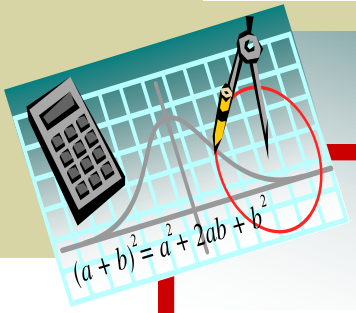

June 2011
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SABES Math Bulletin

In This Issue

Over a year has passed since the last issue of the *SABES Math Bulletin* was published. In that time, the mathematics and adult education community has lost one of its greatest practitioners, Tricia Donovan, Ed.D, editor of this newsletter, co-author of the EmPower textbook series, one of the driving forces behind the SABES Math Initiative, cheerleader for all things mathematics, and a great friend. Tricia is truly missed, but as the teacher of all the teachers, her spirit lives on amongst all of us. It is with Tricia in our thoughts that we offer you this latest installment of classroom materials and research reporting on mathematics education.

In this issue, we'll be examining Reasoning and Sense Making in School Mathematics, a current focus of the National Council of Teachers of Mathematics (NCTM), together with activities to try in the classroom. We'll extend that to pulling math content from current events found in electronic and print sources. We will also explore language in the mathematics classroom with rich problems and bringing out the mathematics in literature.

As always, if you have examples of problem solutions from your classroom or comments on activities from this bulletin that you would like to share, feel free to submit them to the *SABES Math Bulletin* at: lteller@worlded.org

Enjoy!

Inside this issue:

The *SABES Math Bulletin* is a publication of the System for Adult Basic Education Support (SABES), and is funded by the Massachusetts Department of Elementary and Secondary Education. The *Math Bulletin* mission is to make math research and best mathematics classroom practices accessible to ABE practitioners.

Patricia N. Donovan, PhD…What a gift to the world.

This winter, World Education mourned the loss of one of our talented colleagues, Dr. Patricia Donovan. She was highly respected by all those of us who were fortunate to have worked closely with her. How she filled our work with her bright smile, her beautiful mind, and her deep commitment to adult learners.

Tricia was very moved by the awareness that people were so caring and concerned throughout her illness. Many of the math leaders and practitioners with whom she worked continued to stay in touch during those difficult times.

Tricia Donovan, 1952-2011

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And, although it was so difficult for some not to be able to visit her, we were respecting her wishes and honoring her hope that at some point, we would all be back together without the tubes and wires.

Throughout Tricia's illness, World Education's ongoing support of her was a godsend to both Tricia and her husband Tom, and allowed them to focus on her health needs. As Tom so graciously put it, when he looked around at what other patients were dealing with, it was hard not to feel fortunate for all the support.

Lifelong Learner, Lifelong Giver

This is not the outcome any of us expected, but Tricia was a person of deep faith, and she surely felt there was another phase waiting for her. If that's true, given her gentle and gracious spirit, I am sure she was welcomed with open arms and great celebration.

In Tricia's passing, we are reminded of a poem, *The Dash*, by Linda Ellis. If what truly matters is the "dash", then there can be no question that Tricia's "dash" was filled to the brim. We run out of superlatives when we think about her kindness, warmth, faith, courage, and generous spirit…not to mention how brilliant she was.
Patricia Donovan, PhD…What a gift to the world.

The Teacher of all the Teachers: A Remembrance

By Veronica Kell, Barbara Goodridge, and Christina Cronin

Tricia Donovan was the facilitator, brains, and vision behind Teacher 2 Teacher (T2T), a part of the three-year (2005-2008) SABES Math Initiative. We were T2T math practitioner leaders together with others from each region of the state who met quarterly over the years, and we benefited directly from Tricia's leadership – and by so much more than the chocolate that sweetened every one of our meetings. Some of us knew Tricia before T2T (in Barbara's case, many years before), and we worked with her discussing standards, developing courses, and delivering workshops up until the time she was hospitalized in the fall. Tricia remains with us, in our classrooms, our planning time, and our lives. In each of our words, here are our remembrances of Tricia.

From Barbara Goodridge:

Tricia has such a vision for professional development in math; it was my privilege to deliver the very thoughtful and thorough curriculum workshops that she developed.

Tricia was a wordsmith!! She knew the precision of each word. There was no place for generalizations. So when she and I worked together on the Statistics and Probability section of the Math Frameworks in the 1990's, she made careful verbal distinctions in each benchmark. As a result we had more benchmarks in that area than in any other area, leading the UMass MAPT development team to assume that Statistics and Probability was the most important section of the frameworks.

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When I visited her in the hospital last fall, I met her husband, Tom, whose pet name for her was "Wink," he explained, because she could only wink with one eye. Tom and Tricia's very special relationship was described as Tom was the ribbon of Tricia's bow. I say, that bow was on the gift that she was to all of us.

Acknowledgment

The compilation and production of the Math Bulletin was made possible through the help and support of

Veronica Kell,

Mt. Wachusett Community College

Math Instructor

Christina Cronin remembers Tricia:

Tricia was the ultimate mentor to so many and she always put everything into everything she did. Although I learned about so many great math ideas, resources, and lessons from her, it is her example that I will remember most. Anytime I attended a workshop facilitated by Tricia, she instinctively modeled for us the importance of so many qualities of a good teacher.

First of all, she made learning math fun with chocolate, hands-on activities, and openers to pique our interest. It *was* fun, and this is something I know she hoped we would carry into our own classrooms.

Second, she was always well prepared. She connected what she was teaching to a bigger picture: the Frameworks and research. I know she hoped we would do the same with our lessons.

Third, she spent time reflecting with us after every activity or lesson. She once shared a learning model called the "Pillars of Learning" with us that pro-foundly spoke to me in my own teaching. In that model, a learner should first experience something, then **reflect**, abstract or make sense of the activity, and finally test or try out that new knowledge. She never rushed our reflection process or abstracting process in a workshop; she knew it had a greater value than just moving on to the next problem for the sake of time.

Lastly, she made us feel important and empowered us to want to do more to help educate students in math. She had a wealth of knowledge and she shared with us so that we could share with other educators back in our schools.

In closing, whether you were fortunate as I was to know Tricia or not, I hope you will read this and learn from all that she modeled for so many. That way, Tricia's legacy will continue to live on through all of us for years to come. We miss you Tricia!

Ronnie Kell:

The things I've learned from Tricia and practice daily are: smile, be kind, eat chocolate, find the math in it, reflect, read the research, enjoy. I am blessed to have found you, my friend.

Reasoning and Sense-Making in Math

One of the ongoing initiatives of the current National Council of Teaching Mathematic (NCTM) president Mike Shaughnessy is the promotion of reasoning and sense-making in all mathematics classrooms. So, what exactly is reasoning and sense-making? And how is it brought into the classroom?

According to the NCTM publication *A Teacher's Guide to Reasoning and Sense-Making,* "reasoning and sense making refers to students' abilities to think about and use mathematics in meaningful ways." Math students today must have more than the ability to apply procedures. They must develop the critical thinking skills needed to succeed in the subject of mathematics as well as in life – as a citizen and in the workplace.

Students often struggle with finding the meaning in mathematics "When am I ever going to use this?" By focusing on reasoning and sense making as a stance towards math learning, teachers provide the framework for students to connect new concepts with their existing knowledge. Students are not just practicing concepts and procedures they have already been taught, or being asked to recall facts, they are engaged in meaningful tasks that allow them to think about and make sense of the math. The teacher may hear, or ask, the questions "What is happening here?", "Why do you think that?", and "How do you know it works like that?"

What does reasoning and sense-making look like for the teacher preparing lessons and the student in the classroom?

For the teacher:

Have good problems! Provide tasks that require students to figure things out for themselves rather than giving prompts that require little engagement and reasoning. Write "open" questions. In *More Good Questions: Great Ways to Differentiate Secondary Mathematics Instruction* (Teachers College, Columbia University, 2010), Marian Small and Amy Lin state that a question is open when it is framed in such a way that a variety of responses or approaches are possible (pg. 7). Oftentimes in creating open problems, the teacher can start with an existing problem from a text or other resource. Strategies for constructing open questions include turning a question around, asking for similarities and differences between two like items, replacing a number with a blank, and asking for a sentence that includes certain vocabulary and numbers. With open questions, the classroom becomes a place of equitable learning for all students. No matter the math background, all students have access to the opportunity for reasoning.

Examples of traditional problems vs. problems that allow for reasoning and sense-making:

Traditional:	**Reasoning and Sense-Making:**
Evaluate (8 + 4) / 3 + 6	Place a single digit in each shape to create a true equation: (Δ + O) / + ◊ = 10
Traditional:	**Reasoning and Sense-Making:**
-3 + -5 = -10 + 2 =	You add two numbers and the answer is negative. What two numbers might you have added?
Traditional:	**Allows for Reasoning:**
The driving distance from Boston to Chicago is 990 miles. Rico drives from Boston to Chicago at an average speed of 50 mph and returns at an average speed of 60 mph. For how many hours is Rico on the road? An algebraic solution (using the formula distance = rate times time): (50mi/hr)(x hr) = 990 mi (Boston to Chicago) x = 19.8 hrs (60mi/hr)(y hr) = 990 mi (Chicago to Boston) y = 16.5 hrs Other approaches may include: Guess and check. Draw a picture.	Rico drives from Boston to Chicago at an average rate of 50 mph and returns by the same route at an average speed of 60 mph. If he is on the road for 36 hours, how far is it from Boston to Chicago? An algebraic solution: Let x = hours at 50 mi/hr Let y = hours at 60 mi/hr Since the 2 cities are the same distance apart both coming and going: (50mi/hr)(x hr) = (60mi/hr)(y hr) (distance) And, from the problem: x hr + y hr = 36 hr (time) Solve the system of equations for x and y. Other approaches may include: Guess and check. Draw a picture.

What does the classroom look like? How does the teacher facilitate the lesson? With the suggestions in the table below, teachers provide students with the opportunity to reason through the work with informal observations, inductive observations, justification, and formal deduction.

Ask students to restate problems in their own words.
Give students time to analyze the problem, explore models, proceed with a possible approach.
Resist the urge to tell students how to solve problems.
Ask questions that press student thinking. (See *Questioning: Motivating Discourse in the Mathematics Classroom* in the Dec.2009 issue of this publication for more on classroom questioning.)
Provide adequate time.
Encourage students to ask probing questions of themselves and each other. Create a community where math talk is the norm.
Foster a classroom climate where a variety of approaches are encouraged and valued, and students feel free to take risks.
Expect students to communicate their reasoning verbally, and in writing, in follow-up discussions as a class.
Highlight exemplary examples and ask students to reflect on what makes them effective.

The adult education instructor is often challenged by the amount of material to be covered in a short amount of time, so much so that the instructional time required to foster reasoning and sense making can seem like a luxury. But, the potential for retention and streamlining of the curriculum, and less reteaching, because of increased understanding can more than make up for the class time spent.

NCTM is developing an online library of tasks appropriate for higher-level GED and transitions students to illuminate and reinforce the vision of reasoning and sense making.

Find activities to use or adapt at these links:

http://www.nctm.org/uploadedFiles/Journals_and_Books/Books/FHSM/RSM-Task/Fuel_for_Thought.pdf

http://www.nctm.org/uploadedFiles/Journals_and_Books/Books/FHSM/RSM-Task/Old_Faithful.pdf

http://www.nctm.org/uploadedFiles/Journals_and_Books/Books/FHSM/RSM-Task/Horseshoes.pdf

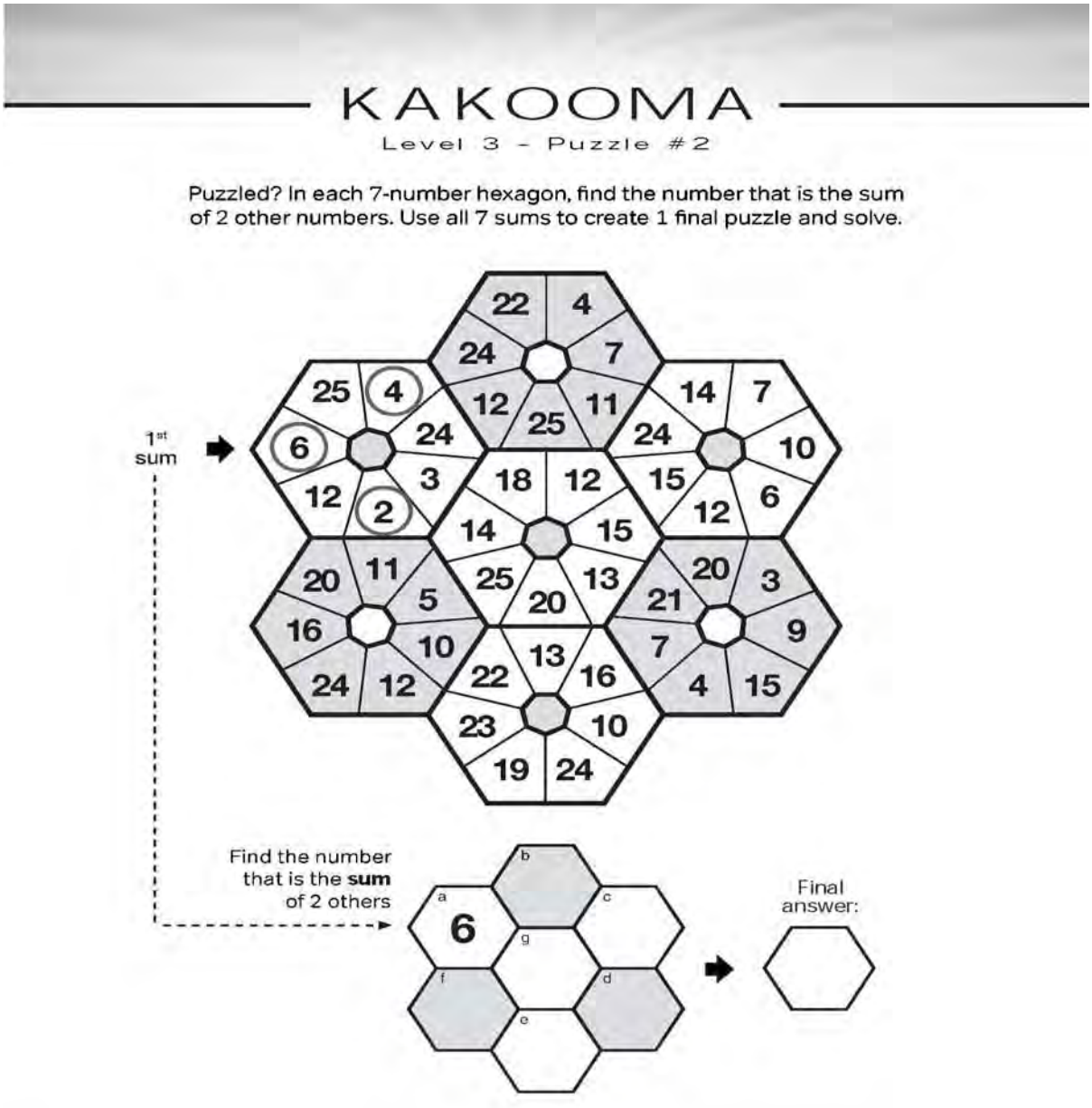
http://www.nctm.org/uploadedFiles/Journals_and_Books/Books/FHSM/RSM-Task/RSM_Task-Taking_a_Spin.pdf

http://www.nctm.org/uploadedFiles/Journals_and_Books/Books/FHSM/RSM-Task/RSM_Task-Taking_a_Spin.pdf

Kakooma™, Anyone?

The keynote speaker at the ATMIM (Association of Teachers of Mathematics in Massachusetts) Conference in Marlborough this Spring was Greg Tang, a Cambridge, MA, resident who is an award-winning author of a series of math picture books including the NY Times best seller ***The Grapes of Math.*** He is also the creator of Kakooma™, a math puzzle designed for all puzzle lovers, math stars and strugglers, and those who just want to keep the brain sharp. These can be found at www.kakooma.com, played online, or purchased in book form. Special thanks to Greg for permission to reproduce these materials.

Test your math skills! (Answer below)



Kakooma Puzzle Answer : 23

Remembering Tricia Donovan — Lifelong Learner, Lifelong Giver

By Mary Jane Schmitt

We are sorry to relate that in February, 2011, Tricia Donovan, ANN President, passed away. Her husband Tom wrote a beautiful obituary, entitled —Tricia Donovan, Lifelong Learner in which he summarized Tricia's myriad interests and accomplishments.

An excerpt: —
" …she was a newspaper reporter for the Patriot Ledger…created and operated the Sweet Spirit Bake Shop in South Deerfield and sold the best sweets, retail and commercial, …in the late 1980s, Tricia became a GED instructor… touched and nurtured the lives of many adult students…took on the task of reviving the Conway Festival of the Hills which raised money for college scholarships. Tricia was the co-chair and constant for over 20 years, with precision and integrity, she calculated the distance of contestants throws in the popular frying pan toss. In the early 1990s, while working for the FHETC (Franklin Hampshire Employment and Training Commission), she enrolled in a doctoral program at the UMass School of Education and received her doctorate in May 2006. In 2000, Tricia started working for TERC in Cambridge, developing and writing math curricula for adult education, and in 2005 … for World Education in Boston as a professional development specialist. Among the many professional organizations whose mission was improving math education for adults, she was a member of: Massachusetts Coalition for Adult Education, National Council of Teachers of Mathematics, and served as president of the Adult Numeracy Network.
"… Tricia had numerous serious health issues over her last 40 years. Not many people saw or heard about these tribulations. What most people saw was her energy, her enthusiasm, and her big smile. Tricia always tried for that most profound of human endeavors: to be useful and helpful."

On a personal note, Tricia Donovan, Lifelong *Giver*, lives on for me on my office shelves, in my computer files, in the books and lessons she wrote, in her newsletters (*The Problem Solver: A Math Newsletter for Adult Educators* and *The SABES Math Bulletin*), the professional development opportunities she created and facilitated, in the arts and craft items, and kitchen gadgets, handwritten notes of encouragement, the perennials dug up from her yard to mine and in the memories of the taste and smells of the homemade baked goods and chocolates that she toted along to every gathering.

For those of you who were not lucky enough to know her, here are links to some of her math creations for adult learners and teachers. Tricia merged research with practice when she reached out to teachers in her popular Massachusetts–based newsletter, the *SABES Math Bulletin*: http://www.sabes.org/resources/publications/mathbulletin/index.htm

Tricia was committed to building teacher communities. She led the T2T (Teacher to Teacher: Exploring Math Program) http://www.sabes.org/curriculum/math/math-initiative.htm

Tricia saw math as a tool for adult learners to understand what is going on globally. Check out one of the more popular lessons she contributed to the EMPower curriculum, such as Countries in Our Closets. A description of how to facilitate the lesson is at http://empower.terc.edu/pdf/Many_Points.pdf.

Numerical Expressions, Order of Operations, and Bingo Chips

"Evaluate 2 + 3 x 5? That's easy, 25," says Student 1.

"No, it's 17," argues Student 2.

Sound familiar? How many of us have had an exchange like this in our classrooms? Re-iterating the order of operations (PEMDAS – Multiply/Divide from left to right; then Add/Subtract from left to right) may work in the moment and, perhaps, in the future for those students adept at recalling the "rules". Responding instead with an activity that builds conceptual understanding and leads to procedural fluency may help all students to become mathematically proficient (National Research Council. *Adding it Up*. 2001).

The following activity is adapted from the Empower series of texts (TERC, Patricia Donovan, Mary Jane Schmitt, and Martha Merson, 2004) and was presented in The Basics of Teaching Math course at Top Floor Learning in Palmer, MA, in May (thank you to Marilyn Moses and Barbara Goodridge).

Objectives:

- Determine the number of objects in a collection without counting one by one.
- Write an accurate numerical expression describing a collection of objects.
- Recognize that multiplication supersedes addition in a numerical expression.

Materials:

- 2 containers/bags of 25 bingo chips, tiles, or similar counters
- 2 containers/bags of 17 bingo chips, tiles, or similar counters
  [Note: 17 and 25 were chosen to illustrate this example. In general, choosing prime numbers of bingo chips produces the most interesting results.]
- Paper/markers
- Picture(s) of objects that are grouped in arrays, e.g., tins of cupcakes, candies in a box, cookies on a tray, and windows with panes.

Facilitating the Activity:

Display a picture of objects arranged in an array. (See page 11 for other examples)

Number of candies?

Ask students how many objects they see and how they found the number of objects. Encourage methods that are not direct counting

(here, 3 x 4 = 12)

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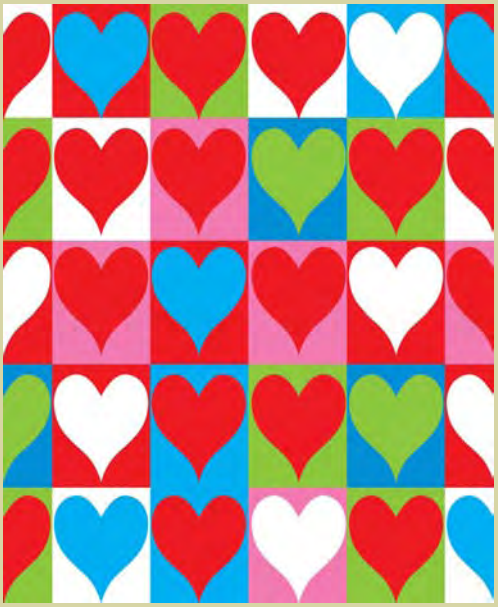
Other possible pictures to display:

Number of hearts?



½ x 5 + 4 x 5 + ½ x 5 = 25

(one option)

Number of panes of glass?

(2 x 3 + 2 x 3) x 4 = 48

(what is another expression?)

- Pass out the bags of chips so that adjacent students have different counts of bingo chips.
- Instruct students **without counting one by one** to determine how many chips they have.
- Ask them to write one or more numerical expressions to describe their array.
- Pair students with others who have the same number of chips. Ask them to compare their arrays and the resulting numerical expressions.

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Examples of arrays and expressions for 25 chips:

OOOOOOOOOO OOOOOOOOOO OOOOO 3 x 5 + 2 x 5 = 25 2 x 10 + 5 = 25 3 x 10 – 5 = 25	OOO OOO OOO OOO OOO OOO OOO OOO O 8 x 3 + 1 = 25 9 x 3 - 2 = 25 9 x 1 + 8 x 2 = 25	OOOOO OOOOO OOOOO OOOOO OOOOO 5 x 5 = 25

Examples of arrays and expressions for 17 chips:

OOOOOO OOOOOO OOOOO 3 x 5 + 2 = 17 2 x 6 + 5 = 17 3 x 6 – 1 = 17	OOOO OOOO OOOO OOOO O 4 x 4 + 1 = 17 5 + 4 x 3 = 5 x 4 – 3 = 17	OO OOOOO OOOOO OOOOO 2 + 3 x 5 = 17 4 x 2 + 3 x 3 = 17

Debriefing the activity:

- What did you find?
- Were your expressions alike? Different?
- What operations did you use in your expressions?
- Can you work together to find a fourth way to group the chips?

Extensions:

- Where might you find this activity useful in your daily life?
- Can you write a word problem that might be solved using your array/expression?
- Reverse the process. Can you draw an array for the expression 5 + 2 x 3? How many tiles did you use?

Now go back to the original question: Evaluate 2 + 3 x 5. If the activity above was successful, Student 1 will look at the numerical expression and immediately respond 17!

[**Note**: This activity can be used to teach/practice writing numerical expressions, to encourage computational fluency by composing and decomposing numbers, and to prepare students for "set up" problems as found on the GED.]

Language and Mathematics

Reasoning and sense making can be fostered in the mathematical classroom using rich problems that involve inquiry and exploration.

Rich problems are those mathematics problems that can be solved in more than one way. They have more than one entry point and oftentimes more than one possible solution. Mathematical thought is required to justify the solution which is frequently more than just a single numerical answer. Rich problems involve words, specific mathematical terms as well as English words used in a math context, and that can be a challenge in the culturally and linguistically diverse classrooms found in adult education environments. (http://msteacher.org/epubs/math/math11/problems.aspx is one source of rich problems. The SABES problem set is another: http://www.sabes.org/curriculum/math/math-probs1.pdf)

"Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge" (NCTM 2000, p.20). In addition, "All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding" (NCTM 2000, p. 5). Without an understanding of the vocabulary in the problem, whether unfamiliar general terms or mathematical language, a student is more likely to have difficulty engaging with the mathematics in the problem.

Four principles that support academic (as opposed to conversational) language acquisition include:

1. Comprehensible input (understanding the words in the lesson, whether spoken or written).

2. Contextualized instruction (learn math and associated academic language in a meaningful context that can be built on).

3. Low-anxiety learning environment (provide tasks with multiple entry points and scaffolds that support student participation. Incorporate cooperative learning).

4. Meaningful engagement in learning activities (daily opportunities to discuss, defend, present, and ask questions about meaningful mathematics. Listen, speak, read, and write about mathematics). (Murrey, 2008)

In the research done by McDuffie, Wohlhuter, and Breyfogle (*Teaching Mathematics* in the Middle School, May 2011) four areas are identified in which modifications can be made to rich problems to make them accessible to all students.

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1. Switch to a Familiar Context.

Students often can't discuss a concept until the context is clear. A "flower bed" or "kitchen island" may make no sense. Sports teams, or even the sports themselves, may be unfamiliar to the student.

2. Supplement Foundational Gaps.

Identify the mathematical knowledge needed to engage in the task, and provide the student with any background necessary, including English definitions. (See an example of English-Spanish Cognates in the table on the following page).

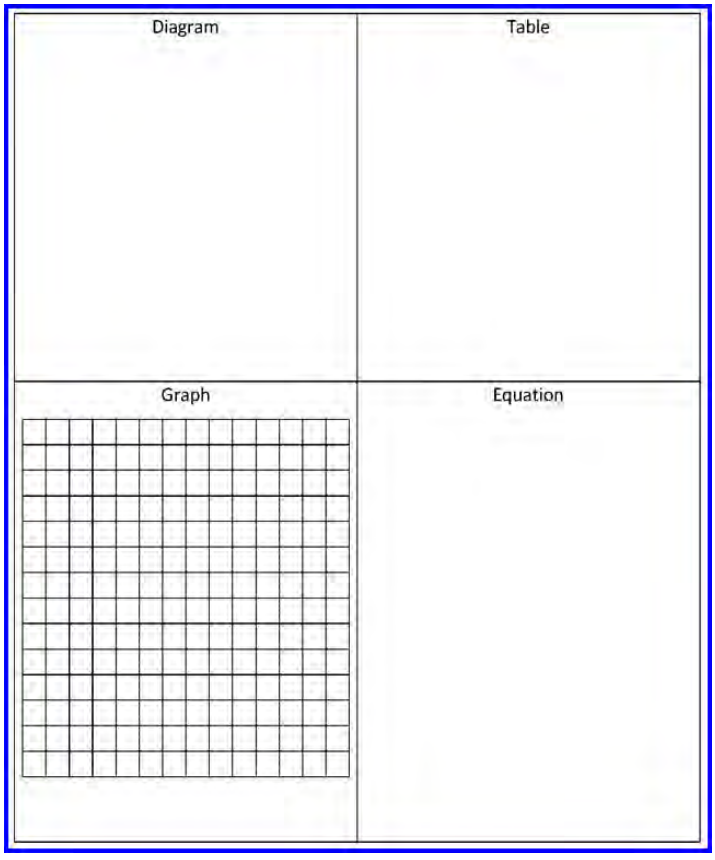
3. Incorporate Overarching Goals.

Is the rich problem, the task's purpose, aligned with the learning standard? Is the process or the resulting answer the objective? Rewrite the materials to meet the goal.

4. Adjust for Reading Levels.

If print density is an issue, re-position the text to provide space for student work. Provide templates for representations found in the problem (for example, a "linking sheet"), or other graphic organizers.

Linking Sheet



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These small changes in using rich problems can enable students of all backgrounds, cultural, linguistic, and mathematical, to be successful in engaging in problems that encourage reasoning and sense-making of mathematics.

Cognates Table

Some English-Spanish Cognates (words with a common origin that sound the same across languages)

English	Spanish
Explain	Explicar
Justify	Justificar
Predict	Predicir
Experimental	Experimental
equal	igual
diameter	el diámetro
estimate	estimar
angle	el ángulo
triangle	el triángulo
rectangle	el rectángulo
capacity	la capacidad
probability	la probabilidad

Resources:

McDuffie, Amy Roth, Kay A. Wohlhuter, and M. Lynn Breyfogle. "Tailoring Tasks to Meet Students' Needs: Thread small changes seamlessly into high-level reasoning tasks to reach all students." *Mathematics Teaching in the Middle School* (NCTM) Volume 16, No.9, May 2011: 550-555.

Murrey, Deandrea L. "Differentiating Instruction in Mathematics for the English Language Learner." *Mathematics Teaching in the Middle School* (NCTM) Volume 14, No.3, October 2008: 146-153.

National Council of Teachers of Mathematics (NCTM). *Principles and Standards for School Mathematics.* Reston, VA: NCTM, 2000.

When staff members of Adult and Community Learning Services at ESE needed help in developing the very first set of professional content standards for ABE and ESOL teachers, we knew exactly where to go. Having worked with Tricia Donovan over the years, we were very familiar with the depth of her mathematics expertise, her ability to present materials clearly, and her commitment to excellence.

For almost two years, my colleagues and I collaborated with Tricia to review extensive research, discuss its implications for the Massachusetts ABE system, and draft and revise numerous versions of standards for mathematics and numeracy. When Tricia became too ill to finish the work, she made sure to identify highly qualified colleagues to do so.

I am pleased that ACLS will soon unveil the *Massachusetts Professional Content Standards for Adult Mathematics and Numeracy: What Adult Basic Education Instructors Need to Know and Be Able to Do.* It was my pleasure to collaborate with someone as knowledgeable and forthright as Tricia to produce this document. From my perspective, it represents an important part of her legacy to the ABE system.

Sharon Artis-Jackson, Ed.D.
ACLS Professional Development Specialist

Finding the Math in Literature

As you sit down this summer to read, at the beach, on the porch, on a plane or train, take a moment to consider incorporating literature into your math curriculum. Encouraging reading in mathematics classrooms can help students with "comprehension of word problems, their mathematical vocabulary, and their critical thinking skills", according to Theoni Soublis Smyth and Brandie Waid ("Integrating Literature: A Novel Idea!". *Mathematics Teacher* 104, no. 2, September 2010: 113-119).

In an interview with Education World (http://www.educationworld.com/a_curr/curr249.shtml), Marilyn Burns and Sharon Powell shared their thoughts on literature in the classroom.

Burns states, "My advice to educators just beginning to incorporate literature into math activities is to choose a book and dive in. Read the story aloud to the class and discuss it as you would any other book. Then introduce an activity. As with all math lessons, keep the emphasis on [students'] reasoning, ask students to communicate their thinking and solutions, and encourage discussion among students."

Sharon Powell, a teacher of students who failed the "exit exam" at Northwestern High School in Rock Hill, South Carolina, believes, "Books are stories about people and their lives, and these lives involve numbers." She uses *The Crazy Horse Electric Game,* by Chris Crutcher, 1987, to join math and literature. *The Crazy Horse Electric Game* is the story of a high school athlete, Willie, who is handicapped after an accident and runs away from home.

Powell provided activities that had the students figuring the costs of situations described in the book. In her words, "The students had to read bus schedules and discover the cost of medical treatments by using percentages based on different rates of insurance payment. They computed statistics for the players. I had them find a job in the classified ads that Willie was qualified to do and plan a budget for him. They did maps of his trip. We did distance problems based on how fast the boat was traveling and how far it had to go if the family took him to the hospital. Basically, I looked for ways that math was used in the book and expanded on it. This can be done with any book."

Following are two suggestions from Smyth and Waid as well as one from children's literature to add to your reading list. Take the activities provided and modify them to fit your learners by incorporating Burns' and Powell's advice on bringing the math from the story to your students. Enjoy the summer, and Happy Reading!

The Digital Fortress, Dan Brown, 1998. This is a book about codes and code-breaking. From the back cover of the paperback: "When the NSA's invincible code-breaking machine encounters a mysterious code it cannot break, the agency calls its head cryptographer, Susan Fletcher, a brilliant and beautiful mathematician. What she uncovers sends shock waves through the corridors of power. The NSA is being held hostage…not by guns or bombs, but by a code so ingeniously complex that if released it would cripple U.S. intelligence. …"

Activities suggested to use with this novel include two created by Doug Schmid and found on the NCTM's illuminations website that involve deciphering a bar code and understanding and writing a cipher. (See page 16.)

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A. http://illuminations.nctm.org/LessonDetail.aspx?id=L693 is an activity that shows how bar codes and credit card numbers are tested, using a check digit, to ensure that they are not entered incorrectly.

B. http://illuminations.nctm.org/LessonDetail.aspx?id=L587 is an activity that investigates the Caesar substitution cipher that encodes and decodes text using inverse operations.

A Wrinkle in Time, Madeleine L'Engle, 1962. This science fiction novel is about two siblings who set out to rescue their father from evil forces holding him prisoner on a far away planet.

The activities that Smyth and Waid suggest deal with time and travel and planetary orbital motion and are also found on the NCTM illuminations website.

A. http://illuminations.nctm.org/LessonDetail.aspx?id=L254 is a hands-on activity that builds an understanding of time and distance by collecting, plotting, and analyzing data.

B. http://illuminations.nctm.org/LessonDetail.aspx?id=L657 has the student supposing that the Earth is the center of the solar system (as was once believed) and finding the orbits of the planets around the earth.

The Lemonade War, Jacqueline Davies, 2007. A brother and sister compete over the summer to see who can be the first to earn $100 at their respective lemonade stands.

Many math activities are found within the text. A discussion guide and information can be found at http://www.teachervision.fen.com/tv/printables/hmco/LemonadeWar_TG.pdf

Other suggestions for "math books" can be found at:

1. http://www.figurethis.org/fc/family_corner_literature.htm
2. http://mathforum.org/t2t/faq/brandenburg.html

SABES
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