



# 7

## PROMOTING ACCESS TO THE CURRICULUM

### LEARNING OBJECTIVES

After studying this chapter, you will be able to answer the following questions:

- What is universal design for learning?
- What is the ADAPT framework?
- What are effective instructional practices?
- How can instructional grouping practices promote effective instruction?
- What guidelines should be followed for textbooks and instructional materials?
- What are assistive technology devices and services for promoting access to the general education curriculum?

## OPENING Challenge

### Planning and Delivering Instruction

**ELEMENTARY GRADES** Mrs. Bell is an experienced and effective fifth-grade teacher with 26 students in a large, urban, public school district. In Mrs. Bell's school, 72% of the students qualify for free or reduced-cost lunch, and 25% are English language learners (ELLs). Mrs. Bell's class includes two students with reading, writing, and mathematics learning disabilities (LD), who are performing about two years below grade level. Her four ELL students speak Spanish or Vietnamese and attended bilingual classes in the primary grades. The Language Support Team (LST) in Mrs. Bell's school agreed that the four were ready to move into English instruction classes; however, one requires pullout services from an ELL specialist. Mrs. Bell also has her first student, Paul, who has cerebral palsy (CP). Paul uses a wheelchair and has good communication skills but struggles with motor tasks such as writing with a pencil. Mrs. Bell reflects about her class: *"I have a range of abilities and needs this year. In reviewing the fall academic assessment scores, I see that about one-third of my class requires extra help with reading, writing, and mathematics. I also have to be sure that I am addressing the needs of my students who are ELLs and students with LD and CP. Differentiating instruction is critical for the success of all my students."*

**SECONDARY GRADES** Ms. Mendez is a ninth-grade biology teacher at a high school in the same school district as Mrs. Bell with similar demographics. Of her six class periods, three are "inclusion classes" with a larger proportion of students with disabilities, including some with LD and a high-functioning student with autism. The special education teacher now joins the weekly science teachers' meetings to identify how best to meet individual students' needs. As she prepares for an upcoming team meeting, Ms. Mendez reflects on her instructional

practices: *"The range of reading, writing, and mathematics abilities is challenging, particularly when students read text in class and for homework. Judging from performance on science tests, some students have not mastered the mathematical concepts and skills required for science instruction, and the writing skills of some are also weak. I know I should make adaptations to differentiate instruction, but I am not sure where to begin. My training is in the sciences, not in basic academics, so I will have to rely on the special education teacher, Ms. Reid, to support the inclusion students and me."*

**REFLECTION QUESTIONS** In your journal, write down your answers to the following questions. After completing the chapter, check your answers and revise them on the basis of what you have learned.

1. How can Mrs. Bell and Ms. Mendez implement the principles of universal design for learning into their instructional practices?
2. How can Mrs. Bell and Ms. Mendez use the ADAPT framework to differentiate instruction for their students?
3. How can Mrs. Bell and Ms. Mendez differentiate instruction for their multicultural and ELL students?
4. What instructional and grouping practices might help them provide effective, differentiated instruction for their students?
5. How can Mrs. Bell and Ms. Mendez ensure that the textbooks and instructional materials they use are appropriate for all of their students?
6. How can assistive technology help Mrs. Bell's students with disabilities access the general education curriculum?



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Inclusive schools use a variety of practices to ensure that all students have opportunities to learn and thrive in a supportive, responsive school environment and to have access to the general education curriculum.

Having **access to the general education curriculum** means being able to (a) learn the knowledge and skills we expect all students to learn; (b) benefit from evidence-based instruction that is designed, delivered, and evaluated for effectiveness; and (c) use materials, facilities, and labs that facilitate learning. For many at-risk students and students with disabilities, mastering the critical academic knowledge and skills is difficult because of learning challenges such as sensory, memory, communication, motor, behavioral, and cognitive problems. Differentiating instruction, then, is critical to helping them become successful learners.

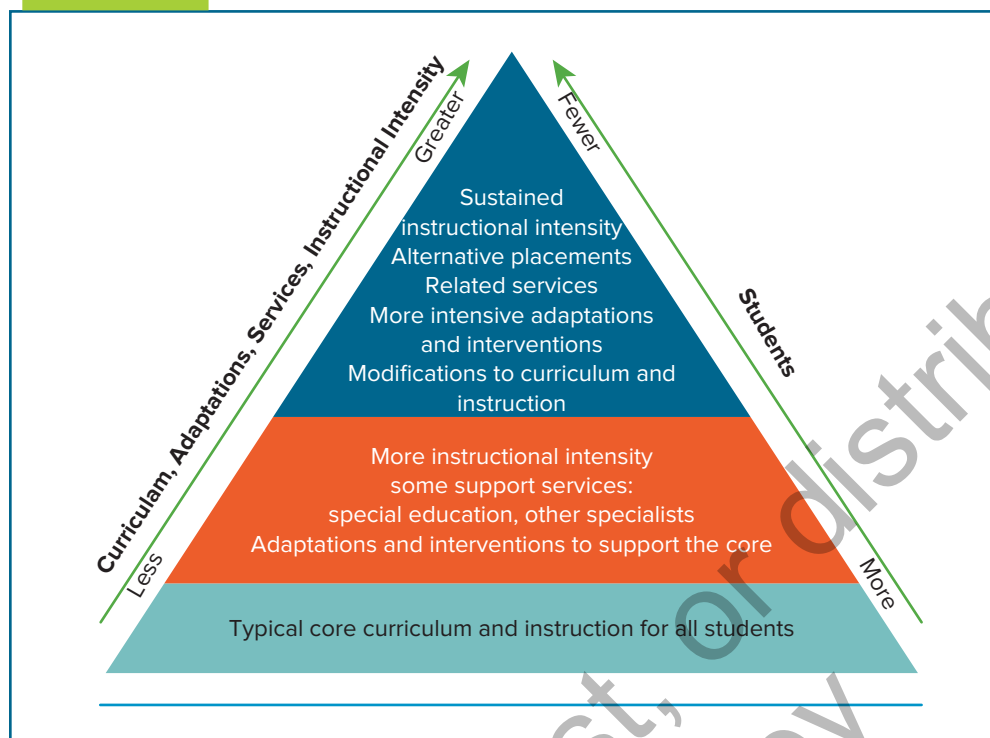
**Differentiating instruction** is instruction that is responsive to the diverse needs of all students, with a focus on curriculum, instructional adaptations, services, and instructional intensity. Figure 7.1 illustrates how most of the student population can benefit from less differentiation in order to successfully access and master the general education curriculum. Some students require differentiation, however, and it can take various forms depending on the student's individual needs. For example, we can differentiate the intensity of instruction by offering small groups increased time for more individualized or alternative instructional intervention. Specialized staff, including special educators, can also deliver more intensive, adapted instruction. Differentiation can occur in different settings, too, such as the general education classroom, a resource room, or a self-contained classroom. In some cases, a change in the curriculum emphasizing more life skills may be required. Student progress with lesson objectives is also carefully monitored (National Center on Intensive Intervention [NCII], 2014). Think back to Chapter 6 regarding the RTI model. It is easy to see how the three levels in Figure 7.1 corresponds to a multi-tiered approach to instruction and intensified intervention instruction for some students.

In this chapter, we discuss ways to differentiate instruction, including using the principles of universal design for learning (UDL) and the ADAPT framework. We provide information about multicultural and linguistic considerations when differentiating instruction. We also discuss effective instructional practices that help students access and master the curriculum, ways to adapt instructional materials, and assistive technology devices and services.

## WHAT IS UNIVERSAL DESIGN FOR LEARNING?

**Universal design for learning (UDL)** is a means for differentiating instruction for all students, including learners with disabilities. It is a framework that provides ways to remove or minimize barriers to learning and promote



**FIGURE 7.1** A DIFFERENTIATING INSTRUCTION CONTINUUM

accessibility to curricula and **pedagogy**, or teaching practices, for all learners, including students with and without disabilities and English language learners (CAST, 2011). The goal is to foster learners' ability to achieve mastery of the curricula within a flexible environment that features various ways content can be conveyed to account for individual differences (CAST, 2011). According to the Higher Education Opportunity Act (2008), universal design for learning

- (A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and
- (B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient.

UDL is an outgrowth of the concept of universal design (UD), which has its roots in the field of architecture (King-Sears, 2009). Let's take an example of UD as it relates to the ADA law, which requires that the physical environment be made accessible for individuals with disabilities. Curb cuts enable people who use wheelchairs to use sidewalks, cross streets, and move independently as they shop or get from a parking lot to a restaurant. But curb cuts also help parents with strollers and people with shopping carts as they walk through neighborhoods or shopping centers. Removing barriers allows people with disabilities to

# TECH notes

## UDL DIGITAL MEDIA

Digital media offer an excellent example of how the universal design principle, “Multiple Means of Representation,” can promote access for students with different needs, such as adaptations in learning, seeing, hearing, moving, and/or understanding English (Rose et al., 2006). Current technology and partnerships with textbook publishers now make electronic versions of texts readily available, so print is not the only way to access books. For the student with CP and motor problems in Ms. Bell’s class and the student with LD in Ms. Mendez’s class who has difficulty reading, the computer can be used to immediately provide auditory access by translating print to audio so a book can be heard instead of read, facilitating access for both students. In another example, by using the same electronic version of the book, the computer can convert print into Braille for tactile access by a student with severe visual disabilities. These types of access to print should be noted in the IEP. UDL allows the broadest spectrum of learners to access the curriculum: students with

varying learning needs, those with disabilities, and those with other special needs.

UDL guidelines can also be applied to teaching students from culturally and linguistically diverse backgrounds. For example, for the “Provide Multiple Means of Representation” principle, teachers can adjust their level of English vocabulary to the student’s level of understanding (UDL Checkpoint 2.1) and support instructional language by repeating, rephrasing, and extending the student’s language (UDL Checkpoint 2.4). They can use nonverbal cues such as gestures, pictures, objects, and other instructional materials to facilitate understanding (UDL Checkpoint 2.5). Teachers can also preview new content by teaching key vocabulary, asking questions to stimulate thinking about the new content, and making linkages among students’ experiences (UDL Checkpoint 3.1).

The Considering Diversity feature offers ways to differentiate instruction for English language learners. Then, we turn our attention to the ADAPT framework.

participate in daily life, but it also helps people without disabilities (see [http://www.ncsu.edu/ncsu/design/cud/about\\_us/usronmacespeech.htm](http://www.ncsu.edu/ncsu/design/cud/about_us/usronmacespeech.htm) for an inspirational speech by Dr. Ron Mace, who coined the term universal design).

Now, let’s translate this concept of UD access to education. Universally designed curricula and pedagogy reflect three principles (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006). First, there are **multiple means of representation**; in other words, information is presented in various formats to reduce sensory and cognitive barriers. For example, written text can be accompanied by audio for students who are blind, and graphics can enhance the content for students who are deaf or have learning problems. Closed captions on video are another option.



The second principle, **multiple means of action and expression**, refers to the ability of students to respond in a variety of ways. For example, voice recognition software, scanning devices, and switches help students with physical disabilities access the computer to complete computer-based activities. The third principle, **multiple means of engagement**, consists of actively engaging

students in activities and making available more than just a single mode of representation and expression to address their needs and interests. Using the computer is an example of providing different ways to engage students in the learning process.

Each principle is comprised of three guidelines and several checkpoints. For example, in Table 7.1, the principle, “Provide Multiple Means of Representation,” is

TABLE 7.1

UNIVERSAL DESIGN FOR LEARNING GUIDELINES

1. Provide Multiple Mean of Representation	2. Provide Multiple Means of Action	3. Provide Multiple Means
<p>1: <i>Provide options for perception</i></p> <p>1.1 Offer ways of customizing the display of information</p> <p>1.2 Offer alternatives for auditory information</p> <p>1.3 Offer alternatives for visual information</p>	<p>4: <i>Provide options for physical action</i></p> <p>4.1 Vary the methods for response and navigation</p> <p>4.2 Optimize access to tools and assistive technologies</p>	<p>7: <i>Provide options for recruiting interest</i></p> <p>7.1 Optimize individual choice and autonomy</p> <p>7.2 Optimize relevance, value, and authenticity</p> <p>7.3 Minimize threats and distractions</p>
<p>2: <i>Provide options for language, mathematical expressions, and symbols</i></p> <p>2.1 Clarify vocabulary and symbols</p> <p>2.2 Clarify syntax and structure</p> <p>2.3 Support decoding of text, mathematical notation, and symbols</p> <p>2.4 Promote understanding across languages</p> <p>2.5 Illustrate through multiple media</p>	<p>5: <i>Provide options for expression and communication</i></p> <p>5.1 Use multiple media for communication</p> <p>5.2 Use multiple tools for construction and composition</p> <p>5.3 Build fluencies with graduated levels of support for practice and performance</p>	<p>8: <i>Provide options for sustaining effort and persistence</i></p> <p>8.1 Heighten salience of goals and objectives</p> <p>8.2 Vary demands and resources to optimize challenge</p> <p>8.3 Foster collaboration and community</p> <p>8.4 Increase mastery-oriented feedback</p>
<p>3: <i>Provide options for comprehension</i></p> <p>3.1 Activate or supply background knowledge</p> <p>3.2 Highlight patterns, critical features, big ideas, and relationships</p> <p>3.3 Guide information processing, visualization, and manipulation</p> <p>3.4 Maximize transfer and generalization</p>	<p>6: <i>Provide options for executive functions</i></p> <p>6.1 Guide appropriate goal-setting</p> <p>6.2 Support planning and strategy development</p> <p>6.3 Facilitate managing information and resources</p> <p>6.4 Enhance capacity for monitoring progress</p>	<p>9: <i>Provide options for self-regulation</i></p> <p>9.1 Promote expectations and beliefs that optimize motivation</p> <p>9.2 Facilitate personal coping skills and strategies</p> <p>9.3 Develop self-assessment and reflection</p>
		
Knowledgeable learners	Strategic, goal-directed learners	Purposeful, motivated learners

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comprised of “Provide Options for Perceptions,” a guideline, and “Offer Ways of Customizing the Display of Information,” a checkpoint for that guideline and principle.

The three principles of UDL are featured in the UDL guidelines (CAST, 2011). Applying the principles of UDL to curricula and pedagogy means adapting goals, strategies, materials, and tests to enable access for all and to remove or minimize barriers to learning. The intent is to make the curriculum and instruction flexible enough to accommodate the diverse learning needs evident in most classrooms (CAST, 2011; Rao, Ok, & Bryant, 2014).

Table 7.1 provides a visual representation (see <http://cast.org/udl/index.html> for additional information).

UDL is supported in the field of education and included in the IDEA legislation as a means for promoting access to the curriculum and instruction for all learners. However, it’s important to know about the evidence that supports these practices (Edyburn, 2010). Fortunately, research studies on the effects of utilizing the principles of UDL on student performance are emerging and preliminary findings are promising (Hall, Cohen, Vue, & Ganley, 2014; Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014; King-Sears et al., 2014). In Tech Notes on page 6, UDL examples are shown for how the UDL “Multiple Means of Representation” principle can be operationalized in the classroom.

## CONSIDERING *diversity*

### STRATEGIES FOR DIFFERENTIATED INSTRUCTION FOR ENGLISH LANGUAGE LEARNERS (ELLs)

Think about how the UDL guidelines connect with these strategies.

#### *Scheduling Strategies*

- Chunk instruction into shorter segments to allow for time to check work.
- Expand assignments over a longer period.
- Extend wait time for oral responses.
- Plan challenging tasks and subjects earlier in the day or period—or other best time for the student.

#### *Setting Strategies*

- Seat ELLs close to speaker, screen, or reader.
- Assign support staff to work with ELLs in addition to the classroom teacher.

- Provide small-group instruction.
- Pair or group ELLs with “buddies” who will assist with modeling and explaining tasks.
- Work one-to-one with students.
- Introduce and develop new vocabulary visually by using a picture dictionary and other visual aids.

### **Presentation Strategies**

- Provide ample repetition of language: repeat, restate, rephrase, reread.
- Keep language consistent when describing or explaining; synonyms, idioms, and metaphors may be confusing at first; gradually introduce figurative language to expand language development.
- Keep explanations and directions brief and concise—focus on key concepts and vocabulary.
- Highlight and explicitly teach key vocabulary needed to accomplish the assigned task.
- Use bilingual dictionaries during reading and writing assignments in order to clarify meaning when possible.
- Adapt texts by shortening or simplifying language to make the content more accessible.
- Use technology and multimedia (software such as Inspiration®, books on tape) and graphic organizers.
- Enhance oral presentations with visual and written support, graphic organizers, and modeling.
- Allow students time to check and discuss their understanding of directions and material with peers.
- Present material through multiple modes, using audiovisual and other technology (books on tape, instructional software, visuals on the overhead projector, presentation software).
- Encourage and allow for nonverbal responses through the use of pictures, manipulatives, and graphic organizers.

### **Response Strategies**

- Encourage and allow for nonverbal responses such as pointing, nodding, drawing pictures, using manipulatives, and completing graphic organizers.
- Adjust expectations for language output (e.g., student speaks in words and phrases, simple present-tense statements).
- Allow shortened responses.
- Require fewer assignments (focus on the quality of a reduced number of instructional objectives).
- Pair ELLs with strong speakers and writers (buddies).
- Encourage “buddies” to take a dictated response during pair work where ELLs explain concepts.
- Allow ELLs to dictate responses into a tape player as evidence of completion of assigned written work.

SOURCE: Adapted from Price and Nelson (2003).



## WHAT IS THE ADAPT FRAMEWORK?

We can also differentiate instruction by adapting the activities used to teach objectives, content being taught, procedures for delivering instruction, and materials that support instruction. Adaptations share three characteristics. They are *individualized*, focusing on the strengths of the individual; they are *relevant* to the objective being taught to all students; and they must be *effective* to ensure that students learn the objectives. If our first attempt at making an adaptation does not help the student benefit from instruction, then we continue to make adaptations until performance improves. Student performance on tasks is a good indicator of the effectiveness of the chosen adaptations. By using the ADAPT framework, educators can make decisions about adaptations that are individualized for the student's strengths and needs and relevant to the task, such as reading and completing homework. It should be noted that the ADAPT framework and the principles of UDL fit nicely together. Think about UDL broadly as the principles apply to instruction for all students and benefit students with various learning needs, whereas the ADAPT framework is intended for students who are at risk or who have disabilities and require adaptations to instructional delivery, materials, content, and activities. The UDL principles are the “bigger picture” for all and the ADAPT framework is a “smaller picture” for some.

The ADAPT framework consists of five steps to guide your decision making about selecting and evaluating the effects of the adaptations:

1. **A**sk, “What am I requiring the student to do?”
2. **D**etermine the prerequisite skills of the task.
3. **A**nalyze the student's strengths and struggles.
4. **P**ropose and implement adaptations from among the four instructional categories—content, materials, delivery, and activity.
5. **T**est to determine whether the adaptations helped the student accomplish the task.

We examine each step to illustrate how to apply the ADAPT framework in your class with students who have special learning needs. Throughout the remaining chapters, you will read about specific ways to use ADAPT in academic, social, and behavioral areas.

### ADAPT STEPS

The first step is **A**sk, “What am I requiring the student to do?” For example, in second grade, students are expected to learn basic academic skills, demonstrate the ability to get along with others, and listen to the teacher. In high school, students are required to take notes in class, complete their homework, learn from textbooks, conduct and write about research, and pass end-of-semester exams.

These “setting-specific demands” are typical of the **core curriculum**—content that is taught to all students in the general education setting (Lenz & Deshler, 2004). Students who have difficulty with these requirements are opportunities for teachers to use the ADAPT framework.

The second step is *Determine the prerequisite skills of the task*. This means identifying what students must be able to do to meet teachers’ expectations, “pulling apart” the task to identify those specific prerequisite skills. For example, to add two numbers ( $9 + 3 = ?$ ), students must be able to (a) identify and understand the numerical value of the numerals 9 and 3, (b) identify and know the meaning of + and = symbols, (c) use a strategy (such as “Count on 3 from 9”) to arrive at the solution, and (d) write the numeral 12 correctly (not 21). All these steps should be performed rather quickly so students can keep up with instruction.

Older students may be required to take notes in class. Think for a minute about yourself as a learner in your college course. What prerequisite skills related to taking notes are necessary for you to be successful? You understand the second step if you said any of the following: listening, identifying important information, writing, summarizing the notes, and studying them for a test. Identifying prerequisite skills is an important step in the ADAPT framework because it forms the basis for addressing the remaining steps.

The third step, *Analyze the student’s strengths and struggles*, means identifying each prerequisite skill of a task (from Step 2) as a strength or struggle for an individual student. You can use assessment techniques or your knowledge of the student. For example, in thinking about our addition problem ( $9 + 3 = ?$ ), teachers can use **active process assessment**, interviewing students as they solve the problem out loud (see Chapter 8) to see they do it. By having the students “think aloud,” the teacher can figure out whether the steps for arriving at the answer reflect strengths or struggles. For example, if a student reads the numerals and symbols correctly, then these prerequisite skills can be listed as strengths for this task. If a student starts with 1 and counts up to 12 rather than starting with 9 and counting up 3 to get 12, the teacher suspects the “Start big and count on” strategy is a struggle.

The teacher can also use observation to determine whether numerals are written correctly, which is a strength. If 12 were written as 21, then writing numerals correctly is a struggle. Referring to our note-taking task, teachers can ask for a copy of a student’s notes to analyze them for the prerequisite skills of identifying and recording the important information and summarizing the information.

In the fourth step, *Propose and implement adaptations from among the four categories*, the teacher considers the student’s strengths and struggles to identify appropriate instructional adaptations. In the ADAPT framework, there are four adaptation categories: (1) instructional activity, (2) instructional content, (3) instructional delivery, and (4) instructional material. Each is described here.

Returning to our addition problem example ( $9 + 3 = ?$ ), the teacher identifies the need to reteach the “Start big and count on” addition strategy. She decides to work with a small group of students (instructional delivery), all of whom need to be retaught the strategy. She uses easier facts (instructional content), such as  $3 + 2$ , and then increases to more difficult facts, such as  $8 + 2$  and  $9 + 3$ ; reviews the concept of greater than (instructional content) to be sure students know which number in a problem is the larger of the two; and uses chips (instructional material) so students can keep track of the “counting on” number (for  $8 + 2$ , there are two chips to move as the student starts big, at 8, and counts on 2 to get 10).

In our note-taking example, several adaptations come to mind. The teacher can provide a skilled student with carbonless paper (instructional material) to take notes and then share a copy of these notes with the student who struggles with the task. The student can record the lecture (instructional material) and then record key ideas. Or a note-taking strategy (instructional activity) such as Note Shrink, discussed in Chapter 12, can be taught to a small group of students who can benefit (instructional delivery).

The fifth step, *Test to determine whether the adaptations helped the student accomplish the task*, focuses on monitoring student progress. For example, returning to our addition problem  $9 + 3$ , during curriculum-based assessment or one-minute timed assessments, the teacher can check to see whether problems that can be solved with “Start big and count on” are answered correctly. In the note-taking example, a final copy of the notes can be graded, and the exam on which the notes are based can be examined for evidence of the key information in the student’s answers.

Bryant and Bryant (1998) originally identified four adaptation categories from which educators can choose when selecting adaptations that are individualized for the student and relevant to the task:

- **Instructional activity** is the actual lesson used to teach and reinforce skills and concepts. Sometimes, a different instructional activity is needed if students do not benefit from the original lesson delivered by the teacher.
- **Instructional content** consists of the skills and concepts that are the focus of teaching and learning, the curriculum that state and local school districts require educators to teach. Content can be located in standards, district documents, and the teachers’ guides that accompany textbooks and other materials. For example, the Common Core State Standards (CCSS; National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010) provide information about concepts and skills that should be part of each school district’s curriculum where the CCSS have been adopted.
- **Instructional delivery** describes the way the activity is taught, including grouping practices, instructional steps, presentation

techniques, practice techniques, and student activities. Systematic, **explicit instruction** is included in instructional delivery and includes the following: (a) **modeling**, in which teachers provide a demonstration of steps and examples for solving a problem; (b) “**thinking aloud**,” in which teachers make their thinking processes transparent to students by saying out loud the steps they are taking while solving a problem; (c) **prompts or cues**, with which teachers provide visual or verbal assistance to increase the likelihood of correct responses; (d) **error correction**, or immediate feedback to correct error responses; (e) **guided practice**, or multiple opportunities for students to respond and practice; and **pacing**, in which teachers provide instruction at an appropriate rate to keep students engaged in learning and understanding. These practices are well-grounded in the literature as critical for struggling students (Bryant, Bryant, Porterfield, et al., 2014; Coyne, Kame’enui, & Carnine, 2011; Gersten et al., 2009; Swanson, Hoskyn, & Lee, 1999).

- **Instructional materials** are aids such as textbooks, kits, hardware, software, and manipulatives. In any subject area, there are multiple types of instructional materials that teachers can use to address various learning needs. You will read about many examples in later chapters.

Recall from the Opening Challenge that Ms. Mendez has students with learning disabilities. She is concerned about their ability to read and understand the science text. She knows adaptations are needed, so she uses the ADAPT framework in action to make instructional decisions. As you read about how she does so, think back to the three characteristics of adaptations and consider whether each adaptation is individualized for the student, relevant for instruction, and effective.

In the remaining chapters, you will encounter many examples of the ADAPT framework in action and you will see applications that illustrate quickly and simply how ADAPT can be implemented. Look for these features as you read.

## WHAT ARE EFFECTIVE INSTRUCTIONAL PRACTICES?

In this section, we discuss two important components related to instructional practices. Planning instruction is considering what you will teach and how you will go about teaching it so all students in your class can benefit from your instruction. Delivering instruction means adopting specific practices for conveying information and ensuring appropriate student responses.

### PLANNING FOR INSTRUCTION

We discuss four areas that teachers should plan as they prepare to teach lessons. For the first, we provide information about *types of knowledge and critical*



## ADAPT *in action*

### STUDENTS WITH LEARNING DISABILITIES IN READING

Ms. Mendez's ninth-grade students with LD in reading are required to read science text in class or for homework. Comprehending text requires many skills, including figuring out difficult words and monitoring your understanding of the science text. Ms. Mendez is alarmed at how poorly these students did on a recent quiz she gave on the science text material. She decides to work with the special education teacher to implement ADAPT to help her choose appropriate adaptations to improve these students' reading comprehension. She shares her thinking about her students using ADAPT.

A

**Ask, "What am I requiring the student to do?"** "My students need to read the science text in class and at home. Text may be in a book or a handout for small group work. Lab assignments often require reading and following instructions that students must comprehend."

D

**Determine the prerequisite skills of the task.** "Students need to be able to read the text, identify important information from multiple paragraphs, organize this information to facilitate comprehension, see relationships among important ideas, and pass quizzes that test their understanding."

A

**Analyze the student's strengths and struggles.** Ms. Mendez knows several of her students have reading comprehension difficulties. They appear motivated to succeed, participating in small group activities and enjoying the lab assignments. Text reading and understanding are her main concerns. She works individually with the students to analyze difficulties by asking them to read several paragraphs out loud, identify important information, talk about the relationships among these important ideas, and organize the information in a way that enhances learning and retention. She finds the students can read many of the words and have strategies for figuring out harder words. They can tell her the important ideas but cannot discuss the relationships among these ideas or organize them in a way that promotes understanding. For example, she gave them a news story about global climate change, and they were unable to structure information that focused on cause and effect.

P

**Propose and implement adaptations from among the four categories.** Ms. Mendez decides to try **graphic organizers (GOs)**, which are visual aids (instructional material) that help students organize, understand, see relationships, and remember important information. GOs can structure different types of information, including causes and effects and similarities and differences. In a small group of her students with reading difficulties, Ms. Mendez models by thinking aloud how to use the graphic organizers as she is reading text (instructional delivery). She gives the students a short

paragraph, and together they read the material and complete the GO. She sets aside 20 minutes to conduct this minilesson (instructional activity), while the other students in her class work in small groups (instructional delivery) on a review exercise.

**T** **Test to determine whether the adaptations helped the student accomplish the task.** Ms. Mendez will review the information included in the graphic organizer as one way to determine the effectiveness of the adaptation. She will also provide a quiz on the material to see how the students understood the content. Can you identify how the adaptation is individualized, relevant, and effective?

## ADAPT framework: FOR STUDENTS WITH LEARNING DISABILITIES IN READING

<b>A</b> <b>ASK</b> “What am I requiring the student to do?”	<b>D</b> <b>DETERMINE</b> the prerequisite skills of the task.	<b>A</b> <b>ANALYZE</b> the student’s strengths and struggles.	<b>P</b> <b>PROPOSE</b> and implement adaptations from among the four categories.	<b>T</b> <b>TEST</b> to determine whether the adaptations helped the student to accomplish the task.
		Strengths	Struggles	
The students will read science text.	<ol style="list-style-type: none"> <li>1. Figure out difficult words by breaking them apart.</li> <li>2. Identify important information.</li> <li>3. Organize information to understand and recall.</li> </ol>	<ol style="list-style-type: none"> <li>1</li> <li>2</li> </ol>	<ol style="list-style-type: none"> <li>3</li> </ol> <p><b>3. Instructional Activity:</b> Conduct a minilesson on using graphic organizers (GOs).</p> <p><b>Instructional Delivery:</b> Model using “thinking aloud” and show students how to use GOs.</p> <p><b>Instructional Material:</b> Provide GOs to be used in class and for homework.</p>	<ol style="list-style-type: none"> <li>3. Assess student use of GOs and mastery of content through correct completion of GOs and accuracy on quizzes.</li> </ol>

*thinking* and instructional techniques for teaching this information. For the next, *types of questions*, we provide examples of questioning techniques. Next is *stages of learning*, where we include information about how students' performance may be affected by their level of acquaintance with the content being taught. How we teach students at different stages varies. Finally, we discuss *instructional components*, including steps for delivering instruction.

## Types of Knowledge and Critical Thinking

Different types of knowledge and critical thinking for different content areas are applicable across the grade levels. They include discrimination, factual knowledge, procedural knowledge, conceptual knowledge, and metacognitive knowledge. Critical thinking refers to reasoning abilities (Mastropieri & Scruggs, 2014).

### Discrimination

Discrimination is the ability to distinguish one item (such as a letter, number, letter sound, math sign, state, or piece of lab equipment) from another. It occurs during the early stages of learning when students are first learning new information and requires the ability to identify and pay attention to the relevant features of an item. Students with learning difficulties may have problems discriminating among items. Teachers should teach the relevant features of items and then present similar items among which discrimination is necessary. For example, students can learn that 12 has a 1 and 2 where the 1 can be color-coded or made larger to emphasize the relevant feature that 1 is first in 12. The same can be done for 21. Once students can identify each number separately, teachers can present the numbers together for them to name. Students should be given multiple opportunities to practice discriminating among items such as similar letters (b, d, m, w, p, q) and numbers (6, 9, 21, 20, 102, 120), words with similar sounds (pet, pit, pig, big), symbols (+, -, ×, =), and concepts that are similar (types of plants). For older students, discrimination learning occurs, for instance, when they are required to identify pieces of lab equipment before instruction begins or mathematics tools such as a compass or protractor before a geometry lesson.

### Factual Knowledge

The ability to memorize, retain, and recall information is factual knowledge, which is fundamental to school. Examples include math facts, vocabulary definitions, historical events and dates, parts of speech in English or a foreign language, parts of a plant, and parts of the brain and their functions. Students with special learning needs may have difficulties learning factual information because of problems with encoding, retaining, and recalling the information. They benefit from strategies that teach them how to memorize and recall information (Swanson, Cooney, & O'Shaughnessy, 1998). Students must learn numerous facts across the content areas so they can apply information to their learning.

## Procedural Knowledge

Learning a set of steps that must be followed to complete a task involves procedural knowledge. Examples include the steps to solve an arithmetic problem, conduct a lab experiment, develop a historical time line, and follow a strategy to read difficult words or to comprehend text. Students with special learning needs may have difficulty with procedural knowledge because it requires memorization of the steps in the correct sequence and the ability to perform each step. It may also be necessary to teach prerequisite knowledge. For example, if students are following a series of steps to multiply  $32 \times 64$ , they must know the steps and the prerequisite knowledge of  $4 \times 2$ ,  $4 \times 3$ ,  $6 \times 2$ , regroup, and  $6 \times 3$ . Modeling, practice, and error correction are examples of ways to teach procedural knowledge. Cue cards containing the steps of the procedure can also be useful for students to refer to until they learn the steps.

## Conceptual Knowledge

Knowledge about principles, models, and classifications entails conceptual knowledge. In essence, **concepts** are categories of knowledge. They range in level of abstractness. For instance, the concept of a table is concrete and easy for most students to understand, and it can be easily represented. The concept of democracy, however, is very abstract and requires multiple examples.

Visual displays can help students understand concepts. For instance, the concept *table* can be described using the categories “dimensions,” “function,” and “types of construction.” Students can create collections of words and pictures that represent a concept. For instance, pictures of different types of tables can be assembled, and descriptive words can be identified to describe the concept (*claw-legged table*). Price and Nelson (2003) recommend that teachers conduct a concept analysis of content to be taught prior to instruction. The concept analysis should include the following:

- Identification of the critical concepts to be taught as part of a unit or chapter
- Definitions of the concepts
- List of attributes or characteristics of the concepts
- List of noncritical attributes that are not essential for understanding the concept
- List of examples
- List of “nonexamples”
- List of related concepts

## Metacognitive Knowledge

Metacognition is often described as thinking about the strategies we use to tackle tasks. It is knowledge about how people learn and process information



### VIDEO CASE 7.1

#### Planning Effective Instruction

1. The teachers in the video discuss a variety of instructional practices that they find to be useful for planning effective instruction. Why do they find these practices to be highly effective and how do they support student learning? Do you notice similarities and differences between the practices used by teachers at the elementary and high school levels?
2. Which types of instructional grouping arrangements are shown within the video? What strategies do the teachers use to plan cooperative groups that promote effective instruction? What are the similarities and differences in how grouping practices are used to support student learning at the elementary and secondary levels?



or tasks, such as the nature of the task and the processing demands on the individual. Students need to understand how they learn and process information so they can develop a plan for accomplishing a given learning task, monitor their comprehension when reading text, and evaluate their progress toward the completion of a task (Pintrich, 2002).

## Instructional Techniques

For students to learn information from their content instruction, information must instead be presented in a meaningful way to aid memory (Schumaker & Deshler, 2006). Instructional techniques that promote meaningful associations of knowledge include clustering, elaboration, and mnemonic devices (Mastropieri & Scruggs, 2014; Schumaker & Deshler, 2006).

### Clustering

Clustering involves categorizing information in a meaningful way. For example, when teaching about states, cluster the states according to the category of geographic region (New England states, West Coast states). Students have a better chance of learning the information when you (or they) reduce the amount of information to learn all at once and organize it in a meaningful way. Information can also be organized and presented in visual displays such as semantic maps and relationship displays (Vaughn & Bos, 2011). Examples of semantic maps and relationship displays are provided in Chapters 10 and 12.

### Elaboration

Adding more details to facts to aid in memorization, retention, and recall refers to elaboration. According to Mastropieri and Scruggs (2009), elaboration helps students remember information. Students can identify what they know about a topic to help them make elaborative sentences. Take the following list of animals: giraffe, elephant, lion, and leopard. Students might create the elaborative sentence, “The giraffe and elephant fear the lion and leopard,” to help them remember it.

### Mnemonic Devices

These devices are techniques for aiding memory by forming meaningful associations and linkages across information that appears to be unrelated (Mastropieri & Scruggs, 2014). Mnemonic devices help students learn content-area vocabulary, memorize lists of factual information, and read multisyllabic words (Bryant & Bryant, 2003; Schumaker & Deshler, 2006).

The **Keyword Method** is one type of mnemonic device. It links information, such as a word, with response information, such as the word’s definition (Schumaker & Deshler, 2006; Mastropieri & Scruggs, 2009). In Chapter 12, we discuss the Keyword Method as a technique to assist students in learning vocabulary meanings.

Acronyms and acrostics are mnemonic devices that aid in recalling lists of information. An **acronym** is a word made from the first letters of the words to be learned. For example, the acronym HOMES refers to the Great Lakes (Heron, Ontario, Michigan, Erie, and Superior). Students must learn and remember not only the acronym, HOMES, but also what each letter represents. An **acrostic** is a sentence wherein the first letters of the words stand for the items to be remembered *and* their correct order. For example, the first letters in “Every good boy deserves fudge” stand for the notes represented by the lines on a musical staff: E, G, B, D, F.

### Critical Thinking

Critical thinking involves reasoning to learn new concepts, ideas, or problem solutions (Mastropieri & Scruggs, 2014). Examples of the use of critical thinking include reasoning about how to resolve a social issue, explaining the ending of a novel, determining how to solve a problem, and explaining historical events and their impact on society and the world. Students with learning needs may experience difficulties with critical thinking because they have not been taught how to think critically, they lack the prior knowledge and background that would help them understand issues, and their earlier instruction may have focused more on factual and procedural knowledge.

One way to ensure instruction is responsive to the need for critical thinking is to incorporate activities that tap domains of cognitive taxonomies that foster critical thinking (Anderson et al., 2001; Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Table 7.2 provides helpful information about how to do so. It identifies and describes cognitive domains in column 1 (remembering, understanding, applying) and provides examples of verbs relevant to each domain in column 2. These can be translated into class assignments (column 3) and activities (column 4). Think about how you could design a lesson by incorporating activities addressing the various cognitive domains that promote critical thinking. It is easier to develop critical thinking skills by drawing from the higher order domains (numbers 3–6) on the list. However, these domains encompass knowledge taught through the lower order domains. So, there is a place in instruction for each domain. Consider ho: David McKay.

**Types of questions.** Posing various types of questions can help students think critically about what they are learning. Students can demonstrate their knowledge about a topic by answering convergent questions. **Convergent, lower order questions** usually have one answer and start with *who*, *what*, or *when*.



Mnemonic devices are techniques for aiding memory by forming meaningful associations and linkages across information that appears to be unrelated. How could mnemonic devices help these students memorize the planets in the solar system?

TABLE 7.2

## CRITICAL THINKING ACTIVITIES

Critical Thinking Activity (arranged lowest to highest)	Relevant Sample Verbs	Sample Assignments	Sample Sources or Activities
1. <b>Remembering</b> Retrieving, recognizing, and recalling relevant knowledge from long-term memory, for example, find out, learn terms, facts, methods, procedures, concepts.	Acquire, Define, Distinguish, Draw Find, Label, List, Match, Read, Record	1. Define each of these terms: encomienda, conquistador, gaucho 2. What was the <i>Amistad</i> ?	Written records, films, videos, models, events, media, diagrams, books.
2. <b>Understanding</b> Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. Understand uses and implications of terms, facts, methods, procedures, concepts.	Compare, Demonstrate, Differentiate, Fill in, Find, Group, Outline, Predict, Represent, Trace	1. Compare an invertebrate with a vertebrate. 2. Use a set of symbols and graphics to draw the water cycle.	Trends, consequences, tables, cartoons
3. <b>Applying</b> Carrying out or using a procedure through executing, or implementing. Make use of, apply practice theory, solve problems, use information in new situations.	Convert, Demonstrate, Differentiate between, Discover, Discuss, Examine, Experiment, Prepare, Produce, Record	1. Convert the following into a real-world problem: $\text{velocity} = \text{dist./time}$ . 2. Experiment with batteries and bulbs to create circuits.	Collection of items, diary, photographs, sculpture, illustration
4. <b>Analyzing</b> Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing. Take concepts apart, break them down, analyze structure, recognize assumptions and poor logic, evaluate relevancy.	Classify, Determine, Discriminate, Form generalizations, Put into categories, Illustrate, Select, Survey, Take apart, Transform	Illustrate examples of two earthquake types. Dissect a crayfish and examine the body parts.	Graph, survey, diagram, chart, questionnaire, report
5. <b>Evaluating</b> Making judgments based on criteria and standards through checking and critiquing. Set standards; judge using standards, evidence, rubrics; accept or reject on basis of criteria.	Argue, Award, Critique, Defend, Interpret, Judge, Measure, Select, Test, Verify	1. Defend or negate the statement: "Nature takes care of itself." 2. Judge the value of requiring students to take earth science.	Letters, group with discussion panel, court trial, survey, self-evaluation, value, allusions
6. <b>Creating</b> Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Put things together, bring together various parts, write theme, present speech, plan experiment, put information together in a new and creative way.	Synthesize, Arrange, Blend, Create, Deduce, Devise, Organize, Plan, Present, Rearrange, Rewrite	1. Create a demonstration to show various chemical properties. 2. Devise a method to teach others about magnetism.	Article, radio show, video, puppet show, inventions, poetry, short story

SOURCE: Anderson et al. (2001).

Answers to these questions are essential to show student understanding about a topic. **Divergent, higher order questions** tap critical thinking skills because they require students to make inferences, to analyze or synthesize information, and to evaluate content. These questions may start with *What could happen . . . ? What if . . . ? What do you think caused . . . ? Why do you think . . . ?* or ask *How were the characters alike and different?* and *How could events be changed to affect the outcome?* Critical thinking must be developed through divergent questioning strategies and coaching. Consider how these types of questions relate to the cognitive domains. Table 7.3 provides examples of instructional techniques for different types of knowledge and critical thinking.

### Stages of Learning

All learners experience stages of learning as they learn new skills. As an example, think about a young student learning how to ride a bike. She gets on the bike and starts to pedal, perhaps at first with a parent holding on to the seat to provide support and stability. Shakily, she peddles. As she builds confidence and learns balance, she is able to peddle on her own. She becomes a proficient bike rider, navigating tight areas and making turns with ease. As you read about the stages of learning, think about how this youngster learned to ride her bike.

Knowing about your students' stage of learning can help you plan instruction and make adaptations to accommodate all their learning needs. Researchers have shown that knowledge of students' stages of learning is important for selecting appropriate instructional interventions. For example, in two classic studies, Ayllon and Azrin (1964) and Hopkins (1968) learned that rewards are not always effective—there had to be some level of correct response before reinforcement could take place. In another classic study about the stages of learning, Smith and Lovitt (1976) found that students had to learn how to solve computational arithmetic problems before reinforcement was effective.

**Acquisition stage of learning.** In this stage, the learner may not know how to perform the skill, so the aim is for the individual to learn to perform it accurately. After a period of instruction, some learners demonstrate that they can perform the task or skill with 90% to 100% accuracy; at this point, they have passed through the acquisition stage of learning. Other students, such as those with special learning needs, may require further instruction and adaptations.

**Proficiency stage of learning.** In this stage, the aim is for the learner to perform the skills fluently; the focus is on accuracy and speed of responding. Examples of skills that should be learned proficiently are answering basic arithmetic facts, saying the letters of the alphabet, writing letters, and identifying instruments used in a science lab.

There are some very important reasons why proficient levels of performance are necessary goals. If students can write the letters of the alphabet correctly



but too slowly, they will not be able to complete writing tasks in a timely manner and keep up with their peers. Writing a report and taking a spelling test are examples of skills that require proficiency in forming letters.

Computing basic facts accurately and quickly is another example; here, proficiency is important for more difficult skills such as multiplying multidigit problems. Students need to be able to perform many tasks fluently so they can work as proficiently but also as quickly as their peers. Students should be able to perform lower-level cognitive skills automatically so that more emphasis can be placed on those higher level skills (such as problem solving, comprehending text, and writing reports) that extend knowledge and learning.

**Maintenance stage of learning.** The goal for the maintenance stage is for the mastered skills to remain at the same performance level as during the proficiency stage. Retention of learning is important. For some students with special learning needs, this is a challenging stage because they may forget factual knowledge, rules, or procedures for solving different types of problems. When students do not retain information at the desired levels of performance, teachers must include in their planning instructional time for reviewing and evaluating what has been taught to promote maintenance of learning. An example is to teach multiplying by factors of 9 ( $9 \times 3$ ,  $9 \times 2$ ) to mastery, such as computing 20 facts correctly in a minute, and then building into mathematics instruction 10 minutes every Friday to review all the mastered multiplication facts.

**Generalization stage of learning.** This stage means that the mastered skills should occur across all appropriate situations. For many students, skills learned in the classroom do not automatically occur in other settings, with other people, or with various materials without explicit instruction. For example, a student may learn a strategy in English class that helps in the writing process but does not apply the strategy in history class when asked to write a report. Another student may have demonstrated the ability to regroup when subtracting two digits minus one digit but may not be able to regroup when subtracting two digits minus two digits. For these students, generalization must be taught (see the classic paper by Stokes & Baer, 1977, for more information about teaching for generalization). In fact, some researchers (Schumaker & Deshler, 2006) recommend that the concept of generalization be introduced to students during the acquisition stage and specifically promoted following demonstration of skill mastery (when students have passed a quiz, for example). A good way to promote generalization during the acquisition stage is to ask students where they can use the new strategy in other classes. For instance, if they are going to be taught a writing strategy in English, they can identify other classes and situations in which they can use it.

**Application stage of learning.** The application stage requires the student to use learning and extend it to new situations. For example, students learn

TABLE 7.3

INSTRUCTIONAL TECHNIQUES FOR KNOWLEDGE AND CONCEPTS

Types of Knowledge and Critical Thinking	Instructional Techniques
Discrimination	Model how to identify the relevant features. For example, point out the lower part of the “b” and say that by adding a similar part to the top you make a “B.” Small “b” is in big “B.” Present a “d.” Point out the lower part of the “d” and say that by adding a similar part to the top you do not make a big “B.” So, “d” is not “b.” Provide practice and error correction on discrimination activities. Prompt students if they require additional help making discriminations. For example, “Can you put a similar part on the top of ‘b’?” What letter did you make? What letter is this ‘b’?” Initially, teach letters, numbers, and sounds that are dissimilar; then introduce items that are similar and focus on the relevant distinguishing features. For example, a 3 only has one side compared to an 8. Put a line under 6 and 9 to help students distinguish where the circle part of the number appears.
Factual knowledge	Present information in categories rather than in long lists. Have students use visual displays to organize the factual knowledge. Reduce the amount of information to be learned. For instance, focus on multiplication facts $\times 7$ , then $\times 8$ , and finally $\times 9$ before mixing the facts. Teach strategies to aid in remembering, such as counting strategies for math facts. Starting Big and Counting On and Counting Back are good strategies for specific facts (see Chapter 11). Provide concrete and pictorial examples of content-area factual knowledge. Show videos that depict the factual knowledge. Take field trips that focus on the information to be learned. Provide multiple opportunities for students to engage with content actively and in ways that aid memory associations (such as categorization, visual displays, and mnemonics; see Chapter 12).
Rules	Teach content knowledge and behavior rules. Have students repeat the rules. Provide examples of how the rules “look” in use and what happens when the rules are broken. Provide practice opportunities to help students recall the rules, especially at the beginning of the school year or after a break such as winter or spring break.
Procedural knowledge	Model using “think aloud” to demonstrate how to use a series of steps to solve a problem. Provide repetition and opportunities to practice each step. Chunk instruction so that students learn just a few steps at a time. Coach students through the use of the steps. Allow students to watch a peer use the steps.
Conceptual knowledge	Name and define the concept. Teach the critical and noncritical attributes of the concept. Have students find examples that illustrate the concept. Provide multiple examples of concepts. Provide nonexamples for students to discriminate from examples. Use concrete and pictorial examples. Have students explain in their own words the meaning of the concept. Have students keep a concepts dictionary.
Critical thinking	Ask divergent questions regularly to provide practice for thinking critically. Model how to answer divergent questions using factual and conceptual knowledge. Provide problem situations for student groups to work together to solve.

SOURCE: Adapted from Mastropieri and Scruggs (2014).

strategies for solving word problems. They then apply these strategies to real-life situations in which they have to solve problems such as determining how much money to take when going to a movie. Students need to be flexible as they apply their learning to new situations. Table 7.4 provides examples of teaching techniques for the stages of learning. Instructional Strategy 7.1 offers an illustration of how students progress through the stages of learning and how teaching techniques vary accordingly.

TABLE 7.4

EXAMPLES OF TEACHING TECHNIQUES FOR THE STAGES OF LEARNING

Stage of Learning	Instructional Techniques
Acquisition	<ol style="list-style-type: none"> <li>1. Teach each subskill of a task analysis.</li> <li>2. Pace the rate of instruction slower than the other stages.</li> <li>3. Keep materials and types of responses consistent.</li> <li>4. Use prompts and cues such as color, size, and verbal cues to focus student attention.</li> <li>5. Use “think aloud” to show the steps. Have students imitate the process.</li> <li>6. Teach the prerequisite skills for the tasks.</li> <li>7. Tell what the response should look like.</li> <li>8. Ask a question or show a fact, and provide wait time for a response. Shorten the wait time.</li> <li>9. Provide multiple practice opportunities.</li> <li>10. Focus on error correction; have students practice just the problems that need extra work.</li> </ol>
Proficiency	<ol style="list-style-type: none"> <li>1. Increase the pace of instruction.</li> <li>2. Provide timed activities as appropriate (writing letters or numbers, naming information, computing facts).</li> <li>3. Use reinforcement (praise, tokens) to reward increases in fluent responding.</li> <li>4. Provide goals or benchmarks for students to achieve.</li> <li>5. Graph weekly fluency scores.</li> </ol>
Maintenance	<ol style="list-style-type: none"> <li>1. Provide weekly, biweekly, and monthly reviews.</li> <li>2. Provide reinforcement for accuracy.</li> <li>3. Provide minilessons on parts of instruction not retained.</li> <li>4. Assess cumulative knowledge regularly.</li> </ol>
Generalization	<ol style="list-style-type: none"> <li>1. Provide specific activities across environments, requiring students to generalize their learning.</li> <li>2. Use role playing and think aloud to teach generalization.</li> <li>3. Have students work with different people (peers, a paraprofessional) to practice skills.</li> <li>4. Change the response mode from oral to written.</li> <li>5. Change the materials, such as showing math facts vertically and horizontally.</li> </ol>
Application	<ol style="list-style-type: none"> <li>1. Provide situations for role-playing.</li> <li>2. Give real-life problems that require the use of skills already taught.</li> </ol>

### Instructional Components

Research findings have identified specific instructional components that produce positive learning outcomes for students with special learning needs (Coyne, Kame'enui, & Carnine, 2011; Swanson & Deshler, 2003). These components are based on direct instruction and strategy instruction. **Direct instruction** is teacher directed and focuses on the teaching of skills using explicit, systematic procedures such as modeling, practice opportunities, pacing, error correction, and progress

monitoring. **Strategy instruction** focuses on the process of learning by using *cognitive strategies* (steps for facilitating the learning process) and *metacognitive* (self-regulatory) cues (Wong, 1993). For example, cognitive strategies for comprehending material from a textbook include activating background knowledge, predicting, and paraphrasing; metacognitive strategies include asking, “Can I make connections between my background knowledge and what I am reading?” “Were my predictions accurate?” and “Does my paraphrase contain the most important information and is it in my own words?”

In a major classic study on the effectiveness of interventions to teach students with learning disabilities, Swanson et al. (1999) found using instructional components from direct and strategic instruction were the most effective. They labeled these instructional components as the combined model and suggested using the following instructional components when planning instruction.

- Sequencing: breaking down the task, providing step-by-step prompts
- Drill-repetition-practice: daily testing of skills, repeated practice
- Segmentation: breaking down skills into parts and then synthesizing the parts into a whole
- Directed questioning and responses: asking process or content questions of students
- Control of task difficulty: sequencing tasks from easy to difficult, teaching prerequisite skills
- Technology: delivering instruction via computer or presentation software
- Teacher-modeled problem solving: demonstrating processes or steps to solve a problem or explaining how to do a task
- Small group instruction: delivering instruction to a small group
- Strategy cues: reminding students to use strategies, modeling the “think aloud” technique
- Instructional Strategy 7.1 illustrates the different stages of learning for Marcus, who is learning how to solve word problems.

## DELIVERING INSTRUCTION

Here we review several instructional steps and techniques designed to help all students access and master the curriculum. They include use of an advance organizer, presentation of information, practice, closure, and progress monitoring.

### Advance Organizer

An **advance organizer** consists of activities to prepare students for the lesson’s content (Lenz & Deshler, 2004; Schumaker & Deshler, 2006). Advance organizers tell students the purpose of the lesson (objectives), motivate students



### STAGES OF LEARNING

Marcus is a fifth-grade student in Mrs. Bell's class identified as having a learning disability in mathematics. His IEP specified annual goals in mathematics, including solving word problems. Mrs. Bell gives a curriculum-based assessment to determine which types of word problems Marcus can solve and which types require instruction. Assessment data show zero percent accuracy for solving two-step word problems using whole-number computation. That is, Marcus is in the acquisition stage of learning for this skill. He can solve one-step word problems but does not generalize his knowledge to two-step problems.

Mrs. Bell uses explicit instruction to teach Marcus a strategy for solving two-step word problems. She discusses with him the importance of solving two-step problems, pointing out that problem solving is used in many daily activities (promoting the occurrence of

generalization). Marcus continues to build fluency with basic facts because facts are part of the word problem calculations (proficiency stage for facts). It takes Marcus four days to reach mastery (90% accuracy) for learning how to solve two-step word problems using the strategy Mrs. Bell taught him. Mrs. Bell has Marcus work in a cooperative learning group with his peers to solve one-step (maintenance stage) and two-step (generalization stage) word problems. The group works together for a week, at which point she determines through curriculum-based assessment that the students can solve two-step problems proficiently. Mrs. Bell then has student groups write their own problems based on situations in the school, at home, or in the community (application stage). The groups share their problems so that different groups solve all the problems. She plans to provide periodic reviews (maintenance stage) of one- and two-step word problems to ensure continued mastery of the skills required for solving them.

by sparking their interest, and activate background knowledge by reviewing related information. Such a review helps students “warm up” for the lesson, promotes active responding, and provides teachers with information about students’ current levels of understanding before new material is introduced. In planning advance organizers, teachers should consider their students’ background knowledge, experience, and ability with prerequisite skills for the new task, the vocabulary to be learned, and the level of abstraction of the new learning (Price & Nelson, 2003). Examples of advance organizers include the following:

- Writing the objective on the board and explaining how it will be taught.
- Explaining the importance of learning the objective and asking students to provide examples of how they can use the new information.
- Providing an active technique such as role-playing, seeing a video clip, or taking a field trip before instruction.
- Having students map or tell what they know about the content to be studied.
- Providing a review of related information for students to make connections.



An advance organizer consists of activities to prepare students for the lesson's content. Here, students prepare for a lesson by watching an overview of the topic on a video.

### Presentation of Subject Matter

In this step, teachers present instructional content related to the instructional objective, such as rules (spelling, phonics, mathematics), strategies (reading strategy, paragraph-writing strategy), and concepts (place value, science vocabulary, health). When presenting facts, rules, and procedures, teachers should *model*, or demonstrate, the correct responses and the appropriate thinking processes by using “think aloud.” Students can imitate the modeled responses orally, in written form, or motorically (by manipulating objects). If students are in the acquisition stage of learning, modeling is particularly important.

Teachers can ask questions to promote discussion and engage students in the lesson. They should ask different types of questions (what, why, how) and provide sufficient wait time (3 or 4 seconds) between asking a question and calling on a student to answer it. Asking a question and then calling on a student by name maintains a moderate **level of concern**, which is student interest in the instruction, and promotes **on-task behavior**, which means students are working on the task that is assigned. Calling on a student by name first and then asking a question allows other students to tune out, so the level of concern and on-task time may be diminished.

Examples should be provided to illustrate new information, and nonexamples can help too. For instance, an example of democracy is the right to vote; a nonexample of democracy is being told who will control the government.

Finally, teachers should keep the instruction moving along so that students remain engaged in learning and to promote on-task behavior. Ideal pacing is demonstrated when the amount of content does not overwhelm and frustrate students (Coyne et al., 2011). Keeping up with other students is often a problem for students with special learning needs. Teachers can provide them with extra practice on chunks or smaller segments of information. For example, math facts can be chunked into segments ( $\times 6$  facts,  $\times 7$  facts), vocabulary word lists can be segmented, and the number of questions to answer can be reduced.

### Practice

We can think of practice in several ways. First, there is **guided practice**, which engages students in practicing what they have learned, usually under the teacher's direction, and checking their understanding. There are several techniques.

Students with special learning needs benefit from multiple opportunities to practice, or **massed practice**; active-participation activities can provide these opportunities. Active participation also promotes engaged time and on-task behavior. **Engaged time** is the amount of time students are actively learning. Students are making some type of response (oral, written, constructing) or exhibiting behavior (demonstrating eye contact, paying attention) that suggests they are paying attention, listening, and engaged. Figure 7.2 provides examples of active-participation activities for guided practice.

**Checking for understanding** (CFU) means periodically determining whether students are learning the content. For instance, CFU can be conducted after subject matter is presented or during guided practice. It is necessary to ensure that all students respond. Teachers can use the following techniques to check for student understanding (Price & Nelson, 2003):

- Present information that was taught (factual, rule, procedure) and ask students to show, by signaling thumbs up or thumbs down, whether the information is correct.
- Use response cards for students to indicate their response to the teacher's statement or question.
- Have students show their responses using materials such as manipulatives in math.
- Have students write their responses to be turned in for checking.
- Have students write their responses on white boards.

*Error-correction procedures* should be implemented to correct mistakes and to provide feedback, ensuring that students do not practice mistakes or learn information incorrectly. Error-correction procedures include stopping the student if an error is made, modeling the correct response, and having the student repeat the correct response.

**FIGURE 7.2** EXAMPLES OF ACTIVE-PARTICIPATION ACTIVITIES

1. Use Jigsaw (Slavin, 1991) as a technique to engage all students in learning and sharing information (see the section on cooperative learning on page 230).
2. Use Think-Pair-Share-Write (students work with a partner to share their response to a question; students turn in their own written responses).
3. Use “Numbered Heads Together” (Kagan, 1990) (students in groups discuss the response to an answer; each student has a number; the teacher calls on one number to provide the answer). This works really well to review the meanings of concepts and terms.
4. Have students brainstorm responses to questions; call on students randomly to provide answers.
5. Require students to take notes.
6. Use peer pairs for practice (see the discussion of small groups in the section on grouping structures).
7. Have students find pictorial representations for content being learned (students can make time lines with significant events pictured or drawn along the timeline).
8. Use response cards. Card 1 can be used when questions require a yes/no or true/false response. Words can be color-coded so that teachers can quickly scan the students to be sure the correct color (word) is displayed. Cards 2 and 3 are pinch cards. The teacher can present a definition and the student “pinches” the answer (puts thumb and forefinger next to the answer). Students should be told, “Hold your response card at chest level. I will give you a question (or definition). I will say ‘think,’ and then you show me. Hold up your card with the correct answer or pinch the correct answer.”

<p><b>Card 1</b> <b>Yes/No or</b> <b>True/False Card</b></p> <p>Yes True</p> <p>No False</p>	<p><b>Card 2</b> <b>Pinch Card</b> <b>Rectangle</b></p> <ul style="list-style-type: none"> <li>• Pyramid</li> <li>• Cylinder</li> <li>• Isosceles trapezoid</li> <li>• Parallelogram</li> <li>• Triangle</li> </ul>	<p><b>Card 3</b> <b>Pinch Card</b></p> <ul style="list-style-type: none"> <li>• Length</li> <li>• Area</li> <li>• Volume</li> <li>• Perimeter</li> </ul>
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Questioning continues to be an important instructional technique to monitor student comprehension of the instructional objectives. Teachers can also use the Response-Dependent Questioning Strategy, which has remained viable for years, shown in Table 7.5 to help students arrive at the correct answer to a question.

Independent practice is a type of practice that occurs in the classroom or as homework and implies that students have demonstrated a good understanding of the skill (as determined during progress monitoring) and are ready for activities that do not require direct teacher supervision or guidance. For example, students can practice in small groups or independently at their desks. They can also be assigned homework as another opportunity for practice. Independent practice activities should be related directly to the instructional objective introduced during the presentation of information, and students can be capable of high

TABLE 7.5

RESPONSE-DEPENDENT QUESTIONING STRATEGY

Steps	Questioning Strategy	Example	Response
Step 1: Opening Question	Teacher asks question about subject being presented.	<i>Example:</i> Asks student to make the sound of the digraph, EE.	<i>Response:</i> Student makes correct sound; if incorrect, proceed to Step 2.
Step 2: Constructed Response	Teacher seeks correct response by prompting student to focus on specific knowledge or information from which a correct response can be constructed.	<i>Example:</i> Think about the rule we have learned for two vowels together.	<i>Response:</i> Student makes correct sound; if incorrect, proceed to Step 3.
Step 3: Multiple Choice	Teacher provides choice of two responses; one of the responses is correct.	<i>Example:</i> Is the sound “ee” (makes long “e” sound) or “e” (makes short “e” sound)?	<i>Response:</i> Student selects correct sound; if incorrect, proceed to Step 4.
Step 4: Restricted Alternative	Teacher eliminates the incorrect response from Step 3 but does not provide the answer.	<i>Example:</i> EE (points to letters on chalkboard) does not make the “e” (makes short “e” sound) sound. What is the correct sound of EE?	<i>Response:</i> Student provides correct response; if incorrect, proceed to Step 5.
Step 5: Complete Model	Teacher provides correct response.	<i>Example:</i> Teacher points to EE on chalkboard and makes “ee” sound.	<i>Response:</i> Student imitates correct response.

SOURCE: Adapted from Stowitschek, Stowitschek, Hendrickson, and Day (1984).

levels of success working independently. **Distributive practice**, which is practice opportunities presented over time on skills that have been taught, ensures that students continue to get some level of practice (in the maintenance stage of learning, for example) so their learning of new skills remains intact. Distributive practice on taught skills can be done during independent practice and as part of homework.

### Closure

During closure, which occurs at the end of a lesson and may take only a few minutes, teachers and students review the instructional objective, review the lesson’s activity, relate learning to other contexts, and discuss follow-up plans. Closure activities can be brief, but they are an important part of the lesson and need to be considered when time is allotted for instructional planning.

### Progress Monitoring

In **progress monitoring** teachers must evaluate students’ understanding of the lesson and their ability to perform the skill. We discuss progress monitoring in Chapter 8 and provide examples of this important instructional step throughout the remaining chapters.



### INSTRUCTIONAL STEPS

Ms. Mendez is teaching a new unit on global warming. She spent several days one week probing her students' knowledge about the concept to determine what they already know from media coverage. She determines her students' stage of learning by assessing overall student performance on key vocabulary and important ideas pertaining to causes and effects and solutions to problems. On the basis of her assessment information, Ms. Mendez decides to use explicit instruction to teach key vocabulary as the beginning of her unit on global warming.

#### ADVANCE ORGANIZER

Ms. Mendez tells the students the purpose of instruction. She has them work with a partner to write down their ideas about the meaning of global warming. After several partner pairs share their ideas, which she puts on the chalkboard, she presents five key vocabulary words and explains that to learn more about global warming, they must understand the meanings of these words.

#### PRESENTATION OF INFORMATION

Ms. Mendez reads the list of five words and their definitions, which are presented in two columns and projected for the entire class to see. She covers up one column (the definitions column). She reads one of the words and asks students to state the definition. She reveals the definitions column and covers up the other column (vocabulary words). She has a student read one of the definitions and asks another student to state the word. Next, she uses one word in a sentence and then asks students for examples of the other words in sentences.

#### PRACTICE

Ms. Mendez has the students stand. With the list of words and definitions concealed, she says a word and gently tosses a Koosh ball to one student, who must define the word. Having defined the word, the student returns the Koosh ball to Ms. Mendez, who repeats this process with the remaining words and different students. She provides error correction for any student who is unable to define the word by showing the definition. She also uses this procedure for saying a definition and asking students to supply the word.

Next, she has students work with a partner to match the words and definitions. She gives each pair two envelopes, one with the words and another with the definitions, for them to match. After the timer sounds, each pair turns to a neighboring pair to share their matches.

Finally, Ms. Mendez gives the students a passage about global warming that contains the new words. She asks them to underline the words and to explain how the words are used in the sentences.

#### CLOSURE

At the end of the lesson, Ms. Mendez asks students to explain the purpose of the lesson and what they learned. She describes the activities in the unit on global warming that the students will complete over the next few weeks.

#### PROGRESS MONITORING

Ms. Mendez gives the students a matching exercise to check their accuracy in selecting the definitions. She also has them use the new words in sentences.

The instructional steps are illustrated in Instructional Strategy 7.2 with an example regarding Ms. Mendez's science instruction.

Table 7.6 offers questions to help teachers reflect on their practices during the steps.

TABLE 7.6

REFLECTIVE QUESTIONS TO GUIDE INSTRUCTIONAL DECISION MAKING

Instructional Step	Reflective Questions
Advance Organizer	<ul style="list-style-type: none"> <li>• Do I have the students' attention?</li> <li>• Is the instructional objective stated specifically?</li> <li>• Do students appear to be interested in the lesson?</li> <li>• Is there sufficient review of background or related content?</li> <li>• Is there vocabulary that needs to be reviewed?</li> <li>• Are students making connections across skills?</li> </ul>
Presentation of Information	<ul style="list-style-type: none"> <li>• Are students comprehending the lesson?</li> <li>• Is modeling effective?</li> <li>• Do I need to provide more examples?</li> <li>• Do students understand after error correction?</li> </ul>
Guided Practice	<ul style="list-style-type: none"> <li>• Are all students engaged actively in learning? Do I need to provide more examples?</li> <li>• Are more practice opportunities necessary? Do I need to give more prompts?</li> <li>• Do students understand after error correction? Is the grouping practice effective for instruction?</li> <li>• Are there vocabulary words that require further instruction?</li> <li>• Are the instructional materials and textbooks appropriate?</li> <li>• Are the practice opportunities appropriate?</li> </ul>
Independent Practice (can also be homework)	<ul style="list-style-type: none"> <li>• Are students ready for independent practice?</li> <li>• Is the grouping practice effective in promoting practice on the instructional objective?</li> <li>• Are students capable of completing activities independently?</li> <li>• Are students achieving high levels of accuracy on independent practice activities?</li> <li>• Am I providing feedback for activities?</li> </ul>
Closure	<ul style="list-style-type: none"> <li>• Do I allow enough time for closure?</li> <li>• Do all or most of the students have opportunities to engage in closure activities?</li> <li>• Do I still have students who do not understand the instructional objective?</li> <li>• Are students able to relate the lesson's objective to other learning?</li> </ul>
Progress Monitoring	<ul style="list-style-type: none"> <li>• Have students demonstrated mastery of the skill presented in the lesson?</li> <li>• Do I need to reteach or model the skill? Was my instructional intervention effective?</li> <li>• Is the skill appropriate for students?</li> <li>• Do I need to task-analyze the skill further to meet individual needs of students?</li> </ul>

## HOW CAN INSTRUCTIONAL GROUPING PRACTICES PROMOTE EFFECTIVE INSTRUCTION?

There are a variety of instructional grouping practices, including whole group instruction, flexible small groups, and one-to-one teaching. Peer tutoring is another grouping practice that supports students who can benefit from more

opportunities to practice their skills. Finally, teachers have used cooperative learning structures for years to enrich practice in student-centered instruction. Consider how to use these practices when planning and delivering instruction.

## INSTRUCTIONAL GROUPING PRACTICES

### Whole Group Instruction

In whole group instruction, the teacher presents a lesson to the entire class. This grouping practice works well where common instructional objectives are identified, the teacher delivers the lesson, and students respond orally or in writing. Whole group instruction is often chosen to teach content-area subjects, such as science, social studies, and health, and it is common at the secondary level. Examples of activities for whole groups include direct, explicit instruction on new information (vocabulary, rules, concepts), read-alouds, and presentations.

Researchers have shown that whole group instruction can be effective for students of varying abilities (Gersten, Carnine, & Woodward, 1987). It allows them to hear responses from peers, and it also lets the teacher pace instruction to maintain academic engaged time and work individually with students following instruction. The disadvantages include limited error correction, which is problematic for students with special learning needs, a pace that may be too fast for some, and the use of instructional objectives that may not be appropriate for everyone. Teachers must be sure the objectives are appropriate for most of the students and allocate time for those who require further individualized instruction.

### Flexible Small Groups

Flexible small groups consist of three to five students and can include those of the same or different abilities. The purpose varies according to instructional level and students' individual needs.

### Same-Ability Groups

Identified through assessment, all the students in **same-ability groups** are performing comparably on a particular skill and require extra or accelerated instruction. For struggling students, extra practice on curricular objectives is often necessary. For students who are high achieving, gifted, or talented, same-ability groups can provide enrichment activities.

Research supports the efficacy of this grouping practice. Small group instruction yields better academic outcomes for students with disabilities than whole group instruction (Schumm, Moody, & Vaughn, 2000; Vaughn, Hughes, Moody, & Elbaum, 2001). Its major advantage is the opportunity to provide students with more modeling, prompting, and error correction, and pacing better tailored



#### VIDEO CASE 7.2

#### Working in Groups

1. What instructional grouping practices do the teachers in the video suggest in order to promote effective instruction? What practices help older and younger students to work collaboratively in small groups or pairs? How are these practices used to support student learning throughout the video?
2. What are the benefits of having older students assist younger students? What are the benefits of having students of the same age work cooperatively together? Describe how both of these effective instructional practices are used within the video.



Students performing at varying levels both academically and socially can learn from one another in mixed-ability groups.

to their individual needs than in whole group instruction. The challenge is to ensure that the rest of the class is actively engaged in meaningful tasks. Having backup tasks ready for those students who require teacher assistance when it is not available, and for those who finish their tasks before small group instruction concludes, can help ensure that all students are actively learning.

### Mixed-Ability Groups

This instructional grouping practice consists of students, identified through assessment, who are performing at various levels on skills. This grouping practice can allow students to work on projects and to make presentations. The advantage is that

they can learn from each other. Little evidence exists that **mixed-ability groups** adversely affect the learning of students who are gifted and talented (Tieso, 2005).

### One-to-One Teaching

In one-to-one groupings, teachers provide instruction to individual students on the basis of their specific learning and behavioral needs. For example, a student may need prompts, feedback, or directions to begin working on or mastering an instructional objective. A student's behavior may warrant individualized instruction away from other students in the classroom. Tutorial assistance might be necessary when preparing for an exam in a content-area class, or individualized assistance might be necessary to correct errors on a homework assignment.

One-to-one instruction has been shown to help students avoid frustration and cope with instructional demands. The advantage is that individual students receive assistance that promotes their learning. On the other hand, teachers must plan tasks so other students are engaged as well. Furthermore, one-to-one instruction may not be easy to achieve in general education classrooms because of the number of students and time constraints.

## PEER TUTORING

**Peer tutoring** is an instructional grouping practice wherein pairs of students work on assigned skills, usually for extra practice. Peer tutoring models that have remained viable instructional grouping practices include Classwide Peer Tutoring (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986) and Peer-Assisted Learning Strategies (PALS; Fuchs, Fuchs, Mathes, & Simmons, 1997). Research on peer tutoring models has shown that peer tutoring can improve the academic achievement of tutees as well as increase the amount of time students spend on school tasks (Heron, Villareal, Yao, Christianson, & Heron,

2006). Based on years of research, peer tutoring has been shown to increase active student involvement and students' opportunities to respond, review, and practice skills and concepts.

In peer tutoring, there is a tutor-tutee relationship, which consists of instruction and feedback to provide efficient teaching to students with disabilities and students who are at risk for academic difficulties (Heron et al., 2006). In reading, for example, a higher performing peer can be paired with a student who is reading at a somewhat lower level and needs additional instructional support. The partners take turns serving as reading coach and reader. The reading coach reads the designated reading passage for a short time period; the reader then reads the same passage for the same time period. The partners provide error correction as needed and praise for good reading. Often this passage reading is followed by comprehension questions. These same procedures can be applied in mathematics, vocabulary development, and spelling.

The advantages of this grouping practice include the opportunity for students to develop academic skills, form cooperative relationships, and gain extra instructional support for learning and behavioral problems. Among the challenges are allocating time to teach tutors their role responsibilities, matching students appropriately, monitoring the pairs, and assessing progress. Moreover, there is a group of students with disabilities who do not necessarily benefit from the peer tutoring model in reading (McMaster, Fuchs, & Fuchs, 2006). Students whose reading skills are significantly lower than the rest of the class likely will require explicit, systematic instruction.

## COOPERATIVE LEARNING

**Cooperative learning** allows mixed-ability small groups to focus on academic and social skills. According to some of the pioneer researchers on cooperative learning, the purposes of this type of learning are for students to work collaboratively to achieve common academic and social goals and to be accountable to the team for their individual efforts (Johnson, Johnson, & Holubec, 1994).

Extensive research on cooperative learning has been conducted in various academic areas (mathematics, reading, social studies) with students who have disabilities, students who are typically achieving, and students who come from diverse backgrounds. In most cases, a classic review of the research literature showed that students tend to derive academic and social skills benefits from this instructional arrangement (Slavin, 1991).

Several models of cooperative learning are popular in classrooms. The techniques share similar characteristics: group academic and social goals, arrangement of heterogeneous student groups, task structure, cooperation, and individual and group accountability. Table 7.7 provides information about cooperative learning models.





TABLE 7.7

SELECTED MODELS OF COOPERATIVE LEARNING

	Teams–Games–Tournaments	Learning Together	Jigsaw
Steps	<ol style="list-style-type: none"> <li>1. Teacher presents material to be studied.</li> <li>2. Students work in teams to learn material.</li> <li>3. Students compete in tournament games with peers of similar ability, answering questions about the material practiced in teams.</li> <li>4. Points are awarded on the basis of performance in tournaments.</li> <li>5. Team (original cooperative learning team) scores are obtained from points that members accrue in tournament games.</li> <li>6. Team standings are announced weekly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Teacher explains academic task, cooperative goal structure, and criteria for success to group teams.</li> <li>2. Students are responsible for learning material and making sure group members learn material as well.</li> <li>3. Students provide encouragement and assistance to team members.</li> <li>4. Teacher monitors group work and intervenes to provide task assistance or teach collaborative skills.</li> <li>5. Student work and group functioning are evaluated.</li> <li>6. Students are arranged to promote face-to-face interaction.</li> <li>7. Teams construct one group product.</li> </ol>	<ol style="list-style-type: none"> <li>1. Teaching material is divided into parts and assigned to group members.</li> <li>2. Students learn how to communicate with and tutor other students.</li> <li>3. Subgroups of students with the same material meet, learn, and then share their material with the original team members.</li> <li>4. All members of the team must learn all parts of the material.</li> <li>5. Teachers monitor groups, providing assistance, encouragement, and direction.</li> </ol>
Goals	<ol style="list-style-type: none"> <li>1. Students learn academic material.</li> <li>2. Students help team members learn material.</li> </ol>	<ol style="list-style-type: none"> <li>1. There is an academic task goal.</li> <li>2. There is a cooperative/ collaborative/social goal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Students learn a part of the material and then teach this to other team members.</li> </ol>
Student Groups	<ol style="list-style-type: none"> <li>1. They are heterogeneous, diverse groups.</li> <li>2. There are four to five students per team.</li> <li>3. Everyone must learn concepts.</li> </ol>	<ol style="list-style-type: none"> <li>1. They are heterogeneous, diverse groups.</li> <li>2. There are two to six students per team.</li> </ol>	<ol style="list-style-type: none"> <li>1. They are heterogeneous, diverse groups.</li> <li>2. There are four to seven students per team.</li> </ol>
Task Structure	<ol style="list-style-type: none"> <li>1. There is group-paced instruction.</li> <li>2. Teams work together to study material.</li> </ol>	<ol style="list-style-type: none"> <li>1. There is group-paced instruction.</li> <li>2. Teams work together to study topic/concept/ material/problem—“We all sink or swim together.”</li> <li>3. Everyone must learn concepts and participate.</li> <li>4. Student roles may be assigned.</li> <li>5. Only limited materials are provided, thus necessitating interdependence.</li> </ol>	<ol style="list-style-type: none"> <li>1. The structure is cooperative/ interdependent.</li> <li>2. Students learn a section of material pertaining to a topic and then teach that material to group members.</li> </ol>

	Teams–Games–Tournaments	Learning Together	Jigsaw
Cooperation	1. Students help each other to learn material so members will do well in tournaments.	1. Students help each other learn material. 2. Students demonstrate collaborative/social group skills (e.g., providing feedback, elaborating, sharing, staying on task, doing one's share of the work).	1. All students must work together to learn all the material on a topic.
Accountability/Evaluation	1. Everyone is responsible for his or her own learning. 2. Everyone is responsible for ensuring that other team members learn concepts. 3. Each member's tournament contributes to a group score.	1. Everyone is responsible for his or her own learning. 2. Everyone is responsible for ensuring that other team members learn concepts. 3. Members may be asked to explain group answers, take a test, or edit another person's work.	1. All students are accountable for learning all the material.
Group Processing	1. Group members evaluate their ability to work as a team according to set criteria at the conclusion of their work. 2. Group members determine group skills that should be worked on to promote better collaboration.		

In preparing for cooperative learning, consider the following questions:

- What are the academic and social skills objectives?
- What task or activity structure can be used to teach the objectives?
- How can the elements of cooperative learning be promoted?
- How will student groups be formed?
- What environmental factors must be considered?
- What management techniques will be used?
- What is the teacher's role during group activities?
- How will individual and group progress with instructional objectives be monitored?
- What difficulties might students with special needs encounter in cooperative learning groups?

Findings from the review of the research literature identified advantages of cooperative learning. First, there are opportunities for students to work together toward common goals, thus necessitating some degree of collaborative behavior. Second, group work requires verbal interactions, creating opportunities to develop language skills. Third, cooperative learning means students, rather than teachers, are responsible for solving problems. Fourth, it promotes social interactions and peer acceptance (Slavin, 1991).

Cooperative learning activities require extensive planning and preparation. Teachers must ensure that all students—regardless of their group assignment—participate fully. The bulk of the work should not fall on the shoulders of only a few students. Finally, teachers must be sure students are capable of performing instructional objectives successfully with group members and individually. The Working Together feature shows how professionals can collaborate to determine how to differentiate content, instructional approach, grouping, and materials for students who are having difficulties—in this case, during a mathematics lesson.

## WORKING together

### COLLABORATING TO DIFFERENTIATE INSTRUCTION

Mrs. Bell is teaching her fifth-grade students different ways to represent fractions and wants them to compare and order fractions according to fractional parts. She provides a review of different fractions and key vocabulary. Mr. Rivera, the math specialist, has encouraged the classroom teachers to provide students with number lines and fraction strips to represent fractional parts, so Mrs. Bell has incorporated these into her instructional practice. She has the students work in small, mixed-ability groups to compare and order fractions before they apply this factual knowledge to problem solving. Ms. Chavez, the special education inclusion teacher, works with the students with mathematics learning disabilities to provide more specialized instruction on fractions. As Mrs. Bell circulates among the small groups, she listens to group discussions and notices that several students seem confused. She sits with them and asks questions to check their understanding of the assignment, the vocabulary, and the use of the number lines and fractions strips for comparing and ordering fractions. She decides to model the procedure once more and watches students complete the next example; she also provides error correction as needed. She instructs the students to complete the next few problems as she circulates among the other groups and makes notes about student progress in her assessment notebook. During the fifth-grade teachers' planning period, Mrs. Bell, the other two fifth-grade teachers, Mr. Rivera, and Ms. Chavez discuss the progress monitoring data from the fractions lessons. They discuss how Mr. Rivera and Ms. Chavez can help students who are struggling during mathematics instruction and support the teachers. Having Ms. Chavez working with struggling students in small groups and Mr. Rivera providing tips for effective



instruction on fractions are viewed by the fifth-grade teachers as effective collaborative practices for now. The teachers have agreed to stagger their math instruction time so that Ms. Chavez can work in all of the classes.

### QUESTIONS TO CONSIDER

1. How can Mr. Rivera help Mrs. Bell better understand the difficulties struggling students are having learning fractions?
2. What cooperative learning model can Mrs. Bell and Ms. Chavez use to maximize Ms. Chavez's support of struggling students?
3. How can Mr. Rivera and Mrs. Bell team-teach a lesson on fractions?

## WHAT GUIDELINES SHOULD BE FOLLOWED FOR TEXTBOOKS AND INSTRUCTIONAL MATERIALS?

### TEXTBOOKS

**Basals** are textbooks usually adopted by school districts to serve as a primary source for subject-area content. They are a good source of instructional content but often raise challenges for struggling students:

- The reading level of the textbook probably exceeds the ability of the student with reading difficulties. For students to benefit from reading a textbook, the material should be at their **instructional reading level**, the level at which they have 90% to 94% word recognition and 90% to 100% comprehension.
- The organization or structure of the text content may be hard for students with reading difficulties to follow. The text may lack, or the student may not be familiar with, key words that signal different types of text organization (cause/effect, compare/contrast). Recognizing how text content is organized helps readers comprehend the material.
- Basals usually do not include enough direct, explicit instruction to help struggling students learn content. For example, there may not be sufficient practice opportunities or examples.

In Chapter 10, we provide additional information about textbooks for students with reading difficulties. In Chapter 12, we offer suggestions for selecting and using content-area textbooks with struggling readers, especially at the secondary level.

### INSTRUCTIONAL MATERIALS

Guidelines for selecting and using instructional materials should address (a) the student and (b) the content and methodology.

### Student

- What are the student's present levels of educational performance?
- Can the instructional material be used to meet IEP goals?
- Does the student seem to be motivated to accomplish tasks and under what conditions?
- Does the student remain focused and persist with tasks? When does the student appear to lose focus and persistence?

Teachers can consult the IEP to identify a student's reading level as they make decisions about the need to adapt instructional materials that require the ability to read. They can also identify a student's reading level by conducting an informal reading inventory, discussed in Chapter 8. Finally, it's important to determine a student's interest in content and materials and identify where in the learning process the student stops trying. Motivation is a key ingredient of successful learning, and knowing their students' level of persistence helps teachers understand learners' needs more fully.

### Instructional Content and Methodology

- Is the content age-appropriate?
- Does the content address state standards and core curriculum?
- Does the instructional material specify a sequence of skills?
- Is information about teaching strategies included?
- Are there sufficient opportunities for practicing new skills?
- Are generalization and maintenance activities included?

Age-appropriateness of instructional materials is a primary concern in the selection process. For example, high-interest/controlled vocabulary materials can be used with older students who have limited reading vocabularies. These materials focus on topics that appeal to older students, such as current events, sports, and entertainment personalities, yet are written with grade-specific vocabulary to take into account limited word recognition and reading abilities. Equally important is the relationship between the materials and the curricular expectations from the school district and state. Teachers are held highly accountable through state assessments to teach the content on which students will be assessed, so materials selected for instruction must reflect this content, which has been specified as appropriate for all students.

Teachers can adopt a sequence for teaching skills and then be sure the instructional materials match this sequence. For example, if math instruction focuses on addition facts ( $6 + 9$ ,  $7 + 3$ ), then the instructional material should include



problems that match this skill. Subtraction math facts should not be included. The next skill in the sequence may include subtraction math facts and materials that focus on these types of problems.

Instructional materials might include review activities (for maintenance), teaching strategies, practice opportunities, and enrichment activities (for generalization purposes). Teachers must examine the materials to determine how the instructional material can best be used in a lesson and what adaptations are needed, if any.

Very often, teachers need to modify instructional materials to meet an individual learner's needs. Some instructional materials offer suggestions, such as extension exercises or alternative methodologies. Other adaptations might include adding more practice options, using only portions of the material, rewording complex directions, and breaking instructional components down into smaller instructional activities.

### ADAPTATIONS FOR CURRICULAR MATERIALS

Textbooks and instructional materials are important components of instruction and must be selected wisely. Textbooks may be assigned to teachers, but those teachers must still analyze them critically to see what difficulties students might encounter when reading the material. Instructional materials are used when concepts are first presented, during guided practice, and as part of independent practice activities. For example, students can use math manipulatives as part of place value instruction, complete reading comprehension sheets during independent seatwork, or use a scale as part of a cooperative learning activity on measurement. These materials must also be chosen carefully to augment instruction. Table 7.8 provides examples of ways to adapt instructional materials.

## WHAT ARE ASSISTIVE TECHNOLOGY DEVICES AND SERVICES FOR PROMOTING ACCESS TO THE GENERAL EDUCATION CURRICULUM?

Advances in technology have benefited most of society, but it could be argued that for people with disabilities, technology has provided a means to an end, which is independence. Assistive technology (AT) allows students access to the curriculum in inclusive settings and environments at school. By focusing on an individual's functional capability, it promotes independence for students with disabilities by enabling them to communicate and socialize with their peers; participate across settings such as the playground, classroom, cafeteria, and library; and demonstrate their learning of the curriculum. **Functional capability** refers to those abilities—such

TABLE 7.8

EXAMPLES OF ADAPTATIONS FOR INSTRUCTIONAL MATERIALS

Task/Instructional Materials	Student Struggles or Challenges	Material Adaptation
Reading directions or instructions/workbooks, worksheets	Reading or understanding written directions or instructions	Have students underline important words (circle, underline, draw). Rewrite directions or instructions using easier words. Explain the directions or instructions to the student. Say, "Tell me what you need to do first." "What do you need to do next?" Reduce the number of directions or instructions.
Reading books and word lists/textbooks, literature	Reading words	Put the text on tape for the student to listen to the reading (electronic books). Use high-interest/low-vocabulary materials.
Comprehending text	Comprehending material	Provide graphic organizers (see Chapters 10 and 12). Provide questions for students to answer after reading a few paragraphs.
Completing worksheets	Completing items on worksheets	Provide more time. Reduce the number of items. Reformat using borders to separate important information. Use color to highlight important information.
Reading text or worksheets	Seeing the material	Enlarge font size. Use a font that has simple lettering. Provide a magnifier. Use screen magnification software (see the following section on assistive technology). Use color. Contrast the foreground with the background.
Computing mathematical problems using workbooks or worksheets	Identifying symbols (=, +, ×).	Have students circle the symbol and state its meaning. Have students highlight the symbol with color before proceeding. Provide a cue sheet with the symbols and their meaning. Enlarge the font size of symbols to make them more readily visible.

as vision, hearing, communication, mobility, cognition, and motor control—that are used to help individuals compensate for struggles that are disability related. For example, an individual who has good hearing but is blind might want to read a chapter in a textbook. Listening to the chapter in an electronic book provides access to that material. When selecting AT devices, *we focus on strengths* to select devices that help individuals access their environments.

## ASSISTIVE TECHNOLOGY DEVICES

An **assistive technology device** is the unit itself, which can be an item (a Hoover cane to help a person who is blind with mobility), a piece of equipment (a motorized wheelchair to help an individual with physical disabilities move about), or a product system (a computer with speech output software that reads the text on the screen). The intent is to promote access and independence for individuals with disabilities by enhancing their functioning. Therefore, an assistive technology device is anything bought or made that helps a person with a disability accomplish tasks that would otherwise be difficult or impossible (Bryant & Bryant, 2003).

AT devices can be viewed along a continuum from low-tech to high-tech. Most of us identify as “high-tech” those devices that are usually electronic. Computers with their multiple capabilities, talking calculators, electronic books, screen reader and voice recognition software, and powered wheelchairs fall at the “high-tech” end of the continuum. Grips for pencils, different font sizes for text, a grab bar in the shower, and a magnifier are at the “low-tech” end. Thus, for a student who has a mathematics learning disability (LD), a calculator may be identified in the IEP as an AT device to help the student compute basic facts when solving word problems. For students who do not have a math LD and who use calculators to check their arithmetic, the calculator is an instructional material rather than an AT device.

**Assistive technology service** was defined by the Tech Act as “any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device” (Assistive Technology Act of 2004). Services include the following:

- Purchasing and/or leasing AT
- Selecting, designing, and fitting AT
- Coordinating and using other therapies or interventions
- Training or providing technical assistance for an individual with disabilities or the family
- Training or providing technical assistance for a professional

How are the terms *assistive technology device* and *assistive technology service* related? The answer is simply that they go together. A device of some sort (such as a wheelchair, a computer, a Braille text, or an FM listening system) may be necessary for a person with a disability to meet challenges related to impaired mobility, cognitive function, or sensory function. But the services associated with such assistive technology devices must also be carefully considered. How will the device be purchased? Who will assess whether the device and the person are a good match? Who will train the student to utilize the device properly? How will teachers, other professionals, family members, and



others with whom the AT user interacts learn how to provide personal and educational supports, in and out of the classroom? And how will these people and their services be coordinated? These questions must be answered successfully for devices and services to be effective.

For more information about assistive technology devices and services to support students' special learning needs, refer to <http://www.closingthegap.com>. Tech Notes, below, provides information about Dragon Dictate, which is voice recognition software and will be used by Mrs. Bell to help Paul write in his electronic reading journal.

We can group AT devices into categories that reflect their purpose and function. These categories include positioning and seating, mobility, communication, adaptive toys and games, adaptive environments, computer use, and instructional aids (Bryant & Bryant, 2003).

Positioning and seating devices encourage the best posture and seating arrangement for a particular function and time period. Students might move from one place to another using a wheelchair, sit during conversation and instruction, and have help while eating. Physical and occupational therapists are key professionals who work with positioning.

Mobility is the act of movement. When most people think of mobility AT devices, they think of wheelchairs, but mobility devices also include scooter boards, vehicular modifications, and white canes. Rehabilitation engineers, physical therapists, and orientation and mobility specialists are important team members with whom to discuss mobility issues.

Communication devices help people compensate for expressive language (speaking) difficulties by focusing on their capabilities to understand language and to convey their thoughts, ideas, and needs. **Augmentative and alternative**

## TECH *notes*

### DRAGON DICTATE

Dragon Dictate is a voice input and voice output program for Mac users. Individuals with upper extremity or vision disabilities, LD, or spinal cord injury are the target groups for this software. As a hands-free operation, individuals can speak naturally and control applications with voice commands to move the cursor or click on the

screen. The software was designed to enable writing, editing, and proofreading capabilities. It includes recognition training so that the software can learn how the user speaks and comes with a USB headset microphone and Bluetooth wireless capabilities (manufacturer: Nuance Communications, Inc., <http://www.nuance.com>).

**communication (aug com)** devices are included in the communication category. Aug com devices can supplement vocalizations when speech is not understood by a particular communication partner and can provide a way for an individual to speak. The speech/language pathologist is a key member of the IEP team when aug com decisions are to be made.

Adaptive toys and games (recreation) give children with disabilities an opportunity to play with toys and games to help them develop cognitive skills and to socialize with their peers. They might include devices with a sound so children who are blind can discriminate among them. Game board markers might have large tops so children with motor problems can grasp and hold them. Early childhood specialists work with assistive technologists and occupational therapists to design features that enable all students to interact with toys and games.

Adaptive environments (control of the environment) are devices and approaches that enable a person to manipulate the environment to allow for daily living, working, schooling, playing, and so forth. For instance, remote control units can be used to turn lights on and off, respond to the doorbell, open doors, or turn a computer on and off in the home, school, or workplace. In the classroom, something as simple as widening aisles can enhance mobility for a student who uses a motorized wheelchair. Other adaptive environment devices include curb cuts; Braille words for restroom, elevator, and room numbers; grab bars in showers; and automatic door openers. Occupational therapists help make decisions about ways to adapt the environment.

Computer access devices include keyboard overlays (templates that lie on the keyboard to define the key space for responding), pointers, and screen reader and voice recognition software. For example, by using voice recognition software, a student whose upper body control is limited but whose speech is a “functional capability” can speak into a microphone and tell the computer what functions to employ. For people who are blind and whose hearing is a “functional capability,” alternative output devices for computer use, such as screen reader software, are necessary. Screen reader software reads the text displayed on the computer screen. Educators, occupational therapists, and rehabilitation specialists typically assist with computer access.

Finally, instructional aids provide access to the curriculum, instruction, and instructional materials. Access to information can come via a screen reader program that allows access to the World Wide Web for research for a student who is blind, and remediation can come from math or reading instructional software.

Instructional software can provide students with extra practice on academic and problem-solving skills. However, students must continue to receive instruction from the classroom teacher.

Figure 7.3 provides guidelines for evaluating and selecting instructional apps and software.



FIGURE 7.3

## GUIDELINES FOR SOFTWARE AND APPS EVALUATION AND SELECTION

**A. Basic Information**

Name of software or app \_\_\_\_\_

Publisher \_\_\_\_\_ Cost \_\_\_\_\_

Hardware/mobile device requirements \_\_\_\_\_

**B. Description**

Grade level(s) \_\_\_\_\_ Reading level of text (if applicable) \_\_\_\_\_

Instructional area(s) \_\_\_\_\_

Purpose \_\_\_\_\_

Type: \_\_\_\_\_ Tutorial \_\_\_\_\_ Drill and practice \_\_\_\_\_ Simulation \_\_\_\_\_ Game \_\_\_\_\_

Instructional Objectives \_\_\_\_\_ yes \_\_\_\_\_ no

List objectives if stated \_\_\_\_\_

How is information presented? (check all that apply) \_\_\_\_\_ Speech \_\_\_\_\_ Music \_\_\_\_\_

\_\_\_\_\_ Graphics (pictures) \_\_\_\_\_ Text (words) \_\_\_\_\_ Animation \_\_\_\_\_

How do the visuals look? (check all that apply) \_\_\_\_\_ Screen is too busy \_\_\_\_\_

\_\_\_\_\_ Graphics enhance, rather than distract from, purpose \_\_\_\_\_ Print is legible \_\_\_\_\_

\_\_\_\_\_ Print Size Age-Appropriate \_\_\_\_\_

What is the quality of the sound? (check all that apply) \_\_\_\_\_ Sound is clear/audible \_\_\_\_\_ Speech is audible \_\_\_\_\_

\_\_\_\_\_ Sound is distracting \_\_\_\_\_ Rate of speech is appropriate \_\_\_\_\_

**C. Instructional Design**

Directions are clear, easy to read, and short \_\_\_\_\_ yes \_\_\_\_\_ no

Examples or models are provided \_\_\_\_\_ yes \_\_\_\_\_ no

Pacing is appropriate \_\_\_\_\_ yes \_\_\_\_\_ no

Practice opportunities are provided \_\_\_\_\_ yes \_\_\_\_\_ no

Error correction is provided \_\_\_\_\_ yes \_\_\_\_\_ no

Difficulty level can be individualized \_\_\_\_\_ yes \_\_\_\_\_ no

Reinforcement (visual and/or auditory) is present \_\_\_\_\_ yes \_\_\_\_\_ no

A recordkeeping/evaluation option is available \_\_\_\_\_ yes \_\_\_\_\_ no

**D. Content**

Appropriate to stated objectives \_\_\_\_\_ yes \_\_\_\_\_ no

Factual and accurate \_\_\_\_\_ yes \_\_\_\_\_ no

Free of gender, cultural, or racial bias \_\_\_\_\_ yes \_\_\_\_\_ no

Relates to school's curriculum \_\_\_\_\_ yes \_\_\_\_\_ no

Relates to student's IEP \_\_\_\_\_ yes \_\_\_\_\_ no

**E. Technical Considerations**

User Demands (respond to any that apply) Academic \_\_\_\_\_

Physical/motor \_\_\_\_\_

Computer or mobile device knowledge \_\_\_\_\_

Technical vocabulary \_\_\_\_\_

Functions (check all that apply) \_\_\_\_\_ Save work in progress \_\_\_\_\_ Print in progress \_\_\_\_\_ Alter sound \_\_\_\_\_

Return to main menu at any point in program \_\_\_\_\_ Change pace \_\_\_\_\_

Teacher Demands (respond to any that apply) Amount of instruction to students for using software \_\_\_\_\_

Installation procedures \_\_\_\_\_

Level of student monitoring \_\_\_\_\_

Preparation needed before using software \_\_\_\_\_

**SOURCE:** Adapted from Bryant (2015).

Classroom teachers can work with assistive technologists and special education teachers to decide which instructional aids are most suitable to help students with disabilities access the curriculum (Bryant & Bryant, 2003). Table 7.9 provides examples of AT devices students with disabilities can use, in accordance with their IEPs, to access and benefit from instruction and function successfully in various environments.

**TABLE 7.9****EXAMPLES OF AT DEVICES**

Use of Device	AT Device
<b>For Students to Access Reading</b>	
To enlarge text screen magnifier software, screen magnifier	Large-print books, larger font size, hand-held magnifier, closed-circuit television
To enhance text and graphics	Eye glasses, color contrast, pictures, Braille text
To convert text to speech	Screen reader software, talking dictionaries, electronic books
<b>For Students to Access Writing</b>	
To increase use of writing tools	Pencil grips, writing paper with colored lines, writing templates
To enhance writing productivity	Electronic/talking spell checker/dictionary, voice recognition software, talking word processor software (WriteOutloud, CoWriter), voice dictation input
To use alternative writing tools	Computer, keyboard enhancements (keyguard, repeat rate adjustments ["stickie keys": key remains depressed for longer time]), electronic notetakers (with Braille), pointing device to access keyboard, alternative keyboards (Intellitools, on-screen keyboard), switches and scanning devices

*(Continued)*

(Continued)

Use of Device	AT Device
<b>For Students to Access Mathematics</b>	
To support calculation	Calculator with print output, “talking calculator,” calculator with large keypad, on-screen calculator, graph paper for problems with writing and aligning
To support measurement	Measuring devices with tactile output, measuring devices with speech output, talking thermometers
To support time telling	Talking watches, watches with large faces, watches with tactile output
<b>For Students to Access Study Skills</b>	
To help with time management	Talking watches, calendars as planners with pictures if necessary, speech output devices to remind about dates
To support memory and organization	Hand-held recorders (e.g., mobile devices) to input important times, dates, and things to do; visual organizers (color-coded folders)
<b>For Students to Be Able to Listen/Communicate</b>	
To listen in class	Hearing aids, assistive technology systems (FM)
To communicate	Communication boards (electronic and nonelectronic), speech amplifier, TTY/TTD (teletype devices), mobile devices (smartphones, tablets)
To listen to multimedia	Closed captions on videotapes and TV, computer-generated speech output
To promote safety	Signaling systems (telephone ring signal, door knock signal, smoke alarm with strobe light)
<b>For Students Who Require Mobility Support</b>	
To enhance orientation and mobility	Eyeglasses, grab bars, white cane, tactile signage, power or manual wheelchairs, motorized scooter

**SOURCE:** Adapted from Technology and Media (n.d.).

AT devices will be necessary to help Paul, Mrs. Bell’s student with cerebral palsy, benefit from instruction. She decides to use the ADAPT framework to make adjustments to a reading comprehension activity, which involves writing, for Paul.

## ASSISTIVE TECHNOLOGY SERVICES

According to the Assistive Technology Act of 2004, several AT services must be provided to ensure that devices are properly identified and used. For example, the selection of appropriate AT devices based on an evaluation of the individual is an important service. Assistive technologists, diagnosticians, audiologists, occupational therapists, speech/language pathologists, and special and general education classroom teachers may participate in an AT evaluation of a student, depending on the student’s needs. Each professional contributes information

# ADAPT *in action*

## READING, WRITING, AND ASSISTIVE TECHNOLOGY

Mrs. Bell has students read sections from a chapter and answer comprehension questions in their reading journal for part of the class period. She then has students share their responses to the questions to check their understanding and to promote class discussion. Paul has good reading and comprehension abilities and can readily participate in discussions. Paul is adept at using a computer to do his work and is familiar with its word processing and spell-check features. He has an electronic reading journal to ease difficulties associated with holding a pencil and writing. A laptop computer has been customized to fit on the tray of his motorized wheelchair. The computer keyboard has been equipped with a keyguard, which is an overlap placed on top of the keys to minimize keys being accidentally hit during typing. However, Mrs. Bell notices that Paul seems to tire when working on his reading journal and falls behind the other students in answering all of the questions. She decides to consult the assistive technologist, Ms. Parette, to identify further assistive technology adaptations to address Paul's needs.

- A** **Ask yourself, "What am I requiring the student to do?"** "I want my students to be able to read text and answer comprehension questions and share their answers."
- D** **Determine the prerequisite skills of the task.** "I want my students to answer comprehension questions in their journal about a section of the chapter from a social studies textbook. They need to be able to discuss their answers with the whole class."
- A** **Analyze the student's strengths and struggles.** Paul's reading comprehension skills are good and he is able to engage in discussions about the material. However, he has motor problems that make turning pages in a textbook and writing difficult. Although he is using a computer for writing, he seems to have problems when doing multiple typing assignments and turning pages in his textbook. He is not keeping up with his peers.
- P** **Propose and implement adaptations from among the four categories.** After conducting several observations of Paul engaging in the reading and writing tasks, Ms. Parette recommends an electronic page turner and Dragon Dictate voice recognition software for writing assignments, and she will teach Paul and Mrs. Bell how to use them.
- T** **Test to determine whether the adaptations helped the student accomplish the task.** Mrs. Bell will monitor whether Paul is completing all of the reading comprehension questions in his electronic journal and how well the page turner seems to be helping him read his section of the textbook. Ms. Parette will conduct observations as well and compare notes with Mrs. Bell.

## ADAPT framework: READING, WRITING, AND ASSISTIVE TECHNOLOGY

A	D	A	P	T
ASK “What am I requiring the student to do?”	DETERMINE the prerequisite skills of the task.	ANALYZE the student’s strengths and struggles.	PROPOSE and implement adaptations from among the four categories.	TEST to determine whether the adaptations helped the student accomplish the task.
		Strengths	Struggles	
The students will write answers to reading comprehension questions on a section of a chapter from a social studies textbook.	<ol style="list-style-type: none"> <li>1. Is able to read the textbook with understanding and respond to questions.</li> <li>2. Is able to turn the pages in the textbook.</li> <li>3. Uses a computer to write answers to comprehension questions.</li> </ol>	1	<ol style="list-style-type: none"> <li>2</li> <li>3</li> </ol> <ol style="list-style-type: none"> <li>2. Instructional material provides an automatic page turner.</li> <li>3. The student already uses a computer to complete written assignments. Needs voice recognition software, Dragon Dictate.</li> </ol>	<ol style="list-style-type: none"> <li>2. Observe to see whether the device is working properly.</li> <li>3. Observe to see how the software works to help the student answer all of the questions and keep up with his peers.</li> </ol>

about how the student is performing in relation to academics, communication, motor development, vision, or hearing. One evaluation example is the *Functional Evaluation for Assistive Technology* (Raskind & Bryant, 2002), which enables professionals to rate the performance of a student on listening, speaking, academics, memory, organization, motor tasks, and behavior. Each discipline (such as occupational therapy, speech/language, and audiology) has its own criteria for evaluating student performance.

For example, when AT is being considered during an IEP meeting for a student with an identified reading disability, the AT technologist works with classroom teachers to determine reading strengths and areas of difficulty when



completing classroom activities. Classroom teachers may be asked specific questions about reading requirements in the classroom and about the student's performance on these tasks. The AT technologist consults a speech/language pathologist if language difficulties are also noted. Together, professionals can make decisions about devices that can help the student with reading tasks. The evaluation process is ongoing; changes may occur in a student's environment or setting, strengths and struggles, and maturity (Bryant & Bryant, 2003; Raskind & Bryant, 2002).

Training is another example of an AT service (Rieth, Colburn, & Bryant, 2004). Training on AT devices should be provided to the students or users of the devices, their families, and professionals such as classroom teachers, speech/language pathologists, and occupational therapists. Professionals must be trained to know how devices work, how to integrate them when working with students, how to troubleshoot if a device malfunctions, and how to evaluate students to make an appropriate match between device and needs. Training must be an ongoing priority to ensure that both users and professionals remain informed. It is conducted in teacher preparation programs and as a part of ongoing inservice training (Rieth et al., 2004). Paraprofessionals too must become competent in the use of AT devices to work effectively with their students who rely on them.

Finally, because devices can often go home with students, family members must know how to use them properly. If electronic devices prove overwhelming, more training may be required for successful implementation (Lemons, 2000).

It is crucial to include families in selecting AT devices and to listen to their viewpoints (Bryant & Bryant, 1998). Team members must consider family viewpoints about disability and how services that are intended to be helpful may be interpreted. The family's experience and comfort level with technology are very important, especially if they are helping their child use the technology at home. Finally, family members should know what outcomes educators hope to achieve by having the student use a particular AT device. These outcomes should reflect the family's interest and values in promoting their child's independence.

## ASSISTIVE TECHNOLOGY INTEGRATION

As teachers design instruction, they can think about the curriculum and objectives students will be taught and the way instruction will be delivered (using grouping, modeling, guided practice). They must also consider the strengths and needs of their students with IEPs and how AT devices can promote their active participation in lessons (Bryant & Bryant, 2003; Rieth et al., 2004). Finally, they should also consider the environmental requirements for the devices, such as whether they produce potentially distracting sound or require electricity. Students may be able to use headphones with devices such as talking

calculators, speech output, and tape recorders. The location of electrical outlets will dictate where devices that require electricity can be set up. Other devices may require batteries, often preferable when mobile environments are part of the setting.

During instruction, teachers should monitor how easy it is to use the device and whether further training is required. Teachers should monitor their students' ability to keep pace with their peers in completing the tasks. Practice with the nuances of the device may be necessary so students can achieve the maximum benefits from using it.

Finally, teachers should not overlook the fatigue factor when using the device. Some devices, such as keyboarding with computers, may be tiring and hinder productivity. Evaluating the effectiveness of integrating assistive technology requires the input of professionals, family members, and students. We now consider using the principles, guidelines, and checkpoints of UDL in a lesson as another example of how teachers can make the curriculum accessible for all learners in an RTI model.

## UDL in action

### Universal Design for Learning Lesson

**Note:** This UDL-based lesson was developed, in part, using an adapted version of the CAST UDL Lesson Builder (<http://udlexchange.cast.org/home>).

**Title:** World War I

**Subject:** Social Studies: American History

**Unit Description:** This lesson is part of a group of lessons that focus on World War.

**Unit Goals:** The purpose of this unit is to understand the sociopolitical issues and causes of World War I.

**Lesson Goals:** The purpose of this lesson is to provide background about the events that led to

World War I through the perspective of the U.S. presidents in power at the time.

**Methods: Advance Organizer:** Tell the student(s) that the purpose of the day's lesson is to help them become familiar with events that led to World War I. A video from a special series about the Roosevelts will be used to address perspectives about the war from U.S. presidents in power at the time (<http://www.pbs.org/kenburns/the-roosevelts>).

#### Introduce and Model New Knowledge:

1. Show a clip of President Theodore Roosevelt that portrays his perspectives surrounding world events that eventually caused

the United States to enter World War I (*Checkpoint 5.1—Use multiple media for communication*). Give students questions to answer following the clip to check their understanding of the video's content. Have students share their responses with a partner (*Checkpoint 8.3—Foster collaboration and community*).

2. Give each pair of students an opportunity to share one idea from the video. Return to sections of the video that support these ideas (*Checkpoint 3.3—Guide information processing, visualization, and manipulation*).

#### Provide Guided Practice:

1. Have students work in cooperative learning groups to read information from

their social studies text on the causes of World War I by relating this content to the video clip.

2. Have student groups create a graphic organizer of the causes of World War I (*Checkpoint 3.2—Highlight patterns, critical features, big ideas, and relationships; Checkpoints 3.3 and 8.3*).
3. Have a representative from each group display their graphic organizer to the whole class and explain the group's thinking (*Checkpoint 5.1—Use multiple media for communication*).

#### Provide Independent Practice:

1. At the end of the lesson, have students answer a set of questions about the causes of World War I.

## SUMMARY

Access to the general education curriculum is critical for *all* students. Differentiating instruction to meet the special learning needs of students helps to ensure that students benefit from instruction and learn the curriculum. UDL is an effective way to promote access and differentiation for all students through the principles, guidelines, and checkpoints. The ADAPT framework is a tool that can help teachers differentiate instruction that is responsive to the individual needs of students. As teachers plan, deliver, and evaluate instruction, they can identify effective practices from the adaptations categories (instructional activity, content, delivery, and materials) to address specific student learning needs. We know that adaptations should be individualized to the learner,

relevant to the curriculum, and effective in order to improve learning outcomes. We know a great deal about what constitutes effective instructional practices for students with special needs. These practices focus on planning and delivering instruction, teaching different types of knowledge, and employing techniques that take the stage of learning into account. Grouping practices such as whole group and small group instruction are a critical component of effective instruction. As part of quality instruction, teachers adapt instructional materials to accommodate learning needs. Finally, assistive technology devices and services hold great promise in helping students with disabilities be active, independent participants in the educational setting.

## REFLECTION QUESTIONS

Let's review the learning objectives for this chapter. If you are uncertain and cannot talk through the answers provided for any of these questions, reread those sections of the text.

- **What is Universal Design for Learning?**

UDL is a means for differentiating instruction for all students, including learners with disabilities. The principles, guidelines, and checkpoints of UDL provide ways to remove or minimize barriers to learning and promoting accessibility to curricula and pedagogy, or teaching practices, for all learners, including students with and without disabilities and English language learners. The goal is to foster the development of learners to achieve mastery of the curricula within a flexible environment that features various ways content can be conveyed to account for individual differences.

- **What is the ADAPT framework?**

The ADAPT framework consists of questions that relate to the ADAPT mnemonic:

- **A**sk, "What am I requiring the student to do?"
- **D**etermine the prerequisite skills of the task.
- **A**nalyze the student's strengths and struggles.
- **P**ropose and implement adaptations from among the four categories.
- **T**est to determine if the adaptations helped the student accomplish the task.

There are four categories of adaptations: instructional activity, instructional content, instructional delivery, and instructional materials.

- **What are effective instructional practices?**

Effective instructional practices include planning for and delivering instruction. In the course of planning, teachers consider types of knowledge (discrimination, factual,

rules, procedural, conceptual, or metacognitive) and critical thinking; types of questions; stage of learning (acquisition, proficiency, maintenance, generalization, or application); and instructional components of direct, explicit instruction and strategy instruction. In delivering instruction, teachers should include the following instructional steps and techniques: an advance organizer, presentation of information, practice, independent practice, closure, and progress monitoring.

- **How can instructional grouping practices promote effective instruction?**

Grouping practices include whole group, flexible, small group, and one-to-one grouping structures. Other effective grouping practices include peer tutoring and cooperative learning. The whole group format works well where common instructional objectives are identified, the teacher delivers the lesson, and students respond orally or in writing. Flexible, small groups include same-ability groups and mixed-ability groups. Teachers use same-ability groups to provide extra instruction and support to those students who are most in need of additional assistance. Mixed-ability groups can be used for students to work on projects and to make presentations. One-to-one instruction enables teachers to tailor instruction to individual students and their specific learning and behavioral needs. In tutoring via peer partners, pairs of students can work on assigned skills, usually for extra practice.

- **What guidelines should be followed for textbooks and instructional materials?**

For textbooks and instructional materials, consider the student and the instructional content and methodology. Regarding the student, identify the student's present levels of educational performance when selecting materials, and consider whether the material can be used to meet IEP goals. Regarding content and methodology, decide whether the material is age-appropriate. Determine whether it includes a sequence of skills and

teaching strategies. Ensure that there are sufficient opportunities to practice new skills and that generalization and maintenance activities are included.

- **What are assistive technology devices and services for promoting access to the general education curriculum?**

An assistive technology device is anything that is bought or made that helps a person with a disability accomplish tasks that would otherwise be difficult or impossible. AT devices can be grouped into categories, including positioning and seating, mobility, communication, adaptive toys and games,

adaptive environments, computer use, and instructional aids.

Assistive technology services are those activities that ensure adoption and maintenance of appropriate devices. One such service is evaluating the functional capabilities and struggles of individuals with disabilities to aid in the selection of appropriate devices to promote access and independence. Another service is the training of professionals, paraprofessionals, families, and users. Training should include how devices work, how to integrate devices into settings, how to troubleshoot if a device malfunctions, and how to evaluate students to determine an appropriate match between device and needs.

## REVISIT THE OPENING CHALLENGE

Check your answers to the Reflection Questions from the Opening Challenge and revise them on the basis of what you have learned.

1. How can Mrs. Bell and Ms. Mendez implement the principles of universal design for learning into their instructional practices?
2. How can Mrs. Bell and Ms. Mendez use the ADAPT framework to differentiate instruction for their students?
3. How can Mrs. Bell and Ms. Mendez differentiate instruction for their multicultural and ELL students?
4. What instructional and grouping practices might help them provide effective, differentiated instruction for their students?
5. How can Mrs. Bell and Ms. Mendez ensure that the textbooks and instructional materials they use are appropriate for all of their students?
6. How can assistive technology help Mrs. Bell's students with disabilities access the general education curriculum?



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## KEY TERMS

access to the general education curriculum, 000

active process assessment, 000

assistive technology device, 000

assistive technology service, 000

augmentative and alternative communication (aug com), 000

basals, 000

checking for understanding, 000

concepts, 000

convergent, lower order questions, 000

cooperative learning, 000

core curriculum, 000

differentiating instruction, 000

distributive practice, 000

divergent, 000

higher order questions, 000

elementary grades, 000

engaged time, 000

functional capability, 000



graphic organizers (GOS), 000	level of concern, 000	multiple means of representation, 000	same-ability groups, 000
guided practice, 000	massed practice, 000	on-task behavior, 000	secondary grades, 000
independent practice, 000	mixed-ability groups, 000	pedagogy, 000	strategy instruction, 000
instructional reading level, 000	multiple means of action and expression, 000	peer tutoring, 000	universal design for learning (UDL), 000
keyword method, 000	multiple means of engagement, 000	progress monitoring, 000	

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## PROFESSIONAL STANDARDS AND LICENSURE

### CEC INITIAL PREPARATION STANDARDS

Standard 1: Learner Development and Individual Learning Differences

Standard 2: Learning Environments

Standard 3: Curricular Content Knowledge

Standard 5: Instructional Planning and Strategies

Standard 6: Professional Learning and Ethical Practice

Standard 7: Collaboration

### INTASC Core Principles

1. Subject Matter

4. Instructional Strategies

7. Instructional Planning

### Praxis II: Education of Exceptional Students: Core Content Knowledge

II. Legal and Societal Issues: Historical movements/trends

III. Delivery of Services to Students with Disabilities: Background knowledge



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