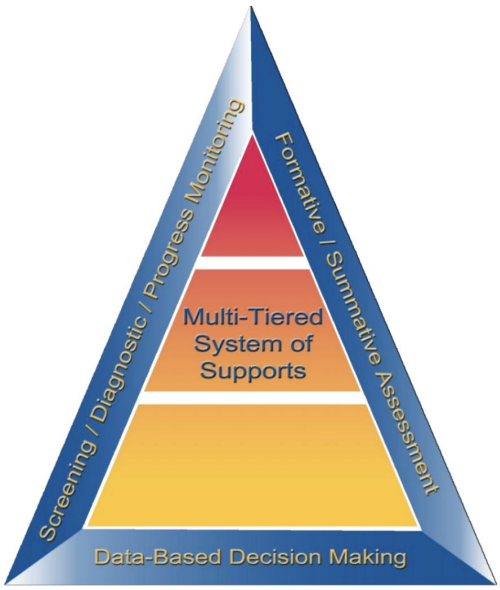


MODULE 6
TIER 1 CORE INSTRUCTION

Participant Workbook

ARKANSAS RESPONSE TO INTERVENTION MODULE SERIES

AIR
American Institutes for Research

State Personnel Development Grant
Arkansas
Building RTI Capacity

Module 6: Tier 1 Core Instruction

Activity 1: Activator Activity

Directions: Generate three to five practices you believe are the most important teaching practices all classroom teachers need to know and write them in the first column. Leave the second column empty. We will revisit this activity at the end of the module.

What I believe are the most important practices teachers need to know to implement core instruction.	What research indicates are the most important practices teachers need to know to implement core instruction.

Activity 2: Self-Evaluation of Tier I System

Directions: For this activity, read the descriptors in each column. With your team, determine which descriptor best describes your current Tier I system.

Measures	1	3	5
a. Research-Based Curriculum Materials	Few core curriculum materials are research based for the target populations of learners (including subgroups).	Some core curriculum materials are research based for the target population of learners (including subgroups).	All core curriculum materials are research based for the target population of learners (including subgroups).
b. Articulation of Teaching and Learning (in and across grade levels)	Neither of the following conditions are met: (1) teaching and learning objectives are well articulated from one grade to another; and (2) teaching and learning is well articulated within grade levels so that students have highly similar experiences, regardless of their assigned teacher.	Only one of the following conditions is met: (1) teaching and learning objectives are well articulated from one grade to another; and (2) teaching and learning is well articulated within grade levels so that students have highly similar experiences, regardless of their assigned teacher.	Both of the following conditions are met: (1) teaching and learning objectives are well articulated from one grade to another; and (2) teaching and learning is well articulated within grade levels so that students have highly similar experiences, regardless of their assigned teacher.
c. Differentiated Instruction	Neither of the following conditions are met: (1) interviewed staff can describe how most teachers in the school differentiate instruction for students on, below, or above grade level; and (2) interviewed staff can explain how most teachers in the school use student data to identify and address the needs of students.	Only one of the following conditions is met: (1) interviewed staff can describe how most teachers in the school differentiate instruction for students on, below, or above grade level; and (2) interviewed staff can explain how most teachers in the school use student data to identify and address the needs of students.	Both of the following conditions are met: (1) interviewed staff can describe how most teachers in the school differentiate instruction for students on, below, or above grade level; and (2) interviewed staff can explain how most teachers in the school use student data to identify and address the needs of students.

d. Standards-Based	The core curriculum (reading and mathematics) is not aligned with the state standards.	The core curriculum (reading and mathematics) is partially aligned with state standards.	The core curriculum (reading and mathematics) is aligned with state standards.
e. Exceeding Benchmark	Neither of the following conditions are met: (1) the school provides enrichment opportunities for students exceeding benchmarks; and (2) teachers implement those opportunities consistently at all grade levels.	One of the following conditions is met: (1) the school provides enrichment opportunities for students exceeding benchmarks; and (2) teachers implement those opportunities consistently at all grade levels.	Both of the following conditions are met: (1) the school provides enrichment opportunities for students exceeding benchmarks; and (2) teachers implement those opportunities consistently at all grade levels.

Activity 3: Systematic and Explicit Instruction

Directions: For this activity, read the assigned feature of systematic and explicit instruction from the article (pages 277 - 278). After reading, work with your group to create a poster or presentation that explains the assigned feature.

Using Explicit and Systematic Instruction to Support Working Memory

Jean Louise M. Smith, Leilani Sáez, and Christian T. Doabler

TEACHING Exceptional Children, Vol. 48, No. 6, pp. 275–281. Copyright 2016 The Author(s). DOI: 10.1177/0040059916650633

Charlotte is a third grader at Evergreen Elementary who has working-memory difficulties that interfere with her learning beyond those challenges associated with her reading disability. These difficulties, although present every day, are almost unnoticeable as a persistent learning need that requires additional teacher support. Yet, Charlotte's difficulty processing multiple pieces of information at the same time impedes her ability to effectively engage, attend, and make important connections required for advancing her learning. Ms. Oratio, the special education teacher at Evergreen, has been noticing that Charlotte has difficulty following multistep directions, even when she appears to pay attention and understand the task. For example, by the time Charlotte gets to the second step of a mathematics word problem, she has forgotten what to do next. Although Charlotte seems to be trying her best, Ms. Oratio frequently needs to redirect Charlotte to get "back on track" during independent seatwork because she has a tendency to be off task while others are fully engaged. Ms. Oratio has also noticed that Charlotte needs extra time and greater support than her peers to make connections with what she has previously learned; without it, important relationships among concepts don't seem to "stick" and Charlotte gets easily confused. Because Charlotte is unable to effectively self-regulate all that her brain simultaneously processes, her working-memory difficulties pose a particular threat to her academic success.

Many teachers, like Ms. Oratio, observe students struggling in a variety of ways with a range of tasks every day in school. Although learning is considered an obvious part of schooling, the processes that enable it are covert and not accessible to teachers for observation, re-direction, or immediate correction. One important aspect of learning often taken for granted is the expectation that learners successfully engage in complex thinking about multiple pieces of information simultaneously, such as when following multistep directions, problem solving, or self-managing other implicit demands across a lesson or instructional goal (e.g., keeping track of relevant information that accumulates over extended periods of time). However, this seemingly basic ability is complicated, involving well-coordinated cognitive processing among at least three executive functions: inhibitory control, working-memory updating, and mental shifting (Miyake et al., 2000).

Working-memory capacity is typically characterized as the range of information that individuals can process at the same time to perform complex tasks (see Miyake & Shah, 1999, for an overview). The greater one's capacity, the more robustly attention can be controlled to effectively manipulate information and avoid processing interference (Engle, 2002). This mental multitasking is accomplished by concurrent processing that emerges from coordinated and timely control of one's attention to information accessed from highly activated long-term memories or temporarily maintained short-term memories (Barrouillet, Bernardin, & Camos, 2004). In this way, working memory functions like a mental "spotlight" that selectively shines on relevant information from one moment to another to actively keep relevant material in mind as needed for processing (Rohrer, Pashler, & Etchegaray, 1998). Ineffective functioning of this working-memory spotlight increases the risk that distracting information will disrupt thinking by allowing nonrelevant information to be processed, which can overload limited capacities (Engle, 2002) or obstruct efficient spotlight shifting in ways that cause forgetting (Barrouillet et al., 2004).

Students with poor working memory are less successful at completing complex tasks, exhibit greater distractibility and forgetfulness, and need teacher redirection or reteaching more often than their peers (Alloway, Gathercole, Kirkwood, & Elliott, 2009). Thus, poor working memory can contribute to learning difficulties through the burden it places

by surreptitiously fragmenting task engagement. Students who forget what they are doing or become easily distracted when performing complex tasks are likely to experience undetected but repeated disruptions that result in disjointed learning and confusion. Classroom observations of children with poor working memory have revealed clear difficulties in keeping up and effectively using what they know during lessons (Gathercole, Lamont, & Alloway, 2006).

Students with learning disabilities may particularly struggle with classroom activities that require mental construction and integration of, or modifications to, information in real time because the challenges associated with the disability can place additional constraints on their working memory capacity, making them more vulnerable to mental overload or forgetting. Decades of research have shown that children with various learning disabilities experience working-memory difficulties (deJong, 1998; Siegel & Ryan, 1989; Swanson & Jerman, 2006), and recent findings indicate that successful intervention outcomes may partially depend on working-memory capacity (Swanson, Lussier, & Orosco, 2015). For example, Swanson et al. (2015) found an effect of working-memory capacity among children with math difficulties, in that greater growth in postintervention problem-solving accuracy was associated with higher capacity. Moreover, the researchers also reported differential intervention strategy effectiveness that was associated with working-memory capacity. It is important to note that the intervention approach used by Swanson and colleagues employed elements of explicit and systematic instructional design, which we address in our recommendations.

Because concurrent processing facilitates the self-management of information flow, working memory functions best when the design and delivery of academic information effectively controls students' attention to prevent mental overload and promote efficient remembering (Artino, 2008). Because the self-regulation of thinking and doing is not visible, methods that help to make the learning process more observable may be particularly beneficial for optimizing working-memory functioning.

Methods that help to make the learning process more observable may be particularly beneficial for optimizing working-memory functioning.

Explicit and systematic instruction is an evidence-based practice for increasing students' reading and math acquisition through unambiguous and careful sequencing of skill-building activities (Gersten et al., 2008, 2009). Studies on explicit and systematic instruction have reported strong effects on student outcomes. In reading, for example, past and recent research has shown that students with reading difficulties draw significant benefits from instruction that is systematically designed and explicitly delivered (Gersten et al., 2008). Mathematics intervention studies echo this beneficial effect. For example, Gersten et al. (2009) synthesized 41 mathematics intervention studies and reported a large effect for interventions that employed a systematic and explicit instructional approach on the outcomes of students who face difficulties in mathematics.

Although research has yet to pinpoint the specific mechanisms of explicit and systematic interventions that improve student achievement (e.g., Doabler et al., 2015), it is reasonable to assume that the effectiveness of such interventions is due at least in part to the indirect enhancement of working memory. Explicit and systematic instruction is a plain and orderly instructional approach that makes learning more accessible at crucial junctures *during* classroom activities rather than *after* lessons are complete. Consequently, the strategies of explicit and systematic instruction are highly relevant for improving students' working memory. Explicit and systematic instruction

- uses simple, brief, and concise language to reduce language demands;
- activates prior knowledge to enhance long-term memory accessibility;
- scaffolds instructional support to facilitate associations that students may miss when processing is overloaded;
- provides frequent review and practice to solidify effortless long-term memory accessibility;
- allows sufficient time to rehearse and process new information to minimize processing efficiency demands;

- includes visual aids to reduce verbal processing demands and make concepts more plain; and
- provides specific feedback to catch misconceptions that may later intrude on processing (Dehn, 2008).

We believe that when such strategies are well integrated, they are ideal for facilitating working memory.

Facilitating Working Memory

Initial learning across different academic areas is effortful and attention demanding for all learners (Ackerman, 2005). As skills become more deliberately practiced, learners come to rely more on direct retrieval of integrated long-term memorized procedures and less on attention-demanding working-memory processing. Therefore, the management of working-memory load is essential to supporting active processing during the initial stages of skill building, when the material is novel and lacks previously established long-term procedural memories. Working-memory support remains important during the intermediate stage of learning when the task is sufficiently complex and inherently requires concurrent processing for task performance (e.g., during reading comprehension, writing, or complex mathematics). A student's level of skill development and criterion level of performance—not the amount of time spent receiving instruction—determine the learning stage and needs for working-memory support. Struggling learners may require greater and longer working-memory support than either students with stronger initial skill levels or those with stronger working-memory capacity for self-managing their learning. With greater initial support, greater efficiency with learning is to be expected.

Supporting Working Memory During Instruction

Although there are many definitions of explicit and systematic instruction, there are four defining features that teachers can implement to optimize working-memory support during reading and math instruction. Each feature aligns with recommendations for managing working-memory load during instruction and has benefits for optimizing working memory.

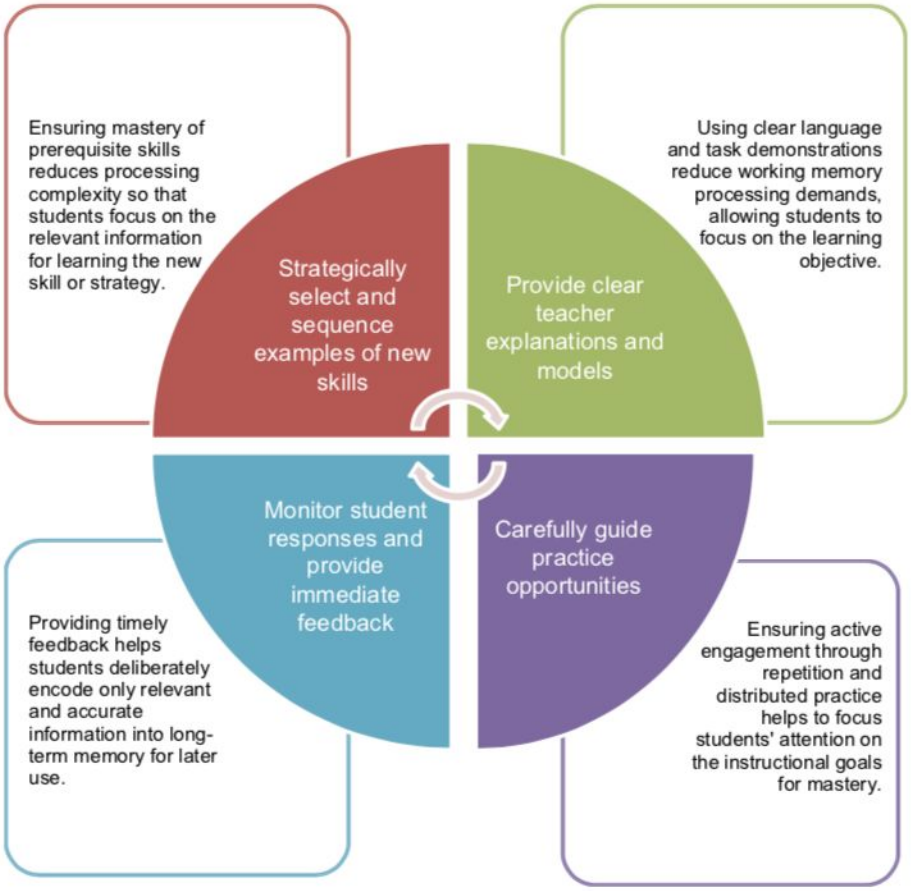
One feature is to **strategically select and sequence examples of new skills**. Instructional sequences build skills gradually by introducing skills first in isolation and then integrating them with other skills to enable students to practice and to build generalization. Ensuring that students have the necessary prerequisite skills will allow students to focus attention on the essential objective of the lesson. When too much information is presented at once, or when processing demands are too great (e.g., similar skills are taught together), working-memory functioning can become overwhelmed. The result of this cognitive overload is student confusion or forgetting. Therefore, to implement this instructional strategy, present information in a logical sequence in which less difficult skills are introduced and taught before more difficult and complex skills. Small amounts of information should be presented with adequate practice opportunities to ensure retention. For example, when identifying the sequence of teaching new skills and strategies, consider (a) teaching easier skills before harder skills, (b) teaching high-frequency skills before skills that are less frequently used, and (c) separating skills or content that are similar during initial instruction of a new skill (e.g., separating the letters *b, d, p*, and *q* in a letter naming task; Archer & Hughes, 2011; Carnine, Silbert, Kame'enui, Tarver, & Jungjohann, 2006; Doabler & Fien, 2013).

A second feature is to **provide clear explanations and models**. Teacher explanations are used to introduce, demonstrate, and describe a task or activity using clear and consistent language. This allows students to see and hear the steps that are involved with a task, which sometimes can seem unclear to them. Unclear language can distract and overwhelm students' thinking by creating confusions that intrude on working-memory processing. Therefore, to implement this feature, use clear and unambiguous language to explain what students will do and model an example of how to complete the task. Whenever possible, "think aloud" to show students the steps that you are taking to complete the task, and demonstrate all the steps that you expect students to complete. This helps to make plain the mental steps needed for engagement, which alleviates the need for students to figure it out on their own (thereby creating additional working-memory demands). Use familiar vocabulary and simple sentences that omit unnecessary information. When introducing new strategies, skills, and content, activate prior knowledge by connecting to past ideas and content and identifying connections to students' lives.

When too much information is presented at once, or when processing demands are too great, working-memory functioning can become overwhelmed.

A third feature is to **carefully guide practice opportunities**. *Guided practice* refers to providing scaffolded support as students practice a new skill, and systematically withdrawing that support as students become more proficient. Supporting students during initial stages of learning a new skill gives them opportunities to be successful and confident in using the skill (Archer & Hughes, 2011; Carnine et al., 2006; Doabler & Fien, 2013). During guided practice, use the same wording as used in the explanation and modeling of the task to provide consistency. This allows students to focus attention on the new skill instead of figuring out the prompt. The use of visual memory aids— such as number lines, cubes, lists of steps, graphic organizers, and sentence starters—reduces working-memory processing demands because the information that must be worked with is tangible and not required to be kept in mind. As students demonstrate success, gradually increase task difficulty as you

Figure 1. Features of Explicit and Systematic Instruction



decrease the level of guidance (Archer & Hughes, 2011; Carnine et al., 2006; Doabler & Fien, 2013). Plan for frequent repetition and distributed practice of skills over days and weeks to allow for sufficient practice and rehearsal of information. As students are successful with the initial instruction, encourage active application and advanced manipulation of content.

A fourth feature is to **monitor student responses and provide immediate feedback**. Monitoring responses includes checking for engagement and accuracy throughout an activity to let students know whether their responses are accurate or not. Monitoring student responses closely and providing timely feedback immediately after a mistake allows teachers to catch early confusion and misconceptions. Providing timely feedback helps students deliberately encode only relevant and accurate information as long-term memories for later use. To implement this feature, carefully watch and listen to students' responses, focus on the target skill, and include modeling of the target skill or concept using clear and consistent language. Whenever possible, reinforce success by pointing out correct responses.

Although each of these identified features of explicit and systematic instruction may benefit working memory (see Figure 1), they are most beneficial when implemented together. For some content, each of these features may occur in one lesson (e.g., carefully sequencing content, explaining a task and modeling a skill, and providing guided practice with corrective feedback), but they also may be implemented across days for more complex content (e.g., summarizing information text might require multiple days of teacher models before students are ready for guided practice; Archer & Hughes, 2011).

Examples of Explicit and Systematic Instruction

Consider an example in which Ms. Oratio is teaching her group to identify the main idea of an expository text from supporting details. Identifying the main idea in one sentence can be challenging for many students. The aforementioned features of explicit and systematic instruction can be applied to more readily teach students to identify the main idea using details from text (see Dissen et al., 2013, for a comprehensive description of teaching steps for identifying the main idea of information text). To strategically select and sequence examples, Ms. Oratio considers that in previous lessons, she modeled finding details for her students. She thinks that her students are ready to find the details with her guided support but that they still will need modeling of how to find the main idea. She also carefully chooses the

Figure 2. Example Read-Aloud Text

Let's take a close look at what can happen in a tide pool. Waves crash into the shore when the tide is high and can damage organisms. Most of the water goes back out at low tide and some animals can get trapped. The sun shines down on the tide pool and can make the water too warm for some animals. Seagulls, and other shore birds, eat many of the animals that live in tide pools.

text to use to avoid overwhelming students' focus on the instructional target. Because her students are in the initial stages of learning the strategy, she chooses text with clear supporting details without distracting information.

Ms. Oratio starts the activity by explaining and modeling the task, telling the group, "Now we will find the details and figure out the main idea of text. Remember, the details are the important parts of information. The main idea tells all of the details in just a few words. I will read to you this time. Follow along with your finger." Ms. Oratio reads the text aloud (see Figure 2) and the students follow along, using their fingers to track. Next, Ms. Oratio tells the students, "What is one detail that you learned? Turn to your partner and tell one detail that you learned. Start with, 'One detail I learned is....'" Ms. Oratio leans in to listen to the partner responses and writes accurate details on the whole-group organizer (see Figure 3) that she has displayed on a clipboard in front of the group. Ms. Oratio monitors closely and provides corrective feedback if students provide inaccurate details. When Charlotte is not able to identify a detail, Ms. Oratio says, "Let's look back at the text. Put your finger on one detail. Yes, that's a detail. Now say it in a sentence." Later, Ms. Oratio hears Charlotte correctly identify a new detail and says, "Yes, Charlotte, one detail is that some animals can get trapped." Ms. Oratio writes Charlotte's correct detail on the graphic organizer. Ms. Oratio then says, "We found the details. Let's review what we found." She then shows students the graphic organizer and reads the details aloud. Then she says, "Remember the main idea tells about all the details in just a few words. All of these details tell us why a tide pool can be a dangerous place for sea animals. So, I can say that the main idea is, 'A tide pool can be a

Figure 3. Graphic Organizer for Teaching the Main Idea

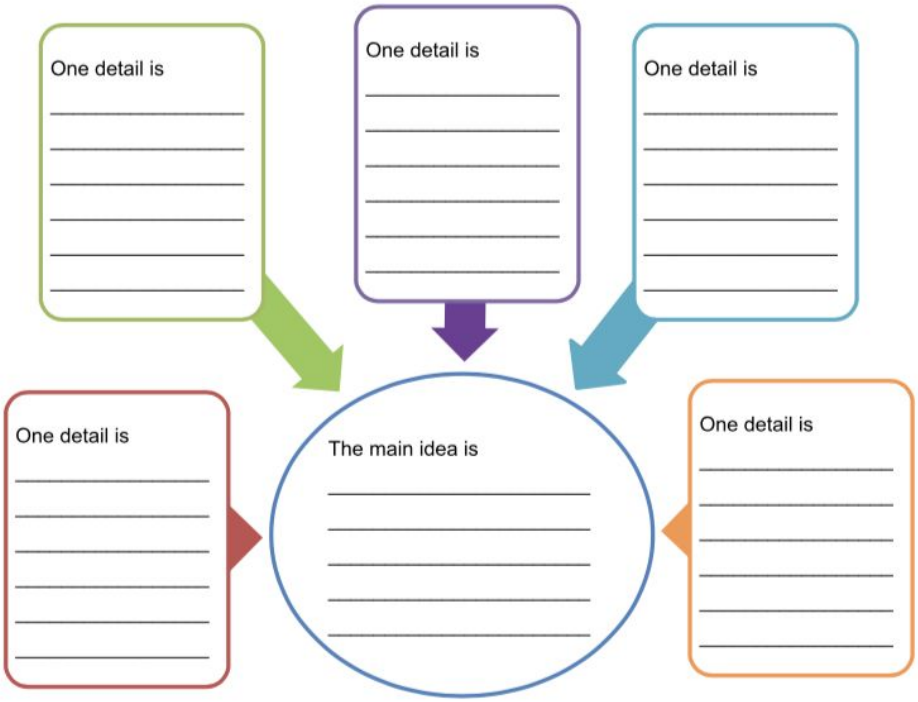
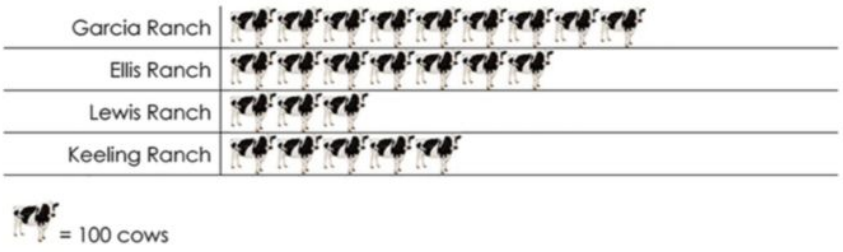


Figure 4. Visual Representation of the Word Problem



dangerous place for sea animals.'" Ms. Oratio then writes the main idea on the graphic organizer for students to see. As Ms. Oratio plans future activities for teaching the main idea, and as students become more independent, she will reduce her support by having the students independently identify the main idea. The focus of this activity is on identifying the main idea, but when the focus is on reading accuracy and writing, Ms. Oratio may have the students read the text or write the details on their own. Over time, Ms. Oratio will also choose more challenging text that includes a greater variation of details, including some details that are not clearly related to the main idea, based on her students' readiness to handle greater complexity.

Ms. Oratio also can apply the explicit and systematic instruction features during her third-grade math instruction. For example, she can use the features to teach her group how to represent categorical data on a scaled picture graph. Given that Ms. Oratio has modeled and explained how to design the picture graphs, during the third lesson she can directly show her students how to use the graphed data to solve "compare" word problems with the difference unknown. On future days (Lessons 4 and beyond), she can provide more guided practice with immediate feedback and less explanation as she reduces her support.

Ms. Oratio begins the third lesson by reminding students about the structural features of comparing word problems (i.e., a comparison between two things using a common unit). This reminder helps prompt her students to retrieve known information about these problem types. Next, using data from Figure 4, Ms. Oratio poses the following: "I want to find out how many more cows live on the Garcia ranch than on the Lewis ranch." She explains that this is a "how-many-more" word problem and that she will need to subtract to find the missing difference.

To help her students work with how-many-more problems, Ms. Oratio verbalizes aloud how to solve the targeted problem, explaining that she plans to break the problem down into more manageable parts. Her reason for doing this is twofold. First, she wants to avoid overloading students' working-memory capacities. Second, she wants to promote students' early success with accurately recognizing and effectively implementing the mathematical structures of comparing word problem types that ask how-many-more questions (Gersten et al., 2009).

She tells the class, "This graph indicates that each picture represents 100 cows. Count with me by multiples of 100 to find out how many cows live on the Garcia ranch. 100, 200, 300 … 900. Nine hundred cows live on the Garcia ranch. So I will write 900 on the board." Next, she asks Charlotte to count how many cows live on the Lewis ranch. Charlotte counts 300 cows and then Ms. Oratio writes 300 below 900 on the board. She then states, "Because I want to find how many more cows live on the Garcia ranch compared to the Lewis ranch, I will need to subtract 300 from 900." Ms. Oratio completes the subtraction problem and then states, "Nine hundred minus 300 equals 600. Six hundred more cows live on the Garcia ranch than the Lewis ranch."

Both of these examples demonstrate how the features of explicit and systematic instruction can be applied to instruction to help students manage implicit working-memory demands. In addition to the four features just described, recommendations for organizing a classroom environment to support optimal working memory include:

- eliminating background noise (specifically speech and talking) that can interfere with working-memory processing,
- displaying materials to reduce what must be remembered (e.g., steps in routines, the classroom schedule, classroom rules and expectations),
- arranging space so that the teacher can move easily around the room for monitoring student work and providing quick feedback during practice,
- having extra instructional materials on hand (e.g., sharpened pencils) to keep students' attention to the task and not to items that may be forgotten or broken, and
- teaching routines and expectations (e.g., what to do when arriving to the group) to minimize distracting behaviors that may undermine task engagement and make unnecessary processing demands.

By managing working-memory load during instruction, teachers like Ms. Oratio can support students in focusing on the objective of the lesson, engaging fully in the activity, learning from their mistakes, and feeling confident in the learning process.

Conclusion

Students are frequently expected to complete multistep tasks within a range of academic or classroom routines and to do so independently. Students' ability to complete these tasks successfully may vary as a consequence of both their working-memory capacity and the conditions under which they are expected to learn. Crucial features in the design or "architecture" of tasks, coupled with how tasks are staged and delivered, can influence a learner's

working-memory ability to perform the initial tasks. Although students with learning disabilities are particularly vulnerable to mental overload during learning, all students can benefit from intervention approaches that strategically manage their processing efforts during instructional activities. Explicit and systematic teaching is an evidence-based practice that contains elements particularly well suited for supporting crucial working-memory processing needed for learning.

References

Ackerman, P. L. (2005). Ability determinants of individual differences in skilled performance. In R. J. Sternberg & J. E. Pretz (Eds.), *Cognition and intelligence: Identifying the mechanisms of the mind* (pp. 142–159). New York, NY: Cambridge University Press.

Alloway, T. P., Gathercole, S. E., Kirkwood, H., & Elliott, J. (2009). Cognitive and behavioral characteristics of children with low working memory. *Child Development, 80*, 606–621. doi:10.1111/j.1467-8624.2009.01282.x

Archer, A. L., & Hughes, C.A. (2011). *Explicit instruction: Effective and efficient teaching*. New York, NY: Guilford Press.

Artino, A. R., Jr. (2008). Cognitive load theory and the role of learner experience: An abbreviated review for educational practitioners. *Association for the Advancement of Computing in Education Journal, 16*, 425–439.

Barrouillet, P., Bernardin, S., & Camos, V. (2004). Time constraints and resource sharing in adults' working memory spans. *Journal of Experimental Psychology: General, 133*, 83–100. doi:10.1037/0096-3445.133.1.83

Carnine, D., Silbert, J., Kame'enui, E., Tarver, S., & Jungjohann, K., (2006). *Teaching struggling and at-risk readers*. Upper Saddle River, NJ: Pearson.

Dehn, M. J., (2008). *Working memory and learning: Assessment and intervention*. Hoboken, NJ: Wiley.

deJong, P. F. (1998). Working memory deficits of reading disabled children. *Journal of Experimental Child Psychology, 70*, 75–96. doi:10.1006/jecp.1998.2451

Dissen, C., Smith, J., Edwards Santoro, L., Travers, P., Baker, S., Fien, H., & Kame'enui, E. (2013). *Enhanced core reading instruction: Teacher workbook*. Eugene: University of Oregon.

Doabler, C. T., Baker, S. K., Kosty, D., Smolkowski, K., Clarke, B., Miller, S. J., & Fien, H. (2015). Examining the association between explicit mathematics instruction and student mathematics achievement. *Elementary School Journal, 115*, 303–333. doi:10.1086/679969

Doabler, C. T., & Fien, H. (2013). Explicit mathematics instruction: What teachers can do for teaching students with mathematics difficulties. *Intervention in School and Clinic, 48*, 276–285. doi:10.1177/1053451212473151

Engle, R. W. (2002). Working memory capacity as executive attention. *Current Directions in Psychological Science, 11*, 19–23. doi:10.1111/1467-8721.00160

Gathercole, S. E., Lamont, E., & Alloway, T. P. (2006). Working memory in the classroom. In S. J. Pickering (Ed.), *Working memory and education* (pp. 219–240). Burlington, MA: Academic Press.

Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). *Assisting students struggling with mathematics: Response to intervention (RtI) for elementary and middle schools* (NCEE 2009-4060). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/practice_guides/rti_math_pg_042109.pdf

Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linan-Thompson, S., & Tilly, W. D. (2008). *Assisting students struggling with reading: Response to Intervention and multi-tier intervention for reading in the primary grades. A practice guide* (NCEE 2009-4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from https://ies.ed.gov/ncee/wwc/pdf/practice_guides/rti_reading_pg_021809.pdf

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology, 41*, 49–100. doi:10.1006/cogp.1999.0734

Miyake, A., & Shah, P. (Eds.). (1999). *Models of working memory: Mechanisms of active maintenance and executive control*. New York, NY: Cambridge University Press.

Rohrer, D., Pashler, H., & Etchegaray, J. (1998). When two memories can and cannot be retrieved concurrently. *Memory & Cognition, 26*, 731–739. doi:10.3758/BF03211393

Siegel, L. S., & Ryan, E. B. (1989). The development of working memory in normally achieving and subtypes of learning disabled children. *Child Development, 60*, 973–980. doi:10.2307/1131037

Swanson, H. L., & Jerman, O. (2006). Math disabilities: A selective meta-analysis of the literature. *Review of Educational Research, 76*, 249–274. doi:10.3102/00346543076002249

Swanson, H. L., Lussier, C. M., & Orosco, M. J. (2015). Cognitive strategies, working memory, and growth in word problem solving in children with math difficulties. *Journal of Learning Disabilities, 48*, 339–358. doi:10.1177/0022219413498771

Jean Louise M. Smith, *Research Assistant Professor, Center on Teaching and Learning; and* **Leilani Sáez,** *Research Associate, Behavioral Research & Teaching, University of Oregon, Eugene.* **Christian T. Doabler,** *Assistant Professor, Department of Special Education, University of Texas at Austin.*

Address correspondence concerning this article to Jean Louise M. Smith, University of Oregon, 1600 Millrace Drive, Eugene, OR 97403 (e-mail: jmercier@uoregon.edu).

TEACHING Exceptional Children, *Vol. 48, No. 6, pp. 275–281.*

Activity 4: High-Leverage Practices

Directions:

1. Get into groups of 4-5 participants.
2. Divide the 22 practices in activity 4 among the group members.
3. Provide individual team members 5-7 minutes to review their assigned practices and highlight key points.
4. Individual team members briefly describe their assigned practices with the group (~1 minute per practice).
5. Discuss implementation considerations.

Expert Note-Taking Guide

Key Points	Implementation Considerations

High-Leverage Practices

High-leverage practices are considered the basic fundamentals of teaching necessary to support all learners. These practices are used constantly across subject areas, grade levels, and contexts and are critical to helping students learn important content. The high-leverage practices are also central to supporting students' social and emotional development.

HLP1 Collaborate with professionals to increase student success. Collaboration with general education teachers, paraprofessionals, and support staff is necessary to support students' learning toward measurable outcomes and to facilitate students' social and emotional well-being across all school environments and instructional settings (e.g., co-taught). Collaboration with individuals or teams requires the use of effective collaboration behaviors (e.g., sharing ideas, active listening, questioning, planning, problem solving, negotiating) to develop and adjust instructional or behavioral plans based on student data, and the coordination of expectations, responsibilities, and resources to maximize student learning.

HLP2 Organize and facilitate effective meetings with professionals and families. Teachers lead and participate in a range of meetings (e.g., meetings with families, individualized education program [IEP] teams, individualized family services plan [IFSP] teams, instructional planning) with the purpose of identifying clear, measurable student outcomes and developing instructional and behavioral plans that support these outcomes. They develop a meeting agenda, allocate time to meet the goals of the agenda, and lead in ways that encourage consensus building through positive verbal and nonverbal communication, encouraging the sharing of multiple perspectives, demonstrating active listening, and soliciting feedback.

HLP3 Collaborate with families to support student learning and secure needed services. Teachers collaborate with families about individual children's needs, goals, programs, and progress over time and ensure families are informed about their rights as well as about special education processes (e.g., IEPs, IFSPs). Teachers should respectfully and effectively communicate considering the background, socioeconomic status, language, culture, and priorities of the family. Teachers advocate for resources to help students meet instructional, behavioral, social, and transition goals. In building positive relationships with students, teachers encourage students to self-advocate, with the goal of fostering self-determination over time. Teachers also work with families to self-advocate and support their children's learning.

HLP4 Use multiple sources of information to develop a comprehensive understanding of a student's strengths and needs. To develop a deep understanding of a student's learning needs, special educators compile a comprehensive learner profile through the use of a variety of assessment measures and other sources (e.g., information from parents, general educators, other stakeholders) that are sensitive to language and culture, to (a) analyze and describe students' strengths and needs and (b) analyze the school-based learning environments to determine potential supports and barriers to students' academic progress. Teachers should collect, aggregate, and interpret data from multiple sources (e.g., informal and formal observations, work samples, curriculum-based measures, functional behavior assessment [FBA], school files, analysis of curriculum, information from families, other data sources). This information is used to create an individualized profile of the student's strengths and needs.

HLP5 Interpret and communicate assessment information with stakeholders to collaboratively design and implement educational programs. Teachers interpret assessment information for stakeholders (i.e., other professionals, families, students) and involve them in the assessment, goal development, and goal implementation process. Special educators must understand each assessment's purpose, help key stakeholders understand how culture and language influence interpretation of data generated, and use data to collaboratively develop and implement individualized education and transition plans that include goals that are standards-based, appropriate accommodations and modifications, and fair grading practices, and transition goals that are aligned with student needs.

HLP6 Use student assessment data, analyze instructional practices, and make necessary adjustments that improve student outcomes. After special education teachers develop instructional goals, they evaluate and make ongoing adjustments to students' instructional programs. Once instruction and other supports are designed and implemented, special education teachers have the skill to manage and engage in ongoing data collection using curriculum-based measures, informal classroom assessments, observations of student academic performance and behavior, self-assessment of classroom instruction, and discussions with key stakeholders (i.e., students, families, other professionals). Teachers study their practice to improve student learning, validate reasoned hypotheses about salient instructional features, and enhance instructional decision making. Effective teachers retain, reuse, and extend practices that improve student learning and adjust or discard those that do not.

HLP7 Establish a consistent, organized, and respectful learning environment. To build and foster positive relationships, teachers should establish age appropriate and culturally responsive expectations, routines, and procedures within their classrooms that are positively stated and explicitly taught and practiced across the school year. When students demonstrate mastery and follow established rules and routines, teachers should provide age-appropriate specific performance feedback in meaningful and caring ways. By establishing, following, and reinforcing expectations of all students within the classroom, teachers will reduce the potential for challenging behavior and increase student engagement. When establishing learning environments, teachers should build mutually respectful relationships with students and engage them in setting the classroom climate (e.g., rules and routines); be respectful; and value ethnic, cultural, contextual, and linguistic diversity to foster student engagement across learning environments.

HLP8 Provide positive and constructive feedback to guide students' learning and behavior. The purpose of feedback is to guide student learning and behavior and increase student motivation, engagement, and independence, leading to improved student learning and behavior. Effective feedback must be strategically delivered and goal directed; feedback is most effective when the learner has a goal and the feedback informs the learner regarding areas needing improvement and ways to improve performance. Feedback may be verbal, nonverbal, or written, and should be timely, contingent, genuine, meaningful, age appropriate, and at rates commensurate with task and phase of learning (i.e., acquisition, fluency, maintenance). Teachers should provide ongoing feedback until learners reach their established learning goals.

HLP9 Teach social behaviors. Teachers should explicitly teach appropriate interpersonal skills, including communication, and self-management, aligning lessons with classroom and schoolwide expectations for student behavior. Prior to teaching, teachers should determine the nature of the social skill challenge. If students do not know how to perform a targeted social skill, direct social skill instruction should be provided until mastery is achieved. If students display performance problems, the appropriate social skill should initially be taught, then emphasis should shift to prompting the student to use the skill and ensuring the "appropriate" behavior accesses the same or a similar outcome (i.e., is reinforcing to the student) as the problem behavior.

HLP10 Conduct functional behavioral assessments to develop individual student behavior support plans. Creating individual behavior plans is a central role of all special educators. Key to successful plans is to conduct a functional behavioral assessment (FBA) any time behavior is chronic, intense, or impedes learning. A comprehensive FBA results in a hypothesis about the function of the student's problem behavior. Once the function is determined, a behavior intervention plan is developed that (a) teaches the student a prosocial replacement behavior that will serve the same or similar function, (b) alters the environment to make the replacement behavior more efficient and effective than the problem behavior, (c) alters the environment to no longer allow the problem behavior to access the previous outcome, and (d) includes ongoing data collection to monitor progress.

HLP11 Identify and prioritize long- and short-term learning goals. Teachers prioritize what is most important for students to learn by providing meaningful access to and success in the general education and other contextually relevant curricula. Teachers use grade-level standards, assessment data and learning progressions, students' prior knowledge, and IEP goals and benchmarks to make decisions about what is most crucial to emphasize, and develop long- and short-term goals accordingly. They understand essential curriculum components, identify essential prerequisites and foundations, and assess student performance in relation to these components.

HLP12 Systematically design instruction toward a specific learning goal. Teachers help students to develop important concepts and skills that provide the foundation for more complex learning. Teachers sequence lessons that build on each other and make connections explicit, in both planning and delivery. They activate students' prior knowledge and show how each lesson "fits" with previous ones. Planning involves careful consideration of learning goals, what is involved in reaching the goals, and allocating time accordingly. Ongoing changes (e.g., pacing, examples) occur throughout the sequence based on student performance.

HLP13 Adapt curriculum tasks and materials for specific learning goals. Teachers assess individual student needs and adapt curriculum materials and tasks so that students can meet instructional goals. Teachers select materials and tasks based on student needs; use relevant technology; and make modifications by highlighting relevant information, changing task directions, and decreasing amounts of material. Teachers make strategic decisions on content coverage (i.e., essential curriculum elements), meaningfulness of tasks to meet stated goals, and criteria for student success.

HLP14 Teach cognitive and metacognitive strategies to support learning and independence. Teachers explicitly teach cognitive and metacognitive processing strategies to support memory, attention, and self-regulation of learning. Learning involves not only understanding content but also using cognitive processes to solve problems, regulate attention, organize thoughts and materials, and monitor one's own thinking. Self-regulation and metacognitive strategy instruction is integrated into lessons on academic content through modeling and explicit instruction. Students learn to monitor and evaluate their performance in relation to explicit goals and make necessary adjustments to improve learning.

HLP15 Provide scaffolded supports. Scaffolded supports provide temporary assistance to students so they can successfully complete tasks that they cannot yet do independently and with a high rate of success. Teachers select powerful visual, verbal, and written supports; carefully calibrate them to students' performance and understanding in relation to learning tasks; use them flexibly; evaluate their effectiveness; and gradually remove them once they are no longer needed. Some supports are planned prior to lessons and some are provided responsively during instruction.

HLP16 Use explicit instruction. Teachers make content, skills, and concepts explicit by showing and telling students what to do or think while solving problems, enacting strategies, completing tasks, and classifying concepts. Teachers use explicit instruction when students are learning new material and complex concepts and skills. They strategically choose examples and non-examples and language to facilitate student understanding, anticipate common misconceptions, highlight essential content, and remove distracting information. They model and scaffold steps or processes needed to understand content and concepts, apply skills, and complete tasks successfully and independently.

HLP17 Use flexible grouping. Teachers assign students to homogeneous and heterogeneous groups based on explicit learning goals, monitor peer interactions, and provide positive and corrective feedback to support productive learning. Teachers use small learning groups to accommodate learning differences, promote in-depth academic related interactions, and teach students to work collaboratively. They choose tasks that require collaboration, issue directives that promote productive and autonomous group interactions, and embed strategies that maximize learning opportunities and equalize participation. Teachers promote simultaneous interactions, use procedures to hold students accountable for collective and individual learning, and monitor and sustain group performance through proximity and positive feedback.

HLP18 Use strategies to promote active student engagement. Teachers use a variety of instructional strategies that result in active student responding. Active student engagement is critical to academic success. Teachers must initially build positive student–teacher relationships to foster engagement and motivate reluctant learners. They promote engagement by connecting learning to students' lives (e. g., knowing students' academic and cultural backgrounds) and using a variety of teacher-led (e.g., choral responding and response cards), peer-assisted (e. g., cooperative learning and peer tutoring), student-regulated (e.g., self-management), and technology supported strategies shown empirically to increase student engagement. They monitor student engagement and provide positive and constructive feedback to sustain performance.

HLP19 Use assistive and instructional technologies. Teachers select and implement assistive and instructional technologies to support the needs of students with disabilities. They select and use augmentative and alternative communication devices and assistive and instructional technology products to promote student learning and independence. They evaluate new technology options given student needs; make informed instructional decisions grounded in evidence, professional wisdom, and students' IEP goals; and advocate for administrative support in technology implementation. Teachers use the universal design for learning (UDL) framework to select, design, implement, and evaluate important student outcomes.

HLP20 Provide intensive instruction. Teachers match the intensity of instruction to the intensity of the student's learning and behavioral challenges. Intensive instruction involves working with students with similar needs on a small number of high priority, clearly defined skills or concepts critical to academic success. Teachers group students based on common learning needs; clearly define learning goals; and use systematic, explicit, and well-paced instruction. They frequently monitor students' progress and adjust their instruction accordingly. Within intensive instruction, students have many opportunities to respond and receive immediate, corrective feedback with teachers and peers to practice what they are learning.

HLP21 Teach students to maintain and generalize new learning across time and settings. Effective teachers use specific techniques to teach students to generalize and maintain newly acquired knowledge and skills. Using numerous examples in designing and delivering instruction requires students to apply what they have learned in other settings. Educators promote maintenance by systematically using schedules of reinforcement, providing frequent material reviews, and teaching skills that are reinforced by the natural environment beyond the classroom. Students learn to use new knowledge and skills in places and situations other than the original learning environment and maintain their use in the absence of ongoing instruction.

HLP22 Provide positive and constructive feedback to guide students' learning and behavior. The purpose of feedback is to guide student learning and behavior and increase student motivation, engagement, and independence, leading to improved student learning and behavior. Effective feedback must be strategically delivered and goal directed; feedback is most effective when the learner has a goal and the feedback informs the learner regarding areas needing improvement and ways to improve performance. Feedback may be verbal, nonverbal, or written, and should be timely, contingent, genuine, meaningful, age appropriate, and at rates commensurate with task and phase of learning (i.e., acquisition, fluency, maintenance). Teachers should provide ongoing feedback until learners reach their established learning goals.

Activity 5: Prioritizing High-Leverage Practices

Directions: Using the High-Leverage Practices handout, identify three to five HLPs that you or your school would like to focus on to improve implementation. Develop an action plan for disseminating and encouraging implementation.

High-Leverage Practice Priorities
1.
2.
3.
4.
5.

Action Plan for Core Instruction including High-Leverage Practices.
1.
2.
3.
4.
5.