

## What are the math deficit areas?

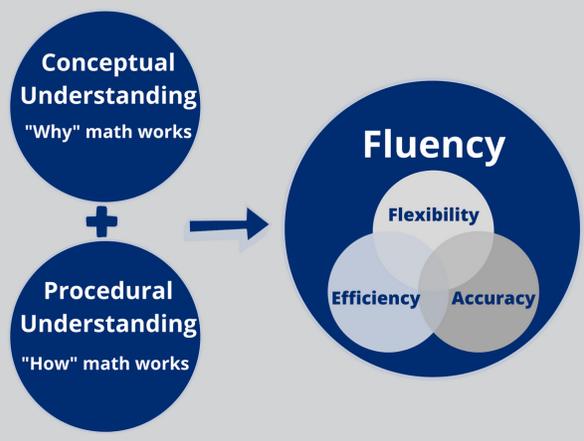
**Math calculation** is the knowledge and retrieval of facts and the application of procedural knowledge in calculation. This is associated with deficits in number sense and operations, one-to-one correspondence, and learning basic facts.

**Math problem solving** involves using mathematical computation skills, language, reasoning, reading, and visual-spatial skills in solving problems; and applying mathematical knowledge at the conceptual level. This is associated with difficulty identifying important information, filtering out unimportant information, determining steps in problem solving, and monitoring one's own learning.

### What is math fluency?

Math fluency is the ability to apply procedures accurately, efficiently, and flexibly, and to recognize which strategy to apply in a given situation.

Fluency requires both conceptual understanding, or "why" the math works, and procedural understanding, or "how" the math works.



- National Council of Teachers of Mathematics, 2014

### What is number sense?

Number sense is a student's ability to work flexibly with numbers and is critical to math achievement. In other words, they "make sense" of the math. Students with strong number sense can:

- Understand the meaning of and relationship between numbers
- Assess the reasonableness of answers
- Perform mental calculations
- Apply number operations to real world situations

## What are some learning difficulties students with math deficits might have?

- Sequencing events
- Developing spatial awareness, or understanding shape, position, size, and movement of objects
- Organizing numerals and signs, especially in complex problems
- Following multi-step directions
- Retrieving math facts fluently and efficiently
- Estimating, or determining an approximate answer
- Retaining concepts and information
- Understanding and comparing quantities, or number sense
- Grasping the meaning of symbols
- Remembering facts and formulas
- Knowing what to do with the numbers and information in a problem

## How do we know what to teach?

The RTI<sup>2</sup> or IEP team should use multiple sources of data to determine a student's skill level and specific skill deficits. All of this information should be used to design the student's goals, services, and instruction.

### Commonly Assessed Areas

#### Math Calculation

- Counting
- Place value
- Naming numbers
- Math fluency
- Fraction operations

#### Math Problem Solving

- Comparing quantities
- Using place value
- Math fluency application
- Fraction & decimal application
- Time
- Money
- Measurement
- Geometry

### Assessment Sources

- Universal screening
- Diagnostic assessments
- General outcome measures
- Mastery measures
- Formative assessments

For more information on assessments, visit <http://bit.ly/TDOEassessments>

# How does mindset impact mathematical performance?

## Why is mindset important in math?

Studies have found a significant relationship between mindset and math achievement. Students with a growth mindset in math are more likely to set learning goals for themselves and believe that they can overcome challenges.

*Claro, Paunesku & Dweck, 2016; Blackwell, Trzesniewski & Dweck, 2007*

## How do teachers build positive mindsets about math?

- Believing and communicating that all students can learn at high levels
- Making math visual by including manipulatives and drawings
- Encouraging student risk-taking by valuing mistakes as learning opportunities
- Having students openly share ideas and methods for solving math problems
- Creating accessible tasks for all learners, including extension options

# What instructional strategies are most effective?

## Universal Design & Accommodations

- Use visuals and manipulatives
- Break problems into smaller parts
- Facilitate peer partners
- Provide instructions both verbally and visually
- Allow extra time on tasks/tests
- Frequently check for conceptual understanding
- Use dry erase boards for formative assessment
- Give graph paper to help students line up numbers and problems
- Highlight key words, symbols, and numbers
- Provide students with lists of formulas with explanations of what the components are
- Use calculator for tasks not assessing computation

\*Determined based on individual needs and age/developmental appropriateness

## Evidence-Based Instructional Strategies

- Use multi-sensory methods
- Provide explicit, systematic instruction targeting identified skill deficits (See the [Intervention Content Focus](#) for more information)
- Focus on both conceptual and procedural understanding
- Include instruction on ways to deconstruct real world problems
- Students verbalize thought processes by sharing how they solve problems
- Teacher modeling followed by guided practice and independent practice
- Follow the Concrete-Representational-Abstract (C-R-A) method
- Devote time to developing fluency through number sense
- Vary problem types

## Addressing Language Needs in the Math Classroom

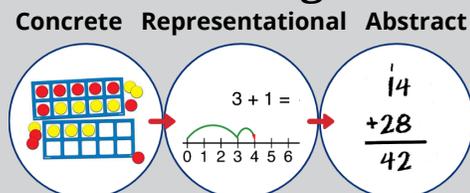
- Use multi-sensory methods
- Teach vocabulary both explicitly and contextually using examples and non-examples (e.g. Frayer model)
- Read books about math
- Have students practice metacognition, which is the process of thinking about and self-monitoring while performing math tasks
- Chunk content
- Allow processing time
- Provide consistent visual representations and graphic organizers to structure and scaffold work
- Intentionally vary delivery methods (ie. teacher-led small groups, peer groups, lecture, etc.)

*Supporting Students with Mathematics Disabilities*  
<http://bit.ly/supportmathdisabilities>

# How will using the C-R-A method increase student learning?

The C-R-A instructional approach is highly effective in helping students in all grades build conceptual understanding and number sense. It begins with the Concrete before moving students into the Representational, and finally, the Abstract stage.

For more information on CRA, visit <http://bit.ly/CRAmethod>



# How do we know if an intervention is effective?

Ongoing assessment through progress monitoring provides continuous feedback on the effectiveness of instruction and intervention. Through the process of tracking and comparing an individual's or a group's performance, data can be used to make instructional decisions. See the [Special Education Framework](#) for more information on progress monitoring types and data-based decision making.