

**Frequently Asked Questions about Mathematics
October, 2007**

Additional questions from parents who attended Math Forums are written in blue font.

Why has the state changed its curriculum and why is it so different than the previous curriculum? Student performance on the Georgia Criterion-Reference Competence Tests (CRCT), the Georgia High School Graduation Test (GHS GT), the National Assessment of Educational Progress (NAEP), and the [Scholastic Aptitude Test] SAT provide data clearly indicating that, although as a state we may be improving in some ways, we are not improving fast enough, nor are we closing the achievement gap among student groups. Furthermore, Georgia students are still below the national average on NAEP mathematics. Despite prolonged efforts to improve students' performance, mathematical proficiency in Georgia schools remains alarmingly low. The federal No Child Left Behind Act requires a curriculum that will meet the needs of all students. A curriculum revised to meet those needs will ensure Georgians that all our students will be doing mathematics at grade level. NAEP data can be reviewed at <http://nces.ed.gov/nationsreportcard/about/>. Additionally, international data (The Third International Mathematics and Science Study, TIMMS and Programme for International Student Assessment, PISA) can be reviewed at these websites: <http://nces.ed.gov/timss/>, http://www.pisa.oecd.org/document/33/0,3343,en_32252351_32236173_37462369_1_1_1_1,00.html.

The new Georgia K–12 performance standards in mathematics support a strong, cohesive, and coherent curriculum that provides a clear path to higher mathematics and intelligent citizenship. They draw on the strengths of the Japanese school mathematics curriculum: coherence, leanness, and rigor. (Japanese eighth grade mathematics students had an average performance of 570 in the Third International Mathematics and Science Study, while the United States' average was 504 and the international average was 466.) The standards are presented in a format adapted from the North Carolina standards. (The NAEP data for North Carolina eighth grade students shows that 27% of their students perform at a Below Basic level, while 34% of the students perform at a Proficient or Advanced level. Georgia's figures are 30% Below Basic and 25% at the Proficient or Advanced levels.) For grades K–8, the Georgia standards are presented grade by grade, and there is a description of what a student should be able to do at the beginning of each grade level. For grades 9–12, the standards are presented course by course. Consistent with the curricula of the top-performing nations in the world, all the high school courses weave together different mathematics content areas, thus requiring course names other than those used at present such as Algebra I and Geometry. The mathematics curriculum is organized into five content strands: number and operations, measurement, geometry, algebra, and data analysis and probability. At each grade, there are process standards that emphasize problem solving, reasoning, representation, connections, and communication. The standards can be reviewed at <http://www.georgiastandards.org/math.aspx>.

Performance standards:

- Set high expectations
- Meet or exceed national standards
- Increase academic rigor
- Guide teaching; and
- Align assessment and accountability

They focus on what students need to know and be able to do to achieve mastery of mathematical concepts in real-world, integrated contexts.

What research supports the GPS?

According to Hugh Burkhardt, “Nowhere else in the world would people contemplate the idea of a year of algebra, a year of geometry, another year of algebra, and so on.” [This is substantiated by the TIMSS study referred to earlier.] The following advantages of integrated curricula are adapted from Burkhardt’s discussion (2001):

- Integrated curricula build essential connections through active processing over an extended period that first consists of weeks as the curriculum points out fundamental links and then ultimately encompasses years as the concepts are used in solving problems across a variety of contexts.
- Integrated curricula help make mathematics more usable by making links with practical contexts that give students opportunities to use their mathematics successfully in increasingly challenging problems.
- Integrated curricula avoid long gaps in learning that result from —year-long chunks of one-flavored curriculum.
- Integrated curricula allow a balanced curriculum with the flexibility to include newer as well as traditional topics of mathematics and to foster problem solving that spans several aspects of mathematics.
- Integrated curricula support equity because different branches of mathematics, for example, algebra and geometry, favor different learning styles, so an entire school year of one branch puts some students at a greater disadvantage than does a more balanced curriculum that includes several areas of mathematics.

Articles:

NCTM's Mathematics Education Dialogues series addressed Integrated Mathematics curriculum in its January 2001 edition which is available on the Web site www.nctm.org. The most relevant articles are:

Integrated Mathematics? Yes, but Teachers Need Support! By Bob Trammel

The Emperor's Old Clothes, or How the World Sees It... by Hugh Burkhardt

Integrated Mathematics and High-Stakes Standardized Testing – They Do Go Together!
By Gabe McMillan

Universities and Integrated Mathematics – How They Interact by James Hershberger.

Prevost, F. J. —Rethinking How We Teach: Learning Mathematical Pedagogy. □ *The Mathematics Teacher*; January 1993; 86, 1; Research Library pg. 75.

Sanchez, W. and Ice, N. —Open-Ended Items Better Reveal Students' Mathematical Thinking. □ *NCTM News Bulletin*, July/August 2004.

McTighe, J. and O'Connor, K. —Seven Practices for Effective Learning. □ *Educational Leadership*; November 2005; 10-17.

Leahy, S., Lyon, C., Thompson, M., & Wiliam, D. —Classroom Assessment Minute by Minute Day by Day. □ *Educational Leadership*; November 2005; 18-24.

Burns, M. —Looking at How Students Reason. □ *Educational Leadership*; November 2005; 26-31.

Books:

Goldsmith, L. T., Mark, J., & Kantrov, I. (2000). *Choosing a standards-based mathematics curriculum*. Portsmouth, NH: Heinemann. ISBN 0-325-00163-4

This book offers research-based evidence on the effectiveness of a standards-based curriculum.

Kilpatrick, J., Martin, W. G., & Schifter, D. (2003). *A research companion to Principles and Standards for School Mathematics*. Reston, VA: The National Council of Teachers of Mathematics. ISBN 0-87353-537-5

Offers extensive research on standards-based instruction – a number of articles provide evidence on the effectiveness of the Process Standards (problem solving, mathematical reasoning, communication, making connections, and use of multiple representations).

Posamentier, A. S. & Jaye, D. (2006). *What Successful Math Teachers Do, Grades 6 – 12*. Thousand Oaks, CA: Corwin Press. ISBN 1-4129-1619-4

Offers 79 research-based strategies that help students and teachers be successful in mathematics – presents research, alignment to NCTM Standards, classroom application, and possible pitfalls.

Senk, S. L. & Thompson, D. R., eds. (2003). *Standards-based school mathematics curriculum*. Mahwah, NJ: Lawrence Erlbaum Associates. ISBN 0-8058-5028-7

Most of the research on integrated curriculum investigates specific curriculum materials. This book provides historical background on reform efforts in mathematics, as well as research on the implementation of various integrated mathematics curricula, looking specifically at the effectiveness of reform (integrated, performance-based) curricula compared to traditional curricula materials.

Stein, M. L., Smith, M. S., Henningsen, M. A. and Silver, E. A. (2000). *Implementing Standards-based Mathematics Instruction*. New York, NY: Teachers College Press. ISBN 0-8077-3907-3

The book presents specific cases of mathematics instruction and instructional strategies. Suggestions are made to teachers about how to cultivate a challenging, cognitively rich, and exciting classroom environment that propels students toward a deeper understanding and appreciation of mathematics.

Are the Georgia Performance Standards rigorous enough or do we have to continue to supplement our students with programs provided by a private company? Programs provided by a private company are algorithmically driven. The Georgia Performance Standards takes students from concept development to the more efficient algorithm, providing a much deeper understanding of mathematics. This approach allows students to learn WHY the algorithm works as it does and gives students the tools to generate the algorithm in the event they forget it. The standards are rigorous and do not need the supplementation provided by a private company.

When will the GPS curriculum in mathematics be implemented?

2005-06	Math 6
2006-07	K- 2 nd grade and Math 7
2007-08	3 rd – 5 th grade and Math 8 (new textbooks for K-8)
2008-09	9 th grade
2009-10	10 th grade
2010-11	11 th grade
2011-12	12 th grade

Is Fulton County required to adopt the Georgia curriculum? Yes. The Georgia Department of Education requires that ALL public schools adopt the new standards as a minimum requirement. Fulton County will supplement and enrich the mathematics curriculum with additional concepts above and beyond GDOE requirements.

What training have K – 8 teachers received to this point?

- Previews of Units 1 & 2 and textbook training in May prior to the first year of implementation
- Summer professional institute for mathematics teachers prior to the first year of implementation
- Pre-planning professional learning day for middle school mathematics teachers the year of implementation
- Ongoing mathematics training for all school leaders
- Ongoing mathematics training for elementary teachers, to include Exemplars, SuperSource, Calendar Math, and Partner Games
- Summer professional institute for mathematics teachers at the end of the first year of implementation

How are variances in the implementation addressed? The principal and his or her leadership team in cooperation with the area superintendent are primarily responsible for the implementation of adopted curriculum and materials. Principals began their training for what to look for in a standards-based classroom in June of 2005 by creating a walk-through checklist under the direction of an Association for Supervision and Curriculum Development (ASCD) faculty member. That checklist was published in *The Principal's Guide to GPS Implementation*. Principals have participated in state trainings on unpacking standards, unit development, differentiated instruction, assessment for learning, and best practice in a standards-based environment. That training is ongoing within the system. If a principal and his/her designee identify a problem for one or more teachers, they can contact the Mathematics Team at the central office for assistance.

In addition, training is and will continue to be offered to Curriculum Support Teachers, Curriculum Assistant Principals, middle school content contacts, high school department chairs, Instructional Support Teachers and others who can assist in the monitoring of classroom instruction.

How were the new textbooks/instructional materials chosen?

- Committee representatives were chosen by school leaders.
- Committee evaluated textbooks and materials with instructional resource rating tool (rubric) developed by MetroRESA (Metro Regional Education Service Agency, a collaborative of the fifteen or more metro systems, CEISMC, the K-12 outreach department for the Georgia Institute of Technology, mathematics professors from Georgia Tech and other universities, and a national grant program (PRISM) held and directed by Georgia State University.
- Committee narrowed the choice to two textbook series based on degree of alignment with GPS and best instructional practice as indicated by the rubric
- All teachers and parents had the opportunity to evaluate instructional materials with a rubric at the school level
- Textbook with highest point total was submitted as the recommendation to the Fulton County School Board and approved.

Are the textbooks aligned to the new mathematics curriculum? Will there be changes in the CRCT questions to reflect the new curriculum? The textbooks were chosen on the basis of their alignment to the new mathematics curriculum. The CRCT will reflect the new curriculum in the year the grade level is implemented, i.e., grade 6 in spring 2006, grades K-2 and 7 in 2007, and grade 3-5 and 8 in 2008. The EOCT in Math 1 and Accelerated Math 1 will reflect the new curriculum in 2009.

What instructional materials were selected?

K-5

- *Investigations in Number, Data, and Space*, 2nd Edition
- *Georgia Math*
- *Everyday Counts Calendar Math*
- *Everyday Counts Partner Games*
- *Exemplars Differentiated Tasks*
- *SuperSource for Mathematical Hands-On Learning*

6-8

- *Connected Mathematics Program*, 2nd Edition
- *Exemplars Differentiated Tasks*
- *Destination Math*
- *Geometers' Sketchpad*
- *Gateway to Geometry*
- *Patty Paper Geometry*

Why did Fulton County choose Connected Math textbooks? (1) Connected Math is the textbook series that most closely aligns in content and methodology to the Georgia Performance Standards; (2) like Investigations, Connected Math began as research into how adolescents learn mathematics rather than a mathematics textbook series; and (3) systems that have implemented Connected Math with fidelity have obtained positive results. Some of those systems are noted in the data provided in this document.

Where can I go to find out more about the impact of these textbooks?

Compilation of Achievement Data from Districts Having Student Populations Greater Than 10,000 and Using Investigations

District Name	Enrollment in District	% Poverty	Number of Schools in Study	Number of Students in Study	Initial Implementation	Assessment Used to Measure Gains/Losses	Gains/Losses
Fulton County, GA	88,017	37.05%			2007		
Jefferson County, KY	97,346	17%	2	120	2000	TerraNova	Portland ES +161%; Luhr ES +19%
Cartwright Elementary District 83, Arizona	19,926	24%		4578	2002	Arizona Instrument to Measure Standards (AIMS)	Grade 3 +13%; Grade 5 +77%
Adams-Arapahoe, CO	32,000	15%		2569	2001	Colorado Student Assessment Program (CSAP)	Grade 5 +62%
Naperville CUSD 203, IL	18,932	3%		2746	2000	Illinois Standards Achievement Test (ISAT)	Grade 3 +1%; Grade 5 -1%
Anoka-Hennepin, MN	42,393	5%		6049	2000	Minnesota Comprehensive Assessment (MCA)	Grade 3 +13%; Grade 5 +24%
Columbia District 93, MO	16,000	13%		2442	2001	Missouri Assessment Program (MAP)	Grade 4 +11%; Grade 8 +96% (Connected Math in MS)
Independence School District 3, MO	11,250	11%		1712	2003	Missouri Assessment Program (MAP)	Grade 4 +22%; Grade 8* +380% (Connected Math in MS)

District Name	Enrollment in District	% Poverty	Number of Schools in Study	Number of Students in Study	Initial Implementation	Assessment Used to Measure Gains/Losses	Gains/Losses
Gadsden ISD, NM	14,000	43%		1047	2001	New Mexico Standards Based Assessment (NMSBA)	Grade 4 +31%
Buffalo City School District, NY	41,000	36%		2533	2003	New York State Testing Program (NYSTP)	+16%
Greece Central School District, NY	14,500	8%		904	2000	New York State Testing Program (NYSTP)	+14%
Rochester City School District, NY	35,034	37%		5183	2003	New York State Testing Program (NYSTP)	Grade 4 +26% Grade 8 +100% (Connected Math in MS)
Syracuse City School District, NY	22,864	33%		3069	2002	New York State Testing Program (NYSTP)	Grade 4 +53%; Grade 8 +5% (Connected Math in MS)
Buncombe County, NC	25,200	13%		5737	1998	ABC End of Grade Tests	Grade 3 +16%; Grade 4 +7%; Grade 5 +8%
Durham Public School District	30,809	17%		6709	1998	ABC End of Grade Tests	Grade 3 +39%; Grade 4 +24%; Grade 5 +19%
Bismark School District 1, ND	10,425	7%		1530	2004	North Dakota Proficiency Test	Grade 3 +11%; Grade 5 +10%
North Clackamas School District, OR	15,800	8%		2596	2003	Oregon Statewide Assessment	Grade 3 +7%; Grade 5 +6%

District Name	Enrollment in District	% Poverty	Number of Schools in Study	Number of Students in Study	Initial Implementation	Assessment Used to Measure Gains/Losses	Gains/Losses
Portland School District 1J, OR	50,000	16%		6886	1999	Oregon Statewide Assessment	Grade 3 +30%; Grade 5 +25%
Reynolds School District 7, OR	10,100	19%		1749	2004	Oregon Statewide Assessment	Grade 3 +6%; Grade 5 +24%
Salem Keizer Elementary School District, OR	37,475	16%		6107	2004	Oregon Statewide Assessment	Grade 3 +8%; Grade 5 +9%
Rapid City Area School District 51-4, SD	13,700	15%		3000	2003	State Testing of Educational Progress (STEP)	Grade 3 +15%; Grade 4 +10%; Grade 5 +45%
Bellevue School District 405, WA	15,328	6%		2240	1998	Washington Assessment of Student Learning (WASL)	Grade 4 +64%; Grade 7 +94% (Connected Math in MS)
Clover Park District 400, WA	13,000	18%		966	2000	Washington Assessment of Student Learning (WASL)	Grade 4 +83%; Grade 7 +124% (Connected Math in MS)

Which school district did you actually speak to as a reference for the TERC materials?

Columbia District 93, MO; Buffalo City School District, NY; Greece Central School District, NY; Rochester City School District, NY; Syracuse City School District, NY; Bellevue School District 405, WA; Clover Park District 400, WA; and Independence School District 30, MO.

Will there be an opportunity to revisit the textbook selection? Typically, textbooks are adopted for a seven-year period according to the Georgia Department of Education timeline. If this structured schedule is followed, the next year for textbook selection in K-8 mathematics would be 2014.

How will parents know what is required for mastery? An overall description of the mathematics program can be found in the Elementary, Middle School, and High School Curriculum Handbooks given to parents, often on Curriculum Nights, and also posted on the Fulton County Schools website (<http://www.fultonschools.org>). Additionally, the K-8 Learning Objectives are distributed to parents and are also posted on the Fulton County website. Teachers are encouraged to send home the performance tasks and rubrics as a means of communicating expectations as well.

What is the expectation parents should have regarding homework? Homework procedures and expectations are established by each school within the construct of the Board Policy on Grading and Reporting. Best practice would indicate that homework assignments should be directly related and reinforcement for concepts developed that day in the mathematics classroom. If five problems of the same type will demonstrate that a student understands the concept, it is not necessary to assign twenty-five problems. **The classroom teacher makes the professional decision as to how many problems are assigned for homework and/or how many days per week math homework are needed.** That is a professional judgment that should be made by the classroom teacher. It is not expected that students would necessarily have mathematics homework every day.

How are students supposed to do the homework without examples in the book?

In the elementary materials, *Investigations* provides a reference to the mathematics handbook pages that support the completion of the homework assignment. For middle school students, the examples are included in the parent letter that is sent home at the onset of each unit, on-line assistance at <http://www.phschool.com>.

In the question below, additional resources are included for assisting your child with mathematics.

How can I support and assist my child in this new curriculum? Explore the GDOE's curriculum website, <http://www.georgiastandards.org>. There is a wealth of information there.

For parents of elementary students:

Each student is provided access to an online student resources website (<http://www.pearsonsuccessnet.com/snpapp/login/login.jsp#>) where parents and students can find assistance with their mathematics by entering a student access code. This code is provided by the classroom teacher.

Additionally, you can go to the Investigations website: <http://investigations.terc.edu/index.cfm>. Click on "For Families" on the left-hand side of the website. It will take you to a page with general information and links to other sites. You will also see two other sections revealed under "For Families" – "About Investigations" and "Helping Your Child."

Also, with Investigations, each student received a handbook that provides support for the child and the parents by presenting examples of new or difficult strategies. This handbook is also available on line for students and parents.

For parents of middle school students:

In helping children learn, one goal is to assist children in figuring out as much as they can for themselves (e.g., constructing meaning). You can help by asking questions that guide, without telling what to do. Good questions and good listening will help children make sense of mathematics, build self-confidence, and encourage mathematical thinking and communication. A good question opens up a problem and supports different ways of thinking about it. A parent letter is sent home at the beginning of each unit that includes a list of questions to aid you in this new approach. We also encourage the use of study buddies to help with homework as well. There is a website to support both the student and parent (www.phschool.com). It includes homework help, on-line activities to extend the classroom learning as well as vocabulary quizzes and practice multiple choice test items. When all else fails write a note to the teacher and explain that the student could not do the homework after spending a reasonable amount of time. This is critically important information for the teacher because it sends the message that more work needs to be done in the classroom.

Most parents enjoyed reading to their young children. It set an example, established a positive attitude toward reading, and developed a value that reading is both fun and important. Similarly, the parent's attitude and approach to math at home impact the importance and value that students place on learning mathematics in school. Your feelings about mathematics will have an impact on how your children perceive and value mathematics, as well as how they view themselves as mathematicians. Two important goals for all students are that **1) they learn to value mathematics** and **2) they become confident in their ability to do mathematics**. Parents can help children develop a "can do" disposition toward math, by nurturing their children's natural curiosity and providing support and encouragement.

Doing Math at Home

1. Math is everywhere, yet many children don't see it. Look for ways to point out and reinforce math skills at home. For example:

- Talk about how you use math at work or in the home
- Involve children in tasks that require computing, measuring, estimating, building, following directions, problem solving and reasoning
- Look for activities that require children to use their math skills such as building scale models, cooking, planning trips, and playing logic games

2. Look for games and activities that teach and/or reinforce math and thinking. For example, look for games that:

- Require and develop skill with mental computation and estimation
- Require players to use their math skills
- Involve the development of strategies
- Require players to think about the probability of certain events occurring
- Require the use of spatial visualization skills
- Require logical thinking

3. When you see articles that have data that might interest your children (e.g., sports statistics, data on teenage smoking, facts about natural disasters), share them and talk about what the numbers mean.

4. Share your problem-solving strategies and techniques, mental computation strategies, and estimation strategies. Have your children teach you some. Work on the same problem, and then compare strategies as well as answers.
5. Invite your children to explain what was learned in math class or have them teach it to you. It provides an opportunity for children to help clarify their thinking, to practice new skills, and to practice communicating mathematically.
6. If your children have access to a computer, look for software that reinforces and teaches math concepts. Help your children learn to use math utilities such as spreadsheets and graphing programs.

Will there be a tutorial for parents so that they can assist their children appropriately?

The system has not at this point created a tutorial. However, in addition to the resources and strategies cited above, many schools are having Math Nights which are tutoring-like environments for parents. Attendance at such events will directly inform parents about how they can continue to assist their students.

What is Fulton County doing about the perceived lack of computation in the mathematics curriculum?

Students must have an opportunity to develop concepts before algorithms are introduced to ensure a deep understanding and facility with the algorithms. In each unit, students work with manipulatives to develop the concept and, then near or at the end of the unit, build the algorithm(s) that make their work more efficient. Teachers are informed about the resources available to them for the reinforcement of computation that should occur when the algorithm has been introduced. These assignments can be given for homework and for continued reinforcement through the next units of study. The resources available for elementary are Georgia Math, Calendar Math, Partner Games, SuperSource and Exemplars. The primary resource for middle school is Riverdeep's Destination Mathematics.

How does the new curriculum fit the philosophy of "continuous achievement?" Teachers should meet students where they are and take them as far as they can go. Students are placed into supported, on-level, advanced, or accelerated mathematics based on their performance. Within each of these levels, teachers differentiate instruction to meet the needs of all students. The Fulton County mathematics curriculum team has created a Differentiation Matrix to assist teachers in making appropriate differentiation decisions. Additionally, differentiated instructional activities, tasks, and assessments are embedded within the GPS units as well as our instructional materials to guide the differentiation for individual students.

How do you "meet each student where they are" and expand on that with approximately twenty students in a class? How do you individualize lessons for each student? The organization of classrooms is a school-based decision. The Curriculum Department has recommended that wherever possible, a teacher have no more than two groups in their classroom. It is further recommended that where there are two groups that the groups are as similar as possible.

The units of instruction are designed so that all students begin with an activity that addresses the concept to be developed. The teacher assesses the response to that activity through observation and discussion with the students. Lessons are then designed for students who need enhancement,

solid reinforcement, or work on prerequisite skills. Lessons designed for a single student are rarely needed in this environment and are met within the small group activities placement.

Why and how are elementary students being assigned levels as young as kindergarten?

What is the significance of these placements and why are they being included on report cards?

The levels reported (supported, on-level, and advanced) are included to communicate to parents the level at which a student is performing on the standards taught within a grading period. The levels can be fluid, i.e., a student may be advanced in one reporting period and on-level in another, or vice versa if their performance on different standards varies significantly. It is expected, however, that advanced students will maintain that status throughout the year and be eligible to take the acceleration test at the end of the year as a result. It is never intended, particularly for students who are working at the supported level, to always remain at that level. It is our goal that all students be able to meet expectations.

Are the above/advanced math classes being phased out in elementary and middle schools?

As the typical and accelerated math progression samples indicate, there is no intention on the part of the Fulton County Schools to eliminate accelerated and/or advanced opportunities for students who need these challenges.

How and when can a student accelerate in the mathematics course progression?

Students at the elementary and middle school can take an acceleration test and “skip” a grade level of mathematics if they score at the 95% level on the assessment. At the high school level, students who have not been accelerated prior to the ninth grade may qualify to accelerate based on multiple criteria.

Who determines when a child takes the acceleration test?

A student enrolled in our elementary or middle schools will be given the acceleration test at the end of the year if he/she has been working at the advanced level for a majority of the school year. A student new to Fulton County will take one or more acceleration tests at the time they enter if the student scores exceptionally well on the grade level placement test and the transcript the student brings provides evidence that the student is performing above level in mathematics. The actual decision to test is made by a collaborative team consisting of the grade level teachers, CSTs or CAPS, and school administration.

What does a typical progression through mathematics look like for an on-level student and an accelerated student?

Typical K-12 Progression

Kindergarten	Grade K Mathematics (on-level, supported, or advanced)
First Grade	Grade 1 Mathematics (on-level, supported, or advanced)
Second Grade	Grade 2 Mathematics (on-level, supported, or advanced)
Third Grade	Grade 3 Mathematics (on-level, supported, or advanced)
Fourth Grade	Grade 4 Mathematics (on-level, supported, or advanced)
Fifth Grade	Grade 5 Mathematics (on-level, supported, or advanced)
Sixth Grade	Grade 6 Mathematics (on-level, supported, or advanced)
Seventh Grade	Grade 7 Mathematics (on-level, supported, or advanced)
Eighth Grade	Grade 8 Mathematics (on-level, supported, or advanced)
Ninth Grade	either Math I or Accelerated Math I
Tenth Grade	either Math II or Accelerated Math II
Eleventh Grade	either Math III or Accelerated Math III
Twelfth Grade	either Math IV or AP Statistics or AP Calculus AB or AP Calculus BC

**Accelerated Progression K-12
Sample**

**At the end of the school year, an advanced level student can be administered the accelerated test to determine if he/she can skip the next level of math. The student must demonstrate 95% proficiency on the test. The sample below indicates a student who passed the accelerated test at the end of 2nd grade.*

Kindergarten	Grade K Advanced
First Grade	Grade 1 Advanced
Second Grade	Grade 2 Advanced *
Third Grade	Grade 4 Advanced
Fourth Grade	Grade 5 Advanced
Fifth Grade	Grade 6 Advanced
Sixth Grade	Grade 7 Advanced
Seventh Grade	Grade 8 Advanced
Eighth Grade	Accelerated Math I
Ninth Grade	Accelerated Math II
Tenth Grade	Accelerated Math III
Eleventh Grade	AP Calculus AB or BC
Twelfth Grade	AP Calculus BC or Calculus II / III (videoconferencing with GA Tech)

If a second grade student is attending a third grade math class, will he be learning the new GPS mathematics curriculum: Also, when he is tested on the CRCT, will it be 3rd grade or the 2nd grade test? Will the test be based on the new curriculum? A second grade student taking third grade math will be in GPS curriculum this year. This is the first year of the 3rd grade implementation. The student will be tested on the 2nd grade curriculum as required by the Georgia Department of Education. The test will be GPS-based.

Why are fifth grade students taking sixth grade math required to take the fifth grade CRCT, a curriculum they have not had? If my child successfully completes sixth grade math but does not perform well on the CRCT, will he/she have to repeat sixth grade math? Fifth grade students are required by the Georgia Department of Education to take the fifth grade CRCT. Students who have done well in sixth grade math will not have to repeat sixth grade math regardless of their CRCT performance. We do not expect the accelerated math students at fifth grade to have difficulty with the CRCT.

How do the changes in curriculum affect qualifying for the Talented and Gifted (TAG) Program? Implementation of the GPS curriculum does not affect qualifying for TAG. Students are not required to perform at a grade-level ahead in order to qualify for TAG.

Why are teachers putting emphasis on spelling, basic writing skills in the math class? The intent of having students write in mathematics is to give them another means of processing information and communicating what they know. If a student communicates meaning adequately even with misspelled words or grammatical errors, he or she should not be penalized in mathematics. The errors can and should be indicated without penalty.

How do we handle students with poor verbal and reading skills? Support will be provided by the teacher as needed, just as we have always done with word problems for these students. Students will be taught strategies for “reading mathematics”, i.e., discerning the important information from the text to solve the problem.

What about students who have special education IEPs and ESOL students who do not have the verbal and/or written skills required by the new curriculum? Allowable accommodations for these students will continue to ensure as much success and mathematics understanding as possible.

What about students who have always loved to work with numbers but are frustrated about having to read so many words in a mathematical problem? We are seeking to provide balance in the curriculum. It is necessary that students learn to read mathematical problems, as “real math” is about “real problems stated in words or in writing.” However, once the algorithms are introduced at or near the end of the units, students will receive reinforcement with computation problems.

How do you know the individual student is able to understand if there is so much group work and “collective thinking”? Group work is a proven strategy for improving conceptual development. When students do tasks together and talk about what they are doing and what they find out, information connects with other things students know and moves from short-term to long-term comprehension. Any grade taken as a result of group work would be considered a classroom participation grade. In the final analysis, all students are to be held individually accountable for what they know through unit tests, quizzes, projects, and 18-week assessments.

What about ITBS and PSAT testing since our students will not have the same curriculum as other students around the country? No two states or no two districts within a state have the same curriculum. The National Council of Teachers of Mathematics (NCTM) has recently conducted research regarding the mathematics standards from 49 states (Iowa does not have standards) and DC and Puerto Rico. They have concluded that there is 60% agreement in mathematics standards between states until students reach algebra. Upon reaching what has been traditionally considered as high school courses, there was only 20% agreement in courses with the same or similar names in 60% of the states. Nationally normed tests are not built on a particular curriculum nor do they measure curriculum at a particular grade level. For example, the ITBS for fourth grade has items we teach in third as well as fifth grade in order to discriminate performance over a wider range. Consequently, we actually expect our standardized test performance to improve since we are introducing mathematical concepts earlier in many cases and are setting expectations higher.

How will nationally standardized testing like ITBS be utilized for student placement when the tests may not be based on the same approach? ITBS is used only for middle school placement in reading or world language and as one criterion for the Talented and Gifted (TAG) Program in both elementary and middle schools. Because the ITBS does not measure any state's or system's specific curriculum, we will be able to continue using it for these purposes.

How will high school students transferring into and out of Georgia be placed? Students transferring from other states will be required to take a placement assessment to determine the "best fit." The data will be used by the student's teacher to provide support for any gaps in student knowledge. For students transferring out of state, course descriptions will be included on all student transcripts to assist in interpreting the transcript. A recommendation of "traditional" placement can be made from the student's mathematics teacher and forwarded to the receiving school through the counseling office of the sending school if needed.

How will colleges determine the meaning of Math I, Math II, etc? Course descriptions will be included on all student transcripts to assist colleges in interpreting the transcript. Most universities require a placement test for mathematics during the student enrollment period.

How many high school credits may students earn in middle school? Students who are one full year ahead in mathematics may qualify to earn one high school credit for Accelerated Mathematics I while in middle school. While the grade for this credit will count toward Fulton County's Grade Point Average in high school for student rank, credits in middle school will not count toward the HOPE scholarship as dictated by state legislation. (This is already into effect and is not new with the implementation of GPS.) The State Rule for the class of 2012 (incoming freshmen 2008-09) requires four high school level mathematics credits to graduate for ALL students. One of the four credits may be earned in middle school.

How will honors points be awarded with the new math courses? Accelerated Mathematics I, II, and III and Advanced Placement courses will receive Honors credit. For middle school students, the seven points are added when the student enrolls in one of our high schools. Honors points are figured into Fulton County's Grade Point Average for class rank, but are not included in the calculations for the HOPE scholarship as dictated by state legislation. (This is in effect now and is not new with the implementation of GPS.)

Have you developed a tool for collecting recommendations for ongoing instructional unit plan and assessment improvement? Yes. There are a number of ways feedback and recommendations are received: our standing revision teams, our professional learning activities during the year, and our summer institutes. Additionally, all the members of the mathematics team communicate with administrators and staff through email.