

## Let's Get Engaged!

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### Robyn Silbey Professional Development Raising Teacher Quality and Student Achievement in Mathematics

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**Selecting and Sequencing Student Solutions, by Gladis Kersaint**

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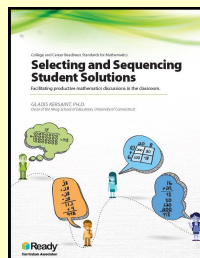
**Monthly Quote: Greg Gierhart**

**Selecting and Sequencing Student Solutions**  
Facilitating productive mathematics discussion in the classroom, by Gladis Kersaint

In this [white paper](#), [Gladis Kersaint](#) asserts that mathematical discussions play an integral part of every math lesson. She describes five practices that teachers can use to promote classroom discussion.

1. **Anticipate:** Identify classroom behaviors, norms, and routines to ensure engagement and effective classroom discussion.
2. **Monitor:** Identify responses that are unexpected or characterize common errors. Incorrect responses may naturally clarify common misconceptions and erroneous thinking.
3. **Select:** Carefully select students to share responses with the class. Utilize samples that provide the most detailed thinking or reasoning, including visual representations and stepped-out solutions.
4. **Sequence:** Consider beginning with a student who has used a relatively inefficient but easily accessible strategy, and move to the more efficient ones. This keeps more students engaged.
5. **Connect:** Connect strategies to each other. Ask students to discuss how the approaches are similar, different, and related to one another.

Kersaint's work reinforces the tremendous value of discourse for both students and teachers. Students are engaged in their own learning, and teachers



#### Shout Out!

**Excel Public Charter School**



The [leadership team](#) at [Excel Academy Public Charter School](#), an all-girls charter school in Washington, DC met with [Robyn](#) in December to program for global upward movement in mathematics for the remainder of the 2017-2018 school year.



With an early January kickoff, Robyn is facilitating professional development workshops on content, problem solving, student-centered learning strategies, and critical thinking. She is conducting a series of demonstration lessons and sequential observations for K-5 teachers to assist in bringing the professional development



receive valuable, immediate feedback about their students' understanding.

themes to life in the classroom.

Teachers will be focused on building their girls' intrinsic motivation



in math and maximizing each girl's potential. Excel's staff and students are poised to leap into a mathematically energized New Year!

## Analyzing Quantitative Relationships in Complex Problems

The Common Core State Standards identify and describe quantitative relationships for the four operations, which can be found in Table 1 and Table 2 on pages 88-89 of the document.

Mathematics Glossary » Table 1

Common addition and subtraction 1

	RESULT UNKNOWN	CHANGE UNKNOWN	START UNKNOWN
<b>ADD TO</b>	The unknown is the result. You know the numbers being added. For example, you know 2 and 3, and you want to find the sum: $2 + 3 = ?$	The unknown is the number being added. You know the result and one of the numbers being added. For example, you know 5 and 3, and you want to find the number that, when added to 3, gives 5: $3 + ? = 5$	The unknown is the first number being added. You know the result and the second number being added. For example, you know 5 and 3, and you want to find the number that, when added to 3, gives 5: $? + 3 = 5$
<b>TAKE FROM</b>	The unknown is the number being taken away. You know the result and the number being taken away. For example, you know 5 and 3, and you want to find the number that, when taken away from 5, gives 3: $5 - ? = 3$	The unknown is the number being taken away. You know the result and the number being taken away. For example, you know 5 and 3, and you want to find the number that, when taken away from 5, gives 3: $5 - ? = 3$	The unknown is the number being taken away. You know the result and the number being taken away. For example, you know 5 and 3, and you want to find the number that, when taken away from 5, gives 3: $5 - ? = 3$
<b>TOTAL UNKNOWN</b>			
<b>PUT TOGETHER/ UNKNOWN</b>			
<b>COMPARE</b>			

Table 1

Mathematics Glossary » Table 2

Common multiplication and division situations 1

	UNKNOWN PRODUCT	GROUP SIZE	NUMBER OF GROUPS
<b>EQUAL GROUPS</b>	The unknown is the product. You know the number of groups and the size of each group. For example, you know 3 groups of 4 items each, and you want to find the total number of items: $3 \times 4 = ?$	The unknown is the size of each group. You know the total number of items and the number of groups. For example, you know 12 items and 3 groups, and you want to find the size of each group: $12 \div 3 = ?$	The unknown is the number of groups. You know the total number of items and the size of each group. For example, you know 12 items and 4 items per group, and you want to find the number of groups: $12 \div 4 = ?$
<b>ARRAY/AREA</b>	The unknown is the product. You know the length and the width of a rectangle. For example, you know a rectangle that is 3 units long and 4 units wide, and you want to find the area: $3 \times 4 = ?$	The unknown is the length or width of a rectangle. You know the area and one of the dimensions. For example, you know a rectangle with an area of 12 square units and a width of 3 units, and you want to find the length: $3 \times ? = 12$	The unknown is the number of groups. You know the total number of items and the size of each group. For example, you know 12 items and 4 items per group, and you want to find the number of groups: $12 \div 4 = ?$
<b>COMPARE</b>			
<b>GENERAL</b>			

Table 2

The relationships described by specific situations are regularly included in the classroom curriculum, but students struggle with applying them in complex problems.

Robyn wonders how discourse and mental math can reduce students' anxiety with problem solving. She thinks students may stay engaged with challenging problems if they replace the problem's actual numbers with single-digit values, solve mentally, discuss and analyze the quantitative relationships they utilized to solve, and repeat the solution process for the actual values. She is training teachers, modeling lessons, and collecting student work to measure the idea's effectiveness. Watch this space for student samples and reflections in future newsletters!

## Coaches' Corner



The News & Views Section of Teaching Children Mathematics will return for the March, 2018 issue. The Coaches' Corner column will feature Robyn's article, "Top Tips for Being Your Best."

## Quote of the Month



"Somebody needs you!"

'On your worst day on the job, you are still some child's best hope.'"

Greg Gierhart

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