December 3, 2024

Dear State Board of Education Members:

Ad Hoc Committee on Mathematics Instruction Framework

Committee Description: The State Board of Education is establishing an Ad Hoc Committee on Mathematics Instruction Framework to evaluate Texas' current mathematics content and process standards, research best practices in mathematics education, and provide recommendations for developing exemplary state standards and effective instruction that will provide significant improvement to student performance.

Committee Members: The Committee makeup is LJ Francis (Chairman), Staci Childs, Kevin Ellis, Pam Little, Tom Maynard. The Committee will not vote but will provide a report to the State Board of Education.

Final Report and Presentation: The Ad Hoc Committee's final report will recommend a framework for revising the Texas K-12 mathematics standards and instructional methods. The framework will provide an organizational structure that reflects the latest research in cognitive science, behavioral learning, and explicit instruction, emphasizing the integration of strategies to improve functional mastery, retention, and application of math skills generally. The report will guide subsequent workgroups responsible for developing detailed standards under the proposed framework.

Goal: Provide clear, actionable recommendations for developing mathematics curriculum standards, teacher training, and district implementation supports that will position Texas as a national leader in mathematics education. The recommendations should emphasize explicit, including direct and systematic instruction, precision teaching, fluency in math facts, functional mastery of foundational skills, and effective spiraling of content to ensure deep understanding and retention. The State Board of Education must lay the foundation for Texas to see significant gains in student mastery of mathematics.

Timeline: The committee will have 18 months to complete its work, with progress updates provided to the State Board of Education at regular intervals. The final report and recommendations should be submitted no later than November 2026.

By fulfilling these deliverables, the Ad Hoc Committee will guide Texas in developing math standards and instructional methods that incorporate best practices in explicit instruction, functional mastery of foundational skills, and preparation for advanced mathematics and real-world problem-solving.

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Deliverables

1. Strengths and Weaknesses Analysis

a) **Current Framework Review**:
   i. Conduct a thorough review of Texas' current mathematics TEKS framework
   ii. Identify specific strengths to preserve and build upon
   iii. Pinpoint areas of weakness, gaps in content coverage, or structural issues to address
   iv. Compare Texas standards to effective frameworks from other states and countries
   v. Provide concrete examples to illustrate strengths and weaknesses
   vi. Analyze how the existing TEKS framework aligns with principles of explicit instruction and cognitive science, such as scaffolding, spaced repetition, and minimizing cognitive load.
   vii. Evaluate the inclusion of the science of math and behavioral learning strategies, such as precision teaching, positive reinforcement, goal setting, and other techniques, in current instructional recommendations.

b) **Strengths:**
   i. Identify areas where the current standards effectively promote mathematical fluency, conceptual understanding, and functional skill mastery.
   ii. Highlight successful practices, such as explicit progressions in foundational skills or effective use of formative assessments.

c) **Weaknesses**:
   i. Pinpoint gaps in addressing long-term retention, problem-solving fluency, and integration of behavioral strategies.
   ii. Assess structural issues that may limit the effective implementation of explicit instruction or fail to address gaps in instructional design and other challenges in classrooms.

2. Comparison with High-Performing Frameworks

a) **Compare the TEKS to math standards from top-performing states and nations to identify best practices, particularly:**
   i. Integration of cognitive science principles, such as working memory, cognitive load theory, spaced repetition, scaffolding and interleaved practice, to support long-term retention and use of the science of math

b) **Provide concrete examples from these frameworks, such as:**
   i. How they structure fluency development through incremental steps and behavioral reinforcement.
   ii. Strategies for embedding spiraling content effectively across grade levels.
   iii. Summarize key findings on sequencing, skill development, and content prioritization

3. Student and Educator Feedback Analysis

a) **Gather insights from Texas educators and students to assess:**
   i. Challenges in applying explicit instruction techniques or behavioral strategies within the current TEKS framework.
   ii. Successes and limitations in fostering math fluency and positive classroom behaviors under the existing standards.

b) **Analyze how current practices impact student motivation and engagement, particularly in relation to behavioral learning.**

4. Recommendations for Improvement

a) **Provide recommendations to address identified weaknesses, focusing on:**
   i. Strengthening explicit instruction and scaffolding practices to better align with cognitive load theory.
   ii. Embedding the science of math and other techniques, such as precision teaching, feedback loops, reinforcement schedules, and progress tracking, to improve student engagement and self-regulation.
   iii. Enhancing spiraling techniques to support conceptual connections and skills retention across grade levels.

5. Implementation Considerations

a) **Identify key challenges in integrating cognitive and the science of math approaches into the revised TEKS framework, including:**
   i. Professional development needs for educators to effectively implement these strategies.
   ii. Adjustments to assessment practices to better align with the current science of math and cognitive mastery goals.
b) **Suggest pilot programs or phased implementation plans to test the integration of explicit instruction, cognitive science and the current science of math in real classroom settings.**
c) **Recommendations for updates to Texas State Statutes and Administrative Code.**

6. Final Review Report and Framework Recommendations

a) **Summarize findings in a clear, accessible report that includes:**
   i. A detailed comparison of the current TEKS framework with high-performing standards.
   ii. Specific, actionable recommendations for incorporating cognitive and the current science of math principles into the TEKS framework and instructional design.
   iii. Examples of effective practices for supporting both math fluency and classroom engagement through an integrated approach.
b) **Final Report Presentation**:
   i. Framework Goal
      - Emphasize that the framework integrates cognitive science and the current science of math enhance student outcomes in mathematics.
   ii. Develop presentation materials
      - Prepare a presentation to the State Board of Education and the Texas Legislature**.**
   iii. Focus on Guiding Future Standards
      - Clarify that the framework will provide the structure for detailed standards development, ensuring consistency and alignment across grade levels while incorporating evidence-based teaching practices.
c) **The report should address the following key areas, with the current science of math principles integrated where appropriate.**
   i. Explicit and Systematic Instruction
      - Propose a framework that prioritizes clear, step-by-step instruction for all math concepts. Support breaking down complex skills into smaller, manageable steps, aligning with cognitive load theory.
      - Emphasize scaffolding and gradual release of responsibility to students (I do, we do, you do) as proficiency develops.
      - Incorporate immediate feedback loops to reinforce correct responses and

address misconceptions.
- Use task analysis to sequence skills hierarchically, ensuring functional mastery at each stage before progressing.

ii. Math Facts and Fluency
- Identify essential math facts (e.g., multiplication tables, connections between fractions, percentages, decimals) students should master at each grade level.
- Recommend strategies for building automaticity, such as spaced repetition and interleaved practice.
- Reinforce fluency through positive reinforcement techniques (e.g., token systems or praise for effort and accuracy) that support retention, endurance and generality.
- Use incremental goal-setting to keep students motivated as they progress toward functional mastery.
- Balance memorization with conceptual understanding

iii. Foundational Skills Mastery
- Propose a framework that emphasizes mastery of prerequisite skills as the foundation for new learning.
- Ensure students have adequate practice opportunities to consolidate these skills over time.
- Encourage the use of explicit reward structures (e.g., achievement badges or progress trackers) to celebrate milestones in skill mastery.
- Apply behavioral modeling where teachers explicitly demonstrate problem-solving strategies and students replicate them.
- Incorporate consistent, continuous measurements of foundational skills until functional mastery is achieved, including the ability to apply skills learned generally.

iv. Effective Spiraling
- Design a coherent progression of content across grade levels.
- Suggest a curriculum that revisits key concepts at increasing levels of complexity across grades.
- Emphasize strategies like spaced review to improve long-term retention.
- Balance introduction of new concepts with repeated reinforcement of prior learning.
- Use systems (e.g., signals or prompts) to remind students of previously learned skills when encountering similar problems.
- Recommend rate (accuracy, time) and depth for content review as applicable.
- Incorporate self-monitoring techniques, encouraging students to track their own progress in revisiting past concepts.

v. Vertical Alignment and Coherence
- Ensure a logical progression of skills and concepts across grade levels, building toward advanced mathematical reasoning.
- Highlight the importance of connecting different strands of mathematics (e.g., algebra and geometry) to reinforce integrated understanding, gradually increasing task complexity while ensuring ongoing reinforcement for success.
- Balance breadth and depth of content coverage

- Provide opportunities for peer learning, where students model and support each other's progress.

vi. Clarity and Specificity
- Recommend clear, concise standards written in accessible language for educators and students.
- Provide any guidance on the appropriate level of detail for the standards.
- Avoid jargon, ensuring standards are user-friendly and actionable.
- Include checklists and rubrics to provide students with clear expectations and help teachers deliver consistent instruction.

7. Implementation Guidelines

a) Workgroup Structure:

i. The framework should offer guiding principles and specific criteria for workgroups tasked with developing detailed standards.

ii. Workgroups should integrate explicit instructional principles and current science of math strategies, like direct instruction, while ensuring alignment with the proposed organizational framework.

b) Professional Development Needs:

i. Professional development should equip educators to implement both explicit instruction and the current science of math techniques, such as reinforcement strategies, self-monitoring, and progress tracking.

ii. Training should also focus on leveraging a variety of formative assessments to provide immediate feedback and inform instructional adjustments.