging in worthwhile and developmentally appropriate tasks.*

#### **Vision of Learning with Understanding**

1. Students are actively engaged in constructing their own mathematical knowledge through meaningful, contextually-based learning activities and the reflective communication of their reasoning.
2. Multiple, flexible approaches to problem-solving are valued and encouraged.
3. Instruction is continually informed by an appropriate use of data from formative and summative assessments that are aligned with curriculum.
4. Appropriate intervention is provided for students with identified gaps in mathematical understanding.

### **Value #4: Guaranteed Viable Curriculum**

*Mathematical proficiency requires implementation of a guaranteed, viable curriculum that focuses on meaningful mathematics, is based on standards, and is well articulated across all grade levels P-12.*

#### **Vision of a Guaranteed Viable Curriculum**

1. Curriculum is viable: It is well-defined, usable and accessible to teachers, organized around a core set of enduring understandings, and teachable within a guaranteed and sufficient amount of time dedicated to mathematics instruction.
2. Curriculum is guaranteed: All teachers are implementing a coherent curriculum P-12, which is aligned to standards and defines the essential learning results (ELRs) that *all* students are expected to meet.
3. All students receive developmentally appropriate mathematics instruction consistent with a well-developed district policy for student grouping, acceleration and placement.
4. Assessment of student learning is designed to inform the differentiation of instruction in the classroom and guarantee the opportunity of success for *all* students in the curriculum

## **ACTION PRIORITIES**

The mathematics program in Boulder Valley Schools will work toward attaining the district vision for equity, teaching and learning, collaboration, and curriculum in order to raise student achievement and lower the achievement gap. A set of action priorities has been prioritized by the BVSD Mathematics Department to provide the overarching direction for meeting these goals. Specific strategies are also being implemented to accomplish these priorities and are listed under each. It is important to note that, as part of a district model for continuous improvement as supported by the Tools of Inquiry for Equitable Schools (TIES) process, these strategies will be re-evaluated annually over the next five years in response to an on-going study of data and research about student learning in mathematics, both within BVSD and in the broader educational community.

1. *Learning Communities:* Build a collaborative professional learning community around mathematics within schools, between schools, and throughout the school district.
  - Advocate for building in time for teachers to collaborate around teaching practices and student learning in mathematics P-12.
  - Train district and school-based mathematics leaders to support on-going, school-based professional learning
  - Support school-based professional learning communities in their development common curriculum plans and assessments, their collaborative sharing of differentiation and intervention strategies, their enhancement of instructional practices, and their advancement of teacher content knowledge
  - Build administration leadership expertise around mathematics instruction P-12
2. *Instruction and Assessment:* Provide appropriate mathematics instruction, intervention support, and extensions to learning that are informed by effective assessment practices.
  - Advocate for sufficient instructional time in mathematics district-wide
  - Enhance middle-level assessment and instructional best practices through CDE Math/Science Partnership grant
  - Administer Add+Vantage Math<sup>®</sup> assessments for number sense K-5
  - Scale up implementation of Add+Vantage Math<sup>®</sup> and Math Recovery<sup>®</sup> programs for early assessment and intervention in mathematics district-wide
  - Integrate high-quality mathematics instructional technology district-wide
  - Facilitate the on-going development of district-wide set of assessment tools and strategies
  - Provide adoption support for *Investigations*, *Connected Mathematics Project*, and *Carnegie Mathematics* programs
3. *Community Engagement:* Engage parents, the Boulder Valley School District, and the community at large in the district vision for mathematics.
  - Build partnerships with local universities, businesses, community organizations, and existing district committees to integrate community perspectives and resources into all aspects of meeting mathematics goals
  - Initiate and sustain a mathematics community engagement program to build broader support for the direction of BVSD mathematics
  - Provide district-wide support for on-going school-based parent events in mathematics

4. *Professional Development*: Support sustained professional learning in mathematics instruction through the following professional development programs, as well as others that may be developed in the future to support BVSD mathematics goals:
- *Investigations* initial training
  - Collaborative Learning in Elementary Mathematics (CLEM) sessions to promote lesson study among grade-level teachers K-5
  - Add+Vantage Math<sup>®</sup> initial training and on-going support for assessment and differentiation in early number sense
  - Math Recovery<sup>®</sup> training for early intervention
  - Mathematics content mini-courses to enhance teacher content expertise
  - Boulder Partnership for Excellence in Mathematics Education (BPEME) professional development for middle-level mathematics teachers
  - Counting On!<sup>®</sup> initial training and on-going support for middle-level assessment and differentiation in number sense
  - *Connected Mathematics* middle-level instructional materials initial training
  - *Carnegie Algebra* secondary instructional materials initial training and experienced user training
  - “Theory to Practice” inquiry-based professional development around how secondary students learn mathematics
  - Coaching support for teachers in high-needs schools
  - Integration of culturally proficient teaching practices and support strategies for language learners into *all* professional learning opportunities described above
5. *Curriculum Inquiry*: Develop a continuous improvement model for a coherent mathematics curriculum P-12.
- Support schools in implementation of a coherent program of mathematics instruction P-12
  - Engage in on-going improvement of mathematics curriculum P-12 through Curriculum Inquiry Task Forces
  - Connect essential learning results in the curriculum to adopted instructional materials
  - Integrate cultural relevance and support for English language learners (e.g., key ELL vocabulary) into curriculum revisions
  - Support curriculum mapping and vertical articulation of mathematics through vertical teams in feeder systems
  - Examine possible revisions to the district graduation requirements in BVSD mathematics and explore the secondary course pathways necessary for students to meet those requirements

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