



Expanding
minds
and Opportunities

Leveraging

the Power of Afterschool and Summer Learning for Student Success

This article is an excerpt from the groundbreaking book, *Expanding Minds and Opportunities: Leveraging the Power of Afterschool and Summer Learning for Student Success*. This landmark compendium, edited by Terry K. Peterson, PhD, is composed of nearly 70 research studies, reports, essays, and commentaries by more than 100 researchers, educators, community leaders, policy makers, and practitioners.

Collectively, these writings boldly state that there is now a solid base of research and best practices clearly showing that quality afterschool and summer learning programs—including 21st Century Community Learning Centers—make a positive difference for students, families, schools, and communities.

Together, the collection of articles demonstrates the power of quality expanded learning opportunities to:

- promote student success and college and career readiness;
- build youth assets such as character, resilience, and wellness;
- foster partnerships that maximize resources and build community ties; and
- engage families in their children's learning in meaningful ways.

For information on how to order the full book, download sections and individual articles, or explore the topic areas, visit www.expandinglearning.org/expandingminds.

About the Expanded Learning and Afterschool Project

The Expanded Learning and Afterschool Project is a 50-state initiative harnessing the power of networks and leaders to help schools and communities leverage the time beyond school to accelerate student achievement. A partnership of funders led by the C.S. Mott Foundation support the Expanded Learning and Afterschool Project. More information about the book and the project, as well as additional resources, can be found at www.expandinglearning.org.

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Supporting Mathematics Learning in Afterschool and Summer Learning Programs

It is late afternoon, and fifth- and sixth-grade students at Intermediate School 125 in Woodside, New York, are beating on plastic buckets and hand drums to create fun rhythmic sounds. However, that is not all they are doing. Their afterschool instructor is also helping them apply and reinforce key mathematics concepts—such as counting, fractions, multiplication, and division—as they keep track of measures to perform percussion routines.

Why do programs, such as the Champions Club After School Program at Intermediate School 125, choose to embed mathematics into their activities? In light of today's strenuous school accountability demands, widespread concern about our nation's ability to compete globally, and high drop-out rates (including disproportionate rates for low-income and minority students), afterschool programs often provide mathematics learning opportunities to support the academic needs of struggling students.

In adding a mathematics component to their core set of activities, programs operating after school and in summer typically have one or more of the following goals in mind:

- *Schools and communities turn to these programs as a resource to raise overall student performance and narrow the achievement gap between high- and low-performing students by providing more individualized learning time through tutoring and other targeted interventions.*

- *Some programs include a mathematics focus to reinforce learning—helping students solidify understandings they develop during the regular school day by engaging with content through different learning modes (e.g., hands-on, interdisciplinary, cross-age, real-world) and during periods when school is not in session, such as the critical summer months when students may be at risk of losing learning gained during the school year.*
- *Finally, some programs incorporate mathematics instruction to accelerate learning, helping students build academic background knowledge they can draw upon as they learn new content in the regular classroom setting.*

Programs typically use a combination of more targeted learning experiences (e.g., direct instruction, tutoring) and enrichment experiences to meet one or more of these purposes.

But do afterschool programs that incorporate a mathematics focus actually lead to improved student outcomes? Early study findings were mixed, and the body of research in this area is still relatively small; however, in recent years a growing number of program evaluations have indicated that participating in well-designed and implemented programs can enhance mathematics test scores and grades, school attendance, and student engagement in learning. Moreover, successful programs tend to have the most significant effects for students most at risk of failing in core subjects, such as math and reading, or dropping out of school (Afterschool Alliance, 2011; Little, 2009).



For the U.S. Department of Education Institute of Education Services (IES) panel recommendations, see *Structuring Out-of-School Time to Improve Academic Achievement* (2009), available at the IES website: <http://ies.ed.gov/ncee/wwc/practiceguide.aspx?sid=10>

For a robust set of resources to support implementation of the IES recommendations, see the U.S. Department of Education's website *Doing What Works*: http://dww.ed.gov/Increased-Learning-Time/topic/index.cfm?T_ID=29

Over the last decade, there has been a dramatic increase in the number of schools, districts, and community-based organizations running afterschool and summer learning programs with the goal of improving academic performance (Stonehill et al., 2009). To respond to these programs' need for research-based guidance, the Institute of Education Sciences (IES) convened an expert panel to review existing research on afterschool, summer, weekend, and tutoring programs (Beckett et al., 2009). The panel generated five recommendations for designing, delivering, and evaluating high quality academically oriented programs:

1. Align the out of school time program academically with the school day.
2. Maximize student participation and attendance.
3. Adapt instruction to individual and small-group needs.
4. Provide engaging learning experiences.
5. Assess program performance and use the results to improve the quality of the program.

The following is a discussion of the recommendations as they relate to designing and delivering high quality programs with a mathematics emphasis.

Designing Afterschool and Summer Learning Programs That Address Mathematics

Designing high quality afterschool and summer learning programs with a focus on mathematics requires aligning the program academically without repeating the school day, while maximizing student participation.

To facilitate the communication and collaboration needed to align the program academically with the school day, while maintaining a distinctive programmatic identity and approach, it is important to designate a point of contact for both the out-of-school and regular school-day program. The afterschool program coordinator, who ideally has access to and presence in the school building during day, develops relationships and maintains ongoing communication with regular school day staff. The school staff person designated to coordinate with the out-of-school-time program provides the afterschool coordinator with student data, curriculum materials, and any other information that assists with aligning the program with the school's academic goals and priorities.

Additionally, the afterschool and school coordinators might identify opportunities for collaborative planning and professional development. Finally, they can work together to determine how to strategically use the school's teaching faculty and community-based and business partners to support the program in engaging, hands-on, and personalized ways. Teachers can be recruited to serve as tutors or intervention specialists, mentor new out-of-school-time staff, model instructional strategies, and collaboratively plan enrichment activities to include the mathematics concepts and skills for which students need the most support. Community organizations and business partners can serve as tutors and mentors, help plan and facilitate real-life and practical math problem solving activities, and demonstrate how math and math "talk" are critical in the work world.

Ensuring that the afterschool program aligns with the school day is an important strategy, but alignment alone is insufficient for improving mathematics performance if the students who need the program the most do not take advantage of it. To help maximize student attendance and participation, schools should promote the programs widely using a variety of communication mechanisms; address the needs and preferences of students and parents, including issues of transportation, location, hours of operation, and programmatic interests; and offer enrichment and recreational activities in addition to mathematics instruction.

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Ohio

Glover Community Learning Center's Akron After School Program is aligned to the regular school day mathematics curriculum, uses intervention assistance teams to identify struggling students for participation, provides targeted math and reading interventions,

and maximizes attendance by allowing students to choose from among a variety of engaging enrichment classes where they enhance their mathematics and other subject-area knowledge through project-based learning. The afterschool program coordinator plays a critical role in ensuring alignment with the school day and uses regular updates about student needs from school-day teachers to tailor afterschool instructional activities. For example, conversations with different teachers led to a priority focus of supporting fifth-grade students with solving math story problems. To further enhance alignment, school-day and afterschool instructors are provided collaboration time to exchange ideas and information about students. All afterschool instructors are encouraged to participate in professional development sessions with school-day teachers, and many school-day teachers serve as afterschool instructors.



For more information about Glover Community Learning Center, see its profile at Doing What Works: http://dww.ed.gov/Increased-Learning-Time/Align-Instruction/profiles/?T_ID=29&P_ID=75&SID=307

Providing Tailored and Engaging Afterschool and Summer Mathematics Learning Experiences

Recommendations 3 and 4 from the IES panel (above) focus specifically on instructional delivery. Programs should provide targeted, intentionally designed learning experiences that are engaging, active, and maximize the flexibility that out-of-school environments offer to meet specific learning needs. The IES panel did not generate content-specific instructional recommendations. Another project, however, previously funded by the U.S.

Afterschool Programs Multiply Math Skills

A Peace Corps water project in Panama receives virtual assistance from an unlikely source: an afterschool program in rural Washington State. Meanwhile, afterschool program participants elsewhere in Washington are learning to build bridges, engineer wind farms, and design robots.

The Northwest Learning and Achievement Group (NLA), which directs these programs, has been highly successful in utilizing the time beyond school to accelerate student achievement. Each afternoon session begins with tutoring and supervised homework time with math teachers then moves to online math tutorials and interactive group projects. Perhaps surprisingly, organizers have cut back on the afterschool time dedicated to homework in part because they found that providing students more innovative outlets to hone their math skills had a larger positive impact on test scores.

In addition to working with a Peace Corps volunteer, NLA programs utilize community resources, including arts and cultural organizations, city and local governments, environmental programs, and parks and recreation departments. Today, more than 2,000 students attend NLA afterschool programs, 80% of whom are eligible for free or reduced-price lunch. Through quality afterschool programs, these students are expanding their horizons while demonstrating impressive gains in their classroom behavior, homework completion, and standardized test scores.

Department of Education—the National Partnership for Quality Afterschool Learning—identifies promising practices for a variety of content areas, including mathematics, as part of a multiyear study of 21st Century Community Learning Centers-funded programs showing gains in student achievement (National Partnership for Quality Afterschool Learning, n.d.). The recommended mathematics practices include the following:

1. Finding Math – use of engaging, everyday situations to bring math to life
2. Math Centers – small-group stations that allow students to work independently or collaboratively on problem-solving tasks at their own pace
3. Math Games – fun activities that develop targeted math strategies and skills
4. Math Projects – learning experiences that extend beyond one lesson that allow students to deepen mathematical knowledge and skills through their own authentic investigations
5. Math Tools – use of pictures, rulers, symbols, technology, and concrete materials to problem solve
6. Math Tutoring – one-on-one or small-group work on specific math skills
7. Family Connections – methods for engaging family and community support and enthusiasm for math in out-of-school time

The project team identified three overarching strategies that should accompany implementation of any of these practices to increase the level of rigor and student engagement with these learning experiences. First, afterschool and summer learning programs should encourage problem solving by providing students opportunities to creatively generate strategies for solving intriguing mathematics problems on their own. Second, program activities should be designed to develop and support math talk by providing ample opportunities for students to communicate ideas to each other. Math talk helps students clarify their thinking, construct meaning, and develop reasoning skills while providing afterschool and summer learning facilitators with informal assessment data they can use to make instructional adjustments and provide targeted feedback. Finally, activities should emphasize students working together to draw on each others' knowledge and deepen learning.



For information, additional resources, and program examples to support use of the math practices, see SEDL's National Center for Quality Afterschool website: http://www.sedl.org/afterschool/toolkits/about_toolkits.html?tab=math

Math talk helps students clarify their thinking, construct meaning, and develop reasoning skills while providing afterschool and summer learning facilitators with informal assessment data they can use to make instructional adjustments and provide targeted feedback.

These crosscutting strategies for supporting afterschool and summer mathematics learning align nicely with several of the new Common Core State Standards (CCSS) for mathematics. Almost all states have adopted these or similarly rigorous learning goals designed to prepare students to succeed in college and the workforce. The CCSS articulate expectations for math content in addition to mathematical practices, or “habits of mind,” such as making sense of and persevering in solving problems, reasoning abstractly and quantitatively, and constructing viable arguments.

With the relative flexibility afterschool and summer programs have with time and structuring activities, they can be perfect environments for fostering these mathematics habits of mind and an invaluable resource as schools and districts plan for transitioning to the CCSS.

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Texas

The afterschool program staff at Purple Sage Elementary School in Houston, Texas, are in ongoing communication with classroom teachers to identify the mathematical concepts they should reinforce through engaging experiences that are different than the school day. At times they focus directly on these concepts. For example, they might have students choose from a variety of center-based math games where one small group of students works to deepen their understanding of and practice applying the concept of equivalent fractions using fraction dominos. Instructors emphasize critical thinking skills through high-level, open-ended questioning, encouraging students to connect math concepts to other familiar ideas and find creative solutions to problems. During other times, mathematics learning is intentionally embedded into other engaging activities, such as incorporating the application of a variety of basic mathematics concepts (e.g., odd and even numbers, factors, multiples) into a competitive group tag activity.



For video clips of Purple Sage Elementary School staff members using the recommended practices of Math Centers and Math Games, see the National Center for Quality Afterschool:
http://www.sedl.org/afterschool/toolkits/math/pr_math_centers.html

http://www.sedl.org/afterschool/toolkits/math/pr_math_games.html

Opportunities for Improving Mathematics Achievement

Afterschool and summer learning programs not only provide additional time but also different modes for supporting, reinforcing, and even accelerating mathematics learning. Communication, collaboration, and coordination between what happens during the school day and what happens in the afterschool or summer learning environment are all critical elements for ensuring successful program outcomes.

In addition, leaders of afterschool and summer learning programs and their regular school day partners who want to enhance math learning and interest should:

- intentionally infuse mathematics content into everyday problems by using math games and centers, incorporating the use of math tools, and constructing authentic project-based learning opportunities;
- provide targeted tutoring assistance; and
- engage families, communities, and businesses to expand students' mathematics learning opportunities through meaningful partnerships.

ABOUT THE AUTHOR

Danette Parsley, director of the Center for School and District Improvement at Education Northwest, has extensive experience providing technical assistance at the local, state, and regional levels in various aspects of systemic school and district improvement, including afterschool teaching and learning practices. She currently serves as co-principal investigator for two federally funded projects to design and evaluate academically oriented afterschool and summer learning programs for high school students. Parsley served on the expert panel that developed the Institute of Education Sciences practice guide *Structuring Out-of-School Time to Improve Academic Achievement*.

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