Teaching Math to English Language Learners

Marji Freeman

Math Solutions

http://www.mathsolutions.com/CMCELL

CMC South 50th Annual Fall Conference
November 6-7, 2009
Palm Springs, California
Teaching Math to English Language Learners

Teachers of English language learners need to accomplish two goals with their students in mathematics:

- mathematical understanding \textit{and}
- proficiency in English.

This session will highlight ways teachers can structure experiences to accomplish these two goals.
Our Mission

As a thriving organization responsive to a changing world, **Math Solutions** is dedicated to improving children’s learning of mathematics by providing the highest quality professional development services, products, and resources to educators.

*Marilyn Burns, Founder*
Supporting English Language Learners in Math Class

instructional resources

Rusty Bresser   Kathy Melanese   Christine Sphar
Common Elements in all *Math Solutions’* professional development
With a focus on supporting English language learners, in this session we will:

• Consider the demands for teaching and learning mathematics

• Engage in and reflect on a professional learning experience

• Consider a variety of instructional strategies that support English Language Learners
Demands of Teaching and Learning Mathematics
Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.

Principles and Standards for School Mathematics, National Council of Teachers of Mathematics 2000
Students build their understanding when instruction provides opportunities to:

- Reason
- Solve problems
- Represent
- Make and use connections
- Communicate

NCTM 2000
It is important for all students, but especially critical for ELL students, to have opportunities to **speak, read, and listen** in mathematics classes, with teachers providing appropriate support and encouragement.

Teaching Mathematics to English Language Learners
National Council of Teachers of Mathematics 2008
Goals for English Language Learners in Math Class

- Actively engage in understanding mathematics
- Build English proficiency
Professional Learning Experience
What we’ll do:

• Investigate and analyze a math task
• Determine the language requirements
• Identify and categorize instructional strategies
• Observe classroom instruction (video)
• Engage in a reflective conversation
Math Goal:

Students will identify and describe the features of polygons and the features of figures that are not polygons.
Sorting Task

1. Sort the figures into two categories: 
   *polygons* and *not polygons*.

2. Describe the figures as you sort them and give reasons for your decisions.

3. As you sort the figures, record the key vocabulary words and language you used as you identified and sorted the shapes.
Vocabulary and Language Goal

Closed
Curved
Intersect
Line segment
Open
Polygon
Sides
Straight
Vertex/Vertices

Identify and describe polygons and figures that are not polygons.

This shape has . . .

This is a . . . because . . .

This is not a . . . because . . .
Identifying and Describing Polygons

Video Lesson Vignette

- Introducing Academic Language
- Introducing Polygons
- Exploring Polygons Independently
- Summarizing the Lesson
Instructional strategies that:

• Make math comprehensible
• Provide opportunities for talk
• Support talk
Identifying & Describing Polygons

A Fourth-Grade Class

Christine Sphar, coauthor of Supporting English Language Learners in Math Class, Grades 3–5
In what ways does the teacher make the math content comprehensible and support students in understanding math concepts?

What opportunities to talk about their mathematical thinking are students given?

What strategies does the teacher use to support students in talking about their mathematical thinking?
Introducing Polygons
Reflection

What strategies have you added to your list?
Observe and Reflect

• Independent Work

• Summarizing of the Lesson
Strategies that Support English Language Learners

• identify a math and a language goal
• use sentence frames
• create vocabulary banks
• use manipulative materials
• pose problems in familiar contexts
• elicit nonverbal responses
• Use wait time
Strategies Continued

- utilize partner talk
- ask for choral responses
- provide visuals
- demonstrate and model
- build the answer into the question
- design questions and prompts for different proficiency levels
- ask yes/no questions with beginning language learners.
Reflection

From “Equity for Language Learners,” NCTM Teaching Children Mathematics, October 2009:

1. What role does language play in learning mathematics?
2. List some challenges that ELLs face during math instruction.
Reflection continued

3. What are important points to remember when modifying a math lesson for ELLs.

4. How can teachers differentiate math instruction for ELLS with varying levels of proficiency in English?

5. What are the benefits of using sentence frames to teach mathematics?
When planning a lesson…

Consider the following:

1. What is the **math goal**?
2. What is the **language goal**?
3. What **vocabulary** needs to be taught explicitly?
4. What is the **purpose for language**: to describe, to categorize, to hypothesize, to sequence, to compare and contrast?
When planning a lesson continued

5. What strategies will you use?
6. How will you differentiate lesson for various language proficiencies?
7. Are opportunities for discussion built in?
Questions?