But can they read the materials central to learning in my subject?

As a former high school literacy coach for over twenty years, I frequently fielded this question from my colleagues. Of course, as teachers we have long had access to reading achievement information for our students. Ostensibly, such student data can inform our instruction and help us meet the needs of a wide range of learners as we teach our discipline. But what exactly do reading achievement scores—whether from a state assessment or from instruments used within our district or school—tell us about students’ likely ability to handle the reading demands inherent in the texts of specific subjects? We know that such assessments tend to offer “all-purpose” insights into a student’s reading ability, based on a general mix of literary and informational samples. These assessments can perhaps be described as decontextualized glimpses at reading achievement that may, or often may not, provide teachers with the guidance they seek. A common concern from disciplinary teachers has been that these generalized assessments sometimes overestimated students’ development as readers of the texts of their subject.

Lauren Leslie and JoAnne Caldwell, the authors of CARA (Content Area Reading Assessment) have created a formative assessment tool, carefully conceived and disciplinarily focused, that endeavors to address these needs of classroom teachers. An ambitious undertaking, CARA is a timely response to the remarkable convergence this decade of two significant cross currents impacting literacy instruction—Disciplinary Literacy and the Common Core. Disciplinary Literacy represents a re-examination of literacy practices that intersect with learning in content area subjects. The research base for Disciplinary Literacy has extended beyond a conceptualization of generalized reading behaviors to the literacy practices exemplified by readers engaged in disciplinary thinking. Such thinking might be typified as “reading through a disciplinary lens.” In effect, readers approach the texts of a discipline in characteristic ways—drawing on certain pools of knowledge, interacting with specialized vocabulary, navigating text structures that are commonly employed to organize and communicate disciplinary knowledge, insights, and practices—to achieve comprehension of disciplinary texts. Instructional implications of Disciplinary Literacy emphasize mentoring students in customizing their thinking as readers: reading science texts through a scientific lens, history texts through a historian lens, and literature through a literary lens, for example.

The other major shift in the landscape of literacy instruction is the implementation of the rigorous expectations of the Common Core Literacy Standards (officially, Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects). The standards’ emphasis on the careful and critical reading of complex texts makes meaningful formative assessments even more valuable for teachers of different disciplines. The standards expect students to grow their capacity to read a variety of texts across the academic disciplines as well as express their comprehension of these texts as writers.

CARA is an exciting outgrowth of and response to these intertwining developments. The assessment is aligned with the ten Common Core reading standards and is designed to provide classroom teachers with disciplinary-specific indicators of their students’ ability to read complex texts that are typical of the materials assigned for learning in science, social studies, and English language arts. CARA offers teachers a number of distinct advantages. Each subtest is designed to be group administered during a regular class period (although certainly this flexible instrument can be used in individual settings as well). Multiple passages for each discipline at each grade level permit teachers to use this formative tool to
track progress during a school year. The specific standard being assessed in an item is clearly articulated, and all relevant standards are accounted for during the course of an assessment. The passages are segmented, with questions interspersed, to prompt careful reading and re-reading of an entire selection. Question stems directly relate to the comprehension processing mandated in the standards and standards’ language is consistently applied across grade levels. The assessment relies on constructed responses, resulting in a more in-depth consideration of student thinking and performance. Thoroughly developed answer keys guide teachers in their analysis of individual results with strong fidelity to the demands of the standard. Finally, the assessments will generate individual student profiles regarding state of progress in meeting each standard, as well as assist teachers in deciding when more concerted instruction on specific standards will benefit an entire class. CARA aspires to fill a definite void in literacy assessment; no current measure accomplishes these worthy aims.

The pragmatic appeal of CARA—obtaining standards-based evaluations of reading achievement from disciplinary appropriate texts—will certainly be well-received by teachers. As busy folks, they are likely to eagerly turn to the assessment passages targeted for their grade level and subject, perhaps overlooking other features of this impressive resource. However, Leslie and Caldwell offer much in their preliminary chapters that teachers will find highly informative. First and foremost, the authors undertake to help teachers understand the intentions behind each of the reading standards, in effect building teacher confidence in and expertise with Common Core expectations. By doing so, the authors establish a groundwork for implementing the standards through developing classroom tasks and assessments that mirror the critical thinking expected by the standards. They thoughtfully examine the case for asking students to comprehend complex, grade level disciplinary texts. In particular, they examine the critical thinking—the closer consideration and analysis of an author’s message—that is a hallmark of the standards. Especially useful are the instructional options detailed in Chapter 5 that can facilitate the development of each of the reading standards. In addition, the authors help teachers keep abreast of the burgeoning scholarship on reading comprehension and specific implications for disciplinary literacy.

Overall, CARA provides significant mentoring for classroom teachers through the carefully crafted assessment items developed for each disciplinary passage. The authors intend that these items will provide teachers with exemplars for writing their own classroom equivalents as part of course tasks and assessments. The extensive discussions for scoring each item are particularly valuable in helping teachers to truly appreciate the rigor and growth expected by each standard. Teachers may find this scoring process initially to be daunting, but working through this process will provide teachers with an outstanding professional development experience as well as important insights into their student’s reading abilities. Teams of teachers collaborating to analyze results, share observations, and discuss instructional implications could be a natural outgrowth of administrations of CARA at specific grade levels or within a discipline.

Lauren Leslie and JoAnne Caldwell are well known and highly respected as the authors of the Qualitative Reading Inventory (QRI), now in its fifth edition. With CARA, they have contributed a unique and much-needed addition to our library of professional assessment options. It was a special honor to be asked to review their work and share my enthusiastic observations.

Doug Buehl
Adolescent Literacy Consultant and Instructor
of Adolescent Literacy
Edgewood College, Madison, WI
The Content Area Reading Assessment (CARA) is a formative, group-administered assessment of reading comprehension that teachers can use to determine students' ability to answer questions based on the Common Core State Standards (CCSS) for English Language Arts and Literacy (ELA) in content areas. The content areas that are included in the ELA standards are literature, history/social studies, science, and technical Subjects. Thus, the CARA comprises literature, social studies, and science passages taken from representative textbooks at grades 4 through high school.

The CARA was developed to meet the needs of adolescent learners in the age of the Common Core State Standards. It was also designed in response to several critical issues facing education in the United States: the wide adoption of the CCSS; the latest reports of the National Assessment for Educational Progress (NAEP); reports of student performance on college entrance examinations; and as a response to two national reports that focused on adolescent literacy. The first report, A Time to Act: An Agenda for Advancing Adolescent Literacy for College and Career Success (2010) concluded, “Beyond grade 3, adolescent learners in our schools must decipher more complex passages, synthesize information at a higher level, and learn to form independent conclusions based on evidence. They must also develop special skills and strategies for reading text in each of the differing content areas (such as English, science, mathematics and history)—meaning that a student who ‘naturally’ does well in one area may struggle in another” (p. x). Another Carnegie report, Measure for Measure: A Critical Consumers’ Guide to Reading Comprehension Assessments for Adolescents (2010), closely examined nine of the most commonly used literacy assessments and determined that none of them measured any degree of critical thinking, defined as “synthesizing knowledge across texts, critiquing an author’s point of view, or composing an essay in response to literature” (p. 7). In addition, none of the tests estimated reading ability in specific content areas such as science and social studies.

These two national reports suggested several things. First, a group-administered test of reading comprehension was needed. Second, such an instrument should include specific attention to different content areas: literature, social studies, and science. It should also focus on critical thinking. The CCSS emerged concurrently with the publication of these reports (all were published in 2010) and we believed that the standards should be used to guide the development of a formative assessment. Accordingly, the Content Area Reading Assessment (CARA) was created in order to provide:

- A formative and group assessment of grade-appropriate and discipline-specific text comprehension based on the Common Core State Standards for grades 4 through high school
- A measure of comprehension in three distinct content areas: literature, social studies, and science that focuses on critical thinking
- A model that teachers can use for designing standards-based questions from their instructional materials
- Information from which teachers can plan standards-based instruction

The CARA was reviewed by teachers of fourth grade through high school and piloted with over 3900 students. Questions and answers were revised based on teacher feedback and student answers. In addition, we hired teachers to score students’ answers to each of our text selections (18 each in literature, social studies, and science) to assess interrater reliability and to evaluate the clarity of answer keys.
Acknowledgments

Over 70 teachers were instrumental in the development of the CARA, but there were some whose contribution should be personally acknowledged. Teacher leaders participated by encouraging teachers in their schools to be involved in piloting. Classroom teachers piloted many sections of students from their schools and others served as scorers for our interrater reliability study. We are supremely grateful to these teachers, without whom the CARA would never have seen the light of day.

Jennifer Berthold, Burleigh Elementary School, Elm Grove, WI
Jeremy Buehl, Madison East High School, Madison, WI
Deborah Diven, Greenfield Middle School, Greenfield, WI
Megan Dixon, Greenfield School District, Greenfield, WI
Leslie Ferrell, Evansville Community School District, Evansville, WI
Pat Gilbert and the teachers at Wauwatosa West High School, Wauwatosa, WI
Tony and Danielle Gonzalez, Milwaukee College Prep, Milwaukee, WI
Laura Gutierrez, Assistant Principal, Bruce Guadeloupe Community School, Milwaukee, WI
Ralph Haas, Menomonie Middle School, Menomonie, WI
Wendy Hamilton, Cindy Wanie, and Erin Romenesko at Hawthorne STEM School, Waukesha, WI
Shandylyon Hendricks-Williams, Urban Day School, Milwaukee, WI
Diane Hilbrink, Mahone Middle School, Kenosha, WI
Andy Hoey, Hingham High School, Hingham, MA
Scott Krueger, Greenfield High School, Greenfield, WI
Kristine Marver Lize, Menomonee Falls School District, Menomonee Falls, WI
Dan Manley, Greenfield High School, Greenfield, WI
Leann Neese and the teachers at Whitman Middle School, Wauwatosa, WI
Julie Norman, Port Washington High School, Port Washington, WI
Linda Simmons, Associate Professor, Retired, Cardinal Stritch University, who played an integral part in data analysis

And a special thank you to Doug Buehl for pushing us to address Standard 8.

We would also like to acknowledge and thank the reviewers who provided valuable feedback to this manuscript: David Hammond, East Jessamine Middle School, KY; Jodi Meyer-Mork, Luther College, IA; Lynette Miller, Licking Heights Central Middle School, OH; and Beth Pendergraft, Regents University, GA.
1

Chapter 1

Introduction to the Content Area Reading Assessment

What Is the CARA?

The Content Area Reading Assessment (CARA) is a formative, group-administered assessment that teachers and districts can use to determine students’ ability to answer questions based on the Common Core State Standards (CCSS) for English Language Arts and Literacy (ELA) in content areas. The content areas included in the ELA standards are Literature, History/Social Studies, and Science and Technical Subjects. Thus, the CARA comprises literature, social studies, and science passages taken from representative textbooks at grades 4 through high school. The passages include questions based on the College and Career Readiness Anchor Standards for Reading (CCSSO & NGA, 2010, p. 10), which require constructed responses—that is, the students must write or type their answers to the questions. The CARA is not a high-stakes assessment; rather, it provides teachers a way to assess students’ standards-based strengths as well as areas in which instruction is needed. In addition, the questions from each passage provide a model for composing standards-based questions. Therefore, teachers can use CARA passages and questions as examples from which to write their own questions, guide students’ understanding of the demands of the standards, and provide standards-based instruction.

In summary, the CARA has several purposes. One purpose is to provide a formative assessment of reading comprehension in the content areas of literature, social studies, and science based on the CCSS in ELA. Second, it is designed to help teachers and students understand the CCSS in ELA. Third, it may serve as a model from which teachers can write standards-based questions from their instructional materials. Fourth, the information gained from classroom administration of the CARA can guide instruction toward standards where students appear to have the most difficulty.

Why Was the CARA Developed?

The CARA was developed because there was no assessment that met the needs of adolescent learners in the age of the Common Core State Standards. It was also designed in response to several critical issues facing education in the United States: the wide adoption of the Common Core Standards, the latest reports of the National Assessment for Educational Progress (NAEP), reports of student performance on college entrance examinations, and as a response to two national reports that focused on adolescent literacy.

As of this writing, 45 states have signed on to participate in the CCSS. This wide acceptance has occurred because student literacy performance has been of concern for some time. The National Assessment of Educational Progress (NAEP), often referred to as the Nation's Report Card, has monitored the academic progress of 9-, 13-, and 17-year-olds since the 1970s. Since the first assessment year, 9- and 13-year-olds have demonstrated
progress in reading; 17-year-olds have not. A comparison of 2012 scores to 2008 scores indicates that only 13-year-olds demonstrated significant progress over the four-year span (NAEP, 2013).

Both the American College Test (ACT) and the Scholastic Aptitude Test (SAT) provide annual data on student readiness for college and career. Fifty-two percent of high school seniors met the ACT readiness benchmark for reading in 2012 (ACT, 2012) and forty-three percent met a similar SAT benchmark (SAT, 2012). “These results illustrate the need for common standards that will enable all students to develop the core competencies critical to college and career readiness” (SAT, 2012, p. 23).

The first national report, A Time to Act: An Agenda for Advancing Adolescent Literacy for College and Career Success (2010), examined the performance of adolescent readers on national tests and concluded,

good early literacy instruction does not inoculate students against struggle or failure later on. Beyond grade 3, adolescent learners in our schools must decipher more complex passages, synthesize information at a higher level, and learn to form independent conclusions based on evidence. They must also develop special skills and strategies for reading text in each of the differing content areas (such as English, science, mathematics and history)—meaning that a student who “naturally” does well in one area may struggle in another. (Carnegie Council on Advancing Adolescent Literacy, 2010, p. x).

The authors of A Time to Act argued that, although we have a strong knowledge base of reading instruction for grades K–3, adolescent literacy presents greater instructional challenges.

Middle and high school learners must learn from texts which, compared to those in the earlier grades:

- are significantly longer and more complex at the word, sentence and structural levels;
- present greater conceptual challenges and obstacles to reading fluency;
- contain more detailed graphic representations (as well as tables, charts and equations linked to text); and
- demand a much greater ability to synthesize information. (Carnegie Council on Advancing Adolescent Literacy, 2010, p. x).

The authors recommended that interim assessments be developed. Such assessments should be closely aligned to standards and provide data to guide instructional decision making. The CARA is such an assessment. It is aligned to the Common Core State Standards and its purpose is to identify the literacy instructional needs of adolescents.

Shortly following A Time to Act, another Carnegie-sponsored report emerged: Measure for Measure: A Critical Consumer’s Guide to Reading Comprehension Assessments for Adolescents (Morsy, Kieffer, & Snow, 2010). This report closely examined nine of the most commonly used literacy assessments and determined that none of them measured any degree of critical thinking, which they defined as “synthesizing knowledge across texts, critiquing an author’s point of view or composing an essay in response to literature” (p. 7). None of the tests measured reading ability in specific content areas such as science, social studies, and mathematics. If different content was included in the test, subject scores were summed so a user could not distinguish a student’s ability in one content area as compared to another.

The two national reports suggested several things. First, a group-administered screening test of reading comprehension is needed. Second, this instrument should include specific attention to different content areas: literature, social studies, and science. Bransford, Brown, and Cocking (2000) state that “characterizing assessments in terms of . . . the content-process demands of the subject matter brings specificity to generic assessment objectives such as
‘higher level thinking and deep understanding’” (p. 143). Third, the answering of test questions should require critical thinking.

Issues in Assessment of Adolescent Literacy

Concern about the nature of available assessments in the literacy field is not a recent occurrence. The influential Rand Report supported “an obligation to develop assessments that are embedded in and supportive of instruction” (Rand Reading Study Group, 2002, p. 55). Similarly, Sweet (2005) stressed the need for teachers to have assessment options that “inform instruction and . . . reflect the effect of instructional intervention” (p. 8). Afflerbach (2007) emphasized the importance of striking a balance between formative and summative reading assessments. Summative assessments help districts ascertain if students have met grade-level goals and state standards, but they do not inform instruction or focus on individual student needs, as formative assessments do. Formative assessments “can help teachers and schools demonstrate accountability on a daily basis” by providing a teacher with a “detailed sense of how well students are ‘getting’ the lesson” (p. 279).

The CCSS and Adolescent Literacy

The emergence of the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects (2010) addressed two of the above needs identified by the national reports:

- A focus on literacy in the content areas of literature, social studies, science, and math
- A focus on higher-level thinking skills

The standards also addressed curriculum concerns voiced by ACT and SAT. The standards include reading standards for literature and for informational text (K–5 and 6–12). Standards are grouped into the following categories:

- Key Ideas and Details
- Craft and Structure
- Integration of Knowledge and Ideas
- Range of Reading and Level of Text Complexity

An examination of the standards illustrates that students are expected to engage in higher-level thinking in grade-level materials. The CCSS expect the students to:

- Read closely
- Make logical inferences
- Determine central ideas or themes
- Summarize
- Analyze how and why
- Interpret words and phrases
- Analyze text structure
- Assess point of view
- Integrate and evaluate content
- Delineate and evaluate arguments

Given the findings of the two foundation reports; concerns about student achievement raised by NAEP, ACT, and SAT; and the emergence of the Common Core State Standards, it is clear that new assessments are needed to address content area literacy, to assess critical thinking, and to provide formative measures for guiding instruction.
Accordingly, the Content Area Reading Assessment (CARA) was created in order to provide:

- A formative assessment of grade-appropriate and discipline-specific text comprehension based on the Common Core State Standards for Grades 4–9/10
- A measure of comprehension in three distinct content areas: literature, social studies, and science that focuses on critical thinking
- A tool that teachers can use to write standards-based questions from their instructional material
- Information from which teachers can plan standards-based instruction

Conley (2008) describes four characteristics of “fair” assessment for adolescents. Our intention was to construct such an assessment. Table 1.1 illustrates the relationship between each of Conley’s four characteristics and how the CARA meets each of them.

### Table 1.1 The Relationship Between Conley’s (2008) Fair Assessment and the CARA

<table>
<thead>
<tr>
<th>Characteristics of Fair Assessment</th>
<th>Content Area Reading Assessment (CARA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fair assessment is based on clear targets and goals.</td>
<td>CARA is grounded in the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, and Science and Technical Subjects (2010), specifically the standards for Literature and Informational Text. The Common Core Standards provide the framework for the design of CARA questions.</td>
</tr>
<tr>
<td>2. Fair assessment should focus on what has been taught and learned by communicating information on performance and growth.</td>
<td>The purpose of the CARA is to identify those Common Core Standards that need to be taught. Because there are at least three passages at each level and in each discipline, a teacher can use the first passage as a measure of initial assessment. After identifying and teaching to areas of need, the second passage can be used as a specific assessment of improved performance in the standards. If more instruction is warranted, a third passage allows for additional assessment.</td>
</tr>
<tr>
<td>3. Fair assessment should provide students with useful and useable information.</td>
<td>Because each question on the CARA is tied to a specific standard, a student can identify his or her strengths and/or weaknesses with regard to each standard. In addition, because the CARA offers literature, social studies, and science passages, a student can determine which subject area may be more problematic and thus require more effort and attention on the student’s part.</td>
</tr>
<tr>
<td>4. Fair assessment creates purposeful learning opportunities.</td>
<td>The CARA passages are drawn from typical textbooks at grades 4 through high school. The selections represent typical literature, social studies, and science passages. Even if a teacher does not administer a specific passage as a formative assessment measure, the teacher can use the passage as the focus of instruction in helping students understand the intent of the standards and in clarifying the cognitive activities that they must employ in order to meet them. The teacher can demonstrate, for example, what it means to analyze, the types of context needed to determine word meaning, and the different types of text structure.</td>
</tr>
</tbody>
</table>
In summary, the CARA was designed in direct response to:

- The lack of progress of 12th graders on national assessments (e.g., NAEP, SAT, ACT)
- The emergence of the Common Core State Standards
- The instructional and assessment concerns of two national reports on adolescent literacy

The CARA provides a formative, group-administered assessment that addresses content area literacy with a focus on critical thinking. It also represents fairness in adolescent assessment as described by Conley (2008). It is grounded in clear goals, offers useful information on performance and growth, and provides passages that can be used for both assessment and instruction. Finally, it provides teachers with a model for developing standards-based assessment and instruction.
Research Perspective for the CARA

Differences Between CCSS and Previous Standards

The purpose of the CARA is to assess comprehension of grade-level text using questions that are based on the Common Core State Standards for English Language Arts and Literacy in History, Social Studies, and Science and Technical Subjects (CCSSO & NGA, 2010), specifically the Reading Standards for Literature and Informational Text. There are four major differences between the Common Core Standards and previous standards.

1. The standards are text based; that is, they demand that readers comprehend explicit content and use this content to draw inferences. To put it another way, "the Common Core expects students to cite textual evidence as they explain what the text teaches" (Calkins, Ehrenworth, & Lehman, 2012, p. 41).
2. The standards focus on literacy in three distinct disciplines: language arts, social studies, and science. After first providing 10 general anchor standards that cross all three subject areas, the standards explain each anchor in more detail according to specific grade levels and subject areas.
3. The standards emphasize a higher level of comprehension—what has often been termed critical thinking.
4. The standards require that students attain proficiency in grade-appropriate text. For example, Standard 10 requires that grade 6 students “by the end of the year read and comprehend . . . in the grades 6–8 complexity band proficiently with scaffolding as needed at the high end of the range” (p. 37). Eighth graders are expected to do this “independently and proficiently.”

Text Comprehension

What Does It Mean to Comprehend Text?

The CARA is primarily an assessment of student comprehension during and after reading literature, social studies, and science passages. Comprehension is a very general term and it is important that teachers and students understand specifically what it means to comprehend a text. Kintsch (2004) describes a text as composed of a series of ideas (the microstructure) that are organized as a narrative, an explanation, an argument, and so forth (the macrostructure). The ideas of the author and the author’s choice of text organization together form what Kintsch refers to as the text base. “Forming a text base is the first step in the comprehension process. . . . A good text base is representative of the meaning of the text and its structure” (Kintsch, 2012, p. 22).
Readers must comprehend the text base; however, they also need to move beyond it and, depending on their purpose, interests, and world knowledge, construct a situation model, which is the reader’s understanding of the text base integrated with the reader’s knowledge. Two readers reading the same text can arrive at very different situation models. One reader interested in drama may read an account of ancient Greece and construct a situation model that focuses on Greek plays and their enactment. Another reader, involved in completing an assignment for a political science course, may concentrate on the organization of Greek government and build a situation model that compares the structure of the Athenian republic to present day democracy.

The standards require that readers use the text base, not their interests, opinions, or prior knowledge of the topic, as the foundation for constructing a situation model. Standard 1 states that students must “read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence . . . to support conclusions (CCSSO & NGA, 2010, p. 10). This means that students must understand the text base, the author's ideas, and how they are organized. "Readers need to get their mental arms around the text, to be able to retell it, to cite it, to ground anything they have to say about the text with textual references" (Calkins, Ehrenworth, & Lehman, 2012, p. 39).

Perhaps an example will clarify how this process works. Consider the three CARA high school passages on Andrew Jackson; they form a text base. The author provides a summary of Jackson's beliefs and behavior prior to and during his two terms of office. The reader must comprehend this text base—what the author says were factors that led to Jackson's election in 1828 and his reaction to such issues as Native American rights, nullification, and the bank of the United States. Using comprehension of the text base as the foundation, the reader constructs a situation model. One possible situation model could be that the author's point of view of Jackson was less than favorable. This situation model might be influenced by the inclusion of Jackson's defiant remark regarding the Supreme Court (a remark one might identify as overly flippant), and by the absence of any quotation of Jackson's that would have presented him in a more favorable light. It could also be influenced by the author's use of the word projected in the passage: “He [Jackson] projected himself as a down-to-earth common man,” rather than “He was a down-to-earth common man,” which might indicate to a reader that the author felt Jackson's stance was somewhat suspect. Such a situation model would not be based on other accounts of Jackson's life or the reader's beliefs regarding political campaigns and the use or misuse of presidential power. The model is based on the text. Another reader may have constructed a different situation model, perhaps interpreting the author's text base as less biased and more objective. However, the critical element of the standards is that the text base was understood and the situation model was inferred from the text base.

**The Comprehension Process (Kintsch, 2004)**

Form a text base
- Understand the author's ideas (the microstructure)
- Understand the author's organization (the macrostructure)

Use the text base to build a situation model
- Analyze
- Apply
- Synthesize
- Evaluate
How Does Prior Knowledge Fit into Understanding the Text Base and Situation Model?

Does the requirement that a situation model be drawn from the text negate the extensive research base that indicates prior knowledge of the topic is a critical element in comprehension? In other words, do the standards expect students to rely on the text to the exclusion of what they already know? It is important, therefore, to clarify what is meant by prior knowledge.

Prior knowledge has often been interpreted in a narrow and somewhat limited fashion as knowledge of the specific topic or content of the passage. However, prior knowledge is much more than that. Alexander and Jetton (2000) describe prior knowledge as “a rich body of knowledge organized around pivotal concepts or principles” (p. 287). It involves linguistic knowledge of word meanings, sentence structure, and text structure. It involves schooled knowledge, which, as the name suggests, is knowledge gathered from school experiences. Perhaps the largest component is unschooled knowledge, the conceptual knowledge gleaned from everyday life experiences and from interactions with a variety of individuals. One can hypothesize that knowledge of specific comprehension strategies might be part of schooled knowledge, but such knowledge may actually be self-taught through wide reading and interaction with a variety of texts, thus falling into the category of unschooled knowledge. Readers construct a text base and a situation model using linguistic, schooled, and unschooled knowledge even if specific information on the topic of their reading is relatively unknown.

What Do Readers Do when They Build a Text Base and Situation Model?

Fisher, Frey, and Lapp (2012) describe comprehension as involving four reader roles: code breaker, meaning maker, text user, and text critic. Code breaker and meaning maker specifically refer to the reader’s understanding of the text base. As code breaker, a reader draws a variety of linguistic inferences; “the reader recognizes words, retrieves their context-appropriate meanings, and builds phrases (parsing) from words” (Perfetti & Adlof, 2012, p. 6). As meaning maker, a reader constructs inferences that bridge text elements and “support the coherence necessary for comprehension” (p. 7). For example, consider the following excerpt from the second CARA passage on Andrew Jackson: “Jackson’s political base lay in the South, where he captured 80 percent of the vote. Those voters expected Jackson to help them remove the 60,000 American Indians living in the region.” Constructing an accurate text base requires inferring that “he” in the first sentence refers to Jackson, “those voters” refers to voters in the South, and “them” refers to “those voters.” Readers frequently draw such bridging inferences without being overtly aware of the process. However, awareness often occurs when readers find themselves struggling to make sense of the text base.

As a text user and text critic, the reader constructs a situation model, which also involves drawing inferences. Many of these inferences are derived from prior knowledge. A reader of the Jackson passages possesses unschooled and schooled knowledge about many things, such as the purpose of authors, the motivations of individuals, the often contentious nature of political disagreements, and an understanding that text is rarely neutral. Using this world knowledge and assuming that an adequate and accurate text base has been constructed, a reader may infer a possible bias on the part of the author even if prior knowledge of Andrew Jackson is missing. But what about an individual who possesses prior knowledge about a specific topic such as Jackson’s presidency? In that case, the reader infers whether the text agrees with, refutes, or adds to what the reader already knew.
What is involved in answering questions based on the standards? Teachers and students must realize that answering questions tied to the standards involves drawing text-based inferences. For example, if asked to analyze how two things are alike, the reader uses explicit statements in the text, not his or her prior knowledge of the topic. However, the ability to draw an inference is affected by understanding the demands of the task and the goals or purpose for reading (van den Broek, Lorch, Linderholm, & Gustafson, 2001). This suggests that students must be made aware of what is involved in answering questions based on the standards.

First, standards-based questions cannot be answered by simply matching the language of the question to similar language in the text. A student must identify text that is relevant to the question to compose an appropriate answer. This involves several components. First, students must understand the question stems. What is meant by analyze, text evidence, text structure, point of view, central idea, context, and so on? Next, the student must search the text and identify all content that may be relevant to the intent of the question. Finally, the student must select those text components that provide the best answer—that is, the text content that allows the student to clearly and effectively analyze, describe point of view, identify word meaning, and so on.

How do the standards address all the comprehension skills that are part of many curriculum standards and/or scope and sequence charts? The primary issue is whether all those skills are actually different and discrete entities, a question investigated in 1968 by Frederick Davis. Using what was then a new statistical tool, factor analysis, he identified eight separate sub-skills of the reading process. Table 2.1 indicates how Davis’ eight factors closely align with the College and Career Readiness Anchor Standards for Reading.

### Table 2.1  The Relationship Between Davis’s (1968) Subskills of the Reading Process and the CCSS Anchor Standards

<table>
<thead>
<tr>
<th>Davis’s Subskills</th>
<th>Anchor Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding content stated explicitly</td>
<td>Standard 1: Read closely to determine what the text says explicitly and to make logical inferences from it.</td>
</tr>
<tr>
<td>Weaving together ideas in the content</td>
<td>Standard 2: Determine central ideas or themes of a text and analyze their development.</td>
</tr>
<tr>
<td>Drawing inferences from the content</td>
<td>Standard 7: Integrate and evaluate content presented in diverse media.</td>
</tr>
<tr>
<td>Remembering word meanings in context</td>
<td>Standard 1: Read closely to determine what the text says explicitly and to make logical inferences from it.</td>
</tr>
<tr>
<td>Following the structure of the content</td>
<td>Standard 3: Analyze how and why individuals, events, and ideas develop and interact.</td>
</tr>
<tr>
<td>Recognizing author’s tone, mood, and purpose</td>
<td>Standard 8: Delineate and evaluate the argument and specific claims in a text including validity of reasoning as well as relevance and sufficiency of evidence.</td>
</tr>
<tr>
<td>Recognizing literary techniques</td>
<td>Standard 5: Analyze the structure of texts.</td>
</tr>
<tr>
<td></td>
<td>Standard 6: Assess how point of view and purpose shape content and style.</td>
</tr>
</tbody>
</table>
Comprehension of Discipline-Specific Text

How does reading differ in discipline-specific text? The standards focus on literacy in three distinct disciplines: English/language arts, history/social studies, and science. Similarly, the CARA is composed of text in three different disciplines: literature, social studies, and science. “Anchor standards for College and Career Readiness (CCR) define general, cross-disciplinary literacy expectations that must be met for students to be prepared to enter college and workforce training programs ready to succeed” (CCSSO & NGA, 2010, p. 4). The anchor standards are then explained in more specific terms for each grade level and each discipline. In the past, the ability to read and comprehend a single generic text was often considered to represent general reading ability. For example, a student’s performance on a story-like passage from an informal reading inventory was used to determine overall reading level. Little attention was paid to the differences between text in different disciplines.

Understanding literature, social studies, and science passages is very different from the casual reading that many individuals engage in such as light fiction, newspaper accounts of football games, and magazine articles describing the tangled lives of Hollywood and reality television stars. “Disciplines of study such as social science, mathematics and science approach, represent and critique information in unique ways” (Shanahan, 2009, p. 240) and difficulty in comprehending them often occurs because students lack understanding of how information is created and shared in different disciplines.

Literature, social studies, and science are often and erroneously thought of as unitary disciplines; that is, they are each presumed to have a common structure and/or purpose. However, in reality, they represent a variety of sub-disciplines. For example, literature encompasses such disparate genres as short stories, plays, poetry, and novels. Social studies includes the disciplines of history and political science. Science comprises biology, chemistry, and physics, to name a few. Each of these sub-disciplines is characterized by a unique structure and content; a civics text is very different from a history text. For example, consider the difference between the chronological structure of an account of Andrew Jackson’s term of office and explanations of how different political structures operate. A student who demonstrates skill in comprehending stories will not necessarily be as adept when asked to comprehend a play. A student who does well in a biology class may not do as well in physics.

Sub disciplines of broad areas of:

- Literature: short stories, plays, poetry, novels, memoirs, biography
- Social studies: history, political science, civics
- Science: biology, chemistry, physics, environmental science, technological studies.

It is true that reading involves some similar processes whether an individual is reading literature, social studies, or science. Readers identify words, attain a measure of automaticity in doing so, and comprehend connected text. However, additional and different skills are required in order to fully comprehend text in different disciplines. Reading comprehension is “context-dependent and influenced in part by the kind of text that one reads” (Shanahan, 2009, p. 257). History text, for example, often presents events and actions as chronological accounts and cause–effect relationships; science texts are structured with an emphasis on procedures and explanations.

Disciplinary experts read text differently. Dole, Nokes, and Drits (2009) described three strategies employed by historians: sourcing, corroboration, and contextualization. Historians identify and use the source of a text to draw inferences about its content. Corroboration involves noting similarities and differences between texts on the same topic. Contextualization entails comprehending an event through the lens of the specific historical and cultural context in which it occurred. In other words, historians “render judgments on the trustworthiness and reliability of the text and author” (Afflerbach & Cho, 2009, p. 78).
Other researchers asked teams of experts in the fields of history, chemistry, and mathematics to read disciplinary texts (Shanahan, Shanahan, & Misischia, 2011). Using think-alouds and focus group discussions, they identified important differences in how the experts read text in their specific discipline. The role of the author was important in each discipline, but how the expert used knowledge of the author was different. Historians paid attention to text authors’ point of view and the possible source of their information. Chemists used the author as a possible predictor of quality. The date of the article also played a role in experts’ evaluations of articles. Historians were concerned about when the text was written and how this might influence the content. Chemists were concerned with whether the content represented out-of-date material. Finally, the experts’ knowledge base was used in interpreting the article. Historians focused on whether the text agreed or disagreed with their own opinions and whether the author represented a credible source. Chemists also were concerned with text credibility but they defined it as “plausibility or its congruence with scientific evidence” (p. 420).

**What Is the Role of Academic Language in Discipline-Specific Text?**

Different disciplines also employ different forms of academic language. Academic language is very different from social and/or spoken language. It is “the form of language expected in contexts such as the exposition of topics in the school curriculum, making arguments, defending propositions, and synthesizing information” (Snow, 2010, p. 450). Academic language is formal, complex, and impersonal. It is characterized by abstraction, conciseness, informational density, precision, and compression of ideas into as few words as possible. It contains morphologically complex words that are heavily dependent on Latin and Greek vocabulary. Nagy and Townsend (2012) argue that academic usage of the grammatical metaphor “is the largest diversion from social/conversational language and presents the most significant issue for students” (p. 94). Grammatical metaphor involves turning verbs and adjectives into nouns, generally by adding suffixes (act/action; active/activity): it allows a single word to express an entire sentence (Jackson opposed Adams, Jackson’s opposition).

**Reading in Different Disciplines**

<table>
<thead>
<tr>
<th>Literature</th>
<th>Emphasis on</th>
</tr>
</thead>
<tbody>
<tr>
<td>character motivation</td>
<td></td>
</tr>
<tr>
<td>dialogue</td>
<td></td>
</tr>
<tr>
<td>theme/message</td>
<td></td>
</tr>
<tr>
<td>author’s point of view</td>
<td></td>
</tr>
<tr>
<td>figurative language</td>
<td></td>
</tr>
<tr>
<td>connotative meaning</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>History</th>
<th>Emphasis on</th>
</tr>
</thead>
<tbody>
<tr>
<td>chronological events</td>
<td></td>
</tr>
<tr>
<td>context of the event</td>
<td></td>
</tr>
<tr>
<td>reliability of the source</td>
<td></td>
</tr>
<tr>
<td>author perspective</td>
<td></td>
</tr>
<tr>
<td>agreement/disagreement with author</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Science</th>
<th>Emphasis on</th>
</tr>
</thead>
<tbody>
<tr>
<td>procedures and experiments</td>
<td></td>
</tr>
<tr>
<td>accuracy of information</td>
<td></td>
</tr>
<tr>
<td>author as a predictor of quality</td>
<td></td>
</tr>
<tr>
<td>concern with out of date material</td>
<td></td>
</tr>
<tr>
<td>value of information</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 2  Research Perspective for the CARA

What Does This Mean for Instruction?

Should instruction focus on generic strategies or discipline-specific strategies? Fang (2012) describes four approaches to content area literacy. The cognitive approach focuses on the use of generic strategies such as note taking, summarizing, and visual mapping. Based on the belief that such strategies are basically the same for all disciplines, “different comprehension activities are replicated from one content area to the next with little regard for the particular challenges to concepts, structure, genre or task within a content area or sub-discipline” (Conley, 2009, p. 538). The sociocultural approach promotes the use of students’ unschooled knowledge and cultural practices “as both a bridge to and a resource for promoting the development of content area literacies (Fang, 2012, p. 104). The linguistic approach concentrates on the development of vocabulary and the analysis of grammatically complex sentences. The critical approach emphasizes that text must be understood in relation to the intention of the author and the context in which it is written.

A variety of studies showing improvement in overall comprehension as a result of teaching various comprehension strategies has been interpreted as evidence that teaching multiple strategies improves comprehension. However, this may occur not because of a specific strategy but because the emphasis on strategies promotes engagement with text and provides a vehicle for student dialogue (Wilkinson & Son, 2011). In fact, “the generic strategy approach can, indeed, be of infinite value to students when content area teachers and literacy specialists engage in thoughtful dialogue about how to contextualize these strategies” (Brozo, Moorman, Meyer, & Stewart, 2013, p. 355). However, a focus on generic strategies such as note taking, paraphrasing, and mapping developed from research on the comprehension process has been infused into different content areas “without considering what makes learning in content area contexts both diverse and often challenging” (Conley, 2009, p. 547). He suggests that the process needs to be reversed—that is, disciplinary practice should identify teaching and comprehension strategies germane to specific disciplines. Or putting it in another way, “strategies provide the tools to help students make sense of the content and the content gives meaning and purpose to the strategies” (Wilkinson & Son, 2011, p. 367).

Other authors have made similar arguments for discipline-focused reading instruction (Dole, Nokes, & Drits, 2009; Moje, 2008) suggesting that experts in a discipline should use knowledge of their field to guide student reading. “What that means instructionally is that secondary school teachers in the content areas need to work together with literacy specialists in joint efforts to improve reading comprehension” (Shanahan, 2009, p. 257; Snow, 2010). These comments parallel the conclusions of the authors of the national report A Time to Act: An Agenda for Advancing Adolescent Literacy for College and Career Success (Carnegie Council on Advancing Adolescent Literacy, 2010) discussed in Chapter 1.

What Does This Mean for Assessment?

The Carnegie-sponsored report, Measure for Measure: A Critical Consumers’ Guide to Reading Comprehension Assessments for Adolescents (Morsy, Kieffer, & Snow, 2010) indicated that none of the most commonly used literacy assessments measure reading ability in different content areas. The assessments may have contained passages from different disciplines; however, the test scores were combined so there was no way to distinguish a student’s ability in one discipline from another. This is unfortunate, because assessment of a student’s ability to comprehend in one discipline may not generalize to a different one; that is, a student may demonstrate acceptable comprehension while reading a story but be less successful when reading a science text. Similarly, the ability to demonstrate mastery of the standards in one content area may not transfer to a different area.
If reading comprehension is context dependent—and it is—then reading comprehension assessment should be as well. The purpose of the CARA is to provide passages in literature, social studies, and science for the classroom teacher to use in determining the needs of his or her students. The teacher has the option to administer all or only a single passage. For example, a fifth-grade teacher may opt to administer only the science or social studies passage if he or she is concerned about student performance in that respective area. Another teacher may choose only to administer the literature passage. The CARA is not an informal reading inventory, as we will explain in the next chapter. It is a formative measure that teachers can use to suit their specific purpose: to examine which standards and which disciplines need instructional emphasis.

Factors Related to Critical Thinking

What Is Critical Thinking?

Besides stating that frequently used assessments did not address reading in the different disciplines, Measure for Measure (2010) concluded that none of the nine commonly used assessments evaluated critical thinking. An online search directed toward critical thinking identified numerous studies in disciplines other than education, as well as studies directed at college-level students. Few studies of critical thinking focusing on upper elementary, middle school, and high school levels were evident. One might hypothesize that the absence of interest or concern regarding critical thinking may reflect its absence in popular assessments. What is not regularly assessed may be viewed as having little relevance for classroom instruction.

The authors of Measure for Measure recommend that answering test questions requires a student to think critically and the standards have been described as focusing on critical thinking. What exactly does that mean? Critical thinking is generally recognized as an umbrella term that encompasses a variety of higher-level cognitive skills such as interpretation, analysis, and evaluation. It includes thinking about issues within specific disciplines as well as addressing the problems and challenges of our increasingly complex world. “Critical thinking or the ability to engage in powerful, self-regulatory judgment is widely recognized as an essential skill for the knowledge age” (Abrami, Bernard, Borokhovski, Wade, Surkes, Tamim, et al., 2008, p. 1102).

Critical thinking must be differentiated from critical literacy. Critical literacy involves preparing students to deal with the multiple uses of literacy in contemporary society. “This comprises knowledge of texts in a range of modalities, textual interpretation, construction and evaluation, and critical understandings about the reflexive relationship of interpretation to both textual and social practices and structures” (Freebody & Freiberg, 2011, p. 432). Critical literacy involves identification of multiple viewpoints, a focus on sociopolitical issues, and the promotion of social justice. Critical literacy has also been interpreted as identifying the viewpoints of textbook authors “that privilege some voices and silence others” (Sheridan-Thomas, 2008, p. 169). Obviously critical thinking is needed to foster critical literacy; however, the terms refer to different entities.

Critical thinking has been described as making use of many of the following cognitive processes that can be clearly linked to specific standards:

- Drawing inferences that bridge elements in the text or support the development of coherence (Perfetti & Adlof, 2012): Standards 1, 2, 3, 6, 7, 8, and 9
- Synthesizing information from various parts of the text and different texts (Pearson & Hamm, 2005): Standards 2, 3, 8, and 9
- Recognizing meaningful patterns of information (Bransford, Brown, & Cocking, 2000): Standards 5, 8, and 9
CHAPTER 2  Research Perspective for the CARA

- Using higher-order, purposeful, and goal-directed operations requiring judgment, analysis, and synthesis (Gunn & Pomahac, 2008): Standards 3, 7, 8, and 9
- Employing metacognition, because critical thinking by definition involves reflecting on what is known and how that knowledge is justified (Kuhn, 1999): Standards 1, 6, 8, and 9
- Engaging in careful argumentation encompassing analysis, synthesis, inference, interpretation, evaluation, and reasoning; a skill that can be developed by teaching students “to think in terms of a series of mini-arguments as they collect evidence” (Yeh, 2001, p. 12): Standards 8 and 9

What Form Does Instruction in Critical Thinking Take?

Little consensus exists “about whether it is a set of generic skills that apply across subject domains . . . or whether it depends on the subject domain and context in which it is taught” (Abrami et al., 2008, p. 1105). Abrami and colleagues (2008) conducted a meta-analysis of four types of interventions involving critical thinking and concluded the following:

- General interventions focused on critical thinking as unrelated to a specific discipline.
- Immersion interventions included attention to disciplinary content but did not identify critical thinking as a specific learning objective. Instead, it was viewed as a byproduct of instruction.
- Infusion interventions included critical thinking as an explicit course objective presented with attention to content.
- A mixed approach taught critical thinking as an independent entity but within a specific content course.

Students who received mixed approaches that combined content and critical thinking instruction significantly outperformed all others. Immersion courses where critical thinking was not an explicit objective had the smallest effects: “Developing CT skills separately and then applying them to course content explicitly works best; immersing students in thought-provoking subject matter instruction without explicit use of CT principles was least effective” (p. 1210).

Supporting that conclusion, explicit instruction in critical thinking skills combined with science content was effective for middle school students (Gunn, Grigg, & Pomahac, 2006). Students examined case studies involving medical dilemmas and were guided to construct visual and text-based argument maps centered on the content. Analysis of the maps suggested improvement in critical thinking. In a follow-up study, seventh graders were taught to differentiate between memory questions and critical thinking questions. Then, using generic question stems, students created critical thinking questions based on science content. Analysis of the questions in relation to Bloom’s taxonomy revealed that the experimental group produced more higher-level evaluation questions, whereas the control group generated more lower-level knowledge questions (Gunn & Pomahac, 2008).

These studies suggest that critical thinking skills as mandated by the standards can be taught if they are regarded as specific instructional components within the content of a discipline; they will not naturally develop as a result of instruction in disciplinary content. Kuhn (1999) states “it is essential that we know precisely what we mean when we refer to critical or thinking skills if the constructs are to be useful” (p. 17). The standards may act as a catalyst for formulating a more specific and agreed-on definition, as opposed to the vague and nebulous definitions that have proliferated. Using the Anchor Standards as a base, critical thinking may become associated with the following mental operations: supporting conclusions; analyzing the development of central ideas and themes; analyzing how word choice shapes meaning; analyzing how point of view shapes content; integrating and evaluating content; and evaluating arguments, claims, reasoning, relevancy, and sufficiency of evidence.
How Is the Difficulty of a Text Measured?

The standards require that, at the end of the year, students are able to read grade-appropriate text with support and/or independently and proficiently. Identification of grade-appropriate text has, for many years, rested on determination of text difficulty based on readability formulas. These include but are not limited to the following formulas: Dale-Chall (Chall & Dale, 1995); Fry (Fry, 2002); Flesch-Kincaid and Flesch Reading Ease (Farr, Jenkins, & Paterson, 1951; Flesch, 1948); Degrees of Reading Power (Questar Assessment, Inc., 2013) and Lexile levels (MetaMetrics, 2013). The authors of the Common Core Standards have adopted the Lexile readability formula as a measure of the text complexity band mentioned in Standard 10. Such formulas are based on word length, sentence length, and/or word frequency. They rest on the assumption that shorter sentences, words of few syllables, and words that are more frequent in speech and print translate into easier text. Readability formulas play an important part in determining which textbooks are considered appropriate for which grade level (Graesser, McNamara, & Louwerse, 2011).

What Are Other Factors That Contribute to the Difficulty of a Text?

Determining text difficulty, however, is considerably more complex than choosing a text that matches a grade-appropriate reading level as indicated by one or more readability formulas. Many other factors besides sentence length and word frequency play a part in making a text easy or difficult: “cohesive cues in text facilitate reading comprehension and help readers construct more coherent mental representations of text content” (McNamara, Graesser, & Louwerse, 2012, p. 90). These include but are not limited to syntax, coherence, the use of connectives, genre, and the complexity and familiarity of the concepts (Graesser, McNamara, & Louwerse, 2011). For example, given identical Lexile scores for two texts, one can certainly hypothesize that concepts included in an account of the Greek wars would be less difficult than those included in a description of the differences between prokaryotic and eukaryotic cells. Students are more knowledgeable about wars in general than about cell types. Also, the selection on cell types is more conceptually dense than the selection on the Greek wars. Similarly in literature, given comparable Lexile scores for two stories, one can estimate that the rather straightforward tale of a wounded animal would be less difficult to understand than a myth with an underlying message.

Narrative and expository texts differ in various components of complexity as suggested by text analysis using Coh-Metrix, a computer program that examines various indices of text difficulty. McNamara, Graesser, and Louwerse (2012) compared narrative, social studies, and science passages according to several indices: word frequency; sentence complexity; referential cohesion, or the overlap of words and concepts across the text; causal cohesion as indicated by use of connectives such as because and therefore; and verb cohesion, or the overlap between actions. Greater ease in comprehending literature may be due to word familiarity and the extensive use of connectives. Science texts, on the other hand, contain less frequent words and less supportive connectives. Although they are more cohesive, this does not necessarily compensate for their high level of difficulty. Social studies text, often as conceptually difficult as science, is less cohesive and offers only a moderate use of connectives. The authors concluded that “it is insufficient to define readability simply on the basis of word frequency, word length and sentence length. Text difficulty is also a result of cohesion” (p. 112). Research such as this suggests that future determination of text difficulty may become more finely tuned and better represent text difficulty.
The authors of the standards suggest that “reading texts have actually trended downward in difficulty in the last half century” (CCSSO & NGA, 2010, Appendix A, p. 3). The trend toward less difficult text may have resulted in an unintended consequence: lower reading levels on the part of students and adults. In an effort to make texts easier, publishing companies have engaged in such practices as making sentences shorter, providing definitions of vocabulary, and including directions or suggestions for comprehending the text. Coleman and Pimentel (2011) take issue with this: “the scaffolding should not preempt or replace the text by translating its contents for students or telling students what they are going to learn in advance of reading the text; that is, the scaffolding should not become an alternate, simpler source of information that diminishes the need for students to read the text itself carefully. Effective scaffolding aligned with the standards should result in the reader encountering the text on its own terms, with instructions providing helpful directions that focus students on the text” (pp. 7–8).

Fisher, Frey, and Lapp (2012) suggest that lowering the difficulty level of texts, probably a genuine attempt to produce more considerate and readable text, has actually removed “the struggle that is so important in developing habits” (p. 45). Similarly, Kintsch (2004) suggests that learning a new skill involves the “opportunity to face difficulties and learn to repair mistakes” (p. 1314). In other words, students can attain higher reading levels only by reading and grappling with difficult text under the guidance of a skilled and understanding teacher. The authors of the standards believe that “current standards, curriculum, and instructional practice have not done enough to foster the independent reading of complex texts so crucial for college and career readiness” (CCSSO & NGO, 2010, Appendix A, p. 3).

### Reading Level

For many years, teachers and intervention specialists have attempted to match student instructional reading level with text written at the same level. The determination of a student’s instructional level is based on criteria established and promulgated over 60 years ago by Emmet Betts (1946, 1957). The teacher asks a student to orally read a passage and answer questions about its contents. The teacher counts the number of oral reading mistakes (often called *miscues*) and errors in comprehension and translates them into percentages. An instructional level for word identification generally falls between 90 and 97 percent accuracy and at 70 percent or above for comprehension (Leslie & Caldwell, 2011). It has been long assumed that a student’s instructional level and text level should match. That is, if a student has an instructional level of fifth grade, he or she should read fifth-grade text because that is the level at which, with teacher guidance, the student can experience success.

Text more difficult than an instructional level, often called *frustration text*, should be avoided. Fisher, Frey, and Lapp (2012) describe matching text to student instructional levels as “a commonly accepted practice” but state that “concerns about this reader-text match have proliferated . . . for decades” (p. 7). Similarly, Halladay (2012) questions assumptions underlying instructional-level text, including the idea that frustration text will lead to emotional upset on the part of the student. Is determination of instructional level an outworn concept? Should all students be expected to read the same text irrespective of their actual reading ability? It is important to put this in perspective.

First, determination of a student’s instructional level serves more purposes than just matching reading level to text level. An instructional level below chronological grade level may indicate a need for instruction beyond what would be normally offered in the regular classroom. An instructional level below third grade, for example, suggests a need for instruction in decoding accuracy and fluency. An emphasis on such skills, a normal part of instruction in grades 1–3, would be inappropriate in higher-level classrooms.
Second, although the standards stress the need for reading at chronological grade level, they also include the caveat “with scaffolding as needed” (p. 14). An instructional level can suggest the degree of needed scaffolding. The extent of a gap between instructional level and chronological grade level indicates the seriousness of the problem. An eighth grader with an instructional level of fourth grade, for example, needs more intensive intervention/scaffolding than one reading at a sixth-grade level. A classroom teacher may be able to support students with instructional levels slightly below their chronological grade levels. Other students will probably need the more individualized and focused instruction offered by intervention specialists.

Third, determination of instructional level varies with the text used during the assessment process. Instructional level can vary depending on the student’s familiarity with the text structure and the underlying concepts (Leslie & Caldwell, 2011). Students often have one instructional level for narrative text and a lower level for expository material. The complexity and cohesion of a text and the familiarity of the underlying concepts also play a significant role. For example, CARA science passages for fifth and sixth grades focus on relatively complex concepts: the structure and function of cells and Wegener’s theory of continental drift. We suspect that even those reading comfortably at a fifth- or sixth-grade level will need support to comprehend these texts to the extent expected by the Common Core Standards.

Finally, using instructional level to match readers and texts has been interpreted as never asking a student to read a text beyond his or her instructional level. This seems to us to be an oversimplification of a basically good idea: providing the reader with a manageable text. However, frustration-level text can be manageable with the support and guidance of the teacher and/or intervention specialist. As schools transition into greater compliance with the standards, many readers presently viewed as capable, with instructional levels that match their chronological grade levels, may experience difficulties in meeting the demands of more complex text.

**Engagement in Learning: What Will Motivate Students to Learn New Content?**

Recently concerns have been raised about whether students will engage in close reading sufficiently to learn at the level demanded by the Standards. Most middle and high school teachers see the average student as not strongly motivated to learn difficult concepts. It is not that they are unable to learn such material, but they need to be motivated by interesting and important content with engaging questions that challenge them. “In my opinion, those are the hooks on which the new and challenging tasks can best be hung” (Snow, June 6, 2013, pg. 1). How can we reconcile the tenet of the Standards that requires students to read texts autonomously without the benefit of focusing questions or orienting information or an introductory activity designed to stimulate enthusiasm for the topic?

Similar concerns have been raised by a researcher who has spent his last decade studying factors that motivate students to engage in learning. In a report from the Literacy Panel, Guthrie argues that although students will have to learn new ways to read text closely, teachers cannot simply assign hard reading materials. Students will not learn by pouring concepts and new skills into them. “Teaching new skills is a must, but new skills must be balanced by inspiring students’ passions and purposes for learning, (Guthrie, 2013, April 15, 2013, pg. 1).

One way that the CARA encourages students’ attention to our materials is by providing one or more introductory sentences that direct them to read for a specific purpose.

**The Development of Questions**

The Common Core State Standards define what “students should understand and be able to do by the end of each grade” (CCSSO & NGA, 2010, p. 10). Assessing understanding involves asking questions; therefore, the clarity and quality of the questions are integral to
the value of any assessment. An unclear question or a question that does not specifically relate to the purpose or content of the assessment is of little value. Although the ability to provide a correct answer to a question is regarded as a measure of comprehension, a student may offer an erroneous answer for several reasons. First, the student may not have comprehended the text on which the question is based. Second, the student may not have understood the question. Third, the student may have comprehended both text and question but did not possess specific skills demanded by the question, such as analyzing, summarizing, or defining a word through use of context.

Why can't students answer comprehension questions correctly?

1. The student may not have understood the text upon which the question is based.
2. The student may not have understood the question.
3. The student may have comprehended the text and the question but did not possess specific skills demanded by the question, such as analyzing, summarizing, or using context to define a word.
4. The student understood the elements of the answer, but was unable to put the pieces together to form a complete answer.

Educators have long realized that questions come in many forms. Answering different questions requires different skills on the part of the student and represents different levels of comprehension. The ability to answer a literal question by matching the question stem to what is explicitly stated in the text (“What are resources provided by the Northeast region of the United States?”) is generally easier than answering a question where the evidence is not directly stated in the passage (“Explain how changes in climate were responsible for developing Niagara Falls”).

What Are Different Kinds of Question Taxonomies?

A variety of question taxonomies have been developed with the purpose of clarifying different types of knowledge or comprehension activities required for answering a specific question. The foundation of these taxonomies comes from Davis (1968, 1972), who was one of the first to conceptualize comprehension as involving different processes. Although not specifically directed at question types, Davis identified eight relatively separate comprehension factors:

1. Remembering word meaning
2. Determining word meaning from context
3. Understanding explicitly stated content
4. Weaving together ideas in the text
5. Drawing inferences
6. Recognizing author's purpose, mood, and/or tone
7. Identifying literary techniques
8. Following the structure of the text

Presumably, different questions would be needed to assess each factor. As illustrated previously (see Table 2.1), the majority of Davis's processes match the Common Core Anchor Standards for Reading. For example, Standard 1 focuses on understanding explicitly stated content and drawing inferences; Standard 4 centers on determining word meaning from context; Standard 5 addresses text structure; and Standard 6 focuses on recognizing author purpose, mood, and tone.

One of the first and perhaps the most well-known taxonomy of question types is that of Bloom (Bloom & Krathwohl, 1956), who divided cognitive processing into six
categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. These categories were used by the authors of the Rand Report on Reading Comprehension (2002). A revision of Bloom's original work by Anderson and Krathwohl (2001) offered the following six levels: remembering, understanding, applying, analyzing, evaluating, and creating. A variety of question taxonomies followed Davis's and Bloom's work (Applegate, Quinn & Applegate, 2002; Ciardiello, 1998; Raphael, Highfield, & Au, 2006). Most frequently, question types were based on the cognitive processes needed to answer different kinds of questions, and were divided into two broad categories of literal and inferential.

A different question taxonomy (Graesser & Person, 1994) is based less on what the reader must do and where the answer may be found and more on “the nature of the information being sought in a good answer to the question” (Grasser, Ozuru, & Sullins, 2010). They offer 16 different question types differentiated as shallow, intermediate, and complex.

- Shallow questions employ such question stems as who, what, where, and when. The reader is expected to offer an example, state if something is true or false, or say if it occurred or existed.
- Intermediate questions focus on understanding of quantitative and qualitative properties; the value of variables; definitions; and comparisons.
- Complex questions concentrate on interpretation of data, causes, consequences, goals, instruments, and procedures; goals and resources; identification of why something did or did not occur; and placement of value on an idea.

Mosenthal (1996) also differentiated questions in terms of the type of information needed to provide an acceptable answer. He formed “a continuum of difficulty depending on how concrete or abstract different types of requested information are” (p. 323).

- Questions that asked an individual to identify persons, animals, or things were the easiest and most concrete in nature.
- The next level included questions that asked for the identification of amounts, attributes, times, actions, locations, and types.
- The third level included identification of manner, goal, purpose, alternatives, and conditions.
- The fourth level included questions that focused on identification of cause, effect, reason, result, explanation, and similarity.
- The highest level of difficulty included questions that asked individuals to identify equivalence, difference, and theme. An examination of the Graesser and colleagues (2010) and Mosenthal (1996) taxonomies suggests that higher levels of questions are clearly related to the standards.

This summary suggests that questions are primarily distinguished by what the student is asked to do in order to answer the question, the nature of the information demanded by the question, and/or where the answer may be found. How a question is phrased signals the type of answer that is required. The proper choice of a question stem and the student’s understanding of that stem are critical components. For example, while analyze and categorize are possible question stems for Bloom and Krathwohl’s higher levels of questions, the student must grasp exactly what they mean in order to answer a question correctly. Using uniform and structured question stems and teaching students the nature of answers required by a specific stem is recommended (Gunn & Pomahac, 2008).

Using Taxonomies to Write Question Stems

Question taxonomies can act as guides to educators for constructing question stems based on the standards. A question stem can use a question word, such as who, what, when or where, or it can include a direction such as explain, describe, or analyze. Using the taxonomies
to write standards-based question stems involves two steps: matching a question type to a specific standard and selecting an appropriate question stem.

For example, Ciardiello’s (1998) classification of questions representing convergent, divergent, and evaluative thinking are applicable to the higher level of thinking demanded by the standards. Convergent questions beginning with *why*, *how*, and *in what way* match with Standard 3. Evaluative questions beginning with *justify* and *defend* match with Standards 8 and 9. Similarly, questions that match the standards can be based on Bloom and Krathwohl’s (1956) question categories using such stems as *compare*, *differentiate*, *analyze*, *explain*, *interpret*, and *summarize*.

**Table 2.2 Classification of Question Taxonomies**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>In the Book:</td>
<td>Memory</td>
<td></td>
<td></td>
<td></td>
<td>Remembering</td>
</tr>
<tr>
<td></td>
<td>Right There,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Literal</td>
</tr>
<tr>
<td></td>
<td>Think and Search</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>In My Head:</td>
<td>Convergent</td>
<td>Identify persons, animals, things, time, attributes, actions, locations</td>
<td>Shallow: Who, what, when, where</td>
<td>Understanding</td>
<td>Low Level High Level</td>
</tr>
<tr>
<td></td>
<td>Author and Me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>In My Head:</td>
<td></td>
<td>Identify manner, goal, purpose, alternatives, condition</td>
<td>Applying</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On My Own</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td>Divergent</td>
<td></td>
<td>Identify cause, effects, evidence, similarity, explanation</td>
<td>Intermediate: Quantitative, qualitative, properties, value, comparisons, definitions</td>
<td>Analyzing</td>
<td></td>
</tr>
<tr>
<td>Synthesis</td>
<td></td>
<td></td>
<td>Complex: Causes, consequences, goals, instruments, reasons, value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td>Evaluative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Evaluating</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Creating</td>
</tr>
</tbody>
</table>
Question stems for the intermediate- and complex-level questions of Graesser and Person's (1994) taxonomy include: What is the value of X? How is X similar to/different from Y? What can be inferred from X? Why did X occur? How did X occur? What are the consequences of X? What are the motives/goals of X? In accord with the demands of the standards, answers to such questions must be text based—that is, they must ask the student to draw inferences based on text content. In addition, questions that match the standards must emphasize higher-level comprehension and focus on analysis and synthesis as opposed to identification of discrete pieces of information.

The challenge in writing question stems to match the standards is the appropriateness of a stem to the intent of the specific standard. It is often assumed that students understand the subtle differences between question stems. For example, how does analyze differ from interpret? Do delineate and evaluate carry the same or different meaning? A student’s ability to answer a question obviously depends on ability to read the text, but it also depends on the student’s understanding of the question stem.

The CARA uses uniform question stems across all passages and all levels, with one exception. For literature, explain or describe are the question stems used in grades 4–6, and analyze is the term used above grade 6. For informational text, explain is the question stem used for grades 4 and 5. It is replaced by analyze for the remaining grade levels. The CARA questions can be used as a model for teachers to construct their own standards-based questions.

Table 2.2 summarizes many question taxonomies and how each taxonomy presents similar concepts represented by different terms.