Effective Math Teaching
Grades 1-6

Linking Assessment and Instruction to Meet the Needs of All Students

Marilyn Burns

www.mathsolutions.com

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40% MORE cereal than our 20 oz. package

Kellogg's

Raisin Bran

KONG SIZE!

NET WT. 30 OZ. (1 Lb. 14 OZ.) (850g)

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Arithmetic

- Computation
- Number Sense
- Problem Solving
Tipulator

$0.99 • Take the guesswork out of restaurant tipping.
Enter the bill amount, select a percentage, and Tipulator will calculate the tip. And it’ll split the check among friends.
Roles of Assessment

• Report school/district effectiveness

• Inform classroom instruction

• Monitor individual student progress in order to
  – Differentiate instruction
  – Identify students for intervention
Strategies for Classroom Assessments

• Observe students
  – whole class discussions
  – small group work

• Examine student work
  – Incorporate writing
  – Take occasional class inventory
  – Let students set parameters

• Individual Math Assessments
Students’ Common Arithmetic Errors

1. $3 + \square = 7$

2. 
   $\begin{array}{c}
   41 \\
   -23 \\
   \hline
   \end{array}$

3. 
   $\begin{array}{c}
   120 \\
   -50 \\
   \hline
   \end{array}$

4. $\frac{1}{2} + \frac{2}{3}$

5. $\frac{1}{3} + \frac{1}{4}$
Students’ Common Arithmetic Errors

1. $3 + 10 = 7$

2. $41 - 23 = 22$

3. $120 - 50 = 70$

4. $\frac{1}{2} + \frac{2}{3} = \frac{3}{5}$

5. $\frac{1}{3} + \frac{1}{4} = \frac{2}{7}$
Differentiation

Intervention
Blue and Orange Cubes Problem

2 identical jars
31 blue cubes
16 orange cubes

How many more blue cubes than orange cubes are there?
Blue & Orange Cubes
Class Inventory
Grade 2 (25 students)

- 9 Counted up
- 6 Counted backward
- 3 Found missing addend
- 3 Subtracted
- 1 Used cubes
- 3 Unsuccessful
Blue & Orange Cubes

There are ___ blue cubes.
There are ___ orange cubes.

How many more blue cubes than orange cubes are there?

7, 4
10, 4
30, 4
30,14
36, 10
56, 12
56, 18
100, 43
91, 16
503, 398
Math and Literacy

• Bringing meaning to symbols

• Sense making is at the heart
  – Comprehension
  – Understanding

• Reading has one gatekeeper skill; math has many

• Assessment integral
What to assess?

• Conceptual Understanding
• Basic Facts
• Place Value
• Relationships between operations
• Number Sense
• Problem Solving
• Paper & Pencil Computation
Also to Assess: Learning Characteristics

• Shows confidence
• Notices errors and/or self-corrects
• Able to communicate thinking
• Perseveres to figure out answers
• Uses a variety of strategies
Challenges to Conducting Individual Math Assessments

• Reading but not Math
• Too much data
• Not enough time
• Students can hide
• “What do I do now?”
Components

• Assessments
  – Early Number
  – Addition
  – Subtraction
  – Multiplication
  – Division
  – Fractions

• Reports
  – Class Profile
  – Individual Student Narrative

• What next?

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## Addition Assessment Class Profile

<table>
<thead>
<tr>
<th>Basic Facts</th>
<th>A'</th>
<th>Rapidly recalls basic addition facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place Value</td>
<td>B'</td>
<td>Counts objects in a group by 2s</td>
</tr>
<tr>
<td></td>
<td>C'</td>
<td>Identifies digits in ones and tens places</td>
</tr>
<tr>
<td></td>
<td>D'</td>
<td>Understands place value of tens and ones</td>
</tr>
<tr>
<td></td>
<td>E'</td>
<td>Adds 10 to a number without counting</td>
</tr>
<tr>
<td>Number Sense</td>
<td>F'</td>
<td>Adds mentally</td>
</tr>
<tr>
<td></td>
<td>G'</td>
<td>Estimates the sum of two numbers</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>H'</td>
<td>Solves missing addend problems</td>
</tr>
<tr>
<td>Paper &amp; Pencil Computation</td>
<td>I'</td>
<td>Adds two-digit numbers with regrouping</td>
</tr>
<tr>
<td>Learning Characteristics</td>
<td>J'</td>
<td>Shows confidence</td>
</tr>
<tr>
<td></td>
<td>K'</td>
<td>Notices errors and/or self-corrects</td>
</tr>
<tr>
<td></td>
<td>L'</td>
<td>Able to explain thinking</td>
</tr>
<tr>
<td></td>
<td>M'</td>
<td>Perseveres to figure out answers</td>
</tr>
</tbody>
</table>
Barack Obama and Joe Biden believe we should not be forced to spend the academic year preparing students to fill in bubbles on standardized tests . . .

They will work to create assessment models that provide educators and students with timely feedback . . .

These assessments will provide immediate feedback so that teachers can begin improving student learning right away.