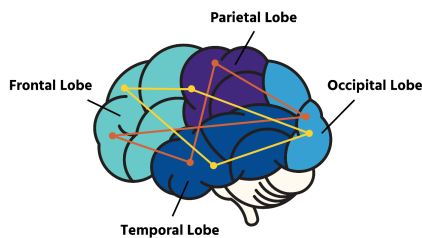


Math Teaching & Learning: Lessons from Brain Research Unbound 2024

How the Brain Processes Mathematics



The Visuospatial Network is crucial in visualizing and manipulating abstract symbols and relationships in math. This network is active when we mentally rotate shapes, imagine fractions on a number line, or track spatial relationships between numbers.

The Semantic Network is responsible for understanding the meaning behind mathematical symbols and equations. This network helps us connect new concepts to existing knowledge, choose the appropriate problem-solving representations and strategies, and apply mathematical principles in real-world situations.

[Acker-Ramirez, Mirzaian, Laskasky, & Salquero, 2024. "Bridging Brain Research and Pedagogy to Cultivate Mathematical Competence"](#)

Flattening the Forgetting Curve | Enhancing Implementation of Instructional Routines

Create Low-stakes Discourse	Surface Understanding	Deepen Learning, Bridge Gaps
<p>Establish ground rules: Ensure everyone feels comfortable sharing their thoughts</p> <p>Model respectful discourse: Demonstrate how to listen attentively, ask clarifying questions, disagree respectfully, and provide constructive feedback.</p> <p>Celebrate diverse perspectives: Encourage students to share their unique viewpoints and appreciate the value of different approaches.</p>	<p>Encourage elaboration: Follow up with questions that ask students to elaborate on their responses.</p> <p>Assess understanding: Ask students to briefly summarize their understanding of a topic or concept at the end of class.</p> <p>Connect ideas: Help students see relationships between different mathematical concepts.</p>	<p>Implement spaced repetition: Review previously learned material at increasing intervals to strengthen retention.</p> <p>Encourage elaborative rehearsal: Ask students to connect new information to their prior knowledge and explain concepts in their own words.</p> <p>Use retrieval practice techniques: Actively recall information using low-stakes quizzes, flashcards, and practice tests.</p>

Working Memory | Enhancing Implementation of Instructional Routines

Create Low-stakes Discourse	Surface Understanding	Reflect & Connect
<p>Establish ground rules: Ensure everyone feels comfortable sharing their thoughts.</p> <p>Model respectful discourse: Demonstrate how to listen attentively, ask clarifying questions, disagree respectfully, and provide constructive feedback.</p> <p>Celebrate diverse perspectives: Encourage students to share their unique viewpoints and appreciate the value of different approaches.</p>	<p>Encourage elaboration: Follow up with questions that ask students to elaborate on their responses.</p> <p>Assess understanding: Ask students to briefly summarize their understanding of a topic or concept at the end of class.</p> <p>Connect ideas: Help students see relationships between different mathematical concepts.</p>	<p>Mind maps: Encourage students to create visual representations of their understanding.</p> <p>Journaling: Have students write about their learning experiences and challenges.</p> <p>Peer feedback: Encourage students to provide feedback to each other and reflect on their own learning.</p>