Office of the Superintendent of Schools
MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

September 17, 2009

MEMORANDUM

To: Members of the Board of Education

From: Jerry D. Weast, Superintendent of Schools

Subject: Update on the K–12 Mathematics Work Group

The purpose of this memorandum is to provide an update on the progress of the K–12 Mathematics Work Group. In a memorandum to the Board on February 10, 2009, you were informed that this multi-stakeholder work group had been charged with exploring the complex issues surrounding mathematics teaching and learning in Montgomery County Public Schools (MCPS). Following its kickoff meeting on January 15, 2009, the K–12 Mathematics Work Group developed an organizational strategy and is using a research-based approach and input from stakeholder groups to review a broad range of issues. Ultimately, work group members will formulate recommendations on ways to improve student achievement in mathematics systemwide. The ultimate goal, of course, is to effectively meet the diverse needs of all students in a rigorous and challenging mathematics program and improve teaching and learning to prepare students for college and the world of work.

It was expected that the work group would generate a comprehensive list of concerns, cluster the concerns into meaningful and manageable topics, identify critical questions that would guide its inquiry, build its capacity and knowledge base around these questions (invite selected experts), create a vision for mathematics teaching and learning in MCPS, analyze relevant data (quantitative and anecdotal) to compare our current state with our desired state, and develop a comprehensive plan with clearly delineated steps for strengthening the district's mathematics program. In short, the work group was directed to research scientifically based practices, benchmark exemplary models, and develop recommendations that encompass the complete scope of the teams' charge.

The work group's initial effort was to generate a comprehensive list of stakeholder concerns that were then synthesized into five categories. Research teams were created around these five categories and have been charged with using a research-based approach to investigate the identified issue. A brief description of the five research teams established by the work group is listed below.

- Curriculum—The Written Curriculum: This team has been charged with examining the MCPS curriculum; national, state, and local standards; and the Voluntary State Curriculum and comparing the structure and content of the MCPS curriculum with these documents and other research findings related to curriculum.

- Classroom/Instructional Practices—The Implemented Curriculum: This team is investigating best practices for supporting and fostering all students' learning and engagement. This includes exploring best teaching practices, as well as identifying recommendations about instructional materials.

- Curriculum—The Assessed Curriculum: This research group is exploring findings about national, state, and local assessment practices, as well as investigating the role and importance of formative assessment.

- Teacher Preparation and Development—Teaching for Mathematical Proficiency: The focus of this team is to research and identify best practices related to professional development structure and substance.

- Acceleration Practices—Mathematics Targets and Acceleration: This research team has been charged with examining the current acceleration practices within MCPS and identifying findings from research that support best practices for appropriate and rigorous learning for all students.

To help facilitate their work, research teams were provided a variety of resources, including access to data analysts, articles and printed materials, and experts in the field of mathematics education. With support from staff members in the Office of Shared Accountability, each team established critical research questions to guide their inquiry and build their capacity and knowledge base. To ensure alignment, and in recognition of the interrelated nature of the research topics, each research team's questions were reviewed by the work group as a whole. Additionally, each member of the work group was given a copy of, *Helping Children Learn Mathematics*, a research report summary from the National Research Council, edited by Jeremy Kilpatrick and Jane Swafford. Further, approximately 100 research articles and policy documents on mathematics curriculum, teaching and learning, assessment, and acceleration, as well as general topics such as learning, equity, and international policy were provided to each work group member.

To further broaden the work group's perspective and to strengthen its ability to create a vision for mathematics teaching and learning in MCPS, three guest speakers were invited to address the group.

- Dr. Francis (Skip) Fennell—a mathematics educator with experience as a classroom teacher, a principal, and a supervisor of instruction. He is currently professor of education at McDaniel College and recently completed a two-year term as president of the National Council of Teachers of Mathematics. He served on the National Mathematics Advisory Panel that produced *Foundations for Success: The Final Report of the National Mathematics Advisory Panel*.

- Mr. Steven Leinwand—principal research analyst at the American Institutes for Research in Washington, DC, which supports a range of mathematics education initiatives and research. Mr. Leinwand served as mathematics supervisor in the Connecticut Department of Education for 22 years and is a former president of the National Council of Supervisors of Mathematics.

- Dr. James Hiebert—professor of education at the University of Delaware. Dr. Hiebert instructs teacher preparation program students. In addition, he teaches professional development, and doctoral studies at the University. His professional interests focus on mathematics teaching and learning in classrooms. He recently served on the National Research Council committee that produced *Adding It Up* and *Helping Children Learn Mathematics*. Dr. Hiebert was the director of the mathematics portion of the Third International Mathematics and Science 1999 Video Study, and is a principal investigator on

the National Science Foundation-funded Mid-Atlantic Center for Teaching and Learning Mathematics.

Each speaker was asked to prepare and deliver a presentation about current issues in mathematics education and what research findings suggest as best practices with respect to our charge. Each guest addressed several topics within the scope of the work group. A question and answer session followed to clarify and gain further insight into a particular issue or topic. Summaries of the prevailing themes from each speaker are listed below:

Dr. Fennell's presentation identified national issues in mathematics education. Among the priorities he listed the need for a common curriculum, equity, linking research and practice, professional development, and advocacy of mathematics for all students. He spoke of the importance of coherence and alignment of curriculum and referenced the National Council of Teachers of Mathematics (NCTM) Curriculum Focal Points as a guiding document. He spoke of the importance of allocating funds for early childhood and primary grades mathematics programs and the need for elementary mathematics specialists.

Mr. Leinwand spoke to the group about "mathematics instruction that makes a difference." He stated that because we are planning high quality, rigorous mathematics programs for all students, something that is unprecedented, the time has come for us to focus attention on what specifically we want students to learn, identify how to best teach those concepts, understand how to best measure student learning, and then plan quality support for teachers' learning of how to teach in these ways. Much of his presentation focused on the importance of quality instruction, which he illustrated through several problem-solving scenarios. In response to questions, he identified core knowledge that students should acquire by the end of Grade 5. He stressed the importance of thinking systematically, not "tinkering at the margins."

Dr. Hiebert started his presentation by stating a very simple, yet powerful fact, that what we know with certitude about teaching and learning is that *teaching* matters—a lot. He stressed the idea that we have the ability to change many things and put interventions in place—curriculum, textbooks, structure of class periods, performance targets, and assessments—but if we fail to address teaching, none of these changes make their way into the classroom and impact students in meaningful ways. The focus of his talk centered on the importance of creating structures where teachers are able to study their teaching and the teaching of others. By studying teaching, conversations about shared learning goals, student learning, best teaching practices, and professional development around content knowledge can all be fostered.

From its inception, the importance of having an orderly and efficient process for gathering input and summarizing and sharing progress updates have been priorities of the members of the K–12 Mathematics Work Group. To ensure stakeholders remain apprised of the work group's progress, the members of the work group, with the support of Office of the Chief Technology Officer's staff, created the following web page that can be accessed from the MCPS website: www.montgomeryschoolsmd.org/curriculum/math/workgroup. Work group meeting summaries, membership details, and meeting schedules are among information available. The site will be an

important component in continuing to disseminate the work group's vision statement, findings, and recommendations, as they become available

Next Steps

Despite broad stakeholder representation within the work group membership, members identified the need to provide a variety of opportunities for other stakeholders' input. As a result, a sampling of feedback from 2009 graduating seniors at four high schools was collected. This feedback is being used to guide student interviews at all school levels this semester. Additionally, plans are being finalized for staff and community forums for October and November 2009 to gather information and share plans. In addition to planning for community, staff, and student outreach efforts, key action steps were identified to develop preliminary recommendations by the end of December 2009.

From now through December 2009, the K-12 Mathematics Work Group will continue to build its capacity and knowledge base around the developed research questions and will synthesize their findings gathered through readings and expert speakers. Using these findings, the work group will create a vision for mathematics teaching and learning in MCPS. Using the work group's vision, a gap analysis will be conducted by examining relevant data (quantitative and anecdotal) to compare our current state with our desired state. Preliminary recommendations based on this work are expected by the end of December 2009. From there, the work group will develop a comprehensive plan with clearly delineated steps for strengthening the district's mathematics program. A preliminary comprehensive plan based on the recommendations from the work group is expected by the end of March 2010.

We recognize the importance that all students must develop strong quantitative literacy skills and be able to think and reason critically in an increasingly technological society. I am confident that through the work of this group, access to a rigorous curriculum will be strengthened and our commitment to increase student performance will be reinforced. An update on the work group's recommendations will be provided upon completion of its task.

Questions should be directed to the work group's co-chairs, Mr. Sherwin Collette, chief technology officer, at 301-279-3581 or Ms. Nicola Diamond, executive assistant to the chief operating officer, at 301-279-3463.

JDW:csa

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