Planning Guide for the Six Phases of Learning

Discovery Education Experience is a simple-to-use K–12 learning platform that combines dynamic curated curriculum resources with on-demand teaching strategies, personalized for your needs as an educator. This collection of real-world educational content brings excitement and relevancy to the topics you teach, so all students have opportunities to unlock their true potential.

Discovery Education partnered with McREL International to align instructional strategies from the Spotlight on Strategies (SOS) series to McREL's Six-Phase Model of Learning. The alignment of the SOS series of strategies to McREL's model helps educators choose the appropriate classroom tactics for aiding the acquisition and recall of information in meaningful, effective, and practical ways.

This document will provide you with an overview of McREL's Six-Phase Model of Learning and present you with practical connections within Discovery Education Experience that support each of the six phases.

Learn more at DiscoveryEducation.com

Designing student learning experiences that stick

Student learning experiences are richer and more likely to stick when they're based on the science of learning—what decades of research says about how our brains assimilate, process, store, and retrieve information. This learning model described below converts the science of learning into a six-phase model for designing student learning experiences that mirrors how our brains turn new information into long-term memory. To use it effectively in your classroom, it's helpful to understand the long (and often perilous) journey new information must take before it becomes embedded in memory. So, let's take a closer look at this process.

Become Interested

For learning to begin, students must filter out distractions and focus their minds on new learning—in short, they must pay attention to it. Every second, our brains receive millions of bits of information, yet can only process a hundred or so bits of information per second. So, to avoid sensory overload, our brains employ a pecking order to filter information, focusing first on emotionally charged stimuli, then novel or interesting stimuli, and ignoring most everything else. What this means for us as teachers is that to start the learning process for students, we must help them feel emotionally safe and become interested, or curious about, what they're learning.

Commit to Learning

Once something grabs students' attention, their brains quickly size up whether to stay focused on it, turn their attention elsewhere, or simply exert less mental energy altogether. In short, students only learn what they commit to learning. And they're more apt to do that if they find personal meaning or value in what they're being asked to learn. As teachers, we can help students commit to learning by helping them see "what's in it for me" with new learning, frame learning around big ideas or compelling questions, provide (or develop with students) learning objectives and success criteria, and help students set their own personal goals for learning.

Focus on New Learning

Once students are interested in and committed to learning (i.e., mentally prepared to learn), a new challenge emerges: helping their brains absorb new information as they focus on new learning. Our brains more readily absorb new information when it's presented visually and verbally—for example, when we see images paired with words, connect abstract (verbal) concepts with concrete (visual) examples, or follow a model when first learning a new process. As teachers, we can help students absorb new learning by telling and showing them what we want them to learn and encouraging them to actively engage in learning by, for example, considering thought-provoking questions or taking notes, which encourages them to extract key ideas from their learning and translate them into visual reminders (text or pictures) in their notes.

Make Sense of Learning

As we absorb new information, we bump up against some of our brains' natural limitations—namely, that they can only juggle a few bits of information at a time and can only stay "powered up" for a brief periods (about 5-10 minutes). As teachers, this means we need to provide students with frequent opportunities to pause and make sense of learning—connecting new learning with prior learning, clustering ideas together into categories, themes, or mental models. As it turns out, cooperative learning is often a great way to help students make sense of learning—engaging them in small-group conversations to think through what they're learning, summarize key ideas, and hear how others are processing what they're learning.

Practice and Reflect

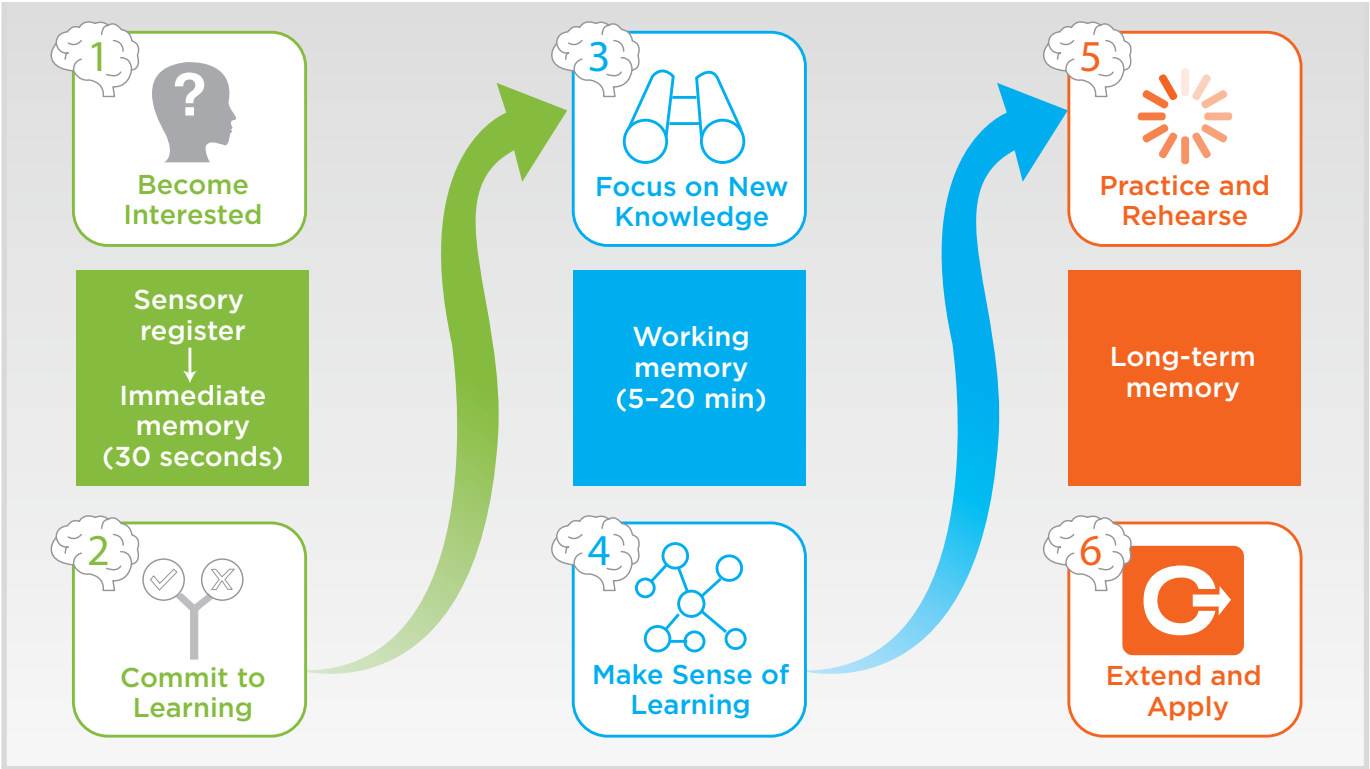
Even after focusing on and processing new learning, it remains in a fragile state and prone to being forgotten unless we engage in a simple, yet critical, next step: repetition. The best (and perhaps only) way to store new learning in long-term memory is to practice and reflect on it. Cramming or rehearsing the same bits of new learning in a single session (called massed practice), doesn't work; at best, it leads to fast learning and fast forgetting. Students are more apt to commit new learning to memory when they engage in distributed practice—sessions spread over many days or even weeks. As teachers, we can also help students commit learning to memory by quizzing them on new learning (called retrieval practice) and showing them how to identify and address gaps in their own learning.

Extend and Apply

Storing and retrieving memories are two different processes, which explains why students can "know" something yet struggle to recall it—or forget it shortly after learning it. As it turns out, we're more apt to store and retrieve new learning when we make multiple mental connections to it, including real-life and personal connections. As teachers, we can help students create richer mental connections to new learning by giving them opportunities to extend and apply their learning into real-life learning tasks, such as analyzing systems or social issues, generating and testing hypotheses, solving complex problems, writing persuasive essays or research reports, or sharing their learning in creative ways.

While this may seem like a straightforward process, our brains are, by design, really good at two things: ignoring and forgetting. Most of what enters our brain gets ignored or discarded and never enters long-term memory. By following this six-phase model of learning, you can help your students—regardless of grade level, subject area, or content— help "hack" the process of learning to successfully engage in deep learning.

The Six Phases of Learning



Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
 **Become Interested**	Stimuli in our sensory register catch our attention.	*Why should students care?*	**Emotional valence** Our brains have a "pecking order" for stimuli; we first pay attention to stimuli that have emotional valence.	*Prime emotion*
		What will spark student interest?	**Curiosity** After emotionally laden stimuli, our brains attend next to novel stimuli—the unexpected, incomplete, controversial, mysterious, or gaps in our knowledge.	*Spark curiosity*

The Classroom Toolkit

Emotional cues and questions—Help students connect emotionally to their learning—feeling excitement, surprise, sadness, joy, anger, disgust, fear, contempt.

Show them you care—Students will be more likely to learn if they feel their teachers are committed to helping them grasp the content or skills at hand.

Ask curiosity questions—Use mystery and suspense, incomplete sequences, "I have a secret," unusual or unexpected events to hook interest.

Structure academic controversy—Engage students in rich/robust debate about content that challenges them cognitively and, when appropriate, emotionally.

Mind the gap—Stimulate student background knowledge to prepare students for learning by revealing gaps in their knowledge.

Discovery Education Experience

SOS Learning Activity: Did You Hear That?

This student learning strategy supports visualizing by asking students to create a story based on two different sounds.

Virtual Field Trips

Spark curiosity by taking students beyond the classroom walls and into some of the world's most iconic locations for rich and immersive learning experiences—no permission slips required.

Student Learning Adventures

Have your students ever thought about traveling to Mars or what kind of animals use biomimicry or what the first telephone looked like? Use these examples as a model for student exploration.

Community Favorites: Instructional Strategies for Phase 1

- Can You Guess My 2-1-4?
- Multiple Perspectives
- Instagram-in

Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
 **Commit to Learning**	We determine the stimuli worthy of further attention.	*What meaning will students find?*	**Meaning and purpose** Our limbic (emotional) system is more powerful than our pre-frontal (logical) cortex; thus, we must "feel" like learning.	*Give a why*
		What will motivate students to learn? *What will connect them to the learning?*	**Commit to learning and mastery** Self-reference connecting learning to our personal lives—is a powerful motivator of learning. Thus, students are more motivated to learn—and recall later what they've learned—when they set personal goals for learning.	*Set goals*

The Classroom Toolkit

Essential questions—Students must see the big picture of where learning is headed, so use big ideas/essential questions to guide learning.

Give students a WIIFM (what's in it for me)—Students must see why something is important to learn. How will they use it later in life? How do people use it in the real world?

Encourage personal learning goals—Ensure goals are mastery, not performance, oriented.

Develop and provide success criteria that describe mastery—Help students set goals for mastery and/or above-and-beyond stretch goals.

Use advance organizers and objectives to show the path—Provide lesson-specific objectives that show students how to achieve goals. Keep the objectives—the path to success—transparent, visually available, and understandable.

Encourage effort—Help students develop a growth mindset/internal locus of control by tracking effort as well as anticipating roadblocks and how to overcome them.

Discovery Education Experience

SOS Learning Activity: Twenty Five Things You Didn't Know

This student learning strategy supports collaboration and critical thinking by asking you to identify new information about a topic that will be shared with classmates.

News and Current Events Channel

Use emerging stories from around the globe to connect learning to students' personal lives.

Community Favorites: Instructional Strategies for Phase 2

- Close Encounters
- Paper Chat
- Three Questions

Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
3 **Focus on New Knowledge**	We focus on new knowledge and skills while they're in our working memory.	*What do I want students to think about?*	**Active engagement** The only way to keep knowledge in our working memory is to think about it—to actively engage with the new knowledge or skills.	*Engage in thoughtful learning*
		What will I show students? *How will I help them visualize important concepts?*	**Visual learning** Our brains process information more effectively when it's presented verbally and visually.	*Support visual learning*

The Classroom Toolkit

Thought-provoking questions with wait time—Higher-order questions combined with wait-time before calling on students prompts students to think about their learning.

Guessing feedback—Mentally searching for answers creates curiosity and supports retrieval.

Encourage active note-taking—Writing things down and drawing pictures enhances memory. Filling in blanks ("discovery" techniques) are also effective.

Teach active learning and close reading—Show students how to quiz themselves and engage in positive self-talk.

Nonlinguistic representations—We're all visual learners, so visual aids (photos, diagrams, models) support learning, especially when students create them.

Modeling—Show, don't tell. Show students the steps you want them to learn and what mastery learning looks like (the "I do" phase).

3 Focus on New Knowledge

Discovery Education Experience

SOS Learning Activity: AEIOU

This student learning strategy supports critical thinking by asking you to interpret information from images or videos and write down thoughts next to five descriptive categories.

Differentiating Instruction with the Discovery Education Experience

Learn how to differentiate instruction with multi-modal digital content for multiple learning styles, degrees of readiness, and interests.

Student Learning Activities

Access student learning adventures as opportunities for independent practice and exploration.

Community Favorites: Instructional Strategies for Phase 3

- Read My Mind
- Sketchnotes
- Z-Chart

Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
 **Make Sense of Learning**	While new knowledge is in our working memory, we begin to cluster it and link it to prior learning.	*How will I chunk learning and support information processing?*	**Pausing and processing** Our working memories are limited in how much information they can hold at once (about 7 items) and how long they go before "timing out" (5–20 minutes) and needing to process learning.	*Provide time to process*
		What themes, categories, sequences, or links to prior learning do students need to make with this learning?	**Categorizing and clustering** Memories form in our brains as neural networks—as complex webs connecting ideas. In short, we learn by connecting new learning to prior learning.	*Help students categorize knowledge*

The Classroom Toolkit

Chunk learning into bite-size segments—Periodically pause during learning to build neural connections.

Cooperative learning for processing—Effective cooperative learning strategies (e.g., reciprocal teaching) support processing.

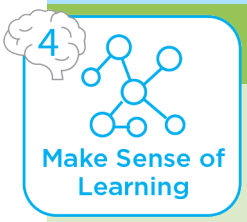
Guided practice—Immediate experiential learning boosts processing (the "we do" phase).

Clarifying feedback—Balance timeliness of feedback—allowing students to "play with" new ideas—yet provide real-time guidance with new skills.

Similarities and differences—Because the heart of learning is connecting new ideas to old ones, sorting and categorizing knowledge is essential for deep learning.

Summarizing—We're more likely to retain learning when we identify salient ideas, principles, and structures. (i.e., summarize learning).

Analyzing and synthesizing questions—Higher-order questions help students apply and connect dots with new learning.



Discovery Education Experience

SOS Learning Activity: Tabletop Texting

This student learning strategy supports communication by asking you to use a texting format on paper to chat with classmates about video content.

Instructional Inspiration

Use these pre-created lesson activities to help chunk learning into bite-size segments.

Community Favorites: Instructional Strategies for Phase 4

- Inquiry Chart
- Four to One
- Get VENN-y With It

Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
 **Practice and Rehearse**	Repetition and retrieval help us store new learning in long-term memory.	*What knowledge and skills must students commit to memory or automate?*	**Spacing and mixing up practice** Memories are more likely to be stored with multiple pathways for retrieval when practice is distributed or "interleaved."	*Design and guide deep practice*
		What feedback will I provide to guide deep learning?	**Reflecting on learning** Neural networks get faster (insulated like electrical wiring) through repetition. During this process, it's essential to insulate the right pathways.	*Help students reflect on their learning*

The Classroom Toolkit

Create opportunities for independent distributed practice—Here, massed practice can create the illusion of fluency, so it's better to use distributed practice (sessions over time) and interleaving (practicing related, but different skills). This is the "you do" phase.

Create opportunities for retrieval practice—Because straining to recall learning builds retrieval pathways, use ungraded pop quizzes and other assessments to support learning.

Teach deliberate practice—Show students how to practice—targeting knowledge and skills they have not yet mastered, interleaving, and distributed practice. Help students self-assess their learning, gauging what they've mastered and what they have yet to master.

Provide formative feedback—Provide students with coaching feedback as they learn, helping them to reflect on their learning and identify next steps toward mastery.

Discovery Education Experience

Assessment Builder

Create a Technology-Enhanced Assessment (TEA) from an item library that offers a variety of interactive item types that support opportunities for retrieval practice.

Studying and Review with Discovery Education

Discovery Education has multiple resources for learning, as well as tools that help students use those resources for studying and review.

Community Favorites: Instructional Strategies for Phase 5

- Paper Slide
- Shake It Up
- Exit Ticket

Learning phase	Information processing	Guiding questions	Design principles (learning science)	How teachers guide learning
 **Extend and Apply**	Applying new learning in novel, meaningful ways supports retrieval.	*What will I ask students to do with their knowledge?*	**Extension and application** Because we store knowledge more easily than we retrieve it (e.g., events "jog" our memory), we're more likely to retrieve learning when we apply it in new ways.	*Help students apply learning to new challenges*
		How will I (and students) know they've mastered learning?	**Personal meaning and mastery** Our brains naturally prune information we don't use or find meaningful; thus, if we want students to retain learning, we must help them use it in ways that are personally meaningful.	*Help students find meaning and demonstrate deep learning*

The Classroom Toolkit

Intellectual curiosity questions—Help students transfer knowledge and embrace curiosity thinking (e.g., "I wonder what would happen if . . .") to generate their own questions.

Guide applied learning (generating questions and finding solutions)—Give students opportunities to explore essential questions via investigations, analyses, and syntheses; without these opportunities, learning quickly fades.

Support dynamic group learning—Social learning and group projects can be a powerful way to develop deep learning, but doing it well requires both positive interdependence and individual accountability.

Student choice—Providing even a few (5–6) choices of how to demonstrate learning helps students develop their own interest in and personal connections to learning.

Performance assessments—Classroom assessments often measure only declarative knowledge. Performance assessments require students to demonstrate both declarative and procedural knowledge while motivating learning with student choice.

Provide feedback that promotes mastery—Evaluative feedback should encourage a growth mindset and show that learning never ends; help students see what they can do better next time.

Discovery Education Experience

Discovery Education Studio

Have students demonstrate their understanding by creating in Studio. They can easily include Discovery Education content and their own images, audio files, and videos.

Organizing Evidence with Discovery Education

Have students organize their evidence and cite sources so their arguments are solid and their citations accurate.

Resources for Student Exploration

Give students choice in exploring their interests, researching, reviewing, and communicating ideas.

Community Favorites: Instructional Strategies for Phase 6

- Pecha Kucha
- Poetry Slam
- Songwriting 101