



Features

- Digital Corner
- Book Review
- Interviews with Aaron Brown

Important Dates

- **December 12:** Advisory Board Meeting, 4:30-6
- **January 23:** CPS Partner Professional Development Workshop, 4-6
- **Feb 13:** Spring Field Advisory, 4-4:50
- **Feb 15:** Student Teaching Applications Due
- **Mar 1:** Internship, Assessment, Clinic Applications Due
- **Mar 13:** Spring Field Advisory, 4-4:50
- **Apr 17:** Spring Field Advisory, 4-4:50

STEP=UP

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Planning Mathematics Instruction

Mathematics curriculum has changed in the last 20 years mainly due to the NCTM standards and educational reforms. Providing effective math instruction to students with disabilities so they can meet the standards is a challenge. Students with disabilities do better when mathematics is meaningful. Both knowing and doing mathematics must be emphasized. For example, they need to know that subtraction represents a difference, rather than a rote computation "take-away" process. Or, understand that subtraction also involves the ability to demonstrate the connectedness between one facet of mathematics (e.g., subtraction) and another (e.g., addition) (Cawley, 2002).

Maccini & Gagnon (1999) have found that certain effective instruction components positively influence the algebra performance of students with learning and behavioral disabilities. They suggest instruction on domain-specific knowledge, self-regulation strategies, sequential introduction of word problems through concrete, semi-concrete, and abstract phases. Peer feedback and use of computer-assisted programs were found to be useful, too.

Montague (1993) shows that effective mathematical problem solving depends on the ability to select and apply task-appropriate cognitive and meta-cognitive processes and strategies for understanding, representing, and solving problems. She has developed Solve It!, an approach that incorporates the cognitive processes critical to mathematical problem solving in each of the following steps: Read the problem, paraphrase, visualize, hypothesize about problem solutions, estimate the answer, compute, check the problem. This process shows how computation is one of the very final aspects of problem solving. For more information, contact Montague at outreach@Miami.edu.

Teaching Transference with "Hot Math"

Students need to be able to classify problems and know the rules for how to solve them. They must also be able to "connect novel problems

to the ones they already know how to solve or 'transfer' their knowledge", says Fuchs (2003). First, students should learn what "transfer" means, e.g., you transfer or move to a different school, and students transfer their knowledge of how to add two-column problems to three-column problems. Next, students should learn the ways word problems can change. They can, for example, be formatted differently, have keywords different from those familiar to students, or have multiple questions within the one problem. Fuchs recommends giving students lots of practice in sorting through varied kinds of problems, and looking in and outside of school for situations requiring the same solution methods. For example, students can identify different types of math problems while grocery shopping or doing other homework. For more information on Hot Math, go to www.vanderbilt.edu/CASL.

Authentic Math Problems

Bottge (2001) presents word problems on video to bypass reading difficulties and get students enthused about math word problems. Video makes it easier for students to visualize the problem and problems posed are intriguing, e.g., building skateboard ramps and hovercrafts. These types of real-life problems embed skills that are imperative to learn. Students realize they need to know how to add fractions to see if the lumber they are cutting will be the right size. This puts a lot of responsibility on the teacher. Teachers have to know their kids well, know when to stop and do more in-depth teaching. They also have to figure out what the problem is and the math concepts embedded in the problem. For more information, see [Teaching Exceptional Children](#), Sept./Oct. 2001.

We need to revise the way we teach problem solving and base our strategies on real life. Gersten (1995) suggests that students need to "practice the language" in order to actually talk about possible solutions. Having them visualize problems by creating representations is helpful in learning mathematics.

Partner's Corner Interview with Aaron Brown

Give us an idea of the population you work with?

AB: I work with students from low income background, all African American, aged 14-18. I teach all areas including Algebra I & II, Geometry.

What are some of the challenges with mathematics instruction for children with disabilities?

AB: One of the challenges I face is the students not being able to remember the concepts that they have learnt before. Additionally Students have difficulty visualizing the information the teacher is presenting. Another challenge is having students prepared for class, insisting that they take notes and refer back to the notes. Students in class who do not take notes are going to be less successful as compared with students who take notes and refer to them before coming into class.

What are some strategies that you use to overcome these challenges?

AB: I am fortunate enough to have my own classroom, so I use displays as much as possible. Right now we are doing an angle activity, students use straws to create angles, paste the straw on the poster boards and we

will put them up for display. This helps students with the visualization and get a sense of ownership. It makes them feel like they are the part of the group and the classroom. I also use a lot of manipulatives, so they can visualize what the mathematical idea means.

How do you connect mathematics to your students' lives?

AB: Children often think and ask – why do I need to know this (a concept in math). I always try to connect to the real world to mathematical concepts and ideas. I always think about what would be a good real world examples for the math concepts that I am introducing. Coming up with these connections is difficult the first time, but once I have it, I can use it with every class I work with. For e.g. working with like terms. I give them the example of how you would describe what is in your closet— will you say 4 pants, 5 shirts and 4 pants or 8 pants and 5 parts. So you are combining like terms. Then I make them work through worksheets and understand the concept of combining and make the expression shorter.

The complete interview with Aaron Brown is available at <http://www.uic.edu/orgs/stepup/aaronbrown.shtml> . Check out the module at <http://www.uic.edu/orgs/stepup/module> for lesson plans and ideas from Aaron on math instruction.

Digital Corner

Plane Math is a project developed by InfoUse and NASA for students with physical disabilities in grades 4-7. The program has been designed to teach the math concepts of these grades without relying on physical acuity of the student. The program endeavors to motivate these students to pursue aeronautics-related careers via the development and delivery of accessible math education materials on the internet. Activities involve finding the shortest path between two cities, learning to how planes lift, knowing when an overcast sky is really overcast, planning a flight around the country etc.
<http://www.planemath.com/>

MathForum is a leading center for mathematics education on the internet operating under Drexel's School of Education. Their mission is to provide resources, materials, activities, person-to-person interactions, and educational products and services that enrich and support teaching and learning in an increasingly technological world. Several services such as Teacher2Teacher, Ask Dr. Math, Problems of the week, Math Tools, Internet Mathematics Library, Teacher Exchange are provided. It also hosts a compilation of resources available for teachers working with children with special needs at http://mathforum.org/library/ed_topics/contexts_disabled/

Book Review

Teaching Inclusive Mathematics to Special Learners, K-6 By Julie A. Sliva (2004), Corwin Press.

"Arm yourselves with the information and tools necessary to help special education students conquer today's mathematics!" - Quote from Publisher

With inclusion of special education students and mathematics requirements on the rise in today's classrooms, this book opens windows to a greater understanding of how to recognize and compensate for the math challenges students face. It provides an expanded framework for K-6 educators to use when teaching math to students who find it difficult to grasp the concepts of math and to meet the ultimate goal of providing standards-based math for all students.

Information and tools provided to help teachers better understand, observe, and include special needs students are:

- Descriptions of characteristics of special needs students and how to "see inside the heads" of the challenged students
- Strategies and recent research useful for teaching students with disabilities
- Instructional techniques, suggestions, and modifications for facilitating learning
- "Look fors" to help clarify, understand, and observe strengths and challenges
- Matrix for matching challenges to strategies

This book emphasizes techniques and strategies designed to address specific difficulties or weaknesses to help the challenged student succeed in math.

Watch out for this book in the STEP=UP Library!