

ROCKWOOD SCHOOL DISTRICT

MATHEMATICS

Grade 9-12

PROGRAM EVALUATION

In-Depth Review 2008



*Growing Together,
Learning for Life*

Evaluators:

Dr. Kathy Peckron, Assistant Superintendent for Curriculum and Instruction
Dr. Bertha Doar, Director of Data Analysis and Quality Management
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High School Math Curriculum Writing Team

Context:

A program evaluation is conducted for every curriculum area as a part of the in-depth curriculum writing process. The High School Math Curriculum Writing Committee began gathering data in the winter of 2007. Through an in-depth analysis of the present curriculum; solicitation of the views of all participants affected by high school mathematics; and a thorough study of the latest research in the fields of mathematics, high school education, and staff development; a thoughtful, progressive curriculum will be presented for implementation during the 2009-10 school year.

Evaluation Process:

Working in concert with Dr. Bertha Doar, Director of Data Analysis and Quality Management, the evaluators surveyed middle school parents, students, and staff on the current effectiveness of the high school mathematics curriculum. Students completed an online survey in class with 561 surveys completed. An on-line survey was developed for a random sample of high school parents with 943 parents completing the survey. Surveys were emailed to high school math teachers were surveyed with 33 surveys completed.

Assessment data, including reports from ACT, AP, and MAP were analyzed. In addition, current literature and research in mathematics content and pedagogy were collected and analyzed.

Representatives from all high schools met to discuss strengths of the current program and appropriate direction and change for the next six-year high school implementation.

Strengths of the Program:

Parent Survey and Comments (943 parents responding)

1. 89% believe their child is sufficiently challenged in math courses.
2. 84% feel homework assigned is appropriate for child's age and grade.
3. 85% believe technology is a beneficial instructional tool.
4. 81% feel their child's reasoning, critical thinking and problem solving skills are good.
5. 79% feel the high school math curriculum sufficiently prepares their child to succeed in future math courses.

Teacher Survey and Comments (33 teachers responding)

1. 97% feel confident in their ability to prepare students to succeed on standardized tests (MAP, SAT-10).
2. 100% believe their students are prepared to succeed in future math courses.
3. 100% feel confident in their ability to use a variety of teaching strategies to help students understand the concepts.
4. 94% state the curriculum is design to challenge students of differing abilities and interests.
5. 94% believe technology is a beneficial instructional tool.
6. 97% report they encourage students to communicate and demonstrate their mathematical thinking.
7. 94% believe the district provides adequate resources for teaching mathematics.

Student Survey (978 students responding)

1. 96% believe they have opportunities to get help when needed.
2. 92% believe they can think, reason, and solve problems.
3. 88% are confident in their ability to learn math.
4. 81% believe they are challenged in their mathematics courses.
5. 80% believe math is important to their future.
6. 80% believe hands-on activities help to learn math.

Concerns of the Program:

Parent Survey and Comments

1. 74% believe sufficient support is available to meet their child's needs.
2. 70% report they have confidence in their child's teacher to motivate students to learn.
3. 69% believe their child's teacher effectively explains the math content.
4. 72% believe their child is confident when dealing with mathematical situations.
5. Parents comment that their children feel math is unexciting.
6. Parents comment that the district does not do enough for the struggling math students.

Teacher Survey and Comments

1. 70% report that students entering their course have been well prepared to succeed in math.
2. 83% believe the district provides teacher with the necessary tools and resources to instruct students in need of remediation.
3. 78% believe technology is adequate to support and enhance the math they teach.
4. 81% feel comfortable differentiating instruction for their students.
5. Teachers comment that students lack critical thinking and problem solving skills.
6. Teachers comment that students struggle to retain information including their basic facts.

Student Survey

1. 72% believe their last math class prepared them for the current course.
2. 76% believe homework is a valuable part of their learning experience in math.
3. 68% believe technology is a valuable part of their learning experience in math.

Recommendations

After studying the current research, reviewing the mathematics curriculum of benchmark and high-achieving school districts, surveying the opinions of parents, teachers, students and administrators, and analyzing the data from MAP, ACT, and AP tests, the following recommendations are proposed for High School Mathematics curriculum to be implemented in 2009-2010.

1. Curriculum resources must be adopted which are compatible with National Math Standards (NCTM), College Board Standards for College Success, and the Missouri Course Level Expectations.
2. Parents, teachers, and administrators must be thoroughly informed about the Missouri Course Level Expectations and testing implications.
3. Increase the academic rigor of the mathematics courses to meet the increased demand on students in the new Missouri Math Learning Goals which will be required in 2010-2011.
4. Resources must be selected that further the acceleration program.
5. Increase the emphasis on Statistics in all Algebra I, Geometry, and Algebra II courses to meet the expectations required on the Missouri End-of-Course exams.
6. Increase problem solving and hands-on experiences in the math classroom.
7. Create new mathematics course opportunities to help students meet the state requirements (3 yrs of Math needed to graduate, Alg I and Geometry End-of-Course exams required) and to provide additional choice in their expanded high school schedule.
8. Research intervention programs to support the students struggling to succeed in high school math courses.
9. Increase the use of technology to support instruction and learning.
10. Increase cost effectiveness of the high mathematics curriculum implementation:
 - a. Using technology, internet, and software as supplemental materials replacing expensive transparencies, review and remedial materials, etc.
 - b. Shipping and volume discounts from publishers.
 - c. Investigate the possibility of on-line textbooks for students at home and a class set of materials in the buildings.
 - d. Inventory existing mathematics supplemental resources in each high school building and purchase only the materials that are necessary for the new adoption.

Review of Literature and Research

Review of Literature and Research

Teachers must provide all students, especially students lacking in confidence, with formative assessment to allow them additional opportunities to succeed in mathematics. Extensive research has shown that formative assessment has significant impact on students' success in mathematics and science. In a recent study at Stanford University, nineteen teachers used formative assessments that provided enhanced feedback through their communications with students about homework, classwork, and tests. Those classes where students received feedback that was based on student learning and not on student accountability showed an average 0.3 standard deviation increase on standardized tests. These improvements, replicated throughout an entire school, would raise it from the lower quartile to well above average. (Black, P., William, D., Lee C., 2003 Assessment for Learning: Putting it into practice.)

When given the opportunity to take higher-level mathematics, students of all races perform better on national tests. The more mathematics students take the better they perform (Education Trust, 1999; NAEP, 1999; U.S. Department of Education, 2000).

In a study of 820 schools and 11,000 students, Glickman (1998) found that schools that reorganized their academic programs around "active learning" (students actively constructing knowledge, using inquiry, and applying their learnings beyond school) had significantly higher student gains in math.

In his comparison of over 7,000 NAEP scores to teacher/student surveys about teacher practices, Wenglinsky (2000) found that classroom practices in math have the greatest impact on student achievement (followed by professional development, and then teacher inputs such as years teaching, degree held, and major or minor). As examples:

- Students whose teachers regularly conduct hands-on learning activities outperform their peers by 72% of a grade level in math.
- Routine use of "ditto sheets" correlates negatively with student test scores.
- Students whose teachers regularly use point-in-time assessments outperform peers by 46% in math.
- Students whose teachers emphasize *higher order thinking skills* in math score about 40% of a grade level higher than their peers whose teachers regularly emphasize lower order thinking skills.

In the same study, 4 out of 5 teachers reported spending time solving series of routine problems. 1 out of 2 teachers reported spending time applying concepts to solve unfamiliar/unique problems.

In a longitudinal study of 16 high schools, the National Center for Studying Secondary School Contexts found that teachers who participated in a reflective, problem-solving community were more often able to dismantle constraining myths like “these students can’t do it” and adapt their practice and pedagogy in ways that were more appropriate and effective for their students (Talbert & McLaughlin). The researchers found the following in **high achieving schools**: shared leadership and high levels of collegiality, innovation, and adult learning opportunities; subject matter viewed as dynamic; public commitment to success for all; high standards for all students; high commitment to school as a whole; more positive views of students. **Low achieving schools** had traditional leadership structures with low levels of collegiality and opportunity for adult learning; high norms of privacy, subject matter seen as static; high student failure; low standards for students; low commitment to the workplace, more negative views of students.

In a study of more than 2000 students in 23 restructured schools, Newmann, Marks, and Gamoran (1995) found much higher levels of achievement on complex performance tasks for students of all backgrounds who experienced what these researchers termed “authentic pedagogy” – instruction focused on active learning in real-world contexts and calling for higher-order thinking, consideration of alternatives, use of core subject ideas and modes of inquiry, extended writing, and an audience beyond the school for the work. In addition, Lee, Smith and Croninger (1995) found that in schools where such authentic instruction was widespread, an average student would learn “about 78 percent more math between 8th and 10th grade than a comparable student in a school with a low level of authentic instruction”.

Studies by Braddock & McPartland, Garcia, and Kapp, Shields, & Turnbull (1995) show that teaching aimed at understanding and applying ideas – once thought appropriate only for selected high-achieving students – has proved more effective than rote teaching for students across a wide spectrum of initial achievement levels, family income levels, and cultural and linguistic backgrounds.

Based on over 15 years of study and 5 million test scores, Sanders and colleagues tracked students’ achievement over time and found a strong correlation between teacher effectiveness (based on growth by a teacher’s previous students) and student achievement. For example, Sanders and Rivers (1996) report math scores for students whose teachers were rated “Highly ineffective” for three straight years averaged a 29% gain in score whereas comparable students whose teachers were rated “highly effective” averaged an 83% gain. In addition, they found residual effects – individual students tended not to recover from a year with an ineffective teacher, whereas a student who spent one year with a highly effective teacher tended to experience benefits even two years later.

In a five-year study (Brown, et al, 1995) the University of Pittsburgh's QUASAR project found higher achievement among students whose teachers were involved in a sustained professional development program that emphasized enhancing teachers' understanding of strategies, having teachers implement new strategies, and encouraging teachers to reflect on instructional outcomes.

In research on teaching and learning mathematics with understanding, four features of the social culture of the classroom have been identified:

- Ideas and methods are valued. Ideas expressed by any student warrant respect and response and have potential to contribute to everyone's learning.
- Students have autonomy in choosing and sharing methods of solving problems. Students recognize that many strategies are likely to exist for solving a problem, they respect the methods used by others and that others need to understand their own methods, and they are given the freedom to explore alternatives and to share their thinking with the rest of the class.
- An appreciation of the value of mistakes as sites for learning for everyone. Mistakes are not covered up; rather, they are used as opportunities to examine reasoning and to deepen everyone's analysis.
- Recognize that the authority for whether something is both correct and sensible lies in the logic and structure of the subject rather than the status of the teacher or the popularity of the person making the argument. The resolution of disagreement resides in mathematical argument.

In addition to selecting tasks with goals in mind and sharing essential information, the teacher's primary role is to establish a classroom culture that supports learning with understanding, thereby serving to motivate students to learn.
(Kilpatrick et al, *Adding It Up*, 2001)

Teachers should differentiate between factors that stimulate student interest and those that maintain student interest. Computers, puzzles, and group work tend to stimulate interest in math while meaningfulness and involvement tend to maintain student interest. In a study of 350 high school students from three high schools, students were administered an interest survey with seven scales: personal interest, situational interest, meaningfulness, involvement, puzzles, computers, and group work. Students rated items on a six-point scale ranging from strongly disagree to strongly agree. Most students were in college preparatory algebra and geometry courses. The results showed that situational interest in secondary school mathematics classrooms is complex, having five different components: meaningfulness, puzzles, computers, group work, and involvement. Increasing student involvement in mathematics appears to be especially beneficial for enhancing situational interest. (Mitchell, M., *Journal of Educational Psychology*)

To reduce math anxiety, teachers should focus on both the thoughts and the emotions of their students. There are two different components of math anxiety, cognitive (intellectual) and affective (emotional), that are similar in boys and girls and in younger and older children. One study examined math anxiety in sixth through twelfth grade children as part of a comprehensive, longitudinal study of children's attitudes, values, and beliefs about mathematics. The results showed that girls and boys, as well as younger and older children, have math anxiety made up of two components. One component is intellectual or cognitive; the other component is emotional or affective. The emotional component of math anxiety had a stronger and more negative relationship to children's perceptions of their ability and their performance, and to their actual math performance, than did the intellectual or worry component. The worry component had a stronger and more positive relationship to the importance children place on math, and their reported actual effort in math, than did the affective component. Girls reported stronger negative emotional reactions to math than boys did. There was relatively little change in math anxiety from middle through high school. (Gourney, A., *Journal of Educational Psychology*)

SURVEYS

Mathematics High School Student Survey

	% Strongly Agree	% Agree	%No Opinion	% Disagree	% Strongly Disagree
1. I am confident in my ability to demonstrate and use my mathematical thinking	30.1	57.9	.5	8.4	3
2. I have opportunities to get help in math when I need it	53.7	42.1	.4	2.9	1.1
3. I can think, reason, and solve problems mathematically.	28.2	63.8	.7	5.9	1.3
4. Homework is a valuable part of my learning experience in math.	25.4	50.4	1.4	15.3	7.6
5. Hands-on activities help me to learn mathematics	34.3	45.6	3.9	13.1	3.1
6. I am confident in my ability to learn math.	37.9	50.5	.7	8.8	2.1
7. The use of technology is a valuable part of my learning experience in math.	19.4	48.8	3.9	23.7	4.1
8. I am challenged in my mathematics courses	26.3	54.2	1.8	14	3.8
9. My last math course prepared me for my current math course.	19.8	52.2	2	21.2	4.8
10. Math is important to me and my future.	34.8	45.4	2.7	12.5	4.6

Mathematics High School Teacher Survey

	% Strongly Agree	% Agree	%No Opinion	% Disagree	% Strongly Disagree
1. The math program encourages students to explain and demonstrate their mathematical thinking.	27.3	69.7	0	3	0
2. I am confident in my ability to use a variety of teaching strategies to help students understand the concepts.	60.6	39.4	0	0	0
3. Students entering my course have been will prepared to succeed in math.	18.2	51.5	0	27.3	3
4. The math curriculum is designed to support students of differing abilities and interests.	21.9	56.3	0	21.9	0
5. The district provides teachers with the necessary tools, resources, and/or staff development to instruct students in need of remediation.	18.8	64.5	0	16.8	0
6. Technology is adequate to support and enhance the math I teach.	6.5	71	0	22.6	0
7. Technology is an integral part of instruction in math.	46.9	46.9	0	6.3	0
8. The math curriculum is designed to challenge students of differing abilities and interests	34.4	59.4	0	6.3	0
9. The district provides teachers with the tools/resources to teach the math curriculum.	18.8	75	0	6.3	0
10. I believe my students are prepared to succeed in future math courses.	34.4	65.6	0	0	0
11. I am confident in my ability to prepare my students to do well on math standardized tests (MAP, ACT)	50	46.9	0	3.1	0
12. Appropriate staff development is provided to support teachers as they teach the math curriculum.	21.9	62.5	0	15.6	0
13. I am comfortable differentiating instruction for my students..	25	56.3	3.1	15.6	0

Mathematics High School Parent Survey

	% Strongly Agree	% Agree	%No Opinion	% Disagree	% Strongly Disagree
1. My child is confident when dealing with mathematical situations.	25.6	46.2	.2	20.9	7.1
2. Sufficient support is available to meet my child's mathematical needs.	21	53	1	20.2	4.8
3. I have observed continued development in my child's ability to think, reason, and solve math problems.	23.4	57.6	1.4	14.5	3
4. I have the ability to provide math homework assistance.	14.1	38.5	2.2	33.2	11.9
5. I am confident that my child's teacher motivates students to learn.	18.2	51.7	4	20.4	5.7
6. I am confident that my child's teacher effectively explains the math content.	15.7	53.4	3.4	20.9	6.6
7. I believe technology is a beneficial instructional tool for mathematics.	30.4	55	3.7	10.1	.8
8. I believe my child is sufficiently challenged in mathematics courses.	29.3	59.6	1.8	7.3	1.9
9. The homework assigned to my child is appropriate.	12.8	71.2	2.5	11.4	2.2
10. I believe the high school math curriculum sufficiently prepares my child to succeed in future math courses.	19.1	59.9	2.7	13.9	4.4
11. I am actively involved in helping my child plan his/her high school math course sequence.	36.7	54	1.4	7	.9
12. Anticipated years of math completed:	Four: 71	Three: 15	Two: 9	One: 5	

ACHIEVEMENT DATA

Mathematics

Commentary on Data for 2006-2007

In grades K-12, Rockwood students continue to increase their achievement in mathematics at the elementary, middle, and high school levels.

MAP

- ❑ All levels consistently perform above the state average by at least 29 MAP Index points. (gr. 3 – 32 pts. above, gr. 4 – 37 pts above, gr. 5 – 36 pts. above, gr. 6 – 29 pts. above, grade 7 – 32 pts. above, grade 8 – 42 pts above, and grade 10 – 42 pts above).
- ❑ Every RSD school and every grade level tested within each school (grades 3-8,10) performed above the state level (MAP Index number).
- ❑ Grade 3: 17 of the 19 elementary schools have greater than 60% of their students in the top two levels. (District average= 66%)
- ❑ Grade 4: All elementary schools have greater than 50% of their students in the top two levels. (District average= 66%)
- ❑ Grade 5: 17 of the 19 elementary schools have greater than 50% of their students in the top two levels. (District average= 66%)
- ❑ Grade 6: All middle schools have greater than 50% of their students in the top two levels. (District average= 63%)
- ❑ Grade 7: All middle schools have greater than 50% of their students in the top two levels. (District average= 62%)
- ❑ Grade 8: All middle schools have greater than 50% of their students in the top two levels. (District average= 60%)
- ❑ Grade 10: All high schools have greater than 50% of their students in the top two levels. (District average= 61%)

SAT-10

- ❑ All grade levels (Gr. 2 – Gr. 8) perform above national averages with Mean NCE scores from 51.8 to 60.3.
- ❑ The Cluster Level Report shows that at least 83% of students in grades 2 through 8 earned average or above average scores in both math problem solving and math procedures.
- ❑ Students enrolled in grade levels 2, 4, 5, 6, 7, and 8 scored at the 60th percentile or greater in “Math Total”.

AP

- ❑ The district continues to perform above the national level on all Math AP exams. The percent of RSD students scoring at the highest levels on the Math AP exams (4 or 5) is substantially greater than the national average: (AP Calculus AB: 35.5% above, AP Calculus BC: 22.6% above, AP Statistics: 17.2% above).
- ❑ 179 students took the Calculus AB exam and 92% scored a grade of “3” or higher.
- ❑ 6 students took the Calculus BC exam and 5 out of the 6 scored a grade of “4” or higher.
- ❑ 121 students took the AP Statistics exam and 75% scored a grade of “3” or higher.

ACT

- ❑ The District continues to perform at high levels with an ACT Math score of 23.3.
- ❑ The RSD ACT Math score of 23.3 is 2.3 points above the state average and 2.3 points above the national average.

Analysis of the Program Related to District Data

In 2007-2008 all three levels will be working to increase overall student achievement as well as making increases in all sub-populations. Test data will be analyzed at the district and building level to identify specific math content or process skills which are areas of concern.

At the **elementary level**, we begin the 2nd year of the implementation of the new K-5 Math curriculum document and resources. Students continue to achieve at high levels with more than 65% of the 3rd, 4th, and 5th grade students scoring in the top 2 levels on the MAP test. The effective use of the newly aligned curriculum, resources, and technology will have an impact on student achievement.

During the 2007-2008 school year, we will continue to focus on raising the level of student achievement for all students, as well as, closing the achievement gap between sub-populations at the elementary level. We will increase the use of standards-based materials as one of many resources to aid student achievement and implement the Knowing Math Intervention Program in all 19 elementary buildings to raise the level of student achievement for 4th and 5th grade students performing below grade level in mathematics

At the **middle school level**, we continue to see a steady increase in student achievement. Students continue to achieve at high levels with more than 60% of the students tested in math scoring in the top 2 levels on the MAP test. We begin the 1st year of the implementation of the newly adopted MS Math curriculum document and resource. The curriculum document is aligned to the MO-Grade Level Expectations and focuses on content and instructional approaches envisioned in the standards the NCTM Standards. We will continue to increase the use of technology as an instructional tool. Training will continue throughout the year for all newly acquired technology: Smart boards, airliners, e-Instruction clickers, and document cameras.

During the 2007-2008 school year, we will continue to focus on raising the level of achievement for all students as well as closing the achievement gap between sub-populations of students at the middle school level. We will expand the use of the Knowing Math Intervention program into 6th grade with the support of SSD funding. We will increase the use of common assessments, assessments for learning, instructional strategies that promote problem solving, and higher order thinking skills.

At the **high school level**, we begin the 5th year of the implementation of the curriculum and resources. The effective use of the aligned curriculum, resources, and technology at the high school level has made an impact on student achievement. All four high schools continue to perform at high levels on the Math MAP. The MAP Index scores at the high school level are more than 22 points higher than the state average at the 10th grade level. The high school student performance on the Advanced Placements exams in Math and Statistics continues to maintain high levels.

During the 2007-2008 school year, we will start the in-depth review of our high school math program and continue to focus on raising the level of achievement of all students as well as closing the achievement gap between sub-populations at the high school level. We will analyze prior student achievement data in an effort to move each student to a higher level of achievement on the MAP test. We will increase the use of assessments for learning, as well as continue the use of common assessments within the math department.

Recommendations and Initiatives

At the **elementary school level**, the continuation of grade level meetings, math vertical team meetings, and structured professional development (content, pedagogy, technology) will help to address areas of concern. Elementary teachers will need to stress the process standards, geometry, and measurement concepts to respond to the increased emphasis on the 3-4-5 Math MAP tests. Elementary teachers will implement the Exemplar constructed response questions to provide authentic problem solving experiences. Emphasis will also be placed on appropriate placement of students for optimal acceleration to increase each student's achievement. We will continue to implement the Knowing Mathematics Intervention Program to raise the level of student achievement for our 4th and 5th grade student population performing below expectations. We will continue to research best practices in mathematics.

At the **middle school level**, structured professional development will continue for all middle school teachers implementing the Connected Math program. Our efforts will also focus on assessment practices, teaching strategies, writing common assessments, and increasing the use of technology as an instructional tool. Middle School teachers will implement the Exemplar constructed response questions to provide authentic problem solving experiences. We will continue to incorporate open-ended constructed response questions and performance events on exams. Current math and technological resources will be used in an effort to raise student achievement and address math concepts in the Missouri Grade Level Expectations. Problem solving, geometry, measurement, and fractions will be areas in which teachers will focus. Middle School teachers will continue to examine current research in mathematics.

At the **high school level**, our professional development efforts will focus on differentiation and block schedule training for all high school math teachers; as well as assessments for learning and the Data Driven Instructional Model. We will continue to construct and use common assessments in all math courses to assess learning as well as prepare students for ACT and MAP. Sophomore teachers will need to stress Geometry and Measurement concepts to respond to the increased emphasis on the 10th grade Math MAP tests. We will continue to incorporate open-ended constructed response questions and performance events on exams and increase the use of technology as an instructional tool.

Rockwood School District Missouri Assessment Program (MAP)

Math - Longitudinal Data 1998 to 2005

(The levels are Reportable percentages while LND is part of the Accountable percentages; therefore, total percentage may be >= 100%)

Mathematics - 4th Grade

	1998	1999	2000	2001	2002	2003	2004	2005	Difference 05-04
Advanced (5)	10%	14%	15%	16%	19%	15%	18%	19%	1%
Proficient (4)	39%	44%	41%	38%	40%	43%	45%	45%	0%
Nearing Proficiency (3)	35%	31%	30%	34%	31%	32%	31%	30%	-1%
Progressing (2)	14%	10%	11%	11%	9%	9%	7%	5%	-2%
Step 1 (1)	2%	1%	2%	1%	1%	1%	1%	1%	0%
LND						1%	1%	1%	
MAP Index Score	NA	NA	227.9	228.0	232.9	231.1	236.4	237.8	

Mathematics - 8th Grade

	1998	1999	2000	2001	2002	2003	2004	2005	Difference 05-04
Advanced (5)	2%	1%	2%	3%	3%	2%	2%	5%	3%
Proficient (4)	19%	17%	23%	23%	24%	24%	25%	27%	2%
Nearing Proficiency (3)	33%	38%	30%	32%	36%	42%	42%	37%	-5%
Progressing (2)	31%	29%	28%	27%	25%	23%	22%	23%	1%
Step 1 (1)	14%	15%	17%	16%	12%	9%	9%	8%	-1%
LND						1%	1%	1%	
MAP Index Score	NA	NA	182.1	184.9	190.7	193.9	194.3	198.4	

Mathematics - 10th Grade

	1998	1999	2000	2001	2002	2003	2004	2005	Difference 05-04
Advanced (5)	1%	1%	0%	2%	2%	1%	4%	4%	1%
Proficient (4)	13%	14%	17%	22%	21%	22%	26%	25%	-1%
Nearing Proficiency (3)	36%	36%	36%	34%	38%	38%	37%	39%	2%
Progressing (2)	31%	29%	28%	28%	25%	26%	22%	23%	1%
Step 1 (1)	20%	20%	18%	14%	14%	13%	12%	9%	-2%
LND						2%	2%	2%	
MAP Index Score	NA	NA	177.0	184.9	185.8	185.7	193.6	195.6	

The MAP Index Score= (Step1% x 1) + (Progressing% x 1.5) + (Nearing Proficient% x 2) + (Proficient% x 2.5) + (Advanced% x 3)

			MAP 2007				MAP 2006			DISTRICT	2007	STATE	2007
SCHOOL		BOT 2	TOP 2	INDEX		BOT 2	TOP 2	INDEX		Index	DIFF	Index	DIFF
RIDGE MEADOWS	3	18.9	81.1	800		17.7	82.3	803.8		780.6	19.4	748.8	51.2
KEHRS MILL	3	28.1	71.9	795.8		32.7	67.2	786.4		780.6	15.2	748.8	47
WOERTHER	3	29.9	70.1	795.3		42.7	57.3	771.8		780.6	14.7	748.8	46.5
FAIRWAY	3	28.9	71.1	791.1		22	78.1	805.5		780.6	10.5	748.8	42.3
KELLISON	3	28.9	71.1	790.4		44.9	55.2	764.1		780.6	9.8	748.8	41.6
CHESTERFIELD	3	26.6	73.4	788.3		44.9	55.1	767.3		780.6	7.7	748.8	39.5
BOWLES	3	34.5	65.5	787.9		28.6	71.4	794.6		780.6	7.3	748.8	39.1
UTHOFF VALLEY	3	34.9	65.1	784.3		37.6	62.4	778.8		780.6	3.7	748.8	35.5
WILD HORSE	3	30.4	69.6	783.7		22.3	77.6	801.2		780.6	3.1	748.8	34.9
EUREKA	3	34.1	65.9	777.3		21.3	78.7	823.4		780.6	-3.3	748.8	28.5
WESTRIDGE	3	38.3	61.7	775.3		32.8	67.3	790.2		780.6	-5.3	748.8	26.5
BLEVINS	3	37.5	62.5	775		45.3	54.6	762.7		780.6	-5.6	748.8	26.2
ELLISVILLE	3	40.1	59.9	773.8		40.4	59.7	774.8		780.6	-6.8	748.8	25
BABLER	3	37.1	62.9	773.3		28.7	71.3	788		780.6	-7.3	748.8	24.5
GEGGIE	3	37.2	62.8	773.1		35.1	64.9	777.7		780.6	-7.5	748.8	24.3
GREEN PINES	3	38.3	61.7	770.4		39.1	60.9	774.7		780.6	-10.2	748.8	21.6
POND	3	38.1	61.9	769.6		41	59.1	774.7		780.6	-11	748.8	20.8
BALLWIN	3	48.1	51.9	762		55.3	44.7	745.9		780.6	-18.6	748.8	13.2
STANTON	3	50.7	49.3	750.7		58.6	41.4	747.1		780.6	-29.9	748.8	1.9
KEHRS MILL	4	23.4	76.6	802.7		13.3	86.7	814.4		783.9	18.8	746.8	55.9
FAIRWAY	4	22.9	77.1	802.1		30.2	69.8	789.6		783.9	18.2	746.8	55.3
WESTRIDGE	4	39.2	60.8	795.9		32.2	67.7	791.9		783.9	12	746.8	49.1
CHESTERFIELD	4	30	70	795		28.3	71.7	783.5		783.9	11.1	746.8	48.2
RIDGE MEADOWS	4	31.3	68.7	794		36.2	63.8	784		783.9	10.1	746.8	47.2
EUREKA	4	29.2	70.8	791.7		41.7	58.4	772.9		783.9	7.8	746.8	44.9
GREEN PINES	4	31.4	68.6	790.7		45.4	54.5	761.4		783.9	6.8	746.8	43.9
POND	4	29.9	70.1	788.8		27.5	72.5	783.5		783.9	4.9	746.8	42
BABLER	4	31.9	68.1	786.2		39.2	60.8	777.7		783.9	2.3	746.8	39.4
UTHOFF VALLEY	4	36	64	781.4		36.7	63.3	784.8		783.9	-2.5	746.8	34.6
WILD HORSE	4	34	66	778		20.3	79.7	803.8		783.9	-5.9	746.8	31.2
WOERTHER	4	36.1	63.9	777.8		31.2	68.8	779.6		783.9	-6.1	746.8	31
STANTON	4	41.1	58.9	776.7		21.2	78.8	803		783.9	-7.2	746.8	29.9

			MAP 2007				MAP 2006			DISTRICT	2007	STATE	2007
SCHOOL		BOT 2	TOP 2	INDEX		BOT 2	TOP 2	INDEX		Index	DIFF	Index	DIFF
BOWLES	4	35.9	64.1	773.6		33.9	66.1	796.4		783.9	-10.3	746.8	26.8
ELLISVILLE	4	40	60	773		37.7	62.3	780.7		783.9	-10.9	746.8	26.2
GEGGIE	4	35.4	64.6	771.9		41.6	58.5	774		783.9	-12	746.8	25.1
BLEVINS	4	42.3	57.7	771.8		35.7	64.2	780		783.9	-12.1	746.8	25
KELLISON	4	42.3	57.7	771.1		51.2	48.8	754.9		783.9	-12.8	746.8	24.3
BALLWIN	4	46.1	53.9	766.7		49.5	50.6	764.5		783.9	-17.2	746.8	19.9
POND	5	17.7	82.3	825.6		20.5	79.5	816.9		788.9	36.7	753.3	72.3
UTHOFF VALLEY	5	26.2	73.8	811.3		55.8	44.2	751.6		788.9	22.4	753.3	58
KEHRS MILL	5	21.8	78.2	809.4		34.6	65.4	780.4		788.9	20.5	753.3	56.1
WESTRIDGE	5	30.1	69.9	807.9		56.6	43.4	754.2		788.9	19	753.3	54.6
WILD HORSE	5	27.1	72.9	807.4		26	74	795.8		788.9	18.5	753.3	54.1
WOERTHER	5	27.4	72.6	804.2		43.3	56.7	766.3		788.9	15.3	753.3	50.9
EUREKA	5	31.4	68.6	796.1		32	68	790		788.9	7.2	753.3	42.8
FAIRWAY	5	33.7	66.3	795.9		23.2	76.9	804.2		788.9	7	753.3	42.6
BLEVINS	5	29.8	70.2	789.6		32.7	67.4	787.4		788.9	0.7	753.3	36.3
STANTON	5	31.5	68.5	789		37.1	62.9	777.4		788.9	0.1	753.3	35.7
RIDGE MEADOWS	5	31.6	68.4	788.4		39.7	60.3	771.1		788.9	-0.5	753.3	35.1
ELLISVILLE	5	37.2	62.8	787.6		40	60	777.5		788.9	-1.3	753.3	34.3
GREEN PINES	5	38.9	61.1	781.1		40	60	781.9		788.9	-7.8	753.3	27.8
CHESTERFIELD	5	35.9	64.1	780.4		27.8	72.1	790		788.9	-8.5	753.3	27.1
GEGGIE	5	32.4	67.6	779.7		38.6	61.5	776		788.9	-9.2	753.3	26.4
KELLISON	5	44.8	55.2	769.2		40.8	59.1	774.6		788.9	-19.7	753.3	15.9
BOWLES	5	41.7	58.3	761.7		42.4	57.6	772.9		788.9	-27.2	753.3	8.4
BABLER	5	50.4	49.6	759.8		46.9	53	769.6		788.9	-29.1	753.3	6.5
BALLWIN	5	54.8	45.2	755.9		51.7	48.4	758.2		788.9	-33	753.3	2.6
ROCKWOOD VALLEY	6	30.5	69.5	790.8		32.2	67.8	786.4		779.2	11.6	750	40.8
CRESTVIEW	6	33.6	66.4	785.8		33	67.1	778.5		779.2	6.6	750	35.8
WILDWOOD	6	37.2	62.8	783.8		34.8	65.2	783.8		779.2	4.6	750	33.8
LASALLE SPRINGS	6	33.9	66.1	783.4		48.3	51.7	756.7		779.2	4.2	750	33.4
SELVIDGE	6	40	60	769.2		44.5	55.5	767.2		779.2	-10	750	19.2
ROCKWOOD SOUTH	6	45.3	54.7	760		52.7	47.3	747		779.2	-19.2	750	10

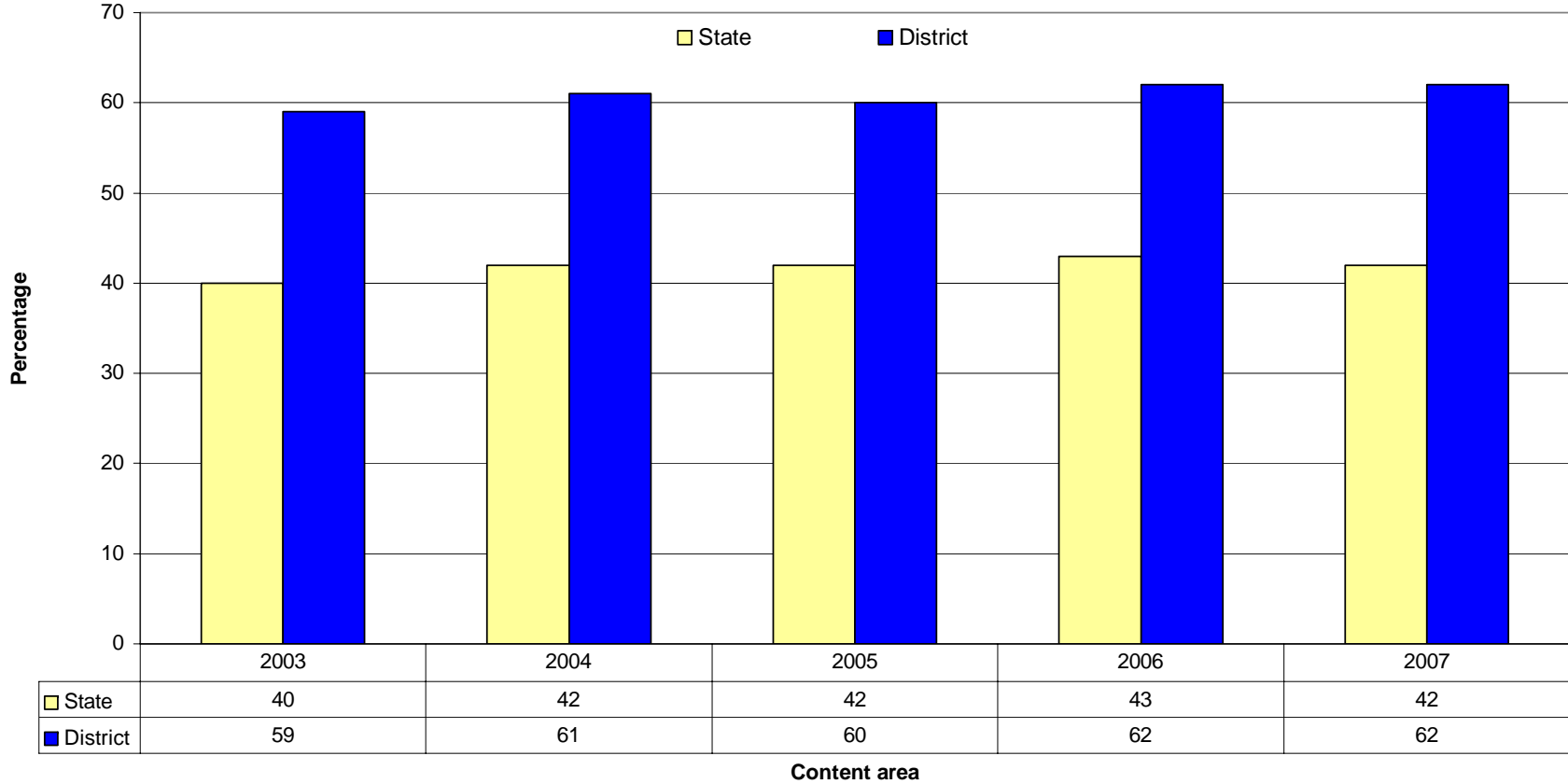
			MAP 2007				MAP 2006			DISTRICT	2007	STATE	2007
SCHOOL		BOT 2	TOP 2	INDEX		BOT 2	TOP 2	INDEX		Index	DIFF	Index	DIFF
ROCKWOOD VALLEY	7	29.5	70.5	796.7		28.2	71.7	796.3		773.2	23.5	741.1	55.6
WILDWOOD	7	33.2	66.8	786.3		32.2	67.8	785.6		773.2	13.1	741.1	45.2
CRESTVIEW	7	33.2	66.8	778.6		37.3	62.7	781.8		773.2	5.4	741.1	37.5
SELVIDGE	7	41.3	58.7	766.3		45	55	768.6		773.2	-6.9	741.1	25.2
LASALLE SPRINGS	7	44.5	55.5	761.5		36.2	63.8	784		773.2	-11.7	741.1	20.4
ROCKWOOD SOUTH	7	49.2	50.8	751.4		47.7	52.3	757.8		773.2	-21.8	741.1	10.3
CRESTVIEW	8	37.5	62.5	786.1		29.6	70.4	795		776.4	9.7	734.4	51.7
WILDWOOD	8	33	67	785.9		32.6	67.4	790.2		776.4	9.5	734.4	51.5
ROCKWOOD VALLEY	8	35.6	64.5	785.4		33.7	66.3	791.6		776.4	9	734.4	51
LASALLE SPRINGS	8	41.5	58.5	772.8		38.8	61.2	776		776.4	-3.6	734.4	38.4
ROCKWOOD SOUTH	8	46.3	53.7	765.3		42.9	57.1	768.2		776.4	-11.1	734.4	30.9
SELVIDGE	8	46.5	53.5	758.9		50	50	750		776.4	-17.5	734.4	24.5
LAFAYETTE	10	33.7	66.3	778.9		30.8	69.2	782.7		767	11.9	725.3	53.6
EUREKA HS	10	35.8	64.1	768.6		40.5	59.4	760.6		767	1.6	725.3	43.3
MARQUETTE	10	40.7	59.3	766.5		35.2	64.8	777.8		767	-0.5	725.3	41.2
ROCKWOOD SUMMIT	10	47.8	52.1	748.2		43.4	56.6	761.5		767	-18.8	725.3	22.9

2007 10TH Gr. RSD Math MAP – Item Benchmark Descriptor Report

GR	STANDARD	GLE code	GLE Description	D.O.K	Item	QT	PP	PE	%PE
10	3.5	G 4 B	draw or use visual models to represent and solve problems	2	1 / 4	MC	1	0.96	96.00
10	1.10	G 3 A	use and apply constructions to represent translations, reflections, rotations, and dilations of objects	2	2 / 6	MC	1	0.90	90.00
10	1.6	A 2 B	use unit analysis to solve problems involving rates	2	1 / 7	MC	1	0.90	90.00
10	3.3	N 3 C	apply all operations on real numbers	1	2 / 1	MC	1	0.90	90.00
10	1.6	A 2 B	describe and use algebraic manipulations, including factoring and rules of integer exponents	2	1 / 26	MC	1	0.89	89.00
10	1.6	A 2 A	use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships	2	1 / 16	MC	1	0.88	88.00
10	3.3	N 3 E	solve problems involving proportions	2	2 / 13	MC	1	0.86	86.00
10	1.10	A 3 A	identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	1	2 / 12	MC	1	0.85	85.00
10	1.5	G 1 C	predict the results of putting together or taking apart two- and three-dimensional shapes	3	1 / 12	MC	1	0.80	80.00
10	1.6	A 2 A	use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships	1	1 / 23	MC	1	0.80	80.00
10	1.6	A 1 B	generalize patterns using explicit function and recursive notation defined functions	2	2 / 18	MC	1	0.80	80.00
10	1.10	M 2 C	determine the surface area, and volume of geometric figures, including cones, spheres, and cylinders	2	1 / 5	CR	2	1.58	79.00
10	1.10	N 3 E	solve problems involving proportions	2	2 / 19	MC	1	0.79	79.00
10	3.7	M 2 D	analyze effects of computation on precision	2	1 / 31	MC	1	0.79	79.00
10	1.6	A 2 B	describe and use algebraic manipulations, including factoring and rules of integer exponents	2	1 / 22	MC	1	0.78	78.00
10	1.6	N 1 D	use factors and multiples to describe relationships between and among numbers and justify characteristics of numbers	1	2 / 24	MC	1	0.78	78.00
10	3.3	N 2 C	apply properties of exponents to simplify expressions or solve equations	1	2 / 23	MC	1	0.77	77.00
10	3.3	M 2 C	determine the surface area, and volume of geometric figures, including cones, spheres, and cylinders	2	1 / 2	MC	1	0.76	76.00
10	1.5	D 1 C	select, create and use appropriate graphical representation of data	2	1 / 30	MC	1	0.75	75.00
10	3.5	M 2 B	solve problems of angle measure of parallel lines cut by a transversal	2	1 / 13	MC	1	0.75	75.00
10	3.3	N 1 A	compare and order rational and irrational numbers, including finding their approximate locations on a number line	2	2 / 15	MC	1	0.74	74.00
10	1.6	A 1 D	understand and compare the properties of linear, exponential and quadratic functions including domain and range	1	2 / 10	MC	1	0.71	71.00
10	3.3	D 3 A	describe how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference	2	2 / 8	MC	1	0.71	71.00
10	1.6	G 1 B	apply relationships among surface areas and among volumes of similar objects	2	2 / 22	MC	1	0.70	70.00
10	3.1	N 3 E	solve problems involving proportions	2	2 / 9	MC	1	0.70	70.00
10	1.5	D 1 C	select, create and use appropriate graphical representation of data	2	1 / 27	MC	1	0.69	69.00
10	3.1	M 2 B	solve problems of angle measure of parallel lines cut by a transversal	2	2 / 16	MC	1	0.69	69.00
10	3.1	D 2 A	apply statistical concepts to solve problems and distinguish between a statistic and a parameter	3	2 / 7	MC	1	0.69	69.00
10	3.3	A 2 B	describe and use algebraic manipulations, including factoring and rules of integer exponents	2	1 / 1	MC	1	0.69	69.00
10	1.5	D 4 A	describe the concepts of sample space and probability distribution	2	2 / 5	MC	1	0.68	68.00

GR	Standard	G		GLE Description	D.O.K.	Item	QT	PP	PE	%PE	
10	1.6	A	1	B	generalize patterns using explicit function and recursive notation defined functions	3	1 / 10	CR	2	1.36	68.00
10	3.3	N	2	C	apply properties of exponents to simplify expressions or solve equations	1	2 / 3	MC	1	0.68	68.00
10	3.5	D	3	A	describe how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference	2	1 / 21	MC	1	0.68	68.00
10	1.6	A	1	B	generalize patterns using explicit function and recursive notation defined functions	1	1 / 9	MC	1	0.67	67.00
10	1.10	N	3	E	solve problems involving proportions	1	2 / 11	MC	1	0.66	66.00
10	1.10	N	1	B	use real numbers to solve problems	1	2 / 4	MC	1	0.66	66.00
10	3.3	D	4	A	describe the concepts of sample space and probability distribution	2	2 / 25	MC	1	0.66	66.00
10	1.6	A	1	B	generalize patterns using explicit function and recursive notation defined functions	2	2 / 17	MC	1	0.65	65.00
10	3.3	D	2	A	apply statistical concepts to solve problems and distinguish between a statistic and a parameter	2	1 / 18	MC	1	0.64	64.00
10	1.5	A	3	A	identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	3	1 / 14	MC	1	0.63	63.00
10	1.5	G	1	C	predict and justify the results of subdividing, combining and transforming shapes	2	2 / 20	MC	1	0.63	63.00
10	4.1	M	2	C	determine the surface area, and volume of geometric figures, including cones, spheres, and cylinders	2	2 / 27	CR	2	1.25	62.50
10	1.5	G	4	B	draw or use visual models to represent and solve problems	1	1 / 8	MC	1	0.62	62.00
10	1.6	A	2	A	use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships	2	1 / 11	MC	1	0.62	62.00
10	1.6	G	1	B	apply relationships among surface areas and among volumes of similar objects	2	2 / 21	MC	1	0.61	61.00
10	3.5	G	2	A	make conjectures and solve problems involving two-dimensional objects represented with Cartesian coordinates	1	1 / 3	MC	1	0.61	61.00
10	3.1	A	2	A	use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships	2	2 / 29	CR	2	1.20	60.00
10	3.3	N	3	E	solve problems involving proportions	2	2 / 14	MC	1	0.59	59.00
10	1.6	G	3	B	translate, dilate and reflect quadratic and exponential functions	3	1 / 15	CR	2	1.14	57.00
10	3.3	N	3	C	multiply and divide positive rational numbers	1	2 / 2	MC	1	0.56	56.00
10	3.3	M	2	C	determine the surface area, and volume of geometric figures, including cones, spheres, and cylinders	2	1 / 17	MC	1	0.49	49.00
10	1.8	D	2	B	given one-variable quantitative data, display the distribution and describe its shape	2	1 / 20	CR	2	0.97	48.50
10	3.3	A	4	A	analyze quadratic functions by investigating rates of change, intercepts and zeros	2	1 / 24	MC	1	0.47	47.00
10	1.10	M	2	C	determine the surface area, and volume of geometric figures, including cones, spheres, and cylinders	2	1 / 25	CR	2	0.93	46.50
10	4.1	D	2	A	apply statistical concepts to solve problems and distinguish between a statistic and a parameter	3	2 / 28	CR	3	1.32	44.00
10	1.6	A	3	A	identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	2	1 / 29	CR	2	0.82	41.00
10	1.6	A	2	A	use symbolic algebra to represent and solve problems that involve quadratic relationships, including recursive relationships	2	2 / 26	CR	2	0.76	38.00
10	3.6	D	2	A	apply statistical concepts to solve problems and distinguish between a statistic and a parameter	2	1 / 6	MC	1	0.38	38.00
10	1.6	A	1	D	understand and compare the properties of linear, exponential and quadratic functions including domain and range	2	1 / 19	MC	1	0.33	33.00
10	1.6	G	3	B	translate, dilate and reflect quadratic and exponential functions	1	1 / 28	MC	1	0.27	27.00
10	1.10	G	4	B	draw or use visual models to represent and solve problems	3	1 / 32	PE	4	1.00	25.00

**2003-07 Percent of ACT-Tested Students Ready for College-Level Algebra
coursework based on the ACT Math benchmark score= 22**



A benchmark score is the minimum score needed on an ACT subject-area test to indicate a 50% chance of obtaining a B or higher or about 75% chance of obtaining a C or higher in the corresponding credit-bearing college course.

ROCKWOOD SCHOOL DISTRICT
Average ACT Test Scores
Trend Comparison
Graduating Seniors
Spring 1994-2007

MATH				
Year	% of Seniors Taking Test	District Average	State Average	National Average
1994	73.0%	21.1	20.2	20.2
1995	70.9%	20.9	20.4	20.2
1996	67.5%	21.4	20.5	20.2
1997	75.1%	22.6	20.9	20.6
1998	76.2%	23.0	21.0	20.8
1999	73.9%	22.7	20.9	20.7
2000	79.0%	23.3	21.0	20.7
2001	79.0%	22.7	20.8	20.7
2002	80.3%	23.3	20.9	20.6
2003	80.8%	23.0	20.7	20.6
2004	79.3%	23.3	20.9	20.7
2005	85.5%	23.2	20.9	20.7
2006	81.5%	23.3	21.0	20.8

AP Test Scores Comparison among High Schools Spring 2007

Calculus AB	Score	EHS	LHS	MHS	RSHS	Total
	5	17	39	24	6	86
	4	13	12	17	8	50
	3	3	7	10	9	29
	2 or below	3	1	3	7	14
Total Tested		36	59	54	30	179
% Scoring 3 or Above		92%	98%	94%	77%	92%

Calculus BC	Score	EHS	LHS	MHS	RSHS	Total
	5	0	0	4	0	4
	4	0	0	1	0	1
	3	0	0	0	0	0
	2 or below	0	0	1	0	1
Total Tested		0	0	6	0	6
% Scoring 3 or Above		0	0	83%	0	83%

Statistics	Score	EHS	LHS	MHS	RSHS	Total
	5	3	19	8	4	34
	4	3	7	8	10	28
	3	5	2	5	17	29
	2 or below	5	0	2	24	31
Total Tested		16	28	23	55	122
% Scoring 3 or Above		69%	100%	91%	56%	75%

**MISSOURI
TOTALS**

**AP GRADE
DISTRIBUTIONS**

			CALCULUS AB	CALCULUS BC	STATISTICS	Number of Students	
MISSOURI TOTAL	5	3657	476	247	110	9/10	1586
	4	4983	360	105	164	11	4549
	3	5732	361	119	216	12	6117
	2	4054	264	29	106	<9	
	1	2416	315	66	122		
	T	20842	1776	566	718	TOTAL	12742
% Scoring 3 or above		69%	67%	83%	68%		
MEAN GRADE		3.16	3.24	3.77	3.05		

SUMMARY OF CURRICULUM DOCUMENT REVIEWS

9-12 Mathematics Curriculum
Board of Education Review and Approval

December 2003	High School Math Document Approved by Board of Education
February 2004	Minor changes and clarifications of wording on Essential Skills, ALAs, Inventory Tests, and Scoring Guides.
February 2005	All facilitating activities were coded to meet MSIP requirements. No changes in course content.
March 2006	Minor changes in wording on the pre-requisite for the senior courses (Discrete Math and Consumer Math).
March 2007	Change in the Honors Algebra II course. Logarithms were removed from the Honors Algebra II course because the concept is not covered on the ACT and will be covered in the Pre-Calculus course. This will allow more time for the trigonometry concepts in the Honors Algebra II course.
February 2008	In-depth Review of the High School Math document.