

Fostering Inclusion Through Afterschool Math



*Creating graphs at the Chinese American
Planning Council*

These guidelines describe the need for and characteristics of successful afterschool inclusive math programs based on the lessons learned from Afterschool Inclusive Math (AIM) developed by the Educational Equity Center at AED.

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Why is Afterschool Inclusive Math Important?

Young people with disabilities are widely underserved and undereducated in the critical areas of science, technology, engineering and mathematics (STEM) beginning at the earliest level of education. Despite their capabilities, these students do not pursue careers in math and science at the same rate as their peers, as illustrated by the fact that only 5.5 percent of employed scientists and engineers are individuals with disabilities yet approximately 12% of the workforce is comprised of persons with disabilities. Success in math is critical for a STEM career.

Fortunately, math provides the ideal vehicle for inclusion as it allows for multiple modes of teaching (including visual, tactile, auditory, and kinesthetic), is part of every child's life and surroundings, welcomes "thinking out of the box," and encourages collaboration.

Unfortunately, negative attitudes can serve to discourage students with disabilities from seeing the mathematician within themselves. Low expectations of student abilities, combined with lack of confidence to teach students with disabilities often leads to discouraged students and frustrated teachers.

However, research shows that by implementing exemplary in-school and after-school programs built upon best inclusive practices, students with disabilities can thrive in math as their teachers gain confidence and competence.

Checklist for an Exemplary Afterschool Inclusive Math Program

- Are students with and without disabilities fully engaged in the activities?

- Do students with disabilities have a role and are their contributions valued?

- Are students with disabilities encouraged to participate to their maximum abilities?

- Are there provisions to ensure that all students have high quality experiences?

- Are peer relationships encouraged to develop naturally?

- Do all students appear to understand the math concepts presented?

Afterschool Inclusive Math (AIM)

Afterschool Inclusive Math (AIM), developed by the Educational Equity Center at AED, is based on After-School Math PLUS, an engaging program that helps students find the math in everyday experiences. After-School Math PLUS creates unique partnerships between afterschool centers and science/technology museums. AIM brings this distinctive, standards-based program to inclusive afterschool settings. Its goal is to give youth with and without disabilities opportunities to work together on real-world, inquiry-based math activities that meet national standards.



Activities are grouped into four thematic units: ArtMath, Built Environment, Jump Rope Math and MusicMath. Each activity has modifications that make it accessible for young people with a broad range of physical, sensory, cognitive and social/emotional disabilities. They ensure that young people with disabilities have the opportunity to interact and communicate with peers and participate in teamwork exercises. Every theme includes role model and career connections and a family letter available in English, Spanish, and Chinese.

- ✎ In **ArtMath**, students experience the elegance of math, explore the many connections between art and math, and use math (tessellations, patterns, symmetry) to create their own art.
- ✎ In the **Built Environment**, students learn about scale, measurement and their immediate environment to create a blueprint and a charrette depicting an “ideal community.”
- ✎ In **Jump Rope Math**, students learn various ways to gather and represent data (bar graphs, line graphs, scatter graphs, and Venn diagrams) while jumping rope and getting exercise.
- ✎ In **MusicMath**, students learn about fractions as they use whole, half, quarter, and eighth notes to create musical compositions.

AIM's Formula for Success

Full Participation in High Quality Math Programs

+

Positive Attitudes of Staff and Peers

—

Low Expectations

=

Successful Math Inclusion!

The AIM Program: Exemplary Inclusion

The AIM program emphasizes high quality math content presented within the context of exciting, relevant topics with accommodations for students with disabilities. AIM suggests a variety of pedagogical approaches and assistive technology devices that can be utilized to promote math inclusion:

- Students with visual disabilities may benefit from the use of: Wikki-stix, glue drops, "puff paint" and Braille labelers to create tactile graphs, charts, artwork, and other materials; electronic "Color Tellers" and "Pocket Viewers" to identify colors and shapes; talking or Braille measuring tape, trundle wheels, and large display talking calculators for measurements and calculations.
- Hearing and communication impaired students may benefit from the use of: "Pocket Talker" devices which block out extraneous sounds from the classroom; chart paper or white board with step-by-step written instructions and vocabulary words; "Big Mack," "Lingo," or "iTalk" communicators to assist them in participating in group discussions while enhancing social skills development.
- Students with impaired motor skills may benefit from the use of: "ChubbiStump" crayons and paints with handles, "Adaptacut" scissors; "hand over hand" guiding techniques.
- Students with learning disabilities may benefit from the use of: Chart paper, handouts, or whiteboards with graphic organizers and framed outlines; manipulatives for linear measurement; multi-modal instructions including written, recorded, and pictorial.

Management Tips for the Inclusive Math Classroom

- Adapt instructional delivery by modifying the rate of the presentation, offering directions in different formats, and pre-teaching prerequisite information to maximize student success and minimize frustration.
- Utilize cooperative learning techniques such as heterogeneous (mixed ability) team formation, team roles, social skills reinforcement, and activities structured to ensure positive interdependence (i.e. the success of the team relies on the participation and success of every member).
- Develop a “Social Skills Sheet” which includes categories such as “Making Eye Contact,” “Using Inside Voices,” “Using Put-Ups,” “Sharing Materials,” “Handling Disagreements with Words,” and “Taking Turns While Speaking.”
- Try “Pass the Microphone” technique whereby only the student with the microphone (a special pencil, student-made microphone, or other item) can speak. This encourages listening and turn-taking!

Good resources for assistive technology are:

www.abledata.com

www.flaghouse.com

www.jumpsnap.com

www.nfb.org

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AED is an independent, nonprofit organization committed to addressing human development needs in the United States and around the world. The Educational Equity Center at AED is an outgrowth of Educational Equity Concepts, a national nonprofit organization with a 22-year history of addressing educational excellence for all children regardless of gender, race/ethnicity, disability, or level of family income. EEC's goal is to ensure equality of opportunity in schools and afterschool settings, starting in early childhood.

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FHI has acquired the programs, expertise, and assets of AED.