CORE MATH®

Supporting Struggling Math Students

Presented by

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www.corelearn.com

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Today's Presenter

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Participant Take-aways

- How to plan for and use time for intervention
- What the focus of intervention time should be — foundational knowledge, today's lesson, and/or tomorrow's lesson
- How and what types of assessments to use
- What materials to use for Interventions
- What much fluency work to include

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Need for Intervention

- **Myth #1** - Students learn at different rates so they will catch up later.

  - **True:** Not all students are alike and there are variations in learning rates.
  - **More True:** Benchmarks for reading and math are set at levels all students (except those with learning disabilities) can and should attain. Students who fall behind are more likely to stay behind if not provided additional support. The further behind a student is the more intensive the support needs to be.

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Overview of Multi Tiered Systems of Support (MTSS)

[MTSS is]. . . a coherent, strategically combined system meant to address multiple domains or content areas in education.

McIntosh & Goodman, 2016

- Academic support – Response to Intervention (RTI)
- Behavioral support – Positive Behavior Interaction and Supports (PBIS)

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Overview of Key RTI Components

- Leader
- Leadership/RTI team
- Data and data-based decision making
- Three tiers of instructional support
  - Tier 1 – core instruction
  - Tier 2 – small group instruction
  - Tier 3 – small group and individual instruction

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Main Steps in RTI Implementation

- Explore and Adopt
- Plan
- Implement
- Sustain

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Common Areas of Concern to Address

- Who to teach
- What to teach
- When to teach
- How to teach
- Who will teach
- Materials to use
- Assess, review, revise

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Who to Teach – Identifying and placing students

- **Myth #2:** Our benchmark test will tell us what students need to learn.

  - **True:** Benchmark assessments, like MAP from NWEA, are good at identifying students who have gaps or are at risk of falling behind, and monitoring overall growth for the year. Benchmark assessments may inform the intensity of intervention needed and some general areas for instructional focus.

  - **Also True:** Not diagnostic and not progress-monitoring.

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Identifying Students Needing Added Support

- Summative
- Screening/Benchmarking
- Progress Monitoring
- Diagnostic
- Teacher Input
- Progress in core instruction

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What to Teach

- **Myth #3**: Each teacher can best figure out what to teach during intervention time.

  - **True:** For less intensive levels of intervention teachers are often in a good position to identify leaning needs.
  - **Also True:** For tier 2 and especially for tier 3, data and research are better resources for determining what to teach.

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Teacher Identified Content

Gaps, misconceptions, or other struggles with learning related to recent or current lesson, extra help on classwork or homework, and firming up the foundation for the next lesson.

- Additional support within core instruction.
- Support class aligned to core instruction.

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Recommendations from Institute of Education Sciences (IES)

- In depth treatment of whole numbers in kindergarten through grade 5, and rational numbers in grades 4 through 8.
- Include instruction on solving word problems that is based on common underlying structures.
- Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.

Assisting students struggling with mathematics: Response to Intervention (RTI) for elementary and middle schools, Gersten et al., (2009)

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Critical Foundations for Algebra

- Fluency with Whole Numbers
- Fluency with Fractions (including positive and negative fractions)
- Particular Aspects of Geometry and Measurement (area, perimeter, volume, and similar triangles)

National Mathematics Advisory Panel Final Report,
United States Department of Education (2008)

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Concepts, Procedures, and Problem Solving

In developing intervention instruction, I have reaffirmed my longtime commitment to helping students learn facts and skills—the basics of arithmetic. But I've also reaffirmed that "the basics" of number and operations for all students, including those who struggle, must address all three aspects of numerical proficiency—computation, number sense, and problem solving. Only when the basics include understanding as well as skill proficiency will all students learn what they need for their continued success.

Marilyn Burns (2007)

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What to Teach – Focus for Math Interventions

- **K-5:** Whole numbers - counting, place value, operations; and basics of geometry and measurement.
- **Grade 4-8:** Rational numbers – meaning and operations; basics of geometry and measurement; and strategies for solving word problems.
- **Grades 6-9:** Rational numbers, integers, ratio and proportions, and solving equations; and strategies for solving word problems.
- **High School:** For tier 2 pre-teach and reteach concepts from core curriculum.

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What to Teach - Fluency

- **Myth #4:** Fluency is best built through drill practice.

  - **True**: Drill or straight forward practice sheets are one good way to practice facts and procedures.

  - **More True**: There are many great fluency building activities that also build deeper number sense. These are NOT drill worksheets.

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What to Teach - Fluency plus Number Sense

Make 24: Use 1, 2, 4, and 12 and any operations

- $(12 - 4) \times (2 + 1) = 8 \times 3 = 24$
- $12 \times 4 \times \frac{1}{2} = 48 \times \frac{1}{2} = 24$

Memories are formed as the residue of thought . . .

Daniel Willingham 2008

. . . there is almost no transfer to long-term memory without rehearsal .

David Sousa 2008

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When to Provide Interventions

- **Myth #5:** We can do intervention within our regular class time as part of core instruction, through things like good warm-up problems.
- **Myth #6: T**utoring time is math intervention time.

  - **True**: These are types of intervention or added support. They provide direct support for core instruction.
  - **More True**: These types of support that will rarely move the needle on students with significant gaps.

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When to Teach – Elementary Classes

When: Daily extended math time (75- 90 minutes) or added time during other parts of the day.

Pitfall: Using the whole time for a single math lesson.

Remedy: Use 20-30 minutes for intervention - small group work, stations, computer rotations, and other techniques to allow time for the teacher to provide the tier 2 small group instruction some students need.

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When to Teach – Secondary Classes

Generally three types of support are found for general education students:

- In the core class, teachers use differentiation, scaffolding, warm-ups, and individual help while the rest of class has independent practice.
- Math support class in addition to core math class.
- Intervention math class replacing regular core class.

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How to Teach

- **Myth #7:** Students just need lots and lots of practice with math facts.

  - **True:** Students do need plenty of practice, both immediate and distributed.

  - **More True:** Students rarely need extra support simply because they don't have all the math facts memorized. As described in research and by math experts, students in intervention need to understand facts, concepts, procedures, and problem-solving.

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Make Connections Explicit

Students who need intervention instruction typically fail to look for relationships or make connections among mathematical ideas on their own. They need help building new learning on what they already know.

Marilyn Burns (2007)

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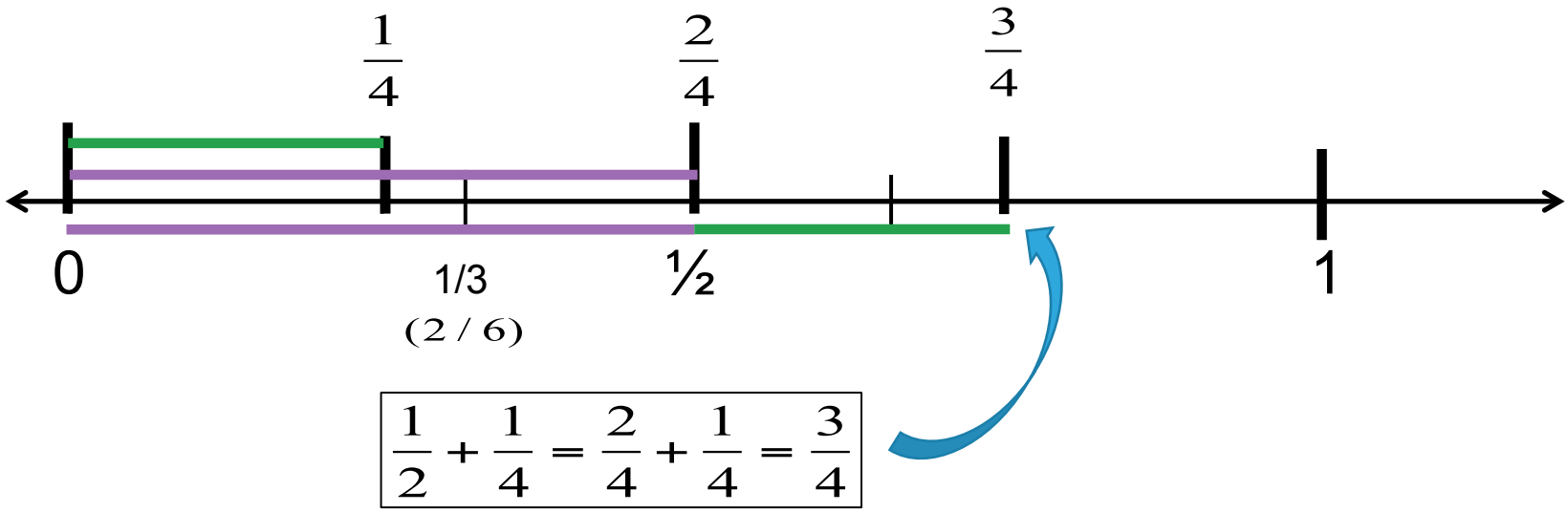
Make Connections Explicit – A Fraction Addition Example

Students make a common error when adding fractions with unlike denominators – add numerators together and add denominators together.

For example $\frac{1}{2} + \frac{1}{4} = \frac{2}{6}$



$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

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Recommendations from Institute of Education Sciences (IES)

- Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.
- Intervention materials should include opportunities for students to work with visual representations of mathematical ideas.
- Include motivational strategies in Tier 2 and Tier 3 interventions.

Assisting students struggling with mathematics: Response to Intervention (RTI) for elementary and middle schools, Gersten et al., (2009)

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Recommendations from the RTI Network

- Instructional explicitness
- Instructional design that eases the learning challenge
- Strong conceptual basis for procedures that are taught
- Emphasis on drill and practice
- Cumulative review
- Motivators to help students regulate their attention and behavior and to work hard

http://www.rtinetwork.org/essential/tieredinstruction/tier2/mathintervention

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Who will Provide Interventions

- **Myth #8:** The computer program is our intervention teacher.

  - **True:** There are many good computer based intervention systems and online resources today that provide diagnostic assessing, progress monitoring, individualized and adaptive instruction, fluency building games, and even rewards. Computer programs are getting better each year and do provide a great resource for addressing needs of struggling students.

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More True: TEACHERS Teach

What we have seen that does NOT work:

- Unmonitored use of computers
- Unlimited use of computers
- Paraprofessionals in charge

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More True: TEACHERS Teach

What we have seen that DOES work:

- Teacher is always in charge
- Limited computer time
- Use time for small group work
- Train students on use of the computers
- Students keep a learning journal for computer work

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Who will Provide Interventions? Teachers.

- Teachers teach
- Small group work with the teacher or specifically trained para is great
- Computers programs, math printed materials, and para professionals are great resources

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Teaching Materials for Intervention

- **Myth #9:** Teachers can create the intervention materials and/or program.
- **Myth #10:** Reteaching and intervention can easily be done using the core program materials, just use lessons from prior grades.
  - **True:** For support directly linked to core instruction teachers can identify and provide instruction as needed using a variety of resources they draw from including the core program, and their own experiences.
  - **More True:** For more intensive support to address learning deficits/gaps most teachers do not have the time or expertise to develop teaching materials.

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Program Materials – Content Resources

- Tier 1/core materials
- Supplementary resources
  - *Such as, Kahn Academy, Reflex Math, MobyMax, ArcAdemics.com, KenKenPuzzles, worksheets, practice problems, released items from assessment sources, fluency activities that also build number sense (like Spend Some Time with 1 to 9), extra resources included in core programs, and others.*
- Intervention program

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Assess, Review, and Revise

- Track student progress
- Use the data
- Make decisions
- Track program progress
- Revise interventions to make them more effective
    - Frequency
    - Intensity (time and group size)
    - Materials
    - Pacing
    - Personnel

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Wrap-Up and Review

1. Who to teach
2. What to teach
3. When to teach
4. How to teach
5. Who will teach
6. Materials to use
7. Assess, review, revise

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Let's Connect!

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