

Instructional Design

in Practice with
Discovery Education Resources



A Letter from McRel Institute

At The McREL Institute, we believe that when teachers know more about how the process of learning works—what we call the science of *learning*—and know more about the instructional strategies shown by research to be highly effective—what we call the *science of teaching*—they often experience a breakthrough moment in their careers. They become more intentional and confident with their instructional practices, understanding not only *what* to do, but *when* and *why* to do it. And they begin designing and delivering lessons and activities that better reflect how students' brains work.

The challenge to making this a reality in every classroom across the country and around the world is that for far too long there's been a big gap between the research and real-life application in classrooms.

Even though cognitive science has been around for decades and its application can have powerful effects on student learning, it's rarely taught in teacher education programs. As a result, many teachers don't fully understand how to guide the process of learning using the science of learning.

Our mission at The McREL Institute is to help bridge that gap, to translate the research into practical, teacher-friendly guidance and resources. To that end, we've developed a brain-based model for student learning and identified specific instructional strategies that support learning at each step of the way.

We're pleased to partner and collaborate with Discovery Education, leveraging the best of both our organizations and aligning Discovery Education's wealth of instructional tools, learning activities, and examples with our brain-based learning model and research-proven instructional strategies.

Our shared goal is to help teaching and learning become a bit easier, more joyful, and more successful for every educator and all their students.



Bryan Goodwin
CEO
McREL Institute



Learning Starts with Engagement. Instructional Design Makes Learning *Stick*.

In the report [*Education Insights 2025–2026: Fueling Learning Through Engagement*](#), Dr. Robert P. Taylor, superintendent of the Wake County Public School System, describes that student engagement is essential because it keeps learners motivated, challenged, and connected. After that first step of engaging students, educators can look to the science of learning for guidance on what improves the stickiness of acquired knowledge and skills over the long term.

Research on what is actually happening in students' brains while they experience instruction must be considered in order to significantly improve outcomes (Goodwin, 2018). For example, knowledge of scientific findings such as the three-part memory sequence that leads to knowledge retention—from sensory register/immediate memory to working memory to long-term memory—can inform instructional design decisions.

*“As district leaders, we share a common goal: ensuring **every** student learns and remains motivated, challenged, and connected to their learning journey. Engagement sits at the heart of that mission.”*

Dr. Robert P. Taylor

Superintendent
Wake County Public
School System, NC



What Exactly Is Engagement?

While engagement's importance in the classroom might be apparent, identifying and fostering it is less clear (Discovery Education, 2025). That challenge comes down to three core realities: engagement is difficult to define and measure, barriers are not always easy to see, and educators need shared strategies and tools to respond effectively.

Since neither teachers, principals, superintendents nor students agree completely on what engagement looks like, there's a clear need for broadening the indicators of and developing a shared language for engagement. For example, while teachers may believe that completing homework indicates an engaged student, some students may be motivated more by grade impact than by real interest in learning and may "equate engagement with doing what is required to appease educators" (Discovery Education, 2025). Conversely, teachers may miss signs that students are engaged in "invisible" ways, such as persisting through challenging schoolwork, taking time to silently reflect on learning, and exploring concepts on their own.

1 Engagement is hard to define, and even harder to measure.

2 Barriers to engagement can be both visible and hidden.

3 Educators need clear strategies, shared definitions, and effective tools to drive engagement.

How to Enable Learning That Sticks

Using findings from the science of learning, McREL International developed a six-phase model for best first instruction that educators can apply in their classrooms as they create learning opportunities for their students (Goodwin, 2018).

The phases describe what students need to experience as they progress through the model in order to develop deep, lasting knowledge.



Become Interested



Make Sense of Learning



Commit to Learning



Practice and Rehearse



Focus on New Knowledge



Extend and Apply

Why an instructional model rather than an instructional framework? A model helps teachers know how to design and implement effective learning opportunities, while a framework categorizes and lists teacher activities and responsibilities. Focusing on the *what* without a strong *why* can lead to boredom, frustration, and confusion—for both teachers and students (Hubbell & Goodwin, 2019).

McREL provides research-backed instructional strategies that align to their phases of learning, which can help educators choose practical ways to follow the science of learning in their classroom. These strategies may incorporate moderate- and high-utility techniques, which include self-explanation, interleaved practice, practice testing,

*A strong instructional model gives teachers more than a list of what to do. It helps them **understand why** it works and how to bring effective learning to life.*

Turn Principles into *Practice* with Discovery Education

While not solely based on McREL's six-phase learning model for best first instruction, Discovery Education programs do align to it in numerous ways. Many draw inspiration from the model, and all combine insights from the science of teaching with knowledge of the science of learning, incorporating design principles that educators can use to guide students in their journey.

Best first instruction is the skillful use of proven teaching techniques that are intentionally sequenced to help all students convert new learning into long-term memory.

(The McREL Institute, 2023).

The following shows examples of design principles that fit within McREL's phases, how Discovery Education programs realize them, and what leaders should look for during classroom observation.



Design Principle: Spark Curiosity

Teaching Practice: Cognitive interest clues

- Posing thought-provoking questions
- Using curiosity hooks
- Helping students make real-world connections

Discovery Education Program Connections

Experience: Can You Guess My 2-1-4? This activity lets students make evidence-based inferences about a specific topic from two facts, one clue, and four pictures that a teacher presents.

Reading Plus: Students can choose texts that reflect their lives and experiences or discover experiences from new and different perspectives.

Science Techbook: Phenomenon-based learning connects to the real world.

Career Connect: Story Cards' story-based lessons encourage students to explore, ask questions, and find answers to build future-ready skills like communication, collaboration, and problem solving.

DreamBox Math and DreamBox Reading: Lessons and activities use discovery to spark student curiosity, emphasizing authentic learning through independent engagement versus procedural instruction.

Social Studies Essentials: Inquiry-based learning connects to the real world.

This **Science Techbook** lesson sparks curiosity by inviting students to think like chemists and explore what happens when substances mix.

Look-For: Are students engaged in learning?

Indicators include contributing to classroom discussions, asking thoughtful questions, participation in hands-on activities, and persistence through challenges.

LEARNING PHASE 2

COMMIT TO LEARNING



Design Principle: Make Purpose Visible

Teaching Practice: Student goal setting and progress monitoring

- Giving students a WIIFM (What's in it for Me)
- Including “so that” statements to make goals relevant (“We will learn... so that...”)
- Using first-person stems to frame goals (“I will...”)
- Setting mastery goals versus performance/grade-based goals

Discovery Education Program Connections

Experience: Goals in Studio lessons help students prepare for learning.

Science Techbook: Built-in formative assessments track progress throughout a course.

Career Connect: The Mindset of a TrueSport Champion activity lets students explore how goal setting contributes to success by examining and practicing different kinds of goals.

DreamBox Math: A trackable dashboard lets students see their progress and set goals for themselves.

Social Studies Essentials: Lesson-level learning targets in student-friendly language directly connect to checks for understanding within the lesson and formative assessment after the lesson.

Prepare

Learning Target:

I will read two sides of an informational text debate and gather text evidence to summarize my stance.

[Printable Reading Notetaker](#)

Optional Scaffolds: [Text Summary](#) [Glossary](#)

Before Reading

Discovery Education **Experience** lessons help students see the purpose behind their learning goals and outcomes, building confidence along the way.

Look-For: How do students demonstrate their learning?

Students can demonstrate learning in many ways, including visuals, technology-based projects, written work, performances, and group activities.



Design Principle: Reduce Cognitive Load

Teaching Practice: Vocabulary instruction

- Directly teaching subject-specific and academic vocabulary
- Helping students master vocabulary in different ways (drawing pictures, using in sentences, providing examples, etc.)
- Providing multiple opportunities to practice and apply new vocabulary
- Front-loading conceptual understanding prior to instruction

Discovery Education Program Connections

Experience: Studio lessons and activities provide contextual opportunities to learn new words.

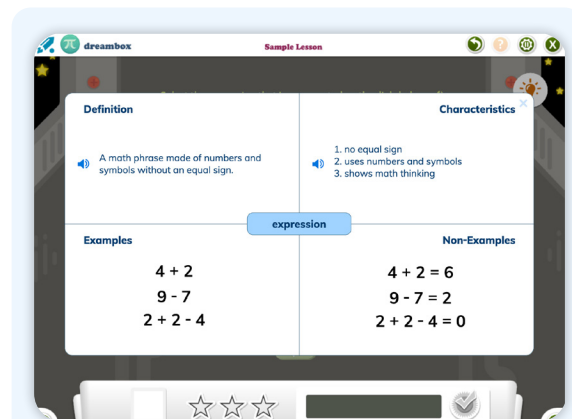
Science Techbook: Lessons naturally incorporate ELA standards and provide context for vocabulary.

Career Connect: Videos explain complex real-world topics, introducing terminology and providing concrete examples.

DreamBox Math: The in-lesson vocabulary tool provides support for key mathematical terms with clear definitions and audio, so students can hear a term, use it in context, and then explain it themselves.

DreamBox Reading: Lessons use best practices based on the Science of Reading to support vocabulary development.

Social Studies Essentials: Subject-specific vocabulary is defined at point-of-use to support instruction and discussion.



DreamBox Math helps students develop mathematical language as they learn, giving them support to understand and apply new terms with confidence.

Look-For: Are teachers and students using subject-specific vocabulary?

Key vocabulary should be clearly identified in some way and evident in student responses and activities.



Design Principle: Make Thinking Apparent

Teaching Practice: High-level questions and student explanations

- Pre-planning questions to scaffold student thinking
- Prompting students to explain their thinking
- Using cold calling and re-calling
- Employing wait time (at least 3 seconds) before and after student

Discovery Education Program Connections

Experience: XO Let's Go gives students opportunities to respond to questions and explain their thinking.

Reading Plus: Rigorous comprehension questions that follow reading selections increase in complexity as skills grow.

Science Techbook: 5E (engage, explore, explain, elaborate, evaluate) lesson structure requires students to share their reasoning.

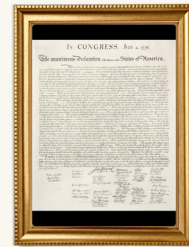
DreamBox Math: Lessons develop conceptual understanding and strategies by game-like exploration and application of knowledge, rather than memorization.

Social Studies Essentials: Discussion and reflection questions scaffold inquiry-based learning.

Discuss It

This artifact is only a piece of a larger story. To better understand historical evidence and perspectives, let's discuss some questions.

1. What did you notice?
2. What questions do you still have?
3. What perspective did the author want you to see?



Lessons in **Social Studies Essentials** help make student thinking visible through purposeful questions and discussion prompts that encourage explanation, reflection, and evidence-based reasoning.

Look-For: Are all students participating and sharing their ideas?

Teachers can experiment with different approaches to ensure that more than just a vocal subset of students is expressing their thinking.



Design Principle: Practice for Retention

Teaching Practice: Retrieval practice (quiz to remember)

- Quizzing more and grading less
- Providing timely correct-answer feedback on quizzes
- Balancing speeded practice of basic skills with reflective practice
- Teaching the 3x3 practice schedule (3 correct recalls during initial practice followed by 2 more sessions)

Discovery Education Program Connections

Experience: Quiz Tools (Quiz and Video Quiz) give opportunities for practice and memory recall.

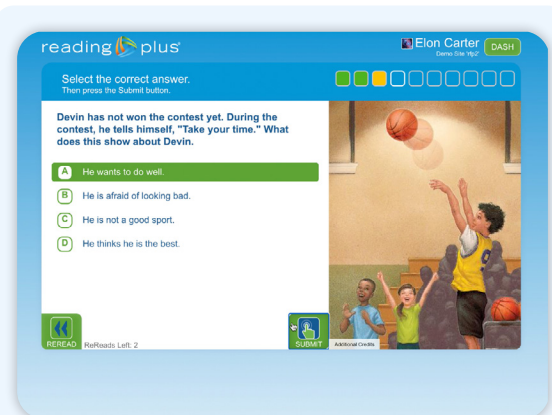
Reading Plus: Post-reading-selection comprehension questions provide immediate feedback to students on their progress.

Science Techbook: Explore/Explain activities include a series of questions for students about their observations and conclusions.

Career Connect: Interactives let students practice responding to real-world job scenarios.

DreamBox Math and DreamBox Reading: Students achieve procedural fluency via productive struggle, in which their choices inform an adaptive engine that selects lessons accordingly. Retrieval is embedded in lessons.

Social Studies Essentials: Students get lesson-level checks for understanding as well as formative assessments and unit-level summative assessments.



Reading Plus strengthens comprehension and retention by prompting students to actively recall what they have read and learn from immediate feedback.

Look-For: Are students given chances to practice new skills and reflect on their progress?

On-the-spot and bell-ringer activity quizzes target new and prior learning. Timed drills develop automaticity, while self-evaluative check-ins support deliberate practice.

LEARNING PHASE 6

EXTEND AND APPLY



Design Principle: Make Connections Through Inquiry

Teaching Practice: Guided investigations

- Identifying what to teach directly and what to allow students to discover via observation, investigation, and experimentation
- Ensuring students return to thinking about key concepts and enduring understandings when presenting what they've learned
- Using a learning model to design investigations

Discovery Education Program Connections

Experience: Virtual Labs replicate hands-on learning with digital simulations that involve experimentation and analysis.

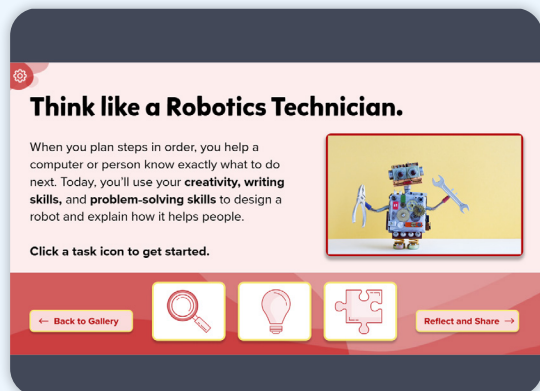
Reading Plus: Texts from global sources support cross-curricular knowledge development.

Science Techbook: STEM and engineering projects push students to synthesize, evaluate, and create solutions.

Career Connect: Career Mini Quests ask students to explore professional roles and complete related challenges.

DreamBox Math: Application-based and multistep word problems activate prior knowledge and ask students to apply it to unfamiliar situations. Lessons move from concrete to abstract concepts.

Social Studies Essentials: Artifact analysis scaffolds historical thinking skills.



This **Career Mini Quest** helps students make connections through inquiry by encouraging them to explore career pathways, investigate real-world challenges, and reflect on how their learning applies to their own lives.

Look-For: Is the learning task challenging (hands-on and minds-on)?

Connections stem from students exploring compelling questions, observing real-world phenomena, analyzing data and evidence, and reporting their discoveries.

Evaluation and Implementation Guidance

What can school and district leaders do to ensure their staff is working with the most effective instructional model possible?

First, assemble a team of teachers and leaders who will collaborate on this undertaking. Second, research current instruction in a school or district by collecting data in a variety of ways, including formative and summative assessments given by teachers, classroom observations and walkthroughs, interviews and/or surveys with all stakeholders (students, teachers, parents), and achievement results. While many teachers may already be using an instructional model, improvement might need to come from adopting, adapting, or creating a new one (Hubbell & Goodwin, 2019).



With that in mind, here are two tools that leaders can use to support the process:



Evaluation Checklist

Look for evidence of:

Engagement Design:

Fosters student interest, shows relevance, and gives students a voice
(CAST, n.d.)

Cognitive Design:

Offers multiple ways of learning and making meaning, including through multimedia resources (CAST, n.d.)

Retention Design:

Incorporates retrieval; spaced, mixed independent; and scaffolded practice
(The McREL Institute, 2023)

Feedback and Formative Assessment Loops:

Helps teachers provide specific, timely feedback focused on improvement and gives insights into instructional needs
(Discovery Education, n.d.)

Accessibility and Learner Variability Supports:

Aligns to Universal Design for Learning Guidelines (CAST, n.d.)

Implementation Supports:

Facilitates consistency in instructional quality through a shared model and incorporates coaching (Hubbell & Goodwin, 2019)

Implementation Keys

Adopting or adapting an instructional model that incorporates evidence-based teaching strategies is not enough to drive meaningful improvement in student outcomes—leaders need to prioritize effective implementation (Fixsen, Ward, & Blase, 2025).

Here are key recommendations:



Implementation Checklist

- Define a coaching structure, roles for teachers and coaches, and what success looks like (Discovery Education, n.d.)
- Set up implementation teams with responsibilities based on their level of operations (building, district, regional, etc.) (Fixsen, Ward, & Blase, 2025)
- Ensure clear communication and coordination among teams with common language, methods, and measures (Fixsen, Ward, & Blase, 2025)
- Define a coaching structure, roles for teachers and coaches, and what success looks like (Discovery Education, n.d.)
- Use a framework such as one of the Active Implementation Frameworks, developed from implementation, organization, and complexity science (Fixsen, Ward, & Blase, 2025)
- Give teachers the freedom to apply their own creativity and judgment when using the new instructional model to plan and deliver lessons (Hubbell & Goodwin, 2019)

Ready to see the phases of learning in action?

Learn how Discovery Education programs drive engagement and make learning stick in your district at [DiscoveryEducation.com](https://www.discoveryeducation.com)

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