



MATH

Shift: Rigor- Conceptual Understanding

Practice(s):

MP.3 Construct viable arguments and critique the reasoning of others

MP.8 Look for and express regularity in repeated reasoning.

Domain/level: B/C

CCRS Teacher Workout

The 'Why' Behind Cross-Multiplication

Time needed: 25-45 minutes

Goals:

- Realize why only teaching *the process* of “cross-multiplying and dividing” without developing conceptual understanding of this process is detrimental to student learning.
- Understand the importance of teaching conceptual understanding for commonly used algorithms.

Materials

[Broken Escalator Video](#)

[Handout](#)

Introduction

1. Watch [Broken Escalator](#) video. Make the point: our students need to have a way to “get off the escalator.” Often times our students use common methods or procedures without understanding why they work. In turn, this limits and immobilizes them while solving problems and they get “stuck”.

Practice

2. Compare $\frac{2}{3}$ and $\frac{4}{5}$.
 - a. Solve the problem. Be prepared to explain your reasoning.
 - b. Ask “Why does your method work?” (Common “tricks” are butterfly method, fish method, monkey face, cross-multiply, etc.) Have teachers explain *why* their method works.
3. Give a handout to each participant. Allow participants some time to individually read through the different methods of comparing fractions.



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4. Have participants talk with a partner about (a) what strategy they found interesting and (b) what strategy, if any, did they find confusing.
5. If time, facilitate a large group discussion, addressing comments questions raised in the groups. If you do not have time for a large group discussion, be sure to check in with the pairs to see if they have questions about any of the methods.

Wrap Up

Time permitting, discuss these questions in large/small groups. At the very least, have these questions posted for teachers to personally reflect on as they leave. A key takeaway of this workout is the importance of teaching students *concepts* behind algorithms.

6. What other math skills use the cross-multiply “trick”? How can you support your students’ conceptual understanding of this commonly used “trick”?
7. What other “tricks” do you anticipate arising this year? Can you articulate the reasoning behind *why* the process works? How can you get your students to do the same?