

Improving Math Performance: Key Practices from the 2004 No Child Left Behind - Blue Ribbon Schools

Exemplary schools, such as the NCLB–Blue Ribbon Schools, manage the complex task of weaving the essential elements of good education into coherent, sustained learning experiences for their students. This year we have grouped those elements into four themes. This year we have grouped the schools’ descriptions of how they improved student math performance into four themes:

- Curriculum
- Teaching
- Assessment
- Student Support



Curriculum

- Alignment to standards
- Continuity across grades/classes
- Spiraling
- Technology



In addition to ensuring that their math curricula are aligned with state and local standards, Blue Ribbon Schools reinforce math concepts by “spiraling”—looping back to confirm that students’ knowledge of earlier concepts remain strong as they learn new concepts. Continuity across grade levels is stressed. Using technology for both assessment and learning, Blue Ribbon schools give their students multiple ways to grasp concepts.

Foulks Ranch Elementary School

Elk Grove, CA

We attribute our students’ success to an assessment-driven, standards-aligned program that meets individual students’ needs. . . . [Additionally] our program includes a spiral that continuously reinforces math concepts throughout our students’ seven years of schooling. All classrooms use the “language of math” and [students know]. . . what they are learning and why in terms they can understand. We utilize “math workshops” to meet individual needs of students and push them to perform at a pace that each child can feel successful in.

Our instructional cycle for math instruction is simple – assess, plan, teach, assess; assess, plan, teach, assess. [Because] each child may learn at a different rate, the individual pace of a child’s instruction is dictated by his/her success. If students need more time on a concept, we plan for that; if students are ready to move at a rapid pace; we plan for that. Most classrooms will “regroup” students each week based on pre-assessments. Using data from pre-assessments, interventions and extensions are used for small groups through workshops.

Killearn Lakes Elementary School

Tallahassee, FL

Math performance has improved, again, through expecting students to achieve, providing instruction based on individual student needs and using a variety of methods to reach all learners. One factor. . . has been aligning the math curriculum to ensure that the delivery of instruction is consistent with the

assessment frequency. Florida has developed Sunshine State Standards for all core subjects. [Students] are assessed each spring using the state-mandated instruments. Through data analysis, teachers and administrators determine the level of mastery of each standard for our school and then look at the frequency that each standard was assessed. The teaching schedule of specific concepts and skills [is] adjusted to ensure that students mastered critical areas early in the school year. Direct instruction, by highly qualified teachers who constantly monitor progress, has been a major contributor to improving student performance.

Britt David Magnet Academy

Columbus, GA

A unique and effective feature of our school is the use of our ILS and computer labs. Students spend 15-20 minutes in the lab and receive individualized instruction in math to help remediate and enhance math skills. Reports generated enable teachers and parents to help identify progress and areas of weakness. The program implements a spiraling method whereby. . . the student may not continue until mastery [of all preceding skills] is attained.

Franklin Elementary School

Jacksonville, IL

We firmly believe that one single program will not meet the needs of all students. With this in mind, we research and review scientifically research-based programs, materials, and teaching techniques, pilot them in the classrooms, and adopt those that [prove] successful. All programs and materials are aligned to the Illinois State Learning Standards and the National Council of Teachers of Mathematics Standards. Spiraling skills and concepts across the grade levels is accomplished through consistent communication among teachers and the principal. Math instruction at all grade levels focuses on helping [students] master basic skills and concepts, learn higher-order and problem-solving skills, and [know] how to speak and write about mathematics. Manipulatives and hands-on activities are utilized as well as cooperative learning groups and independent work.



Motley Elementary School

Motley, MN

We use a variety of approaches. Teaching with different techniques has produced

greater results in student success. Therefore, we use Math Investigations (an in-depth problem-solving curriculum) combined with traditional methods and textbooks. The traditional methods include teaching basic facts in computation as taught in our textbooks and with technology. We currently incorporate Math Facts in “Flash” computer software to utilize our technology in the math program.

A vital component of our math curriculum is homework. One example of a homework assignment is a third grade robot creation. The project requires students to construct a robot demonstrating their knowledge of shapes, space, and measurement and the functions of flips, turns, and slides. Because of strong parental support, 100% of our students have successfully completed this project.

Thrasher Elementary School

Signal Mountain, TN

[We] employ many hands-on strategies that allow the students to "experience" mathematics. An emphasis on problem solving is evident in all grade levels and greatly improves our students' performance on state assessments. . . . Instruction is based on state standards, not just on curriculum scope-and-sequence, allowing the supplemental instruction necessary for success. Foundational skills in math are integrated into other curriculum subjects such as science, social studies, and literature.

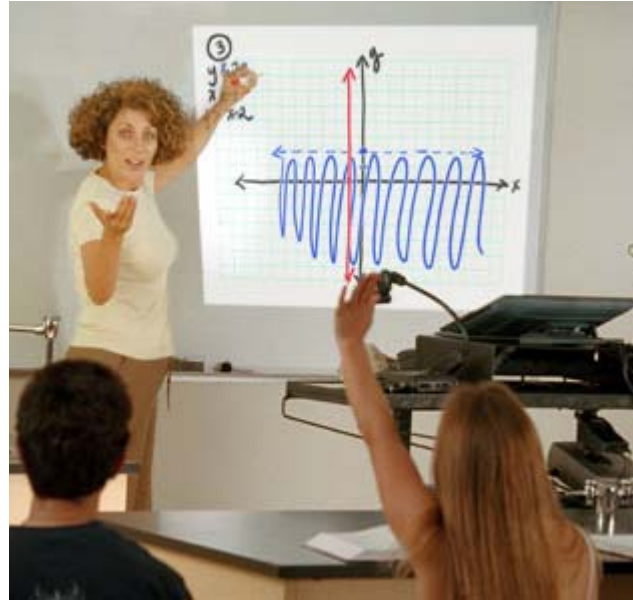


Teaching

- Qualified/dedicated staff
- High expectations
- Multiple techniques, especially manipulatives and writing
- Professional Development

Math teachers at Blue Ribbon schools hold their students to high expectations. They use a range of teaching techniques; many favor manipulatives and writing as tools for understanding.

Because the schools value having highly qualified teachers, they support ongoing professional development.



Morgantown Elementary School

Morgantown, KY

Students' math performance is directly affected by the quality of the educator working with them on a daily basis. If teachers know their content and curriculum they can concentrate on dynamic delivery and powerful planning for all students to reach their potential. At Morgantown Elementary, 100% of our staff is highly qualified and receives on-going training. A biannual improvement plan . . . ensures teachers stay on top of research-based strategies and keep our students on the cutting edge.

Earl Warren Middle School

Solana Beach, CA

Ongoing staff collaboration allows for sharing strategies that work. Teachers and administrators disaggregate data to look for areas of needed improvement. Teachers actively seek professional learning opportunities and partnerships to enhance their own skills. High academic expectations are established for every student, with ongoing teacher inservice to open new avenues for reaching every child. Support classes . . . bolster struggling students. Saturday Support School provides voluntary tutoring for all students. Teachers believe in their students.

Saint Mary's Catholic School

New Albany, IN

[We used] state grant money to fund a strong professional development plan. All teachers [may] attend workshops to learn . . . to facilitate supplemental math programs to enhance the curriculum. Professional waiver days have been granted from the state to dismiss students early and allow for professional development in the school. On these days standardized test scores are analyzed to determine overall student needs and the curriculum is aligned accordingly.

We have a full-time technology coordinator, which has allowed us to [introduce] some creative scheduling and integration of technology and math. This scheduling provides for very small individualized groups in the areas of math and technology to better serve the needs of our student population. We believe in writing about math to ensure student understanding and incorporate[e] a great deal of problem-solving in our math programming that extends beyond what is provided in the adopted text. Students are actively engaged in the math lessons to ensure understanding and to assess [their] ability to apply the skills/standards that are being taught.

Academy Avenue Primary School

Weymouth, MA

In keeping with our emphasis on writing throughout the grade levels, students are taught to use writing to identify steps to solve problems, clarify their thinking, and explain their reasoning. . . . Note taking, graphic organizers, strategy lists, rubrics, and daily journal writing [support] students . . . in developing their writing skills in math. By writing about math . . . students not only reinforce their understanding of math concepts and procedures, but . . . may also uncover new understandings or correct misunderstandings. Teachers regularly include open response questions in assessment tools and students are encouraged to share their thinking. Through this process students raise their own metacognitive awareness and value alternative approaches to solving problems.



Carroll Manor Elementary School

Baldwin, MD

Our ability to provide our students with hands-on instruction . . . enables them to move through the concrete, representational, and abstract stages as they develop their understanding of mathematical concepts. Manipulative are used to develop concepts at all grade levels, whether it is connecting and separating cubes to explore addition and subtraction in first grade, using pawns and a balance to help students solve for x in algebra equations in third grade, or modeling decimals with place value models in fifth grade.

Our students are actively engaged in their learning and are given opportunities to collaborate, solve problems, discuss process and strategies, and justify thinking as they use their manipulatives. Teachers consider the learning styles of all children as students demonstrate, think, and write about mathematics. The use of manipulatives also provides teachers with an additional means to assess students' understanding of skills . . . as they observe students interacting with their materials. By [learning] mathematics with this hands-on approach, students develop a meaningful understanding of concepts [which] translates into increased performance.

Pearl River Central Junior High School

Carriere, MS

[Our students' improved math performance] can be linked directly to the strength and dedication that the math teachers and teacher assistants exhibit on a daily basis. Teachers regularly modify their planned instruction to meet [all students'] . . . learning styles and ability ranges. They are diligent in their efforts to teach, re-teach, evaluate, and tutor students before school, during class, and at afternoon break. As a daily practice, teacher assistants provide students with hands-on opportunities to target and correct math-related deficiencies utilizing the school's computer lab and research-based math software.



Assessment

- Assessment-driven lessons
- Continuous evaluation and analysis

At Blue Ribbon schools, formative and evaluative assessments are continual. Lessons are designed around assessment results, and individual student progress is closely monitored.



Ocotillo Elementary School

Tucson, AZ

As a result [of our school improvement process], we identified specific math goals based on a thorough analysis of our data results, established benchmark assessments, monitored student progress, and provided teachers with the necessary training and resources that resulted in dramatic gains in our students' math performance.

Hyannis West Elementary School

Hyannis, MA

[A team of teachers conducts] yearly in-depth analyses of student performance on the Massachusetts Comprehensive Assessment System mathematics test at grade four and the Stanford 9 Achievement test at grades 1–3. [This allows us] to identify strengths and weaknesses in students' performance, align curriculum with the Massachusetts Mathematics Curriculum Framework, develop recommendations for instructional emphasis, [provide] professional development, and [design] instructional strategies for improving students' problem solving abilities.

Each classroom teacher in grades K–4 completes a [yearly] classroom mathematics instruction plan [that] includes a group profile, instructional goals, instructional materials, a plan for meeting individual needs, and an assessment plan. The plan is reviewed and updated throughout the year.

Beacon Heights Elementary School

Riverdale, MD

Students are given a pre-test in order to determine their mathematical knowledge of the skill to be taught. This gives teachers insights to the needs of the class and allows for adjustments in the curriculum. Students are grouped according to their

needs and may be regrouped according to their mastery. Following each unit a post-test is administered to constantly monitor student progress. This allows the teacher to increase student understanding of mathematics language, vocabulary, and syntax through the use of manipulative tools, centers, and computer programs.

Shadybrook Elementary School

High Point, NC

A variety of tools are available to help teachers determine student mastery of objectives in math, including quarterly benchmarks provided by the district, pre- and post-assessments available through the math basal textbook, and software programs (Yearly Progress Pro and Success Maker) that provide data which specifically pinpoints areas of weakness. Teachers act quickly when difficulties are diagnosed. Students receive small group re-teaching, individualized practice, and an opportunity to be retested on their particular areas of weakness. The tools available to teachers provide an opportunity for on-going assessment.

Pate Elementary School

Darlington, SC

Our curriculum, assessment, and instruction are aligned with the South Carolina Math Standards. Teachers periodically administer benchmark tests to determine which of our state standards students are achieving and which standards indicate a need for re-teaching and reviewing. Based on the results of these benchmark tests, teachers plan classroom instruction to ensure that all students achieve mastery of state grade level standards.

Crawford Elementary School

Crawford, TX

The single most important factor . . . has been the disaggregation of data received from individual student's tests, group tests, and class tests. This has helped our teachers to determine weaknesses in their teaching as well as weaknesses in student performance. After designing and studying charts, graphs, and tables of data, teachers can easily see where to target areas for improvement. Then they can research best practices in order to help students to reach their highest performance.

Student Support

- Alignment with feeder schools
- Early intervention
- Flexible ability grouping
- Tutoring/extra help programs



Blue Ribbon schools offer students ongoing support. Teachers group students by skill level, adjusting groups as needed, to maximize learning. Struggling students receive early interventions, tutoring, and extra help classes. Secondary schools align their curricula with those of their feeder schools so students transition smoothly and are placed in appropriate classes.

A. D. Henderson University School

Boca Raton, FL

Recognizing that all students are not “in the middle,” teachers are open to administering a variety of practice opportunities based on student needs. For students who need remediation, opportunities are offered for additional guided practice and limiting volume of work. On the [other] side of the spectrum, students who are higher achieving may be provided opportunities to advance their skills through enhanced practice opportunities and increased point values for accomplishments.

Bishop Dwenger High School

Fort Wayne, IN

Aligning our curriculum with the curriculum of our feeder schools. . . ensures that our students feed into our system smoothly and are prepared for our level of instruction. We intimately worked with our feeder schools to assure all state standards are being met, technology is being utilized, and students are prepared to take an incoming 9th grade placement exam. . . to help determine the level of math they are capable of mastering. [Based on] . . . the placement exam results, the 8th grade teacher recommendation, and the student’s middle school grades, students are served according to their needs. . . . Each course within the math department has a group leader who holds regular meetings to assure each teacher is teaching the same material and [is] following a similar pace. This serves as a balance and check system that each student is being taught all material required by the course description.

North Pontotoc High School

Ecru, MS

The addition of . . . faculty members has helped us lower the student to teacher ratios in the classrooms, especially in our math classes. This addition has also helped in the expansion of course offerings that help transition students in math courses like Algebra I. These classes give students the opportunity to learn at their own rate and speed, [and give] our teachers the opportunity to individualize instruction for students. With the additional personnel we [have] expand[ed] our course offerings to meet the needs of our advanced math students as well.

Sunny View Elementary School

Mill Spring, NC

Early identification of students who are unlikely to meet grade level standards allows us to provide appropriate interventions. State testing results and classroom assessments are evaluated to identify student needs. . . . Students receive instructional support through our Title One program, after-school labs, and . . . tutorial sessions with volunteers and staff. Personalized Education Plans are written for each student at risk in math. These plans include strategies for enhancing performance that are agreed upon by the teacher, student, principal, and parents. Small group instruction and modification instruction are utilized when needed.



Wrightstown Elementary School

Wrightstown, PA

The collaborative efforts of everyone involved in providing for the students' mathematical needs [has been critical]. Collegial dialogue between parents, teachers, students, teacher assistants, IST, and administrators to identify math needs and concerns is ongoing. Wrightstown does not stop with the identification of students' needs. Educational plans have been designed (and can be redesigned) and are implemented to address these math needs to give students every opportunity to experience 'advanced' math success. Math vocabulary, problem solving, daily computation/calculations, performance assessment tasks, and problems of the day occur in many settings, including the regular math class, during math help, in math enrichment, and [in] before, during, and after school tutoring sessions. A continual examination of each individual's mathematical progress is essential.

Flexible action grouping and high expectations have led to dramatically improved student performance in math. The teacher has a set of extended math standards that go beyond the expectations of the state or district. The use of flexible action groups ensure that all students get individual attention on the skills [they] do not master in the regular math instruction. Students [who] do not master the basic computational facts are given extra time after school and even summer school to ensure they have mastered the required skills before continuing. Once the skills are mastered, the skills are used in real life application problems involving constructed and extended response questions. This has led to all students being successful at math. The students now believe they can do math and they enjoy math.

