High-Quality Mathematical Instructional Practices for Students with IEPs, Dyscalculia, and Mathematics Difficulties

The West Virginia Department of Education (WVDE) is committed to rigorous mathematics instruction for all students. To achieve this vision, it is essential that general and special educators respond to the diverse ways students experience mathematics. While many students, with and without disabilities, may struggle with math concepts at various points in their academic journey, some face persistent challenges that stem from underlying learning differences.

Dyscalculia is a neurologically based specific learning disability that affects a student's ability to understand, process, and manipulate numerical information (DSM-5-TR and WV code §18-20-10). Dyscalculia can impact:

- Number sense and magnitude comparison
- Basic arithmetic operations (e.g., addition, subtraction)
- Understanding place value and number relationships
- Sequencing steps in multi-step problems
- Telling time, estimating quantities, and managing money

Students with dyscalculia may have difficulty retrieving math facts, recognizing patterns, or applying procedures consistently—even with repeated instruction. **These challenges are not due to lack of effort or intelligence, but rather a distinct cognitive profile that requires targeted supports and evidence-based strategies.**

To improve mathematics outcomes for students with or at risk for dyscalculia and other mathematics difficulties, a robust body of research points to highly effective instructional practices. The recommendations presented in this guide are synthesized from systematic reviews, syntheses, and meta-analyses; providing clear, actionable guidance for general and special education teachers.

This guidance also incorporates Specially Designed Instruction (SDI) to ensure that students with disabilities receive instruction tailored to their unique learning needs. SDI refers to the adaptation of content, methodology, or delivery of instruction as specified in a student's Individualized Education Program (IEP). These supports may be provided by a variety of qualified personnel including general educators, special educators, related service providers, intervention specialists, and other team members, depending on the student's needs and the nature of the instruction. By embedding SDI into evidence-based practices, educators and support staff can better serve students with disabilities through personalized strategies that address their specific challenges in mathematics.

Each Evidence-Based Practice (EBP) listed includes core principles and/or key components and a clear rationale for the practice. Additionally, each practice is aligned with the Mathematical Habits of Mind (MHM) and the National Council of Teachers of Mathematics (NCTM) Eight Effective Teaching Practices to support high-quality, standards-based instruction.

The Mathematical Habits of Mind (MHM) refer to the ways of thinking and reasoning that proficient mathematicians use when approaching problems. These skills include looking for patterns, making conjectures, reasoning logically, and persevering through challenges. Embedding MHM into instruction helps students develop flexible, strategic thinking and deep conceptual understanding—critical for long-term success in mathematics.

Integrating the MHM and NCTM into instruction will improve the delivery of mathematics instruction by fostering deeper student engagement, promoting strategic thinking, and ensuring that teaching practices are both rigorous and responsive to diverse learning needs. Together, they provide a cohesive framework for cultivating mathematical reasoning, discourse, and problem-solving across all grade levels.

Evidence-Based Practices

Systematic, Explicit Instruction

- **Core Principle:** Systematic, explicit instruction is a core component of SDI and is especially effective for students with dyscalculia. This is the most strongly supported instructional approach for students with mathematics difficulties. It is not "drill and kill," but rather a carefully designed sequence of instruction that builds understanding developmentally. Rather than relying on rote memorization or repetitive drills, this instructional delivery method requires each mathematical step to be explicitly taught using clear language, visual scaffolds, and guided practice, allowing students to internalize strategies and understand ***why* math works, not just how to do it.**
- **Key Components:**
  - **Sequential Design:** Instruction is delivered in a carefully planned order, where each skill builds on previously learned concepts. This approach ensures that student(s) master foundational skills before moving on to more complex ones. This includes the review and integration of previously learned content (e.g., spiraling instruction), allowing students to strengthen retention and apply prior knowledge in new contexts.
  - **Here is an example of sequential design in the elementary grades:** When delivering a second-grade math unit on addition and subtraction within 100, instruction follows a sequential design that builds conceptual understanding step by step. Students begin with concrete modeling of place value using base-ten blocks, then progress to two-digit addition without regrouping, followed by regrouping with visual supports. As the unit advances, lessons spiral back to reinforce these foundational skills through word problems and subtraction strategies. This intentional sequencing ensures students develop the foundational concepts and flexibility needed for more complex tasks like multi-step problem solving and number comparisons.
  - **Co-development of Knowledge:** Instruction should clearly teach both conceptual understanding (the "why") and procedural knowledge (the "how"). These two types of learning should be connected and applied to real-world situations, helping students understand not just how to solve problems, but why the methods work
  - **Learning Supports:** Instruction includes prompts and questions that help students connect what they already know to new mathematical concepts. It also uses physical or visual representations such as manipulatives, diagrams, or models to make abstract ideas more concrete and support deeper understanding.

- **Retrieval Practice:** Retrieval practice is a learning strategy that involves actively recalling information from memory, rather than simply reviewing it. This approach incorporates intentional, deliberate practice with real-time corrective feedback to consolidate new learning into long-term memory. By prompting students to retrieve previously learned content—through low-stakes quizzes, verbal recall, or problem-solving—educators strengthen neural pathways and improve retention, especially when spaced and repeated over time.
- **Why it's Crucial:** Students with math difficulties often need more structure and support to understand new concepts. Systematic, explicit instruction breaks learning into small, clear steps and teaches each one directly. This approach reduces confusion and helps build confidence by making expectations clear and manageable. Unlike discovery-based learning, which requires figuring things out independently, systematic instruction provides the guidance needed to develop strong foundational skills.

» **MHM and NCTM Eight Effective Teaching Practice Alignment:**

- MHM5. Use appropriate tools strategically.
- NCTM's Eight Effective Teaching Practices 1. Establish mathematics goals to focus learning.
- NCTM's Eight Effective Teaching Practices 3. Use and connect mathematical representations.
- NCTM's Eight Effective Teaching Practices 5. Pose purposeful questions.
- NCTM's Eight Effective Teaching Practices 6. Build procedural fluency from conceptual understanding.

Clear and Concise Mathematical Language

» **Core Principle:** Explicitly teach and support students' use of precise mathematical vocabulary and symbols.

» **Mathematical Language:** Use the clear, concise, and correct mathematical language embedded in the West Virginia College- and Career-Readiness Standards to build and reinforce students' understanding of important mathematical vocabulary. Adhering to the mathematical language in the standards supports cohesion and understanding of math terminology, especially for students who are struggling readers. Avoid the use of tricks, shortcuts, or acronyms used for specific procedural mathematics that bypass mathematical understanding. Support students in using mathematically precise language during construction of their mathematical arguments.

» **Why it's Crucial:** Many students with mathematics difficulties also struggle with language processing. Clear definitions, opportunities to use terminology, and linking vocabulary to various representations (i.e., physical, visual, symbolic, verbal, and contextual) are vital for comprehension and communication of mathematical ideas and for solving word problems (National Council of Teachers of Mathematics, 2014).

» **MHM and NCTM Eight Effective Teaching Practices Alignment:**

- MHM3. Construct viable arguments and critique the reasoning of others.
- MHM5. Use appropriate tools strategically.
- MHM6. Attend to precision.
- MHM7. Look for and make use of structure.
- NCTM's Eight Effective Teaching Practices 3. Use and connect mathematical representations.
- NCTM's Eight Effective Teaching Practices 4. Facilitate meaningful mathematical discourse.
- NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

Multiple Representations, Including Number Lines

» **Core Principle:** There are five key types of representations—contextual (real-world scenarios or story problems), verbal (spoken or written explanations), symbolic (numbers, expressions, equations), visual (diagrams, graphs, charts), and concrete (physical models or manipulatives)—to support student understanding. Teachers should intentionally select and model these representations so that students can use and connect the representations to help them make sense of mathematical ideas, reason flexibly, and communicate their thinking. This approach aligns with NCTM's Principles to Actions and supports equitable, conceptually rich instruction.

» **Concrete-Representational-Abstract (CRA) Instructional Model:** Provide opportunities for students to explore mathematics by physically manipulating concrete materials. Then, through linking questions and classroom dialogue, create a visual representation or drawing of that concrete model. The same questioning techniques can be used to support students as they transfer their mathematical understanding of the previous representations to a symbolic representation

» **Emphasis on Number Lines and other tools:** The use of a number line is one of many powerful visual models for understanding numerical magnitude, relationships, and operations (e.g., whole numbers, fractions, integers). The CRA strategy incorporates a progression of tools and representations throughout a student's mathematical journey. It provides a continuous visual scaffold for abstract concepts.

» **Why it's Crucial:** Visual and hands-on representations, specifically using and connecting mathematical representations, help students with dyscalculia build conceptual understanding and make connections between representational stages, by providing tangible connections to abstract ideas (National Council of Teachers of Mathematics, 2014).

For example, in a third-grade unit on multiplication, a student begins by using concrete tools like counters and arrays to model equal groups (e.g., 3 groups of 4). As understanding develops, the teacher introduces representational supports such as area models, number lines, and drawings to visualize the same concept. Eventually, the student transitions to the abstract stage, solving equations like $3 \times 4 = 12$ using symbolic notation and mental math strategies. This progression ensures that each new representation builds on the last, reinforcing conceptual understanding and supporting long-term retention.

» **MHM and NCTM's Eight Effective Teaching Practices Alignment:**

- MHM5. Use appropriate tools strategically.
- MHM7. Look for and make use of structure.
- MHM8. Look for and express regularity in repeated reasoning.
- NCTM's Eight Effective Teaching Practices 3. Use and connect mathematical representations.
- NCTM's Eight Effective Teaching Practices 6. Build procedural fluency from conceptual understanding.
- NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

Develop Fluency (Accuracy, Efficiency, Flexibility)

- **Core Principle:** Developing fluency in mathematics fosters the ability to perform mathematical tasks efficiently, flexibly, and accurately across all content areas (e.g., counting, identifying shapes, multiplying fractions, calculating area, solving equations). Fluency enables students to easily access concepts for future use and is also a critical element for building mathematical properties as students progress through elementary and secondary grades.
- **Beyond Fact Fluency:** Fluency in math requires more than just factual recall—but factual recall plays a foundational role. Think of math fluency as a blend of **conceptual understanding, procedural skill**, and **strategic flexibility**. Students need to know *what* to do (procedures), *why* it works (concepts), and *when* to apply it (strategy). Factual recall, like knowing basic math facts or properties, serves as the cognitive "glue" that frees up working memory for higher-level reasoning. (NCTM, 2014)

  That said, **fluency is not just speed or memorization**. A student might not instantly recall 7 × 8, but if they can flexibly decompose it (e.g., 7 × 4 + 7 × 4), explain their reasoning, and apply it in context, they're demonstrating mathematical fluency. In inclusive classrooms, especially for students with disabilities, fluency should be defined by **accuracy, efficiency, and flexibility**, not just rapid recall. Students can be fluent even if factual recall is slower than their peers, or supported, ***as long as they have reliable strategies and conceptual grounding***.
- **Achieving Fluency:** The NCTM's *Position Statement: Procedural Fluency in Mathematics* (2020) clarifies that procedural fluency involves the ability to apply procedures **efficiently, flexibly, and accurately**, and to choose among strategies based on context. The NCTM warns against equating fluency with rote memorization alone. Acquiring fluency requires carefully designed, productive practice opportunities. Students with mathematics difficulties often need more opportunities to practice than their peers to achieve fluency. In conjunction with additional practice opportunities, students having difficulties in math also benefit from having access to just-in-time resources and manipulatives to support the development of conceptual understanding. Here are a few tips to keep in mind regarding achieving fluency for every student:
  - **Fluency should be taught, not tested.** Use retrieval practice, strategy instruction, and spaced repetition—not timed drills—as the foundation.
  - **Support diverse learners.** Students with disabilities, language needs, or slower processing speeds can still be fluent if they use efficient strategies and understand the math concepts.
  - **Align with SDI and IEP goals.** Instructional goals should reflect fluency as a blend of accuracy, efficiency, and flexibility—not just automaticity.
- **Effective Practice Strategies:**
  - **Access to Resources and Tools:** Provide consistent access to foundational supports and tools such as 100's charts, multiplication tables, number lines, and manipulatives to build fluency. These tools serve as visual and tactile anchors that help students make sense of numerical relationships and operations. When used strategically across grade levels, they support retrieval, reinforce patterns, and promote flexible thinking. Embedding them into daily instruction ensures that all learners—especially those with disabilities—can access core content and develop procedural fluency with confidence.

- **Subitizing Exercises:** Subitizing is the ability to instantly recognize the number of items in a small group without counting. Subitizing supports number recognition, addition, subtraction, and the understanding of quantity and part-whole relationships. Subitizing exercises—quickly recognizing quantities without counting—build foundational number sense that continues to support students well beyond early elementary. For example, in third grade, students might instantly recognize a 3×4 array as 12 without counting each dot, reinforcing multiplication and area concepts. In middle school, subitizing helps students estimate fractions on a number line or recognize proportional relationships in a double number line. By high school, students use visual subitizing to interpret slope from a graph or identify transformations in geometric figures. These quick-recognition skills strengthen mathematical intuition, reduce cognitive load, and support flexible reasoning across increasingly complex tasks.
- **Problem Strings:** This strategy, also called number strings, is intentionally designed sequences of related math problems that help students build flexible, efficient strategies for solving mathematical operations. This set of problems is presented one at a time to highlight patterns, develop mental math strategies, deepen number sense, and encourage mathematical reasoning and discussion.
- **Number Talks:** This strategy is a short, focused classroom routine where students mentally solve a math problem or related set of problems and discuss their thinking. The goal is to build number sense, mental math strategies, and mathematical communication.
- **Incremental Rehearsal:** This strategy is used to teach new information by blending it with known material in a structured way. The purpose is to build long-term retention by maximizing success and minimizing cognitive overload. Incremental rehearsal can be used to teach new math facts. Here is a hypothetical example – a student is learning the fact 6 + 7 = 13 (new). The teacher pairs it with known facts like 2 + 2, 5 + 5, and 3 + 4. The teacher intersperses the new fact with the already known facts to blend retrieval with spaced repetition, reinforcing the new fact through distributed practice. Another example of using incremental rehearsal is to teach new math vocabulary. A student is learning the term "coefficient" (new). The teacher mixes it with known terms like variable, expression, and equation. This approach supports long-term retention and is especially effective for students with memory or processing challenges.
- **Cover-Copy-Compare:** This strategy is a self-managed, error-correction strategy used to improve accuracy and fluency in math facts. The purpose is to reinforce accuracy and independence in recall while encouraging immediate self-correction. The student begins by studying a correct problem and answer, then covers it, copies it from memory, and compares their response to the original. If errors occur, they immediately correct them, reinforcing accurate recall through repetition and feedback. This approach promotes independence, strengthens memory, and supports sustained practice—especially effective for students who benefit from explicit routines and visual scaffolds.
- **Flash Cards:** A simple, flexible tool for repeated practice and memorization using cards with a question or prompt on one side and the answer on the other. The purpose is to build fluency through repeated retravel practice.
- **Technology-Based Practice:** The use of digital tools (apps, games, online platforms) to practice academic skills through interactive and often adaptive formats. The purpose is to increase engagement and provide individualized practice with real-time feedback.
- **Short, High-Intensity Practice:** This strategy involves brief but highly focused bursts of practice designed to rapidly build fluency, accuracy, or automaticity in a specific skill with short duration, typically 1-10 minutes per practice.
  - **Flash Cards:** A simple, flexible tool for repeated practice and memorization using cards with a question or prompt on one side and the answer on the other. The purpose is to build fluency through repeated retravel practice.
- **Distributed Practice:** Spreading practice over multiple sessions (days/weeks) is more effective than "cramming."
- **Goal Setting & Self-Graphing:** Empowering students to track their progress and set goals, with meaningful feedback linking student effort to improved outcomes.

- **Caution on Timed Activities:** While the Institute of Education Sciences/What Works Clearinghouse practice guide referenced at the end of this document suggests timed activities can build fluency, their use with students with dyscalculia must be approached with extreme caution due to the potential for anxiety and negative effects. Prioritize low pressure, strategic practice.
- **Mathematical Habits of Mind and NCTM's Eight Effective Teaching Practices:**
  - MHM7. Look for and make use of structure.
  - MHM8. Look for and express regularity in repeated reasoning.
  - NCTM's Eight Effective Teaching Practices 1. Establish mathematics goals to focus learning.
  - NCTM's Eight Effective Teaching Practices 6. Build procedural fluency from conceptual understanding.
  - NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

Deliberate Instruction on Word Problems

- **Core Principle:** Provide targeted support for understanding and solving text-based mathematics problems.
- **Effective Strategies:**
  - **Systematic, Explicit Instruction:** Essential for teaching students how to interpret word problems. However, this does not mean to look for key words, find matching operations, and pluck numbers from the problem. Instead, teachers should help students determine the context of the problem, strategize possible solutions, and persevere in solving the problems.
  - **Metacognitive Strategies:** Metacognitive strategies are evidence-based tools that help students become aware of their own thinking, plan their approach, monitor progress, and reflect on outcomes. In math instruction, these strategies empower learners to articulate problem-solving steps, evaluate the reasonableness of their answers, and adjust strategies when needed. Students should be encouraged to reflect on the answer they've generated and justify why it makes sense within the context of the problem—whether it's a real-world scenario, a visual model, or a symbolic equation. Embedding prompts like "What do I know?" or "Does my answer fit the situation?" fosters self-regulation and deeper engagement. These strategies are especially beneficial for students with learning disabilities, as they reinforce clarity, persistence, and strategic flexibility. An example of a metacognitive strategy to teach self-regulation during problem-solving is Read, Plan, Solve, Check.
  - **Schema Instruction:** Teach students to classify problems by common types (e.g., "combine," "compare").
  - **Mathematics Vocabulary Support:** Explicitly teach vocabulary critical for interpreting word problems.
  - **Multiple Representations:** The NCTM's five mathematical representations—contextual, verbal, symbolic, visual, and concrete—provide a powerful framework for teaching word problems with clarity and intentionality. Word problems often overwhelm students because they require translating language into mathematical meaning. By deliberately using these representations, teachers can scaffold that translation process:
    - **Contextual:** Ground the problem in a relatable scenario to activate prior knowledge and make the math meaningful.
    - **Verbal:** Encourage students to restate the problem in their own words, explain their reasoning, and justify their solution.
    - **Symbolic:** Guide students to express the relationships using equations or expressions that match the context.
    - **Visual:** Use diagrams, number lines, bar models, or graphs to represent quantities and relationships spatially.
    - **Concrete:** Provide manipulatives or physical models (e.g., counters, fraction tiles) to act out or build the problem structure.

Together, these representations help students make sense of the problem, choose appropriate strategies, and justify their answers—all critical components of metacognitive and standards-aligned instruction.

- **Reading Strategies:** Provide opportunities for students to visualize the problem by drawing a picture, retell the problem, make connections to personal and mathematical experiences, and ask questions about the problem.

  In addition, the RAP strategy—**Read, Ask, Put**—is an evidence-based approach that supports deliberate instruction in solving word problems, especially for students with learning disabilities. Students first **Read** the problem carefully to identify key information, then **Ask** themselves what the question is really asking and what operation or strategy is needed. Finally, they **Put** the information into a structured response, such as an equation, diagram, or written explanation. This routine builds metacognitive awareness, reinforces comprehension, and helps students connect language to mathematical reasoning. When used consistently, RAP promotes independence and accuracy in solving multi-step and context-rich problems.

» **Why it's Crucial:** Word problems integrate academic vocabulary, conceptual understanding, and procedural skills, areas where students with dyscalculia often face significant challenges. Therefore, the use of multiple strategies to support both reading comprehension and mathematical understanding is most effective.

When deliberately teaching word problems, teachers can activate prior knowledge and link word problems to authentic situations to enhance application and generalization. In addition, teachers must be mindful of each student's individual context and the prior knowledge they bring to the classroom, to ensure that students are engaged and connected to instruction.

» **Mathematical Habits of Mind and NCTM's Eight Effective Teaching Practices:**

- MHM1. Make sense of problems and persevere in solving them.
- MHM2. Reason abstractly and quantitatively.
- MHM3. Construct viable arguments and critique the reasoning of others.
- MHM4. Model with mathematics.
- MHM5. Use appropriate tools strategically.
- MHM6. Attend to precision.
- MHM7. Look for and make use of structure.
- MHM8. Look for and express regularity in repeated reasoning.
- NCTM's Eight Effective Teaching Practices 3. Use and connect mathematical representations.
- NCTM's Eight Effective Teaching Practices 4. Facilitate meaningful mathematical discourse.
- NCTM's Eight Effective Teaching Practices 5. Pose purposeful questions.
- NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

Provide Ample Response Opportunities, Timely Feedback, and Purposeful Practice

- **Core Principle:** Maximize student engagement through frequent opportunities to respond, followed by immediate and informative positive or corrective feedback.
- **Integration:** Weave the following elements throughout the systematic, explicit instructional cycle, not just during independent practice.
  - **Ample Response Opportunities:** Provides students frequent chances to engage and respond – boosting retention.
  - **Ample Wait Time:** Gives students an opportunity to think and rewards mathematical thinking, not just efficiency.
  - **Ongoing Formative Assessment and Timely Feedback:** Helps teachers identify misconceptions and correct them immediately. When feedback is specific and immediate, students are more likely to internalize corrections and apply them independently.
  - **Purposeful Practice:** Ensures practice time targets specific meaningful content.
  - **Self-Monitoring:** Helps students track their progress as they solve problems, recognize errors in real time, and adjust strategies to stay on task—building independence and accuracy.
  - **Self-Reflection:** Encourages students to evaluate whether their solution makes sense, justify their reasoning, and consider alternative approaches, deepening conceptual understanding and promoting metacognitive growth.
  - **Turn and Talk:** Promotes verbal reasoning and active processing, allowing students to clarify their thinking and hear diverse approaches in real time.
  - **Group Work:** Fosters collaborative problem-solving, encourages peer modeling, and helps students learn to justify and refine their strategies through discussion.
  - **Learning from Mistakes:** Normalizes mistakes as part of learning, giving students space to revise their thinking, build confidence, and deepen understanding through iterative exploration.
- **Practice Types:**
  - Interleaved Practice (also referred to as Mixed or Varied Practice): Mixing different types of problems within a session helps students learn when to apply specific strategies.
  - Distributed (Spaced) Practice: Spreading practice of previously learned content over multiple sessions to consolidate learning and develop fluency.
  - Spiral Review: Emphasizes content sequencing—intentionally reintroducing previously taught skills alongside new ones to reinforce connections and prevent forgetting.
- **Why it's Crucial:** Frequent responses with feedback accelerate learning. Interleaved and distributed practice types are more effective than "blocked" practice for long-term retention and generalization.
- **Mathematical Habits of Mind and NCTM's Eight Effective Teaching Practices:**
  - MHM3. Construct viable arguments and critique the reasoning of others.
  - NCTM's Eight Effective Teaching Practices 5. Pose purposeful questions.
  - NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

Collect Data and Adapt Instruction (Data-Based Decision Making)

» **Core Principle:** Continuously collect student data through ongoing formative assessments (such as math exit tickets, student conferences/classroom dialogue, checks for understanding, work samples, and problem-solving journals) and summative assessments (such as unit tests, benchmarks, and performance tasks). Frequent formative assessments help identify misconceptions, error patterns, and gaps in mathematical reasoning, allowing teachers to adjust instruction, reteach concepts, and target specific skills. Summative assessments provide a broader snapshot of student mastery across mathematical domains, informing long-term planning and curriculum pacing.

» **Linguistically Appropriate Assessment:** For emergent bilingual students, consider assessing mathematical understanding in their primary language when appropriate to distinguish between conceptual difficulties and language-related barriers. Use visuals, manipulatives, and structured math talk to support access and ensure assessments reflect true mathematical thinking. Explore any translation options that may be embedded within technology tools used for instruction and assessment.

» **Instructional Responsiveness in Math:** Use data to guide flexible grouping, scaffold problem types, and select representations that match student needs. For students receiving SDI or intervention, align progress monitoring tools to specific math goals (e.g., computation fluency, conceptual understanding, strategy use) and adjust supports based on growth trends.

» **Why it's Crucial:** This individualized approach ensures that instruction is responsive to each student's specific needs, a hallmark of effective special education and essential for students with mathematics difficulties.

» **Mathematical Habits of Mind and NCTM's Eight Effective Teaching Practices:**

- NCTM's Eight Effective Teaching Practices 5. Pose purposeful questions.
- NCTM's Eight Effective Teaching Practices 8. Elicit and use evidence of student thinking.

References

National Council of Teachers of Mathematics. (2014). Principles to actions: Ensuring Mathematical Success for All. National Council of Teachers of Mathematics, Incorporated.

National Council of Teachers of Mathematics (2020). Procedural Fluency in Mathematics: A Position of the National Council of Teachers of Mathematics. Retrieved from *NCTM's official website*.

Institute of Education Sciences/What Works Clearinghouse

This practice guide from IES/WWC provides evidence-based practices that can help teachers tailor their instructional approaches and/or their mathematics intervention programs to meet the needs of their students.

https://ies.ed.gov/ncee/WWC/PracticeGuide/26 - Available at this link is a full resource guide, a summary document, guides and videos for each of the recommended EBPs, etc.

Below is a summary of the evidence-based, high-quality instructional mathematics practices for Students with IEPs, Dyscalculia, and Mathematics Difficulties

- **Provide systematic instruction when teaching mathematics to develop student understanding of mathematical ideas**. Systematic instruction includes explicit modeling, guided practice, and cumulative review, ensuring students build conceptual understanding alongside procedural skill. It supports mastery through intentional sequencing and scaffolding of content, especially for learners who benefit from predictable routines and visual supports.
- **Teach clear and concise mathematical language and support students' use of the language to help them effectively communicate their understanding of mathematical concepts.** Embedding academic vocabulary into instruction and prompting students to explain their reasoning using precise terms strengthens both comprehension and discourse. Sentence frames, anchor charts, and structured talk routines can help students internalize and apply mathematical language across contexts.
- **Use multiple representations to support students' learning of mathematical concepts and procedures.** Use a variety of representations to support students' learning of mathematical concepts and procedures. Foundational tools such as base-ten blocks, fraction tiles, area models, number lines, tape diagrams, graphs, and symbolic expressions help students transition from a concrete to abstract comprehension of math skills. These representations promote access, support flexible strategy development, and deepen understanding by helping students make connections across representational stages and prepare for advanced mathematical reasoning.
- **Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical language and ideas.** Word problem instruction should include explicit strategy instruction (e.g., RAP, schema-based models), opportunities for dialogue, and scaffolds that help students make sense of context and choose appropriate operations. Visual models and metacognitive prompts can support comprehension and transfer.
- **Fluency in mathematics is defined by the NCTM (2020) as the ability to apply procedures efficiently, flexibly, and accurately, and to choose among strategies based on context. Fluency is not demonstrated through rote memorization alone, and speed is not the primary measure of fluency**. Instruction should emphasize strategy selection, reasoning, and adaptive use of procedures across problem types. Fluency-building routines (e.g., Cover-Copy-Compare) should be paired with conceptual checks to ensure students understand the "why" behind the "how."
- **Continually collect data and adjust instruction accordingly.** Educators must collaborate to continually assess student growth in mathematics. Students with disabilities and/or difficulties in mathematics require ongoing formative assessment to monitor their understanding and application of math skills during instruction and provide timely feedback to address any misunderstandings. In addition, educators should reference summative assessments such as benchmarks, to determine how well students are mastering concepts over time.

West Virginia Department of Education Resources

The following resources are available on the WVDE or Canvas in the WVDE Professional Learning Resource for Mathematics to support educators.

» *https://wvde.us/academics/programs-initiatives/math4life/educators*

» *https://wvde.us/academics/programs-initiatives/math4life/educators/mathematical-habits-mind*

» *https://wvde.us/academics/programs-initiatives/unite-numeracy/educators*

» *https://wvde.us/academics/programs-initiatives/unite-numeracy/family-guardians*

» *https://wvde.instructure.com (WVDE Canvas – WVDE Single Sign On required)*

- Educators' Guides for grades K-8 and Algebra I
- Mathematical Habits of Mind individual deep dive documents and comprehensive booklet
- Mathematical Habits of Mind educator and family engagement videos
- PLC Guides for Educators' Guides, Mathematical Habits of Mind, and Number Talks