Precal 911: Engaging Activities to Save the Day!

Presented by
Savannah Hill
and
Elizabeth Howell

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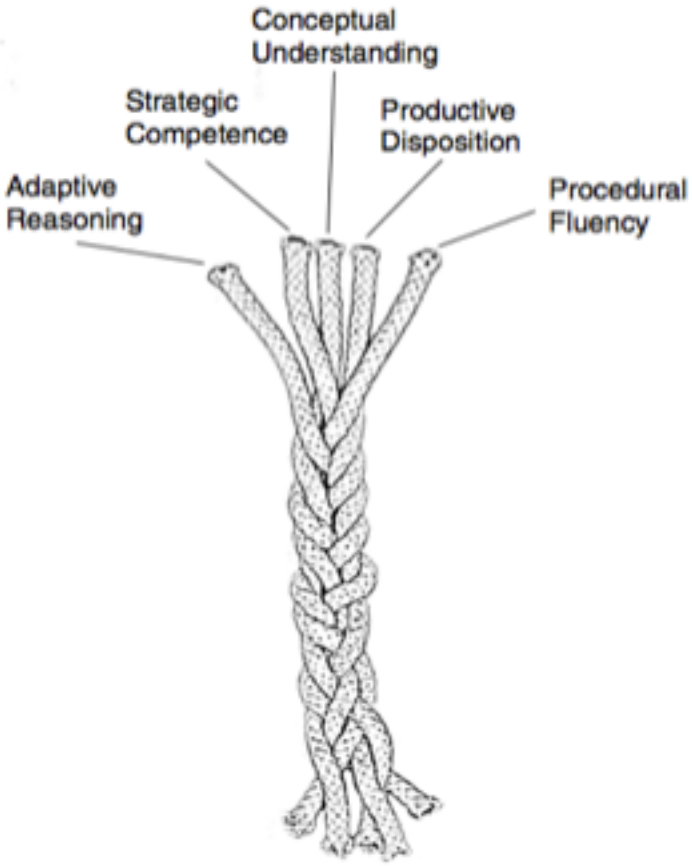
Precalculus TEKS

(1) The desire to achieve educational excellence is the driving force behind the Texas essential knowledge and skills for mathematics, guided by the college and career readiness standards. By embedding statistics, probability, and finance, while focusing on fluency and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.

Cognitive Engagement

- 5 strands of mathematical proficiency:
  - Conceptual understanding
  - Procedural fluency
  - Strategic competence
  - Adaptive reasoning
  - Productive disposition
- "Interwoven and interdependent"



Intertwined Strands of Proficiency

(NRC, 2001)

Connecting Conceptual and Procedural Knowledge

- Procedural Knowledge (incorrect)

$$(x^2)\times(x^3) = x^{2\times 3} = x^6$$

- Conceptual Knowledge (not efficient)

$$(x^2)\times(x^3) = xx \times xxx = x^5$$

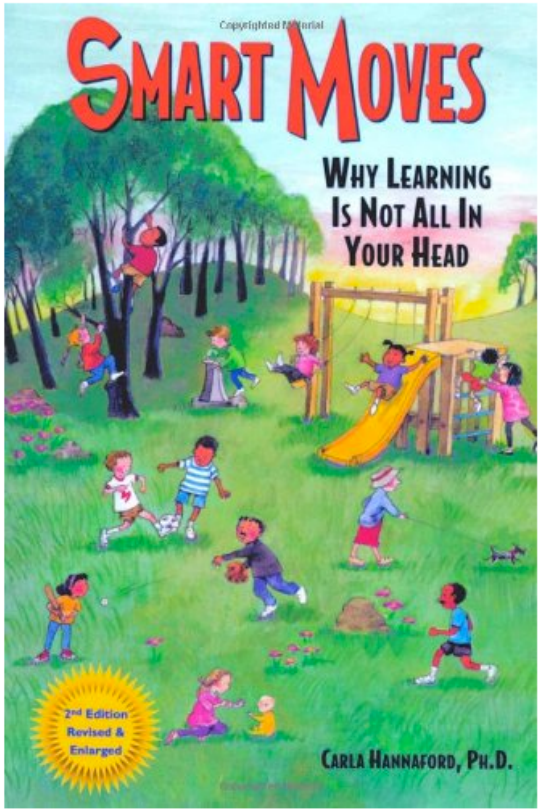
- Both

$$(x^2)\times(x^3) = x^{2+3} = x^5$$

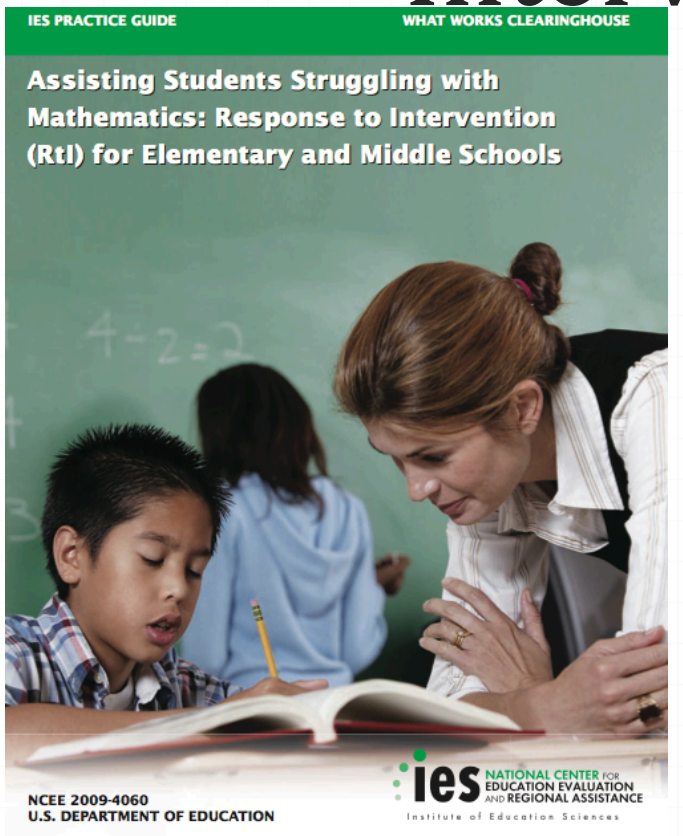
Movement

"The more closely we consider the elaborate interplay of brain and body, the more clearly one compelling theme emerges: movement is essential to learning.

...Movement awakens and activates our mental capacities. Movement integrates and anchors new information and experience into our neural networks. Moving while learning increases learning."



Research-Based Recommendations for Tier II Interventions



Recommendation	Level of evidence
Tier 1	
1. Screen all students to identify those at risk for potential mathematics difficulties and provide interventions to students identified as at risk.	Moderate
Tiers 2 and 3	
2. Instructional materials for students receiving interventions should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee.	Low
3. 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.	Strong
4. Interventions should include instruction on solving word problems that is based on common underlying structures.	Strong
5. Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas.	Moderate
6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.	Moderate
7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.	Low
8. Include motivational strategies in tier 2 and tier 3 interventions.	Low

Source: Authors' compilation based on analysis described in text.

Resources

- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/
- Hannaford, C. (2007). *Smart Moves: Why Learning Is Not All In Your Head, (2nd ed.).* Salt Lake City, UT: Great River Books.
- National Research Council. (2001). *Adding it up: Helping children learn mathematics.* J. Kilpatrick, J. Swafford, and B. Findell (Eds.). Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Research in Mathematics Education

- Teacher T.O.M. - A Strategy for Reflective Practice - Tuesday, July 22, 11:30 - 12:30 and 1:00 - 2:00 Omni Stockyards 3
- ESTAR: Understanding the Value of an Assessment Plan - Tuesday, July 22, 1:00 - 2:00, Omni FW 5
- Implementing the NEW TEKS with Best Practices - Tuesday July 22, 1:00 - 2:00, CC 114
- Money Management: Developing Appreciation Through Mathematics - Tuesday, July 22, 1:00 - 2:00, CC 204AB
- Spaghetti & Meatballs and Algebraic Reasoning - Wednesday, July 23, 10:00 - 11:00, Omni Sundance 2
- ESTAR: Understanding the Value of an Assessment Plan - Wednesday, July 23, 2:30 - 3:30, Omni FW 5

SMU | Annette Caldwell Simmons School of Education & Human Development

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www.smu.edu/RME

Email: RME@smu.edu

@RME_SMU

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