While you Wait – Opportunity to Engage in Research

Montana Special Education Teachers and Support Personnel

We need to hear from you to better understand your needs and partner with you effectively. Please consider taking this **voluntary, anonymous** 10-minute survey to share your thoughts on your current teaching morale and provide feedback on the supports you find most valuable.

Scan the QR code to participate:

Montana Council for Exceptional Children Conference
April 3, 2025 9:00 AM - 10:15 AM
Copper 1

FROM RESEARCH TO PRACTICE: PRACTICAL TIER 3 MATH STRATEGIES FOR LONG DIVISION MASTERY

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TABLE OF CONTENTS - Practical Tier 3 Math Strategies

01

INTRODUCTION

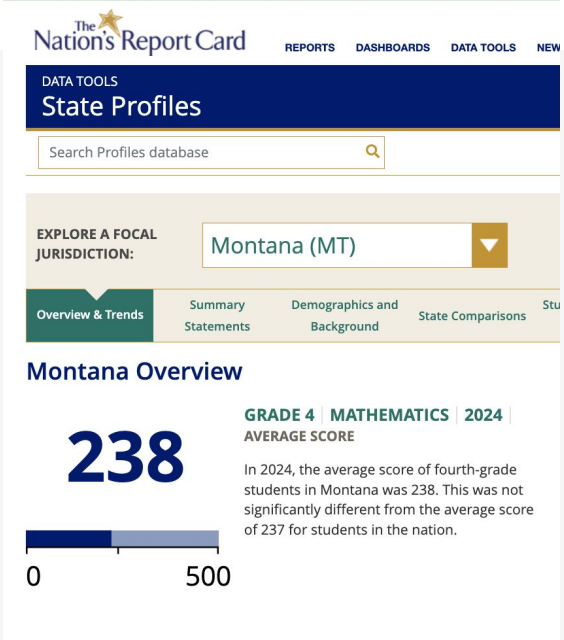
INTRODUCTION

Why Math?

Why Older Students?

All Students Underperforming

In Montana - NAEP 2024
60% NOT Proficient (G4)*
68% NOT Proficient (G8)*



High Percentage of Students Experience Math Difficulties (MD)!

As high as **35%** have "MD" (Gersten, 2004; Rojo et al. 2024)

True/False?

Not Only Important - Information on how to support older students is limited compared to literacy!

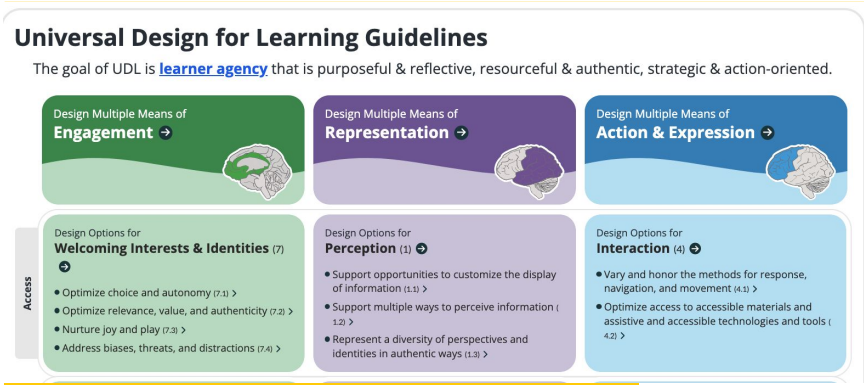
"Understanding how to support wide range of learners in upper grades remains limited" (Powell et al., 2022; Personal Communication MT Special Educators Fall 2024)

02

Tier 3 Math

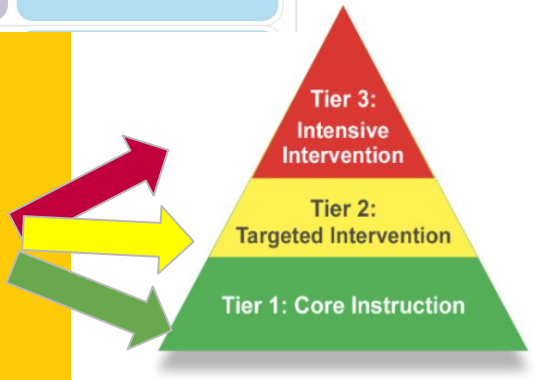
Tier 3 Math

We often rely on general frameworks - UDL & MTSS/RtI



https://exceptionalchildren.org/topics/universal-design-learning
https://udlguidelines.cast.org/

Evidence-Based Practices



https://opi.mt.gov/Educators/Teaching-Learning/Multi-Tiered-Systems-of-Support/Tiered-Implementation

UDL & MTSS: How They Help - Yes! Show me what works!

Tier 3

Do's and Don’ts

“**Practice Based Evidence (PBE)** is immediately relevant, contextually-based-data collected to address the particular: this student in this context.” (Eppley et al., 2018, p. 37)

Beyond UDL & MTSS – PBEs

Eppley et al., 2018

~~UDL: Outlining Robust processes for older students~~

(Lambert et al., 2021)

~~MTSS Tier 3: Identifying effective interventions~~

(Johnson & Smith, 2008).

~~MTSS Tier 3: Providing PD for Targeted Interventions~~

(Johnson & Smith, 2008).

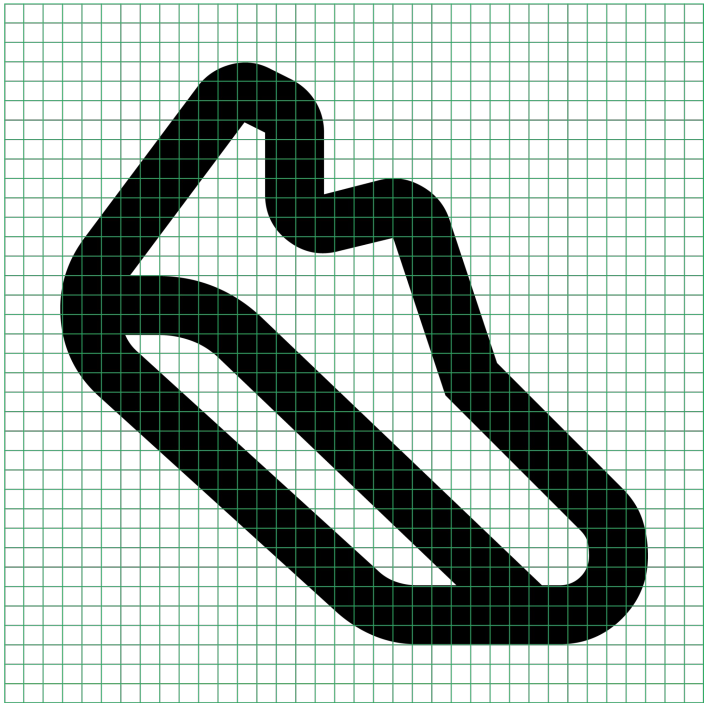
03

6 Lessons - PBE

6 Long Division Math Lessons

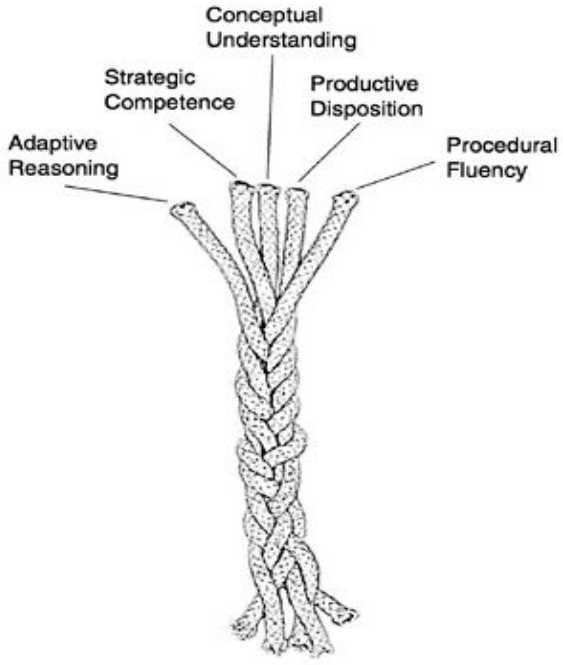
How We Built

1. Identified Problem (Long Division Math Skills - 5th grade - rural school)
2. Identified EBP **Structure** (SRSD & CRA)
3. Collaborated - SPE & Math
4. Taught & Refined Based on Data



Getting Ready for Our Tier 3 Math Intervention

More information on how we designed the lessons based on SRSD AND understanding of mathematical proficiency

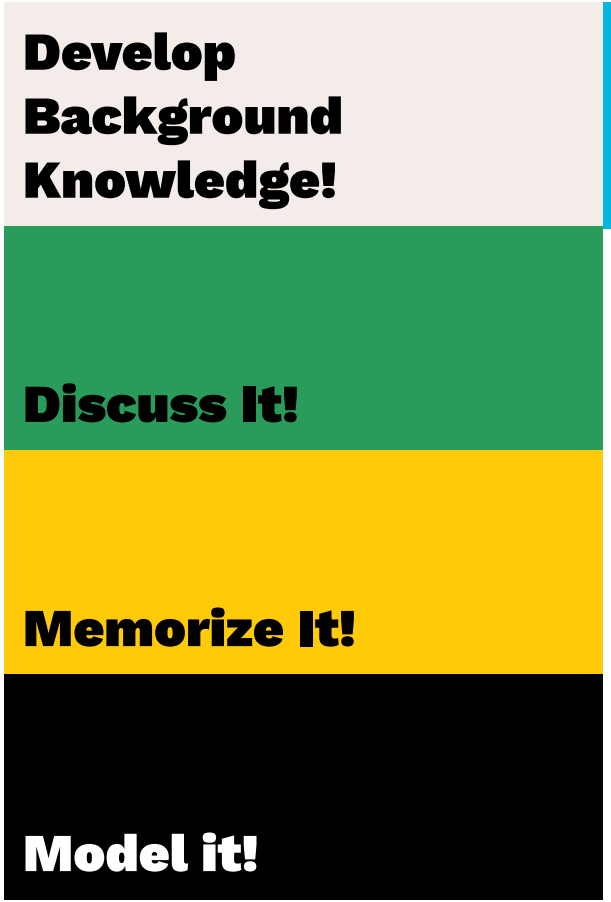


- Conceptual Understanding: connecting ideas to what they already know
- Procedural Fluency: carrying out procedures flexibly, accurately, efficiently, and appropriately
- Adaptive Reasoning: logical thought, reflection, explanation, and justification
- Strategic Competency: formulate, represent, and solve mathematical problems
- Productive Disposition: see mathematics as sensible, useful, and worthwhile

6 Long Division Math Lessons

EBP #1: Self-Regulated Strategy Development Model (SRSD) – 6 Stages

What I love most about the stages is how flexible they are—if a student gets stuck, we can go back. Revisiting an earlier stage often gives students exactly what they need to move forward.



Support it!

Continue Until Student Reaches the final stage: **Independent Performance!**

6 Long Division Math Lessons

SRSD =

Academics (Long Division) & SEL

Self-Regulation Incorporated Throughout Lessons!

1. Individualized Positive Self-Talk
2. Individualized Goal Setting
3. Individualized Self-Monitoring
4. Individualized Self-Reinforcement

6 Long Division Lessons

EBP #2: Concrete Representational Abstract (CRA)

[redacted]

A Meta-Analytic Review of the Concrete-Representational-Abstract Math Approach

Sara Ebner, PhD, Mary K. MacDonald, MS, [...], and Kathleen B. Aspiranti, PhD +1 View all authors and af

Volume 40, Issue 1 | https://doi.org/10.1177/09388982241292299

Contents | Get access

Abstract

The concrete-representational-abstract (CRA) approach is an instructional framework for teaching math wherein students move from using concrete materials to solve problems to using visual representations of the materials, and finally abstract concepts.

6 Long Division Lessons

Let's Watch to better Understand SRSD & CRA

Notice & Wonder

04

6 Lessons: Details

SRSD Math Targeted Treatment:

What? Do Monkeys Sell Banana Rugs? Check it Out!

Lesson 1a

Instructor: _____ **Date: _____**

Student: _____ **Total Time: _____**

In Lesson "1a", activities focus on assessing a student's background knowledge (through discussion), building rapport, generating excitement, and introducing the long division strategy. Discussions are very important throughout as students play a critical role in lesson progression and knowledge construction.

Throughout the lessons, we have selected tutor notes to help you predict possible challenges and celebrations for each of the 6 SRSD lessons. The tutor was a teacher candidate at the University of Wisconsin – La Crosse. This individual was working toward certification in the following areas: MC-EA (Grades 1-8) with a minor in math and special education (cross categorical). For this lesson, this tutor noted the following: **What went well?** I was very impressed about how many connections I could find. I believe this will be helpful; hopefully I will find a way to also help him connect long division to a topic that he is interested in. **What areas of the lesson were challenging?** When I was talking with this student about how long division is useful outside of school, he really struggled to come up with examples of division in real life. He alluded to not using long division in real life because he can't do long division in his head. I told him that I can't do long division in my head either and there is nothing wrong with needing a pencil and paper to do long division. I feel like I could have explained what I wanted him to do better, I should have asked him to create a story problem for me.

Aha moments from working with this student - This student was able to tell me what a strategy was. He said that it was "something that can help you." He said that using a multiplication table was a strategy when completing a multiplication problem. He also named a strategy for completing chores at home. He said the strategy was "weird," but I think he is excited to learn how to use it!

W
D
M
S
B
R
C

Lesson 1a - Not fully discussed in this training.

Look at this to see the structure of the lessons.

SRSD Math Targeted Treatment:

What? Do Monkeys Sell Banana Rugs? Check it Out!

Lesson 1b – May repeat if necessary.

Instructor: _____ **Date:**_____

Student: _____ **Total Time:** _____

You are teaching Lesson "1b", because during Lesson "1a", the student had a difficult time representing hundreds, tens, and ones with symbols and needed more concrete examples. During this lesson, activities continue to focus on developing background knowledge. This is done through discussions, memorizing, modeling, and providing "scaffolded" levels of support (i.e., provide only as much support as needed in order for student to be successful). You will continue with this lesson until the student can successfully demonstrate how to use base-10 manipulative blocks to represent a long division problem. One tutor who delivered this instruction reported that a student needed two days (each session was approximately 25 minutes) to find success in this lesson. The tutor shared the following information.

Lesson 1b – Day 1: **What went well?** This student once again did awesome when it came to memorizing the strategy! He was able to write down the entire strategy and what each "letter" stood for. He could also recite the strategy with ease! This student, as always, was very agreeable and cooperative! I also really tried to emphasize the relationship between the base-10 blocks (100 little cubes in the square, 10 sticks in the square, 10 cubes in each stick...etc.) This student seemed to follow along well and I think using the base 10 blocks is going to help him see the big picture once we get rolling into the strategy more. His goal for next session is to be able to represent numbers using the base 10 blocks. This student was also able to answer my questions throughout the lesson as well much better than he has been able to in the past. **Concerns?** I didn't have as much time as I would have liked to; the lesson felt rushed at the end. Otherwise, there weren't any problems that I can identify, this student watched attentively as I was modeling so I am really happy about that! **Aha moments from working with this student -** I still haven't seen the "light bulb" go off quite yet, but I think using the blocks to help this student understand the "What" portion of the strategy. He was able to tell me by looking at the blocks at the end that 5 ones were able to go into each of the 6 groups and he told me that 2 was the remainder! Hopefully once he is comfortable with the concrete way of dividing the more abstract ways this student come easily to him as well!

W
D
M
S
B
R
C

Lesson 1b - We will be discussing!

This is where we dove into the "C" of "CRA" approach.

____**I. Review Work Completed Last Time & Generate Excitement**

_____ You discussed solving 3-digit by 1-digit long division problems.
_____ They helped you solve a problem.
_____ They learned a 7-step strategy for solving long division problems.
_____ They set a goal for memorizing ____ # of parts of the strategy.

____**II. "Test" & Remind about Upcoming "Tests"**

_____Give the student a sheet of paper and see how many steps of the strategy they can successfully write down on the paper.

_____**III. Explicit Discussion Related to Self-Regulation Strategies**

_____ **Self-Monitoring**

____Use the rocket to have them mark off how many of the 7 steps they remembered.
____Remind them that if they get all 7 parts that they will be able to blast off the rocket! ☺

_____ **Goal Setting**

_____Did they meet their goal. Congratulate them!
_____Have them set a goal for the next time.

___ **IV. Explicit Discussion Related to Long Division & Explicit Teacher Modeling.**
(*Model using strategy when solving a long division problem. Examples of how this could be done are provided below.)*

____Explicitly state that you are going to demonstrate how to use the strategy to help you solve a long division problem. Inquire about student's current level of interest in learning this. If they are not interested, engage the student in a discussion about why learning this skill is important. Refer back to the discussions that occurred during session 1a.

_____ **Model how using a strategy can help the student correctly solve a long division problem.**
Take out a blank "Probe 1" and say something such as, "Ok, here is a long division problem. I'm a little concerned about doing everything I need to do to correctly solve this problem, but I don't need to worry. Why? I have a strategy I can use to help me solve this problem. I am going to write that strategy down the side of this paper to help me remember all of the important steps!

_____**Take out Form "1A" and a blank sheet of paper and model how to use the graphic organizer to recall the 7 steps.**
Say something such as, "I haven't memorized all of the steps yet, but that's alright. I

Lesson 1b continued!

can use this organizer to help me. I am going to write down the first letter of each step down the side of this blank piece of paper. Writing more than the first letter will take too long. I can use this reminder sheet until I memorize all of the steps. The strategy for solving a long division problem is **What? Do Monkeys Sell Banana Rugs? Check it Out!** So, I am going to write **W, D, M, S, B, R**, and **C** down the side of this paper.

____**Model how to complete the W using base 10 manipulative blocks**

_____**Explicitly model how to use manipulatives to complete the "W"**

_____ Say something such as the following, "Ok. Looking at my trick I see that the first thing I need to do is answer the "W" – What is this problem asking me to do?", *"I have a better way to help me understand the "W" in this trick. Instead of drawing the squares, lines, and circles…I am going to use these blocks to help me understand what this problem is asking me to do. Let's look at the problem we tried to solve last time together. The problem was 615 divided by 5. The first letter -"W" - reminds me that I need to ask myself, "What is this problem asking me to do?" It looks like it is asking me to determine how many time "6s" can be evenly distributed into "5" piles. I am going to use these blocks to help me understand this…*

_____*Proceed to divide the hundred blocks (if possible) to "__" sheets of paper.* ***State that you need to start with the hundreds****. Then, move to the tens, and finish with the ones when doing the next 5 steps.*

_____ **Model a self-regulation component: self-monitoring**

Place a check next to the W (that you wrote down the side of your piece of paper) to demonstrate that you have completed this first important step.

Lesson 1b continued!

We'll stop here

Practicing the Lessons

Focus on the W - What is the problem asking me to do?

We're going to walk through the first step of the SRSD strategy—just the 'W'—because without understanding what a problem is asking, nothing else works.

✅ I Do (5 minutes)

✅ We Do (10 minutes)

✅ You Do (10 minutes)

1-page handout providing detailed description of this is accessible by using QR code or clicking THIS LINK.

05

Summary

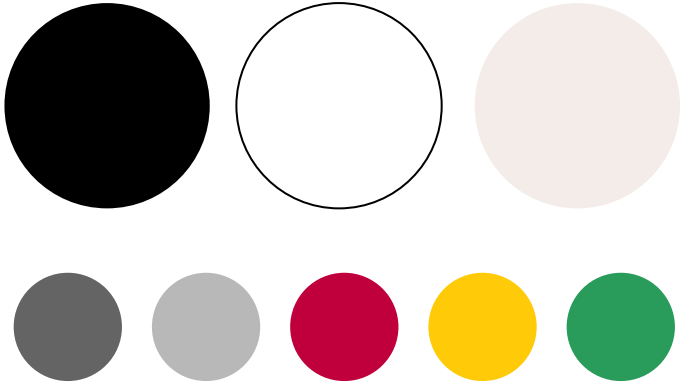
Practical Tier 3 Math Strategies

~~Practice-Based~~ Evidence Based on Evidence-Based Strategies

Structure = SRSD & CRA

Six Structured Lessons with Implementation Notes

WHAT IS THIS QUESTION ASKING ME TO DO - PRACTICE



Application Ideas - Q&A

Thank you