Sense Making? Aren’t We Already Doing That in Literacy?

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Sample Grade 3 State Test Problem

The corner deli sells roses in bunches of 6. If Dylan buys 3 bunches of roses, how many roses does he have?

A. 6 18%  
B. 9 46%  
C. 18 31%  
D. 24 4%

Combined scores of the 160 third graders in a group of four low-performing schools I used to support.
Sample Test Problem, Revised

The corner deli sells roses in bunches of 6. Dylan bought 3 bunches. Draw a picture of the story.

Sample Grade 3 State Test Problem 2

A nickel is worth 5 cents. If Steve has 4 nickels, how much are they worth altogether?

A. 9 cents  27%
B. 10 cents  4%
C. 20 cents  56%
D. 25 cents  12%
Sample Test Problem 2, Revised

A nickel is worth 5 cents. Steve has 4 nickels.

5 5 5 5

Jekylls and Hydes in Grade 6

Bud, Not Buddy

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CCSS Mathematical Practice 1

Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution.

They analyze givens, constraints, relationships, and goals.

They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt.

They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution.

They monitor and evaluate their progress and change course if necessary.

Characteristics of Strong Readers

• They are motivated to read.
• They are able to read words accurately and automatically.
• They comprehend what they read.
• They use a variety of strategies to tackle words they don't recognize.
• They use active problem solving strategies to search for information, to determine meaning, to make sense of words, to make connections.
Reading Lesson Objectives

• What are some reading strategies you’ve taught/seen taught in the last month?

Reading Strategies – Unfamiliar Words

• Sound it out
• Context clues
• Apply known patterns to a new situations
Reading Strategies - Comprehension

- Predicting
- Estimating
- Hypothesizing
- Make a movie in your mind
- Storyboarding (beginning, middle, end)
- Story elements (character, setting, problem, solution)

What Do Readers Need?

- Direct and explicit instruction in the skills and strategies of proficient reading.
- Time to talk about books. Just five minutes of conversation can ramp up comprehension.
- Most reading skills and strategies are also thinking skills and strategies.
Sample Grade 3 State Test Problem 3

Hot dog buns come in packages of 8. Michael buys 6 packages of hot dog buns. How many hot dog buns does Michael have in all?

A. 14  43%
B. 36  8%
C. 48  40%
D. 56  5%

“Cracking the Math Code”

<table>
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<th>ADDITION</th>
<th>SUBTRACTION</th>
<th>MULTIPLICATION</th>
<th>DIVISION</th>
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</thead>
<tbody>
<tr>
<td>Add</td>
<td>are not</td>
<td>By (dimension)</td>
<td>as much</td>
</tr>
<tr>
<td>Altogether</td>
<td>change</td>
<td>Double</td>
<td>cut up</td>
</tr>
<tr>
<td>And</td>
<td>decreased by</td>
<td>Each group</td>
<td>divided by</td>
</tr>
<tr>
<td>Both</td>
<td>difference</td>
<td>Multiplied by</td>
<td>each group has</td>
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<tr>
<td>How many</td>
<td>fewer</td>
<td>Of</td>
<td>half (or other fractions)</td>
</tr>
<tr>
<td>How much</td>
<td>have left</td>
<td>Product of</td>
<td>how many in each parts</td>
</tr>
<tr>
<td>In all</td>
<td>how many did not</td>
<td>Times</td>
<td>quotient of</td>
</tr>
<tr>
<td></td>
<td>have</td>
<td>Triple</td>
<td>Separated</td>
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<tr>
<td></td>
<td>how many more</td>
<td></td>
<td>Share something</td>
</tr>
<tr>
<td></td>
<td>less than</td>
<td></td>
<td>equally</td>
</tr>
<tr>
<td></td>
<td>remain</td>
<td></td>
<td>split</td>
</tr>
<tr>
<td></td>
<td>subtract</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>take away</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taller/shorter</td>
<td></td>
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(document from the web site of a large eastern metropolitan school district)
C.U.B.E.S.

- Circle the numbers.
- Underline the important words.
- Box the question.
- Eliminate unnecessary information.
- Solve.

Encouraging Sense-Making in Math

Q: How do we cultivate a classroom focused on sense making rather than answer-getting?

A: Get rid of the question. Literally.
You Think Your Teacher is Tough!

Mr. Garcia doesn’t like students to rush through their work or take wild guesses. He gave his class a test of 20 math problems. For each correct answer, a student earned 5 points. For every incorrect answer, Mr. Garcia subtracted 2 points.

Tyler answered every problem.

I Notice | I Wonder

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You Think Your Teacher is Tough!

Mr. Garcia doesn’t like students to rush through their work or take wild guesses. He gave his class a test of 20 math problems. For each correct answer, a student earned 5 points. For every incorrect answer, Mr. Garcia subtracted 2 points.

Tyler answered every problem. His score for the test was 58. How many problems did he get correct?
You Think Your Teacher is Tough!

Answer:
Well i think that he got 5 questions right and 10 wrong.

Explanation:
I was not so sure How to do this so I just took my calculater and I said 20/ 5
4. Then 20/2
10

THEN I added more to get to 20

I did not really understand this question

Ryan, age 11

You Think Your Teacher is Tough!

Answer:
Tyler got about 13 questions correct.

Explanation:
First I did 100/20 because there are 20 questions and got 5 and that means that each question is worth 5%. 5 goes into 58 11 times. 58 was hard to find because if he got 5 right 58 isn't divisible by 5. There are two questions left though. I got stuck here and I didn't know what to do.

Riley, age 7
“Noticing and Wondering” with Textbooks

Apple juice costs 50¢. The juice machine accepts quarters, dimes, and nickels.

Mr. Gavin has a ladder that is 100 centimeters tall.
Ms. Cornell has a ladder that is 2 meters tall.

To make a stained glass window, Robert used 16 pieces of glass. Seven of the pieces were red.

“Noticing and Wondering” with Textbooks

Mike had 3 puzzles.
Now he has 5 puzzles.

A store has the floor plan shown. The area of the women’s department is

<table>
<thead>
<tr>
<th>Women’s</th>
<th>Boys’</th>
<th>Girls’</th>
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</thead>
<tbody>
<tr>
<td>50%</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>Sporting Goods</td>
<td>Both</td>
<td>Men’s</td>
</tr>
<tr>
<td>10%</td>
<td>40%</td>
<td>50%</td>
</tr>
</tbody>
</table>
Encouraging Sense-Making in Math

Q: How do we cultivate a classroom focused on sense making rather than answer-getting?

A: Ask about ideas, not answers.

This can be really simple:

“Tell me something about number 7.”

instead of

“What's the answer to number 7?”

Encouraging Sense-Making in Math

“Who tried something that didn’t work?”

“What's a hint you would give a student who is stuck?”

“What makes this problem hard?”

“Does this problem remind you of anything we have done recently?”

What sorts of questions do you ask during math? Record yourself and find out!
Brainstorming and Next Steps

What’s something you’re going to try next week?

Want to do the third grade math/drawing experiment with me?

Send me email (address on the printed handout), or visit my blog (linked from the URL below) for a link to resources for this talk (a PDF of my PowerPoint slides and eventually some post-NCSM musings).

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