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Acting State Superintendent of Schools

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TO: Members of the State Board of Education

FROM: Karen B. Salmon, Ph.D.

DATE: June 28, 2016

SUBJECT: Mathematics Update

PURPOSE:

The purpose of this agenda item is to provide information and an update on educational programs, projects and initiatives related to mathematics education in Maryland. The presentation will address the following questions:

- (1) Why it is important for all students to reach higher levels of mathematics achievement?
- (2) What is working and how do we know?
- (3) What efforts are in place to address challenges in mathematics education?

BACKGROUND/HISTORICAL PERSPECTIVE:

The following excerpt is from the 2014 Executive Summary of the National Council of Teachers of Mathematics (NCTM) publication *Principles to Action*.

“In 1989, the National Council of Teachers of Mathematics (NCTM) launched the standards-based education movement in North America with the release of Curriculum and Evaluation Standards for School Mathematics, an unprecedented initiative to promote systemic improvement in mathematics education. Now, twenty- five years later, the widespread adoption of college- and career-readiness standards, including adoption in the United States of the Common Core State Standards for Mathematics (CCSSM) by forty- five of the fifty states, provides an opportunity to reenergize and focus our commitment to significant improvement in mathematics education.”

Maryland has adopted new common rigorous standards that have motivated significant changes in the teaching and learning of mathematics in the state, but there is still much work to do. As asserted in NCTM’s *Principles to Action* publication, “it is effective teaching that is the nonnegotiable core that ensures that all students learn mathematics at high levels.” Thus while Maryland mathematics educators continue to focus on providing high quality, standards-based

instruction, those in leadership positions must continue to strive to enact practices, policies, programs and supports needed for successful implementation of the Maryland College and Career Ready Standards. Currently every Maryland district is working to increase teacher capacity by providing professional learning opportunities, supports and resources to their mathematics educators. This update provides an overview of actions designed to foster continued improvements in the teaching and learning of mathematics that are taking place in Maryland at the state, district, school and classroom level.

EXECUTIVE SUMMARY:

(1) MSDE has implemented several initiatives and supports at the State and district level to improve teacher capacity. These include:

Professional Learning Opportunities

- Educator Effectiveness Academies/College and Career Readiness Conferences
- Mathematics sessions at the Maryland Assessment Group (MAG) Mini-MAG, and Common Ground Conferences
- Mathematics webinar series
- Mathematics edcamps
- Mathematics Supervisors' briefings
- Schoolwide Integrated Framework for Transformation (SWIFT) Professional Learning Institute mathematics sessions

Resources

- Common Core Mathematics Standards aligned resources developed by national, state and local organizations
- MSDE Mathematics Office facilitated the process of aligning many excellent online resources to the Maryland College and Career Ready Standards and they can be accessed using the MSDE Online Instructional Toolkit

Support

- MSDE Mathematics Office provides direct assistance to districts with various initiatives:
 - Book Studies
 - After school professional learning experiences
 - Support with a Mathematics Academy districts planned for PreK through grade 5 teachers. The MSDE Elementary Mathematics Specialist provided assistance in the planning and delivery a series of after school professional learning sessions for Kent, Queen Anne's, Prince George's and Somerset counties.
- Examples of district provided supports include:
 - Mathematics support teachers in schools

- Content experts to provide guidance and assistance
- Scheduled collaborative planning time
- District-provided curricular documents
- Common formative and summative assessments
- Data discussions

(2) MSDE focuses on fostering a culture of collaboration and communication

Mathematics Office Internal Stakeholder Collaboration

Members of various MSDE divisions frequently work together in support of a variety of initiatives directed towards improving the education of all Maryland students. The members of the Mathematics Office have worked collaboratively on projects related to:

- Special Education
- Early Childhood
- English Learners
- Career and Technology
- Program Approval and Certification
- Professional Learning

Mathematics Office External Stakeholder Collaboration

Members of the MSDE Mathematics Office obtain a clear and up-to-date picture of what is happening related to mathematics education that enables them to provide current strategies and cutting-edge research to Maryland mathematics educators by attending events and meetings at all levels:

- National level (National Council of Teachers of Mathematics)
- State level (Maryland Council of Teachers of Mathematics)
- Local level (Mathematics Advisory)

(3) Maryland Mathematics Advisory

The Maryland Mathematics Advisory is comprised of educators from a variety of geographic regions of Maryland who represent levels of education ranging from Early Childhood to four-year universities. Each member of the advisory brings a unique expertise and perspective to discussions that provide valuable guidance to MSDE on issues, initiatives and recommendations relevant to mathematics education in Maryland.

This year the Mathematics Advisory addressed a variety of issues on the forefront of mathematics education. Summaries of several of the major issues addressed by the MSDE Mathematics Advisory at this year's meetings are listed below.

Challenges in Mathematics Education

After reviewing the National Council of Teachers of Mathematics (NCTM)'s March 2015 article *Grand Challenges and Opportunities in Mathematics Education Research*, the Advisory identified three main challenges:

- Changing perceptions about what it means to “do mathematics”
- Changing the public's perception about the role of mathematics in society
- Achieving equity in mathematics education

Members of the Advisory agreed to follow the work being done by NCTM during the summer of 20163 surrounding these challenges and consider how to support this work with the Maryland mathematics community in the coming year.

The Maryland Mathematics Reform Initiative (MMRI)

Working with USM, the focus of the work of this initiative is the development of multiple pathways in college mathematics <http://www.usmd.edu/newsroom/news/1534>. The path to higher education and upward mobility is no longer open to hundreds of thousands of students due to high failure rates in developmental and gateway mathematics courses. Far too many students are unsuccessful in these courses, and the course content does not build the mathematical skills needed for many jobs and for informed citizenship. The work of this group seeks to improve this situation by developing multiple pathways with relevant and challenging mathematics content aligned to specific fields of study. The Advisory discussed possible implications for the Maryland high school mathematics program of study when the multiple mathematics pathways are well established in Maryland's institutions of higher education.

Revised CAEP Standards

The Council for the Accreditation of Educator Preparation (CAEP) is in the process of revising the CAEP Elementary Teacher Preparation Accreditation Standards. This information provided valuable guidance to work of the MSDE Elementary Mathematics Work Group, which is creating a framework for course developers from Maryland's Institutes of Higher Education (IHEs) to reference as they develop mathematics courses for prospective elementary teachers. The goal is that mathematics coursework in elementary teacher preparation programs will provide candidates the opportunity to study PreK- Grade 8 mathematics from a teacher's perspective. Such preparation would better prepare prospective elementary teachers to provide students the type of instruction required for successful implementation of a curriculum aligned to the Maryland College and Career Ready Standards.

This update provides but a few highlights of the tremendous efforts put forth by mathematics educators across the state to foster continuous improvement in the teaching and learning of

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mathematics. As United States Secretary of Education John King recently said, “We don’t just want educators to be part of the necessary change – we need them to lead it.”

ACTION:

For information only.

Attachment

Mathematics Update

Maryland State Board of Education
June 28, 2016

Dr. Henry Johnson, Interim Deputy State Superintendent
Heather Lageman, Director of Curriculum

Purpose

- (1) Why it is important for all students to reach higher levels of mathematics achievement?
- (2) What is working and how do we know?
- (3) What efforts are in place to address challenges in mathematics education?

In his essay, “**A Mathematician’s Lament**,” mathematician Paul Lockhart states:

"I don't see how it's doing society any good to have its members walking around with vague memories of algebraic formulas and geometric diagrams, and clear memories of hating them."

State efforts to ensure that all Maryland students are receiving high quality mathematics education:

- Adoption of the Maryland College and Career Ready Standards
- Professional Learning Opportunities
- Resources
- Supports
- PARCC Assessments
 - PARCC Grade 3-8
 - PARCC Algebra
- College and Career Readiness Assessments
 - Accuplacer, SAT, ACT, PARCC Algebra II, etc.

Fostering Continuous Improvements in Mathematics Teaching and Learning

LEA Perspective

Rosemary Heher

*Coordinator of Mathematics
Instruction*



Mathematics Instruction Today

LEA Perspective

VIDEO:

Kent County Schools

Elementary Mathematics Instruction

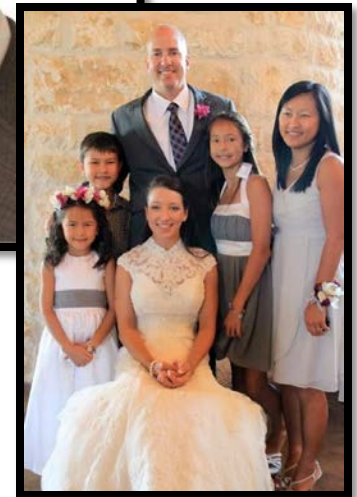


Mathematics Instruction Today

Mathematics Educator/ Parent Perspective

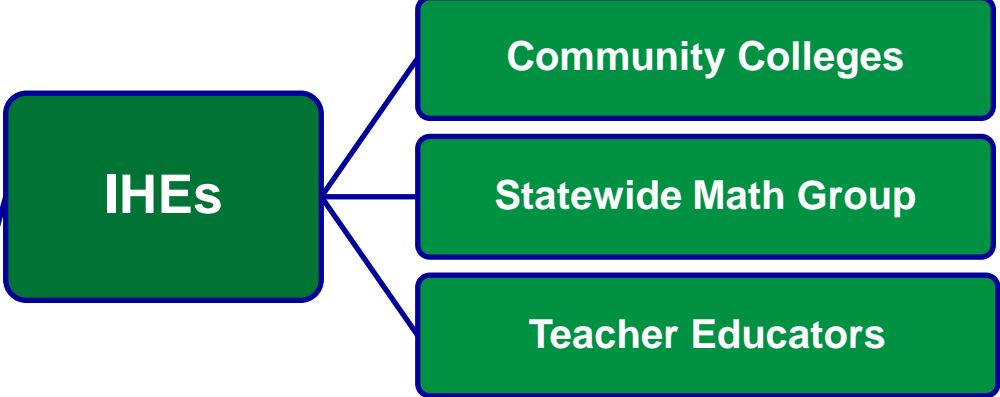
Jon Wray

*Mathematics Instructional Facilitator
Howard County Public Schools*



Collaboration

**MSDE
Mathematics Office**



English Learners

MSDE Divisions

Early Childhood

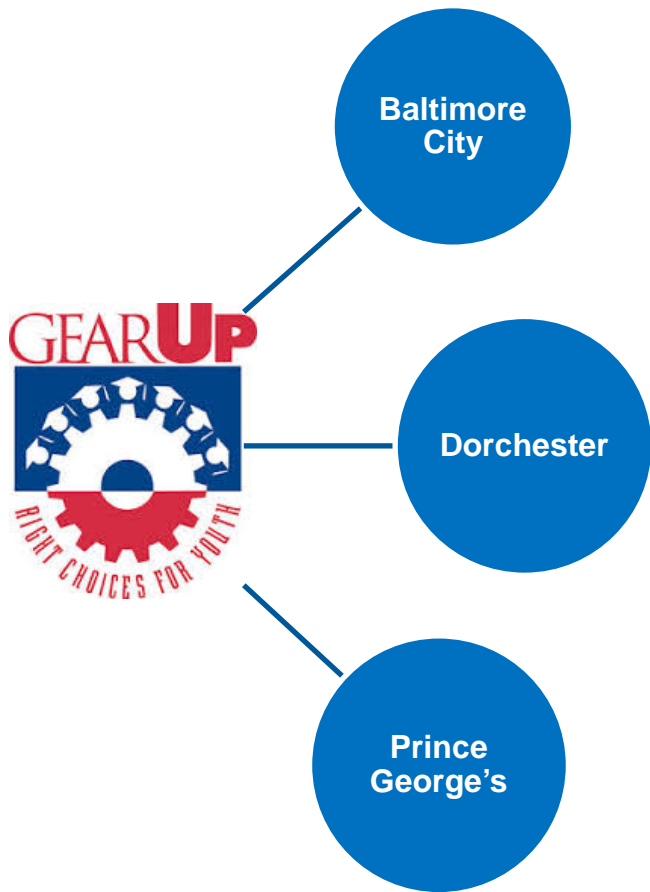
Career and Technology

Program Approval

Professional Learning

Special Education

Grants



Maryland State Personnel Development Grant (SPDG)

Narrowing the Achievement Gap



INCREASE MATHEMATICS ACHIEVEMENT AMONG STUDENTS WITH DISABILITIES



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Family
engagement

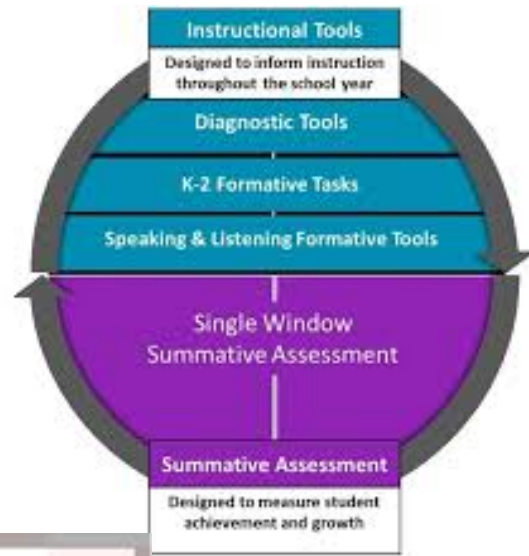
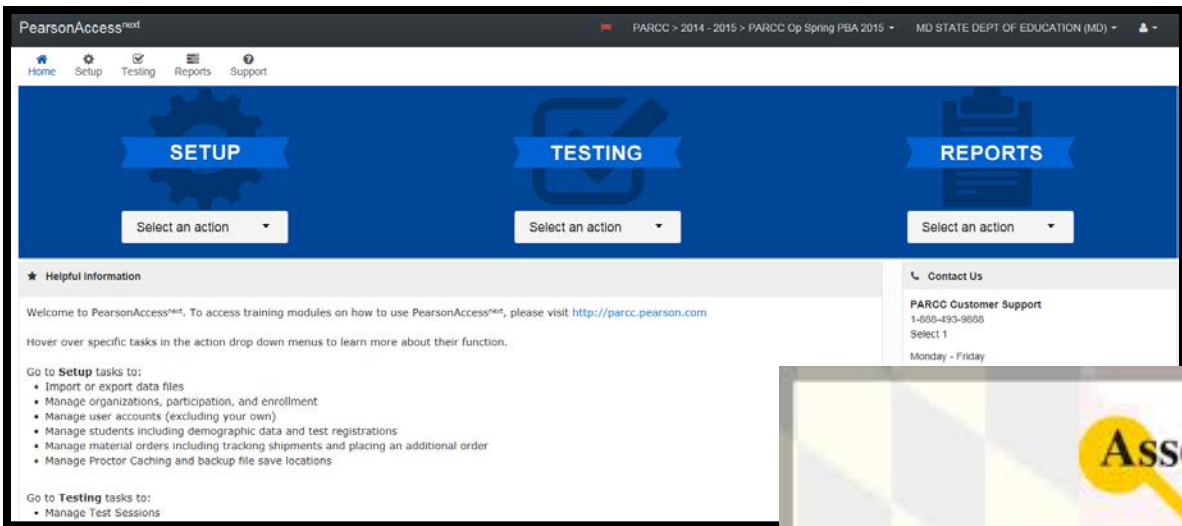
STUDENT
ACHIEVEMENT

SWIFT | schoolwide
integrated
framework for
transformation

SWIFT is a national K-8 technical assistance center that builds school capacity to provide academic and behavioral support to improve outcomes for all students through equity-based inclusion



Data from Formative and Summative Assessments



Grand Challenges in Mathematics Education

- **Changing perceptions about what it means to “do mathematics”**
- **Changing the public’s perception about the role of mathematics in society**
- **Achieving equity in mathematics education**

Next Steps for Mathematics Education....



- “We don’t just want educators to be part of the necessary change – we need them to lead it.”
-United States Secretary of Education John King