**Marshall Memo 575**

A Weekly Round-up of Important Ideas and Research in K-12 Education

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# 4. A School Focuses on Classroom Math Questions

In this *Journal of Staff Development* article, Boston Public Schools educators Sara Zrike and Christine Connolly describe making a series of 20-minute visits to math classrooms in a K-8 school and noticing that teachers’ questions were often not engaging students in higher-level thinking. They also noticed that teachers were talking more than students, questions and answers happened in ping-pong fashion between teachers and students, there were few moments when students commented on each others’ thinking, and misconceptions were not used as learning opportunities. All this was a problem because the school was trying to bring math instruction up to Common Core levels.

Zrike and Connolly created a transcript of classroom math questions from their visits, asked teachers to read an article on question types, and devoted several grade-level meetings to this topic. At first, teachers were reluctant to look at the transcripts, fearing they would reveal ineffective instructional practices. But teachers’ names weren’t attached to the questions and the exercise of sorting them into two categories proved to be non-threatening and eye-opening. The two types mentioned in the article were “funneling” questions (leading to one right answer) and “focusing” questions (more open-ended and thought-provoking). Here are some examples of each:

Funneling:

* What’s a decade?
* If 490 were males, how many would be females?
* Are these pieces bigger or smaller?
* Would 8/7 be more than a whole?
* How many multiples of 24 are there?
* Do you agree or disagree?
* Did anyone else make it simpler?
* Is that a fraction?
* What are you going to put right there?
* Count by 5s; what comes after 15?
* So which one is your answer? You have 2 numbers circled.
* Is it getting bigger or smaller?

Focusing:

* How do you know this answer doesn’t make sense?
* Tell me which answer is ridiculous and why.
* Why is this more complicated?
* Can you explain it again?
* Do you want to explain what she said?
* How did you know that?
* Why was I confused?

“Teachers said they had no idea that they were asking so many funneling questions,” says Zrike, “and felt that it would be easy to make some of the same questions more focusing.” For example, the question, “Would 8/7 be more than a whole?” was rewritten as, “What does the fraction 8/7 tell us about the whole? How do you know?” Teachers went to work on crafting higher-level questions with a new consciousness of questioning rigor.

Classroom observations a few months later showed a marked improvement: “A majority of the questions asked by teachers probed students to explain how they solved a problem, why they solved it that way, and how do they know they problem-solved correctly,” says Connelly. “Often, teachers exhibited longer wait times, which is necessary when asking cognitively demanding questions requiring significant language in the answers.” In that spring’s state MCAS testing, the school showed a significant uptick in math and literacy scores.

“Problem Solvers: Teacher Leader Teams with Content Specialist to Strengthen Math Instruction” by Sara Zrike and Christine Connolly in *Journal of Staff Development*, February 2015 (Vol. 36, #1, p. 20-22, 29), [www.learningforward.org](http://www.learningforward.org); Zrike can be reached at

[szrike3@bostonpublicschools.org](mailto:szrike3@bostonpublicschools.org), Connelly at [cconnolly@bostonpublicschools.org](mailto:cconnolly@bostonpublicschools.org).