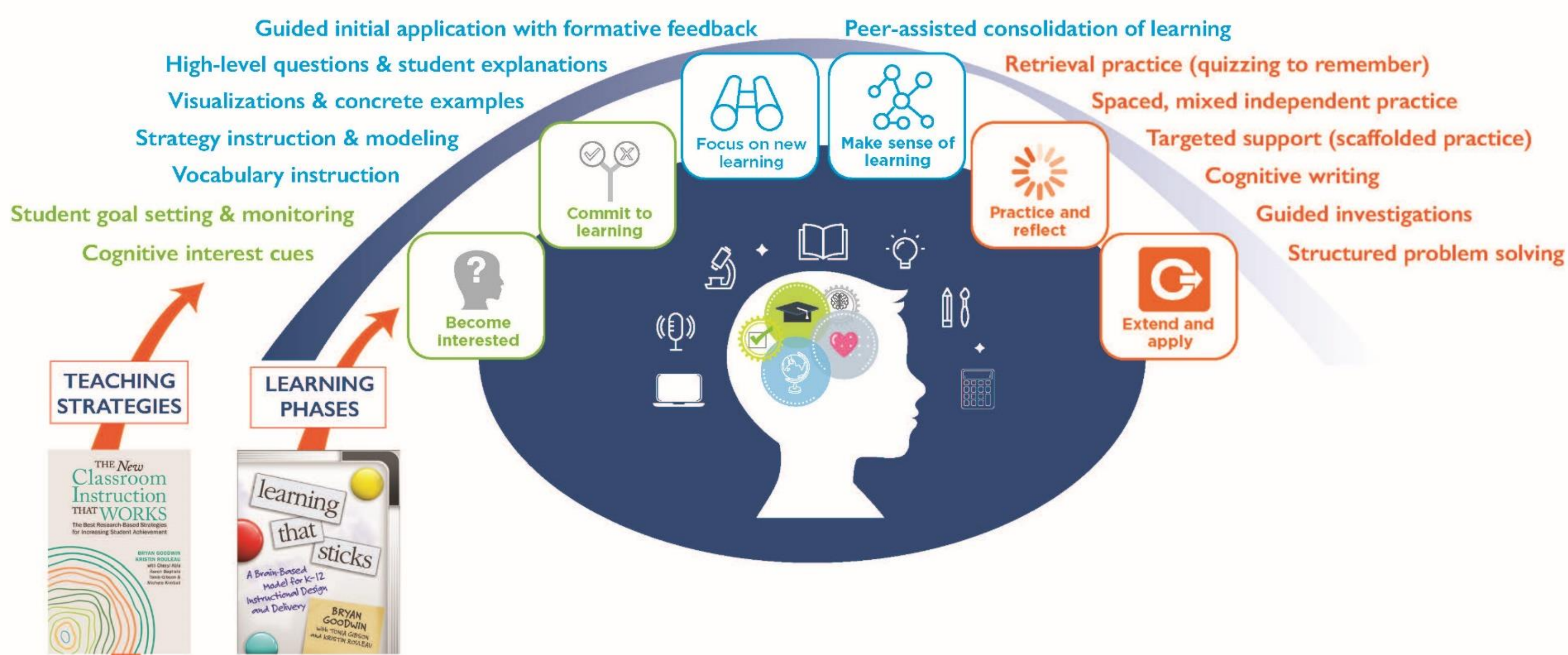
Best First Instruction

A research-based model for planning and delivering engaging and memorable Tier 1 instruction that supports deep learning for all students.

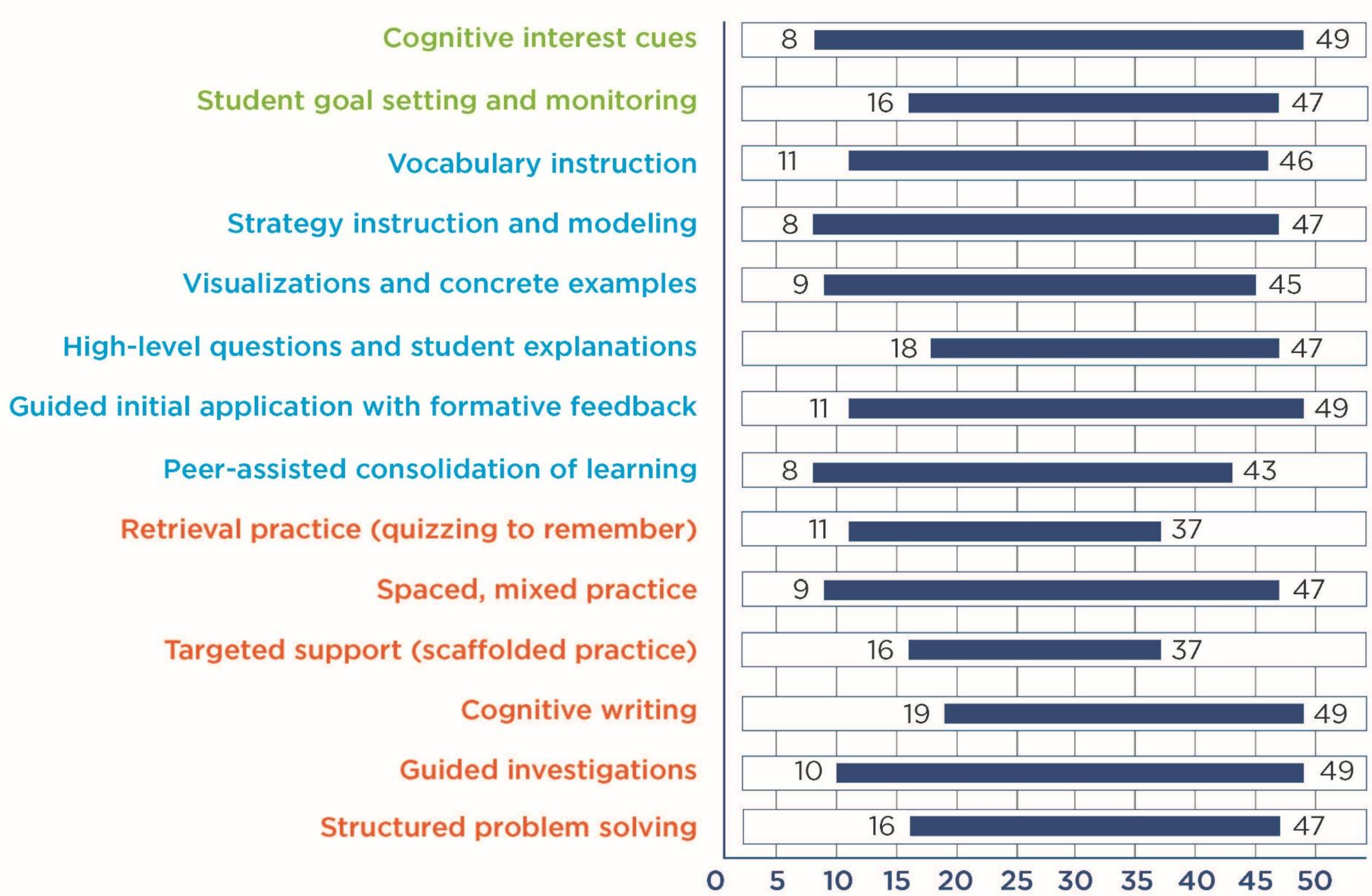
Inside:

- An aligned crosswalk between what brain science tells us about how students learn and what education science tells us about the most effective teaching strategies that can be used across all K-12 classrooms.
- Descriptions of what each teaching practice looks like in classrooms.
- Classroom "look fors" to inform lesson planning and observations.
- Professional reflection questions that can be used by individual teachers, teacher teams, instructional coaches, and/or principals.

McREL's Framework for Best First Instruction



Improvement Index Score Ranges for the 14 Strategies



How does learning occur? *The science of learning*	**Related teaching practice** *The science of teaching*	**What does it look like in the classroom?** *Classroom tips*	**Classroom & lesson planning "look-fors"**	**Coaching questions**
Phase 1: Become interested. Because our brains ignore most of the stimuli they encounter, to learn anything, students must first become interested in it, finding it personally relevant, meaningful, and/or intellectually stimulating.	**Cognitive interest cues.** Scientific studies confirm the power of hooking student interest in learning with thought-provoking questions, compelling visuals, and personal connections to new knowledge and skills that draw students intellectually into new learning.	• Posing questions that create prior learning **knowledge gaps** ("You know how to calculate the area of shapes with straight sides, but did you know there's a "magic" formula we can use to calculate the area of a circle?). • Using **curiosity hooks**: mysteries (How did the Wooly Mammoth disappear?), incongruities (Are "hot hand" streaks in basketball real phenomena or mathematical probabilities?), controversies (Is nuclear power a viable way to reduce greenhouse gases?), and suspense (What will you see tomorrow morning in your petri dish?). • Help students make **relevant connections** to learning (e.g., linking math to cooking, relating biology to common illnesses, writing assignments that encourage students to make personal connections to literature).	Are students engaged in learning? Do lessons and units start with curiosity hooks or relevant connections to students' lives?	• In what ways could you make this lesson or unit more interesting to students? • Would your students engage in this lesson if they didn't have to?

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Phase 2: Commit to learning. Learning takes mental effort, so students must commit to it—convincing their brains to "switch on" to learning.	**Student goal setting and monitoring.** Numerous studies show significant effects for engaging students in setting and monitoring progress toward goals—translating teaching objectives into personal goals for learning that they find valuable and achievable.	• Give students a **WIIFM** (What's In It For Me)—Help students see why what they're learning is relevant and useful. • Use **SO THAT** statements to make learning goals relevant (We will learn to calculate the area of polygons SO THAT we can calculate the size of actual spaces in our world). • Use **first-person stems** to frame learning goals (I will be able to explain the process of photosynthesis). • Help students set **mastery goals** not performance goals (I will master how to write a persuasive essay vs. I will get an A).	Can students articulate what they're learning and why? Can students articulate how they will demonstrate their learning?	• What are you teaching and why? • How will you know when students have mastered their learning?

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Phase 3: Focus on new knowledge. To learn anything, students must focus on it in their short-term working memory. Research suggests they do this best if they encounter material presented both visually and verbally and have opportunities to translate complex ideas into concrete examples and concise packets of information called words (i.e., vocabulary).	**Vocabulary instruction.** Words are the pegs upon which we hang ideas. So, it's not surprising that direct instruction of subject-specific and academic vocabulary has been shown to significantly improve student learning outcomes.	• Directly teach **subject-specific and academic vocabulary** (identify and ensure students understand key words essential for comprehension of key concepts and ideas). • Help students **master vocabulary in multiple ways** (defining words, drawing pictures, using in sentences, providing examples). • Provide students with **multiple opportunities to practice** and apply new vocabulary. • **Front-load conceptual understanding** prior to vocabulary instruction (e.g., show students the process of mitosis prior to teaching the term).	Are teachers and students using subject-specific vocabulary in classroom discussions?	• What words do you want to hear and see students using to demonstrate their mastery of key ideas and concepts?
	Strategy instruction and modeling. Studies make a strong case for providing students with step-by-step direct instruction and modeling of new skills and procedural knowledge, including thinking skills.	• Identify the skills students need and **teach them directly** (e.g., providing step-by-step instruction for solving math problems, decoding, punctuating sentences, close reading, etc.). • **Show and tell** students what you want them to learn, illustrating and guiding students through each step of a process. • Provide direction instruction of **thinking strategies** (e.g., analysis, planning, monitoring, etc.) with **think-alouds** (What can I infer from the title what this article is about? …).	Do students have adequate opportunity to learn new skills? Are teachers showing them how to engage in thinking?	• What skills are essential for mastering your learning goals? • Have you taught them directly to students?
	Visualizations and concrete examples. Our brains process information better when it's presented visually *and* verbally. Using visual images and helping students grasp abstract concepts with concrete examples greatly enhances learning.	• Identify what you **want students to see** while they learn (e.g., two-column addition, photosynthesis, the top-heavy hierarchy of the Mayan civilization). • Illustrate abstract principles with **concrete examples** (at least three of them). • Use **schematics and diagrams** to help students visualize processes (e.g., how to write a paragraph, solve word problems, complete a research project) and complex phenomena (e.g., the water cycle, supply and demand, elements of story plot).	Is learning supported with visual representations and concrete examples? Are teachers showing and telling students what they should learn?	• What do you want students to see while they're learning? • What do they need to picture mentally to master their learning?

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Phase 4: Make sense of learning. Students' short-term working memories can juggle only small amounts of information at once. So, we must provide them with regular opportunities to pause and process new learning by connecting it to prior learning, thinking about it learning and discussing it with peers.	**High-level questions and student explanations.** Thinking about their learning helps students consolidate new information. Not surprisingly, multiple studies support the power of posing high-level questions to students that prompt them to analyze, synthesize, and reflect on new learning, and/or explain their thinking.	• **Pre-plan questions** to scaffold student thinking about their learning (identify concepts students must grasp and create a short list of questions to help them think about ideas, concepts, relationships, etc.). • **Prompt students to offer explanations that make their thinking visible** (e.g., How exactly does that work? Why should that be true? What makes you say that?). • Use **cold calling** (and re-calling) to ensure all students think about their learning (calling only students who volunteer responses leads to a few students doing most of the talking). • Use **wait time** (at least 3 seconds) before and after student responses to ensure all students have time to think about questions and develop thoughtful answers**.**	Are teachers asking questions that prompt students to think about (e.g., analyze, synthesize, explain) their learning? Are all students participating and sharing their ideas?	• What do you want students to *think about* while they are learning? • How can you encourage more students to engage in class discussions?
	Guided initial application with formative feedback. After seeing a new skill demonstrated, students need to try it for themselves to make the neural connections that will eventually become automated mental scripts. While doing this, it's vital they receive feedback that helps them reflect on error patterns and how to correct them.	• **Observe students** during initial application of learning so that you can check for understanding and provide immediate constructive feedback to guide their learning. • Identify **error patterns** and provide **targeted feedback** (What's the key error? What's the most likely reason they made it? What did they do right? How can I help them avoid the error in the future?). • Provide **formative feedback that is specific and actionable** (provide students with feedback that helps them to reflect on their learning and be clear about what to do differently in the future). • Help students understand and apply the **"thrice-is-nice" principle** during initial practice sessions (achieve three correct recalls during initial attempts to master new learning).	Do teachers observe students as they attempt to apply new learning? Are students receiving immediate feedback on their learning? Is it specific and actionable?	• What's the most common error you see students make? • What's the most likely reason for the error? How will you help students avoid them in the future?
	Peer-assisted consolidation of learning. Multiple studies point to the power of group learning to help students *consolidate* new learning by processing together what they've learned following lectures, independent reading, or experiments to help students process what they've learned.	• **"Chunk" learning** with 5-10-minute segments of focused learning interspersed with peer-assisted learning to help students pause and process their learning. • Assign students to **strategically designed mixed-ability groups** (not groups students choose for themselves) to encourage each group represents a variety a perspectives and prior knowledge). • Embed **high-level questions** into group dialogue to ensure students think about their learning. • Use a **variety of structures** (e.g., reciprocal teaching, numbered heads together, think-write-pair-share) to ensure that group work remains interesting and cognitively challenging.	Do students have regular opportunities to pause & process their learning? Do high-level questions guide group discussions?	• What "brain breaks" can you build into your learning? • What do you want students to *think about* during small-group discussions?

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Phase 5: Practice and reflect. Repetition is the key to long-term memory. To commit new learning to memory, students must practice it, attempt to recall it, think about it, and/or apply it multiple times.	**Retrieval practice (quiz to remember).** Racking our brains to retrieve learning strengthens the neural connections that store knowledge. Hence, providing students with frequent (ungraded) quizzes has been shown to significantly strengthen their recall of new learning.	• **Quiz more, grade less.** On-the-spot quizzes and bell-ringer activity quizzes of new and prior learning are a powerful learning tool and need not be scored in grade books. • Provide students with **timely correct-answer feedback** on quizzes**.** This is easier to do, of course, if quizzes are ungraded. • Balance **speeded practice of basic skills** with **reflective practice**—timed drills develop automaticity while self-evaluative check-ins ("Where are you struggling?') supports deliberate practice. • Teach students the **3x3 practice schedule** (3 correct recalls during initial practice followed by 2 more sessions for a total of 3 practice sessions).	Do students have frequent opportunities to rack their brains to retrieve prior learning? Do students have opportunities to practice new skills and reflect on their progress?	• What must students automate or commit to memory to achieve their learning goals? • What opportunities can you provide to help them automate skills and store new learning in memory?
	Spaced, mixed practice. Research shows massed practice ("cramming") leads to fast learning and fast *forgetting*. It also shows that rehearsing *a mix of skills* (instead of just one skill) during the same practice session enhances memory. So, student practice sessions should be spaced over days and weeks and engage them in practicing a variety of related skills.	• Intentionally **build spaced practice opportunities** into unit plans—provide students with at least three opportunities spread over days and even weeks to practice new learning. • **Mix up repeated practice sessions**. Weave prior learning into practice sessions (e.g., mixing verb conjugations, math problems, or science concepts mastered in previous units into practice sessions). • **Mix up the format and presentation of problems—**for example, presenting a problem as 13 = 7 + 3x instead of 7 + 3x = 13 or placing third-person plural in the upper-right hand of conjugation tables. • As noted above, provide students with opportunities to follow a **3x3 practice schedule** (3 correct recalls during initial practice followed by 2 more sessions for a total of 3 practice sessions).	Do homework assignments support students' mastery of new skills be engaging them in opportunities to practice them in sessions spread out over days and even weeks?	• How do you know students are ready for independent practice? • How can you help them continuously review prior skills (so there's no need to review for the final?).
	Targeted support (scaffolded practice). Multiple studies show the benefits of providing students who initially struggle to master new learning with opportunities to re-learn and re-practice it. Delivered well, targeted supports can virtually close achievement gaps and help students return to on-grade-level performance.	• Identify key knowledge and skills students must master and **teach them well.** Targeted (Tier II) supports are only as effective as the Tier I supports they follow, so it's essential to provide effective strategy instruction and modeling (see Phase 4) to reduce the need for additional supports. • Use regular **checks for understanding** during independent practice to catch students before they fall. • Structure targeted supports as **mini learning cycles**—re-teaching skills, providing students with opportunities to re-try them, re-observing students during practice, and re-coaching them. • Offer targeted supports to **students in small groups** will others engage in independent practice. • **Use data** to determine when students no longer need targeted supports.	Can teachers identify which students need targeted support? Are targeted support groups temporary and data driven?	• Which students are most in need of additional support right now? • What progress are they making? • What data leads you to says that?

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Phase 6: Extend and apply. Ultimately, for new learning to stick, students must return to it in multiple ways—applying it, thinking about it, and using it to engage in personal and creative expression. Hence, to support deep learning, we must provide students with opportunities to extend and apply their learning.	**Cognitive writing.** Often, we don't know what we think until we see what they've written. Research points to the power of cognitive writing (extended writing assignments that engage students in high-order processing of new learning) to support deeper learning.	• Start with **what you want students to think about** and then engage them in extended writing tasks that prompt them to think about (i.e., compare, analyze, evaluate, synthesize, critique) their learning. • Provide students with **tools and guides to structure their writing** (e.g., use a graphic organizer that provides the purpose of the assignment, directions, guiding questions, and tools for arranging ideas). • **Teach thinking & writing skills** directly (e.g., show how to develop & revisit a main idea, use evidence to support their arguments, consider and respond to counter-arguments, revise their writing). • Develop and provide students with **rubrics** for all writing assignments. • Provide students with opportunities to **share and revise** their writing.	Do students have opportunities to share their thinking through writing? Can students extend the knowledge and skills of this curricular unit through writing?	• How might you provide students with opportunities to write to learn? • What thinking skills can they demonstrate through writing?
	Guided investigations. Several studies demonstrate that guided investigations (students exploring compelling questions, observing real-world phenomena, analyzing data and evidence, and reporting their discoveries) have lasting effects on learning. Likely, that's because inquiry helps them develop richer mental connections to new material.	• Anchor guided investigations in the **enduring understandings** you want your students to develop and then design an opportunity for students to develop this insight through research and experimentation. • Identify which essential knowledge and skills to **teach directly** (e.g., through vocabulary instruction, strategy instruction and model) and which **students will discover** through observation, investigation, and experimentation. • Ensure students return to **thinking about key concepts and enduring understandings** when presenting what they learn—guided investigations should be hands-on and *minds-on* learning tasks. • Use the **learning model** to design your investigation (help students become interested, commit to learning, focus on new knowledge, make sense of learning, practice and reflect, extend & apply).	Do students have opportunities to develop enduring understandings through observation and investigation? Is the learning task challenging (e.g., hands-on and *minds-on*)?	• What enduring understanding do you want students develop through this learning task? • How will students demonstrate their mastery of it?
	Structured problem solving. Multiple studies point to the power of teaching students the step-by-step processes required to apply new knowledge and skills to identify the underlying structure of complex, real-life problems and retrieve prior learning to solve them.	• Anchor application of skills in solving **complex, real-life problems** (e.g., calculating costs for building a skateboard ramp, savings from energy conservation, comparing costs of various phone plans). • Provide students with a **process and memory/visual aid for tackling complex problems** (e.g., grasp the problem, plan a course of action, work the problem, review the answer). • Help students **recognize and categorize problem types** (e.g., group problems vs. compare problems vs. change problems). • Teach students the **habits of mind** and **positive self-talk** needed to solve complex problems (e.g., clarifying directions, keeping goals in mind, reflecting on solutions, getting back on task, not giving up).	Is this unit anchored in an opportunity for students to apply their learning to solve a meaningful problem? Are students being supported in learning how to solve complex problems?	• How might students apply what they are learning to solve a real-life meaningful task? • How can you help students solve the problem while also learning the process for solving it?

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