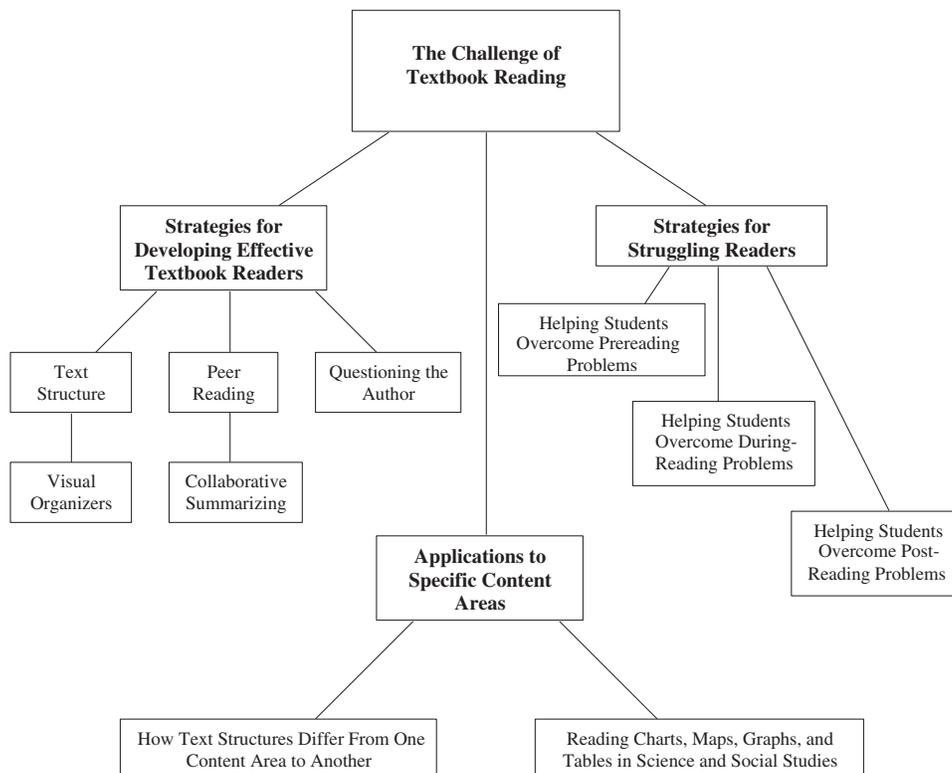


The Challenge of Textbook Reading



Like it or not, textbooks are here to stay. Even as technology changes the nature of nonfiction reading into a multisensory, multitext experience, the textbook—that single, hardbound, seemingly complete container of a year’s worth of content—remains a constant. In fact, recent studies show that more than two-thirds of all instruction is structured or guided by textbooks (Woodward & Elliott, 1990). Even if we chose to reject textbooks completely—cast them aside as biased, or poorly written, or demotivating—it turns out that we would be doing our students a disservice in preparing them for college, where the first-year student is asked to read, on average, eighty pages per class per week, with most of the load coming from textbooks (Carson, Chase, Gibson, & Hargrove, 1992). In these case study college classes, it was the implicit expectation of the professors that students would be able to organize textbook information effectively so it could be used later. Add to this all the technical manuals, how-to resources, and informational material we read at work, at home, and online, and the importance of textbook reading becomes even clearer. Obviously, with so much riding on their futures, students need to become effective and strategic textbook readers.

Overcoming the Image of the Textbook

Do you remember your own experiences with textbooks when you were a student? For most of us, these experiences were neither pleasant nor particularly memorable. Our textbooks contained information—lots of information—and it was expected that we would be able to remember at least some of this information for tests and quizzes. But for some of us, the textbook experience was far worse than simply prosaic; textbooks were nightmares of information that never stopped coming. Trying to differentiate the important information from the not-so-important information, attempting to make sense of tables and diagrams that were sandwiched into text, keeping track of all the new vocabulary words, doing our best to thwart boredom and lagging attention spans—these are the associations many of us and many of our students have.

Thus, a big part of teaching students the skills involved in textbook reading lies in overcoming their perceptions of the textbook. For we can be certain that if our own associations of textbooks are negative, yet we continue to use them in roughly the same way that our teachers did, then our students are similarly bored and frustrated in our classrooms. In general, overcoming the image of the textbook means developing a curriculum that

- Uses the textbook to enrich teaching and learning but does not rely on it to drive teaching and learning
- Balances textbook reading with other sources of information, including primary documents, periodical and journal articles, and texts that provide different perspectives

- Incorporates, when possible, Internet- or technology-based reading and research that, through its plurality of media, enriches and enlivens the classroom while it develops essential research and information-management skills
- Encourages students to read the textbook critically, discussing potential biases, poorly written passages, and difficulties in understanding

From the standpoint of instruction, two critical shifts are required to turn students into successful textbook readers:

1. Because textbook reading is so often difficult for students, the teacher should model and teach the skills and strategies students will need to address specific kinds of reading difficulties.
2. Because students will need to apply these skills throughout their academic and vocational careers, the teacher should promote student independence and growth by gradually shifting responsibility for these skills and strategies to students.

Why Are Textbooks Hard to Read?

Four commonly cited answers to this question follow:

1. *Text structure.* Often, the overriding pattern used to arrange the part-to-whole or big-idea-to-subtopic relationships is invisible to students. Lacking a big picture to work from makes it unlikely that students will be able to extract the essential information from their reading.

2. *Information overload.* Textbook prose is saturated with information: facts, names, equations, battles, chemical processes, figures, diagrams, charts, old concepts, new concepts, familiar vocabulary, unfamiliar vocabulary. Without a strategic approach for managing this flood of information, many students lose their way through the text as well as their motivation to keep pushing forward.

3. *The “authority” of the textbook.* Despite the shortcomings of textbooks, most students believe that the information and writing inside them are unassailable. This perceived authority of the textbook can disarm students, turning their questions into passive nods of acceptance. It is almost as if textbooks somehow hide the fact that they—like all texts—are written by people who can hold biases, write poorly and unclearly, and leave out important information and whose methods of presenting information must be actively questioned by readers. Thus, turning students into active textbook readers means helping them conduct critical examinations of their textbooks.

4. *New vocabulary and concepts that are disconnected from experience and prior knowledge.* Countless studies of both proficient and poor readers show that the ability to integrate the new with the old, to tap into prior knowledge and to use it to illuminate new ideas, is a key to reading well. Textbooks, however, make this skill especially difficult because they contain so much information that, in many cases, seems to make no connection to what the students already know. The preponderance of new concepts and new vocabulary requires students to look for other ways to make their reading meaningful.

The next section of this chapter contains a set of strategies designed to help students overcome each of these difficulties. (Because vocabulary is such a common and pervasive issue in all secondary classrooms, we have devoted a separate chapter to managing and mastering vocabulary.)

Text Structure and Visual Organizers help students to recognize common text patterns and graphically arrange important information.

Peer Reading and Collaborative Summarizing teach students how to manage large amounts of information, discriminate between essential and nonessential information, and condense reading into powerful summaries.

Questioning the Author teaches students how to “interrogate” a text and construct meaningful interpretations of textbook passages and chapters.

After the strategies, you will find a section titled *Applications to Specific Content Areas*, which highlights the issues of discipline-specific text structures and the preponderance of graphics in social studies and science. Last, in a section titled *Strategies for Struggling Readers*, you will find tips, suggestions, and strategic approaches to assisting readers before, during, and after reading.

Strategies for Developing Effective Textbook Readers

Text Structure and Visual Organizers

Overview

A common impediment to textbook readers is the inability to “see” a text’s structure. Without understanding the underlying pattern, students have trouble understanding how information is connected, and the text can become a meaningless stew. This strategy teaches students how to identify text structure and use visual organizers to expose the critical relationships within a reading.

Steps in Implementation

1. Explain and model how to use a graphic organizer to record essential information from a text. Show students how to identify text structure and choose visual organizers that complement the text structure.

2. Distribute copies of the sample organizer to each student in the class (reproducible versions of the most common organizer structures are included at the end of this strategy). Address student questions on the use of the organizer.
3. Allow students time to read and record information on their organizers. Observe students' progress, and help those who may be having difficulty.
4. When students have finished, conduct a review session with the whole class to make sure all students have recorded the essential information from the reading and have used the organizers correctly.
5. Assign students a culminating or processing activity that will allow them to use their organizers. For example, you could ask students to write an essay, create and explain a metaphor, create a time line, or build a model.
6. Guide students toward selecting (or even designing) organizers to complement any text structure they may encounter. The ultimate goal of the strategy is for students to identify text structure and use organizers independently.

Strategy in the Classroom

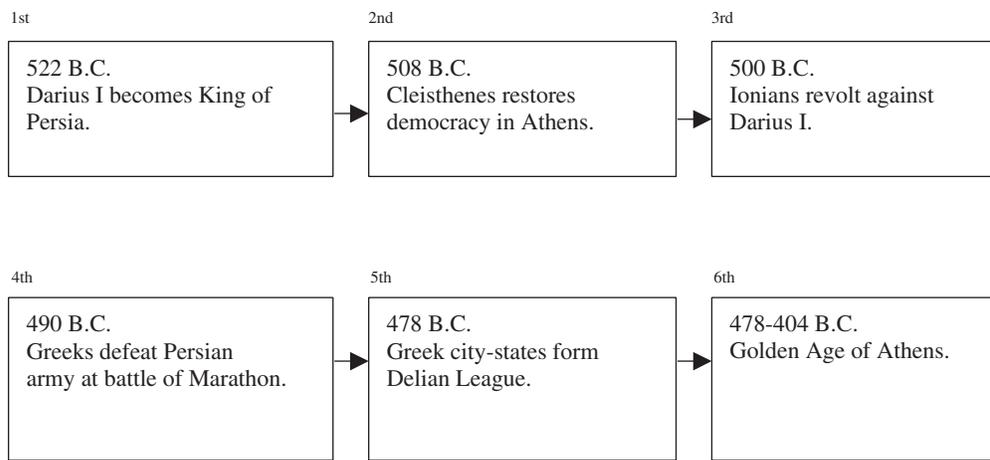
Here's an example of this strategy in action: Robert Gilman has begun a unit on Ancient Greece with his ninth-grade World History class. He wants his students to understand the series of events that led to the Golden Age of Athens, a period that helped shape the Western world.

Robert says,

Some people see history as isolated events occurring at a certain time in a certain place. A good historian, however, knows that events never occur in isolation but are part of a sequence of events that shape history. The next section in our book deals with a series of events known as the Persian Wars that eventually led to the Golden Age of Athens. As you read, I want you to pay particular attention to how events build upon one another to create the picture of an age.

Robert then distributes the sequence organizers the students will use to record the key events and ideas during their reading (see Figure 1.1). While his students work, Robert walks around the room observing them, making sure they understand how to use the organizer to extract the essential information from the text. When the students are finished, he conducts a review of key ideas and events on the board. Once the review is complete, Robert asks his students to use their organizers to write a short essay that examines the question, "Would the Golden Age of Athens have happened without the Persian Wars?"

Here's another example: In her biology class, Marcy Jackson has decided to use a topic organizer to help her students understand and remember the parts and functions of a cell. She begins by giving her students a quick introductory lecture on the concept of the cell, relating its parts and functions to the parts and

Figure 1.1. The Golden Age of Athens

functions of the human body. She explains to her students that they will be reading a section in their book that is filled with information, most of which will be unfamiliar to them.

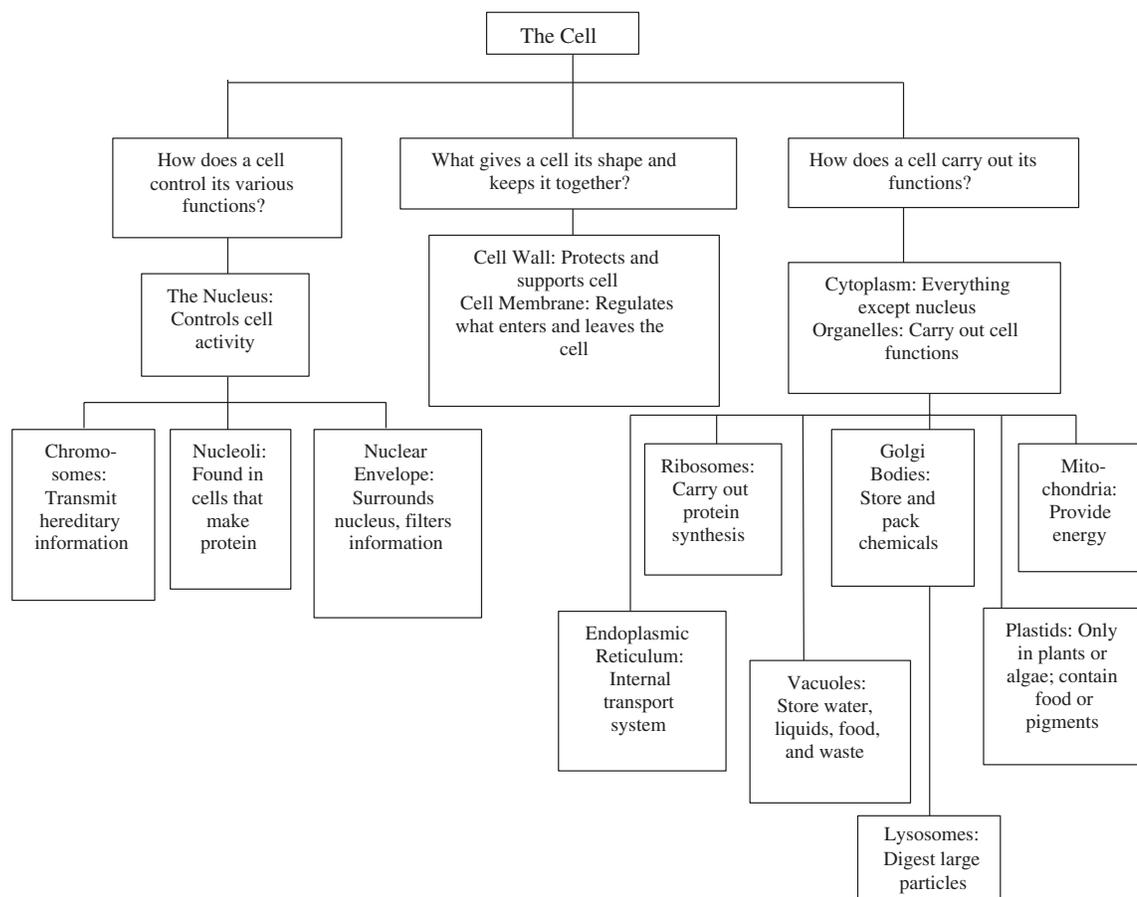
Marcy explains:

It's easy to feel overwhelmed by all the information that you are going to find in this section. There will be plenty of new vocabulary that you've probably never come across before. I would like all of you to know the parts and functions of a cell by the end of this unit, but I also want you to understand how these parts affect each other and interact. I think if you know how a cell works instead of simply memorizing its parts, your understanding will be comprehensive.

Marcy then goes on to show her students how to use a topic organizer to show hierarchical relationships and connections between terms and ideas (see Figure 1.2). As her students work, she circulates through the room helping those who have difficulty using the organizer or picking out key ideas. When they have finished, she conducts a class review to make sure everyone's organizer has all the essential information. As a culminating activity, Marcy asks her students to use their organizers to explore the metaphor How is a cell like a city? Students relate parts of the cell to parts or departments in a city and justify their metaphors with detailed explanations.

Why the Strategy Works (What the Research Says)

Textbooks are designed to hold vast amounts of information, often covering entire disciplines, such as biology, or thousands of years of Western history in a

Figure 1.2. The Cell

single volume. In an effort to make an overwhelming amount of information manageable and the content more accessible, textbook editors and nonfiction writers use various text structures. Yet for many students, especially average and struggling students, these structures are invisible. Think of this problem as the difference between trying to find a knife in a junk drawer versus trying to find a knife in an organized silverware drawer. To the student who can't see text structure, every text looks like a junk drawer.

Compounding this problem is the fact that most students are exposed to the structure of fiction texts and narrative in elementary grades, but they get little training in nonfiction structures. This lack of familiarity with nonfiction structures makes seeing organizational patterns doubly difficult. Addressing this problem means helping students learn to see how texts are organized and how to extract the essential information from each type of structure (Just & Carpenter, 1987).

Text structure can change any number of times in a given reading, yet most structures fall into six basic formats:

- *Comparison structures* examine the similarities and differences between two or more events, ideas, concepts, people, and so on.
- *Time line or sequence structures* present the chronological order of events or place a list of procedures or steps in a comprehensible order.
- *Topic description structures* relate facts, ideas, events, and so on in simple lists, one after the other, often in order of importance.
- *Cycle structures* represent patterns or trends in ideas, events, or concepts that often end where they began.
- *Problem-solution structures* set up problems, explain their solutions, and discuss the effects of the solution.
- *Cause-and-effect structures* present the causal relationship between a given event, idea, or concept and the events, ideas, or concepts that follow.

These are by no means the only structures students will encounter. A more comprehensive list of content-specific text structures appears later in this chapter. The six structures listed, however, are those most commonly found in textbooks today. For this reason, we have created reproducible organizers for each of these structures, which you'll find at the end of this section.

Once the teacher has modeled each type of text structure, students can follow the pattern of organization to extract important ideas, concepts, and events. To do this well, students must be taught to look for cues or signal words that alert readers to the structure. For example, in a text presenting a sequence of events or steps, students may find many of the following words: first, second, third, finally, last, now, then, next, while. (See reproducible sample organizers for signal words associated with each type of structure.) Of course, practice in identifying different structures and whole-class discussions on problems and insights will help students gain independence.

Students who can identify text structure can then use visual organizers that mirror that structure to record essential information they take from the text. According to Marzano, Gaddy, and Dean (2000), visual organizers make information memorable by presenting it in both linguistic and nonlinguistic modes. In other words, information is both visually structured according to the pattern of the organizer and concisely condensed into words for deep comprehension and easier memorization. Resources 1.1 through 1.6 are reproducible examples of various organizers.

Resource 1.1. Comparison Organizer

Name: _____

Comparison Organizer	
Differences	Differences
Similarities	

Signal words: on one hand, similarly, but, then, either ... or

Resource 1.2. Sequence Organizer

Name: _____

Sequence Organizer		
First	Second	Third
Fourth	Fifth	Sixth
Signal words: now, then, first, second, next, finally, while		

Resource 1.3. Topic Description Organizer

Name: _____

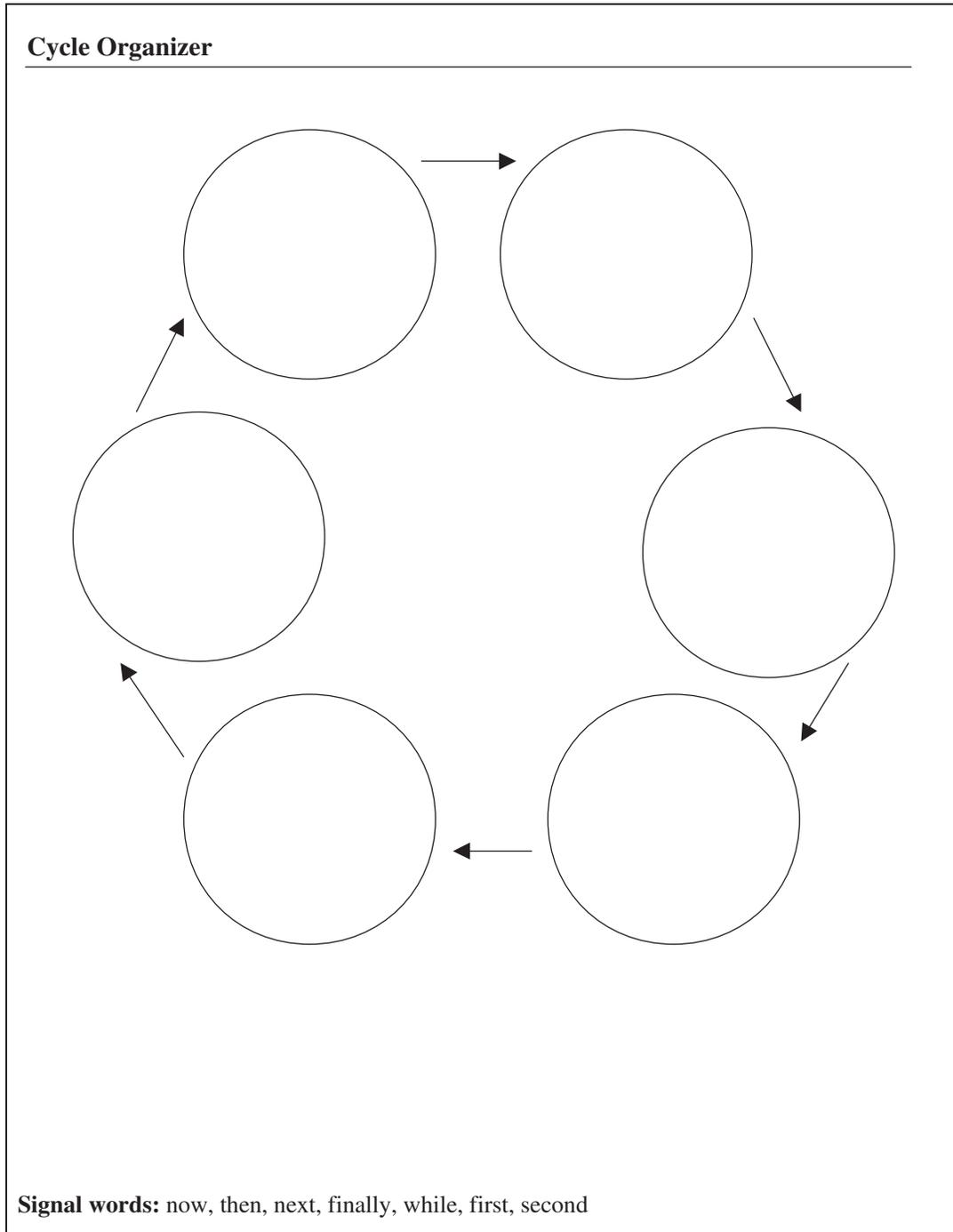
Topic Description Organizer

```
graph TD; Topic[Topic] --- Subtopic1[Subtopic]; Topic --- Subtopic2[Subtopic]; Topic --- Subtopic3[Subtopic]; Subtopic1 --> Details1[Details]; Subtopic2 --> Details2[Details]; Subtopic3 --> Details3[Details];
```

Signal words: generally, most important, in fact, specifically, for instance, for example

Resource 1.4. Cycle Organizer

Name: _____



Resource 1.5. Problem-Solution Organizer

Name: _____

Problem/Solution Organizer

Problem	Solution	Effect

Signal words: since, as a result, this led to, because, so, if ... then

Resource 1.6. Cause-Effect Organizer

Name: _____

The image contains four identical cause-effect organizer triangles arranged in a 2x2 grid. Each triangle is oriented with its apex at the top. The left side of each triangle is labeled "Cause:", the right side is labeled "Effect:", and the bottom side is labeled "Conclusion:". The triangles are empty, intended for students to write their own cause, effect, and conclusion.

Peer Reading

Overview

Because textbooks are so densely packed with information, many students feel overwhelmed, lost in a sea of words and disconnected ideas. *Peer Reading* is a partnering technique that teaches students how to break down a reading into manageable chunks, use questions to focus on essential information, and distill a reading into a concise summary.

Steps in Implementation

1. Select a reading and break it down into three or four smaller sections. Create questions for each section that focus student reading toward important information and record them on the Peer Reading Coaching Sheet (a sample Peer Reading Coaching Sheet is shown in the upcoming classroom example).
2. Pair students up, and assign each member of each pair a letter, A or B. Explain that both students will read each section and then will alternate roles as coach and oral summarizer (Reader A will use his or her notes to coach Reader B to a complete summary of the section and vice versa).
3. Have students continue to reverse roles as coach and summarizer until all questions on the Peer Reading Coaching Sheet are answered.
4. Ask students to work in their pairs to summarize the entire reading using their notes and marked texts.
5. As students become comfortable with Peer Reading, encourage them to chunk and question on their own, as a way of managing textual overload.

How the Strategy Works in the Classroom

In Jerry Kendal's tenth-grade psychology class, students have been studying human development. His students are about to read a section in their textbooks about Piaget's theories of childhood development. Based on the last writing assignment, Jerry realizes that his students are having trouble extracting essential information from their textbooks. In response, he has decided to use Peer Reading to slow down the reading process of his students so they can gain greater control over the information. He splits a four-page passage on Piaget into four readings of relatively equal length. He asks his students to pair up and assigns each member of each pair either a letter A or B. Jerry then introduces the class to the coaching sheet they will use to complete the reading (see Figure 1.3).

Student pair Paul and Jenny begin by reading the first passage independently. As they read, both students use the summarizing questions on their coaching sheets to take notes and record what they believe to be central ideas and important facts or details. They also note any new vocabulary they may encounter. When both students have finished the passage, Paul (Reader A) takes

Figure 1.3. Peer Reading Coaching Sheet

Peer Reading Coaching Sheet
<p>Section 1 questions (Reader A)</p> <ol style="list-style-type: none">1. According to Piaget, where do the roots of knowledge lie?2. What are the first two stages of childhood development?
<p>Section 2 questions (Reader B)</p> <ol style="list-style-type: none">1. What are the last two stages of development?2. Why is it important that children “transcend egocentrism”?
<p>Section 3 questions (Reader A)</p> <ol style="list-style-type: none">1. What can adolescents in the last stage of development do that younger children cannot?2. How are assimilation and accommodation related?
<p>Section 4 questions (Reader B)</p> <ol style="list-style-type: none">1. What are the major criticisms of Piaget’s theory?2. What do experts consider to be Piaget’s greatest contribution to developmental psychology?

a moment to look over his marked passage and then turns the copy over, while Jenny (Reader B) uses her marked passage to coach Paul to complete answers to the questions under “Section 1” on the Peer Reading Coaching Sheet:

Jenny: OK. Ready?

Paul: Ready.

Jenny: Question one: According to Piaget, where do the roots of knowledge lie?

Paul: OK, well, Piaget was interested in how a child's experiences shape his development, so the roots of knowledge lie in a child's interaction with the world around him.

Jenny: Good, but there's a simple answer.

Paul: OK, wait . . . uh, was this near the beginning of the passage?

Jenny: Yup.

Paul: Well, they focused quite a bit on action initially . . . that's it, action! The roots of knowledge, according to Piaget, lie in action!

Jenny: Good job! Question two . . .

Once Paul has finished answering the questions under "Section 1," he and Jenny continue on to the second reading. This time, their roles are reversed. Paul (Reader A) becomes the coach, while Jenny (Reader B) turns over her text to answer the questions for Section 2. The partners continue this process for Sections 3 and 4, each time switching roles, until all the questions on the Peer Reading Coaching Sheet have been answered.

Once all the questions have been answered, Paul and Jenny look over their answers to the questions on the coaching sheet and work together to create a summary of Piaget's four stages of cognitive development. Throughout this process, Jerry walks around the room observing his students. He pays special attention to any problems students encounter in trying to answer questions or in creating a summary. Over the next month, as students learn about social development in children, Jerry will teach students how to use this process on their own by chunking the text and asking themselves summarizing questions to determine what is essential information in their reading.

Why the Strategy Works (What the Research Says)

Summarizing is such an old practice that the teaching of the method has yet to catch up with modern educational theory. Traditionally, when a teacher engages a student in a summarizing activity, the expectation is that the student will be able to ignore unnecessary ideas and details, form a more generalized concept, and pick out main ideas or topic sentences from a reading.

The problems with this method of teaching become apparent when we examine the assumed skills these tasks take for granted. Peter Afflerbach and Peter H. Johnston (1986) keenly note that when teachers ask a student to delete unimportant information, they are assuming the student already knows how to extract only the essential information.

Following the findings of research showing how questions help readers focus on essential information and manage longer readings (Just & Carpenter, 1987; Wood, 1986), Silver, Hanson, Strong, and Schwartz (1996) developed the Peer

Reading strategy. This method of reading and summarizing brings the following advantages to the students' learning experience:

- Through oral summary and the support of a coach, students are involved in deep processing of the content.
- The task of summarizing is structured by the use of coaching questions that point students toward essential information.
- Information is extracted from the text in a number of ways, including coaching, taking notes, answering questions, and writing a collaborative summary.
- Students work toward creating their own coaching questions and developing autonomy with the process so they can use the strategy as an independent research tool.

Resource 1.7 shows a sample blank, reproducible Peer Reading coaching sheet.

Collaborative Summarizing: Helping Students Build More Powerful Summaries

Some students may have trouble creating effective summaries, even after they have practiced using Peer Reading. Collaborative Summarizing (Silver, Strong, & Perini, 2001) is a strategy that will help them build confidence and independence with this vital skill. To use Collaborative Summarizing in your classroom, distribute summary sheets (see Resource 1.8) and proceed through the following six steps.

1. Ask students to list three to five ideas that they feel are the most important in the reading.
2. Have students pair up and review the rules for peer negotiation:
 - a. You must use textual evidence to show why an idea is important.
 - b. Do not jump to simple solutions.
 - c. This is not a contest of wills, so avoid win-lose situations.

Ask students to come to an agreement on the three to five most important ideas, using the foregoing rules.

3. Allow each student pair to meet with another pair to renegotiate their list of ideas. Explain that this final list will be the basis for their summary, so they should arrange it in a way that will make sense when written out. For example, one student group created this list for a reading on the role of geometry in Renaissance art:

Resource 1.7. Sample Peer Reading Coaching Sheet

Peer Reading Coaching Sheet
Section 1 questions (Reader A)
Section 2 questions (Reader B)
Section 3 questions (Reader A)
Section 4 questions (Reader B)

- a. Unlike Medieval artists, Renaissance artists wanted to paint objects realistically and accurately.
 - b. Many Renaissance artists turned to geometry to help them paint more realistically.
 - c. They discovered that parallel lines running directly away from the viewer come together at a *vanishing point* on the horizon.
 - d. They used this knowledge to create a three-dimensional effect called *perspective*.
 - e. Raphael, Leonardo da Vinci, and Albrecht Dürer all relied on perspective to create their most famous paintings.
4. Ask students to use their final lists to write their summaries individually.
 5. Have each original team of four meet with another team of four. Students read and discuss their summaries, then develop a set of criteria for creating powerful summaries. Students share and refine these criteria through whole-class discussion.
 6. Over the course of the year, students refer to these criteria to help them create effective summaries of different texts.

A sample reproducible Collaborative Summarizing worksheet is shown in Resource 1.8.

Questioning the Author

Overview

It is not uncommon for students to view textbooks as infallible sources of information. This view, however, fosters a passive approach to reading, where learning is not constructed by the reader and where information is rarely questioned. The strategy called Questioning the Author seeks to make students active participants in constructing meaning and critiquing the way information is presented in textbooks.

Steps in Implementation

1. Explain to students that an author's meaning in a text is not always easy to understand and that authors can sometimes be unclear or write poorly.
2. Have students read a selected text. At critical points during the reading, stop to pose initiating queries that will spark group discussion, such as, "What is the author trying to say here?" or "What does the author want us to understand in this section?"
3. Guide discussion by delving more deeply into the text's meaning or pointing out missing information by posing follow-up queries, such as, "Does the author fully support this statement?" "How does this compare with

what the author said before?” “Is the reason for this explained in the text?”

4. Allow students time to reflect on and discuss the meaning of the text and the process of Questioning the Author.

How the Strategy Works in the Classroom

Alison Quipac’s U.S. History I class is studying the Civil War. Much of the information they have gathered has come from their textbooks, supplementary readings provided by Alison, and documentaries. Alison’s students are about to read a passage in their textbooks about the Emancipation Proclamation, which she feels is unclear. Alison says,

I know I’ve been having you all read your textbooks at home for the past few weeks, but today, I’d like to try something a little different. We’re going to read a passage on the Emancipation Proclamation together, aloud. As we read, I want you to think about what the authors are trying to say and how they are saying it.

Alison then begins to read the passage aloud with her students. She pauses several times during the reading to pose questions that go beyond the literal content of the passage to get at information the authors may have left out or neglected. She sparks discussion in the following manner:

Alison: OK. Let’s pause for a moment. What are the authors trying to say here?

Kareem: They say Lincoln declared that slaves would be free in the South by January 1, 1863.

Alison: Did the authors say slaves would be free in “the South” or were they more specific?

Kareem: They said slaves would be freed in territories controlled by the rebels.

Alison: OK. Kareem has led us to a key phrase here, “territories controlled by the rebels.” Why do the authors use this phrase as opposed to just saying “the South”? Brendan?

Brendan: Well, uh, I think it’s because Union troops controlled areas of the South like, uh, the authors mention Maryland, Missouri, and Kentucky.

Alison: So Brendan is saying that the North actually controlled areas of the South, but Kareem pointed out that Lincoln declared that slaves would be free in rebel-controlled territories in the South by January 1, 1863. So would Lincoln have been able to enforce that proclamation in rebel-controlled territories? Tony?

Tony: No.

Alison: Did the authors of the textbook make that clear? Melissa?

Melissa: Well, not exactly. I mean, they made it sound like the Emancipation Proclamation was, like, a law that would take effect all over the South on January 1, 1863. But that would be like the U.S. government today trying to change the laws in Canada.

Alison: Right. We have no way of enforcing laws in Canada similar to the way Lincoln in the North had no way of enforcing a law in the rebel-controlled territories of the South in 1862.

Alison then goes on to explain to her students the purpose of this activity. She says that while she wants her students to understand the true circumstances surrounding the Emancipation Proclamation, she also wants them to see that textbooks are not perfect. She explains:

Textbooks and other types of nonfiction writing can sometimes be written unclearly or even be missing important information. Whenever you feel confused after reading something, ask yourself what the author is trying to say. It will enable you to see whether what you've read is written unclearly, is missing information, or is assuming you know something that you don't.

Why the Strategy Works (What the Research Says)

Too often in secondary classrooms, textbooks are upheld as ideal sources of information and learning. This is not surprising, considering the extent to which curricula are structured and revolve around textbooks. Without question, textbooks are valuable stores of information from which students can readily pull a wide variety of facts and ideas; however, they are not above criticism.

The Questioning the Author approach, developed by Beck, McKeown, Hamilton, and Kucan (1997), seeks to “depose the authority of the text” (p. 18). Beck and her colleagues noticed that many students who were having difficulties with texts that were unclear, poorly organized, or lacking essential information blamed their difficulties in understanding on their own inadequacies as readers. This, in turn, led to a reduction in students' self-confidence, eventually affecting the learning process across curricula and content areas.

Opening expository texts up to student interrogation encourages students to become involved in what they read. Questioning the Author instills in students the desire to actively construct meaning by interrogating the text. This approach, known as *constructivism*, is based on current research about how our brains and minds make meaning and has been explored by millions of teachers as well as noted researchers, such as Beck and Carpenter (1986), Brooks and Brooks (1999), Bruer (1993), and McGilly (1994).

To encourage active engagement with the text, Questioning the Author uses queries rather than literal questions. Queries are questions that ask students to look for gaps in their comprehension and see if those gaps are addressed by the text. For example, “What is the author trying to say here?” “Is there something the author is not telling us here?” “Do you think this would be more clear if . . . Why?” Queries perform three key functions:

- They guide students during initial reading and throughout the reading process.
- They create confident, constructive readers who are able to wrestle with challenging ideas within a text.
- They shift discussion from a student-teacher dynamic to a student-to-student forum in which authors’ ideas are probed and evaluated.

Applications to Specific Content Areas

How Text Structures Differ From One Content Area to Another

With so much research pointing to the importance of being able to see the organizational patterns of texts (Derewianka, 1990; Dickson, 1995; Just & Carpenter, 1987; Pearson & Comperell, 1994), it seems appropriate to focus on the relationship between specific disciplines and the text structures commonly found in those disciplines’ textbooks. We deal here with the disciplines of science, social studies, and math—the most textbook-driven subject areas.

In general, text structures stretch across several paragraphs of text, sometimes even whole sections of a chapter. The discipline that is the exception is math, where readings tend to come in smaller units and are commonly interrupted by problem sets or demonstrations. Because modeling and practicing using visual organizers has proven to be one of the most effective ways of teaching students how to see a text’s structure, we have outlined the most common text structures in each subject area and provided useful organizers for each structure. To use them in the classroom and build student independence, follow the same steps as those provided for Text Structure and Visual Organizers, discussed earlier.

Common Text Structures in Science

The most common text structures in science textbooks are as follows:

Topic structures, or main idea structures explain a topic or central idea, the main subtopics, and key supporting details; see Figure 1.4.

Figure 1.4. Organizers for Topic or Main Idea Structures in Science Texts

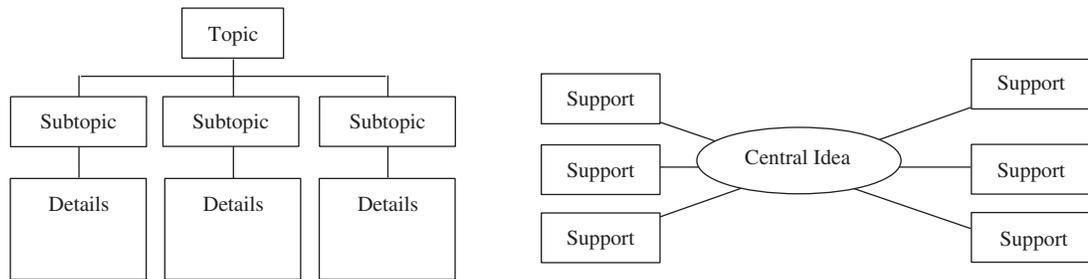


Figure 1.5. An Organizer for a Descriptive Structure in Science Texts

Useful Organizer:

Item	Criteria

Descriptive structures lay out a number of items and the criteria distinguishing each; see Figure 1.5.

Compare-and-contrast or classification structures explain two or more topics simultaneously, highlighting the similarities and differences between them; see Figure 1.6.

Generalization structures describe a general principle or idea (e.g., *a key idea in biological structure is that form fits function*) and the applications of that principle or idea; see Figure 1.7.

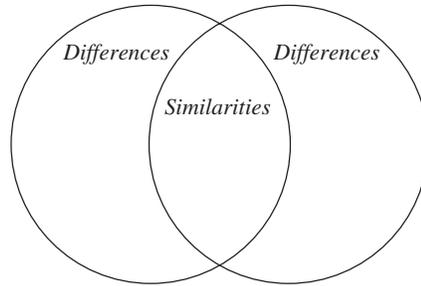
Problem-solution structures identify problems and describe their solutions, and *cause-effect structures* show the relationship between one set of events or ideas and another set of events or ideas; see Figure 1.8.

Process and cycle structures show the steps, phases, or events that make up a larger process; see Figure 1.9.

Figure 1.6. Organizers for Compare-and-Contrast and Classification Structures in Science Texts

Useful Organizers:

Differences	Differences
Similarities	



Topic	Topic	Topic
Characteristic	Characteristic	Characteristic

Figure 1.7. An Organizer for a Generalization Structure in Science Texts

Useful Organizer:

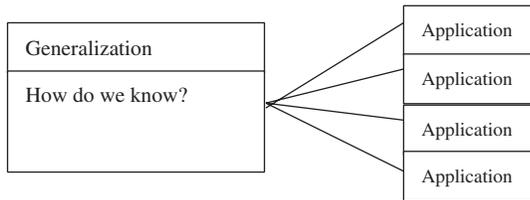


Figure 1.8. Organizers for Problem-Solution and Cause-Effect Structures in Science Texts

Useful Organizers:

Problem	Solution	Result

Cause	Effect

Figure 1.9. Organizers for Process and Cycle Structures in Science Texts

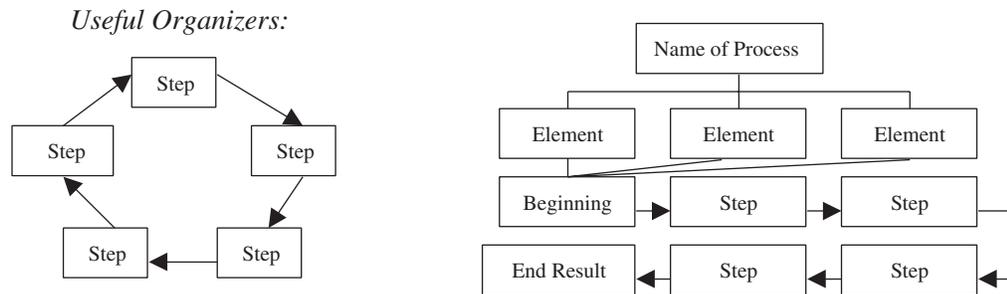
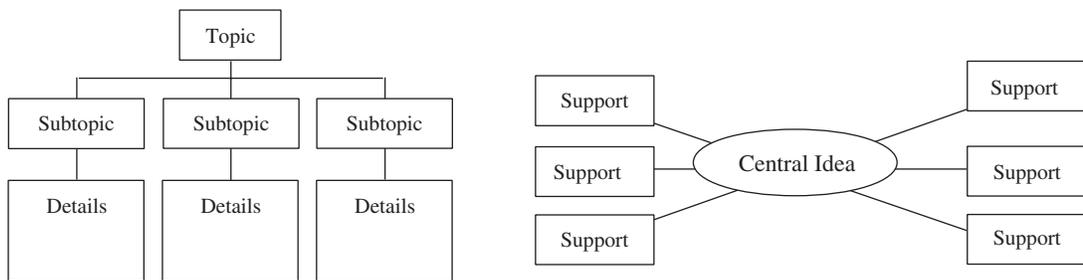


Figure 1.10. Organizers for Topic and Main Idea Structures in Social Studies Texts



Common Text Structures in Social Studies

The most common text structures in social studies textbooks are the following:

Topic structures or main idea structures explain a topic or main idea, the main subtopics, and key supporting details; see Figure 1.10.

Generalization structures describe a general principle or idea (e.g., *the Nile River was central to Egyptian life*) and the applications of that principle or idea; see Figure 1.11.

Sequence structures present a set of related events in chronological order or show how specific events affect history; see Figure 1.12.

Figure 1.11. Organizer for Generalization Structures in Social Studies Texts

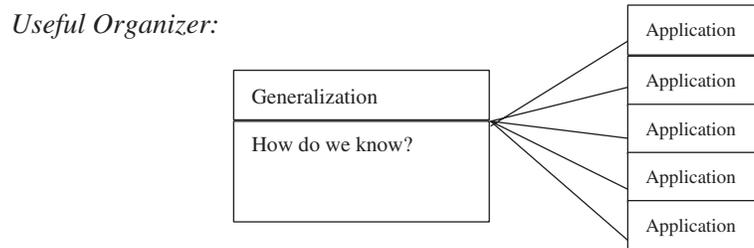
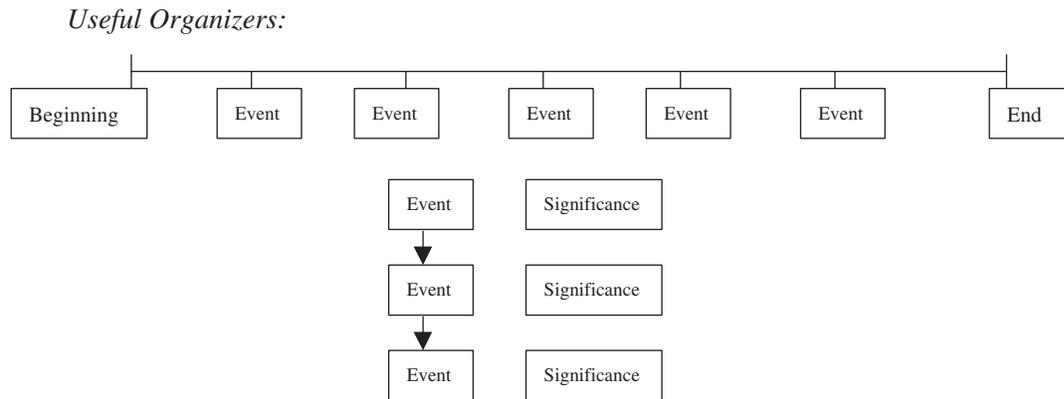


Figure 1.12. Organizers for Sequence Structures in Social Studies Texts



Compare-and-contrast structures set forth similarities and differences between two different items, events, or concepts; see Figure 1.13.

Problem-solution structures identify problems and describe their solutions, *cause-effect structures* show the relationship between one set of events or ideas and another set of events or ideas, and *question-answer structures* ask questions, answer them, and provide details; see Figure 1.14.

Common Text Structures in Math

The most common text structures in math are these:

Concept structures define key concepts and often include questions, formulas, or visual illustrations along the way; see Figure 1.15.

Figure 1.13. Organizers for Compare-and-Contrast Structures in Social Studies Texts

Useful Organizers:

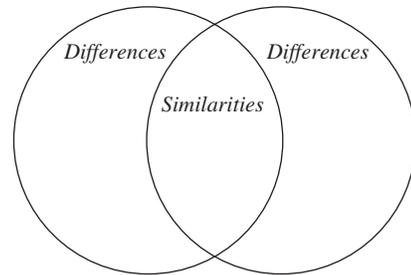
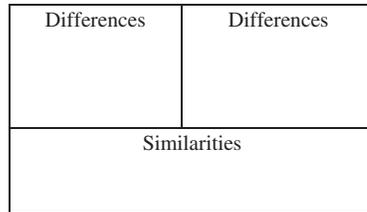


Figure 1.14. Organizers for Problem-Solution, Cause-Effect, and Question-Answer Structures in Social Studies Texts

Useful Organizers:

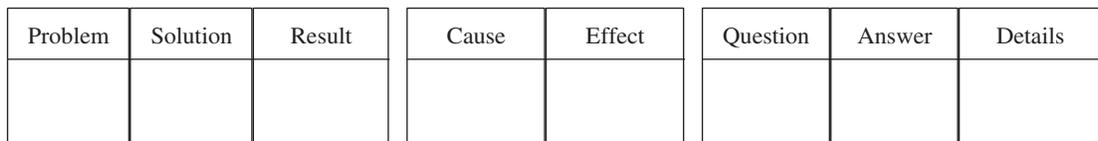
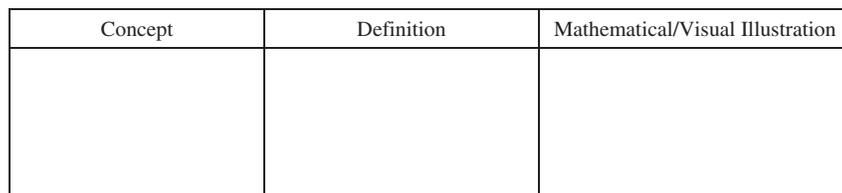


Figure 1.15. Organizer for a Concept Structure in Math Texts

Useful Organizers:



Principle structures explain mathematical generalizations and often use mathematical formulas or visualizations to clarify the principle. Sometimes, real-world applications of the principle are described as well; see Figure 1.16.

Figure 1.16. Organizer for a Principle Structure in Math Texts*Useful Organizer:*

Principle	Explanation	Mathematical/Visual Representation	Application

Figure 1.17. Word Problem Organizer for Math Texts*Useful Organizer:*

What are the facts?	What steps will I take in solving it?
What is the question?	How can I represent the problem visually?
Solution	

Word problem structures ask students to read a problem, set it up in mathematical terms, and solve it; an example of a word problem organizer is shown in Figure 1.17. (See Note Making and Mathematical Problem Solving in Chapter 2 for a note-making system designed to help students solve word problems.)

Reading Charts, Maps, Graphs, and Tables in Science and Social Studies

Textbooks contain a lot of graphic material that can play a central or complementary role in textbook comprehension. Designed to help students better understand the prose they are reading, graphic material often has the opposite effect. Nevertheless, despite the importance of graphic material and the trouble it poses for students, instruction designed to process graphic material is rare (Fry, 1981).

One response to the issue of graphic material in textbooks is to use the *graphic information lesson* (Reinking, 1986). A graphic information lesson moves through three steps:

Step 1: Model with students the use and function of graphic material. Using a textbook, select a graph, table, chart, or map and explain to students how it works in relation to the text (is it central, supplemental, or redundant?). Ask students questions about the graphic material, including literal questions (e.g., How many settlers came to Jamestown in 1618? And how many were left in 1620?), interpretive questions (e.g., What does this astronomical death rate tell us?), and experience-based questions (e.g., Can you think of any other times when the death rate was disproportionately high? What can we learn from those situations?).

Step 2: Present simple graphics to students. Create simple graphic materials or find graphic materials from another text that relates to the textbook section. Ask students to decide whether these graphics are valid or invalid by using specific evidence from the text to justify their decision. Samples of these “homemade” graphics are shown in Figure 1.18.

Step 3: Ask students to synthesize their learning. After students have completed a lesson, they can apply their learning in one of two ways: They can create their own graphic material for the textbook section they have just read or they can evaluate how effectively the textbook’s graphics were used.

Strategies for Struggling Readers

Research shows that students who struggle with textbook reading experience three distinct types of difficulty:

1. *Prereading problems*, such as activating prior knowledge and preparing for the reading
2. *During-reading problems*, such as reading actively and monitoring comprehension
3. *Postreading problems*, such as consolidating and elaborating on their understanding

Each of the strategies presented in this chapter (Visual Organizers, Peer Reading, Questioning the Author) relies on this before-during-after structure to maximize the potential for student success. However, sometimes, students will experience specific difficulties in one or more of these three areas. This section provides tips and reading strategies for addressing each area of difficulty separately.

Figure 1.18. Two Samples of Student-Made Graphics

Average Tobacco Exports From Virginia	
1613	200 lbs.
1616	2,500 lbs.
1617	8,839 lbs.
1618	49,518 lbs.

Letter From Third Governor

Sirs:
 The colony is in great disarray. Only five or six houses are standing. The palisade (fence surrounding the town) has fallen down. The complete store of horses, goats, hens, sheep, and even cats and dogs has disappeared. The church is being used as a storehouse for produce, and every inch of town has been ploughed and planted, including the streets themselves.

Helping Students Overcome Prereading Problems

Provide cues or questions that help students develop a precomprehension grip on what they will be reading and that focus their attention on important information. Simple, single-sentence cues that provide important information and that help students develop a prereading image of the text are good ways to activate prior knowledge. For example, to help students conduct a reading of a textbook section on the development of our understanding of the solar system, a teacher could provide these cues:

- This section is about scientists' attempts to understand planetary motion.
- The scientists we will meet include Ptolemy, Copernicus, Galileo, Kepler, and Newton.
- Thanks to scientists, we now know that the sun is the center of the solar system and that the planets revolve around it.

Similarly, you can provide prereading questions to direct students' attention to essential information:

- What are exponential functions?
- How do they differ from linear functions?
- How are exponential functions used in real life?

Ask students to form predictions before reading. Good readers intuitively make predictions about what a text will be about and then test their predictions against the text as they read. Struggling readers, on the other hand, often begin reading without forming any notion of what a text will be about. Remind students to form prereading predictions. To develop more powerful predictions, encourage them to scan the headings and pictures in the section or chapter, and make sure students understand that there are no wrong predictions. For even greater benefits, have students create prediction organizers to keep track of evidence in the text that supports or refutes their prediction (see Resource 1.9).

Use the Mind's Eye strategy to develop prereading visualizations. Visualization is a powerful entryway into a topic. By using the Mind's Eye strategy (Brownlie & Silver, 1995b, adapted from Escondido School District, 1979), you can help students build rich prereading images of a text's big ideas. Mind's Eye works like this:

Step 1: Select 20 to 30 key words from the text.

Step 2: Read the words slowly to students, one at a time and with feeling. Ask students to construct mental images as you read the words.

Step 3: Ask students to draw a picture, ask a question, make a prediction, or describe a feeling about the text based on the words. Allow students to show their products.

Step 4: Instruct students to read the text, comparing their initial ideas with what they discovered while reading.

Step 5: Encourage students to reflect on the process and the types of thinking they are most comfortable using (e.g., visualization, questioning, exploring feelings, predicting).

Distribute visual organizers in advance. When students see a visual organizer that maps out what they will be reading, it serves as a comprehensive preview of the text. Visual organizers reveal textual structure and help students to see how the big ideas fit together. (See the earlier discussion of Text Structure and Visual Organizers.)

Resource 1.9. Sample Prediction Organizer

My Prediction	Evidence For	Evidence Against	How My Understanding Has Changed

Helping Students Overcome During-Reading Problems

Model and allow students to practice using active reading processes. One of the most important factors in getting students to become active readers is teacher modeling. Show your students how you read a text. List the important steps on the board, and coach students through the process. Using a sample text placed on an overhead, conduct a Think Aloud session, in which you describe the thinking in your head out loud to students while you read actively. Give students practice time, feedback, and support as they practice the skills of active reading.

Using the foregoing suggestions for modeling and practice, directly teach struggling readers how to

- Mark essential information using a keyed set of symbols, such as these:
 - * = This is important.
 - + = This supports what I already knew.
 - = This contradicts what I thought I knew.
 - ? = This is confusing; I have a question about this.
 - ! = This is new information to me.
- Use visual organizers.
- Break a text into chunks and summarize each chunk before moving on.
- Make and monitor predictions.

Adjust levels of support. The basic structure of Peer Reading, in which students read sections of a text together and then stop to review it together, can be used at any time to accommodate struggling readers. What's more, the structure can be adapted to provide more or less support, depending on the student's needs. At a level of reduced support, both students might read the entire section, discuss it together, and summarize it. At a moderate level of support, both students might read the section in chunks and then one partner would coach the other partner through the process of summarizing the section; students then switch roles for the next chunk (summarizer becomes coach, coach becomes summarizer). At a high level of support, one student might read the section aloud to the other student before both students read it silently. After this double processing (listening to the text for the gist, reading the text for comprehension), students would serve as summarizers and coaches as usual. In all cases, encourage students to stop reading periodically to review, ask questions, make predictions, and assess their own understanding before going on.

Use cooperative structures. Help students manage during-reading difficulties by placing them in heterogeneous groups of four to six students. After modeling, allow students to practice and discuss active reading techniques, sharing their

thoughts and ideas on what is difficult and what techniques work best to increase comprehension.

Use Questioning the Author. As described earlier, Questioning the Author is a group or whole-class strategy designed specifically around the constructivist principles of breaking the text into manageable chunks, reading actively by looking for gaps in comprehension, and holding collaborative discussions about the difficulties of textbook reading. Regular use of this strategy is a great way to assist struggling readers who feel that textbooks are lifeless, incomprehensible, or unmotivating.

Helping Students Overcome Postreading Problems

Use Peer Reading and Collaborative Summarizing. Both Peer Reading and Collaborative Summarizing (see earlier discussions) help students develop a systematic approach to consolidating comprehension into effective postreading summaries. For even better results, work with students to develop a set of criteria for developing and assessing summaries (e.g., Is it accurate? Is it clear and easy to understand? Does it include all the essential information and leave out all the trivial information?).

Give students the opportunity to demonstrate comprehension in multiple ways. Every classroom contains a variety of learning styles (see Chapter 7 for more on student styles). Just as students learn differently, they also demonstrate comprehension differently. After reading a text, some students may prefer to

- Restate the facts: What happened? Who was involved? Where did it occur? How did it occur?
- Make inferences and develop an interpretation: How would you explain ____? What evidence can you find?
- Develop images, hypotheses, or original products: What would happen if ____? Can you create a poem, icon, or skit to represent this?
- Explore values, personal feelings, and reactions: Why is ____ important to you? Can you describe your feelings?

Asking students to demonstrate understanding in a variety of ways allows them to work in their strongest styles, where they are most comfortable, and in the styles that need development.

Ask students to compare their prereading and postreading predictions. One of the best ways to engage postreading elaboration is to have students analyze how their prereading predictions were validated or disputed by the text. Using a prediction organizer, students not only collect evidence, they are also asked to explain how their understanding has changed as a result of reading (see Resource 1.9 again).