



Directions in BVSD Mathematics P-12

District Accountability Committee
February 6, 2007

Tim Stoelinga
Curriculum Director for Mathematics P-12

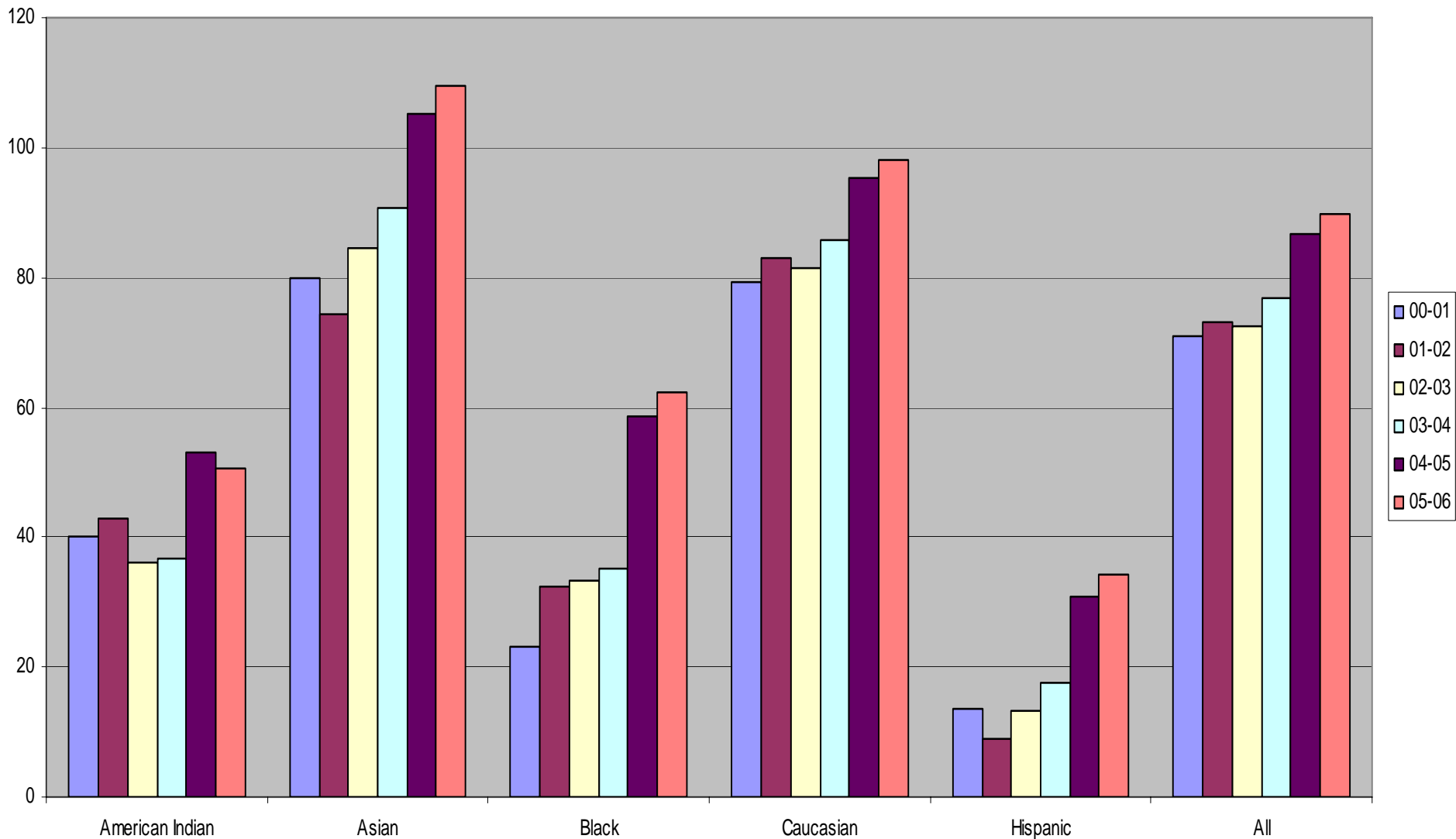


Objectives

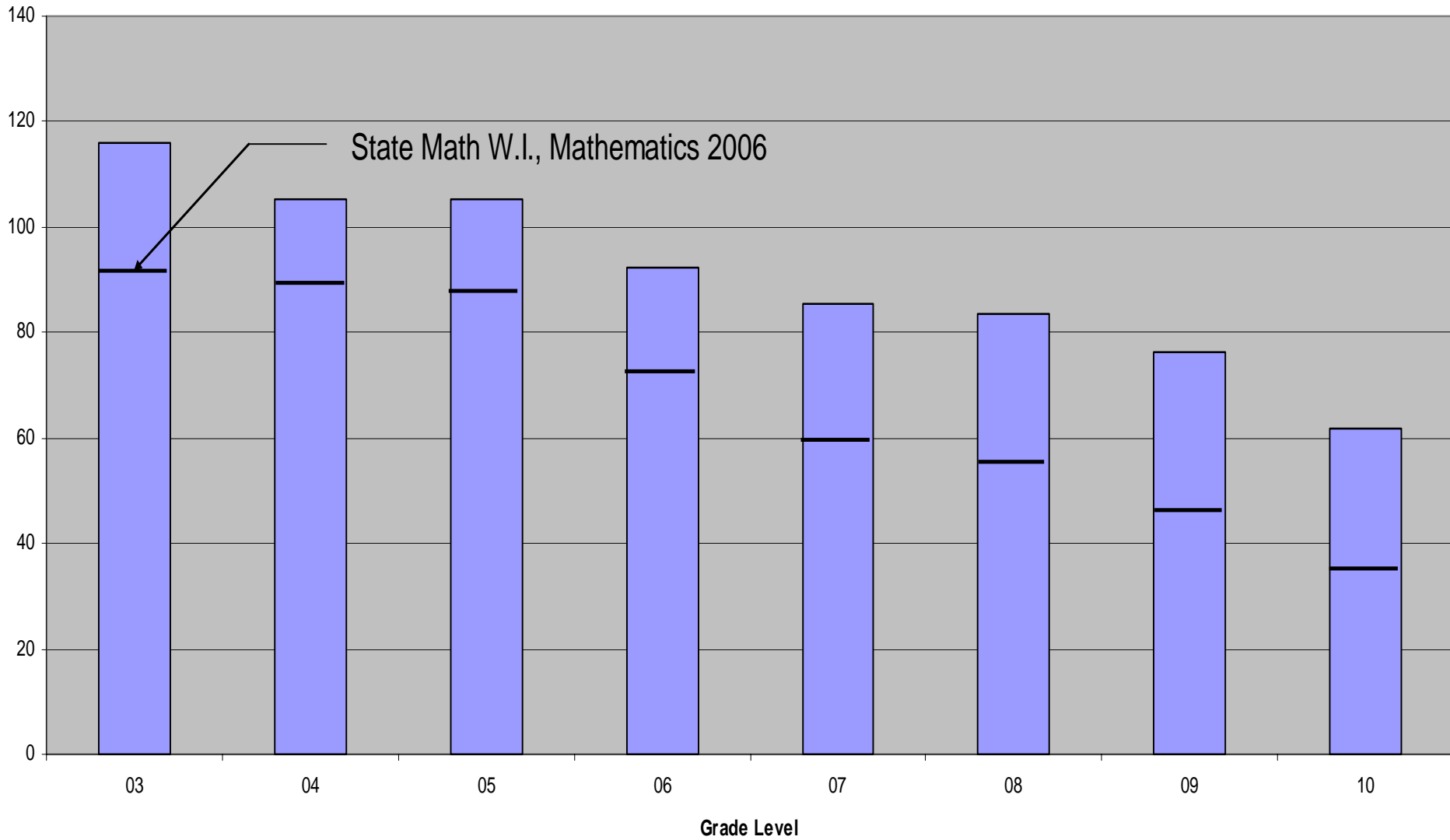
1. What do the data tell us?
2. A vision for mathematics P-12
 - What does proficiency look like?
 - Core values
 - Action priorities
3. Questions, answers, and next steps



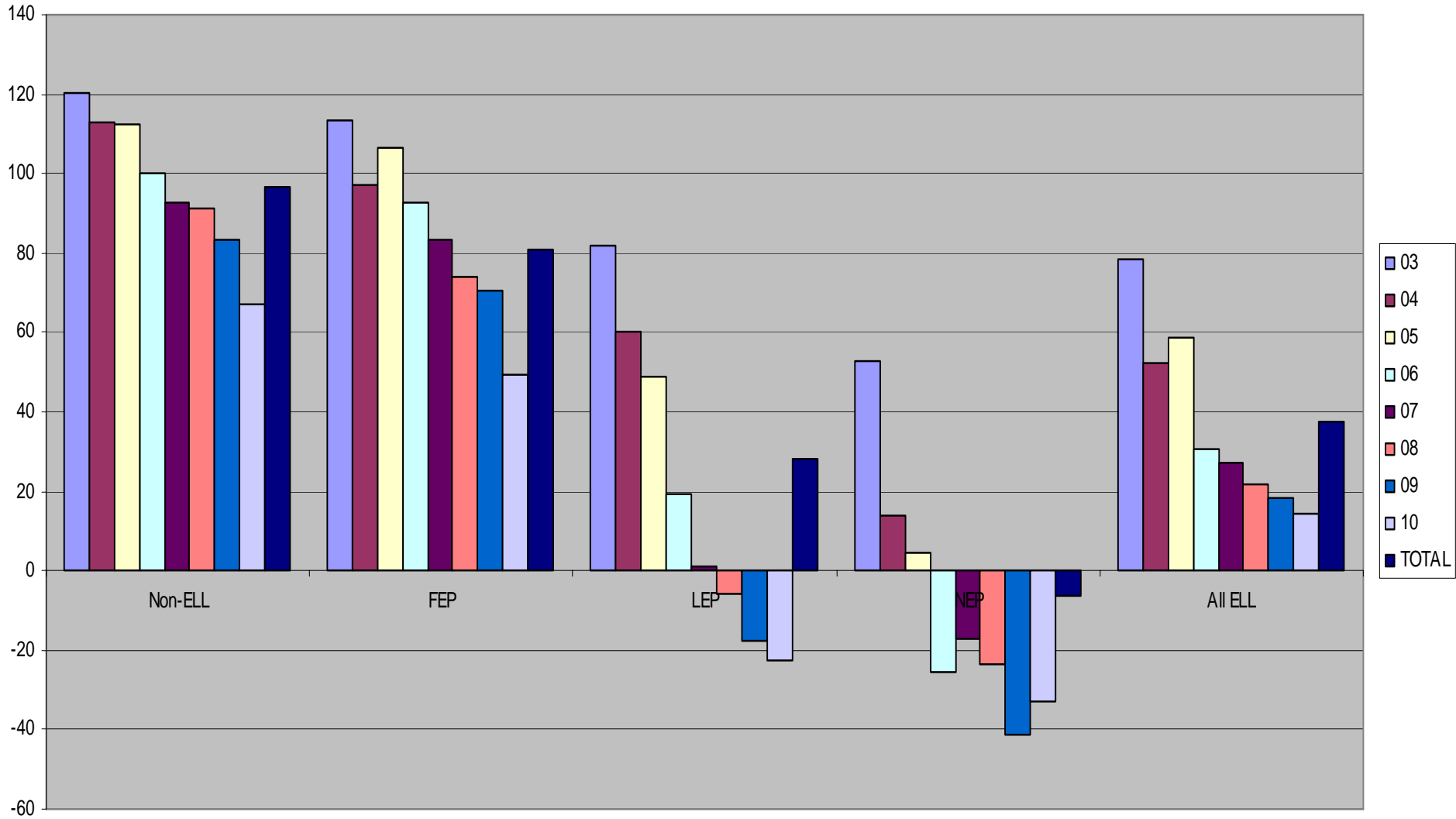
Overall W.I. by Ethnicity and Year



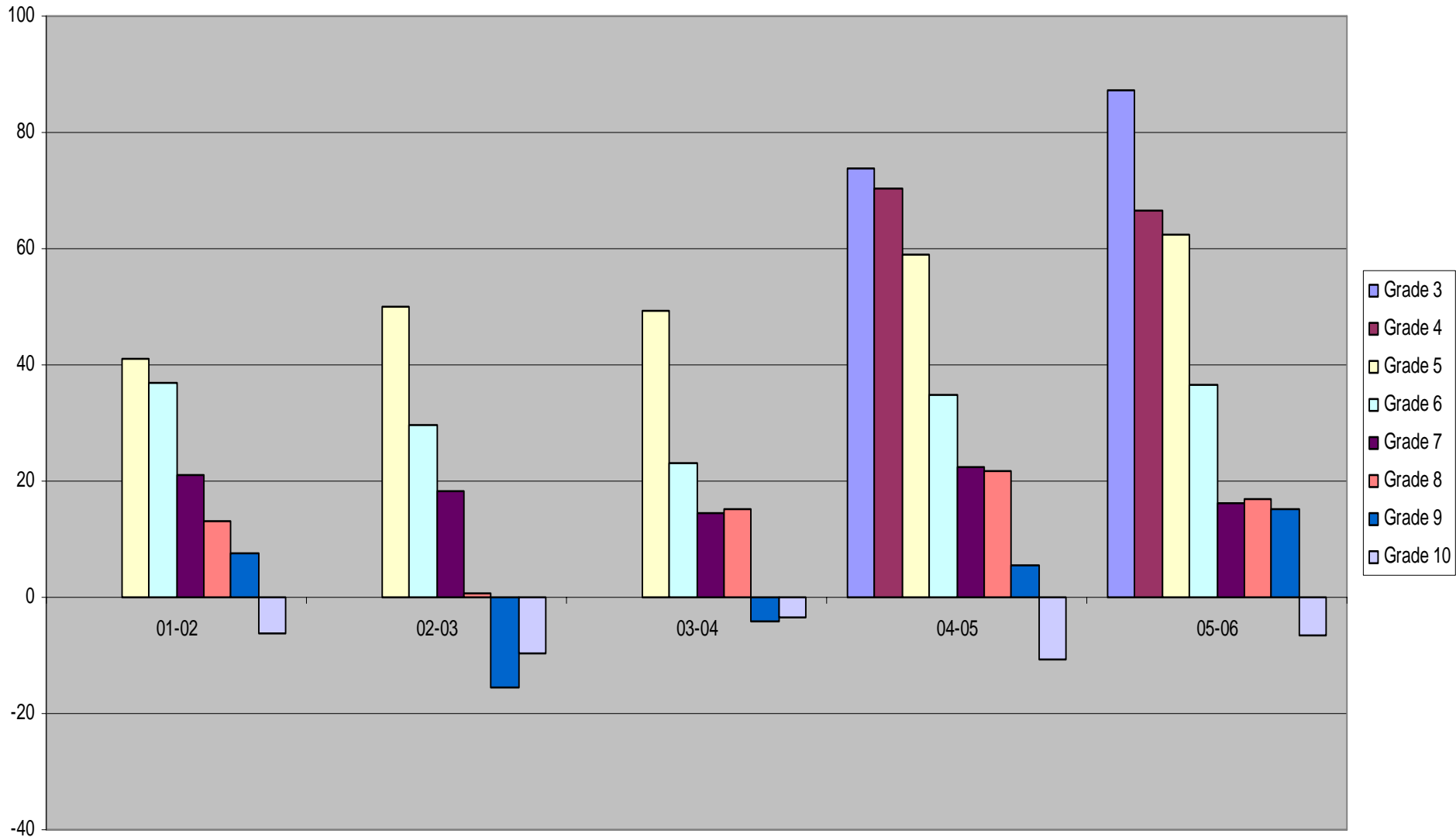
2006 Mathematics W.I. by Grade



2005-06 WI, ELL by Grade



W.I. SPED by Year and Grade

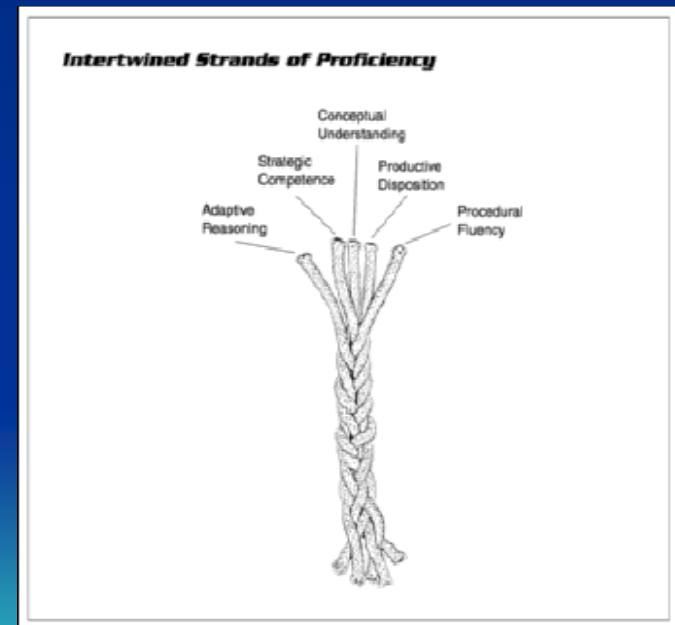


What do successful mathematics learners demonstrate?

Mathematical proficiency: Interwoven strands developed together, emphasizing no strand over the others

- **Understanding** (conceptual understanding)
- **Computing** (procedural fluency)
- **Applying** (strategic competence)
- **Reasoning** (adaptive reasoning)
- **Engaging** (productive disposition)

- Adding It Up, NRC, 2001



What does understanding look like?

Dividing fractions:

$$6 \div \frac{2}{3} = \underline{\underline{9}}$$

Understanding division of fractions:

- Represent with a diagram



- Make up a problem

(A recipe calls for $\frac{2}{3}$ cup of sugar. How many batches can be made with 6 cups of sugar)

- Identify patterns

What does computing look like?

Computational facts and procedures:

$$6 + 7$$

$$17 - 9$$

$$8 \times 4$$

$$6 \div \frac{2}{3}$$

Solve for x when:

$$4x - 7 = 28$$

Computational fluency:

- Fluency with measurement, geometry, statistics as well as numerical operations
- Compute with flexibility
- Selecting and devising efficient algorithms
- Appropriate use of calculators

What does applying look like?

Application of basic facts:

“If 12 students are on the minibus and 7 more get on, how many students are on the bus?”
(2nd grade)

Mathematical application:

“A minibus has 7 seats that hold 2 or 3 students each. If there are 19 students, how many must sit 2 to a seat, and how many must sit 3 to a seat?”
(2nd grade)

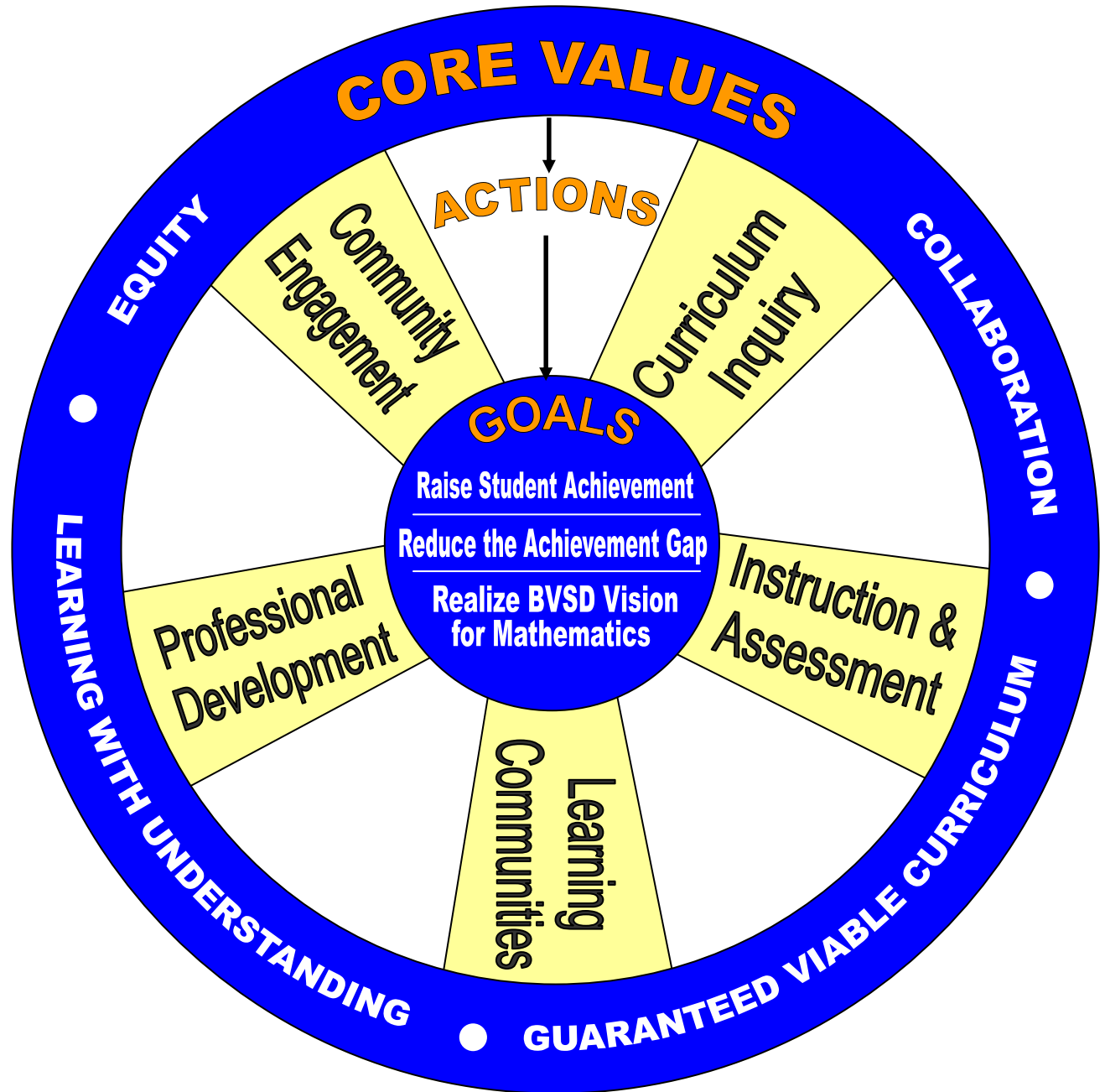
What does reasoning look like?

- Explanation or justification of answers to others
- Discussion and comparison among students of various ways to solve a problem
- “Explain to your partner why the sum of any even and odd number will always be odd.”
(4th Grade)

What does engaging look like?

- Personal commitment, belief that math holds meaning and relevance
- Mathematics makes sense
- Mathematics helps *us* make sense of the world
- Positive disposition
 - Belief that “I can learn meaningful mathematics”
 - No “math gene”
 - Math is not “done to us,” it is useful

**Vision for
BVSD
Mathematics
Support
P-12**



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.

Vision of Equity

1. A common understanding of high expectations guides teachers to engage all students at the highest level of mathematics possible.
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 *all* learners, including students with special needs, English language learners, and Hispanic students.

Value #2: Collaboration

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

Vision of Collaboration

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 21st 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 K 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.

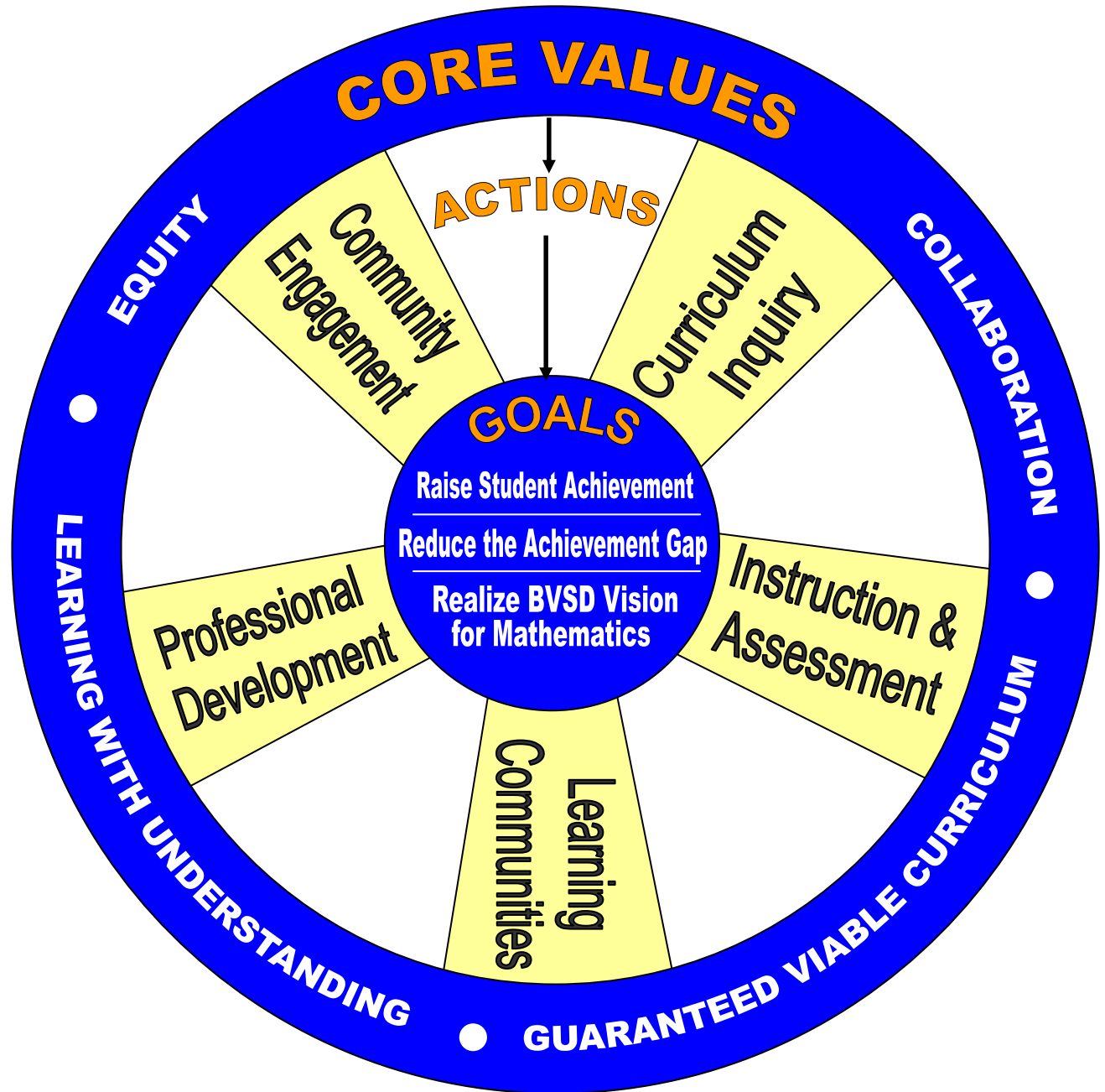
Value #4: Guaranteed, Viable Curriculum

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 K-12.

Vision of 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 PK-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

**Vision for
BVSD
Mathematics
Support
PK-12**



ACTION PRIORITY: Curriculum Inquiry

- Revise mathematics curriculum PK-12
 - Develop Pre-K mathematics curriculum
 - Increase depth and focus, reduce breadth
 - Connect to instructional materials adoptions
 - Connect to pool of assessment tasks
 - Ensure curriculum can be guaranteed for all students
 - Ensure viability in time allotted
- Explore graduation requirements in BVSD mathematics



ACTION PRIORITY: Community Engagement

- Build partnerships with local universities, businesses, and community organizations
- Implement MEC Community Engagement Program
- Provide model for on-going school-based parent math nights
- Develop BVSD Mathematics newsletter



ACTION PRIORITY:

Assessment and Instruction

- Enhance middle-level assessment and instruction through CU partnership grant
- Implement early numeracy assessments K-5
- Create a pool of curriculum-linked assessment items
- Support *Investigations, Connected Mathematics Project, and Carnegie Mathematics* adoptions
- Provide coaching for teachers in high-needs schools



ACTION PRIORITY: Learning Communities

- Advocate for time for teachers to collaborate about teaching mathematics P-12.
- Train district and school-based leaders to support school-based professional learning in:
 - Development of common curriculum plans and assessments
 - Sharing of differentiation and intervention strategies
 - Enhancement of instructional practices
 - Advancement of teacher content knowledge
- Build administration leadership expertise around mathematics instruction PK-12



ACTION PRIORITY: Professional Development

- *Investigations* initial training
- Collaborative Learning in Elementary Mathematics (CLEM) sessions to promote lesson study among grade-level teachers K-5
- Add+Vantage Math® initial training and on-going support for assessment and differentiation in early number sense
- Math Recovery® 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! ® 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



Tim Stoeltinga

BVSD Mathematics Department

303-447-5139

tim.stoeltinga@bvsd.org

