Chapter 10

Assessing and Teaching Content-Area Learning and Vocabulary

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Learning Outcomes

10.1 Identify specific word instruction and word-learning strategies to teach content-area vocabulary.

10.2 Describe content enhancement and specify how teachers could use content enhancement to teach content-area reading.

10.3 Identify reading strategies teachers can use to make content accessible for students with learning difficulties.

10.4 Describe how teachers adapt textbooks, lectures, assignments, homework, and tests to meet the needs of students with learning and behavior problems.

10.5 List the three types of study skills and provide a rationale for why they are important to learning.

When Ms. Cho moved from her position as a special education teacher at the elementary school to one at a high school, her experience and education in teaching reading, writing, and math served her well for part of the school day. Ms. Cho provides three periods daily of intensive instruction in reading, math, and study skills for students with learning and behavior problems. However, she also coteaches in three general education content-learning classes to support her students in an inclusion model. For American history and American government, she has some content knowledge because she minored in political science and history in college. She also coteaches one section of general science; here, she relies more heavily on the science teacher to provide content instruction because of her limited content knowledge in this area. Ms. Cho provides support to integrate the special education students into general education classes and helps to address literacy standards from the Common Core State Standards in the content instruction.

Juan, a fourth grader with a reading disability, moved to the United States when he was in the first grade. With the help of his special education teacher, Juan has made considerable progress in reading and understanding texts that have stories. Since entering fourth grade, however, he has been challenged by vocabulary words in expository texts (his math and social studies texts). The vocabulary words that he is encountering in these texts are more complex and abstract than the words in narrative texts—for example, *exponent*, *ecosystem*, *matriculate*, and *fibrosis*. As a result, Juan is having significant difficulty understanding what he reads in his math and social studies classes and he is failing to learn the content from these texts.

When Desmond entered Bailey Middle School, he had been receiving help in a special education resource room since second grade. During that time, Ms. Jackson, the resource-room teacher, had been working with Desmond on word identification and basic comprehension skills as well as spelling and writing compositions. In elementary school, Desmond went to the resource room for 45 minutes every afternoon. He consistently missed either social studies or science in the general education classroom while he was receiving special assistance in the resource room.

Desmond receives special education in a resource setting for English and reading, but he has social studies, science, and home economics classes in general education classes. All of these classes require him to listen to lectures in class and take notes, read textbooks and answer the questions at the end of each section, take timed tests, write reports, and keep track of assignments and turn them in on time. Textbooks for these classes are information driven and contain unfamiliar technical vocabulary. It is challenging for Desmond to learn from textbooks because he does not know the meaning of many of the vocabulary words that are crucial to understanding the content. By the end of the first 9 weeks, Desmond has received failing slips in all three classes. He is frustrated by his classes and is becoming disruptive.

Doreen worked hard in high school and, despite her reading and writing disabilities, is a senior in high school with a high-enough grade-point average to enter college. However, she is feeling overwhelmed by the demands of her classes. Doreen can't seem to get organized. She has difficulty estimating how long it will take her to complete an assignment, and she is unable to keep up with the reading assignments. Doreen is a bright student with good potential to succeed as an architect or engineer, but she may never get through the basic liberal arts courses required for her degree.

Both Desmond and Doreen need strategies to assist them in being more effective learners. They need skills in managing time, organizing notebooks, taking notes, studying for tests, taking tests, reading textbooks, learning new vocabulary, and writing reports and essays. Desmond and Doreen have mastered many basics of reading and writing, but they are having difficulty applying them in content-area classes.

Both Juan and Desmond need systematic vocabulary instruction that introduces important vocabulary words and word-building strategies. Preteaching specific vocabulary words that are crucial to understanding the texts should improve their comprehension. Also, word-building strategies they can apply to figure out the meanings of a variety of words would help improve their vocabulary acquisition.

Many of the reading comprehension and writing strategies highlighted in Chapters 8 and 9 are effective in promoting content-area learning and effective studying and learning. In addition, the Strategies Intervention Model (**www.ku-crl.org**) presented in Chapter 2 can be used to teach many of the study skills and learning strategies suggested in this chapter.

Ms. Cho, Juan, Desmond, and Doreen are experiencing difficulties functioning in the upper-elementary, secondary, postsecondary school, and professional environments. In these environments, the task demands for teachers and students change dramatically. Special education teachers often coteach, teach content subjects, or need to provide content-area teachers with learning and teaching strategies to support students so that they can access the general education curriculum. Students are asked to apply learning strategies and study skills as well as skills in listening, reading, writing, and math to learn content-area subjects such as biology, American history, art history, welding, computer programming, and home economics.

Teaching Content-Area Information and Vocabulary

How can teachers use specific word instruction and word-learning strategies to teach vocabulary? How important is it for students to know the meaning of words and to have an adequate vocabulary in order to successfully read and learn content? According to Rupley, Logan, and Nichols (1998), "vocabulary is the glue that holds stories, ideas, and content . . . making comprehension accessible for children" (p. 339). Limited vocabulary has been viewed as both a cause and an effect of poor reading achievements (Gunning, 2010; Kuder, 2017). Students with a low vocabulary have a difficult time understanding what they read. Think about it this way: You can probably read the words in a book about quantum physics, but you may not be able to answer questions very well afterward. Why? One of the important ingredients to reading is having adequate background knowledge and knowing the meaning of words. Not only do students with limited vocabulary know fewer words, but their knowledge of the words may also lack depth. After third grade, when content-area texts contain more unfamiliar technical and abstract vocabulary words than primary-grade texts do, the cumulative vocabulary differences between students who are good readers and students who are poor readers get larger. In fact, good readers know about twice as many words as do poor readers in the first grade, and as these students go through the grades, the gap widens. By the end of high school, good readers know four times as many words as do their counterparts with limited reading skills. This growing gap means that when students with a rich vocabulary read or hear new words, they are more likely to figure out the meaning of unknown words on the basis of words they already know. This chapter focuses on instructional practices for teaching vocabulary and content-area information, making adaptations, and teaching learning strategies and study skills.

Furthermore, vocabulary is the key to unlocking reading comprehension. How many words do students need to know to read and understand text? The actual number depends on the complexity of the text, but at a minimum, students require 8000 to 10,000 word families to read for understanding (Schmitt, 2008). Closing the gap is challenging; however, systematic, explicit vocabulary instruction holds promise.

Types of Vocabulary and Vocabulary Instruction

We can think of the words students know in two ways: oral and reading vocabulary. *Oral vocabulary* refers to words that a reader recognizes in listening and uses in speaking. *Reading vocabulary* refers to words that a reader recognizes or uses in print. If the word is in a reader's oral vocabulary, the reader can understand what the word means as long as the reader can decode it. However, if the word is not in the reader's oral vocabulary, the reader must learn its meaning. This relationship between oral and reading vocabulary provides insight into vocabulary learning and instruction (see Apply the Concept 10.1).

As students read more complex content-area texts, they usually encounter more unfamiliar words that are not part of their oral vocabulary. These technical terms or concepts that have meanings specific to the content area students are learning may be referred to as *academic vocabulary*. Following are some examples of academic vocabulary in social studies, science, and math.

Social Studies	Science	Math
compare	reliable	estimate
contrast	solve	solve
inquire	table	set
relate	cell	symbolize
model	inquiry	reduce

Two main approaches are used in teaching vocabulary: the indirect approach and the direct approach (M. F. Graves,

10.1 Apply the Concept

Word Learning and Instruction

Kind of Word Learning	Instruction
Knows a word when hears it but does not recognize its meaning	Teach the word in printed form.
Knows the concept but does not know the particular word for that concept	Teach the word and relate it to the concept that the reader knows.
Recognizes the word but does not know the concept	Develop the concept.
Does not know the word and the concept	Develop the word and the concept.

Source: Based on National Reading Panel (2000).

2009; Kame'enui & Bauman, 2012). Students can learn vocabulary words indirectly when they hear and see words through conversations with other people, especially adults; through listening to adults read aloud; and through reading extensively on their own. Because not all the words in a text can be taught directly, it is important that teachers promote students' indirect learning of vocabulary by teaching them to be "word detectives" who recognize new words and try to find their meaning. Teachers can also use more complex words in their instruction regularly until students learn their meaning. Providing students with texts, oral language, and peers who use rich language improves their word learning.

Many students with learning and behavior problems are less likely to learn words indirectly than are their average-achieving peers. Because of this, directly teaching vocabulary is recommended as an effective approach to improving vocabulary knowledge for poor readers or at-risk students (Beck, McKeown, & Kukan, 2013; Kaldenberg, Watt, & Therrien, 2015). Additionally, this instruction needs to occur daily as more instruction is associated with more word learning (Beck & McKeown, 2007). In the direct approach to vocabulary instruction, students learn difficult words that are not usually part of their everyday experiences through systematic, explicit instruction of individual words and word-learning strategies. Directly teaching vocabulary provides access to learning new words that students, especially those with reading difficulties, may not pick up incidentally.

Teaching Vocabulary Through Specific Word Instruction

Specific word instruction, or teaching individual words, helps students to build in-depth understanding not just of word meaning but of text reading, as well. For both of the specific word instruction approaches we describe, instruction starts with teachers' careful selection of a few vocabulary words (about 7 to 10 per week) that are critical for understanding the text and difficult for students. Students should have multiple interactions with selected vocabulary words. Exposures should engage students in reading and using the words in a variety of formats, such as classroom discussions, multiple texts, writing exercises, and technology applications such as electronic books with interactive questions (Smeets & Bus, 2012).

MyLab Education
Video Example 10.1

In this video, experts discuss direct instruction for preteaching vocabulary to promote word understanding and text understanding.

Using Oral Language For young students, a teacher can teach words while reading aloud texts (Hickman, Pollard-Durodola, & Vaughn, 2004; E. Swanson, Vaughn, et al., 2011). Regular read alouds provide students with opportunities to be exposed to new words that may be difficult for them to read. Remember, it is valuable to select text that is slightly above the level of students so that challenging new information, concepts, and vocabulary are the focus. The teacher identifies about three key vocabulary words (high-utility words) in a reading passage for direct teaching. High-utility words are words that students will encounter in a variety of contexts and are necessary for understanding the main idea of a particular text. After a story is read aloud to students, the teacher discusses the passage with students to provide a context in which to begin the vocabulary instruction. Then the teacher provides systematic vocabulary instruction:

1. Contextualize the word in the story. (Teacher: "In the story, the leaders of the Cherokee Nation were *amazed* by characters developed by Sequoyah.")
2. Ask students to repeat the word (e.g., *amazed*) so that they know how to pronounce it. (Teacher: "Say the word with me.")
3. Provide a simple definition so that students can easily understand its meaning. (Teacher: "When people are *amazed*, they are very surprised.")
4. Provide other examples to further facilitate students' understanding of word meaning. (Teacher: "Someone might be *amazed* by the number of stars in our galaxy, or someone might be *amazed* by how big a bear is.")
5. Ask students to use their own examples, to promote their active involvement. (Teacher: "Tell about something you would be *amazed* by. Try to use *amazed* when you tell about it. You could say, 'I would be *amazed* __.'")

Using Preteaching Before Reading Preteaching vocabulary before reading is an effective strategy to enhance students' knowledge of word meanings (M. F. Graves, 2009; Swanson, Reed, & Vaughn, 2016). Preteaching vocabulary is especially helpful for students with learning problems because it provides them with background knowledge to successfully read the words when they encounter them in text. To increase the effectiveness of preteaching vocabulary, it is important for teachers to appropriately select words that are critical to understanding the passage and are challenging for their students.

Preteaching key words and concepts is effective for older readers when teaching reading, social studies, science, and math (Hairrell et al., 2011; Vaughn, Martinez, et al., 2009; S. Vaughn et al., 2015). Preteaching such key words as *freedom, abolitionist, advocate, decimal, galaxy*, and *incubate* helps all readers prepare to read with meaning. These words

are high-utility words because students may encounter them in a variety of contexts and across content areas.

Using synonyms, examples, and/or readily understood definitions can be an effective way to enhance students' understanding of a word. First, interact with students to develop a list of synonyms for the new word. Second, teachers can provide examples when few words are available to appropriately define the concept (e.g., *feeling*). Third, teachers can use definitions when introducing new words that are complex. As students progress through the grades and words become more complex, teachers may increasingly use definitions to introduce new words. Teachers should provide student-friendly definitions consisting of words that students know:

- Introduce a vocabulary word—for example, *immigrant*—and ask students to repeat the word so that they know how to pronounce the word.
- Discuss the meaning of the word using synonyms, examples, pictures, and/or definitions. For example, "*Immigrant* means "someone who comes from abroad to live permanently in another country." And, "Most of us have relatives who were immigrants—for example, my grandfather came from Germany and he was an immigrant to the United States." It is helpful to ask students to make connections to their own lives, for instance, by asking students if anyone in their families are immigrants.
- Check with students on their understanding of the word by asking students to figure out positive or incorrect examples and to explain them. Here is a positive example of the word *immigrant:* "Tom's grandparents came to the United States from England in 1912. They lived in the United States until they passed away." Ask the students, "Are Tom's grandparents immigrants? Why or why not?" Here is an example of an incorrect use of the word *immigrant:* "Recently, many international students came to the United States to study." Ask the students, "Are the international students immigrants? Why or why not?"

Give students an opportunity to interact with the word either verbally or in writing with either a partner or a group of three. Using the word orally or in writing ensures that the word will retain its meaning.

Web Resources

For a helpful website on evidence-based practices for vocabulary instruction, go to **http://ies.ed.gov/ncee/wwc/**, then type *Vocabulary* in the Search box.

Another helpful source is the Vocabulary section of the Reading Rockets website: **http://www.readingrockets.org/reading-topics/vocabulary**.

Teaching Vocabulary Through Word-Learning Strategies

In addition to specific word instruction, it is critical to teach students word-learning strategies that are supported by research, including using contextual analysis, morphemic analysis, and dictionaries and other reference aids. Once students are familiar with strategies, they're more able to independently figure out unfamiliar words.

Using Contextual Analysis *Contextual analysis* involves using the context, or text that surrounds an unknown word, to find clues to reveal a word's meaning (C. Blachowicz & Ogle, 2001; Swanson et al., 2011). Contextual analysis may be a useful word-building strategy for students to use during their independent reading. In text, writers often provide the definition, synonym, description, or examples of a word that may be difficult for the reader. Writers provide several types of context clues in their text:

- *Definition.* The word is defined in the sentence. (Example: The *surplus*—that is, an amount left over—was so great that the office was full and desks and chairs were lying on the floor.)
- *Synonym.* The word is compared to another word with a similar meaning. (Example: When Tom went to the parking garage and his car was not there, he was *furious*. Tom was *very mad*.)
- *Description.* The word is described by the context. (Example: After taking a spill on her bike, she was able to stand up, get back on the bike, and pedal away on her own *volition*.)
- *Contrast.* The word is contrasted with some other word, like an antonym. (Example: Kim was *lethargic*, yet her sister was very energetic.)
- *Comparison.* The word is compared with some other word or phrase to illustrate the similarities between them. (Example: John was exhausted after the *interview*, which was more work than mowing grass all day in the neighborhood.)

Regardless of types of context clues, the first step in teaching contextual analysis is to provide explicit modeling in looking at the words surrounding an unknown word and finding possible clues that may help students figure out its meaning. Then a teacher gives students ample opportunities to practice how to use contextual analysis and engage them in lively discussions. Teachers should introduce a few types of context clues (about two) at one time and sequence types of context clues from easy (e.g., definition) to difficult (e.g., comparison).

The following activity helps students understand the supporting role of context in understanding word meanings:

1. Prepare a series of passages in which context is used to define a difficult word.
2. Present the difficult word in isolation.
3. Ask students for the definition of the word.
4. Present the difficult word in context, and point out the word.
5. Have students reread the sentence before, with, and after the one with the difficult word, to look for context clues.
6. Ask students for the definition of the word and how the definition is derived.
7. Have students compare the definition of the word from context with that of the word in isolation.
8. Present other vocabulary words in context. Pair students, and ask them to analyze the context to figure out the meaning of each vocabulary word and record the definition for each word.
9. Have students look up the definitions for the vocabulary words in a dictionary.

It is valuable to prepare students for text that does not provide sufficient information to help them understand words and concepts. They will undoubtedly encounter text in content areas as well as narrative that provides little information or perhaps even misleading information about words and concepts. It is necessary to help students distinguish words that are not defined in text and to teach them how to use other resources to gain meaning.

Using Morphemic Analysis Morphemic analysis in vocabulary instruction involves breaking a word into morphemes, the smallest linguistic units that have meaning, and using their meanings to figure out the meaning of the whole word (Reed, 2008; Reed, Wexler, & Vaughn, 2012). The explicitness of morphemic instruction matters for students with reading difficulties (Brown, Lignugaris-Kraft, & Forbush, 2016; Kieffer & Lesaux, 2007) There are two types of morphemes: free, which can stand alone (e.g., *some*), and bound, which must be linked to words or other morphemes (i.e., prefixes and suffixes). Because Greek and Latin morphemes are found commonly in content-area textbooks, teaching morphemes and their meanings helps students to independently figure out the meanings of the words. Figure 10.1 provides common Greek and Latin roots and their meanings. Having students break words into small parts based on meaning can help them to figure out the meaning of words on the basis of what they know about the meanings of the smaller parts. For instance, a student can break the word *unchangeable* into the word parts *un*, *change*, and *able*. If the student knows the meanings of these word parts (*un* meaning "not," *change*, and *able* meaning "able to"), the student can determine that *unchangeable* means "not able to change." Figure 10.2 presents common prefixes and suffixes and their meanings.

Figure 10.1 Common Greek and Latin Roots

SOURCE: Based on University of Texas Center for Reading and Language Arts (2009). Reprinted by permission.

Root	Meaning	Sample Words
astro	star	astrology, astronaut, asteroid
aud	hear	auditorium, audition
bio	life	biography, biology
dict	speak	dictate, dictator
geo	earth	geography, geology
meter	measure	thermometer
mit, mis	send	transmit, mission, missile
ped	foot	pedal, pedestrian
phon	sound	microphone, phonograph
port	carry	portable, transport
scrib, script	write	manuscript, scribble
spect	see	inspect, spectator
struct	build	construction, destruction

Web Resources

For a helpful website and resource for teaching older students vocabulary instruction, go to **www.meadowscenter.org** and click on *Library* and then, under topic, click on *Content Area Instruction* to browse through resources and information articles. It is possible to narrow the search by picking elementary, middle, or high school under the *Grade Level* menu.

Learning prefixes is relatively easy in comparison to learning suffixes (Reed et al., 2012). Prefixes generally have clearer meanings and are spelled more regularly than suffixes. For instance, the prefixes un- and re- have clear meanings of "not" and "again," respectively, and are always spelled as *un* and *re*. In contrast, the suffixes -tion and -ness have more abstract meanings of "the act or process of" and "the state or condition of," respectively. Some suffixes can also be spelled differently depending on the base words (e.g., -tion, -ion, -sion). However, not all suffixes have abstract meanings (e.g., -less meaning "without" and -ful meaning "full of").

Figure 10.2 Common Prefixes and Suffixes

SOURCE: Based on University of Texas Center for Reading and Language Arts (2009). Reprinted by permission.

Prefix	Meaning	Sample Words
ante-	before, front	antechamber
anti-	against	antislavery, antisocial
bi-	two	bicycle
co-	with, together	coworker
de-	opposite of, down, remove, reduce	deactivate, devalue, dethrone
dis-	not, opposite of	dishonest, disagree
en-, em-	cause to	enable, embrace
ex-	out, out of	exterior, exhaust, expose
fore-	before	foreground
in-	in or into	inside, interior
in-, im-, ir-, il-	not	inactive, immature, irregular, illegal
inter-	between	international, intersection
intra-	inside	intrastate
mid-	middle	midnight
mis-	wrongly	misbehave, mispronounce
non-	not	nonfiction
over-	too much	overdue, oversleep
pre-	before	preheat, preschool
re-	again	reread, redo
semi-	half	semicircle
sub-	under	submarine, subway
super-	above	supernatural
trans-	across	transport
tri-	three	tricycle
un-	not, opposite of	unable, unchangeable
under-	too little	underpaid

Suffix	Meaning/Function	Sample Words
-able, -ible	can be done	comfortable, changeable
-al, -ial	characteristic of	natural, remedial
-ance, -ence	state of	importance
-ation, -ition, -tion, -ion, -sion	act, process	tension, attention, imagination
-ant	person connected with	accountant
-en	noting action from an adjective made of	harden, loosen, wooden
-er, -or	person connected with	painter, director
-ful	full of	fearful, beautiful, hopeful
-fy	make	clarify
-ic	having of	poetic
-ish	characteristic of	greenish
-ity, -ty	state of	necessity, honesty
-ive, -ative, -itive	noting action from an adjective	active, affirmative
-less	without	fearless, tireless, hopeless
-ly	characteristic of	gladly, happily
-ment	result of an action	entertainment, excitement
-ness	state of, condition of	kindness, happiness
-ous, -eous, -ious	having of	joyous, gracious
-y	characterized by	rainy

Morphemic analysis instruction involves presenting new morphemes and their meanings in several specific steps:

1. Introduce a new morpheme and its meaning.
2. Introduce words containing that morpheme.
3. Provide practice for determining the meaning of words that contain that morpheme.
4. Test students on the meaning of several words that contain that morpheme.
5. Provide practice for the meaning of the new morpheme and previously taught morphemes.

Although morphemic analysis can help students build their vocabulary, several cautions should be considered when planning morphemic analysis instruction. First, this strategy works with a limited set of words; therefore, morphemic analysis instruction should not be too long. Second, only one or two prefixes or suffixes should be introduced at a time, with an emphasis on their applications to unfamiliar words. Teachers can use small groups to promote student discussion of the meanings of word parts and the new words.

Using Dictionaries and Other Reference Aids It is important for students to learn how to use dictionaries, glossaries, and thesauruses to help broaden and deepen their word knowledge, but it is also important to understand that these tools are difficult for most students with learning disabilities to use in learning the meaning of words. These resources require students to understand alphabetization, though these tools are increasingly available using electronic resources with search functions. Using dictionaries and other reference aids can be a difficult task for young students for several reasons:

- Definitions often contain words that students do not understand. Therefore, when possible, teachers should select dictionaries that are written at the appropriate

reading level. Second, many words have more than one definition listed in the dictionary (e.g., the word *parcel* can mean something wrapped up or packaged, or a portion or plot of). Teachers should teach students how to determine the most appropriate meaning. For example, a teacher may present a word having several meanings in sentences. The teacher then asks students to look up the word, examine the definitions listed in the dictionary, read the sentence substituting each definition in the dictionary to see whether it makes sense, and select the definition that is most appropriate for the sentence.

- Although using dictionaries and other reference aids is an important word-building strategy students can use while reading, students should not look up every unknown word. Teachers should encourage students to use contextual analysis and morphemic analysis to assist in determining word meanings. Teachers should encourage students to decide whether a word is important to understanding the passage. When students fail to figure out the meaning of important words through contextual analysis and morphemic analysis, they can look up the word in a dictionary or other reference aid.

Assessing Vocabulary Determining whether students know the meaning of a single word is not difficult. However, knowing how many words students know, which words they know and don't know, and whether they know one or more meanings and can use them orally and in writing—well, that is all more than a little overwhelming. Vocabulary is perhaps one of the most difficult areas of reading and content learning to assess. Vocabulary is also difficult to assess because knowing what a word means has many different levels. We can recognize the word when we see or hear it, we can know what the word means when someone else uses it, and/or we can use the word adeptly in conversation and writing. For the purposes of instruction, teachers can monitor the words and concepts related to understanding text or learning from their content-area instruction.

Progress Monitoring What can teachers do to monitor their students' vocabulary and concept learning? The first step is to identify the words and concepts that students most need to know and understand for the text or unit to make sense to them. Although it is tempting to select a lot of words for instruction, the most important goal is to select words that have high impact on learning and comprehension. For example, Mr. O'Malley, a middle school social studies teacher, was concerned that a number of his students would not understand many of the most important words in his unit on how money works. He realized that he couldn't teach all words at a deep enough level that students would be able to use them orally and in their writing. He selected eight words for the first week of his unit. He decided to teach two new words each day for the first 4 days and then briefly review the words that he had previously taught. He monitored the progress of students' understanding of these words in two ways. First, he did daily checks with selected students to determine whether they knew what the words meant. Second, he asked students to document in their notebook if they saw or heard any of the key words either during the day at school or at home. Third, he provided a paper-and-pencil assessment of all eight words at the end of the week so that he would know which words required further review during the second week of the unit.

Teaching Content-Area Reading

The Common Core State Standards provide a framework for teachers to guide their literacy instruction in the content areas. Thus, social studies, science, and even math teachers are also responsible for ensuring that students have access to high-level texts in their content area and are prepared to read these texts for understanding. See Figure 10.3 for a list of the Common Core State Standards as they relate to content-area reading. For a complete description and analysis, including grade-level examples, go to **www.commoncore.org**.

A summary of the Common Core State Standards for science and technical texts follows (see Figure 10.4). For a complete description and analysis, including grade-level examples, go to **www.corestandards.org/**.

Promoting Comprehension Through Text Reading

How can content teachers effectively use text to promote reading comprehension? Teachers can establish three simple classroom routines to support content acquisition and promote reading comprehension. The Promoting Adolescent Comprehension through Text (PACT) project includes three key strategies that improve reading comprehension and understanding of content for students in social studies classrooms: the Comprehension Canopy Routine, the Essential Words Routine, and the Critical Reading of Text Routine (Swanson et al., 2016; Swanson, Wanzek, Vaughn, Roberts, & Fall, 2015; Vaughn et al., 2015; Wanzek, Swanson, Vaughn, Roberts, & Fall, 2016). These routines use a team-based learning framework with students organized into heterogeneous groups to provide peer support for learning.

To teach students the routine of activating and connecting their own background knowledge related to information in the text, teachers can use the Comprehension Canopy Routine. This process helps students to think about what they already know and to fill in gaps in their background knowledge through a structured interactive peer discussion

Figure 10.3 Common Core State Standards: Reading in the Content Area

Key Ideas and Details

- Cite specific textual evidence to support analysis of primary and secondary sources.
- Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).

Craft and Structure

- Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- Describe how a text presents information
- (e.g., sequentially, comparatively, causally).
- Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).

Integration of Knowledge and Ideas

- Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- Distinguish among fact, opinion, and reasoned judgment in a text.
- Analyze the relationship between a primary and secondary source on the same topic.

Range of Reading and Level of Text Complexity

- By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.

Key Ideas and Details

- Cite specific textual evidence to support analysis of science and technical texts.
- Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Craft and Structure

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
- Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
- Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

Integration of Knowledge and Ideas

- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

routine. At the beginning of a unit of study, the teacher introduces a few key words and concepts, uses prompts to activate students' prior knowledge, and poses one or two critical questions. The students then view a short high-interest video, followed by a structured peer discussion of the critical questions. This routine takes 7 to 10 minutes prior to reading a passage. Figure 10.5 provides an example of the Comprehension Canopy Routine applied to a middle school social studies unit on colonial America.

The Essential Words Routine of PACT focuses on pre-teaching key words that are essential to understanding the content. This routine provides an explicit introduction of the word and its meaning, followed by opportunities for students to immediately practice using the words. Teachers identify several "essential words," or words that are important to grasping key concepts. On the first day, the teacher introduces the words, providing a definition, examples, and nonexamples that students will understand. The teacher then reads brief text excerpts that contain the words so students can hear the words in context. Then, teachers engage students in a "Turn and Talk" routine that requires students to interact with a peer in thinking about and using the word. Figure 10.6 shows the Essential Words Routine used in a science lesson.

The third component of the PACT routines is Critical Reading of Text. This routine is organized into three phases: Before Reading, During Reading and After Reading. Students engage in the critical reading routine in small groups or pairs to provide peer support for reading. The steps of the Critical Reading of Text Routine are described below.

Figure 10.4 Common Core State Standards: Science and Technical Texts

SOURCE: Common Core State Standards Initiative. Retrieved July 23, 2013, from **www.corestandards.org**.

Key Ideas and Details

- Cite specific textual evidence to support analysis of science and technical texts.
- Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

Craft and Structure

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
- Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
- Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

Integration of Knowledge and Ideas

- Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Range of Reading and Level of Text Complexity

- Read and comprehend science/technical texts independently and proficiently.

Figure 10.5 Comprehension Canopy Routine

SOURCE: Meadows Center for Preventing Educational Risk (2015). *PACT Plus Sample Lessons for Grades 6–8*. Austin, TX: Meadows Center for Preventing Educational Risk.

Example from 8th Grade Social Studies
Purpose: To activate and build background knowledge
Materials: A short video about colonial America

Introduction and Prior Knowledge

Step 1: Pose a question to activate prior knowledge.
"What do you already know about colonial America?"
Students provide answers, and the teacher leads a class discussion.

Step 2: Introduce the unit and pose critical questions for the unit.
"We are going to learn about the English settlement of North America, a time called 'colonial America.' This time period begins with the English trying to establish colonies in America and ends with three distinct colonial regions: the New England colonies, the middle colonies, and the southern colonies. In this unit, we will ask these questions: 'How were these regions different?' and 'What caused them to develop differently?'"

Springboard

Step 1: Introduce the video.
"This video is about the first English settlers in America. It will prepare you to learn more about why these settlers made the decision to go to America, even when they knew they would face grave danger."

Step 2: Provide a purpose for viewing the video.
"As you watch the video, think about three things: (1) What were some reasons people immigrated to the Americas? (2) What was life like in colonial America? And, finally, (3) Why do you think the colonies developed so differently?"

Step 3: Show the video.

Step 4: Provide a Turn and Talk prompt.
"Would you ever leave your hometown? Why? What were some reasons people immigrated to the Americas?"

Step 5: Present a Comprehension Focus Question.
"We will think about this key question as we study this unit: How did the colonial regions develop differently?

Figure 10.6 Essential Words Routine

SOURCE: Meadows Center for Preventing Educational Risk (2015). *PACT Plus Sample Lessons for Grades 6–8*. Austin, TX: Meadows Center for Preventing Educational Risk.

Step 1: Introduce the word.
The teacher introduces the word and its definition, showing a picture that represents the word relevant to its use in the upcoming lesson, along with a sentence showing how the word is used.
Ecosystem *is a community of organisms that live and interact in a particular area.*

Step 2: Discuss the word.
The teacher then presents a few related words to help the student to connect this word with prior knowledge, discussing examples and nonexamples.
Related Words: *ecology, environment, habitat*
Example: *a stream with fish, insects, frogs and water grasses*
Nonexample: *a puddle on the sidewalk from a recent rain shower*

Step 3: Provide a Turn and Talk prompt.
The teacher provides a prompt that requires the students to think about the meaning of the word and how it applies to their own lives.
Prompt: *Is our classroom an ecosystem? Why or why not?*

Follow-Up: Revisit word understanding and use in warm-up activities on subsequent days.
For several days, the teacher should begin each lesson with a "warm-up," a five-minute review of one or more words. This includes a review of the definition and an opportunity for students to apply the meaning of the word in an oral or written activity.

Before Reading Introduce the reading, providing information about the type of text (e.g., narrative or compare-contrast), the purpose for reading, and what students should be looking for.

During Reading Plan a few stopping places to guide students through the reading of text. Prepare questions focusing on key concepts to ask each time you stop. Stopping points are opportunities to revisit any essential words that were pretaught and examine how they are used in this context. At each stopping point, facilitate student note taking in response to the prepared questions. Provide feedback to students regarding any misunderstandings of vocabulary or concepts.

After Reading At the conclusion of the reading, ask a final question and facilitate student note taking in response to the question. Ask students to write about how any essential words connect to what they have read.

Content Enhancement Practices

What is content enhancement, and how can teachers use it to teach content-area reading? Content teachers must teach the important concepts and vocabulary and their relationships. The goal is to enhance the content and teach related vocabulary to help students identify, organize, and comprehend important content information (Bulgren, Marquis, Lenz, Shumaker, & Deshler, 2009). In addition, content enhancements inform students of the purpose of instruction and increase student motivation. Content enhancement routines ensure that students possess the prerequisite background knowledge or provide scaffolded instruction so students can obtain this knowledge; assist students in working with related concepts; and give students the skills to predict, solve problems, infer, and synthesize information in a variety of settings (Hock, Bulgren, & Brasseur-Hock, 2017). Several types of content enhancements have been developed and recommended: advance organizers, concept diagrams, comparison tables, semantic feature analysis (SFA), semantic maps, concept mastery, anchoring, and comparison routines.

MyLab Education
Video Example 10.2
The algebra teacher in this video uses content enhancement strategies to develop relationships between important concepts and essential vocabulary in the text.

What is a concept? A concept is a key word or limited number of words that is essential for understanding content. For example, the following concept might be used in a science course:

> Bacteria are a class of microscopic plants that help people, other animals, and plants; however, bacteria also do things that hurt people, other animals, and plants.

Several related ideas that elaborate on the concept of *bacteria* are as follows:

> Bacteria are small; you use a microscope to see them; bacteria multiply; bacteria live in soil, water, organic matter, plants, or animals; bacteria can make you ill; bacteria can spoil food.

The vocabulary associated with the general concept and its related concepts is the *conceptual vocabulary*. These are the words that are necessary for understanding the general idea and are associated with it. Examples of the conceptual vocabulary for a unit on bacteria in a science text are *bacteria, microscope, colony, multiply, reproduce,* and *decay*. These words and their meanings facilitate understanding of the general concept.

A six-step process or teaching routine can be used to teach concepts through content enhancement (Anders, Bos, & Filip, 1984; Lenz & Bulgren, 1995). Admittedly, some concepts and vocabulary are more important than others. Deciding what concepts to teach is a crucial part of content-area teaching. The process for teaching concepts is presented in Apply the Concept 10.2 and discussed in more detail in the following sections.

Selecting the Big Idea of Content Learning

Before proceeding with selecting content vocabulary and teaching it, teachers must decide what the "big ideas" are they want every student to learn, asking, "What do I want every student to know about this content unit when I finish teaching it?" The answer to this question identifies the big ideas for learning and guides the teacher in selecting key concepts and related vocabulary. A teacher needs to determine the conceptual framework for the unit to present the information in an organized fashion on the basis of this framework. During this step, the teacher should focus on the critical information or knowledge all students need to understand about a particular unit (Bulgren et al., 2007; Vaughn, Martinez, et al., 2009).

Selecting Concepts and Related Vocabulary

The process that a teacher uses for determining the major concepts depends on the teacher's expertise and knowledge in the content area, knowledge of the structure of the textbook information, and knowledge about the students' background for the content and their study/reading skills. A teacher who has specialized in a given content area can probably generate concepts from expert knowledge and experiences and use the assigned textbook along with key resource books and websites as the primary resources for verifying the appropriateness of those concepts. A teacher with limited background knowledge could use a variety of resources, such as the assigned textbooks, trade books, state or local curriculum guides, websites and other computer-based resources, and other teachers or experts in the field. Some texts—especially those written for students with reading problems—tend to provide too much detail and fail to explain the overall concept or to relate the concepts.

After articulating the major concepts to be learned, the teacher next generates and organizes the related vocabulary. To do this, the teacher studies the assigned text and instructional materials and compiles a list of relevant related words and phrases. In doing this, the teacher might realize that some important vocabulary is missing from the text; if so, it can be added to the list.

To organize the vocabulary list, a teacher can group words that are related and then create a semantic or content map to visually represent the relationships among these terms (Swanson et al., 2011). Figure 10.7 depicts a map that was developed with the conceptual vocabulary a teacher generated from a chapter in a biology text. The map helps to solve an all-too-common problem that confronts content-area teachers: deciding what concepts and related vocabulary to teach in a content lesson.

10.2 Apply the Concept

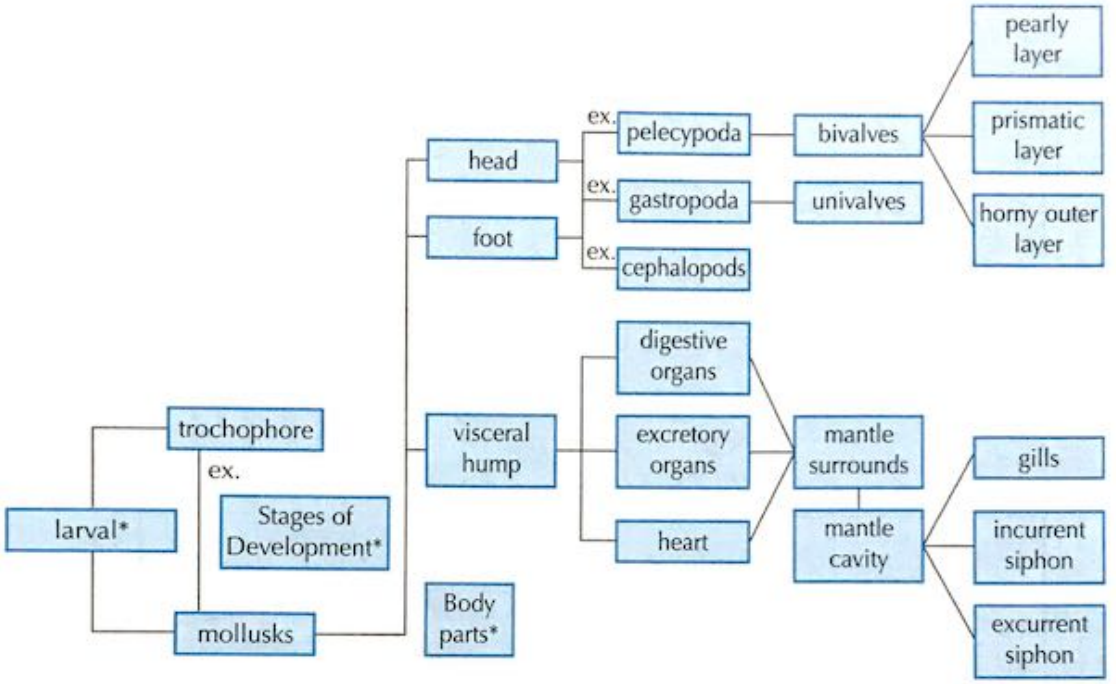
Process for Teaching Concepts

The following steps can be used to identify and teach key concepts within content-area (e.g., science and social studies) instruction:

1. Identify the "big idea" of what you want students to learn.
2. Decide what concepts and related vocabulary to teach.
3. Evaluate the instructional materials to be used for reader friendliness or considerateness—alter and supplement as needed.
4. Assess the students on their background knowledge for the concepts and related vocabulary.
5. Use prelearning or prereading activities to facilitate and support learning.
6. Conduct the learning or reading activity.
7. Provide postlearning activities that further reinforce and extend the concepts and information learned.
8. Assess students' learning and reteach if necessary.

Figure 10.7 Map with Conceptual Vocabulary

SOURCE: P. L. Anders & C. S. Bos (1984). In the beginning: Vocabulary instruction in content classes. *Topics in Learning and Learning Disabilities, 3*(4), p. 56. Reprinted with permission of PRO-ED.



*Note: There seem to be two concepts being developed (apologies to the biologists among us):

1. When classifying animals, biologists look for relationships between animals during the various stages of development from birth to adulthood.
2. Biologists describe the body parts of animals and the functions of each part.

Evaluating Texts

Before teaching concepts and related vocabulary, teachers need to evaluate the instructional materials and texts they intend to use in teaching the unit so that they are aware of the instructional adaptations needed for students with learning problems. One simple and beneficial way teachers can preview texts is to identify all proper nouns and preteach how to read them and what they mean. When teachers preteach proper nouns, students with reading difficulties read and understand text better (e.g., Fletcher et al., 2006). Some examples of proper nouns include names of cities (e.g., Prague, Beijing, London), states (e.g., Missouri, California), persons (e.g., Mr. Glenview, John Glenshire), and key events (Gettysburg Address).

Although the breadth of instructional materials has increased with the use of the Internet and other media, textbooks still continue to serve as a key resource in instruction. How concepts are presented in a text, whether it is the class textbook, a resource book, or on the Internet, will affect how easily the students comprehend and learn the concepts. The manner in which the text is organized (e.g., use of headings and subheadings, highlighted words, marginal notes) will also affect the comprehensibility of the text.

Readability Traditionally, evaluations of content-area texts emphasized readability as determined by readability formulas (e.g., E. Dale & Chall, 1948; Fry, 1977). Most readability formulas, including the Fry readability formula presented in Figure 10.8, are based on two factors: sentence complexity as measured by sentence length, and word difficulty as indexed by word length or frequency. One of the most frequently used procedures for determining the reading level of text is assessment of the **lexile level of the text.**

MyLab Education

Video Example 10.3

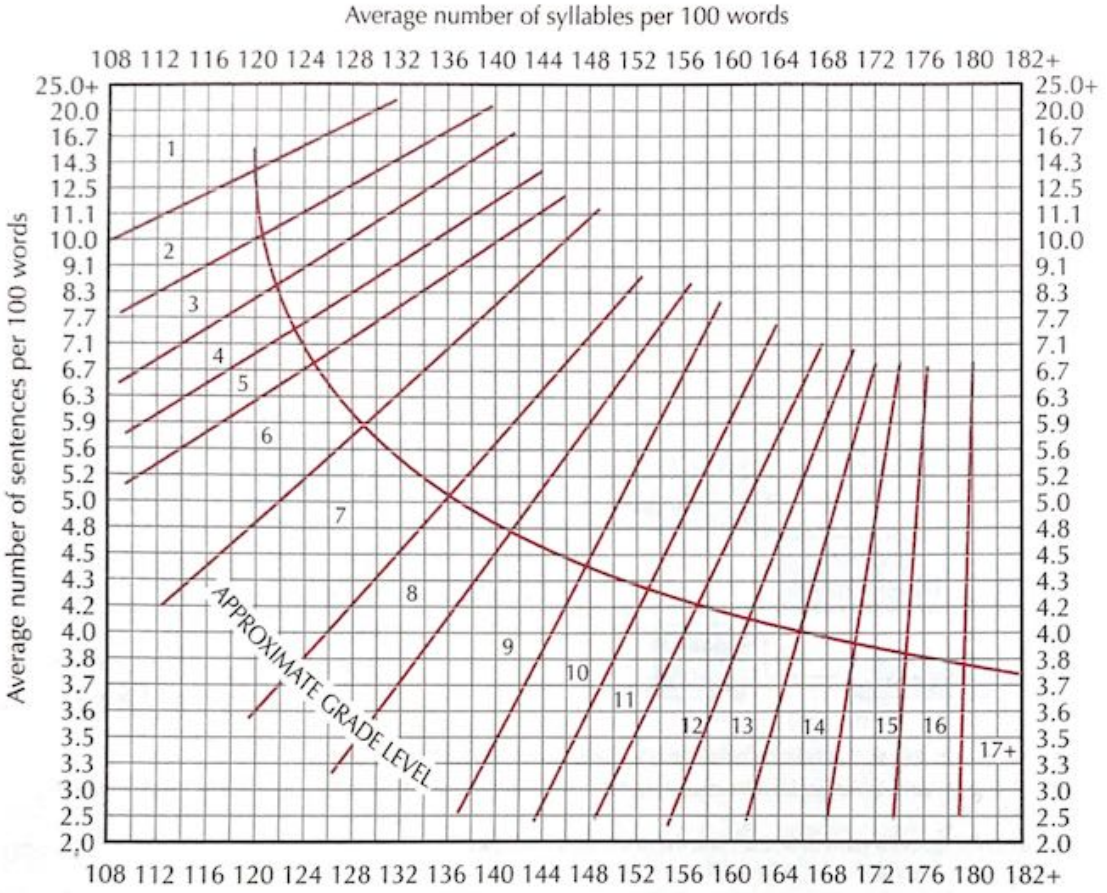
Text structure influences students' comprehension, particularly in expository text. The teacher in this video helps students recognize text features and patterns that promote comprehension. As you evaluate texts, what features of text structure will you emphasize?

Web Resources

A useful website for learning more about lexile levels and to find useful tools for determining lexile levels, see **https://lexile.com**. Another useful resource can be found at **https://www.scholastic.com/parents/books-and-reading/reading-resources/book-selection-tips/lexile-levels-made-easy.html.**

Figure 10.8 Fry Readability Graph for Estimating Readability—Extended

SOURCE: E. Fry (1977), Fry's readability graph: Clarifications, validity, and extension to level 17, *Journal of Reading, 21*, pp. 242–252.



1. Randomly select three text samples of exactly 100 words, beginning with the beginning of a sentence. Count proper nouns, numerals, and initializations as words.
2. Count the number of sentences in each 100-word sample, estimating the length of the last sentence to the nearest one-tenth.
3. Count the total number of syllables in each 100-word sample. Count one syllable for each numeral or initial or symbol; for example, 1990 is one word and four syllables, LD is one word and two syllables, and "&" is one word and one syllable.
4. Average the number of sentences and number of syllables across the three samples.
5. Enter the average sentence length and average number of syllables on the graph. Put a dot where the two lines intersect. The area in which the dot is plotted will give you an approximate estimated readability.
6. If there is a great deal of variability in the syllable or sentence count across the three samples, more samples can be added.

Readability formulas should be used as only one aspect of evaluating a text because they often have a large range of grade levels and do not reveal how difficult the text is for a particular student. For example, a text whose readability formula is predicted to be at grade 7 can range by chance from grade 6.0 to grade 9.0. Readability formulas do not take into account many characteristics of text that are important in comprehension and learning. For instance, to reduce the reading level or difficulty as measured by readability formulas, textbooks—particularly adapted textbooks that are designed for students with learning and behavior problems—are written in short sentences. Often this means that important relational words such as *and, or, because,* and *if . . . then* have been eliminated to shorten the length of the sentences and thus lower the readability level as predicted by the formula. Although the readability level according to the formula may be lower, the text is actually more difficult to understand. Students' prior knowledge of the content and the concepts and technical vocabulary associated with the content can dramatically affect how easy a text is to comprehend. Last, readability formulas neglect to consider other reader characteristics that affect comprehension, such as interest, purpose, and perseverance.

Another useful tool for determining the complexity of text is **Coh-Metrix**. Coh-Metrix provides a sophisticated technology for calculating the coherence of text on a wide

Figure 10.9 Coh-Metrix: Computational Tool for Text

The indices in Coh-Metrix can be categorized into six groups:

1. General Information and Reference Information
2. Readability Indices
3. General Word and Text Information
4. Syntactic Indices
5. Referential and Semantic Indices
6. Situational Model Dimensions

range of measures. The idea of Coh-Metrix is to solve many of the problems with readability formulas previously discussed and to help identify text cohesion through the use of a computational tool providing linguistic and discourse representation in text. Figure 10.9 provides a brief description of Coh-Metrix, but a more elaborate one is available on the Coh-Metrix website.

Coh-Metrix can be used to analyze text and better understand features of text so that teachers can best align text with student's reading abilities. The Coh-Metrix site includes a mechanism for calculating the complexity of text on numerous levels.

Considerate, or User-Friendly, Text What characteristics should be considered in evaluating how considerate, or user-friendly, a text is? Criteria for developing considerate text that students can read:

1. *Structure* refers to the manner in which a text is organized and how the text signals its structure. Use of titles, headings, subheadings, introductions, and summary statements; informative and relevant pictures, charts, and graphs; highlighted key concepts; marginal notes; and signaling words (e.g., *first, second, then, therefore*) can facilitate comprehension. In evaluating a text, it is important to check not only whether such structural features are used, but also whether they match the content. For example, sometimes headings will not relate well to the text that follows the headings. In this case, the structural features may serve more as a source of confusion than as an aid. Also, the teacher should check whether the highlighted words in the text represent the important concepts or simply the words that are difficult to decode.

The teacher should also consider whether the format and the table of contents help readers to draw relationships between the various chapters by using such devices as sections and subsections. Do introductions to each section or chapter encourage readers to make connections between previous ideas and concepts already discussed and the new ideas to be presented? Some key features to consider in assessing text structure include:

- The introduction is clearly identified.
- The introduction provides purpose, relevance, and overview.
- Titles, headings, and subheadings reflect main ideas of content.
- Key vocabulary words are highlighted and reflect important concepts.
- Definitions of key terms are provided.
- Signal words or headings are provided.
- Margin notes provide summaries or expand on information.
- Illustrations and pictures enhance important information.
- The summary is clearly identified.
- The summary reviews goals and the most important concepts.
- Review questions require students to think about key concepts and ideas.
- The questions have good balance among main concepts, fact/detail, and critical thinking (application, analysis, reactions).

2. *Coherence* refers to how well the ideas in a text are organized and make sense. Particularly in content-area texts, coherence is the way in which the text instructs and makes sense to the reader. With coherent text, the relationships among concepts are clear. Text that is clearer is associated with improved learning, and, importantly, students who are taught to use "self-explanation" while reading text retained the most about what they read (Ainsworth & Burcham, 2007). Coherence is also facilitated by using different kinds of *cohesive ties*—linguistic forms that help to convey meaning across phrase, clause, and sentence boundaries (Rapp et al., 2007).

Examples of cohesive ties are *conjunctions* and *connectives, pronoun referents* (using a pronoun to refer to a previously mentioned noun), and *substitutions* (using a word to replace a previously used noun or verb phrase).

3. *Audience appropriateness* refers to how well a textbook is suited to the readers' content knowledge, reading, and study skills. The text needs to provide enough explanation, attributes, examples, and analogies to give readers adequate information to relate to their background knowledge. Superficial mentions of new topics about which the reader has limited background knowledge do little to build understanding. In contrast, too many or too few technical supporting details can obscure the important concepts.

Another area to consider in relation to the audience is the explicitness of main ideas. Text in which the main ideas are explicit and are regularly placed at the beginning of paragraphs and sections facilitates learning.

Part of the process of preparing to teach content knowledge is evaluating instructional materials for readability and friendliness. By considering the structure, cohesion, and audience appropriateness when evaluating text or other

Chapter 8 discusses how to teach strategies for understanding the main ideas to students with learning and behavior difficulties.

types of instructional materials (e.g., films, lectures, demonstrations), teachers develop a good idea of how considerate, or user friendly, the materials are. Based on this evaluation, teachers may decide to modify, augment, or adapt the instructional materials (see the section on adapting textbooks later in this chapter).

Assessing Students' Background Knowledge

Before content-area teachers assign a specific chapter or text to read or present a lecture on a topic, they need to assess the students' background knowledge for the concepts and related vocabulary to be covered. Background knowledge plays a critical role in determining how effectively students will comprehend and retain the information and vocabulary to be presented. Semantic mapping (Klingner, Vaughn, & Boardman, 2015) develops background knowledge by using brainstorming ideas about the topic to generate a list of words and phrases related to the key concept. The teacher and students take the ideas given by the students and relate them to the key concept, developing a network that notes the various relationships (e.g., categories, subcategories, definition, class, examples, properties, or characteristics). A semantic map for the concept of *desert* was developed by a group of fifth-grade students with learning disabilities who were preparing to study deserts. The map shown in Figure 10.10 indicates that the students could give examples and characteristics of a desert. However, the students did not produce a class (landform) or a definition ("What is it?"). Additionally, the property and example relations that were generated lacked technical vocabulary, despite further probing on the part of the teacher. The semantic map in Figure 10.10 serves not only as a visual representation of the students' current understanding of the concept of *desert*, but also as an initial blueprint for teaching (Reyes & Bos, 1998).

See Chapter 8 for a review of a technique that assesses background knowledge, the PreReading Plan (PReP).

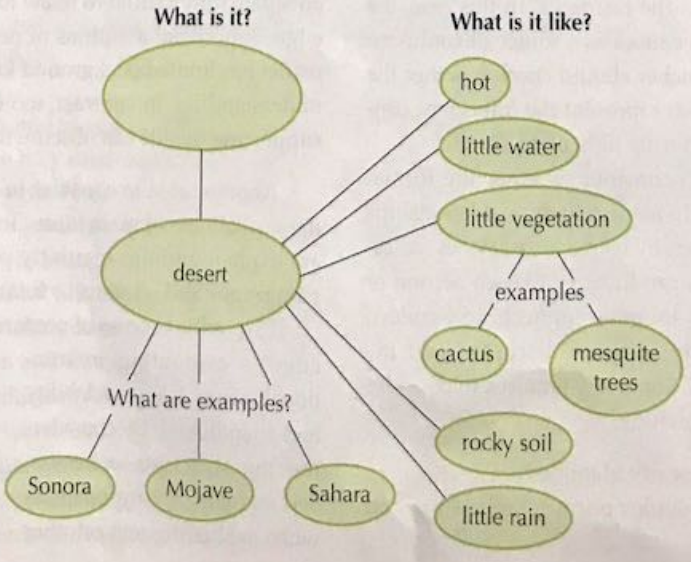
Using activities such as semantic mapping and PReP not only provides teachers with valuable information about their students' knowledge, but also activates the students' knowledge. We have found that promoting discussions during these activities and encouraging students to relate first-hand experiences help both students and teachers make connections and clarify concepts.

Using Prelearning Activities

Limited background knowledge signals the teacher that students need more instruction to learn the information that will be presented in a text or lecture. Teachers can present any number of prelearning activities—such as advance organizers, concept diagrams, SFA, and semantic mapping—that students can use before reading an assigned text or listening to a lecture.

Advance Organizers Advance organizers are activities that orient students to the material before reading or class presentation. They provide students with an overview or preview of the content they will be learning. Use of advance organizers is based on the notion that students profit from having a framework for the material to be learned to help them assimilate the new information into their current schemas or cognitive structure. Advance organizers should inform students of the purpose of instruction, identify topics and subtopics, supply background information, introduce new vocabulary, provide an organizational structure, and state the intended student outcomes. Reviews of studies that have explored the effectiveness of advance organizers

Figure 10.10 Concept Map of Fifth-Grade Students' Knowledge of Deserts



on learning have drawn the following conclusions (Corkill, 1992; Jung & Brown, 2016; Preiss & Gayle, 2006):

- Groups that are given advance organizers consistently perform better than control groups that do not receive them. This advantage diminishes when the material is familiar, when the learners have an extensive background of knowledge about the area, when the learners have high IQs, and when tests fail to measure the breadth of transfer ability.
- Advance organizers particularly aid students of lower ability and/or limited background knowledge.
- Advance organizers are more effective when presented before a learning task than when presented after the task.
- Advance organizers that are well structured and detailed are associated with improved learning and retention of learning (Gurlitt, Dummel, Schuster, & Nückles 2012).

MyLab Education
Video Example 10.4

In this video, a special education teacher supports her students' ability to learn science by using an advance organizer. How does she construct the graphic organizer to scaffold learning? How does she ensure that students understand their tasks?

Evidence-Based Practice

Advance Organizers

Procedures: Lenz (1983; Lenz et al., 1987, 2005) identified 10 steps for teachers to follow in using an advance organizer (see Apply the Concept 10.3). The resource teacher trained the students in the resource classroom to use advance organizers by giving the students a worksheet with each of the 10 steps as headings. The students then practiced listening to advance organizers given by the resource teacher and completing the worksheets. Next, the students used the advance organizer worksheet in inclusive content-area classes, and the resource teacher and students met afterward to discuss the success of the worksheets. They discussed how they could use the advance organizer information to organize notes and how they could modify the worksheet to assist the students to cue in on the most common organizing principles used by particular teachers.

In giving an advance organizer, the teacher provides an organizational framework for the information to be learned (see step 3 in Apply the Concept 10.3). This framework might be an agenda, a lesson outline, a diagram in which the parts are labeled, or a picture semantic map, as discussed earlier. The use of visual representations or pictures is particularly salient for students with learning and behavior problems (N. H. Schwartz, Ellsworth, Graham, & Knight, 1998).

10.3 Apply the Concept

Steps in Using an Advance Organizer

1. Inform the students of advance organizers.
   - **a.** Announce the advance organizer.
   - **b.** State the benefits of the advance organizer.
   - **c.** Suggest that students take notes on the advance organizer.
2. Clarify the action to be taken.
   - **a.** State the teacher's actions.
   - **b.** State the students' actions.
3. Identify the topics or tasks.
   - **a.** Identify major topics or activities.
   - **b.** Identify subtopics or component activities.
4. Provide background information.
   - **a.** Relate the topic to the course or previous lesson.
   - **b.** Relate the topic to new information.
5. State the concepts to be learned.
   - **a.** State specific concepts/ideas from the lesson.
   - **b.** State general concepts/ideas that are broader than the lesson's content.
6. Clarify the concepts to be learned.
   - **a.** Clarify by examples or analogies.
   - **b.** Clarify by nonexamples.
   - **c.** Caution students of possible misunderstandings.
7. Motivate the students to learn.
   - **a.** Point out the relevance to students.
   - **b.** Be specific, short-term, personalized, and believable.
8. Introduce vocabulary.
   - **a.** Identify the new terms, and define them.
   - **b.** Repeat difficult terms and define them.
9. Provide an organizational framework.
   - **a.** Present an outline, list, or narrative of the lesson's content.
10. State the general outcome desired.
    - **a.** State the objectives of the instruction/learning.
    - **b.** Relate the outcomes to test performance.

Source: Based on B. K. Lenz (1983), Promoting active learning through effective instruction, *Pointer, 27*(2), p. 12.

Comments: Lenz, Alley, and Schumaker (1987) found that regular content-area teachers can implement advance organizers with minimal teacher training (45 minutes). Teachers who used advance organizers expressed satisfaction with the students' response to the instruction as well as the improvement in the overall quality of their own instruction. However, Lenz did find that teacher use of an advance organizer alone was not enough to facilitate student learning. "Learning disabled students had to be made aware that advance organizers were being presented and then had to be trained in the types of information presented in the advance organizer and ways in which that information could be made useful" (Lenz, 1983, p. 12).

Concept Diagrams and Comparison Tables The concept diagram as part of the Concept Mastery Routine (Bulgren et al., 2007; Bulgren, Schumaker, & Deshler, 1988, 1996) is a content enhancement tool that teachers can use to assist students in understanding important key concepts in the reading or lecture; it also works well as a prelearning activity. Research revealed that the Concept Mastery Routine led to gains in students' knowledge in concept and expression of information. The concept diagram is a visual tool that supports students as they delineate a concept by doing the following:

- Exploring their prior knowledge of the concept
- Understanding the relationship of the concept to the overall concept class to which it belongs
- Classifying characteristics of the concept
- Generating examples and nonexamples
- Constructing a content-related definition of the concept

Evidence-Based Practice

Concept Diagrams and Comparison Tables

Procedures: In using a concept diagram (see Figure 10.11), the first step is to prepare the diagram. The teacher identifies

Figure 10.11 Concept Diagram

CONCEPT DIAGRAM

Concept: fossils

Overall Concept: past geologic age

Classifying Characteristics

Always Present	Sometimes Present	Never Present
remains or prints	frozen in ice	still alive
plants or animals	trapped in tar	still decaying
thousands of years old	crushed by water	
preserved in the earth	in volcanic ash	

Example: tigers in La Brea tar pits; Siberian mammoth; petrified forest in Arizona; fish skeleton in limestone layers

Nonexample: your pet cat; elephant in Africa today; tree limbs and leaves in your yard; fish in supermarket

Definition: Fossils are remains or prints of plants or animals who lived thousands of years ago that have been preserved in the earth.

major and related concepts of which the students need a deeper or more technical understanding. In a science chapter on fossils, Mr. Bello, the seventh-grade science teacher, felt that it was important for the students to develop a more technical understanding of the concept of fossils, so this became the concept to diagram. Second, Mr. Bello used the instructional materials and his knowledge to list important characteristics of fossils. He also thought about whether each characteristic is "always present," "sometimes present," or "never present." Third, he located examples and nonexamples of the concepts in the instructional materials. In reviewing the chapter, he found that nonexamples were not provided, so he decided to show the students fossils and nonfossils to help them to start thinking about examples and nonexamples. Finally, Mr. Bello constructed a definition.

After preparing the concept diagram, the next step is using it with the students to develop their understanding of the concept. After giving an advance organizer to explain its purpose, how the diagram works, and the expectations, the teacher can use the linking steps to teach the concept (Bulgren et al., 1988):

Convey the concept name and why it is the focus of study.

Offer the overall or overarching concept.

Note the key words by having the students brainstorm words related to the concept.

Classify the characteristics by using the key words and other ideas to generate characteristics that are always, sometimes, and never present.

Explore and list examples and nonexamples.

Practice with the examples by having students discuss how the examples relate to the characteristics.

Tie down a definition by generating a content-related definition that includes the concept, the overall concepts, and the characteristics that are always present.

Comments: Concept diagrams help not just students with learning disabilities but all learners in the classroom, making them ideal for inclusion settings. Figure 10.12 presents a sample comparison table and includes the steps that are used in generating the table (see the steps in the upper-right-hand corner, which are the acrostic for COMPARING). An important part of this table and the steps in generating it is outlining the similar and dissimilar characteristics.

Bulgren and her colleagues note that both the concept diagram and the comparison table as shown in Figures 10.11 and 10.12 are "instructional tools developed and researched at the University of Kansas Center for Research on Learning. They represent a number of organizing and teaching devices designed for teachers to use as they teach content information to classes containing diverse student populations. They are data-based teaching instruments that have been found effective when used in instructional routines that combine cues about the instruction, specialized delivery of the content, involvement of the students in the cognitive processes, and a review of the learning process and content materials" (Bulgren, Lenz, Schumaker, & Deshler, 1995).

Semantic Feature Analysis/Relationship Charts Like an advance organizer, SFA is a prelearning activity that serves to organize the major concepts and related vocabulary to be taught in a unit, chapter, or lecture. Whereas the concept diagram can be used to clarify a concept that is difficult for the students, the SFA activity helps students to see the relationships between the major concepts, the related vocabulary, and their current knowledge of the topic. Because knowledge is hierarchically organized, relating the new concepts to students' prior knowledge will help students learn these new concepts. In addition, teaching attributes of a concept as well as teaching examples and nonexamples is important to concept learning, and principles of scaffolded instruction and interactive dialogues will promote learning.

Evidence-Based Practice

Semantic Feature Analysis and Relationship Charts

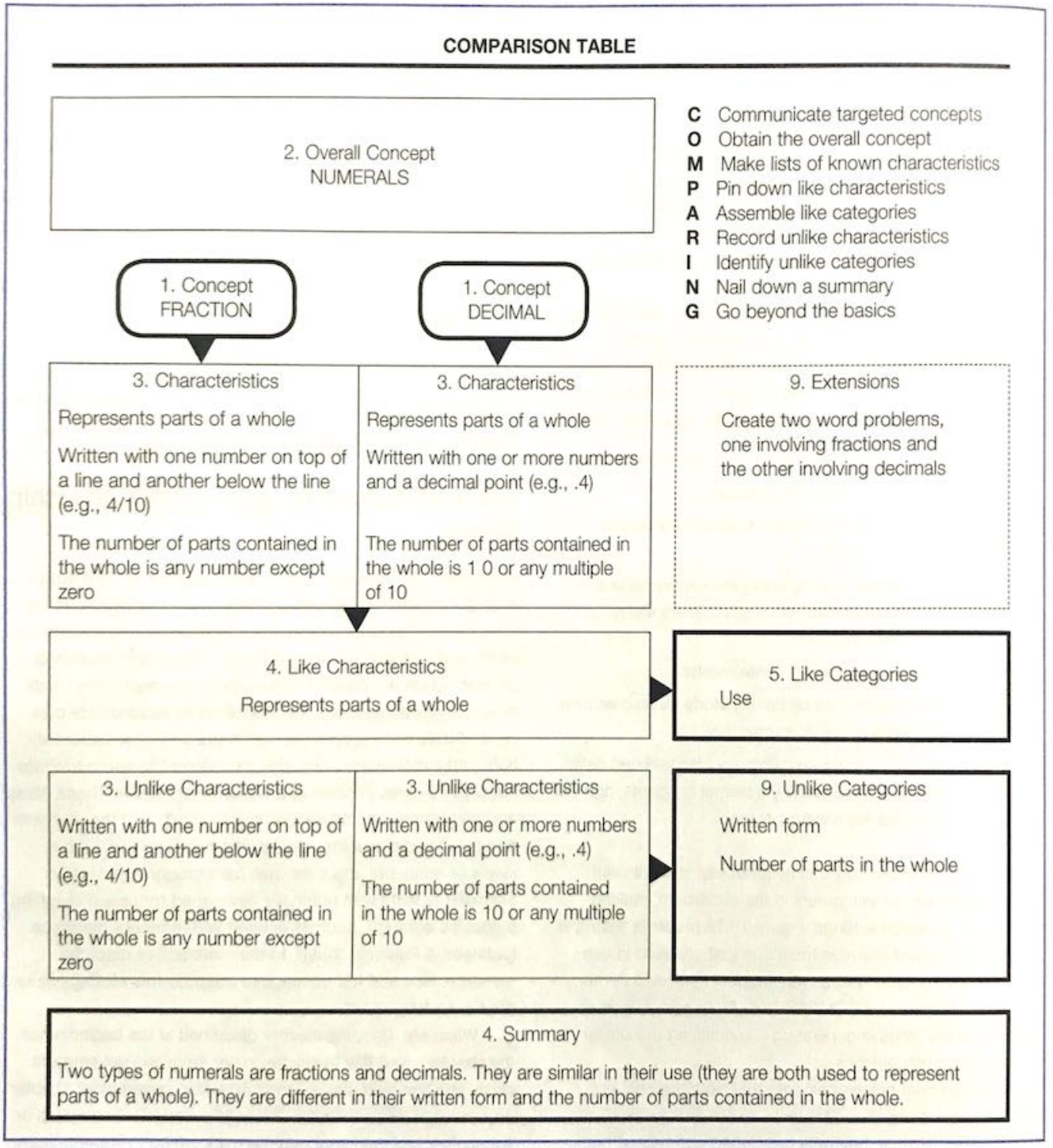
Procedures: The first step in preparing for an SFA activity is to develop a relationship chart. This chart is based on the idea that ideas or concepts are related to one another in terms of a hierarchy of abstractness. The most inclusive or abstract ideas are called *superordinate concepts;* the most concrete or narrow ideas are identified as *subordinate concepts*. Ideas or concepts that fall in between the superordinate and subordinate concepts are referred to as *coordinate concepts* (Frayer, Frederick, & Klausmeier, 1969). These ideas are then organized into a relationship chart, and the students and teacher discuss the relationship between the various levels of concepts and their own background knowledge. This SFA activity was originally developed for use in teaching a specific concept, such as is used with concept diagrams (Johnson & Pearson, 1984). In their interactive teaching research, Bos and her colleagues adapted this strategy to text (Bos & Anders, 1992).

When Ms. Cho, the teacher described at the beginning of the chapter, used this technique in her American government class, she first read the assigned American government chapter on contracts. As she read, she listed the important concepts or vocabulary and then arranged them according to superordinate, coordinate, and subordinate concepts. She used words as well as relevant phrases:

contract	counteroffer
promise	holding good
contracting parties	conditions
buyer	acceptance
seller	consideration
written contracts	statute of frauds
verbal contracts	legal obligation
contractual offer	legal action

Figure 10.12 Comparison Table for the Concepts of Decimals and Fractions

SOURCE: J. A. Bulgren, B. Lenz, D. D. Deshler, & J. B. Schumaker, *The Concept Comparison Routine* (Lawrence, KS: Edge Enterprises, Inc., 1995), p. 55. Reprinted with permission.



Next, she organized the vocabulary into a relationship chart (see Figure 10.13). The superordinate concept "Contracts" is used as the name for the chart. The five coordinate concepts (main ideas in the text) serve as the column headings and are listed as the important or major ideas. The related vocabulary or subordinate concepts are listed down the side of the chart. Notice that Ms. Cho left blank spaces for adding important ideas and important vocabulary. She encourages students to add relevant information from their background knowledge.

The relationship chart became Ms. Cho's instructional tool. She made a copy for each student and a teacher copy to show the class with a document reader so that the class could complete the chart as a group. To do this, she introduced the topic (superordinate concept) of the assignment. The students then discussed what they already knew about contracts. Next, she introduced each coordinate concept (important idea) by assisting the students in generating meanings. During this introduction and throughout the activity, she encouraged students to add their personal experiences or understandings of the terms.

Figure 10.13 Relationship Chart: Contracts

CONTRACTS

Name: _____
Period: _____

Important Ideas

	Contract	*Promise*	*Written Contracts*	*Verbal Contracts*	*Conditions*	
Legal action						
Consideration						
Legal obligation						
Holding good						
Contractual offer						
Counteroffer						
Acceptance						
Statute of frauds						
Contracting parties						

+ = positive relationship
− = negative relationship
0 = no relationship
? = unknown relationship

For example, when Ms. Cho presented the major idea of *contract*, Joe inquired whether a contract had to be written to be legal. This led to Anya's conveying a firsthand experience of her father's making a verbal contract and having the contract honored in court even though it was not written. The discussion ended with one of the purposes for reading being the clarification of what was needed for a verbal contract to be considered legal.

Following the discussion of the coordinate concepts, Ms. Cho introduced each subordinate concept. Again Ms. Cho and her students predicted what the meanings would be in relation to the topic of contracts. For the more technical vocabulary (e.g., *contractual offer, statute of frauds*), Ms. Cho sometimes provided the meaning, or the students decided to read to clarify the concept. After introducing each concept, she and the students discussed the relationship between each coordinate concept or phrase and each subordinate term or phrase. They used a plus sign (+) to represent a positive relationship, a minus sign (−) to represent a negative relationship, a zero (0) to signify no relationship, and a question mark (?) to indicate that no consensus could be reached without further information.

Ms. Cho found that student involvement during the discussion was important to the success of the SFA strategy. One key to a fruitful discussion was encouraging students to ask each other why they had reached a certain relationship rating. This seemed to encourage students to use their prior knowledge about the topic and seemed to encourage other students to activate what they already knew about the vocabulary.

After completing the relationship chart, Ms. Cho guided the students in setting purposes for reading. These purposes, for the most part, focused on the chart, reading to confirm their predictions and to determine the relationships between the terms for which no agreement could be reached. After completing the reading, Ms. Cho and the students reviewed the relationship chart. They discussed changes to any of the relationships if necessary and reached consensus on those that were previously unknown.

Sometimes when Ms. Cho and her students used a relationship chart, they found that some information was still unclear after reading the text. Then they checked other sources, such as experts in the field, technical and trade books, the Internet, and other media. Ms. Cho also taught the students how to use the relationship chart to study for chapter tests by asking each other questions based on the meanings of the concepts and vocabulary and on their relationships (e.g., What is a contractual offer? What are the conditions necessary to have a contract?). She also taught how the chart could be used to write a report about the concepts.

Comments: Findings from a synthesis on graphic organizers (A. Kim, Vaughn, Wanzek, & Wei, 2004) confirmed that SFA was consistently associated with gains in comprehension. One of the most important questions asked during discussion is, Why?

(e.g., Why is *evidence* positively related to *evidence in court*?). Students need to justify their reasoning. By answering *why* questions, students think through concepts, reaching a deeper understanding and more effectively relating new information to old.

Semantic and Curriculum Maps Semantic and curriculum maps (Klingner et al., 2015; Lenz, Adams, Bulgren, Pouloit, & Laraux, 2007; Vaughn, Martinez, et al., 2009; Vaughn, Swanson, et al., 2013) are ways of visually representing the concepts and important vocabulary to be taught (refer back to Figure 10.10). These content enhancement devices can be used as prelearning activities that assist students in activating their prior knowledge and in seeing the relationships between new concepts and related vocabulary.

Evidence-Based Practice

Semantic Maps

Procedures: In using semantic maps, the teacher can begin by putting the major concept for a lecture or text on the board and then ask students to generate a list of related vocabulary from their background knowledge. However, when presenting more technical vocabulary, the teacher could begin by writing on the board the list of important vocabulary she generated in reviewing the text chapter or developing the lecture. After listing the words, the teacher discusses the meanings of the words, using a procedure similar to the one just presented in the section on SFA. Next, the teacher arranges and rearranges the vocabulary with the students until the class has a map showing the relationships that exist among the ideas.

For example, when presenting the following words for a chapter on fossils, the students and teacher first grouped the animals together.

trilobites	small horses
crinoids	winged insects
ferns	geography of the present
dinosaurs	land masses
lakes	brachiopods
bodies of water	saber-toothed tigers
animals	guide fossils
geography	rivers of the past
trees	plants
oceans	Continents

Next, they grouped the plants together. In the case of guide fossils and several other types of fossils with which the students were not familiar (e.g., crinoids, trilobites), they decided to wait until they had read before placing the concepts on the map. Finally, they grouped together the geography terms.

After the map is completed, the teacher instructs the students to refer to the map while reading and/or listening to the lecture. Like the relationship chart, the semantic map can provide a framework for setting purposes for reading. The students read to confirm and clarify their understanding in relation to the map and make changes to it during discussions held as they read or after completing a chapter. The map can also serve as a blueprint for studying and for writing reports.

Comments: A number of researchers have investigated the use of semantic mapping with students who are low achievers or have learning disabilities (for a review, see Ciullo & Reutebuch, 2013; A. Kim et al., 2004). In some cases, the students generated the maps; in other studies, the teacher had already developed the framework for the map, and the student completed them. Some studies provided a map or visual display (see Figure 10.14) to the students in completed form, and systematic direct instruction (Carnine, 1989) was used to assist the students in learning the information contained in the display (Bergerud, Lovitt, & Horton, 1988; Darch & Carnine, 1986). The research has been consistently encouraging in this area: The use of semantic maps or visual representations of information improves the learning performance of students with learning and behavior problems.

Reinforcing Concept Learning During and After Learning

Whether using an advance organizer, SFA, semantic map, concept diagram, or comparison table, these frameworks can be used to guide students as they read a text or listen to a lecture and as they react to their learning. For example, a semantic map can be used before, during, and after a lesson—students can add new vocabulary to the existing map during the lesson and can revise the map after the lesson. Also, the list of major ideas that is obtained from the advance organizer can serve as the framework in which students can take notes when listening to a lecture. After the lecture, students can meet in small groups and share their notes to create one overview that can serve as a study guide for the test. Students can be instructed on how to develop questions based on a concept diagram or semantic map. These questions can serve as self-questions to be asked when reading and when studying for a test.

Students generally require considerable practice in using these content enhancement devices.

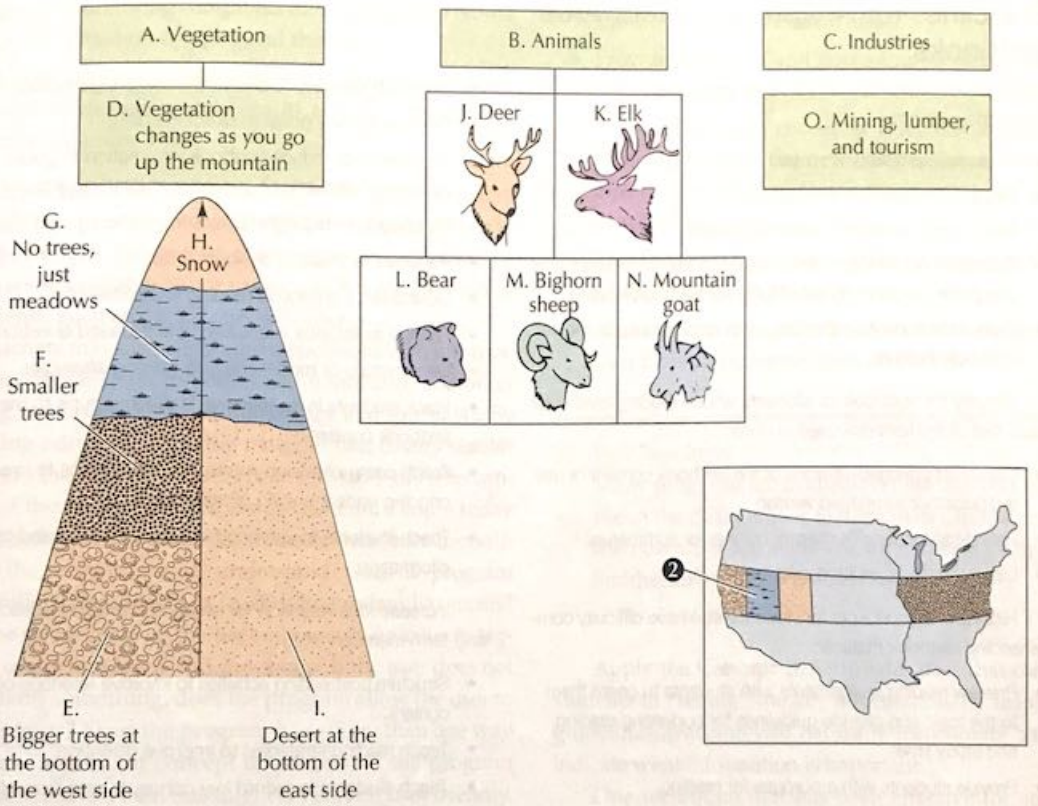
Web Resources

For helpful websites on content-area learning, see:

- National Science Teachers Association (NSTA) website: **http://www.nsta.org**.
- National Council for the Social Studies: **http://www.socialstudies.org**.

Figure 10.14 Visual Display

SOURCE: C. Darch & D. Carnine (1986), Teaching content area material to learning disabled students, *Exceptional Children, 53*, p. 243. Copyright © 1986 by the Council for Exceptional Children. Reprinted with permission.



Making Adaptations

Textbook Adaptations and Study Guides

Text adaptation is a technique that involves making changes to or adding to an existing text to make it more comprehensible for students with and without special needs. Apply the Concept 10.4 lists textbook adaptations that teachers may consider, three of which are discussed here in greater depth.

Study guides are tools teachers can use to lead students through a reading assignment. A typical study guide is a series of questions or activities that emphasize important content information. Students complete study guides while they read a selection. Study guides help direct students to the key points to be learned. The study guide also provides an organizational structure for students to reflect about what they are reading and to engage in higher-order thinking. In short, study guides help to "tutor" a student through a chapter.

Commercially prepared study guides can be purchased or obtained through the Internet as supplements to some textbooks. The advantage of commercial study guides is that they are already prepared, so they are real time-savers. The disadvantage is that the publisher does not know a given teacher's style of teaching, emphasis, or school district's requirements. Moreover, the publisher does not know the students. For these reasons, many teachers construct their own study guides.

Many types of study guides exist. Some are designed to help students activate prior knowledge, others to help students understand literal or inferential information in the textbook, others to foster peer interaction and discussion, and still others to help students recognize meaning patterns in text (e.g., cause and effect, compare and contrast). Consider the following when developing a study guide:

- *Decide how a guide will assist the students with special needs.* Is the textbook information difficult for the students to access and understand? Are there particular sources of information (e.g., graphs and figures) that need to be interpreted? Will students with special needs require support and guidance to get through the chapter and to grasp the most important ideas?
- *Analyze the chapter organization and content.* Can some parts be omitted? Are some parts easier to understand

10.4 Apply the Concept

Guidelines for Adapting Content-Area Textbooks

Substitute the textbook for students who have severe word-recognition problems:

- Audio record textbook content.
- Read textbook aloud to students.
- Pair students to master textbook content.
- Use direct experiences, films, videos, audio recordings, and computer programs as substitutes for textbook reading.
- Work with students individually or in small groups to master textbook material.

Simplify the textbook for students whose reading level is far below that of the textbook used in class:

- Construct abridged versions of the textbook content or use the publisher's abridged version.
- Provide students with chapter outlines or summaries.
- Use a multilevel, multimaterial approach.

Highlight key concepts for students who have difficulty comprehending textbook material:

- Preview reading assignments with students to orient them to the topic and provide guidelines for budgeting reading and study time.
- Provide students with a purpose for reading.
- Provide an overview of an assignment before reading.
- Structure opportunities for students to activate prior knowledge before starting a reading assignment.
- Introduce key vocabulary before assigning reading.
- Develop a study guide to direct learning.
- Summarize or reduce textbook information to guide classroom discussions and independent reading.
- Color-code or highlight textbooks.
- Reduce the length of assignments.
- Slow down the pace of reading assignments.
- Provide assistance in answering text-based questions.
- Demonstrate or model effective reading strategies.
- Place students in cooperative learning groups to master textbook content.
- Teach comprehension-monitoring techniques to improve ongoing understanding of text material.
- Teach students to use graphic aids to understand textbook information.

Increase idea retention for students who have difficulty with long-term memory:

- Structure postreading activities to improve retention of content.
- Teach reading strategies to improve retention.
- Teach students to record key concepts and terms for study purposes.
- Teach memory strategies to improve retention of text material.

than others? What skills will students need to read and understand this material?

- *Decide how you want to structure your study guide.* Create one that includes the suggested components:
  - Specific information about the reading assignment (page numbers, title)
  - Learning objectives of the assignment
  - Purpose statement for the assignment
  - Introduction of key terms or vocabulary
  - Activities for students to complete
  - Questions for students to answer as they read
  - Sources and websites that might provide further information
  - Suggestions about how and when parents and other students can provide assistance

Text Highlighting Students with comprehension problems have difficulty sifting out important information. Underlining or highlighting key points in textbooks can help students attend to the most salient information. Teachers can highlight the information in a textbook that they think is most important. Then students or adult volunteers can use this book as a guide to highlight the same information in books for students with reading and learning disabilities. Keep in mind that the teacher will also want to teach students this and other textbook study skills (see the section titled Study Skills and Learning Strategies).

Using Alternative Reading Materials For students with very low reading skills who can learn by listening, the teacher can do the following:

- *Audio record textbook chapters.* Some publishers provide online resources with their textbooks. If the textbook you are using is not accompanied by an audio version, adult and/or student volunteers can read and record the chapters. Students can then listen to the audio at home or in their resource classes.
- *Read text aloud to students.* Encourage students to follow along, reading silently. Pause frequently to assess student learning from the reading.

- *Pair a good reader with a poor reader.* The good reader reads the textbook material aloud and, together, the two students learn the content. Both students should use self-monitoring comprehension strategies to ensure that both readers comprehend the text.
- *Identify websites or apps that teach.* Most students are comfortable using websites to acquire information, including video sites.

Sometimes teachers find it necessary to use alternative materials that present similar content, such as films, videos, and trade books. Numerous text-to-speech readers can be found, some available online at no cost, that read text aloud to students, such as the Kurzweil Reader.

Teachers may also supplement textbooks with informational trade books (both fiction and nonfiction) and other reading materials (such as magazines and journals). By providing additional reading material that covers similar content to the textbook, teachers enable students who cannot read the textbook to access the content. People today discuss software programs in terms of their user friendliness. Is the program easy to understand? Does the program use familiar language or at least define unfamiliar terms? Does the program give the user cue words or icons to signal the important ideas and processes? If the user does not understand something, does the program allow the user to ask questions? Does the program have more than one way to explain a difficult concept or process? If the program has these features, then one might consider it user friendly.

Now take a minute to reread the previous paragraph, but substitute the word *lecture* for the word *program* and the word *listener* for the word *user*. Just as using considerate, or user-friendly, text assists students in learning the critical information, a well-organized lecture makes the students' work easier in that it assists them in seeing relationships among concepts and distinguishing important from supplementary information. It also helps them relate new information to old.

As teachers plan their teaching, the following guidelines can make lectures "listener friendly":

- Use advance organizers.
- Preteach important vocabulary.
- Use cue words or phrases to let students know what information is important (e.g., "It is important that you know . . . ," "The key information to remember is . . . ," "In summary . . . ").
- Repeat important information.
- Write important information on the board, a transparency, and/or a handout.
- Stress key points by varying the tone and quality of your voice.
- Number ideas or points (e.g., *first, second, next, then, finally*).
- Write technical words or words that are difficult to spell.
- Use a study guide that lists the major concepts, with space for students to add other information.
- Use pictures, concept diagrams, and content maps to show relationships among ideas.
- Provide examples and nonexamples of the concepts you are discussing.
- Ask questions and encourage discussion that requires students to relate the new information to ideas they already know (from their own background or your previous lectures).
- Stop frequently, and have students discuss what they have learned with partners.
- Allow time at the end of a lecture for students to look over their notes, summarize, and ask questions.

Web Resources

Many programs are available online that you can use in the classroom or that students can use on their own. For an online science museum by the Smithsonian, go to **www.smithsonian.org**.

Apply the Concept 10.5 provides cues that can assist students in "seeing" the key information. By using these guidelines, teachers will naturally incorporate cues that indicate what information is important.

One technique that has been effective for students with learning and behavior problems in enhancing their understanding and recall of information presented through lectures is the pause procedure (e.g., Dyson, 2008; Hock, 2012; Ruhl, 1996). This procedure consists of pausing during natural breaks in lectures and having students work as partners for about 2 minutes to discuss what they are learning and review their notes. Another way to implement the pause procedure is to give students a chance to write one thing they learned and to write one question. At the end of the 2 minutes, the teacher asks students whether they have any questions or concepts that need further discussion or clarification. The teacher then resumes lecturing.

Many content-area teachers use PowerPoint presentations to display critical content information. One procedure that can make learning "less passive" and lead to greater understanding is developing questions about the content that relate to the PowerPoint presentations and promote more interactive and engaged learning (Gier & Kreiner, 2009).

Adapting Class Assignments and Homework

One area in which students with learning and behavior problems often struggle is the completion of assignments

10.5 Apply the Concept

Cues to Listen and Watch for in Lectures

Type of Cue	Examples
Organizational cues	"Today, we will be discussing . . . "
	"The topic I want to cover today . . . "
	"There are [number] points I want you to be sure to learn . . . "
	"The important relationship is . . . "
	"The main point of this discussion is . . . "
	Any statement that signals a number or position (e.g., *first, last, next, then*).
	"To review/summarize/recap . . . "
Emphasis cues	
Verbal	"You need to know/understand/remember . . . "
	"This is important/key/basic/critical . . . "
	"Let me repeat this . . . "
	"Let me check, now do you understand . . . ?"
	Any statement is repeated.
	Words or terms are emphasized.
	Teacher speaks more slowly, more loudly, or with more emphasis.
	Teacher stresses certain words.
	Teacher spells words.
	Teacher asks rhetorical question.
Nonverbal	Information written on overhead/board.
	Information handed out in study guide.
	Teacher emphasizes the point using gestures.

Source: Based on S. K. Suritsky & C. A. Hughes, Note-taking strategy instruction, in D. D. Deshler, E. S. Ellis, & B. K. Lenz, *Teaching Adolescents with Learning Disabilities*, 2nd ed. (Denver, CO: Love, 1996) and Schumaker & Deshler, 2006.

MyLab Education
Video Example 10.5

The teacher in this video recognizes the need to adapt learning tasks for struggling students. Consider adapting assignments in ways that help students accommodate for their learning and behavior problems and succeed academically.

and homework. Students with learning disabilities, and particularly students with attention problems, have greater difficulty completing homework assignments (Langberg et al., 2010). Furthermore, students with special learning needs spend more time completing homework assignments than average-achieving students (Harniss, Epstein, Bursuck, Nelson, & Jayanthi, 2001). At the same time, homework has become a significant part of schooling, accounting for a significant amount of time students spend learning. Furthermore, completing homework is associated with better grades, staying in school, and achievement.

What can teachers do to facilitate homework success for students? Consider that the most common homework and assignment types of problems include (Evans et al., 2009; Langberg et al., 2010; Stockall, 2017):

- Problems forgetting to bring materials home and also returning materials to school
- Inaccurately recording homework assignments
- Having unrealistic plans or no plans for completing assignments
- Procrastinating completion of work
- Submitting assignments that are incomplete
- Having disorganized book bags, lockers, and other resources so that organizing and completing assignments is difficult

Teachers can facilitate students' success with assignments and homework by:

- Assisting them in developing a checklist to organize whether they know the assignment, have the materials, and know whom to check with for questions
- Keeping a calendar with due dates
- Developing a plan to complete assignments and homework
- Establishing a plan that provides for positive feedback or successfully completing assignments and homework

After conducting a comprehensive review of the literature, H. Cooper and Nye (1994; H. M. Cooper, 2007) concluded that homework assignments for students with disabilities should be brief, focused on reinforcement rather than new material, monitored carefully, and supported through parental involvement. Especially for students with special needs, homework should not result in a "battle" between parents and students. One way to prevent this is to give complete information for assignments. Having complete information helps to motivate students, as does giving them real-life assignments (i.e., assignments that connect homework to events or activities in the home) plus reinforcement, using homework planners, and graphing homework completion. The tips in Apply the Concept 10.6 can help teachers to provide students with a complete set of directions.

Class assignments and homework can be adapted for special learners so that they can experience success without undue attention being brought to their learning difficulties. The key to success is to make assignments appropriate in content, length, time required to complete, and skill level needed to accomplish the task. It is also important to explain the assignments, model several problems if appropriate, and check for understanding (Bender, 2008). Students should know how and where to get help if they get stuck.

Constructing and Adapting Tests

The best way to discover what students have learned is to construct student-friendly tests, adapt test administration and scoring as necessary, consider alternatives to testing (such as assessment portfolios), and teach test-taking skills. Student-friendly tests are considerate to the test taker in both content and format. The content has been covered in class or assigned readings, and students have been told explicitly that they are responsible for learning it. The format is clear and easy to understand. Assessments not only measure student learning, but also enhance it (Benjamin & Pashler, 2015). When students have to recall information for a test, they are more likely to be able to retrieve that information later. Likewise, giving periodic quizzes or tests improves students' long-term recall (Agarwal, Roediger, McDaniel & McDermott, 2010).

To construct student-friendly tests, a teacher must first decide what skills and concepts to include. In the test format, directions should be clear and unambiguous, and items should be legible and properly spaced. Attention to format is important for all students, but particularly for those who have difficulty reading and taking tests and who are overly anxious about taking tests. Perhaps one of the most important things to consider with testing is time. Particularly for students with disabilities, most will need additional time to show what they know in a testing situation.

Even with student-friendly tests, students with learning and behavior problems may have difficulty reading tests, working within time constraints, or resisting distractions during a test. Poor or laborious writing can cause them to tire easily and can inhibit performance on a test.

All students tend to perform better on assessments when they are provided accommodations, such as more time (Lai & Berkeley, 2012; Lang et al., 2008; B. J. Lovett, 2010); however, students with disabilities often have differential performance, particularly on reading assessments (Lang et al., 2008). Fortunately, students tend to view accommodations as fair for most students but even more fair for students with disabilities (Lang et al., 2008).

Apply the Concept 10.7 suggests accommodations for test administration and scoring. As teachers decide which, if any, adaptations to use, they should consider the material to be covered by the test, the test's task requirements (e.g., reading, taking dictation), and the particular needs of special learners.

In addition to or instead of tests, teachers may use portfolios as an assessment tool. Apply the Concept 10.8 presents ideas for developing and using portfolios.

10.6 Apply the Concept

Tips for Giving Assignments

1. Explain the purpose of the assignment. Stress what you expect students to learn and why learning the skill or concept is important. Connect the skill or concept to real-life applications.
2. Explain in detail the procedures for completing the assignment. To check for understanding, ask one or two students to summarize the procedures.
3. Get students started by modeling one or two problems or by providing an example.
4. Describe the equipment and materials needed to complete the assignment.
5. Anticipate trouble spots, and ask students how they might tackle difficult parts in the assignment.
6. Explain when the assignment is due.
7. Explain how the assignment will be graded and how it will affect students' grades.
8. Describe appropriate ways to get help or support in completing the assignment.
9. For an in-class assignment, explain your expectations for the behavior of students while they complete the assignment, and explain what students who finish early should do.
10. Address students' questions.

10.7 Apply the Concept

Testing Accommodations

- Read proper nouns to students.
- Read question stems to students.
- Teach students test-taking skills.
- Give frequent quizzes rather than only exams.
- Give take-home tests.
- Test on less content than the rest of the class.
- Change types of questions (e.g., from essay to multiple choice).
- Give extended time to finish tests.
- Read test questions to students.
- Use tests with enlarged print.
- Highlight key words in questions.
- Provide extra space on tests for answering.
- Simplify wording of test questions.
- Allow students to answer fewer questions.
- Give extra help in preparing for tests.
- Give practice questions as a study guide.
- Give open-book and note tests.
- Give tests to small groups.
- Allow the use of learning aids during tests (e.g., calculators).
- Give individual help with directions during tests.
- Allow oral instead of written answers (e.g., audio recording).
- Allow answers in outline format.
- Allow word processors.
- Grade for content, not for spelling and writing mechanics.
- Give feedback to individual students during tests.

10.8 Apply the Concept

Using Portfolios or Work Samples to Monitor Student Progress

Assessment portfolios are collections of work samples that document a student's progress in a content area. You can use portfolios to provide tangible evidence of student performance over a period of time. Portfolios can include writing samples of all stages of the writing process in all genres. Suggestions for developing assessment portfolios include the following:

- Develop a portfolio plan that is consistent with your purposes for the assignment.
- Clarify what work will go into portfolios.
- Start with only a couple of different kinds of entries, and expand gradually.
- Compare notes with other teachers as you experiment with portfolios.
- Make it a long-term goal to include a variety of assessments that address content, process, and attitude goals across the curriculum.
- Make portfolios accessible in the classroom. Students and teachers should be able to add to the collection quickly and easily.
- Develop summary sheets or graphs that help to describe a body of information (e.g., "I can do" lists, lists of books read, or pieces of writing completed). Let students record these data when possible.
- Work with students to choose a few representative samples that demonstrate the student's progress.
- Review portfolios with students periodically (at least four times during the school year). The review should be a time to celebrate progress and to set future goals.
- Encourage students to review portfolios with a classmate before reviewing with the teacher. Students should help to make decisions about what to keep.

Examples of items that can be included in a portfolio are as follows:

- Student assignments and work samples
- Student interviews
- Self-assessments
- Audio recordings
- Videos
- Diagnostic tests
- Achievement tests
- Teacher-made tests
- Pages from writing journals
- Awards
- Personal reading and writing records
- Interest and attitude inventories
- Photographs
- Copies of passages read fluently
- Contributions from parents
- Report cards
- List of accomplishments
- Observation checklists

Study Skills and Learning Strategies

What are the three types of study skills, and why are they important to learning? Even when teachers plan user-friendly lectures and make adaptations, students will still need to develop study skills and learning strategies. Particularly as students move into secondary and postsecondary settings, their tasks increasingly require time management, self-monitoring and feedback, listening and note taking, studying from textbooks, and test-taking skills. These study skills are particularly important in secondary settings because students' grades often depend on written products, such as papers, reports, and tests.

Study skills are the competencies associated with acquiring, recording, organizing, synthesizing, remembering, and using information and ideas (Pauk, 2001). Study skills are the key to independent learning, and they help students gain and use information effectively. Study skills are particularly important in postsecondary settings, where students with dyslexia report that their greatest needs are in learning how to organize coursework, learning in lectures, and academic writing (Mortimore & Crozier, 2006; Soni, 2017).

Students with effective study skills can be characterized as executive learners (Olson, Platt, & Dieker, 2008; Schumm & Post, 1997) in that they

- Are knowledgeable about personal learning strengths and challenges.
- Have a clear understanding about tasks to be accomplished.
- Have a repertoire of learning strategies that can be applied in independent learning situations.
- Have developed a set of help-seeking behaviors to activate when additional assistance is needed.
- Have independent note-taking skills for class lectures as well as for text reading.
- Can organize and plan for the completion of assignments.

Study skills can be divided into three areas:

1. *Personal development skills:* personal discipline, management and organizational skills, self-monitoring and reinforcement, and positive attitudes toward studying.
2. *Process skills:* technical methods of studying, such as note taking, outlining, learning information from a text, and library reference skills.
3. *Expression skills:* retrieval skills, test-taking skills, and using oral and/or written expression to demonstrate understanding.

As one would expect, these are the very skills and strategies that students with learning and behavior problems have difficulty developing. This may be because they require explicit and ongoing instruction in how to use study skills practices during class, for independent assignments, and for class planning.

Personal Development Skills

Personal development skills include personal discipline, goal setting, management and organizational skills, self-monitoring and reinforcement, and positive attitudes toward studying. Many of the personal development skills related to school focus on time management, scheduling, organization, self-monitoring, and reinforcement.

Time Management and Scheduling Jon's mother is concerned because Jon, who has learning disabilities, falls asleep while trying to finish book reports the night before they are due. Even if she gets him up early in the morning, there is little chance that he will have time to finish. Even though he knows about the assignments in advance, he waits until they are due to start reading, despite his mom's queries about homework. Granted, it takes Jon longer than the other students to complete assignments, but his teacher gives him the assignments early. He has the skills to get a B or a C if he would just start working on assignments earlier.

Many families and teachers can identify with this scenario. Jon has the skills to complete assignments successfully, but he lacks personal management skills, particularly time management. Teaching a unit on time management at the beginning of the year and then reinforcing students during the year for the effective use of time can be well worth the effort.

Building a Rationale The first step in getting students to schedule and manage their time is to build a rationale for its importance to success in school and later life. Discuss the following ideas with your students to build a rationale for effective time management:

- Parents or guardians will get off your back when they see that you are getting your work done on time.
- If you write down what you have to do, you don't have to try to remember everything.
- If you set a time to begin, it is easier to get started and not procrastinate.
- When you set a time frame to complete an assignment, it helps you work for a goal and concentrate.
- When you have a schedule, you're less likely to let a short break become a long break.
- Being in control of time makes you feel that you have more control of your life.
- When you get assignments and jobs done on time, then you can really enjoy your free time.
- Scheduling your time helps you to get jobs done and have more time for fun and your friends.

Determining How the Time Is Spent Before students can decide how to schedule their time, they need to determine how they are currently spending it. Using a schedule, have students keep track of their activities for 1 or 2 weeks. Also have them list the school assignments they have for the time period and whether they have "too little," "enough," or "too much" time to complete them.

Estimating Time As part of the time management process, have students determine how long it takes them to complete regularly scheduled tasks such as meals, going to and from school, reading assignments in their various textbooks, writing a paragraph on a topic, and completing a 10-problem math assignment. Although the time taken to complete a task will probably vary considerably, most students with learning and behavior problems underestimate the time it takes. Having students get an idea of the time required can be helpful in planning a schedule. This step will also help students identify and prioritize tasks that need to be completed.

Scheduling If students do not have enough time to get their tasks completed or if they do not have regular times for studying, encourage them to set up a schedule. Some suggestions that students might want to use when setting up their schedules are as follows:

1. Plan regular study times.
2. Plan at least 1-hour blocks of time in which to study.
3. Plan which assignments you are going to work on during study time.
4. Take the first 5 minutes of each study activity to review what you have done already and what you have learned, and to plan what you are going to accomplish today. This helps to promote long-term learning and a sense of accomplishment.
5. When studying longer than 1 hour, plan breaks and stick to the time allowed for the breaks.
6. Use daytime or early evening for study if possible. Most people work less efficiently at night.
7. Work on your most difficult subjects when you are most alert.
8. Distribute your studying for a test over several days rather than cramming the night before the test.
9. Balance your time between studying and other activities. Allow time for recreational activities.
10. Reward yourself by marking through your schedule each time you meet a scheduled commitment and by crossing off items you complete on your to-do list.

The schedule should list not only regular times for studying, but also due dates for assignments and dates for other events so that the schedule serves as a calendar. Students should be encouraged to set aside some time they can use as they please if they accomplish their tasks on schedule during the day or week. This type of self-determined reinforcer can serve as an extra motivation for some students.

Monitoring and Using a To-Do List Setting up a schedule does little good unless students follow and monitor their schedules. Teachers can have students fill in the activities they feel are important to monitor on a weekly schedule. Figure 10.15 presents a schedule and to-do list for Jon. His study time, time spent working out, and recreational time were the most important tasks for him to monitor, so he scheduled them in each week. He also noted when the next book report was due and used his to-do list to schedule other assignments and chores, crossing off tasks as they were accomplished.

Jon developed a contract with himself. If he studied at least 80% of the time he had scheduled during the week, then he could work out at the gym or goof off 2 extra hours on Saturday. In this way, Jon was not only monitoring his schedule, but also setting goals and providing rewards for meeting his goals. After 2 weeks, Jon's teacher encouraged him to review his deadlines and adjust his schedule based on how he had done over the past 2 weeks. While Jon had met his goal of studying 80% of the scheduled time, he still did not complete all his tasks. He had to adjust his goal in order to complete all of this work on time. Although Jon realized that schedules need to be flexible, he found that planning, even when plans change, helped him to get more work accomplished in a timely manner.

Self-Monitoring and Reinforcement Students with learning and behavior problems have difficulty setting goals and self-monitoring, whether in the areas of attention and memory, reading comprehension, or personal and management skills. Van Reusen and Bos (1990) developed a strategy that assists students in setting goals and keeping track of their progress. The strategy is the acrostic for MARKER (it gives students a *mark* to work toward and is a *marker* of their progress) and includes the following steps:

Make a list of goals, set the order, set the date.

Arrange a plan for each goal, and predict your success.

Run your plan for each goal, and adjust if necessary.

Keep records of your progress.

Evaluate your progress toward each goal.

Reward yourself when you reach a goal, and set a new goal.

For each goal, students use a goal-planning sheet (see Figure 10.16) to answer the following questions:

- Can I describe my goal?
- What is the reason or purpose for the goal?
- What am I going to do first, second, and third to complete this goal?

Figure 10.15 Jon's Weekly Schedule and To-Do List

NAME: Jon

WEEK OF: Oct 14

	MON.	TUES.	WEDS.	THURS.	FRI.	SAT.	SUN.	
6:00 a.m.	get up and eat →							6:00 a.m.
7:00	ride bus	→				sleep	sleep	7:00
8:00	History							8:00
9:00	English					housework		9:00
10:00	PE		Same every day			yard chores	go to church	10:00
11:00	Welding							11:00
12:00	Lunch						eat	12:00
1:00 p.m.	Algebra					eat	read for fun	1:00 p.m.
2:00	General Science					go to gym		2:00
3:00	ride bus						goof off and eat	3:00
4:00								4:00
5:00	recreational activity			study	eat and have fun	eat and have fun		5:00
6:00	eat →							6:00
7:00	study	study	study	study			study	7:00
8:00	↓	↓	↓	↓				8:00
9:00	↓	↓	↓	↓			↓	9:00
10:00	sleep →						sleep	10:00
11:00	↓				sleep →		↓	11:00

TO-DO LIST						
history paper due math assign finish book	math assign	math assign book report due	math assign welding project due	science test math test	chores mow grass pull weeds fix cooler	start English paper

- How much time do I have to complete the goal?
- What materials do I need to complete the goal?
- Can I divide the goal into steps or parts? If so, in what order should I complete each step or part?
- How am I going to keep records of my progress?
- How will I reward myself for reaching my goal?

The teacher can use the steps in the Strategies Intervention Model to teach the students the MARKER strategy. After learning the strategy, students usually work on one to three goals at a time, keeping progress data on each goal.

For more on the Strategies Intervention Model, see Chapter 2.

When Van Reusen and Bos (1992) used this strategy with middle and high school students with learning disabilities and behavior disorders, they found that students accomplished more goals and gained a more informed perspective of their educational and personal goals.

Hughes and his colleagues (Hughes, Ruhl, Deshler, & Schumaker, 1995) developed an assignment completion strategy for the Strategies Intervention Model that is similar and is the acrostic for PROJECTS. The steps in this learning strategy are as follows:

Psych up. Prepare your assignment-monitoring form and your mind.

Figure 10.16 Goal-Planning and -Monitoring Sheet

SOURCE: Based on A. K. Van Reusen & C. S. Bos, *Use of the Goal-Regulation Strategy to Improve the Goal Attainment of Students with Learning Disabilities* (Final Report) (Tucson, AZ: University of Arizona, 1992).

Name: _____ Class: _____ Date: _____

1. Goal: _____
2. Reason(s) for working on goal: _____
3. Goal will be worked on at: _____
4. Date to reach goal (due date): _____
5. Materials needed: _____

_____

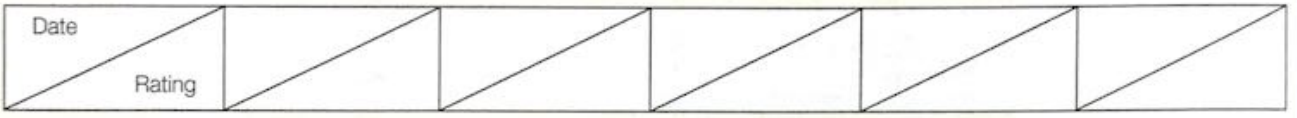
6. Steps used to reach the goal: _____

_____

_____

7. Progress toward the goal: Record in each box the date and progress rating.

3—Goal reached 2—Good progress made 1—Some progress made 0—No progress made



8. Reward for reaching goal: _____

Record and ask. Record the assignment, think about it, and ask questions.

Organize. Break the assignment into parts, estimate and schedule the number of study sessions, and organize your materials.

Jump to it. Survey the assignment, and set goals and a reward.

Engage in the work. Follow the instructions, note questions, and get help if you need it.

Check the work. Check for requirements and quality, store the assignment, and reward yourself.

Turn it in. Take it to class, turn it in, record the date, and praise yourself.

Set your course. Record your grade, evaluate your assignment, and think about future assignments.

Classroom Participation Students who actively participate in class tend to be more successful academically than their quieter, less attentive peers. Students with learning and behavior problems may benefit from specific strategies to enhance their classroom participation. The SLANT strategy is part of the Strategies Intervention Model and was designed to increase active participation in class. The acrostic for SLANT follows:

Sit up.

Lean forward.

Activate your thinking.

Name key information.

Track the talker.

Examples of activating your thinking include asking yourself questions (What is this about? What do I need to remember?), answering your questions (This is about ___. I need to remember ___.), and asking the teacher a question when you do not understand. Examples of naming key information include answering the teacher's questions, sharing your ideas, and adding to others' comments (Ellis, 1991). This general set of activities can be used in any learning situation to improve students' active participation.

An important part of assignment completion and class participation in inclusive classrooms is recruiting positive teacher attention. Students with learning and behavior problems often get the teacher's attention for their negative behaviors rather than their positive behaviors in class. Using instruction, role-play, and reinforcement, one special education teacher taught four middle school students with learning disabilities to recruit positive teacher attention in their general education classrooms (Alber, Heward, & Hippler, 1999). Students were taught to raise their hands and wait quietly to ask such questions as "How am I doing?" or "I don't understand" or "Would you please look at my work?" Observations in the general education classrooms demonstrated that students increased their amount of positive teacher recruiting and teachers increased their rate of student praise. Teaching students strategies for self-monitoring, self-reinforcement, and classroom participation is an important part of the special education curriculum because these skills, like study skills, support student success in the general education classroom and curriculum.

Process Skills

Process skills include the technical methods of studying, such as note taking, outlining, learning information from text, and research and library skills.

Listening and Taking Notes In school, students spend more time listening than reading, speaking, or writing. Also, despite all of the advances in technology, the vast majority of students spend most of their time taking notes with pen and paper. Note taking is one of the most efficient ways to record this information and retrieve it in one's own words. It has several important functions:

- Note taking increases students' attention.
- Note taking, as opposed to simply listening, requires a deeper level of cognitive processing because students must make sense of the information to write the ideas.
- Because the information has been processed more deeply, note taking helps students learn and remember the information more easily.

Even if students do not go back and review their notes, just the act of taking notes results in greater recall of information on tests. Note taking with review practices are associated with substantially higher school learning than not taking notes and reviewing (Kobayashi, 2006). Furthermore, when teachers provide interventions to assist students with note taking and reviewing, students perform better.

Students with learning and behavior problems often have difficulties with listening and taking notes. For some students with severe writing disabilities, having a note taker will be important. Lightweight laptop computers, tablets, or devices designed specifically for taking notes are also very beneficial if students are instructed in how to use them. Students with learning difficulties benefit from the use of digital pens that have multifunctionality to support reading content and note taking (Ok & Rao, 2017). Students with learning disabilities may have difficulty with the following:

- Paying attention
- Writing fast and legibly
- Deciding what information to write
- Spelling
- Making sense of notes after the lecture
- Providing a model of what the notes might look like

Given the importance of taking notes and the difficulty some students encounter with this skill, teachers will want to teach students how to take notes, provide an outline so students can take notes within the outline, and consider giving listener-friendly lectures to make note taking easier.

Teaching Students to Take Notes Note taking is a procedure that requires students to listen, interpret, organize, and record information. Therefore, students with limited reading and study skills often feel overwhelmed when they must take notes. Numerous formats for note taking have been suggested (for a review, see Kobayashi, 2006). One aspect these systems have in common is the focus on making note taking and reviewing an interactive learning process. To facilitate this interactive process, two- and three-column note-taking systems have been developed. Figure 10.17 gives an example of each system. Students take class notes in the second column in both systems, using only the front side of the paper. Modified outlining is the format most often suggested for taking these notes. In both systems, students note the key concepts in the left-hand column, sometimes referred to as *triggers*, because they are meant to trigger the ideas noted in the Class Notes column. Later, in reviewing, students should be able to cover the second column and use their personal triggers to help them remember the ideas covered in the class notes. In three-column systems, the additional column generally serves as a space to write textbook notes so that they can be integrated with class notes. This is most helpful when the teacher's lectures make frequent, direct ties to the textbook. It is also important to teach some students note-taking subskills, such as using abbreviations, diagrams to related ideas, or visual markers and editing notes.

Figure 10.17 Formats for Note Taking

Sample Two-Column System

Topic: _____ Date: _____

Triggers or Key Concepts	*Class Notes*

Sample Three-Column System

Topic: _____ Date: _____

Triggers or Key Concepts	*Class Notes*	*Text Notes*

The following list gives several hints for helping students to develop efficient note-taking skills:

- Take notes using a two- or three-column system.
- Take notes on only one side of the paper.
- Date and label the topic of the notes.
- Generally use a modified outline format, indenting subordinate ideas and numbering ideas when possible.

- Skip lines to note changes in ideas.
- Don't worry about punctuation or grammar.
- Write ideas or key phrases, not complete sentences.
- Don't write down every word the teacher says.
- Use pictures and diagrams to relate ideas.
- Use consistent abbreviations (e.g., w/ with, & and).
- Put question marks by any points you don't understand. Check them later with the teacher.
- Underline or asterisk information that the lecturer stresses as important.
- Write down information that the lecturer writes on the board or transparency.
- If you miss an idea you want to include, draw a blank (___) so that you can go back and fill it in.
- If you cannot automatically remember how to spell a word, spell it the way it sounds or the way you think it looks.
- If possible, review the previous sessions' notes right before the lecture.
- If the lecture is about an assigned reading topic, read the information before listening to the lecture.
- As soon as possible after the lecture, go over your notes, filling in the Key Concepts column and listing any questions you still have.
- After going over your notes, try to summarize the major points presented during the lecture.
- Listen actively. In other words, think about what you already know about the topic being presented and how it relates.
- Review your notes before a test.

Direct Instruction in Note Taking Regardless of the note-taking format chosen, a teacher should provide direct instruction in note taking. Direct instruction should include explicit demonstrations of the note-taking process and ample opportunities for students to practice with guidance and feedback. For many students with learning and behavior problems, telling them how to take notes is insufficient; note-taking practice is key. Teachers may want to develop and conduct a unit on listening and note taking. The following is a list of teaching ideas for developing such a unit:

1. *Have students evaluate the effectiveness of their current note-taking skills, and determine whether they will profit from instruction.* Generally, this can be assessed in two ways. First, have students bring to class current examples of notes, and have them evaluate the notes for completeness, format, ease of use for review, and legibility. Apply the Concept 10.9 presents one way that students can evaluate their own notes. Second, present a simulated 10- to 15-minute lecture or a video of a lecture, and ask the students to take notes. Give a test covering the information on the following day. Have the students again evaluate their notes and their test results.

2. *Use video lectures when teaching students to listen effectively and to take notes.* The use of video lectures is particularly helpful because it allows the students to replay the lecture so that they can watch or listen for main ideas. For example, you may be teaching students to watch and listen for cues the lecturer gives to note the important information. After listening to a short segment of video, have the students list the cues and then discuss why they are important. Then replay the segment so that students can verify their list of cues and add other cues.

3. *Control the difficulty of the lectures.* When first introducing new listening or note-taking skills such as listening

10.9 Apply the Concept

Note-Taking Inventory

From time to time, it's smart to check the quality of your notes to see how you're doing. Then you'll know if you need to make any changes or improvements. Use this Note-Taking Inventory whenever you feel the need. Simply check it against that day's class notes.

You'll need a piece of paper and something to write with. Number the paper from 1 to 10. Give yourself 1 point for each item you find in your notes.

1. Date of lecture
2. Title of lecture
3. Writing neat enough for you to read (that's all that counts)
4. No more than one idea per line
5. Plenty of blank space to add extra ideas later
6. All main ideas brought up during class
7. All important details mentioned during class
8. All key terms and definitions given during class
9. Abbreviations used where necessary
10. No unnecessary words

Scoring: Add up your points.

9–10 points: You're a great note taker!

7–8 points: You're a good note taker!

5–6 points: You need to take better notes.

4 points or less: Make a note of this—practice, practice, practice.

Source: J. S. Schumm (2001), *School Power: Study Skill Strategies for Succeeding in School* (Minneapolis, MN: Free Spirit Publishing, Inc.).

for cues or using a two-column system, begin with short, well-organized lectures with ample use of advance organizers and visual aids, covering fairly simple, relatively familiar materials. As students reach proficiency, gradually increase the length of the lectures, reduce the use of organizers and visual aids, and increase the difficulty and novelty levels of the materials.

4. *Have students learn how to review their notes for tests.* Although students may learn to take more effective notes, they may fail to use the notes to study for tests. Teach students how to review their notes and ask themselves questions, using the Triggers column to develop questions about the material in the Class Notes column.

5. *Have students monitor the use and effectiveness of note taking in other classes.* To increase the probability that students will generalize their note-taking skills to other classes, have them discuss in which classes the skills would be helpful, and then have them monitor and discuss their effectiveness in those classes.

6. *Have students determine the effects of note taking on learning.* Students need to know that their increased effort has a payoff. Have students rate how well they feel they have taken notes over a unit or lecture, and have them monitor their performance on tests of the material. This will aid them in determining whether better note taking leads to better learning.

Overall, note taking and reviewing notes are associated with better performance and more learning (Kobayashi, 2006).

Learning from Text Probably the best-known technique for learning information from text is SQ3R, developed by Robinson (1946). This acronym stands for the five steps in this study skill: Survey, Question, Read, Recite, Review. The purpose of this technique is to provide students with a systematic approach to studying text. The following is a brief description of SQ3R:

> *Survey.* Read through the headings quickly to learn what is to be studied.
>
> *Question.* Change each heading into a question (to have in mind what is to be learned from the reading).
>
> *Read.* Read to answer the question.
>
> *Recite.* At the end of each heading, either write brief notes about the highlights of the reading or engage in self-recitation.
>
> *Review.* After completing these steps on the entire selection, review the main points of the notes by self-recitation. Check to see if the information is correct.

One of the major difficulties associated with the SQ3R method is the complexity of the process, particularly for students who are experiencing reading problems. In content-area classes, these students are often attempting to read and learn information from textbooks that are written above their instructional reading levels. A modified version that uses only read, recite, and review has been implemented with effective results for secondary students and may hold promise with older readers (McDaniel, Howard, & Einstein, 2009).

Multipass **Schumaker, Deshler, Alley, Warner, and Denton** developed a strategy based on SQ3R that incorporates the learning acquisition and generalization stages from the Strategies Intervention Model for students who experience problems learning information from textbooks. This strategy is referred to as Multipass because students make three passes through a text while carrying out the process. Each pass through the text (i.e., Survey, Size-Up, and Sort-Out) entails the use of a different substrategy. Because each substrategy represents a fairly complex set of behaviors, each of the substrategies is taught as a unit, with students reaching proficiency in the first substrategy before learning the next substrategy. Prerequisite skills include the ability to paraphrase and a reading level of fourth grade or above. Research conducted with eight high school students with learning disabilities indicated that the students were able to master the strategy in instructional-level materials and were able to use the strategy in grade-level materials without further training or practice. The students' grade on content tests improved—from barely passing to a grade of C or better.

Evidence-Based Practice

Multipass

Procedures: During the Survey Pass, students become familiar with the main ideas and organization of the chapter (Deshler, Schumaker, & McKnight, 1997; Hock & Mellard, 2005). In completing the Survey Pass, students complete the following steps:

1. *Title.* Read the chapter title. Think about how it fits with what you have already studied. Predict what the chapter will be about.
2. *Introduction.* Read the introduction, and make a statement about the main idea of the chapter. If the chapter has no introduction, read the first paragraph, which is usually the introduction.
3. *Summary.* Turn to the last page of the chapter, read the summary, and make a summary statement. If no summary is present, check the last paragraph to see whether it is a summary. If it is not a summary, make a mental note so that you can summarize later.
4. *Organization.* Look through the chapter to see how the chapter is organized. Use the major headings to make a written outline. Paraphrase each heading.
5. *Pictures, maps, charts.* Look at the illustrations. Think about why they might have been included.

6. *Table of Contents.* Determine how this chapter fits in with the other information in the book by perusing the table of contents. Decide what relationships this chapter has with the others, especially the chapters immediately preceding and following it. For example, in a history book, chapters are often related because of chronological sequence. Chapters might also have a causal relationship (e.g., perhaps Chapter 6 talks about the causes of the Depression and Chapter 7 talks about its effects). Other types of frequently occurring relationships include general/specific, compare/contrast, and related concepts.

   After completing this process, close the book, and think about what the chapter is going to be about and what you already know about the topic.

Using the Strategies Intervention Model, the teacher first describes and then models this survey process. Students should practice with guidance and feedback in materials at their reading instructional level until they are effective and efficient at surveying a chapter.

During the Size-Up Pass, students gain more specific information from the chapter without reading the chapter from beginning to end. Whereas the Survey Pass provides a general framework for the chapter, the Size-Up Pass allows the students to look for the information that fits into that general framework using textual cues. In learning the Size-Up Pass, students complete the following steps:

1. *Illustrations.* Again look over the pictures, maps, and charts, and read the captions. Think about why they are included.
2. *Questions.* Read the questions, including those found at the beginning or interspersed in the chapter. If you can already answer a study question, put a check mark by it.
3. *Words.* Read over the vocabulary words, including any vocabulary list and words highlighted in the chapter.
4. *Headings.* Read a heading. Ask yourself a question that you think will be answered in the section. Scan for the answer. When you find the answer, paraphrase it orally, or state something that you have learned from the information under the heading. Note on your outline what information you have learned from the section.

As with the Survey Pass, the teacher needs to describe the Size-Up process, and the students should practice in instructional-level material until they are proficient.

During the third and final pass, the Sort-Out Pass, students test themselves on the material in the chapter. This pass assists them in determining what they have learned and on what information they should still concentrate. In the final pass, the students read and answer each question at the end of the chapter, using the following process:

1. *Read.* Read the study question at the end of the chapter or each question provided by the teacher.
2. *Answer.* Answer the question if you can.
3. *Mark.* If you can answer a question, put a check by it; if you cannot answer it, put a box in front of it. If you do not know the answer, scan the headings on your outline to determine in which section it most likely will be answered. When you find the likely section, look for the answer. If you find the answer, paraphrase it and check the box. If you do not find the answer, scan the headings a second time for another likely place to find the answer. Again, look for the answer, and paraphrase it if you find it. If you do not find the answer after trying twice, circle the box so that you know you need to come back to it later and possibly get help.

As in the other two steps, the students should practice with materials at their instructional level until they are effective and efficient at answering questions about the material presented in the chapter.

Comments: From the description of Multipass, it should be clear that when students use this strategy, they do not have to read a text in its entirety. Instead, they study the text to determine the main ideas, its overall framework, and related details and to answer the study questions. In this way, students can use this strategy with textbooks that are written above their instructional level. However, several cautionary notes are in order. First, remember to have the students reach proficiency on each substrategy before they begin learning the next substrategy. Second, when the difference between the students' instructional reading level and the reading level of the textbook is greater than 1 to 2 years, students may have difficulty moving from instructional-level materials to grade-level materials. Teachers will generally need to provide graduated instructional materials. (For example, Hector's instructional reading level is fifth grade, and he is a ninth grader. Hector will probably need to practice using the strategy in seventh-grade material as an intermediary step.) Third, do not expect students with learning and behavior problems to transfer this study strategy automatically to various content-area textbooks. You will need to instruct for generalization.

Most of these materials require professional development training, which can be acquired by contacting **www.ku-crl.org**.

Expression Skills: Remembering and Demonstrating Learning

Several skills and processes help us remember and learn new content—an important task related to school success. Remembering and retrieving facts and knowledge, test-taking skills, and other oral and/or written expression skills are used to demonstrate understanding and application of knowledge.

Remembering Information Have you ever arrived at the grocery store without your grocery list? What strategies do you use to help you remember what was on the list? Maybe you know how many items were on the list, and now you just need to find out how many of them you can recall. Or maybe you read the list over several times, almost rehearsing it, so it was easier to recall. Or you might use association by thinking of the meals that you were planning for the next few days and trying to associate the needed items

vith the meals. Or you might visualize your kitchen and uickly think about the refrigerator and each cabinet and ne items needed for each. Finally, you might categorize the ems on the basis of the sections in the grocery store (e.g., roduce, cereal, dairy products, frozen foods). Clearly, there re many strategies for remembering information.

In many ways, remembering information for a test is milar to remembering items on a grocery list. Often we are sked to remember a list of things (e.g., the major exports of ne United Kingdom, the different kinds of flour and their ses, the names of the cranial nerves). During tests, we may e asked to take this information and apply it to specific tuations (e.g., to explain why the U.K. economy is strug- ing), but we still need to remember the basic information.

Students with disabilities often have difficulty mem- rizing information, whether for tests, presentations, or ritten work. Sometimes the students do not understand e information to be learned, but in other cases poor per- rmance may be due to difficulties with retrieval of the formation, failure to use deliberate memory strategies, nd/or poor motivation for school tasks (H. L. Swanson, oward, & Saez, 2006). Research suggests that these stu- ents also have difficulty with metamemory (i.e., awareness memory strategies and the ability to use and monitor ese strategies), because they have trouble with one or ore of the following:

- Knowing, selecting, and using appropriate strategies
- Estimating their own memory capacity for specific tasks
- Predicting accuracy on a memory task
- Allotting appropriate time to study
- Deciding when they have studied enough

Consequently, it is important to teach students mem- y strategies and tricks for remembering. Because teachers regularly ask students to remember information (e.g., for tests, class discussions), it is relatively easy to incorporate teaching memory strategies into the content curriculum. Incorporating the general teaching principles presented in Apply the Concept 10.10 gives the teacher ways for making the information more memorable and for encouraging students to learn and remember the information.

Many content-area learning strategies, such as semantic mapping, advance organizers, and SFA, can be thought of as teaching procedures that facilitate memory. In addition to these kinds of activities, a number of formal strategies have been deliberately designed to improve memory. These are often referred to as *mnemonics*.

Mnemonics are systematic procedures for enhancing memory. The word *mnemonics* literally means "aids memory." Mnemonics aid memory and retrieval by forming associations between what students need to know and what they currently know. To use mnemonics, the information needs to be distilled so that the students are learning conceptual lists or frameworks. The students then operate on this information by using mnemonics. Mnemonic strategies can be grouped into three types: organization and association, visualization, and verbal rehearsal.

Organization and Association Organizing and associating information refers to arranging the information or associating it with other information in such a way that it is easier to remember. Study the following list of terms in order to remember them:

democracy	mammals
socket wrench	judiciary
biology	anatomy
photosynthesis	drill press
lathe	blowtorch
freedom of speech	constitution

10.10 Apply the Concept

General Teaching Principles for Increasing Students' Memory of Information

- Orient student attention before presenting information, and emphasize important vocabulary and concepts when they occur.
- Activate prior knowledge and help students to make connections between old and new knowledge.
- Use visual aids such as graphic organizers to highlight the important information and make it more memorable.
- Control the amount of information presented; group related ideas.
- Control the rate at which the information is presented.
- Provide time to review, rehearse, and elaborate on the information.
- Teach the students how to use and apply memory strategies and devices.
- Provide time and guidance in developing associations and mnemonics such as acronyms and acrostics.
- Provide opportunities for distributed review of information, and encourage mastery.
- Enhance the meaningfulness of what they are learning.
- Use pictures and very brief videos to illustrate key ideas.
- Increase practice including active manipulation and reasoning.

Chances are that you categorized the words according to three superordinate categories, possibly labeled *tools*, *science concepts*, and *social studies concepts*. Now, instead of learning 12 unrelated words, you are learning three sets of 4 related words. Research shows that the second task is considerably easier. Research and practice have also demonstrated that students experiencing learning problems do not tend to make these associations spontaneously (Mastropieri, Scruggs, & Marshak, 2008). Therefore, one mnemonic strategy to teach students when they are trying to remember lists of information is to associate or categorize related ideas.

Another type of association is the use of acrostics and acronyms. As you saw earlier in this chapter, *acrostics* are groups of sentences whose first words begin with the letters of a significant word. (For examples of acrostics, see SLANT, MARKER, and COMPARING, earlier in this chapter.)

Acronyms are words or abbreviations that are created by joining the first letters of a series of words (or just the major words in a series). Examples are *radar* (radio detecting and ranging), *scuba* (self-contained underwater breathing apparatus), *laser* (light amplification by stimulated emission of radiation), and *FBI* (Federal Bureau of Investigation). If needed, extra letters can be inserted, or the letters can be rearranged. By teaching students to construct acronyms and acrostics, sharing them in class, and then cueing students to use them when they study and take tests, you help them to learn and retrieve information.

The FIRST-letter mnemonic strategy (Nagel, Schumaker, & Deshler, 1994) is one way to help students construct lists of information to memorize and develop an acronym or acrostic for learning and remembering the information. The strategy includes an overall strategy (LISTS) and a substrategy for making the mnemonic device (FIRST). The steps in the overall strategy include the following:

Look for clues. In the class notes and textbooks, look for lists of information that are important to learn. Name or give a heading to each list.

Investigate the items. Decide which items should be included in the list.

Select a mnemonic device, using FIRST. Use the FIRST substrategy, explained next, to construct a mnemonic.

Transfer the information to a card. Write the mnemonic and the list on one side of a card and the name of the list on the other side of the card.

Self-test. Study by looking at the heading, using the mnemonic to recall the list.

To complete the Select step, students use the FIRST strategy to design an acronym or acrostic:

Form a word. Using uppercase letters, write the first letter of each word in the list; see whether an acronym—a recognizable word or nonsense word—can be made.

Insert a letter or letters. Insert one or more letters to see whether a word can be made. (Be sure to use lowercase letters so that you know they do not represent an item on the list—BACk, for example.)

Rearrange the letters. Rearrange the letters to see whether a word can be made.

Shape a sentence. Using the first letter of each word in the list, try to construct a sentence (an acrostic).

Try combinations. Try combinations of these steps to generate the mnemonic.

This strategy is taught by using the Strategies Intervention Model. It can be used with most content but is particularly effective with science and social studies, in which lists of information are to be learned. The strategy provides a systematic method for students to review text and class notes, construct lists, and develop acronyms and acrostics that help them to remember and retrieve information.

Visualization and Key-Word Method Another strategy helpful in remembering information is visualization. Visualization is making a mental image of what you want to remember. Sometimes the visual image is simply the information that needs to be remembered. For example, it is not unusual to notice students closing their eyes when they are trying to remember how to spell a word. They may be using visualization to recall "what the word looks like."

If the information is complex, however, it may be helpful for the students to change the image of what they want to remember into a picture that will trigger or cue the information. One strategy used to do this is the *key-word method* (e.g., Mastropieri, Sweda, & Scruggs, 2000; Scruggs, Mastropieri, Berkeley, & Graetz, 2009). Using this visualization strategy, students construct a picture that represents an interactive relationship between a concept and its definition. Figure 10.18 shows a key-word picture generated

Figure 10.18 Key-Word Picture Generated for the Concept *Allegro*

SOURCE: C. A. Hughes, Memory and test-taking strategies, in D. D. Deshler, E. S. Ellis, & B. K. Lenz, *Teaching Adolescents with Learning Disabilities*, 2nd ed. (Denver, CO: Love, 1996), p. 223. Reprinted with permission.

for the concept of *allegro* and its definition (i.e., to move quickly). This picture links the vocabulary word with the definition, using key words that together sound like the vocabulary word. In Figure 10.18, *leg* and *row* are the key words used to construct a picture that triggers the definition of *allegro*.

The following steps are suggested for creating the key-word picture (King-Sears, Mercer, & Sindelar, 1992) and are the acrostic for IT FITS:

Identify the word or term.

Tell the definition or answer information.

Find a key word that sounds like the new word or the word you need to remember.

Imagine an interaction, that is, something the key word and the answer information can do together. If you draw a sketch of the interaction, you may review it later for improved memory.

Think about the key word and the interaction.

Study your vocabulary and the information, using your key word to help you remember. Review by asking for each item: What was my key word for [word]? What was happening in my picture [or image]? What is the information I am supposed to remember?

The key-word method is most effective in increasing the recall of information by students with learning disabilities when the key-word relationships are presented to the students rather than having individual students generate them (Fulk, Mastropieri, & Scruggs, 1992). Students should have ample opportunities to create key-word associations as a class or in cooperative groups before having students work individually.

Verbal Rehearsal Repeating the information aloud or to yourself can help to facilitate memory. Verbal rehearsal is the major cognitive strategy used to enhance short-term memory (Hughes, 1996; Loomes, Rasmussen, Pei, Manji, & Andrew, 2008). Rehearsal is most effective if interference between the time of the rehearsal and the time of recall is held to a minimum, the number of items to be remembered is limited, and the information is clustered or chunked.

General Memory Strategies Often several mnemonics are used simultaneously. For example, after you have categorized the words in a list, you can use acronyms and acrostics within each category to help you remember the specific words and then use rehearsal to practice, review, and test your memory. Teaching students with learning and behavior problems which strategies to use for which types of information and how to combine strategies is generally necessary. In addition to teaching students how to use the various memory strategies, it is also important to teach students to use periodic review to minimize forgetting.

Studying and Taking Tests Studying and taking tests are important aspects of secondary schools. Tests are the primary means that teachers use to determine whether students have learned new concepts and can apply them. In a 9-week grading period, students were expected to take an average of 11 tests in each content area. On the average, teachers used scores on tests to determine approximately half of a grade for a course. Although a great deal of effort is placed on tests to measure learning, teachers often do not teach test-taking strategies.

Studying for Tests Studying for tests means that students should be reviewing information on a regular basis so they are not left cramming the day before the test. To help promote positive study habits, Teri Martinez, a middle school resource social studies teacher, taught the following guidelines for studying:

1. *Manage your study time.* Keep up with assignments, and do daily and weekly reviews. Ms. Martinez planned 5 minutes each day at the end of her social studies class for students to review the material. On Monday, she took an extra 5 minutes and had the students review the previous week's work. She used individual, small-group, and whole-class discussion to review.

2. *Create study aids.* Create a semantic map or other graphic organizer to help students remember key information. Ms. Martinez often used an ongoing map during review sessions, and the students added to the map each day. Ms. Martinez also taught the students how to create and use flashcards for key concepts and vocabulary. She taught the students the following procedures:

- When learning vocabulary, put the word on one side and the definition and an example on the other side.
- When learning other information, put the question on one side and the answer on the other side.
- When learning a formula, put the formula on one side and examples of how it is used on the other side.
- Review the flashcards in random order or after sorting the cards into categories or making a semantic map.
- Keep index cards in notebooks and on desks during class.
- Make a card when learning about a key concept or idea.

3. *Learn about the test.* The more information students learn about the format, type, and time allotted for the test, the more effectively they can prepare for it. Rather than telling the students about the test, Ms. Martinez would start the discussion by saying, "Let's talk about the test. What do you want to ask me?" She used the following checklist to guide the students' questioning:

- Format of test, types of questions
- How much test is worth
- Date of test
- Time allotted for test

- Whether books or notes are allowed
- Information covered
- Teacher recommendations for how to study
- Teacher recommendations for what to study

4. *Predict questions.* Ms. Martinez also demonstrated how the students can predict the questions that will be asked. The students can use what they know about the teacher's testing style, their class notes, their maps, and other study aids to predict questions. Two days before a test, Ms. Martinez had the students work in cooperative groups and write what they thought would be the most important questions on the test and then answer them.

5. *Think positive.* An important part of doing well on a test is having a positive attitude and believing that one is going to do well. Ms. Martinez finds that she enjoys working with the students on having positive attitudes. Each day during their review, she asks the students about the following:

- What they learned today
- How it relates to what they already know
- What they will be working on tomorrow
- How well they have learned the information

She also has them rate how well they think they will do on the test and consider what they could do to improve their ratings. Just before a test, Ms. Martinez takes several minutes to review test-taking strategies and to have the students visualize themselves being successful as they take the test.

Test-Taking Strategies In general, teaching test-taking strategies has limited impact on students' test performance. Devoting some time to test-taking procedures familiarizes students with the testing process, but teaching for deep content learning produces the greatest results on tests (Desimone, 2013; Welsh, Eastwood, & D'Agostino, 2014). For students with learning difficulties, there may be some benefits with test preparation. In a 2005 study, Carter and colleagues taught 38 high school students with disabilities the following test-taking strategies in a series of six lessons:

- Bubble-sheet completion and pacing
- Sorting problems: identifying which items are the easiest and solving those problems first
- Estimating: solving math problems by rounding
- Substitution and back-solving: substituting the given answers in a multiple-choice test into the question to find the correct answer
- Recopying problems: rewriting problems in a more familiar form
- Underlining and reading all answers
- Elimination of redundant or off-the-wall answers

Although students in the study did demonstrate small increases in their test scores after learning the strategies, Carter and coworkers (2005) report that students with disabilities need to learn test-taking strategies within the content instruction. In other words, to best prepare students with disabilities to take multiple-choice tests, integrate test-taking instruction into content instruction on a regular basis.

Other test-taking strategies and hints that can help students perform better on tests include:

- Survey the test.
- Read the directions carefully. Underline key words in the directions that tell you what to do.
- Be sure you understand the scoring system (e.g., is guessing penalized?).
- If you have memorized specific outlines, formulas, mnemonics, and the like, write down that information before you forget it.
- When answering questions, place a mark in the margin for those questions about which you are unsure and/or want to review.
- Place the questions in the context of what has been discussed in class and what you have read.
- Avoid changing answers arbitrarily.
- Review your answers.

Taking Objective Tests For students with learning and behavior problems, it may be beneficial to teach specific test-taking strategies. The PIRATES strategy can be used for taking objective tests (Hughes, Ruhl, Schumaker, & Deshler, 2002) and uses the Strategies Intervention Model. Research indicates that students with learning disabilities can increase their performance by 20 to 40 percentage points by learning and applying this strategy. The steps in the strategy are as follows:

Prepare to succeed.

- Put your name and PIRATES on the test.
- Allot time, and order the sections.
- Say affirmations.
- Start within 2 minutes.

Inspect the instructions.

- Read instructions carefully.
- Underline what to do and where to respond.
- Notice special requirements.

Read, remember, reduce.

- Read the whole question.
- Remember what you studied.
- Reduce your choices.

Answer or abandon.

- Answer the question.
- Abandon the question for the moment.

Turn back.

Estimate your answer.

- Avoid absolutes.
- Choose the longest or most detailed choice.
- Eliminate similar choices.

Survey.

- Survey to ensure that all questions have been answered.
- Switch an answer only if you are sure.

When using this strategy, a student repeats, for each section of the test, the second, third, and fourth steps (i.e., inspect the instructions; read, remember, reduce; answer or abandon).

In addition to this strategy, there are a number of hints for taking objective tests. Apply the Concept 10.11 presents information that is helpful in answering objective questions (e.g., true–false, multiple-choice, matching, and completion).

Taking Essay Tests Essays tests are not used as frequently as objective tests, but when essay questions are incorporated into a test, they make up a sizable portion of the test grade. This type of test can be particularly difficult for students with disabilities. Not only do the test takers have to recall information, they also have to write clearly in terms of organization, legibility, spelling, and grammar. Students with difficulties in written expression may be able to orally express the answer to the question, but their writing skills may make it difficult for them to communicate that knowledge. You may want to audio record the student's answers. For some students, it may be advantageous to teach a strategy for answering

10.11 Apply the Concept

Tips for Answering Objective Questions

True–False Questions

- Remember, *everything* in a true statement must be true. One false detail makes it false.
- Look for qualifying words that tend to make statements false, such as *all, always, everyone, everybody, never, no, none, no one, only*.
- Look for qualifying words that tend to make statements true, such as *generally, most, often, probably, some, sometimes, usually*.
- Simplify questions that contain double negatives by crossing out both negatives and then determining whether the statement is true or false.
- Don't change an answer unless you have a good reason to. Usually, your first impression is correct.

Matching Questions

- Read directions carefully. Determine whether each column contains an equal number of items and whether items can be used more than once.
- Read both columns before you start matching, to get a sense of the items.
- Focus on each item in one column, and look for its match in the other column.
- If you can use items only once, cross out each item as you use it.

Multiple-Choice Questions

- Determine whether you are penalized for guessing.
- Answer the questions you know, putting a check mark in the margin next to items you want to return to later.
- Read all possible options, even when you are pretty sure of the right answer.
- See whether multiple options are available (e.g., c. A and B; d. All of the above).
- Minimize the risk of guessing by reading the stem with each option to see which option is most logical.
- Use a process of elimination, crossing out options you know are wrong.
- When you do not know the answer and you are not penalized for guessing, use the following signals to help you select the right option:

  The longest option is often correct.

  The most complete answer is often correct.

  The first time the option "all of the above" or "none of the above" is used, it is usually correct.

  The option in the middle, particularly if it is the longest, is often correct.

  Answers with qualifiers such as *generally, probably, sometimes*, and *usually* are frequently correct.

Completion Questions

- Determine whether more than one word can be put in one blank.
- If blanks are of different lengths, use length as a clue for the length of the answer.
- Read the question to yourself so that you can hear what is being asked.
- If more than one answer comes to mind, write them down; then reread the question with each answer to see which one fits best.
- Make sure that the answer you provide fits grammatically and logically.

Source: Selected ideas based on J. Langan, *Reading and Study Skills*, 8th ed. (New York: McGraw-Hill, 2007).

essay questions so that the students organize the information and communicate it effectively. One strategy that has been developed to assist students in organizing better responses to essay questions is called ANSWER (Hughes, Schumaker, & Deshler, 2001). The steps include the following:

Analyze the situation.

- Read the question carefully.
- Underline key words.
- Gauge the time you need.

Notice requirements.

- Scan for and mark the parts of the question.
- Ask and say what is required.
- Tell yourself that you will write a high-quality answer.

Set up an outline.

- Set up the main ideas.
- Assess whether they match the question.
- Make changes if necessary.

Work in details.

- Remember what you learned.
- Add details to the main ideas using abbreviations.
- Indicate the order.
- Decide whether you are ready to write.

Engineer your answer.

- Write an introductory paragraph.
- Refer to your outline.
- Include topic sentences.
- Tell about details for each topic sentence.
- Use examples.

Review your answer.

- Look to see whether you answered all parts of the question.
- Inspect to see whether you included all main ideas and details.
- Touch up your answer.

In her social studies class, Ms. Martinez taught the ANSWER strategy because essay questions were one format she used in her tests. She also gave students a list of direction words for essay questions (see Figure 10.19). She demonstrated how taking one concept such as *democracy* and using different direction words would change the response. In her daily reviews, she frequently discussed one of the cue words in relation to the content that had been covered that day. She provided examples of how to write an answer to a question using that cue word.

Providing appropriate content instruction for students with special needs in general education classrooms is challenging but potentially beneficial to all learners. Effective teachers implement the following practices associated with improved outcomes in content-area learning (Scruggs et al., 2009):

- Hands-on activities
- Computer-assisted learning
- Peer mediation
- Spatial or graphic organization
- Study aids
- Classroom learning strategies
- Mnemonic strategies
- Explicit instruction

Figure 10.19 Direction Words for Answering Essay Questions

Cue	Meaning	Cue	Meaning
Analyze	Break into parts, and examine each part.	Interpret	Explain, and share your own judgment.
Apply	Discuss how the principles would apply to a situation.	Justify	Provide reasons for your statements or conclusion.
Compare	Discuss differences and similarities.	List	Provide a numbered list of items or points.
Contrast	Discuss differences and similarities, stressing the differences.	Outline	Organize your answer into main points and supporting details. If appropriate, use outline format.
Critique	Analyze and evaluate, using criteria.	Prove	Provide factual evidence to support your logic or position.
Define	Provide a clear, concise statement that explains the concept.	Relate	Show the connection among ideas.
Describe	Give a detailed account, listing characteristics, qualities, and components as appropriate.	Review	Provide a critical summary in which you summarize and present your comments.
Diagram	Provide a drawing.	State	Explain precisely.
Discuss	Provide an in-depth explanation. Be analytical.	Summarize	Provide a synopsis that does not include your comments.
Explain	Give a logical development that discusses reasons or causes.	Trace	Describe the development or progress of the idea.
Illustrate	Use examples or, when appropriate, provide a diagram or picture.		

Add your own direction words and definitions!

Instructional Activities

This section provides instructional activities that are related to content-area learning and study skills. Some of the activities teach new skills; others are best suited for practice and reinforcement of already acquired skills. For each activity, the objective, materials, and teaching procedures are described.

Word Association Map

Objective: To teach students a strategy for learning vocabulary words

Grades: Secondary

Materials: Textbook chapter, word association map worksheet (see Figure 10.20)

Teaching Procedures:

1. Introduce a key vocabulary word (e.g., *wicked*), and write it on the map.
2. Ask students to brainstorm what the word means.
3. With student input, come up with a good definition, and write it on the map. If necessary, provide examples to help students understand the meaning of the word.
4. Test students on several examples and nonexamples (e.g., example: "The witch in the children's story is mean for no reason and is wicked"; nonexample: "Diana is a considerate boss who is always willing to listen").
5. Ask the students to identify synonyms and antonyms of the word and write them on their word maps (e.g., synonyms: *unkind, bad;* antonyms: *good, considerate*).
6. Finally, ask the students to create their own personal sentences with the word.

Source: Adapted from University of Texas Center for Reading and Language Arts (2001a).

Add-a-Part: Prefixes and Suffixes

Objective: To give students practice in creating words with prefixes and suffixes

Grades: Fourth through secondary

Materials: Cards with prefixes (e.g., *dis-*), cards with suffixes (e.g., *-able*), cards with root words (e.g., *honest, comfort*) that can be combined with these prefixes and suffixes, two plastic bags

Teaching Procedures:

1. Have students sit in a circle.
2. Place the plastic bag of cards with prefixes and suffixes and the other bag with root words in the middle of the circle within reach of everyone.
3. Model playing the "add-a-part" game by drawing one card out of each bag, saying the affix (e.g., *-less*) and the root word (e.g., *care*) on the cards, and creating a new word with the affix (e.g., *careless*). Say the new word and its meaning, and tell whether the word is real or not.
4. Have the students take turns playing the game

Source: Adapted from University of Texas Center for Reading and Language Arts (2001b).

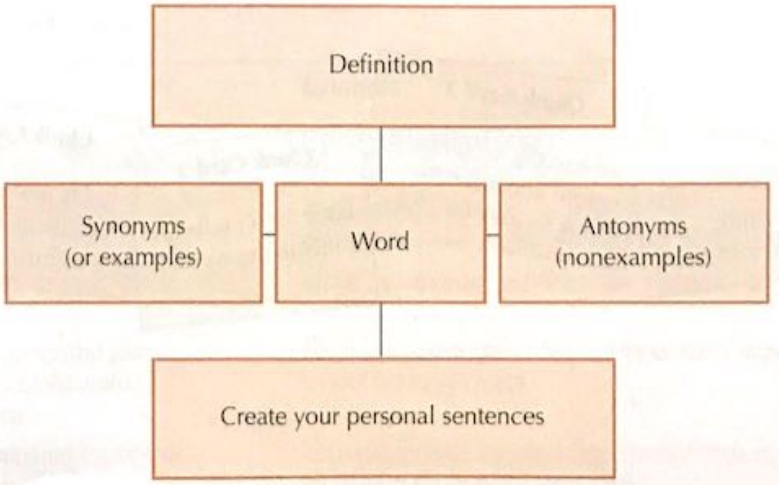
VOCAB

Objective: To teach students the VOCAB strategy and enhance their vocabulary

Grades: Secondary

Materials: A list of vocabulary terms that are generally related (e.g., federal government, legislative branch,

Figure 10.20 Word Association Map Worksheet



executive branch, judicial branch); index cards or pieces of paper

Teaching Procedures:

1. Discuss the components of the VOCAB strategy, and introduce the strategy step by step:

   Verify the key vocabulary terms and concepts to be learned, and put them on individual vocabulary cards or pieces of paper.

   Organize the vocabulary word cards into a diagram that shows the relationship of the words to each other as you understand them in the context of what is being learned.

   Communicate your reasoning, and share your diagram with a partner and vice versa.

   Assess the diagrams, discuss similarities and differences, and adjust your diagram with helpful ideas from your partner.

   Build your understanding with self-testing.

2. Identify and provide for students a list of vocabulary words.
3. Have the students write one of the words on each of the index cards or pieces of paper.
4. Ask the students to organize the words in any way that they think shows the correct relationships among the words.
5. Have the students explain how and why they organized the words the way they did.
6. On the basis of the discussion, have the students reorganize their words if they think they have a different understanding of the meaning of the words.
7. Circulate among the pairs, and monitor students' discussions to make sure that they are building their understanding of the words through self-testing.
8. As a whole class, have several pairs of students share how and why they arranged their words.

Source: Adapted from University of Texas Center for Reading and Language Arts (1999).

Click and Clunk

Objective: To help students monitor their understanding as they read and apply fix-up strategies to determine the meanings of unfamiliar words

Grades: Elementary through secondary

Materials: Reading passage, clunk cards, paper

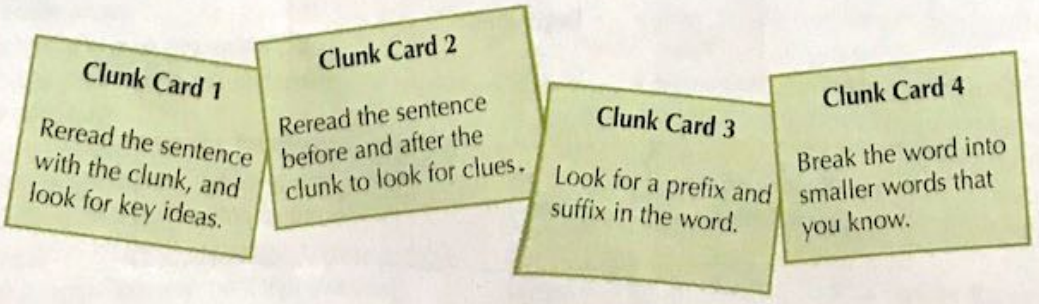
Teaching Procedures:

1. Introduce clunk cards. Explain to students that *click* means words or ideas they understand and *clunk* means words or ideas they do not know. The students continue to read until they have a clunk. Tell the students that they can use the clunk cards when they have a clunk, to figure out the meaning of a word.
2. Model each of the fix-up strategies on the clunk cue cards.
3. Provide opportunities for guided practice, followed by independent practice in which students apply these strategies as they read.
4. Pair students, and ask them to read each paragraph of the passage.
5. After reading each paragraph, have the students find clunks and write them on the paper. Then, have the students use the fix-up strategies on the clunk cards to figure out what the clunks mean. Provide supports if necessary.
6. Have the students record the definition of the clunk on the paper.
7. Repeat the same procedure until the students have read the entire selection.
8. When they have read the entire selection, have several pairs of students share their clunks and the fix-up strategies they used to help them determine meaning.

Source: Adapted from Klingner, Vaughn, Dimino, Schumm, and Bryant (2001).

Contextual Searching

Objective: To help students use various context clues to identify the meaning of the words



Grades: Secondary

Materials: Ten vocabulary words; contextual sentences for each vocabulary word using the five types of context clues (i.e., definition, description, contrast, comparison, synonym), sentence strips, list of possible definitions; dictionary

Teaching Procedures: Before the instruction,

1. Identify 10 vocabulary words.
2. Develop one context clue for each word. Be sure to use different types of context clues.
3. Write a sentence with a vocabulary word containing one context-clue type (definition, description, contrast, comparison, or synonym) on each sentence strip.

During the instruction,

4. Present the first five vocabulary words in isolation (e.g., *cilia, volition, lethargic, inquisition,* and *literally*).
5. Ask the students for definitions of the words.
6. Write the words and the students' definitions on the chalkboard or overhead.
7. Present the vocabulary words in context.
8. Model how to use the type of context clue to figure out the meaning of the unfamiliar words (see Figure 10.21).
9. Have the students compare the definitions from context to their definitions in isolation.
10. Present the other five vocabulary words in isolation.
11. Ask the students for definitions of the words.
12. Write the words and the students' definitions on the chalkboard or overhead.
13. Present the vocabulary words in context.
14. Pair students, and ask them to analyze the context to figure out the meaning of each vocabulary word and record their definitions for each word.
15. Ask the students to identify which type of context clue they used for each vocabulary word.
16. Ask the students to compare their definitions from context clues to their definitions in isolation.
17. Have students look up the definitions for the vocabulary words in the dictionary.
18. Call on several pairs of students to share how the dictionary definition fits with their definition from context clues.

Source: Adapted from University of Texas Center for Reading and Language Arts (2002).

Web Resources

For further description of content enhancement routines, see **https://sim.drupal.ku.edu/content-enhancement-routines**.

Jeopardy!

JEOPARDY!

Pop Music	Presidents	Football	Southwest
20	20	20	20
40	40	40	40
60	60	60	60
80	80	80	80
100	100	100	100

Figure 10.21 Using Context Clues

Context Clue Type	Example
Definition: The word is defined in the sentence.	If disease reaches your bronchial tubes, *cilia*—tiny hairlike structures—are another barrier to prevent infection.
Description: The word is described by the context.	After taking a spill on her bike, she was able to stand up, get back on the bike, and pedal away on her own *volition.*
Contrast: The word is compared with some other word as an antonym.	Kim was *lethargic,* yet her sister was very energetic.
Comparison: The word is compared with some other word or phrase to illustrate the similarities between them.	Birgit was exhausted after the *inquisition,* which was like being in a boat on rough seas.
Synonym: The word is compared to another word with asimilar meaning.	Tom interpreted the message *literally;* that is, he believed the message as though every word were real.

Objective: To give students practice in using reference and trade books to obtain information and to generate questions

Grades: Secondary

Materials: Reference and trade books, Jeopardy! board with four categories and five answers per category, index cards to fit in the Jeopardy! board

Teaching Procedures:

1. Divide the students into three teams of two to four students. Explain that each team is going to make a Jeopardy!-style game for the other students to play.
2. To make the game, each team needs to select four categories. Then have the students use reference books, trade books, and other sources to generate five questions and answers for each category that other students could possibly answer. Have them write the questions and answers on separate index cards and order the questions and answers from easy to difficult.
3. Each team then takes a turn directing its Jeopardy! game. First, the team members insert their category names and answer cards into the Jeopardy! board. Then they direct the game as the two other teams compete against each other. To direct the game, one student should serve as master of ceremonies, another as timekeeper, and the rest as judges.
4. To play, each team takes a turn selecting a category and a level underneath the category. The answer is then exposed, and the team members have 15 seconds to give the question. If the question is correct, they get the number of points indicated and are allowed to make another selection. If the answer is incorrect, the other team has 15 seconds to give an answer.

Study Groups

Objective: To provide students with the opportunity to work in groups when studying a textbook for a test

Grades: Secondary

Materials: Content-area textbook chapter or sections on which the students are going to be tested, index cards

Teaching Procedures:

1. Have students who are studying for tests that cover the same material work in groups of two to three students. (*Note:* When students first do this activity, the teacher will generally need to demonstrate and guide the students through the process.)
2. Have the students read the assigned materials together, stopping at the end of each paragraph or section to discuss the main ideas and the important vocabulary. Each main idea and important vocabulary for each section should be written on an index card.
3. After the students finish reading the assignment using this technique, they should take all the main idea cards and arrange them in logical groupings or in a logical order.
4. Have the students take each important vocabulary card and write a simple definition that makes sense according to the text. Then have them arrange the important vocabulary next to the related main idea.
5. Next, have each student copy onto paper the arrangement that was organized for the main ideas and vocabulary (with definitions).
6. Finally, the students should study the paper and then take turns quizzing each other on the information.

Learn Those Words!

Objective: To teach students a simple strategy for memorizing vocabulary words—either English words or those of a foreign language

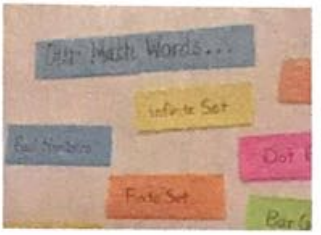
Grades: Fifth through secondary

Materials: Index cards used whole or cut in half or in thirds, a pen, a paper cutter or scissors

Teaching Procedures:

1. Have students write a word on one side of an index card and its definition or translation on the reverse side.
2. Have students study the words and then test themselves. Have them form two piles of cards as they work: a pile for the words they know and another for those they do not know. Students continue to study the words they don't know until no cards are left in the unknown pile.
3. Tell the students that they should always keep a set of words with them. While they are waiting in line or waiting for class to begin, they can test themselves on their words.
4. Have students make new sets of words and continuously review the old sets.

MyLab Education Self-Check 10.1
MyLab Education Self-Check 10.2
MyLab Education Self-Check 10.3
MyLab Education Self-Check 10.4
MyLab Education Self-Check 10.5
MyLab Education Application Exercise 10.1: Teaching Vocabulary Through Word-Learning Strategies



MyLab Education Application Exercise 10.2: Expression Skills: Remembering and Demonstrating Learning

MyLab Education Application Exercise 10.3: Study Skills and Learning Strategies

Summary

- In specific word instruction, teachers select a few vocabulary words that are critical for understanding a text and are difficult for students. Words can be selected from a text that the teacher will read aloud or from a text that students will read themselves. Teachers can highlight selected words after reading or preteach the vocabulary words. Students also need word-learning strategies that they can use independently while reading. Effective word-learning strategies include using contextual analysis, morphemic analysis, and reference aids.
- Content enhancement is used to help students identify, organize, and comprehend important content. First, teachers select important concepts and related vocabulary. Next, teachers evaluate materials. Reviewing texts before reading helps teachers to identify the difficulty of the ideas or concepts. Teachers then assess students' prior knowledge through the use of activities. Next, teachers can implement appropriate prelearning activities that students can use before reading an assigned text or listening to a lecture. Finally, the semantic map, concept diagram, or other activity becomes a learning tool that students can use as a guide during and after reading.
- Text adaptation involves changing an existing text to make it more comprehensible for students. Methods for adapting textbooks include using study guides; highlighting important points; or using alternatives to reading, such as audio recording text chapters or reading aloud. Lectures can be adapted by making their organization and key points clear to students through aids such as advance organizers, vocal cues, or visual aids. Teachers who are aware of students' abilities and needs construct assignments and homework that are appropriate in content, length, time required to complete, and skill level. Teachers should always communicate why an assignment is important, when it is due, what support is available, and what steps are involved. Teachers should tell students explicitly what they will be responsible for knowing, should design tests that are clear and easy to understand, and should provide accommodations during testing situations.
- Personal development skills, process skills, and expression skills are the three types of study skills. They are important because they help students to manage their time; use strategies to organize, synthesize, and remember new information; and communicate what they have learned to others. Study skills are critical to independent and efficient learning.