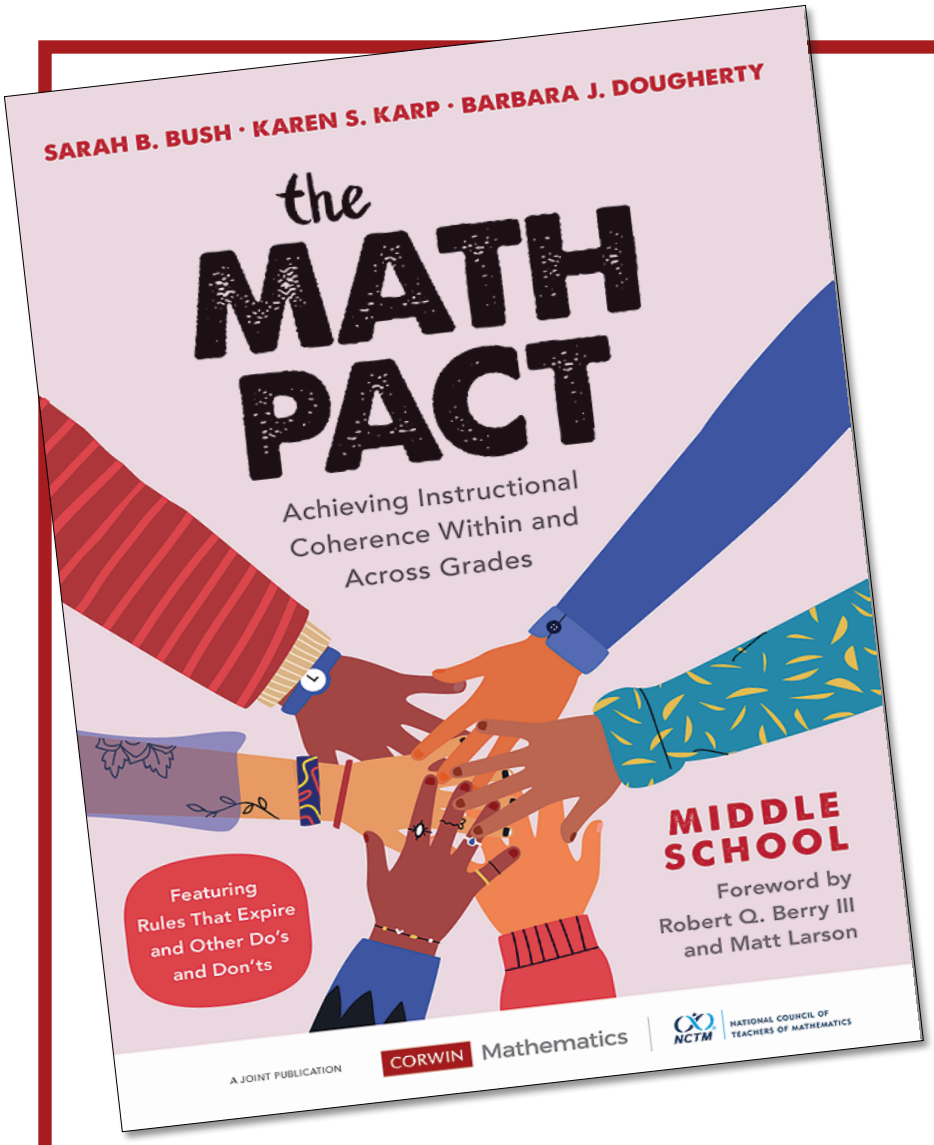

Thank you

FOR YOUR INTEREST IN CORWIN

Please enjoy this complimentary excerpt from *The Math Pact, Middle School* by Sarah B. Bush, Karen S. Karp, and Barbara J. Dougherty.

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COMMONLY USED NOTATION IN MIDDLE SCHOOL THAT NEEDS ATTENTION

Let's pinpoint other notation in middle school that needs attention. Figure 3.1 provides a list of commonly used symbols and shares what should be used instead. These ideas need to be reinforced heavily at the middle level so that students can continue to experience success when they encounter even more complex mathematical ideas in high school and beyond. This list is just a sampling—consider other such notation that exists in your setting.

FIGURE 3.1 • NOTATION THAT EXPIRES IN THE MIDDLE GRADES

Notation that expires	Expiration details	MWSA-suggested alternatives and explanations
Using the notation $\frac{1}{4}+4=4\frac{1}{4}+6=10\frac{1}{4}+5=15\frac{1}{4}$ to symbolize a running series of addition problems	You can see the thinking here. As an answer is given, another addend is tagged on for a new problem, followed by a new answer, a new addend, and so on. Stringing together this series of additions (or other computations), the addends cannot be connected with equal signs, as the computations are unequal. This string is in fact nonsensical and illogical and distorts the meaning of the equal sign as a balance.	Students must use three individual equations in this case to be accurate. For each answer from the previous problem, a new equation is created with the answer as the first addend. Equal signs must connect equal quantities.
Using a *diagonal bar* when writing a fraction	This notation is an issue when students read the diagonal bar as a 1 (e.g., $\frac{5}{8}$ is read as 518, and 5/10 = 1/2, especially when handwritten, is read as 5110 = 112). The diagonal bar is an issue later too, for example, when students see 1/3 *x* and are unsure if it is $\frac{1}{3}x$ or $\frac{1}{3x}$. When trying to connect symbols to situations in context, precision matters.	The use of a *horizontal bar* is preferred. Instead of 1/2, write $\frac{1}{2}$ by hand on the board and in any tasks you create (e.g., Microsoft Word and Google Docs have an equation editor feature that makes this easy). The consistent use of the horizontal vinculum takes much of the confusion away. The use of the diagonal bar was mainly for typesetters, who did not want to break the line of type in print form. But it seems that they were willing to get beyond this need in high school mathematics books, where the diagonal bar is less prevalent.

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Notation that expires	Expiration details	MWSA-suggested alternatives and explanations
Writing the decimal seven tenths as .7	The decimal seven tenths should be written as 0.7, as writing a decimal without the leading zero does not align with international notation standards.	International notation standards indicate that a leading zero must be used when a measure can possibly be greater than 1. The leading zero is also an indication that a decimal is coming, and students are less likely to overlook the decimal point (we can all imagine that this convention is particularly critical in circumstances such as medicine doses). Many students are more successful when this notation is consistently used.
Writing only a number to represent a unit of measure, for example, 9 for the area of a parallelogram	This influences students' grasp of how to accurately use notation in mathematics. When we measure, we must use units that have the same attribute as what we want to measure. So measures of length need a tool and units that have length, and measures of an angle need a tool and units made up of angles. It is no different for measuring area or volume. The notation for area as ft^2, for example, can be confusing, as students are not sure how to interpret this—feet squared or square feet?	The answer must be 9 square units. We measure area with units that cover space—commonly square units, and for volume, we use cubic units to fill space. Without the unit of measure given to notate a measurement, the answer alone is without meaning.
Writing a variable as "x"	Students often confuse 3x as the beginning of a multiplication problem with the multiplier missing, thinking that the x represents multiplication.	Use italics when writing variables, to help students make sense of the symbols—especially when *x* is used as a variable. Write 3*x* instead.

Source: The notations that expire presented in this table are, in part, adapted and synthesized from ideas we have collected from educators as well as based on our previous work in Karp et al. (2014, 2015) and Dougherty, Bush, and Karp (2017).

REFLECTION

CONSTRUCTION ZONE REVISITED—NOTATION WALL

Now that you have a math word wall, consider these questions:

- What notation should be there for students' reference?
- What have students learned lately that needs to be reinforced?
- What prior knowledge is it important to refresh for upcoming lessons?
- As with vocabulary and phrases, how can you combine visuals with definitions to support your learners' use and understanding of these symbols?

Use this template to map out your additional ideas.