BEST PRACTICE STRATEGY:

Understand the little words in relation to math

Focus on the little words in math story problems

When teaching math, content-specific vocabulary is a vital aspect. But beyond typical math terms, students also need instruction on the little words sprinkled throughout math word problems. Words like *on, off, of, have, each, it, do,* etc. have a big impact on whether students comprehend and compute the problem accurately.

At first glance, these words seem rather insignificant and are often overlooked as vocabulary that needs to be addressed. However, Kathryn Sullivan's research from 1982 demonstrates that an intense 3-week study of these words significantly improves students' computation scores.

Each word individually is not difficult (e.g., *of*). Rather, it's the accurate inferring of its meaning in various contexts that poses misunderstanding. Here are some of Sullivan's examples:

- The word "a" can mean "any" in mathematics. When asking students to "show that a number divisible by 6 is even," we aren't asking for a specific example, but for the students to show that all numbers divisible by 6 have to be even.
- The words "of" and "off" cause a lot of confusion in solving percentage problems, as the percent of something is quite distinct from the percent off something.
- When we take the area "of" a triangle, we mean what the students think of as "inside" the triangle.
- The square (second power) "of" the hypotenuse gives the same numerical value as the area of the square that can be constructed "on" the hypotenuse.

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To clarify, students need more than just math-content lessons; they need reading lessons, too. Although reading instruction has traditionally fallen under the ELA department, these particular reading skills can only be taught in math class, because the other content areas don't have this unique type of text. Thus, the responsibility falls on the math teacher.

This might be most-easily achieved during the first weeks of school, when teachers are reviewing easier math concepts students previously learned. Utilize this time to present math review in story problem format. This offers the opportunity to not only review content, but also introduce and target those small words with big meaning. Such lessons would include introducing and studying these little words within the context of grade-appropriate word problems.

Although this additional instruction will take more time, Kathryn Sullivan's research proves that this extra step significantly improves students' math computation skills and scores. This intentional slow-down of instruction leads to an eventual speed-up of success.

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References

Metsisto, D. (2007). Chapter 2. Reading in the Mathematics Classroom. *Literacy Strategies for Improving Mathematics Instruction*. Hawker Brownlow Education.

"A study by Kathryn Sullivan (1982) showed that even a brief, three-week program centered on helping students distinguish the mathematical usage of "small" words can significantly improve student mathematics computation scores. Words studied in the program cited by Sullivan include *the, is, a, are, can, on, who, find, one, ones, ten, tens, and, or, number, numeral, how, many, how many, what, write, it, each, which, do, all, same, exercises, here, there, has,* and *have.*"

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Literacy Strategies for Improving Mathematics Instruction

Sullivan, K. (1981). Vocabulary Instruction in Mathematics [microform] : *Do the "Little" Words Count?,* ERIC Clearinghouse, Washington, D.C.