



BBBD Supports and Interventions



Using the *Building Blocks of Brain Development* to Support Students with Learning Disabilities

Peter Thompson, Ed.S., Ph.D.





Module 3.2

BBBD: Supports and Interventions

**Intermediate Level: Learning Processes
Supporting *New Learning* Problems in the
Classroom**



Important Note

The information, concepts, and models provided in this presentation are intended to give practitioners a framework when conducting special education evaluations and employing interventions. It is emphasized that nothing in this presentation is meant to be directive or prescriptive.

Professionals are free to use some, or all of the information presented, but they are not required to do so in their practice. **Always consult with your special education director for clarity around district policies and expectations for special education evaluations.**



IMPORTANT 

Learning Outcomes

- Understand why some students struggle to learn new concepts
- Learn effective interventions for “new” learning problems
- Learn about effective strategies for students that struggle to learn mathematics



Presentation Organization

- I. Review BBBD and New Learning Key Concepts
 - A. New (Novel) Learning
 - B. Learning Problems Related to Mathematics

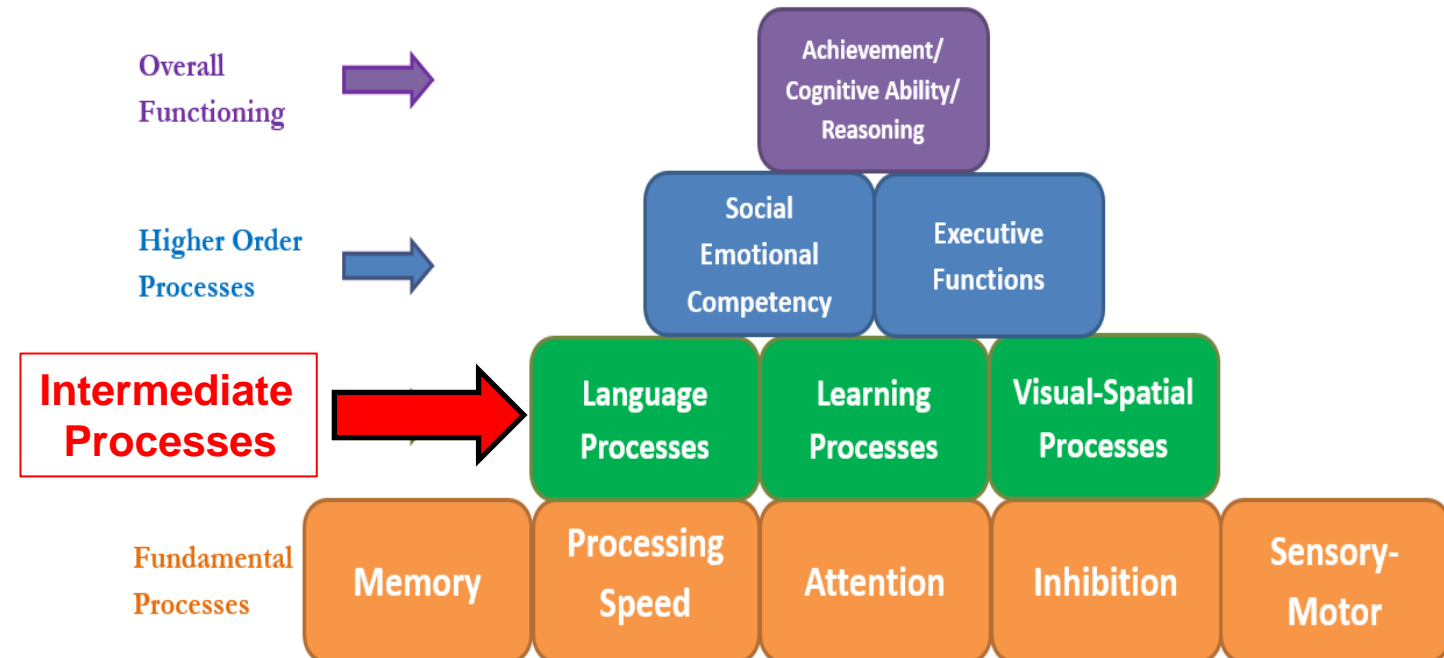
- II. New Learning and Math Interventions
 - A. Expert Guidance
 - B. Interventions
 - C. Accommodations



What Are Intermediate Processes? Impact on Learning and SLD

- Success within this level is based on proper functioning of fundamental processes
- Critical difference is the integration of functions to process complex information
- Acquisition of specific information and broad knowledge-critical for later use-(skills)

Building Blocks of Brain Development ©



The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.

The Building Blocks of Brain Development © – further adapted by the CO Brain Injury Steering Committee, 2016.

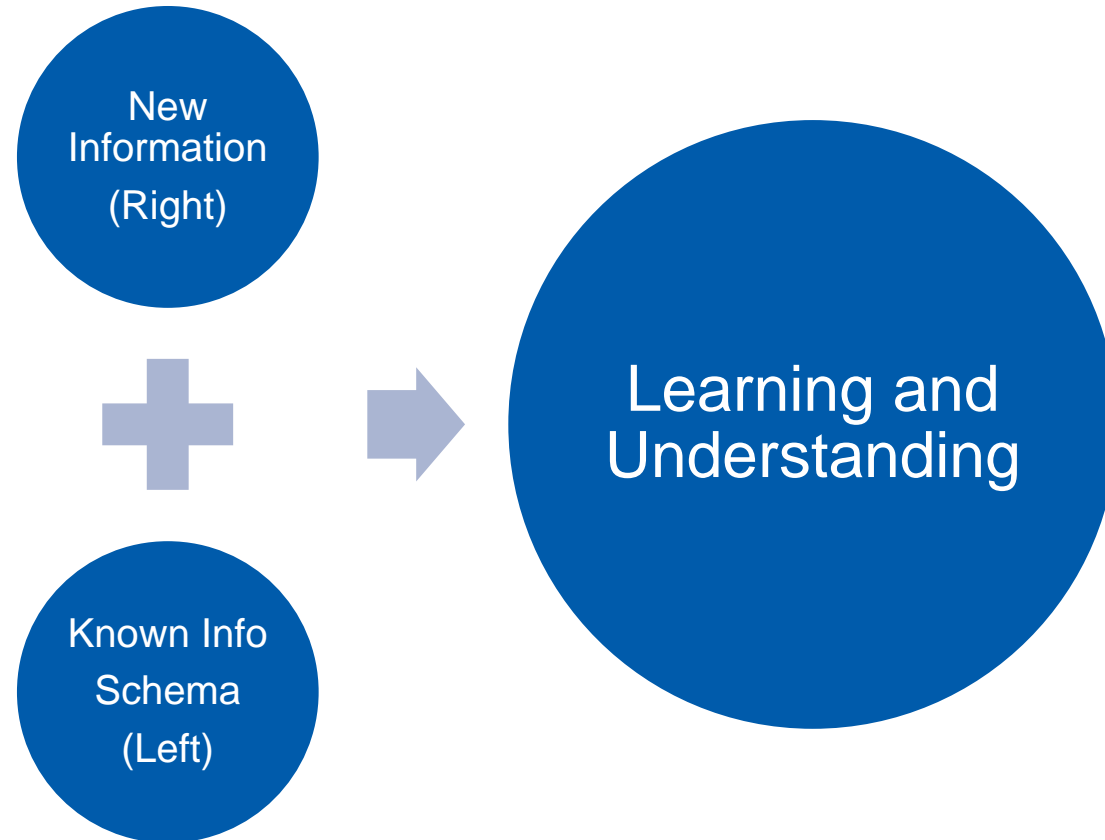


Intermediate Processes: Learning Processes Key Concepts

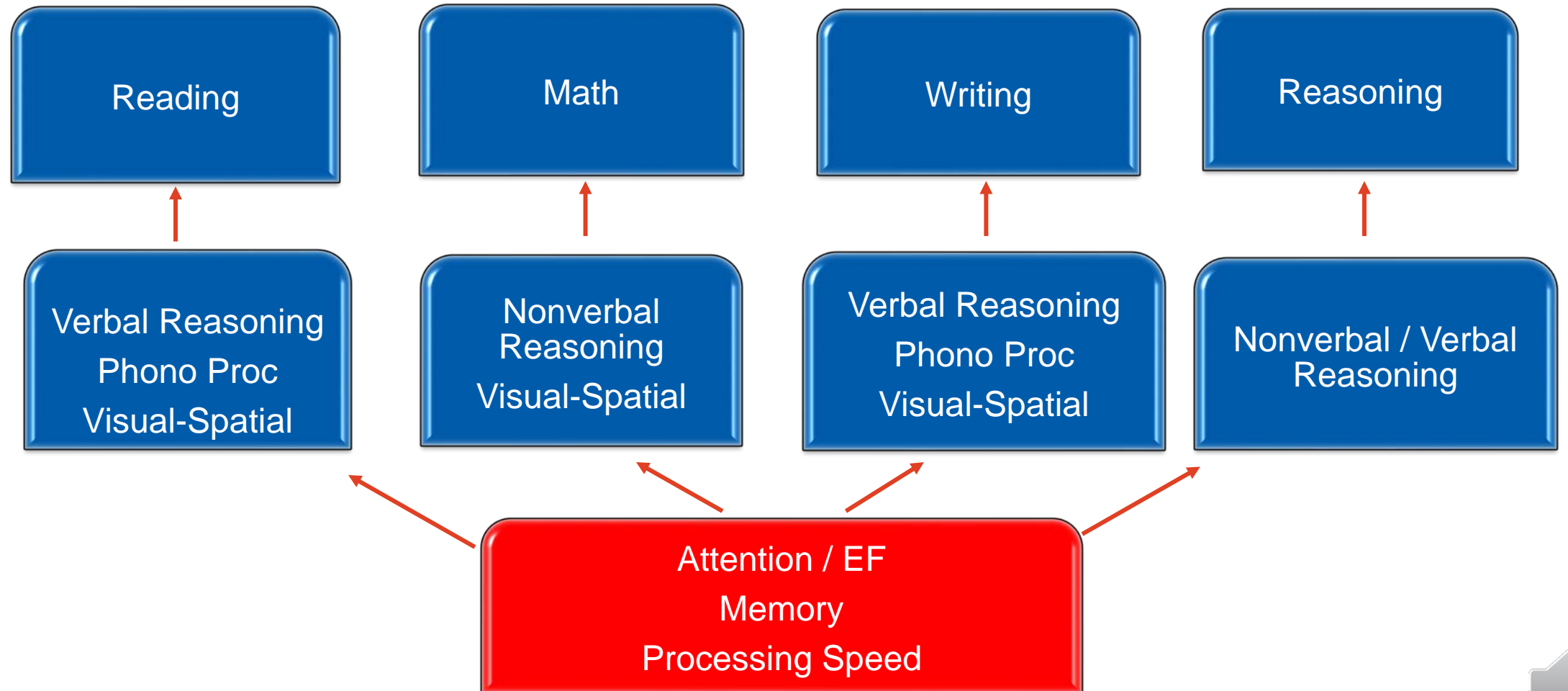
- All learning is a complex neurocognitive process that needs the successful integration of several brain-based functions.
- In the BBBD model, new learning is related to “knowing” and reasoning such as inductive, deductive and abstract reasoning.
- While several regions of the brain are active during new learning, the right hemisphere plays a major role (Hale and Fiorello).
- To learn new concepts and to understand information, one must “merge” what is novel to what is known-importance of activating prior knowledge.
- Poor math performance is highly linked to poor novel reasoning.



New Learning: Simplified Illustration



New Learning Entails Reasoning Impacts All Areas, Especially Math

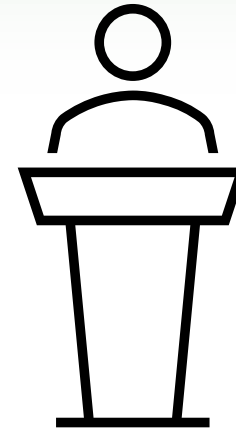


II. New Learning Supports and Interventions

1. Expert Guidance
2. Interventions
3. Accommodations



1. Expert Guidance



1. Expert Guidance



- ✓ Critical! Remember to develop a positive philosophy of SLDs. Attitudes about SLDs will impact the success of student interventions. Re-assure students, stay positive and expect realistic gains!



1. Expert Guidance



- ✓ Students with very low reasoning abilities present special challenges as they are in between SSN and SLD.
- ✓ While most SLD referrals center on reading problems, math disabilities are under-identified.
- ✓ There is a high comorbidity rate between reading and math disorders—same verbal reasoning, working memory and processing speed issues maybe implicated with both disabilities.



1. Expert Guidance



- ✓ Students with significant reasoning issues may need experiential opportunities, manipulatives and several trials of learning, which involves special teaching and testing considerations.
- ✓ Consider “degree” of deficits related to nonverbal reasoning.



1. Expert Guidance



- ✓ Students that struggle to learn new information may develop behavioral and emotional problems, especially anxiety (e.g. math anxiety).
- ✓ There are no 100% effective interventions, be critical when examining commercial programs*.

* See the Mathematics Program Evaluation tool in the resources folder for this module.



2. Intervention



2. Interventions: Low Reasoning Abilities

- Critical to acquiring knowledge is the ability to reason and integrate increasing amounts of information that varies in complexity to existing knowledge. New learning can be impacted by memory deficits—memory is a “bridge” that is necessary to merge old with new information.
- In general, students with low reasoning ability will benefit from the same effective teaching strategies that benefit all students, which is explicit and direct instruction (Module 2.1)—there is no magic intervention (Pennington).
- Low reasoning typically impacts basic math skills and quantitative comprehension, which maybe an early indication reasoning deficits.



2. Interventions: Low Reasoning Abilities

Increase dose of:

- Explicit and direct instruction in small group (Key)
 - Slower pace and break down task in very small steps
 - Frequent corrective feedback
 - Target specific skills (not cognitive area)
 - Several opportunities for practice
 - Make learning relevant (real world experiences, examples)
 - Use exemplars, visuals, and manipulatives
 - “Teach me” opportunities



2. Interventions: Math

Key Points

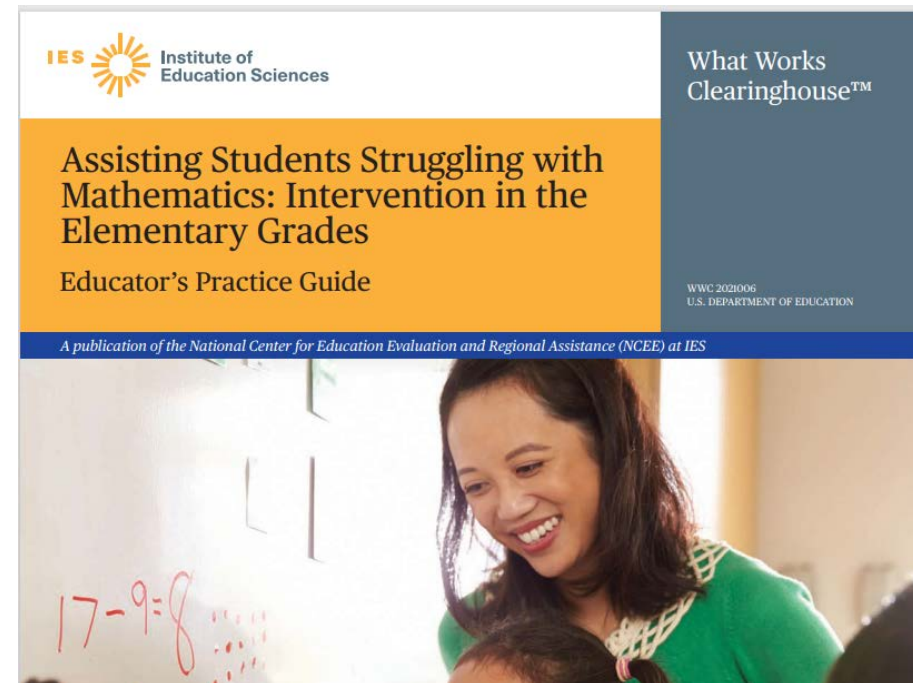
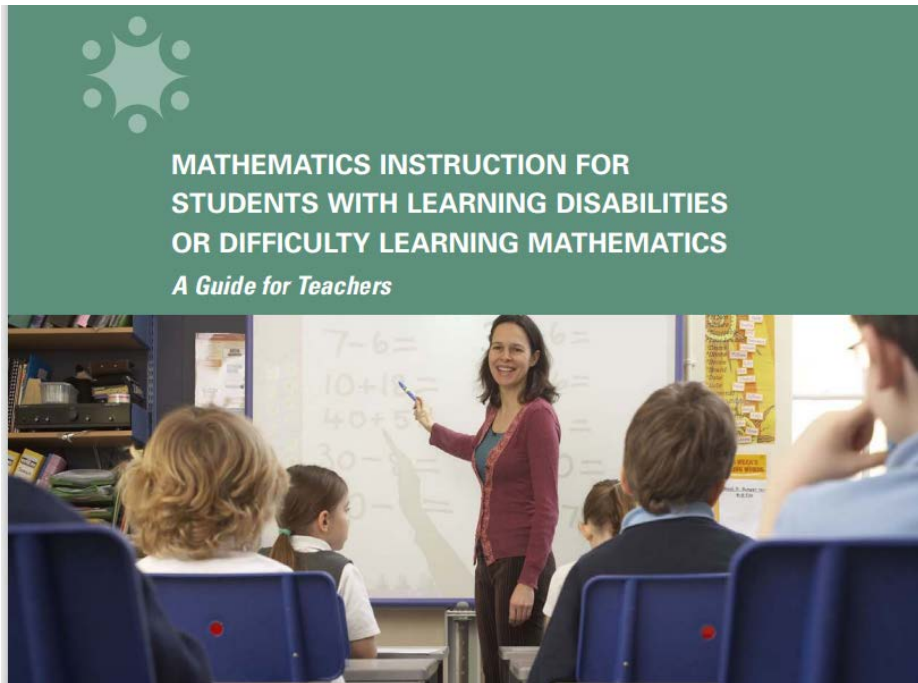
- More than just arithmetic, includes quantitative reasoning
- Quantitative and magnitude estimation
- Symbolic number sense (Precise Quantity)
- Working memory is key and may need to reduce WM demand (use of visuals)



2. Interventions: Math

Key Research Supported Teaching Strategies for Math (Dept of Ed)

https://www.researchgate.net/publication/234623037_Mathematics_Instruction_for_Students_with_Learning_Disabilities_or_Difficulty_Learning_Mathematics_A_Guide_for_Teachers



2. Interventions: Math

Key Research Supported Teaching Strategies for Math (Dept of Ed)

- Teach students using explicit instruction on a regular basis.
- Teach students using multiple instructional models and examples.
- Have students verbalize decisions and solutions to a math problem.
- Providing immediate feedback and connect new learning to previous learning.
- Teach students to visually represent the information in math problems.



2. Interventions: Math

Key Research Supported Teaching Strategies for Math (Dept of Ed)

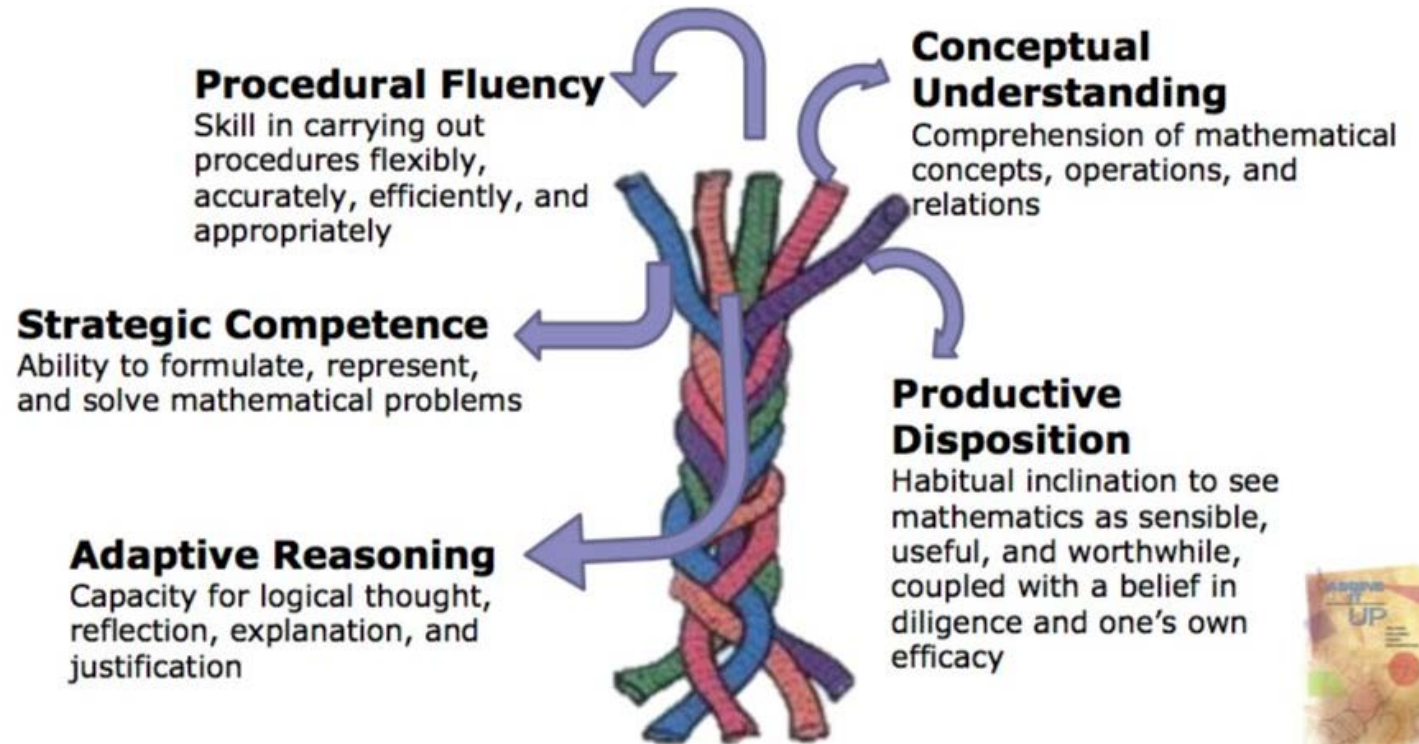
- Teach students to solve problems using multiple/ heuristic strategies.
- Allow for peer-assisted instruction to students.
- Use of manipulatives-- developmentally appropriate.



Areas of Math Intervention

- Can use direct and explicit instructional methods for each of the 5 strands (components) of math proficiency.
- For each strand, make meaningful connections, activate prior knowledge—provide the “why”.
- Initial areas to focus; Conceptual and Procedural.
- See: *Developing Math Proficiency* in Resource Folder.

The Five Strands of Mathematical Proficiency



2. Interventions: Math-Commercial Programs

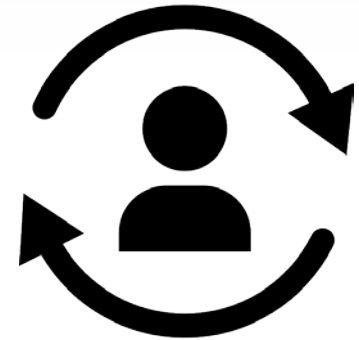
Review of Key Intervention Resources

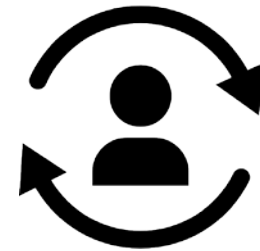
- What Works Clearinghouse (Stringent Criteria)
- National Center for Intensive Intervention tools chart (NCII)
- Paucity of research supporting commercial programs
- Be critical of commercial programs*. They do not replace sound teaching practices like direct, small group instruction.

* Please see the module 3 resource folder for a guide for evaluating mathematics programs



3. Accommodations





3. Accommodations

- Students with very low reasoning ability may need several opportunities to re-take tests and quizzes.
- Emphasize mastery approach vs. performance approach.
- Allow for notes and devices on tests (calculators).

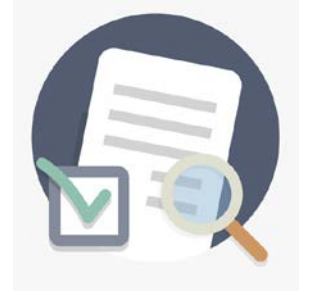


3. Accommodations

- Allow for manipulatives and visuals when describing new concepts and /or testing
- Encourage student self-advocacy—actively seek help when don't understand
- Actively check for understanding
- Allow for alternative ways to express knowledge



Summary



- Learning processes are highly complex and integrated brain functions. Reasoning is essential for learning and impacts all academic areas.
- BBM-Learning processes rely heavily on nonverbal reasoning, verbal reasoning, memory, processing speed, and attention.
- Good teaching practices, such as direct instruction at a high frequency rate, are key to supporting students with low reasoning skills.
- Poor math skills may be an indicator of low reasoning. Focus on the “mastery” approach to learning, not the “performance” approach. Allow for test retakes.





Thank You For Listening End of Module 3.2



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