K-12 Mathematics

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Trends in Mathematics Education

"...start with believing that all students can achieve at the highest levels, as research on the brain shows. It also involves grouping structures that encourage high achievement for all and the provision of challenging and interesting work for all students. If we can bring about these changes in mathematics teaching, many more students will enjoy mathematics, achieve at high levels, take more advanced mathematics classes and develop the quantitative literacy they need to become effective citizens in the 21st century."

Jo Boaler, Stanford University

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K-12 Math Review Committee

2013-2014 School Year

- Develop "A Comprehensive Approach to Mathematics"
- Identify pilot curriculum
- Develop pilot plan

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A Comprehensive Approach to Mathematics

Five Core Beliefs for High Quality Mathematics Instruction, K - 12

It is essential that a comprehensive approach to mathematics instruction take place in all classrooms for all students. In a comprehensive and balanced math program, the following elements are exemplified:

Students are:

- Actively engaging in the learning process
- Using existing mathematical knowledge to make sense of problems and persevere in solving them
- Making connections among mathematical concepts by making use of structure and regularity
- Reasoning abstractly and making conjectures
- Using a variety of representation and tools to solve problems and communicate their process and solution
- Receiving and providing feedback on thinking and solutions
- striving towards precision and accuracy via self reflection and feedback

Teachers are:

- Creating classroom structures to support independence and engagement
- Designing lessons to support student's perseverance in problem solving
- Able to use robust content knowledge to support students in making connections between and among mathematical concepts
- Utilizing a variety of models and representations of mathematical ideas
- Providing timely and actionable feedback to students
- Using appropriate technology and tools to provide access to mathematical content and thinking to all students

Principles

1. **Equity**
   Excellence in mathematics education requires equity.
2. **Curriculum**
   A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, well articulated across the grades, and shared across the district.
3. **Teaching**
   Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn with understanding.
4. **Learning**
   Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.
5. **Assessment**
   Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.

Pilot Process

- **Summer 2014**: Comprehensive professional development for pilot teachers
- **Fall 2014**: Pilot programs, ongoing professional development, school visits, data collection
- **Early Winter 2015**: Curriculum selection

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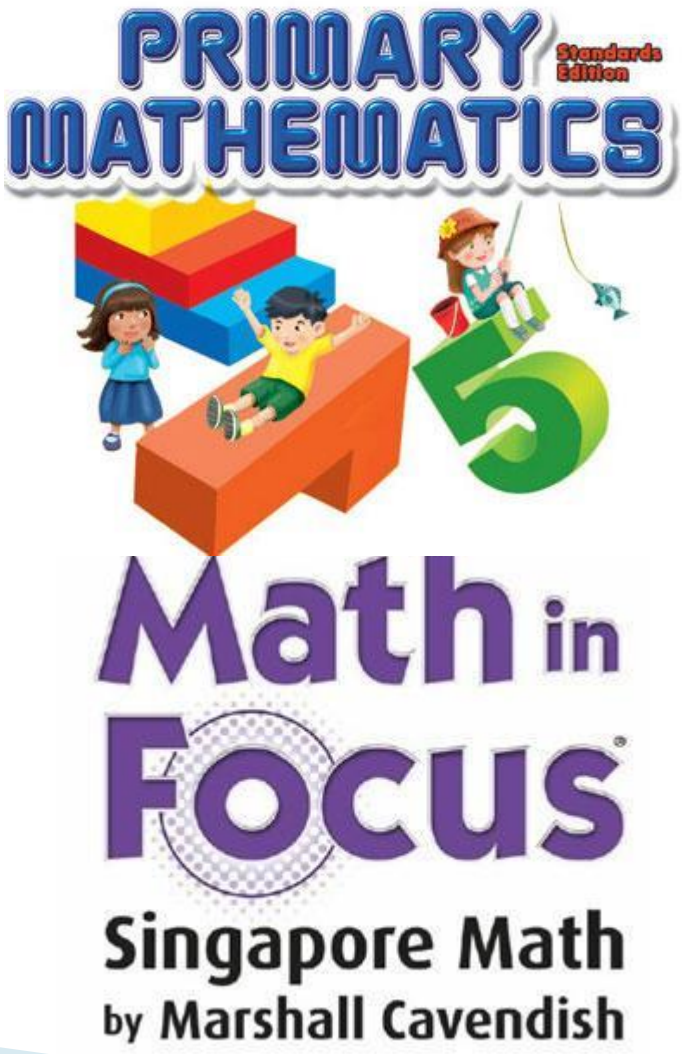
K-5 Pilot

Programs piloted:

- Primary Mathematics - Singapore Math Product
- Math in Focus - Singapore Math Product



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Math in Focus – Key Strengths

- Fewer topics in greater depth at each level.
- Develops concepts and skills in tandem.
- Clear and engaging visuals present concepts and model solutions.
- Scaffolded approach to solving word problems and model drawing to build students' success and confidence.

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6-8 Pilot

Programs Piloted:

- Dimensions Mathematics
  - Singapore Math Product
- Digits Mathematics

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6-8 Recommendation

- Further exploration
- Continue to explore:
  - Math in Focus
  - Big Ideas Mathematics

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Professional Development Plan

Winter/Spring 2015

- Joint faculty meetings
- Professional development days
- Visitations

Summer 2015

- 3-day summer institutes
- Transition, scope & sequence guides
- Technology resources

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Professional Development Plan

2015-2016 School Year

- Classroom coaching
- Joint faculty meetings / professional development days
- Math In Focus consultants
- Grade-level feedback and collaborative planning

Summer 2016, 2016-2017 School year

- Summer institute
- Ongoing professional development

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Community Communication Plan

Winter/Spring 2015

- E-mail blasts
- Community overview session

Summer 2015

- Parent website creation
  - Instructional strategies
  - Videos
  - Curriculum materials

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Community Communication Plan

2015-16 School Year

- Math in Focus university
- Unit description sheets
- Informational e-mails and videos

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Mathematics is one of the deepest and most powerful expressions of pure human reason, and, at the same time, the most fundamental resource for description and analysis of the experiential world.

Hyman Bass, University of Michigan,
AMA lecture

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