

Let's Get Engaged!

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Thu, Apr 26, 2018 at 8:25 AM

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

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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
ADD TO	The unknown is the result. Example: 2 + 3 = ?	The unknown is the number being added. Example: 2 + ? = 5	The unknown is the number being added to. Example: ? + 3 = 5
TAKE FROM	The unknown is the result. Example: 5 - 2 = ?	The unknown is the number being subtracted. Example: 5 - ? = 2	The unknown is the number being subtracted from. Example: ? - 2 = 3
PUT TOGETHER/JOIN	The unknown is the total. Example: 2 + ? = 5	The unknown is the number being added. Example: 2 + ? = 5	The unknown is the number being added to. Example: ? + 3 = 5
COMPARE	The unknown is the difference. Example: 5 - ? = 2	The unknown is the number being subtracted. Example: 5 - ? = 2	The unknown is the number being subtracted from. Example: ? - 2 = 3

Table 1

Mathematics Glossary » Table 2

Common multiplication and division situations 1

	UNKNOWN PRODUCT	GROUP SIZE	NUMBER OF GROUPS
EQUAL GROUPS	Example: 3 bags with 4 items each. How many items? $3 \times 4 = ?$	Example: 12 items in 3 equal groups. How many in each group? $12 \div 3 = ?$	Example: 12 items in groups of 3. How many groups? $12 \div 3 = ?$
ARRAY/AREA	Example: 3 rows of 4 items each. How many items? $3 \times 4 = ?$	Example: 12 items in 3 equal groups. How many in each group? $12 \div 3 = ?$	Example: 12 items in groups of 3. How many groups? $12 \div 3 = ?$
COMPARE	Example: 3 items cost \$4. How much do 5 items cost? $3 \times 4 = 12$, $5 \times 4 = ?$	Example: 12 items cost \$4. How many items? $12 \div 4 = ?$	Example: 12 items cost \$4. How many items? $12 \div 4 = ?$
GENERAL	Example: $3 \times 4 = ?$	Example: $12 \div 3 = ?$	Example: $12 \div 3 = ?$

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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