

Making Connections

A newsletter highlighting useful strategies, tools, and research in education.

Issue 1 - Middle School Mathematics

Written by Brea Ratliff, M.Ed.



The acronym P.E.M.D.A.S., also known as “Please Excuse My Dear Aunt Sally”, has long been a strategy for teaching the order of operations in mathematics classrooms.

Unfortunately – and incorrectly – P.E.M.D.A.S. has been used interchangeably with the phrase “order of operations”, leading to several misconceptions for students.

Here are a few reasons to retire this acronym:

- When multiplication and division appear in an expression, the operations should be completed in the order they appear. This is also true of addition and subtraction. A learner who follows the acronym without understanding the relationship between multiplication and division (the “M” and “D”) or addition and subtraction (the “A” and “S”) will often make calculation errors.
- Parentheses (the “P”) are a type of grouping symbol and are not the only symbols used in expressions. Other grouping symbols include “brackets, braces, square root symbols, and the horizontal fraction bar” (Karp, Bush and Dougherty, 2015).
- Overall, the hard and fast rules presented in P.E.M.D.A.S. are not always true. Ask your students (and yourself) this question: How many ways could this expression be simplified?

$$5^2 + [3(7 + 6)] + \frac{6 + 6}{8 - 2}$$

Reference

Karp, K. S., Bush, S. B., & Dougherty, B. J. (2015). 12 Math Rules That Expire in the Middle Grades. *Mathematics Teaching in the Middle School*, 21(4), 208-215.



Access Brea’s most recent presentation at the January 2018 Making Middle School Matter Symposium [here](#).



Understand the “why” and “how” behind authentic performance tasks with this research article:

[“Planning, implementing, and assessing an authentic performance task in middle grades classrooms”](#)

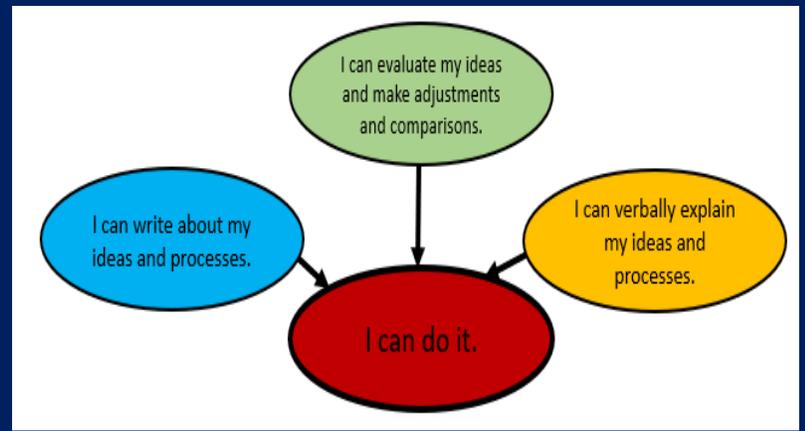
An Exciting New PD Opportunity!

- Struggling with classroom management?
- Discouraged by unsatisfactory test scores?
- Unsure of how to design and implement effective lessons?
- Are your students struggling to retain necessary processes and procedures?

If you or someone you know answered “yes” to 1 or more of these questions, register for [the Teacher Makeover® Institute!](#)

Did You Know?

Students' ability to explain their own thinking and understanding of mathematics is a high-leverage formative assessment practice.



Big Changes with Small Steps

Scaffolding Through Questioning



Provide **all** students with access to math tasks with a high-level demand – they deserve it! Differentiate by preparing and asking learners a variety of questions. Look at this example:

Create a real-world situation for this equation:

$$\frac{1}{6} \left(\frac{2}{3} \right) = x$$

Explain how someone could find a solution to your situation without using a "rule".

Will the value of the variable be greater or less than $\frac{1}{6}$ or $\frac{2}{3}$?

What number do you think the variable represents?

"How would you express what this equation means in words without saying "times" or "multiplied by"?"

"Could you use a model or a drawing to represent this situation?"

"Is there more than one way to solve this equation?"

"What 'rule' (or 'rules') have you learned for solving these types of equations?"

"What do each of the symbols in this equation represent?"

"How would you summarize this question?"

"How would you define a 'real-world situation'?"

Help students build on or construct new ideas by asking specific questions!

Your Turn!

Share your solutions with the education community on social media
#middleschoolmath

Twitter: @brea_ratliff

Facebook: @metothepowerof3



Two bags each hold a collection of blue and green marbles.

- Bag A has more marbles than Bag B.
- The fraction of green marbles in Bag B is greater than the fraction of green marbles in Bag A.
- There are 5 green marbles in Bag B.

How many blue and green marbles could be in each bag?