

Creating the Framework for Reading

*Never let the future disturb you. You will meet it,
if you have to, with the same weapons of reason
which today arm you against the present. . . .*

—Marcus Aurelius

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LITERACY AND CONTENT AREA LITERACY: WHAT ARE THEY?

While it is an accepted fact that one must read to be considered literate, the world is not so quick to accept the concept that reading and literacy are the same thing. While reading encompasses the ability to make sense of print symbols and, in turn, create meaning from those printed symbols, literacy seems to be a much more complicated venture. As Vacca and Vacca (2002) note, the research into what it means to be literate has grown. The concept has expanded from mere literacy, the ability to read or write a language, into functional literacy, the skills needed to survive in society; illiteracy, the inability to read or write a language; and aliteracy, the term attributed to those who can read and write but choose not to. Vacca and Vacca (2002) stress that literacy is, in fact, situational, and other researchers agree, as can be seen in Mikulecky's (1990) workplace literacy, the ability to read and write effectively on the job; Taylor's (1983) family literacy, how family interactions affect children's literacy development; and McKenna and Robinson's (1990) content literacy, the ability to use reading and writing to learn new content material in a given subject area.

It is this latter literacy, we feel, that most affects the students in our classrooms today. Content literacy is a complicated process. First, McKenna and Robinson (1990) note that content literacy is not the same as content knowledge because content literacy requires students to possess (1) general literacy skills; (2) content-specific literacy skills—the ability to read maps, charts, and graphs; and (3) prior knowledge of the content being studied. However, they do stress that content knowledge is a prerequisite of content literacy. Obviously, the more a person knows about a content, the more that knowledge will aid in the reading and writing of that content. McKenna and Robinson are quick to point out that content area teachers do not actually need to teach reading and writing. Rather, as students acquire content literacy skills, they read and write to learn rather than learn to read and write.

Another notion McKenna and Robinson present is that content literacy is content specific. In other words, students may be literate in one content but not so literate in another. One only needs to consider the comments of some English majors who readily admit they do not have a “math brain” or math specialists who proclaim they fail to see the symbolism in *The Scarlet Letter* to validate McKenna and Robinson’s findings. In addition, Vacca and Vacca (2002) stress that a myriad of factors, such as prior knowledge, attitude toward reading, interest in the subject being studied, the purpose for which the student is reading, the way the book is written, and even the teacher’s beliefs and attitudes about using text, can influence a student’s content literacy. In effect, “To help students become literate in a content area does not mean to teach them *how* to read or write. Instead, reading and writing are tools that they use to think and learn with text in a given subject” (Vacca & Vacca, 2002, p. 17). As a result, McKenna and Robinson (1990) stress that teachers must set expectations for content literacy high enough to challenge students.

THE STATUS OF LITERACY TODAY

The words of McKenna and Robinson pose an excellent question. Are we challenging our students? Moreover, are they ready for the challenge? Middle and high school students today are faced with a myriad of reading tasks, content area texts, supplemental reading such as magazines, newspapers, trade books, and even electronically transmitted text. Yet, what is the status of literacy and content literacy in our nation today? Almost every day we open a newspaper or hear a news broadcast that decries the current standards of literacy in the United States. Furthermore, for many years, the US Department of Education’s Office of Educational Research and Improvement has provided some dismal news about literacy in its National Assessment of Educational Progress (NAEP) Reading Report Card. This report is issued every four years and portrays nationwide student achievement in reading at Grades 4, 8, and 12.

NAEP, a congressionally mandated project of the US Department of Education’s National Center for Education Statistics, has assessed the academic performance of students in a variety of subjects including reading, writing, and mathematics since 1969. This report provides descriptions of students’ strengths and weaknesses in basic and higher-order skills as well as comparisons of achievement by race/ethnicity, gender, community, regions, and trends across the years.

The NAEP reading assessment measures the reading comprehension of students in addition to assessing their ability to

1. carry out simple discrete reading tasks (Level 150), where students can follow brief written directions; select words, phrases, and sentences to

describe a simple picture; and interpret simple written clues to identify a common object, but have difficulty making inferences. This is considered Below Basic for both 13- and 17-year-olds.

2. demonstrate partially developed skills and understanding (Level 200), where students can locate and identify facts from simple informational paragraphs, stories, and articles. They can combine ideas and make inferences based on short, uncomplicated passages. This is considered Basic for 13-year-olds and Below Basic for 17-year-olds.
3. interrelate ideas and make generalizations (Level 250), where readers use intermediate skills and strategies to search for, locate, and organize the information they find in relatively lengthy passages and can recognize what they have paraphrased. They can make generalizations and inferences about the main idea and the author's purpose in passages of literature, science, and social studies. This is considered Proficient for 13-year-olds and Basic for 17-year-olds.
4. understand complicated information (Level 300), where students can understand complicated literary and informational passages, including content area materials. They can analyze and integrate less familiar content area material and can provide reactions and explanations of text as a whole. This is considered Advanced for 13-year-olds and Proficient for 17-year-olds.
5. learn from specialized reading materials (Level 350), where readers can extend and restructure the ideas they read in specialized and complex texts like scientific materials, literary essays, and historical documents. They are also able to understand the links between ideas, even if they are not explicitly stated. Finally, they are able to make appropriate generalizations. This is considered Advanced for both 13- and 17-year-olds.

Although the 2004 average reading score was higher than the average score in 1971 for 13-year-olds, there was no difference from the average score in 1999. Furthermore, no statistically significant difference was found between the average scores in 1999 and 2004 for 17-year-olds, either. In addition, at the 75th and 90th percentiles, scores for 13-year-olds were higher in 2004 than in 1971, but again, no significant differences were detected between the scores in 2004 and 1999. And an even more depressing scene exists for 17-year-olds, where no statistically significant differences between the scores at any of the selected percentiles between 2004 and 1999 or 1971 were found.

While these scores are alarming, there is even more cause for concern when we look at these data in relation to their impact on academic performance in school. The NAEP performance achievement levels are

reported in five numerical categories: Below Basic, Level 1; Basic, Level 2; Advanced, Level 3; and Proficient, Levels 4 and 5, with the Proficient Level representing an ability to show solid academic performance, and this is the level of achievement identified as a standard that all students should reach. Students who achieve this level are considered competent enough to read challenging subject matter, apply the knowledge gained to real-world situations, and use analytical skills appropriate to the subject matter (Office of Educational Research and Improvement, 2004). Finally, while the percentage of students who reached Level 300 (understanding complicated information) was higher in 2004 than in 1971 for 13-year-olds, that same success was not seen for 17-year-olds. In fact, the percentage of students at or above Level 250 (the ability to interrelate ideas and make generalizations) was almost the same in 2004 as it was in 1971.

These trends report that, while many adolescents in the United States can comprehend specific factual information, few have gone beyond the basics to the levels of advanced literacy. In addition, when one examines the specific literacy status of students of cultural diversity or those for whom English is not a first language, while the situation is brighter than ever before, an achievement gap still exists. The NAEP report, which categorizes student scores according to White students, Black students, and Hispanic students, reports that, although White, Black, and Hispanic 13-year-olds' reading scores have increased 5, 22, and 10 points, respectively, achievement gaps still exist. Furthermore, while Black 17-year-olds' average reading score was higher in 2004 than in 1975, the achievement gap between White and Black students has only decreased by 24 points between 1975 and 2004. Furthermore, while Hispanic 17-year-olds' average reading score was also higher in 2004 than in 1975, the White-Hispanic achievement gap decreased by only 11 points between 1975 and 2004 (Office of Educational Research and Improvement, 2004).

WHAT CAN TEACHERS DO TO FOSTER LITERACY?

Given this information, many observers cannot help but wonder if we are headed for an Age of Illiteracy or at the very least an Age of Struggling Learners. Since the NAEP report describes changes in student achievement as measured through the long-term assessment in reading, we have reason for concern. It seems that we have a vast number of students who may not effectively function in college or in the work setting in the future. They may not be able to read and understand test directions, instructions for operating machinery, office memos, tax forms, and so on. In addition, because of their inability to read, they may not know how to gain access to that information. As a result, many fear that the unemployment rate

might rise, forcing young people into low-paying jobs and necessitating remedial programs. As teachers, what can we do?

First, we must be aware of what constitutes a struggling reader. Struggling readers come from a myriad of environments and represent various racial, ethnic, and socioeconomic backgrounds. Overall, they are dependent readers (Beers & Howell, 2003). They often lack the cognitive abilities to read independently and, if tested, read significantly below their grade level. They have trouble recognizing words and decoding them and thus have difficulty making sense of what they read. As a result, they carry negative attitudes toward reading. Such negative feelings destroy their self-confidence and leave them feeling that they are school failures. It is not a surprise, then, that the struggling reader's participation in reading and writing activities is marginal. Lacking the competence needed to maneuver through the complex texts offered in school, the struggling reader often just reads to get done, punctuating his or her reading experience with disengaged disinterest.

Second, we need to be aware of what research informs us about the Best Practices to follow to build adolescent content literacy. The International Reading Association, in its position paper *What Adolescents Deserve* (Moore, Bean, Birdyshaw, & Rycik, 1999), proposes that adolescents deserve instruction that builds both the skill and the desire to read increasingly complex materials. In addition, they state that adolescents deserve expert teachers who model and provide explicit instruction in reading comprehension and study strategies across the curriculum. And McKenna and Robinson (1990) stress that reading and writing must be integrated and used as tools to support learning in all curricular content areas. Thus, another important tenet of adolescent literacy is the development of content area literacy skills (Buehl, 1998; Brozo & Simpson, 2003). It is this type of literacy that enables our students to read their content area texts and learn from them; it is the type of literacy that most affects the students in our classrooms and on nationwide assessments such as the SAT, ACT, and NAEP and state assessments such as the ISAT and PSAT.

STRATEGIC READERS

In effect, then, students must learn to be strategic readers because strategic reading is inherent in all expert readers and is crucial to success in school. According to Paris, Wasik, and Turner (1991), there are six reasons why this is true. First, strategic reading allows the student to elaborate, organize, and evaluate what is being learned from the text. Next, the acquisition of strategic reading strategies occurs at the same time that many of the student's cognitive strategies to enhance attention, memory, communication, and learning are developing. In addition, strategic reading is controlled by the

student because it consists of personal cognitive tools that are used selectively and flexibly as the student sees fit. Fourth, strategic reading reflects metacognitive awareness and motivation because the student needs to have both the knowledge and the disposition to use the strategy. Furthermore, strategies that foster reading and thinking can be taught directly by teachers, and, finally, strategic reading can enhance learning across the curriculum. Paris, Lipson, and Wixson (1983) posit that strategic readers are readers who are in control of their reading because they move through a series of steps in the reading process: They are cognizant of three types of knowledge about reading, declarative knowledge, procedural knowledge, and conditional knowledge.

First, strategic readers possess declarative knowledge. In other words, they have factual knowledge about what is involved in reading. They know that making meaning is critical in reading and, as such, analyze the reading task before them by understanding the reading demands made of them and setting a purpose for their reading. In essence, they are able to identify the type of text, narrative, or expository; the reading goal to be accomplished, to read the first chapter or the entire selection; and the purpose for reading, for pleasure or to answer test questions (Paris, Wasik, & Turner, 1991). Next, using their procedural knowledge, which enables them to know how to approach and carry out a wide variety of reading tasks, strategic readers initiate a plan of action to achieve that purpose by choosing the strategies they will use as they read. For example, they might choose to first skim the material, identifying the text patterns used; then reread it, making predictions as they go; and end by summarizing what they have read. Finally, strategic readers make use of their conditional knowledge, the knowledge to know when a particular strategy works and when to use it or to abandon it and try another. In effect, they are able to monitor and regulate their comprehension; they are able to recognize that comprehension is occurring because they understand what they are reading, and, if they suddenly become aware that they no longer understand, they know what to do to repair or “fix up” their comprehension problem, whether that is to reread a passage, look up an unfamiliar vocabulary word, or ask a teacher for help. By the same token, if comprehension is progressing well, they may skip sections that contain irrelevant or extraneous details or skim over a passage that contains familiar material. As a result, they have metacognitive awareness and control over the reading process and their learning activities (Baker & Brown, 1984; Royer, Cisero, & Carlo, 1993).

To become strategic, however, students must be taught strategies to utilize throughout the three phases of the reading process: before, during, and after reading. They need to have extensive opportunities to read for a variety of purposes and to reflect on what they read. Furthermore, students must be taught and given opportunities to apply the following comprehension

strategies for constructing meaning: making and confirming predictions, visualizing, summarizing, drawing inferences, generating questions, making connections, and self-monitoring. They need to learn to use cognitive strategies to synthesize, analyze, evaluate, and make applications to authentic situations. Given these principles and practices, we can readily see that the basic strategies of outlining text or consulting a dictionary for the meaning of an unfamiliar word are simply not enough to satisfy the literacy demands of the 21st century. And as these literacy demands become more complex, adolescents must be able to meet those demands by utilizing more complex learning strategies such as being able to

1. utilize self-questioning techniques.
 2. synthesize information from various sources.
 3. identify, understand, and remember key vocabulary.
 4. recognize and understand how a text is organized.
 5. maintain a system for organized note taking.
 6. manipulate graphical literacy.
 7. monitor their own understanding.
 8. evaluate authors' ideas and perspectives.
- (Moore, Bean, Birdyshaw, & Rycik, 1999)

As we reflect on the notion of adolescent content area literacy, we become truly aware of how broad the concept of content literacy has become. What does it mean to be literate today? Does it mean the same thing that it did a century ago? Roberta Sejnost's grandmother sometimes reminisces about her immigration from Czechoslovakia. She tells a wonderful story about how she and her husband were channeled into the "literate line" when they landed at Ellis Island. Since they could each identify their names and were able to sign their names on a baggage receipt, they were considered literate! Perhaps in the late 1800s that was all that was needed to be literate, but that definition surely would not stand today. Today, literacy seems to be a complex, multifaceted creature. On a regular basis, we hear terms such as computer literacy, the ability to use a computer and software to accomplish simple tasks; cultural literacy, the ability to read about another population and understand their customs and beliefs; media literacy, the ability to understand communication in various mass media; visual literacy, the ability to understand graphic material such as charts and maps; and academic literacy, the ability to read and understand the academic textbooks used in classrooms. In addition, McKenna and Robinson (1990) speak of content literacy, the kind of literacy that we feel most affects our students in their daily learning activities and nationwide assessments such as the NAEP.

Thus, it is this type of literacy that we wish to address in this text by providing a variety of strategies that will enable students to become strategic

readers. These strategies are especially applicable for use with students who are considered to be struggling readers. Finally, as we present these strategies, we strongly advocate that a specific procedure be utilized to teach them to students.

GUIDING THE STRATEGIC READER

Peterson, Caverly, Nicholson, O’Neal, and Cusenbary (2000) posit that for students to effectively learn a strategic approach to reading, struggling readers must be taught how, why, and when to use each strategy. Furthermore, Winograd and Hare (1988) determined that five critical elements are needed to guide the direct explanation of all strategies.

1. First, the strategies are carefully explained so they are meaningful and sensible to the students.
2. Next, students are made aware of the direct benefits of the strategies and why they need to learn them.
3. Then, students are given a step-by-step explanation of how the strategies worked.
4. Next, students learn exactly in and under what circumstances the strategies are most effective.
5. Finally, the students reflect on how well the strategies work for them.

This process also parallels the Gradual Release of Responsibility Model developed by Pearson and Gallagher (1983) as a way of facilitating reading comprehension. This process begins with the teacher demonstrating and modeling the steps of a strategy using an actual piece of text to illustrate each step. Next, in pairs or small groups and with teacher support, students practice the strategy. Finally, when students become proficient in the use of the strategy with teacher and/or peer support, they are ready to use the strategy independently.

MATCHING THE READER AND THE TEXT

As we work to make our students literate, we utilize many tools, the major one being a textbook. In fact, Zahorik (1991) estimates that during the school years, students utilize texts in some fashion from 55 to 91 percent of the time. Yet we as teachers know that the reading of texts often presents problems for our students. We hear them complain that the books are too difficult as well as boring and dry. Even worse, many profess that they simply do not understand what they have read. And, when this is the case, students become frustrated and give up, not bothering to read their texts at all.

To understand how your students feel, read the following paragraph:

When the computer functions are suspended, a fatal error is caused. In order to repair the problem, you may be required to halt the process. Holding down the Control, Alternate, and Delete keys simultaneously will end the task. It might also prove useful to defrag the system afterward.

Was this snippet of text easy to understand? Would you have understood it better if you had a command of the content-specific vocabulary used? Do you fare better with the next example?

I spent 45 minutes in eyeball hang time, and I only made one hit!

Both of these samples make perfect sense to someone who is computer literate but may well stymie those who are not. Thus, we must admit that these text samples are not very meaningful or user-friendly to readers who are unacquainted with computer terminology.

When we look at texts, then, we need to consider the subject of readability. Harris and Hodges (1995) note that readability is really a measure of how easily a text can be read based on the style of writing used. These researchers point out that variables in the text (such as format, typography, content, literary form and style, vocabulary difficulty, sentence complexity, concept load, and cohesiveness) contribute to whether or not the text can be easily understood. When variables within the student (such as motivation, reading ability, background knowledge, and interests) come into play, the issue of readability becomes even more complex. Richardson and Morgan (2003) warn us that readability is not just a formula but, instead, a combination of the characteristics within the reader and those within the text. Furthermore, they suggest that it is only by considering the notion of readability that teachers will be able to prepare their students to read and learn.

This leads to the question of what we can do to determine whether our students are well matched to the texts they use. How can we determine whether the text is written at the appropriate reading level? Research dating from the 1920s until now reports that, on the whole, textbooks are written at levels that well exceed students' reading abilities (Chall & Squire, 1991). Second, how do we determine whether our students have enough prior knowledge to understand the text? Chall (1947) tested sixth- and eighth-grade students and discovered that the students' prior knowledge about a topic was positively correlated with their comprehension of a passage on that topic. Students who had the highest knowledge scores also succeeded in achieving the highest comprehension scores. Finally, since we know that students are better able to comprehend a text that is well written and filled with frequent examples and graphic aids (Readence, Bean, & Baldwin, 2004), is there an overall analysis teachers can use to determine whether the text they choose is user-friendly? In the following sections, we

provide an explanation of three methods: the readability formulas, the cloze procedure, and the textbook analysis. These methods help teachers determine how well their students' ability levels correlate with the texts they must read.

The Raygor Readability Formula

There are probably more than 100 readability formulas currently in use today. They are widely used by teachers and administrators as a way of predicting if a text is written at a level appropriate for the students who will use it. While we can say with relative ease that readability formulas are fairly reliable, we need to be cautious in using them. As Richardson and Morgan (2003) point out, readability formulas are useful when textbook selection committees need to make a decision but have no students available to try out the materials on, or when teachers want to assess materials that students may be asked to read independently. Basically, a readability formula is a quick and easy way to determine the grade level of written material. However, we must remember that it is only one measure, and the grade level obtained is only a predictor and thus may not be exact (Richardson & Morgan, 2003). Harris and Hodges (1995) provide the following suggestions to predict readability accurately:

1. Consider the purpose of getting a readability score. Texts used to cultivate readers should be more challenging than those used merely to inform or entertain them.
2. Choose the formula carefully and consider the formula's screening devices and all scores' probability statements.
3. Choose a formula that yields two index variables: semantic and syntactic.
4. Take a large random sample of the text to increase the accuracy of the analysis, to ascertain the reliability of the average score, and to get an indication of variability.
5. Be aware that different readability formulas often give different grade level scores.
6. Remember that readability formulas are derived from counts of style variables. They can be poor predictors in upper-grade-level texts where content weighs heavily.
7. Do not rely on readability formulas alone. Take into account students' abilities, motivation levels, and prior knowledge. Also, seek the opinion of experts, or seek the consensus opinions of colleagues.

As noted earlier, the numbers of readability formulas available are impressive. One that is both simple and reliable, since it eliminates the step of

counting syllables and replaces it with counting words of six or more letters, is the Raygor Readability Estimate (Raygor, 1977). Anyone who has ever battled with the task of counting syllables (a common step in most gauges of readability such as the Fry, SMOG, and FOG formulas) is cognizant of how easily a counting error can be made. Of course, if an error occurs, the reliability of the formula is compromised. The Raygor Readability Estimate eliminates this margin of error by counting words of six letters or more rather than by counting syllables. Furthermore, Baldwin and Kaufman (1979) point out that while both the Raygor and the Fry methods yield similar readability estimates, the Raygor is much easier and faster to use, and every busy classroom teacher will appreciate these elements (see Figure 1.1). See the end of this chapter for a Blackline Master of the Raygor Readability Graph (Figure 1.13).

The Rule of Thumb Readability Formula

Often, we are in a situation where the use of standard readability formulas is inconvenient or too time-consuming, such as when we have taken our students to the library to choose a book to read. While it would be beneficial to know whether the book the student is choosing is written at an appropriate level for good comprehension as well as for pleasurable reading fulfillment, we do not want to destroy the spontaneity of the situation or detour our student's reading ambition. This is when the use of Veatch's (1968) Rule of Thumb is an appealing alternative. Although it is predominately utilized for younger students, it can be effective for struggling adolescent readers as well. The process is as follows:

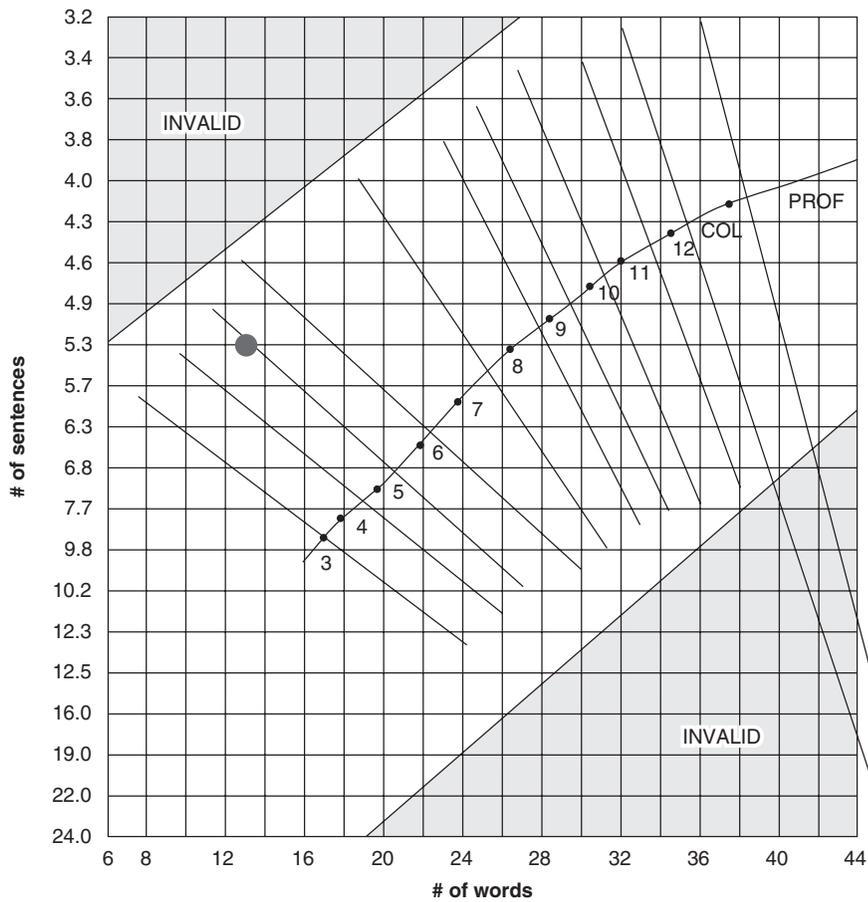
1. The student opens to the middle of the book.
2. The student begins reading.
3. Each time the student locates an unknown word, he or she folds down a finger.
4. If the student locates 5 or fewer unknown words on that page (folds down 5 or fewer fingers), the book is probably a good match.
5. If the student locates 10 or more unknown words on that page (folds down 10 or more fingers), the book is most likely too difficult.
6. If only one or two unknown words are found, the book may be too easy.

Word Processor Readability

With the advent of the computer has come the convenience of using it to compute readability statistics. Word processing programs such as Microsoft Word or WordPerfect provide readability information as part of

Sample Raygor Readability Graph

- Directions: Choose three 100-word passages, one at the beginning, one in the middle, and one at the end of the textbook. In the count, include proper nouns, but do not include numbers. Then follow these steps:
- Count the number of sentences in each passage, estimating to the nearest tenth.
 - Count the words that have six or more letters.
 - Average the sentence length and the word length over three samples. Then plot the average on the graph.



Example:	Sentences	Number of Words (With Six or More Letters)
Sample A	5	10
Sample B	5.6	15
Sample C	5.2	12
TOTAL	15.8	37
AVERAGE	5.3	12.3

According to the figures calculated, the text is written at the fifth grade level.

Figure 1.1

their grammar functions. For example, in Microsoft, follow these simple steps: Access

1. Tools
2. Spelling and Grammar
3. Options
4. Show readability statistics

In WordPerfect, merely click on Grammatick on the toolbar.

Both of these programs present the readability statistics using the Flesch-Kincaid readability formula, which uses the average number of syllables and the average number of words per sentence to assess the readability of the passage. The score is reported as a grade level, thus yielding information similar to that provided in the Raygor Readability Formula.

The Cloze Procedure

Although a readability formula is certainly useful in estimating the difficulty of a textbook and indicating the reading level students must possess to comprehend the material, it focuses on variables in the text such as sentence length, word length, or number of syllables used. The formula fails, however, to take into consideration reader variables such as student experience, interest, motivation, prior knowledge, or knowledge of content vocabulary. The cloze procedure (Taylor, 1953) is a method that measures how well students can comprehend a selection based on how they interact with the reading material. “Closure” takes place when the reader is able to supply enough of the deleted words to understand the passage.

In effect, as students move through a “cloze” passage—reading actively, thinking, and filling in blanks appropriately—they must make use of their prior knowledge and manipulate their knowledge of content-based vocabulary as well as the author’s style of writing. Richardson and Morgan (2003) suggest steps for constructing the cloze for all grade levels as well as a method of interpreting scores (see Figure 1.2). If students score at 60 percent or above on the measure, they are considered capable of reading the text independently. Students who score between 40 percent and 60 percent are at an instructional level and will be able to read the text with assistance from the teacher. Finally, those who score below 40 percent are at a frustrational level and will find the material simply too difficult to comprehend or learn.

Steps in Constructing a Cloze

1. Select a passage of approximately 125 words for students in Grades 1–3. Choose a passage of 250–300 words for students in Grades 4–12.

2. Copy the first sentence of the passage in its entirety.
3. Delete every 10th word, until a total of 10 words are deleted for students in Grades 1–3 and every 5th word until a total of 50 words are deleted for students in Grades 4–12.
4. Copy the last sentence in its entirety. (You may, for continuity, copy the remainder of the paragraph.)
5. For students in Grades 1–3, create a word bank containing the exact words that have been deleted. (However, do not list the words in the order in which they appear in the text.)
6. For students in Grades 4–12, instruct students to read the passage and fill in each blank with the exact word they believe was deleted. (Note: Research indicates that the most valid score is reached when the exact word is used.)
7. To score, calculate the number of correct responses and multiply by 10 for students in Grades 1–3 and by 2 for students in Grades 4–12 to determine the percentage.

Figure 1.2 will help you determine the instructional match between the text and your students and provide some insight into how successfully your students will comprehend the text.

Levels of Comprehension as Assessed by the Cloze Procedure		
Independent Level	Instructional Level	Frustrational Level
Score 60% or Above	Score Between 40% and 59%	Score Below 40%
Text is too easy for the student; it can be read independently without instructional aid from a teacher.	Text is suitable for the student; it can be comprehended easily with instructional aid from a teacher.	Text is too difficult for the student; the text may require modification. An alternative text may need to be assigned, or a great deal of instructional guidance may need to be provided by a teacher.

Figure 1.2

Figure 1.3 is an example of the cloze procedure you could use in your science classroom.

Example of the Cloze Procedure for Science

Passage

The body contains several systems that keep it functioning well. While all of these 1. ___ are crucial to the 2. ___ survival, we will discuss 3. ___ of them: the digestive 4. ___, the circulatory system, and 5. ___ respiratory system.

There are 6. ___ organs in the digestive 7. ___: the stomach, the small 8. ___, and the liver. Their 9. ___ purpose is to process 10. ___ we all eat. However, 11. ___ bodies can only use 12. ___ we eat after the 13. ___ system does its work 14. ___ allowing enzymes and digestive 15. ___ to change the food 16. ___ chemical forms that are 17. ___ by the body. Then, 18. ___ food undergoes this chemical 19. ___, it then moves to 20. ___ bloodstream, and at this 21. ___ the circulatory system begins 22. ___ important job.

In the 23. ___ system, the heart is the 24. ___ worker. It works hard 25. ___ pump the blood through 26. ___ body's veins, arteries, and 27. ___. During this very complex 28. ___, the blood works to 29. ___ the food to the 30. ___ cells. At the same time, 31. ___ also removes the wastes. 32. ___ function of the blood 33. ___ to produce antibodies which 34. ___ the special agents that 35. ___ the body's cells against 36. ___.

The respiratory system is 37. ___ unique system that keeps 38. ___ breathing. Air, which contains 39. ___, moves in and out 40. ___ our bodies regularly. It 41. ___ enters through our nasal 42. ___ or mouths. Next, the 43. ___ passes into our throats 44. ___ down our windpipes where 45. ___ eventually enters our lungs. 46. ___ in the lungs, the 47. ___ proceeds to absorb the 48. ___ and then gives off 49. ___ dioxide as a by-product 50. ___ the process.

This, then, is a thumbnail sketch of three of the several systems that our body has. Each and every one of them is truly a miracle in operation!

Answers:

1. systems	11. our	21. point	31. it	41. usually
2. body's	12. food	22. its	32. another	42. passages
3. three	13. digestive	23. circulatory	33. is	43. air
4. system	14. by	24. major	34. are	44. and
5. the	15. juices	25. to	35. guard	45. it
6. three	16. into	26. the	36. disease	46. once
7. system	17. utilized	27. capillaries	37. the	47. blood
8. intestine	18. the	28. process	38. us	48. oxygen
9. basic	19. change	29. deliver	39. oxygen	49. carbon
10. foods	20. the	30. body's	40. of	50. of

Figure 1.3

The Readability Checklist

Although readability formulas and cloze procedures provide some excellent and valuable information about how well our students can understand their textbooks, there is another procedure to help us determine the text's usability: the Readability Checklist. Basically, we know a textbook that is efficiently and effectively written will be easier for students to understand. Common sense tells us that students will better comprehend a text they can understand and use easily. In other words, when considering textbooks, we must consider questions such as the following: Is the text well organized? Does it have a table of contents? An index? Does each chapter begin with an introduction and end with a summary? Do the chapter titles and sub-headings provide a clear outline of the material to be read? Are the ideas and concepts presented logically? Are main ideas stated clearly and with adequate, but not superfluous, supporting details? Do the visual aids adequately reflect the content they represent? Is important vocabulary highlighted and supported with effective context clues or a glossary? These are just a few of the questions we need to consider when we choose a text for our students.

There are numerous readability checklists available to help teachers evaluate texts. However, one we find most utilitarian is the Readability Checklist developed by Irwin and Davis (1980).

INTERPRETING THE TEXT

Once we are confident that students are able to read the words in their textbooks with comfort, we also must be sure that they are equipped with the processes to maneuver through the text with ease and to answer the text-based questions we ask them. Too often, we hear our students complain that they have been given questions for which they cannot locate the answers. Unfortunately, much of the time they are correct. Yet this is not the fault of the teachers who pose the questions; the fault is really a twofold problem.

First, most of our students recognize only one type of question: the textually explicit question that is found easily in one place in the text. Often, obvious markers such as boldface type lead the reader to a definition that is readily located. However, as teachers, we also expect our students to ascend in the hierarchy of thought and answer questions that are textually implicit. To answer these questions, they must think about and peruse several sections of the text. In addition, they must process, apply, and transfer their thoughts about these difficult questions to real-life experiences.

The second part of the problem lies in the fact that many of our students do not familiarize themselves with their texts, and too often,

teachers do not do an effective job of introducing these texts. We would never buy a house without walking through it first or buy a car without going for a test drive. Yet we expect students to open their books and jump right into the text without ever bothering to introduce them to the format.

Question-Answer Relationships Strategy (QARS)

These two problems can be alleviated, however, by using the Question-Answer Relationships Strategy (QARS) and Content Area Reading Inventory (CARI). Teaching students to identify various kinds of questions as explicit or implicit in the text can help them to both locate and synthesize information. Raphael (1984, 1986) illustrated four types of questions in her QARS shown in Figure 1.4.

The Question-Answer Relationships Strategy (QARS)

Kind of Question	Textually Explicit or Implicit	Characteristics
Right There	Explicit	Answer stated directly in the text
Think and Search	Implicit	Answer requires students to put together several sections of the text
Author and You	Explicit and Implicit	Answer requires that students mesh their thoughts about a topic with information the author presents
On Your Own	Implicit	Answer comes from application of the information from the text

Figure 1.4

Steps for QARS

1. Introduce the concept of QARS by explaining each type, providing a clear example, and discussing the difference in each.
2. Assign a short piece of text for students to read.
3. Upon completion of the reading, lead the students through the process of answering each type of question, making sure they go back into the text to verify their answers. Ascertain that they clearly understand the differences among each type.

4. Continue this practice, increasing the number of questions for each type, until students are clearly able to understand the differences among the types and can identify them with ease.
5. Finally, ask students to read a longer passage and develop a set of QARS for their classmates to identify and answer.

Once students have become accustomed to the QARS format, apply the strategy to content area assignments and discussion sessions. In classrooms in which students have learned to use QARS, teachers can often be heard telling a student who is having difficulty locating an answer to a question: “It is a Think and Search Question,” or “It is an On Your Own Question.” That is usually all it takes to get a response of “Oh! Now I get it!” See Figure 1.5a for an example of QARS in the social studies classroom and Figure 1.5b for an example of QARS in a science classroom.

Example of QARS for Social Studies

Children and Immigration

Right There Questions

1. How long were immigrant children required to go to school?
2. In what year did the first school for immigrant children open?

Think and Search Questions

1. What kinds of jobs were available for immigrant boys?
2. How did the teachers treat the immigrant children?

Author and You Questions

1. Identify some ways that the immigrants’ new and old countries were similar.
2. How did the immigrant experience make most children feel?

On Your Own Questions

1. If you were an immigrant child, what would have been most difficult about coming to America?
2. What could have been done to make the immigrant children’s lives more comfortable?

Figure 1.5a

Example of QARS for Science

Planet Uranus

Right There Questions

1. How long is a year on Uranus?
2. Name the five moons of Uranus.

Think and Search Questions

1. How is Uranus different from Earth?
2. What caused the surface features of Uranus' moons?

Author and You Questions

1. How were scientists able to learn new information about Uranus?
2. Why do you think that Uranus is called a dark planet?

On Your Own Questions

1. Do you think there is life on Uranus? Explain your answer.
2. Describe what you think life on Uranus would be like.

Figure 1.5b

Content Area Reading Inventory (CARI)

A Content Area Reading Inventory (CARI) is an excellent and easy way to judge how successfully students can learn from their content area texts. This inventory is an informal, silent measure that can be easily administered to the entire class within a single class period. Furthermore, since it is a teacher-made measure constructed using the students' actual content area textbook, the diagnostic information garnered is both informative and relevant. Teachers can easily assess which areas of the text or which skills and strategies may provide potential problems for students. Finally, the fact that the measure is teacher-made offers students the opportunity of becoming familiar with the style of writing the teacher uses to compose questions.

Readence, Bean, and Baldwin (2004) suggest that an effective CARI consists of three major sections. The first section assesses students' knowledge of and ability to utilize the various textual and reading aids, such as the table of contents, glossary, index, pictures, charts, maps, and graphs. Ability to use these aids is tantamount to successfully learning the content of the textbook. The next two sections require students to read portions of the text and then respond. In Section 2, students respond to questions that

assess their knowledge and use of the technical or specialized vocabulary pertinent to the content. In Section 3, students respond to explicit and implicit comprehension questions as well as questions that reflect their ability to manipulate text structure. Vacca and Vacca (2002) suggest that a fourth section, rate of reading, be added to check fluency.

Steps for CARI

1. Select a short passage (2–6 pages) from the class text for students to read.
2. Construct approximately 20–25 questions based on the text material read using the following format:
 - a. Construct 8–10 questions about using the study and reading aids found in the text, such as the table of contents, index, glossary, chapter introductions, and summaries, and visual aids, such as charts, maps, graphs, and pictures. Include questions about reference texts like encyclopedias, the *Readers' Guide to Periodical Literature*, and common library technological search tools.
 - b. Construct 4–6 questions on content-specific vocabulary.
 - c. Construct 7–9 questions testing both explicit and implicit textual information that indicate students' abilities to make sense of the book's structure.
 - d. To inventory reading rate, have students record how long it took them to read the selection and then ask them to divide the number of words read by the number of minutes it took them to read. This will result in a words-per-minute score.
 - e. Score the test according to your criteria. Readence, Bean, and Baldwin (2005) suggest the scale seen in Figure 1.6.

CARI Rating Scale	
Percent Correct	Range of Text Difficulty
86–100%	Text is too easy; student is working at Independent Level.
64–85%	Text is adequate for instruction; student is working at Instructional Level.
63% and below	Text is too difficult; student is working at Frustrational Level.

Figure 1.6

- f. In discussing the CARI results with students, be sure to help them see the relationship between their reading rate and their vocabulary and comprehension scores.

- g. Finally, use the results of the CARI to determine areas students have mastered and those in which they will need further instruction.

See Figure 1.7 for an example of a Content Area Reading Inventory.

Example of Content Area Reading Inventory for Science

Section I: Study and Reading Aids

1. On what page would you find a map of the solar system? (Tests ability to find a map or table in a science textbook)
2. On what page does Chapter 7 begin? What is the title of the unit that contains this chapter? (Tests ability to use table of contents)
3. How can the introduction on page 18 and the summary on page 49 help you to study the chapter? (Tests understanding of unit introduction and chapter summary)
4. Why are the chapter questions and vocabulary exercises on pages 50–53 valuable? (Tests understanding of specific study aids)
5. What library aid tells you the call number of a book on plant mutation? (Tests knowledge of library information resources)
6. Name a library guide that will help you find information about a famous scientist. (Tests knowledge of reference materials)
7. Name a library guide that will help you find current information about cloning. (Tests knowledge of reference materials)
8. Look at the chart on page 32. From the information given, tell what the jobs of the specific cell parts are. (Tests ability to understand charts)
9. Look at the map on page 69. From the information given, tell which of the following are found near the picture of the city: a river, a school, hills, train tracks, major roadway, dirt road. (Tests ability to understand maps)

Section II: Vocabulary

10. Define nucleus.
11. Read the third paragraph on page 31. From the information given in that paragraph, what do you think a nuclear membrane is?
12. What is a vacuole?
13. Give an example of diffusion.

Section III: Text Explicit and Text Implicit Information

14. What six elements make up most of the living matter of our earth? (Text explicit)
15. What do chloroplasts contain? (Text explicit)
16. Why are mitochondria often called the powerhouses of the cells? (Text implicit)
17. How do mitochondria and chloroplasts differ? (Text implicit)
18. What is found between the cell membrane and the nucleus? (Text explicit)
19. Read the section entitled “Cells and Their Jobs.” Create a mind map or an outline that clearly illustrates the cells and the specific jobs they do. (Text implicit)

Figure 1.7

Patterns of Text Structure for Reading

As readers and writers ourselves, we are aware that information in textbooks is organized according to a hierarchy, where ideas are layered according to importance: first, ideas that represent major concepts; second, ideas that are subordinate to these major concepts; and finally, ideas that relate to the subordinating ideas. This hierarchy is often referred to as the text structure or text organizational pattern or paragraph pattern. Textbook authors use many different basic patterns of organization in their writing, but, in our experience, we have found that five patterns are used consistently: (1) definition/example, (2) proposition/support, (3) comparison/contrast, (4) cause/effect, and (5) problem/solution. Research shows that students who are able to recognize and use an author's text structure/organization are able to comprehend their content area textbooks much more effectively than students who cannot (Armbruster, Anderson, & Ostertag, 1989; Taylor & Samuels, 1983). In addition, our experience shows that when students know how to identify text structure, their writing skills also improve because they understand how to organize their writing to achieve their purpose. Thus, it seems only wise to make all students aware of the text structure and organizational patterns authors use so they can utilize this knowledge to better comprehend their content area textbooks.

The challenge we face as teachers, then, is to effectively teach these patterns to students. Armbruster and Anderson (1985) use the phrase *text frames* to refer to those key questions and categories of information that align themselves with the specific text patterns authors use to present their information. Buehl (1995) developed a series of questions to help students of all grade levels identify each of these paragraph patterns more efficiently. In addition, each paragraph pattern contains key structure words that aid in the identification of the specific paragraph pattern.

Definition/Example Text Structure

Consider the following questions as you read.

- What is the concept?
- To what category does it belong?
- What are its critical characteristics or attributes?
- How does it work?
- What does it do?
- What are its functions?

- What are examples of it?
- What are some examples of things that share some but not all of its characteristics?

Also, have students look for the following key words: *for example, for instance, specifically, in addition, described as, synonymous with.*

The following shows how the definition/example text strategy is used.

Example of Definition/ Example Text Structure

Learning Doesn't End at Three O'Clock

A comprehensive high school is a place where adolescents can receive a well-rounded education in academics and life. To develop academically, students have the opportunity to enroll in a variety of classes. They can study subjects that provide a basic, educational foundation, like language arts, mathematics, and science, as well as subjects that will prepare them for future vocations, such as auto mechanics, word processing, and fashion merchandising. In addition, they also have a choice of subjects that will enhance their cultural side, such as foreign languages, art, music, and even cinema. But their education does not stop there. A comprehensive high school also offers students an opportunity to develop life skills. Diverse extracurricular activities like Math Club, Photography Club, Outdoor Adventure Club, and Latin Dance Club give students an opportunity to practice their social skills while honing their specific interests. Organized athletic programs allow them to practice their competitive skills and achieve their personal best. Truly, a comprehensive high school can offer many things to students eager to take advantage of the array of activities offered.

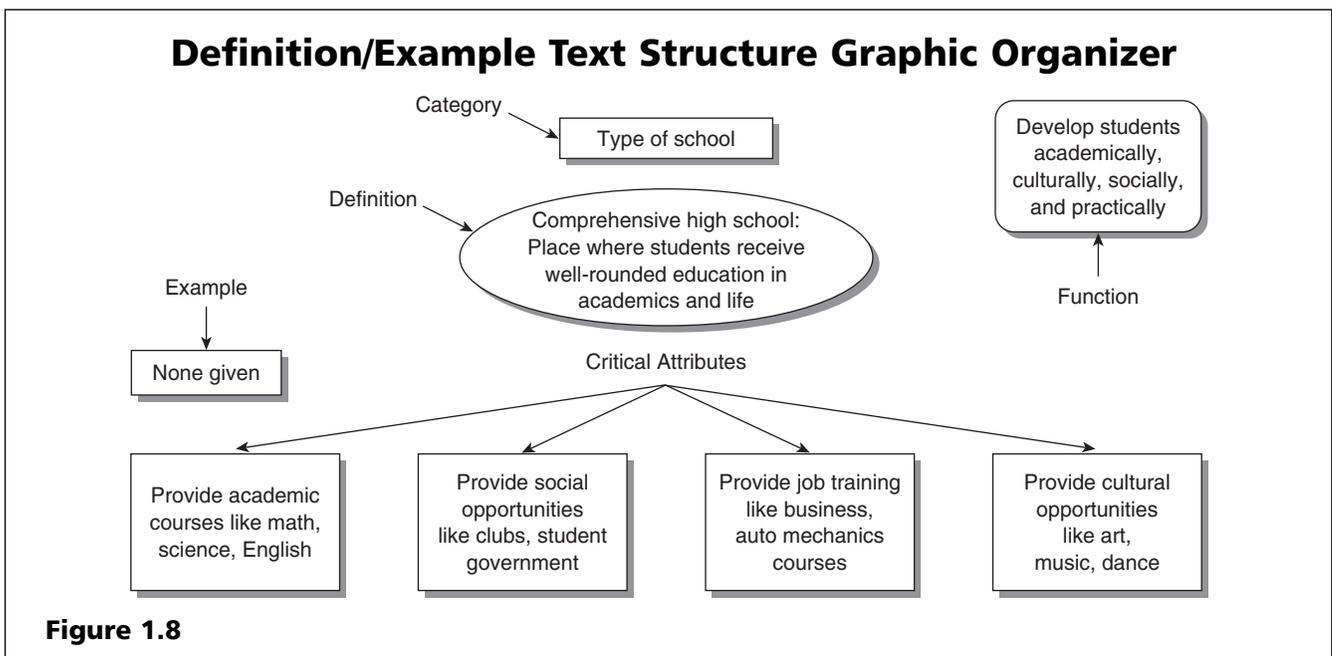


Figure 1.8

Proposition/Support Text Structure

Consider the following questions as you read.

- What is the general topic area or issue?
- What proposition (viewpoint, theory, hypothesis, thesis) is being presented?
- How is the proposition being supported?
- Are examples provided? Do the examples support the proposition?
- Are data provided? Do the data support the proposition?
- Is expert verification provided? Does it support the proposition?
- Is a logical argument provided? Does it support the proposition?
- Is a sufficient case presented to warrant acceptance of the proposition?

In addition, have students look for the following key words: *first, second, third, then, next, another, in addition, at last, in conclusion, before, after, later, in the beginning, in the end.*

See the following for a useful example of proposition/support text structure.

Four Years of Fun

There are many reasons why high school can be an enjoyable experience for adolescents. First, even though teens must attend classes, passing in the halls between those classes can provide opportunities for seeing friends and sharing a few minutes of gossip, jokes, or moral support. Next, lunch provides a much needed break in a busy day. During a lunch break of close to an hour, friends can eat, talk, relax, laugh, and even help each other with a little bit of last-minute homework. It is also a perfect time to find out what algebra homework was assigned or, even more importantly, how hard the chemistry test was! And, best of all, the cafeteria is the place where all the candy and pop machines are; junk food can make any experience loads of fun. Last, but not least, are the afterschool activities. When the long academic day ends, some students eagerly look forward to athletic practices, club meetings, and play or band practice. Many students fill their weekends with athletic competitions and concerts and dances. There is no doubt in my mind: High school is fun and getting better every day!

**Example of
Proposition/
Support Text
Structure**

Proposition/Support Text Structure Graphic Organizer

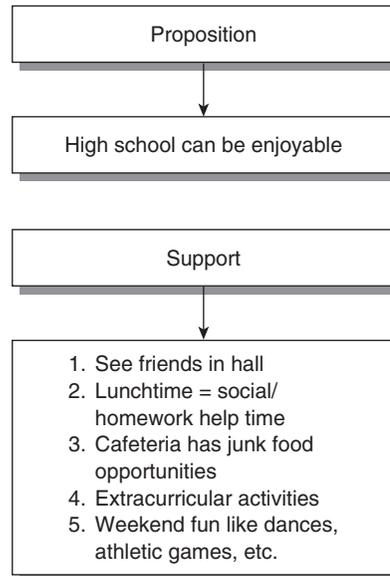


Figure 1.9

Comparison/Contrast Text Structure

Consider the following questions as you read.

- What is being compared/contrasted?
- What categories of characteristics or attributes are used to compare/contrast these things?
- How are things alike or similar?
- How are the things not alike or different?
- What are the most important qualities or attributes that make them similar?
- What are the most important qualities or attributes that make them different?
- In terms of the qualities that are most important, are these things more alike or more different?
- What can we conclude about these things or items?

Source: Comparison/Contrast Text Structure Questions from *Classroom Strategies for Interactive Learning* by Doug Buehl, © 1995 Wisconsin State Reading Association. Reprinted with permission.

In addition, have students look for the following key words: *similarly, on the one hand, on the other hand, but, in contrast, in the same vein, as opposed, either . . . or.*

See the following for a useful example of contrast text structure.

A World Apart

There are many differences between middle school and high school. The biggest difference is in the number of people who attend each. Most middle schools have a hundred or so students, while most public high schools that draw students from many districts have a thousand or more. Another difference is the teachers. High school teachers expect the majority of their students to be independent learners who can turn in quality work. Middle school teachers often allow students a bit more leeway and are more available to give help. They often allow students to revise their work until it meets certain standards. Finally, grades are another area where the two schools differ. In middle school, students are urged to do well, but college acceptance does not hinge on middle school grades. However, in high school, grades really count because they determine whether or not students will get into the colleges of their choice. All in all, middle school and high school are two different worlds.

Example of Contrast Text Structure

Notice how high school and middle school are compared in the following.

Common Ground

While many students feel that middle school and high school are very different, I feel that they really have a lot in common. First, both have students who must attend classes and meet certain requirements to eventually graduate. These students, no matter which school they attend, usually go to school for about the same length of time each year. Next, both schools offer choices of classes, various kinds of clubs, and many athletic programs. Social activities are available to both middle and high schoolers. In both these settings, students mingle together in the hall, stop and chat at their lockers, and join in long conversations over lunch or snacks in the cafeteria for at least 45 minutes every day. While middle schools and high schools may appear different to some, I think they are really a lot alike.

Example of Comparison/ Contrast Text Structure

Comparison/Contrast Text Structure Graphic Organizer

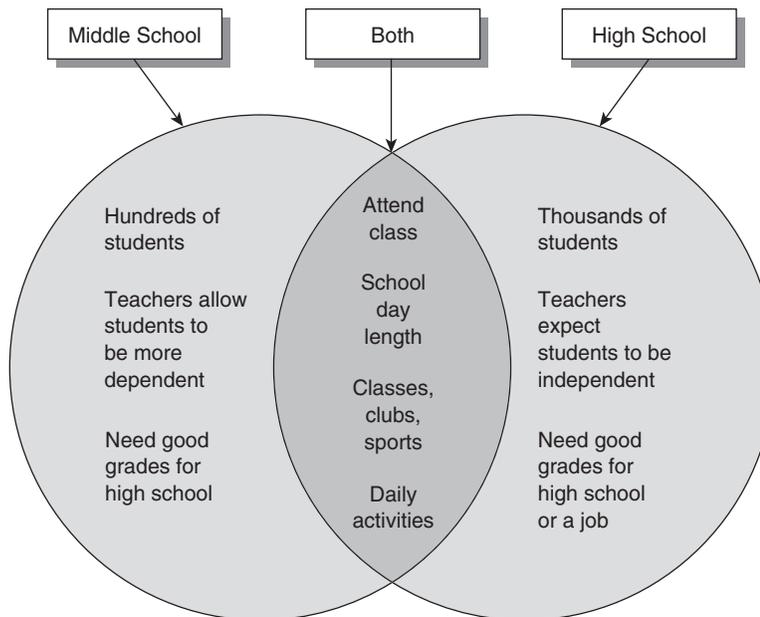


Figure 1.10

Cause/Effect Text Structure

Consider the following questions as you read.

- What is it that happens?
- What causes it to happen?
- What are the important elements or facts that cause this effect?
- How do these factors or elements interrelate?
- Will this result always happen from these causes? Why or why not?
- How would the result change if the elements or factors were different?

Also, have students look for the following key words: *if, then, consequently, hence, because, as a result, therefore.*

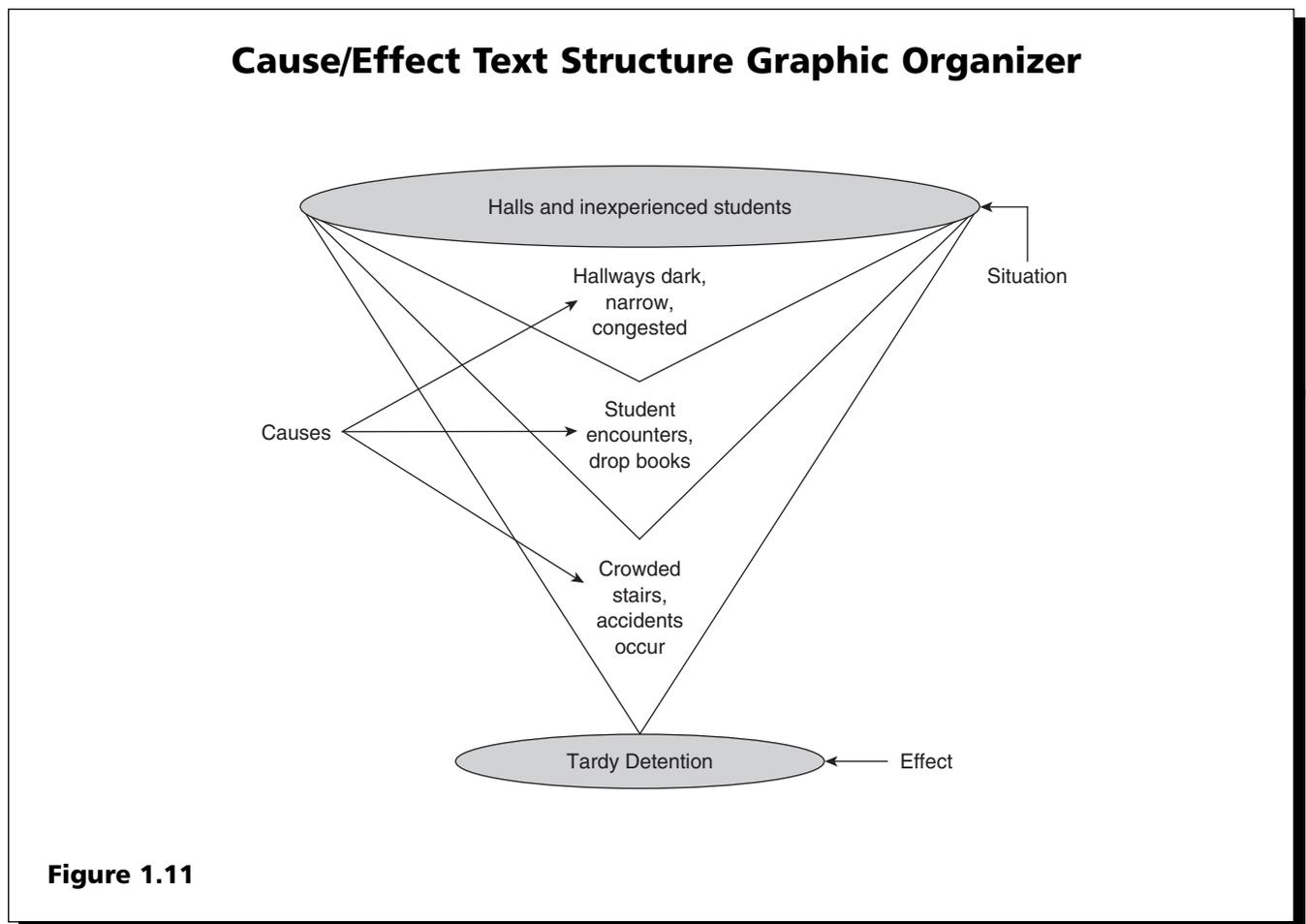
Following is an example of cause/effect text structure.

Source: Cause/Effect Text Structure Questions from *Classroom Strategies for Interactive Learning* by Doug Buehl, © 1995 Wisconsin State Reading Association. Reprinted with permission.

Traffic Alert

Hallways can provide many problems for new, inexperienced high school students or transfer students. First, most high school hallways are dark and narrow with heavy hall traffic. Therefore, much congestion occurs during passing periods. This congestion can cause students to drop their books, fall, or even run into other students, which could trigger a shoving match or even a fight. But that is a minor problem compared to what happens when the hallway ends in a stairwell. Now the congestion problem is compounded as students try to push their way down the stairs. In addition to an accident happening, students often face the ultimate problem: being late for class because they could not get down the stairs, through the next crowded hallway, and into their respective classrooms. While dropping books, falling, or fighting are all big problems, they pale in comparison to a Tardy Detention, given after several late arrivals. Unfortunately, sometimes there is no easy way to avoid being late to class!

Example of Cause/Effect Text Structure



Problem/Solution Text Structure

Consider the following questions as you read.

- What is the problem?
- Who has the problem?
- What is causing the problem?
- What are the effects of the problem?
- Who is trying to solve the problem?
- What solutions are recommended or attempted?
- What results from these solutions?
- Is the problem solved?
- Do any complications develop because of the solutions?

In addition, have students look for the following key words: *however, therefore, in addition*.

See how a writer handles problem/solution text structure in the following.

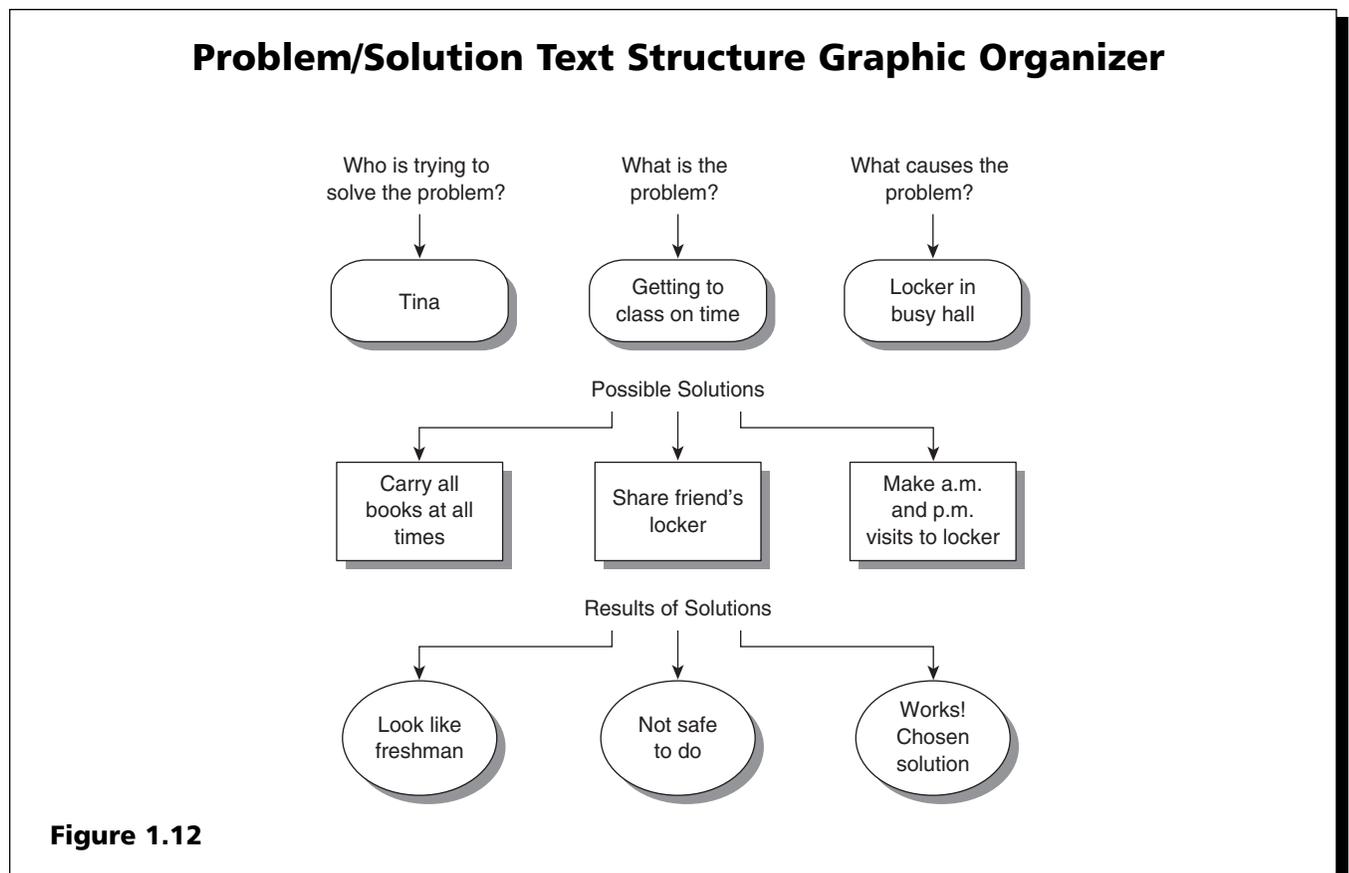
Example of Problem/Solution Text Structure

A Daily Dilemma

Tina is having a problem. She is a freshman in high school, and she does not know how she is going to make it to class on time because she is stuck with a locker right by the main entrance, which is a long, long distance from all of the rest of her classes. Because she is a very bright teen, however, she quickly realizes that she can't possibly visit her locker after every class. What, then, will she do? Well, she really has three options. First, she can opt to carry all of her books for all of her classes around with her all day long. But that is not very appealing. She doesn't want to look like a freshman, which she surely will if she drags every single book and paper around with her. Another option is to find some friends who have lockers close to her classes and store the appropriate books for those classes in their lockers. But this may not work either, since she will have to store her belongings in a locker whose combination is known to at least one other person and maybe even more. That does not make for a very safe situation for storing valuable textbooks and even more valuable homework assignments. So Tina seizes on the last option: She will carry all the possessions she needs for her morning classes with her and then visit her locker at lunch when she has more time. During that visit, she will gather all her afternoon possessions

Source: Problem/Solution Text Structure Questions from *Classroom Strategies for Interactive Learning* by Doug Buehl, © 1995 Wisconsin State Reading Association. Reprinted with permission.

and finish the day carrying them. While this may not be Tina's ideal plan of action, it will work, and it will prevent her from receiving a dreaded Tardy Detention!



Text Structure Strategy

As noted earlier, knowing the structure of a passage greatly facilitates comprehension. Readence, Bean, and Baldwin (2004) suggest a simple procedure to help students learn expository text structure.

Steps to Recognize Expository Text Structure

1. Model the strategy for students by showing students a particular text structure and explaining why it is a certain type and how that type is organized. Making use of the specific questions and graphic organizers illustrative of each type detailed above will facilitate this.

2. Next, walk students through a practice session wherein they utilize the specific questions that signal each text structure pattern to determine the type being read. Making use of this second step allows the teacher to gradually shift the responsibility of learning about text structures from the teacher to the student (Gradual Release of Responsibility Model).
3. Finally, after students have become proficient at identifying specific text structure patterns, they should produce examples of the various structures on their own. Again, utilizing the specific questions and graphic organizers illustrative of each type detailed above will facilitate the process. In addition, Computer Connection 1 below will also help students foster the students' knowledge and use of text structure patterns.

CHAPTER SUMMARY

Chapter 1 discusses the importance of matching the reader with the text to be read and suggests different methods to assess students' ability to do this. Various readability formulas are provided as well as two specific strategies, the Question-Answer Relationships Strategy (QARS) and the Content Area Reading Inventory (CARI), to help students interpret their texts. The chapter also presents five patterns of text structure: (1) definition/example, (2) proposition/support, (3) comparison/contrast, (4) cause/effect, and (5) problem/solution, with accompanying examples and graphic organizers. Students need to identify these five patterns to comprehend content area textbooks effectively.

COMPUTER CONNECTIONS

1. As a review procedure, place students in groups of five and assign to them a section of the chapter to be read. After reading the section, have students draw lots to choose one of the five types of paragraph patterns discussed in the chapter and, using the computer, compose a paragraph highlighting the important points of the section using the pattern of organization they drew. Students then read their paragraphs to the group (or the entire class) and challenge their classmates to identify the pattern of organization used.
2. Individually or in pairs or a small group, students self-select a topic to research and locate articles using the Internet. Students will read the articles and identify the text structure the author used to write each

article. Next, students will use Microsoft Word or Inspiration to create a graphic organizer to illustrate the major concepts of the article as well as its structure. Finally, students will combine their information into a spreadsheet, using Excel, to summarize the various text structures found and what content disciplines they represented.

3. Place students in groups and assign a different section of the chapter to each group. When the groups have completed reading their assigned sections, have them create three to five questions based on the reading for each of the four QARS types on the computer. Create a file of these questions so that students may use them as a review or you can use them as a form of assessment.
4. Using Microsoft Word or WordPerfect, have students calculate a readability estimate on one of the texts they use in their content area classes.

TEACHER TIPS

1. Use the Raygor Readability Graph, Figure 1.13, to determine the readability of your text.

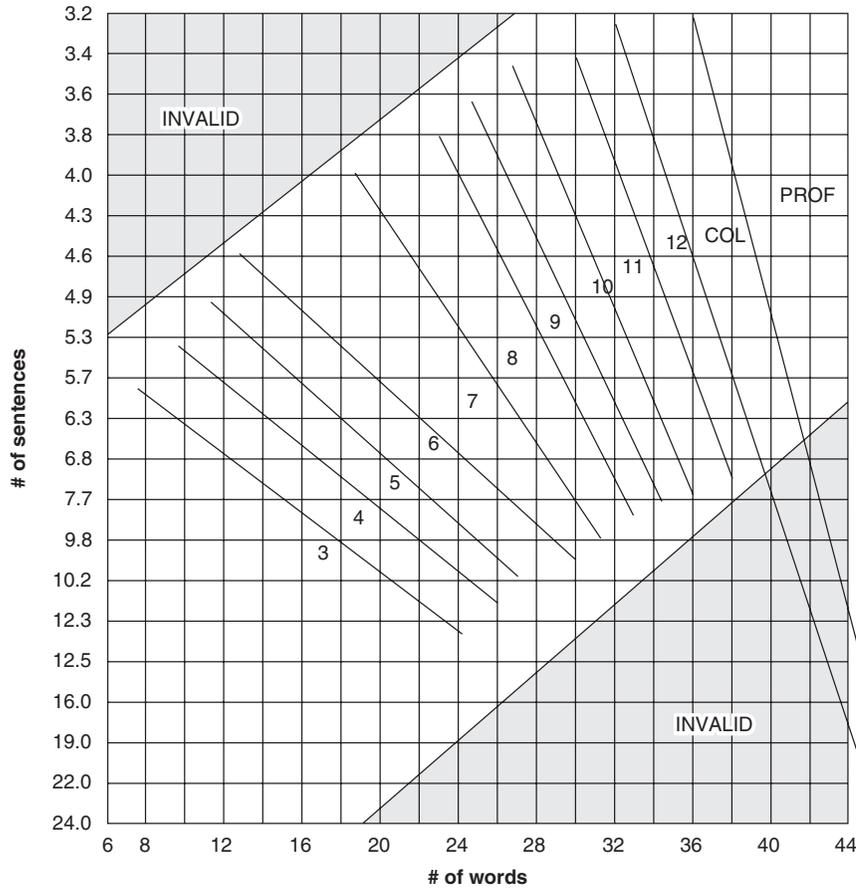
Directions: Choose three 100-word passages, one at the beginning, one in the middle, and one at the end of the textbook. In the count, include proper nouns, but do not include numbers. Then follow these steps:

- a. Count the number of sentences in each passage, estimating to the nearest tenth.
- b. Count the words that have six or more letters.
- c. Average the sentence length and the word length over three samples. Then plot the average on the graph.

Raygor Readability Graph

Directions: Choose three 100-word passages, one at the beginning, one in the middle, and one at the end of the textbook. In the count, include proper nouns, but do not include numbers. Then follow these steps:

- a. Count the number of sentences in each passage, estimating to the nearest tenth.
- b. Count the words that have six or more letters.
- c. Average the sentence length and the word length over three samples. Then plot the average on the graph.



<i>Worksheet:</i>	<i>Sentences</i>	<i>Number of Words</i>
Sample A	_____	_____
Sample B	_____	_____
Sample C	_____	_____
TOTAL	_____	_____
AVERAGE	_____	_____

Figure 1.13

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