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Building and Sharing Knowledge Key Practice: What Do You Know, What Don't You Know, What Did You Learn?

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RESEARCH REPORT

Building and Sharing Knowledge Key Practice: What Do You Know, What Don't You Know, What Did You Learn?

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In this paper we provide the rationale and foundation for the building and sharing knowledge key practice for the *CBAL*™ English language arts competency model. Building and sharing knowledge is a foundational literacy activity that enables students to learn and communicate what they read in texts. It is a strategic process that involves the integration of five key components or phases. Before reading, students *activate their relevant background knowledge* to help set learning goals, identify relevant information, and ask guiding questions that set the context for learning. During reading, students *understand the text* by using a host of strategies to construct a coherent mental model of the text content that is consistent with their background knowledge. Students *clarify meanings* of unknown words and concepts as they engage in metacognitive and self-regulated learning. After reading, students *consolidate* what they have read by using a variety of reading strategies that strengthen the representation in long-term memory. Finally, students *convey* what they have read in writing, speaking, or other representational formats to reflect communication goals and the intended audience. Collectively, the building and sharing knowledge key practice is intended to both model skilled performance and help identify component skill weakness. In this paper we outline the major features of the key practice as well as address potential advantages and challenges of the approach.

Keywords *CBAL*™; key practice; scenario-based assessment

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Reading and writing are complex skills that involve the coordination of a number of integrated components. Despite this complexity, educators are charged with the daunting responsibility of developing the literacy skills (reading and writing) for learning, including those of students who may have fallen behind their grade-level peers. Educators need the right assessments for documenting growth and providing feedback that is meaningful and will move instruction forward. As part of the Educational Testing Service (ETS) research initiative called Cognitively Based Assessment of, for, and as Learning (*CBAL*™; Bennett & Gitomer, 2009),[1] an English language arts (ELA) project team is developing a set of 11 key practices that cover critical literacy activities required for college and career readiness. The key practices identify bundles of skills that students must integrate to achieve complex, capstone performances or outcomes. An analysis of key practices identifies how skilled practitioners break the complex process down into major phases and links them to a set of component tasks and procedures that document where students are in their developmental trajectory.

In this paper, we describe the rationale, empirical literature, and assessment opportunities for one such key practice: building and sharing knowledge. Building and sharing knowledge is foundational for a wide range of literacy activities. In learning from text, students need to know what they know, know what they do not know, and take strategic action to build up a coherent and complete understanding of text to increase their knowledge. This process is iterative. For example, students need to identify and correct any misconceptions or errors in understanding that may arise during their reading as new information and resources that reveal such errors become available. Readers also need to represent texts to themselves in ways that are deep, but succinct and organized, so that the memory representation formed is stable and enduring over time. Finally, students need to be able to communicate their understanding in ways that are appropriate for the goals of the communication and the intended audience. Although the process of building and sharing knowledge can be quite complex, it can be used to structure assessments that support skill development by helping to identify learning targets and by modeling and mirroring the key practice.

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In the following section we provide the background and context for the building and sharing knowledge key practice, a construct definition, the rationale for why we need a building and sharing knowledge key practice, and an overview of the essential aspects of the practice as well as a review of the relevant empirical literature and an example assessment. In short, it is our hope that the building and sharing knowledge practice, and associated assessments, will help model effective learner habits by encouraging a strategic approach to literacy.

Background and Context

Criticisms of Traditional Assessments

Reading comprehension assessment has a long and rich history (see Sarroub & Pearson, 1998) that has resulted in the development of a wide range of reliable and efficient measures. Despite this achievement, assessments are imperfect measures, and in recent years, reading comprehension assessments have been repeatedly criticized by researchers and educators. For example, existing reading comprehension assessments have been criticized as being atheoretical and not explicitly guided by the empirical literature (Hannon & Daneman, 2001); as relying too much on multiple-choice formats that target superficial understanding (Rupp, Ferne, & Choi, 2006); as being thin on measuring key aspects of the construct at certain developmental levels (Paris & Hoffman, 2004); as being measures of students' background knowledge rather than their reading ability (Katz & Lautenschlager, 2001); as being not very sensitive to the effects of reading interventions (O'Reilly, Weeks, Sabatini, Halderman, & Steinberg, 2014); as being measures of only the product of reading and not the underlying process that feeds into it (Magliano, Millis, Ozuru, & McNamara, 2007); and as being a unique testing genre that requires learning-specific test-taking skills (Hornof, 2008).

Time for Change?

While many of these criticisms are not new (Sarroub & Pearson, 1998), recent advances in cognitive theory and technology (see Paris & Stahl, 2005; Sabatini, Albro, & O'Reilly, 2012; Sabatini, O'Reilly, & Albro, 2012) coupled with national large-scale efforts such as the Race to the Top funding (U.S. Department of Education, 2009), the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), and other seminal works (Partnership for 21st Century Skills, 2004, 2008; Pellegrino, Chudowsky, & Glaser, 2001) have opened the discussion and the door for a new generation of reading and writing assessments. In particular, this discussion has resulted in the recommendation to create assessments that are informed by the theoretical and empirical literature and provide instructionally useful information (Gordon Commission, 2013).

CBAL

In light of these and other forces, the researchers and assessment developers at ETS have embarked on a long-term research and development project to create a next generation of reading, writing, mathematics, and science assessments (Bennett, 2010, 2011; Bennett & Gitomer, 2009; ETS, 2014). This initiative, CBAL, has developed dozens of formative and summative assessments that have been administered to thousands of students across the country (Bennett, 2011). The items, tasks, assessments, and designs are based on detailed literature reviews conducted in each of the domains (see ETS, 2014, for links to the reviews). These literature reviews summarize the theoretical and empirical research in a wide variety of learning science areas including strategies, learning, memory, transfer, and best instructional practices specific to the domains of ELA (reading and writing), mathematics, and science.

Relevant to the current paper, reviews and competency models have been developed for reading (O'Reilly & Sheehan, 2009), writing (Deane et al., 2008), and recently, an integrated reading and writing ELA competency model (Deane, Sabatini, & O'Reilly, 2012). As a general goal, CBAL assessments are designed to capture the complex performances required to succeed in 21st-century learning environments while simultaneously leveraging technology and cognitive science principles to model and support learning for students across their developmental span. The details of the general CBAL initiative and the specific competency models are beyond the scope of the paper; interested readers are encouraged to visit the Web site (ETS, 2014) for more information. To set a context for our discussion of the building and sharing knowledge key practice, we provide a brief review of a critical CBAL design feature — the use of scenario-based assessment.

Scenario-Based Assessment

Traditional reading assessments have no global purpose for reading other than to answer questions correctly (Rupp et al., 2006). This lack of a global purpose for reading not only fails to reflect reading in the real world, but it also fails to provide a standard of coherence (Linderholm, Virtue, Tzeng, & van den Broek, 2004; van den Broek, Lorch, Linderholm, & Gustafson, 2001; van den Broek, Risden, & Husebye-Hartman, 1995) that students can use to evaluate the importance or relevance of the texts and sources (McCrudden, Magliano, & Schraw, 2011). Also, in traditional reading assessments, items are typically associated with a single passage, and there are no interconnections between items, tasks, and texts across the course of the assessment.[2] This design, while useful for measuring single-text comprehension, does not reflect the range of reading in 21st-century environments that demand multiple text comprehension (Britt & Rouet, 2012) and digital literacy (Coiro, 2009).

Similarly, in many traditional writing assessments, students are given a generic prompt and are expected to write a coherent and informed essay without any source materials. Arguably, such tasks are artificial in the sense that they do not represent the types of writing required in college and careers for which we are trying to prepare students. In such contexts, students must typically read, summarize, analyze, critique, and integrate information across multiple sources as part of the writing process. Traditional writing assessments may, therefore, fall short, not only in measuring some of the most important skills of writing, but also in signaling what is important to learn and teach. To address the issues discussed above, the CBAL team has developed a technique called *scenario-based assessment*.

A key innovation of CBAL designs is the use of scenario-based assessment to measure integrated reading and writing skills (Deane, 2011; Deane et al., 2012; O'Reilly & Sheehan, 2009; Sheehan & O'Reilly, 2012). Scenarios provide test takers with a realistic purpose for reading and writing about a collection of thematically related but diverse sources (O'Reilly & Sabatini, 2013; Sabatini, O'Reilly, & Deane, 2013). The sources help build students' knowledge of the topic and also provide the material from which students can write thoughtful responses. Because the sources are thematic, the tasks have the potential to provoke deeper understanding. This deeper understanding is facilitated by requiring test takers to synthesize and integrate multiple sources and perspectives as well as evaluate their credibility. This deeper approach to measuring literacy is in contrast to many traditional assessments that have been criticized as measuring standards that are "a mile wide and an inch deep" (see Schmidt, McKnight, & Raizen, 1997, p. 122, for a discussion of narrowing standards).

The potential advantage of the scenario-based design is that it contextualizes literacy activities by providing goals and a standard of coherence (Linderholm et al., 2004; van den Broek et al., 2001; van den Broek et al., 1995) for processing sources. The scenario and purpose for engaging in literacy activities help to define what is and what is not important to attend to and what constitutes quality performance. The contextualization, coupled with the sequencing and modeling of texts and tasks, allows test designers to ask deeper questions that demand more thoughtful written responses. This depth results because the assessment design digs into thematic issues rather than attempting to sample a wide, disparate range of general topics and standards at a shallow level (Schmidt et al., 1997).[3]

The Challenge for Scenario-Based Assessment

The scenario-based approach, while innovative, also poses several challenges. For instance, too much contextualization may limit the generalizability of the assessment results—a criticism relevant to performance assessment more generally (Ryan, 2006). If the purposes for reading and writing are too narrow and the topical content too specialized, the skills measured may not transfer to other topics, texts, and tasks. On balance, we want to build assessments that not only are generalizable and practical, but also measure deep but broadly relevant reasoning and literacy skills.

Key Practices

The scenario-based approach, as operationalized in CBAL, aims to balance the competing goals of practicality and gathering evidence of deeper cognitive skills. It also has a parallel goal—helping to provide essential evidence about student learning that enhances educator understanding and capability to effect meaningful changes in practice. Toward this end of communicating assessment evidence to educators, we have developed the conceptual tool we are calling *key practices*. Key practices are sets of literacy activities that are meaningful to educators and can be applied to a wide range of literacy contexts. Key practices cover a constellation of skills that span a range from emergent literacy in young children to

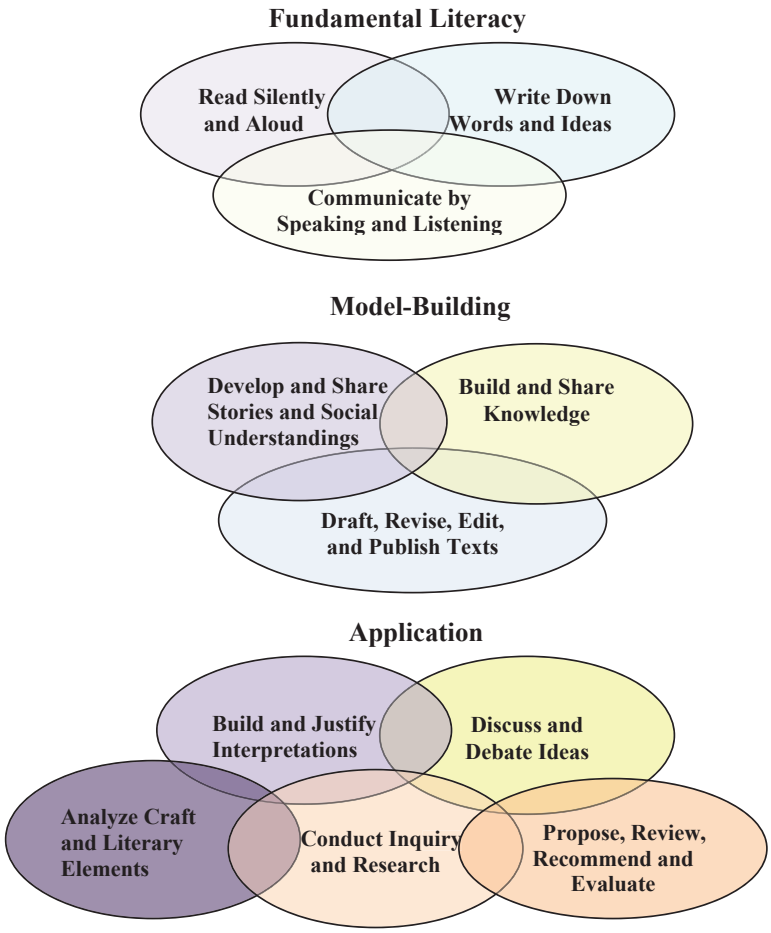

Figure 1 Key practices for the English language arts (ELA).

proficiencies necessary for college and career readiness (and beyond). Key practices can be sensitive to a topic, but they are not necessarily limited by it. Rather, they represent a collection of processes, techniques, and strategies that are useful in modeling and measuring cross-cutting literacy activities. In other words, key practices help to translate scenarios into generalizable conceptual and instructionally relevant assessment designs.

In accordance with these aims, we have developed 11 key practices that cover a wide range of meaningful reading and writing activities (see Figure 1; Deane et al., 2014). These key practices envelop a spectrum of literacy skills, from the foundational (e.g., communicate by speaking and listening) to the advanced levels that require students to go beyond the text and apply what they read (e.g., conduct inquiry and research). The key practices are organized along a quasidevelopmental continuum. That continuum is based on the age or grade band at which instruction is most likely to emphasize a particular key practice. However, this clustering of key practices into levels should not be treated as a strict hierarchy. In fact, most of the key practices span the entire developmental continuum from preliterate speaking and listening activities through postsecondary proficiency. Nonetheless, it is helpful heuristically to consider when each key practice is likely to be a focal point of instruction.

The first cluster of key practices is called *fundamental literacy*. The three fundamental literacy key practices composing the cluster serve as the foundation for speaking, listening, reading, writing, and thinking in ELA. This cluster includes such basic skills as word decoding, transcription, and basic print knowledge, which serve as the building blocks for basic understanding and communication. The second cluster, called *model building*, organizes the set of activities that are necessary for forming an understanding of text and communicating to an audience. These key practices include skills that enable students to form a representation of narrative and informational texts as well as fundamental practices authors use in conceptualizing, structuring, and organizing formal written communications. The third cluster, called *application*, involves the advanced set of skills that require students to go beyond the basic text representation and apply the meaning

for different purposes, such as to evaluate, integrate, solve problems, and communicate to particular audiences. While the details of each of the 11 key practices are beyond the scope of the current paper, interested readers are encouraged to consult Deane et al. (2014) for more information. The purpose of the current paper is to provide a detailed description of the model-building key practice, building and sharing knowledge.

Definition

Building and sharing knowledge refers to the constellation of knowledge, skills, and abilities that are required to understand, learn from texts, and communicate or represent that understanding to an audience. It includes the set of strategic abilities, metacognitive activities, and self-regulatory actions students engage in before, during, and after reading. Before reading, students consider their reading or learning goals and activate relevant background knowledge by previewing key sections of the text and generating guiding questions. This constellation of skills also includes the set of skills for judging the relevance and usefulness of information for particular literacy goals. During reading, students construct a mental model of the text to help them understand the text at deeper levels. Students take action to clarify meanings and gaps in understanding to ensure the mental model is internally coherent from the word to the discourse level of understanding. Students consolidate their understanding by organizing, summarizing, and elaborating what they have learned. In some cases, students may test the limits of their understanding by consulting multiple sources and by applying what they read to new situations and contexts. Finally, students convey what they have learned to targeted audiences and adjust their communication accordingly (see Figure 2).

From this definition, we can extract some general themes. First, the skills that feed into building and sharing knowledge are intertwined and complex. The multifaceted skills forming a collection work in tandem, and no one skill is sufficient for

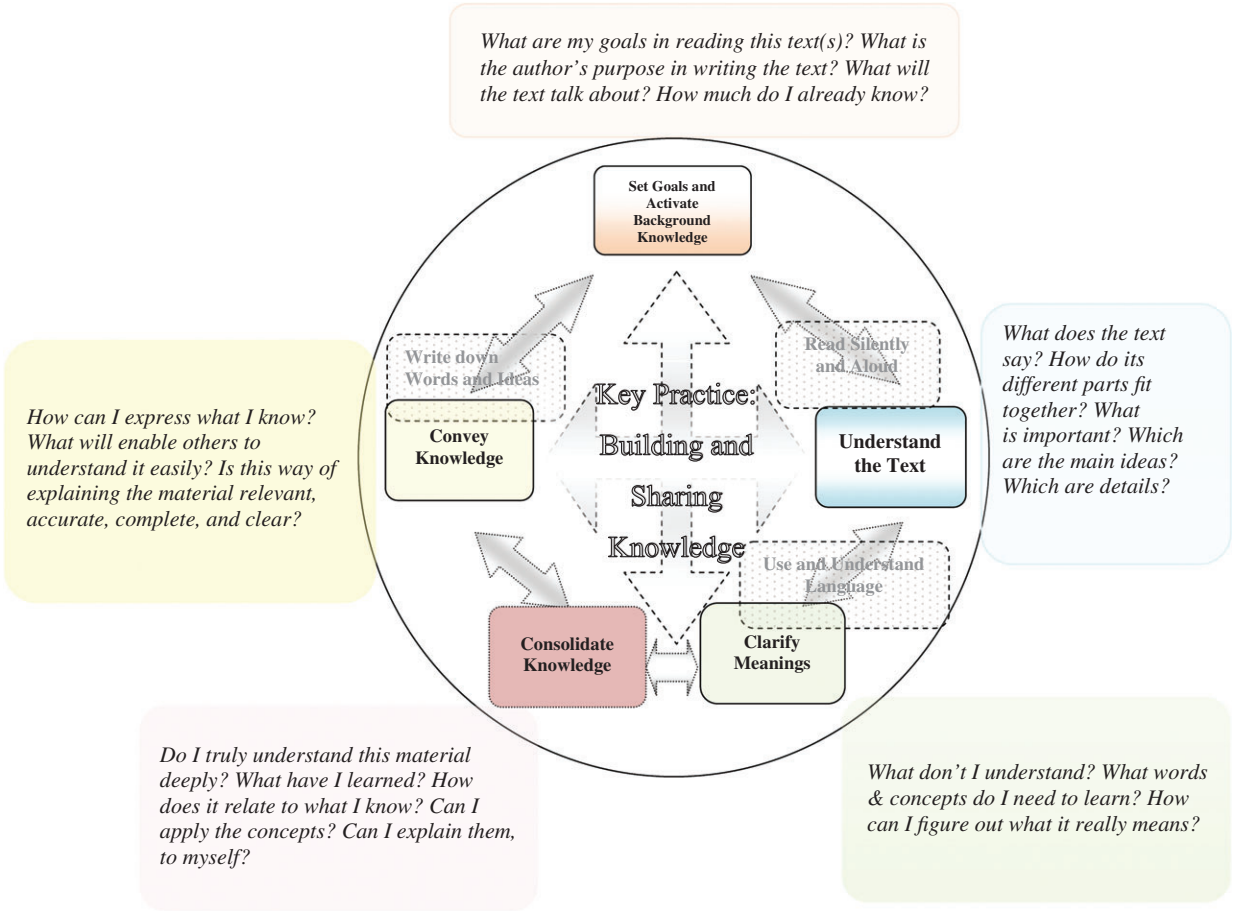

Figure 2 Activity diagram for building and sharing knowledge.

proficient performance. Second, building and sharing knowledge is a process. Not every step in the process is necessary for every literacy task; however, structuring the key practice into manageable steps is likely to model good habits of mind and possibly provide more information on what parts of the larger task students can or cannot do. Third, building and sharing knowledge is an iterative process. Understanding is dynamic, and it often requires revisiting the text and one's own understanding to clarify or check the veracity of claims or the global coherence of the intended message. Fourth, building and sharing knowledge is strategic. Students can use a wide range of literacy strategies to reduce processing load (e.g., reduce the working memory demands) or to improve the long-term retention of the meaning of the text. Below, we explain some of the rationale for why a building and sharing knowledge key practice is necessary.

Why Building and Sharing Knowledge Is Educationally Important

Text Processing Demands

Texts are complex and incomplete and thus require strategic processing. As mentioned above, reading comprehension is a complex process (McNamara & Magliano, 2009; Perfetti & Adlof, 2012). Part of this complexity resides in the set of integrated skills necessary to understand text; other challenges are raised by the nature of the texts themselves (Snow, 2002). For example, textbooks are often inconsiderate for readers—they frequently comprise complex, long, and sometimes incomplete blocks (Beck, McKeown, & Gromoll, 1989; Chi, de Leeuw, Chiu, & LaVancher, 1994; Konopak, 1988; McNamara & Kintsch, 1996; McNamara, Kintsch, Songer, & Kintsch, 1996; Wilson & Anderson, 1986). Consequently, to deeply understand text requires the reader to engage a variety of strategic processes that make the text more manageable and coherent (McNamara, 2007). In other words, deriving meaning from text is an active and effortful process.

For instance, to deal with longer texts, students need to extract the key ideas in order to reduce memory load (Franzke, Kintsch, Caccamise, Johnson, & Dooley, 2005). This activity requires leaving out many minor details or irrelevant events. Conversely, sometimes authors leave out key background information because they assume readers already know it; this omission can result in texts that are perceived as disconnected by low-knowledge readers (Beck et al., 1989). When such gaps are present in texts, readers need to draw knowledge-based inferences to fill in the unstated information (McNamara, de Vega, & O'Reilly, 2007). The consequence of this text processing is the formation of a mental representation, sometimes called a mental model of the text (Gentner & Stevens, 1983; Johnson-Laird, 1983; van Dijk & Kintsch, 1983), as described in the next section.

The Need for Mental Models

Readers need to construct mental models. The concept of a mental model is present in most theories of reading, including the construction integration model (Kintsch, 1998, 2004, 2012; van Dijk & Kintsch, 1983); the constructionist theory (Graesser, Singer, & Trabasso, 1994); the structure building framework (Gernsbacher, 1990, 1997); the landscape model (van den Broek et al., 2001; van den Broek et al., 1995; van den Broek, Young, Tzeng, & Linderholm, 1999); the event indexing model (Zwaan, Langston, & Graesser 1995; Zwaan & Radvansky, 1998); the resonance model (Myers & O'Brien, 1998); and the minimalist hypothesis (McKoon & Ratcliff, 1992). See McNamara & Magliano (2009) for a general review.

Although different theories posit different ways of describing a mental model and how it is formed, there are some common features. First, mental models are representations of the text. As such, they rarely involve verbatim memorization, though there may be some particular clauses or quotes that are retained. In lay terms, much of the representation is constructed in the students own words. Thus, the formation of a mental model involves recoding of the text for long-term storage (e.g., Kintsch, 1998, describes the memory units as propositions). Second, sound mental models are reductionistic in nature—key ideas, concepts, and principles are retained, but many minor details are often left out (Franzke et al., 2005). In other words, mental models are often strategic simplifications of the full text. Third, sound mental models are organized to reflect the basic structure of the text (Meyer & Ray, 2011). While certain details in the mental model might be left out, how the main points are structured, sequenced, and described should be preserved as a part of the mental model (e.g., problem-solution, compare-contrast). Fourth, sound mental models are internally coherent and gaps in understanding need to be filled in with knowledge-based inferences (McNamara et al., 2007). When texts are incomplete, students need

to make connections so that the main ideas and causal structure line up. As such, students need to self-regulate their learning and be metacognitively aware of their understanding.

The Need for Self-Regulation

Readers need to self-regulate their understanding as they read. Although the formation of an initial mental model is important, we argue that it is not enough. Students need to be able to monitor and check the accuracy of the model and repair it when necessary (Hacker, Dunlosky, & Graesser, 2009). They need to update the model when new information is present and check it against background and general world knowledge (Kintsch, 1998, 2004, 2012). Students also need to test the limits of their understanding by applying what they know to new contexts and situations (O'Reilly & Sabatini, 2013; O'Reilly & Sheehan, 2009; Sabatini, O'Reilly, & Deane, 2013). Understanding also needs to be communicated. Students need to be able to share what they know and communicate it effectively to particular audiences. This activity involves an understanding of audience so that the presentation or written communication can be tailored (Bereiter & Scardamalia, 1987; Midgette, Haria, & MacArthur, 2008). Collectively, this strategic process requires the self-regulatory skills to keep learning on track.

In summary, the formation of a mental model is effortful, strategic, and complex, and many students may have difficulty either with component processes or in coordinating these skills to support effective learning from (and communication about) informational text. Building assessment scenarios that model this process is likely to benefit a range of students for several reasons. First, by deconstructing and modeling the process that makes up the building and sharing knowledge bundle, the tacit components become more explicit. The integrated nature of complex performances, such as the construction and sharing of a mental model, is often opaque for less skilled readers. Having a step-by-step breakdown of the process in the form of an assessment may serve as a recipe that is more tractable and easier to follow than simply viewing the final product itself.

Second, having a tractable set of tasks that measures the various components of the key practice may help signal weaknesses in component processes or phases. In turn, these signals may act as starting points for further instruction. Third, the process of building and sharing knowledge cuts across a range of text genres and is foundational to a host of other more complex applied key practices. In order for more complex skills, such as critical thinking, to operate, a strong foundation of what the text says is important. Collectively, the building and sharing knowledge key practice is generalizable across a range of literacy activities, and it is foundational for higher level key practices. Assessments that measure and model this practice are likely to have a wide range of trickledown benefits. In the next section, we provide an overview of the five key elements that comprise the building and sharing knowledge bundle and review some of the relevant literature that informed its development.

Overview of Building and Sharing Knowledge

The building and sharing knowledge key practice was derived from the more general CBAL ELA framework, as expressed in the CBAL wiki (http://elalp.cbalwiki.ets.org/) and related publications (Deane, 2011). The framework focuses on defining categories of activities and skills and mapping these categories onto learning progressions, which are then used to define measurement targets for specific tasks. Learning progressions are hypothesized developmental sequences that lay out the qualitative levels through which students might pass as they progress toward skill proficiency. In other words, integrating the learning progressions into an assessment design allows assessment designers to break down more complex performances into smaller units so that the current sophistication level of the student is more visible and the instructional decisions are potentially more targeted.

The current paper reflects the accumulation of prior work that focused on developing learning progressions relevant to the building and sharing knowledge key practice (see the Appendix for examples in Tables A1 to A14). However, the purpose of this document is not to delve into the details of individual learning progressions but to provide an overview of the core features of the key practice as a whole. With this goal in mind, Figure 2 shows the general structure of the building and sharing knowledge key practice, which relates the information provided in texts to the knowledge activated or acquired by an individual during reading. This activity diagram corresponds to the kind of reading most often performed with purely informational texts. It is based in part upon analyses of reading and writing strategies and practices to be found in prior CBAL literature reviews (Deane, 2011; Deane et al., 2008; O'Reilly & Sheehan, 2009). It is intended

to capture key activities in which people may engage if their purpose is to build and share knowledge from a textual source.

According to this analysis, five major types of activities are involved in this activity system:

- *Set goals and activate prior knowledge.* Reading is a purposeful activity. This purpose may simply be to learn about a new topic, or it may be more targeted. Considering one's general goals will help to set a standard of coherence and of the relative importance of different pieces of information in a text. With some general or specific purpose in mind, the reader then would engage a class of activities corresponding to prereading strategies, though brainstorming strategies, for example, in preparation for writing an informational text, may also be called upon. With a clear goal or purpose in mind, students are also in a better position to write a more effective communication that is targeted to a particular audience. Especially relevant strategies are those that support goal setting and the retrieval of relevant knowledge from long-term memory to support reading or producing an informational text.
- *Understand the text.* This class of activities corresponds to normal reading for comprehension, where the focus is on building a sound, coherent representation of text content (i.e., a sound mental model that is concise, accurate, and coherent). Building understanding of a grade-level text typically presupposes mastery of an earlier, emergent-reading key practice (reading silently and aloud) at a level commensurate with grade-level text linguistic structures, which is why we have represented that practice using a shadowed figure placed mostly behind the figure labeled "Understand the Text."
- *Clarify meanings.* This class of activities corresponds to a range of comprehension repair and learning activities designed to build a richer, more accurate representation of text meaning, even in the face of comprehension failures. Clarifying meaning specifically presupposes sufficient mastery of an earlier language-skills key practice (use and understand language) to have high levels of metalinguistic awareness as a tool to support comprehension repair, which is why we have represented that practice using a shadowed figure placed mostly behind the figure labeled "Clarify Meanings."
- *Consolidate knowledge.* This class of activities corresponds to a range of reading strategies designed to consolidate textual content with prior knowledge for deeper and more stable representation. The key practice overlaps with skills deployed in other key practices we have identified, most notably, research and inquiry.
- *Convey knowledge.* This class of activities comprises a range of writing or representation skills needed to organize and present information to a particular audience. Conveying knowledge specifically presupposes sufficient mastery of the emergent-writing key practice (write down words and ideas) at the grade level of text sophistication to support the goal of conveying knowledge. For this reason, we have represented that earlier practice using a shadowed figure placed mostly behind the figure labeled "Convey Knowledge."

In Figure 2, each of the five activity types is paired with a set of questions designed to identify the goals and subgoals that individuals might progress through as they build their understanding.

Note that we arranged the activities in a circle, with an implied (but not strictly necessary) clockwise flow from goal setting and activating knowledge to understanding the text, clarifying meanings, consolidating knowledge, and conveying knowledge. We do not intend to communicate a strict order, since a nonlinear or multilayered integrated approach to reading is consistent with expert practice. There may be multiple passes over the text, with multiple episodes of each activity type, and the order may proceed in any combination from moment to moment. A two-step counterclockwise sequence, for example, from activating knowledge to conveying knowledge, represents a simple knowledge-telling approach to writing an informational text. Skilled writing, however, will include rereading one's own text (applying the other activity types to assess how well one's own text supports reading), which entails more incremental, recursive processing. The activity diagram is intended to capture common sequences that may be helpful didactically. The diagram might be helpful when introducing the concepts to students, as well as in specifying major classes of activities that are important for a particular phase. However the diagram is not intended to provide a strict, uniform directional process model.

From the individual activities, or phases in the practice, we can identify the skills needed to support that activity, and from the skills, we can map to learning progressions. For building and sharing knowledge, some of those skills fall into the conceptual category of the larger CBAL classification of learning progressions, some fall into the discourse category, and some are in the verbal category. These skills are labeled as appropriate (see Table 1). In Table 1, the rows correspond to classes of activities from Figure 2; the columns refer to specific task types that can be used to accomplish that activity's goals. The individual skills represent specific activities (which may in turn require specific knowledge, skills, and abilities)

Table 1 Mapping From the Activity Diagram to Specific Targeted Skills

Goal Setting and Activating Prior Knowledge[a]			
Genre Differentiation	*Print Cue Sensitivity*	*Verbal & Conceptual Association*	*Knowledge-Telling*
Determine what sort of text one is dealing with, infer readers' or author's purposes, and set expectations and goals for reading.	Identify structural features of the text and use these to identify/recall key terms and concepts.	Scan for repeated or associated words that identify key topics and themes. [was part of vocabulary development]	Review what one already knows about the topic(s) addressed by the text, possibly writing them out in some form to solidify them in memory and provide an external cue for further reasoning or analysis. [was self-explanation]
Understanding the Text (may also be used to support consolidation of knowledge)			
Discourse Fluency & Control	*Outlining*	*Knowledge-Based Inference*	
Maintain sufficient fluency, control, and coordination of text production and comprehension to support efficient processing of the text.	Explicitly represent the hierarchical structure of a text, possibly using some form of graphic organizer or other external representation of text content.	Bridge gaps and specify details by making inferences that draw upon prior knowledge of the topic. [was prediction]	
Clarifying Meanings			
Word Formation	*Definition and Lookup*	*Multiple Meanings*	
Use morphological relationships between words to infer the meaning and use of unfamiliar vocabulary. [was analogy]	Clarify what a word or concept means using the reasoning strategies built into formal definition; clarify understanding of a text using lexical tools such as a dictionary.	Recognize when a word or sentence structure has multiple possible meanings; infer new word meanings using metaphor, metonymy, and other conceptual relationships.	
Sentence Context	*Paraphrase*	*Logical Analysis*	
Use sentence context to infer what a word or phrase must mean in context.	Capture a clear understanding of what part of a text means by recasting the same meaning in different words.	Clarify the meaning and implications of a statement using sentence form to constrain logical reasoning. [On wiki: Verbal Inference]	
Consolidating Knowledge (also support understanding the text)			
Summary/Main Ideas		*Compare, Contrast, and Organize*	
Form a gist understanding of the text that captures main and supporting ideas; use this gist representation to recall information for further use.		Compare and contrast the discourse structure and content of multiple sources on a topic; organize information with respect to salient categories or goal-driven purposes.	
Conveying Knowledge			
	(P)Review: Apply Standards for Quality of Informational Text [on wiki]		
Framing an Exposition	*Relevance*	*Accuracy*	*Level of Detail*	*Clarity of Expression*
Arrange content for communication to others.	Discipline oneself to expressing only information relevant to the topic, purpose, and specific ideas in focus.	Discipline what is said or written to avoid conveying incorrect information.	Discipline the level of detail so as to provide useful information without belaboring the obvious.	Choose language that expresses the information to be conveyed clearly but concisely.

[a]This row needs to be expanded somewhat to include goal-setting skills, which we will address in future work.

that fit into the larger frame provided by Figure 2, but activities in the same row work together to achieve the same subgoals. Each cell in Table 1 corresponds to a hypothesized learning progression. The links in the table connect either to the Appendix or to the CBAL wiki, cited earlier. Some of the progressions presented in Table 1 are new or revised from the version on the CBAL wiki. In the discussion that follows, we briefly review some of the relevant strategy and learning science literature that led to the development of the five phases in the building and sharing knowledge bundle.

Relevant Literature

Set Goals and Activate Background Knowledge

Knowing what one knows and does not know can help an individual assimilate new information as well as identify goals or learning intentions (P. A. Alexander, Murphy, & Kulikowich, 2009) for what to find out while reading. Moreover, having a specific purpose for reading can also serve as a criterion for determining whether the text is relevant for that purpose (McCrudden et al., 2011). These strategic prereading behaviors are foundational for later phases in the key practice. In the building and sharing knowledge key practice, activating relevant knowledge is also critical. Relevant knowledge of the text structure (Meyer & Wijekumar, 2007), the topic, content or discipline (S. Goldman, 2012), the author, and the author's purpose (P. Alexander, 2012; Meyer, 1987) will all likely provide an advantage to students before they read the text.

Why do these prereading and activating-knowledge behaviors help? Research has shown a relationship among reading, writing, and the level of students' background knowledge (Benton, Corkill, Sharp, Downey, & Khramtsova, 1995; Cromley & Azevedo, 2007; S. J. Davis & Winek, 1989; DeGroff, 1987; Shapiro, 2004). In general, this literature indicates that students who know more about a topic generally comprehend and write more effective essays than students with lower levels of background knowledge. Background knowledge may help students comprehend and write more effectively in several ways. First, background knowledge serves as a structure or schema (Mandler, 1984) for integrating and organizing new knowledge (Kintsch, 1998, 2004, 2012). It is much easier to slot new information into a known structure than to build a new structure from scratch. Second, background knowledge provides readers with the inferences needed to fill in conceptual gaps encountered in text (McNamara & Kintsch, 1996). That is, background knowledge provides readers with both a structure and a mechanism for assimilating and modifying new information.

When building new knowledge during reading, it is often advantageous to activate existing knowledge relevant to the topic of the text. This activation is advantageous because the brain is a network of associations, and activation spreads to related concepts (Anderson, 1983). In other words, thinking about a topic such as organic farming is likely to trigger other related concepts such as natural ingredients and healthy food. This spread of activation allows individuals to recall concepts related to the topic in question. In effect this is like a warm up activity before reading. With these related concepts at hand, students have a structure to integrate new information as they read (e.g., green living).

In the reading strategy literature, the activation of relevant knowledge is a key element in the previewing strategy (Spires, Gallini, & Riggsbee, 1992).[4] During the previewing strategy, students skim key aspects of the text to activate relevant background knowledge and to generate a list of questions to guide further reading. These text aspects include the title, headings, bold and italicized words, and chapter questions. Previewing these key sections of the text is likely to help the reader get a better sense of what the text will describe (i.e., set expectations) and also to help draw the reader's attention to areas that might be problematic (e.g., difficult vocabulary, unfamiliar concepts). For the previewed areas of the text that are problematic, the readers can generate questions that can be used as guides when reading the text in full. Answering these guiding questions while reading should result in a more complete understanding of the text than if gaps are left unchecked. This metacognitive and self-regulatory function of the previewing strategy is a critical part of the building and sharing knowledge key practice and is described in a later section.

More broadly however, the previewing strategy has been shown to improve reading comprehension (Spires et al., 1992). Thus, integrating some previewing strategy and the more general approach of activating background knowledge in a reading assessment might improve performance and model good reading practices. In short, setting goals and activating relevant background knowledge is a useful prereading strategy and a foundational step in building and sharing knowledge.

Understand the Text

The aim of the goal-setting and background-knowledge-activating parts of the building and sharing knowledge key practice is to better prepare the student before reading the full text. In contrast, the purpose of the understand text phase

is for readers to build a sound mental model (i.e., concise, accurate, and coherent) while they are reading. On the surface, the understand the text phase might seem relatively simple: Students just need to decode the words and then the meaning becomes self-evident. However, what it means to understand and the process of reaching an acceptable level of understanding are often complicated (McNamara & Magliano, 2009). As described earlier, students need to construct a mental model of the text (Kintsch, 1998, 2012); this process involves many steps, and it can go awry at many points. Critical information needs to be identified, irrelevant details need to be suppressed, relations among key ideas need to be preserved, gaps must be filled in, an organizational structure needs to be created, and coherence should be maintained at all levels (Franzke et al., 2005; S. Goldman & Rakestraw, 2000; Graesser et al., 1994; McNamara et al., 2007; McNamara & Magliano, 2009; Meyer & Ray, 2011; Perfetti & Adlof, 2012; van den Broek et al., 1995; Zwaan et al., 1995).

Although constructing a concise, accurate, and coherent representation may be relatively easy for skilled readers, it may be difficult for less skilled readers. For this reason, CBAL designs are geared toward modeling good habits of mind and adding supports for this latter group (i.e., the assessment can be a learning experience in and of itself). From a design perspective, this modeling and support can be achieved in a number of ways, most notably by incorporating a variety of reading strategies in the assessment design (McNamara, 2007). Reading strategies are sets of actions that modify, elaborate, simplify, organize, or re-represent textual information for the purposes of improving reading comprehension.[5]

Reading strategies include, but are not limited to, visualization/imagery (Oakhill & Patel, 1991), paraphrasing (Fisk & Hurst, 2003; Hagaman, Casey, & Reid, 2012; Hua, Woods-Groves, Ford, & Nobles, 2014), elaborating (Menke & Pressley, 1994), predicting (Afflerbach, 1990), self-explanation (McNamara, 2004), note taking (Faber, Morris, & Lieberman, 2000), summarization (Franzke et al., 2005), previewing (Faber et al., 2000; Spires, 1993), inferring the meaning of unknown words from context (McKeown, Crosson, Artz, Sandora, & Beck, 2013), and using graphic organizers and text structure (S. Goldman & Rakestraw, 2000; Meyer & Wijekumar, 2007). Collectively, these strategies have been effective in improving reading comprehension. They can be incorporated into assessments as evidence-eliciting tasks as well as improve the instructional relevance of the assessment (O'Reilly & Sabatini, 2013).

In relation to the understand the text phase of the building and sharing knowledge key practice, a variety of strategies are likely to be useful including paraphrasing, note taking, and inferring word meanings from context and imagery. For instance, paraphrasing allows students to put the text into their own words and can increase memory for and comprehension of text. Note taking can help identify key ideas and elicit questions the student can use to guide further reading. Students can also use the contextual cues to help them infer the meanings of unknown words. Additionally, visualization and imagery strategies can create alternate representations for strengthening the meaning of text (e.g., dual code theory, Pavio, 1986). Collectively, these and other reading strategies can serve as a basis for building meaning of the text at the word, sentence, and discourse levels. In effect, reading strategies help facilitate the construction of sound and stable mental models of text (McNamara, 2007).

The process of understanding the text, however, presupposes mastery of the emergent reading key practice, reading silently and aloud, at a level commensurate with grade-appropriate text linguistic structures. For that reason, we have represented that practice using a shadowed figure placed mostly behind the figure labeled "Understand the Text" in Figure 2. Finally, although much attention in the classroom has been focused on teaching reading skills and strategies, much less attention has been given to other important reading influences such as metacognition and self-regulation (Afflerbach, Cho, Kim, Carassas, & Doyle, 2013), which is taken up in the next section.

Clarify Meanings

The first two aspects of the building and sharing knowledge key practice are designed to activate relevant background knowledge and to build an initial model of the text. Although this aspect of the key practice might sound linear in theory, in reality, knowledge building is an iterative process. Initial concepts, ideas, and relations are constructed over cycles and updated when new information is revealed in the passage (see the landscape theory, van den Broek et al., 1999). Students revisit and revise initial interpretations based on accumulating evidence. This process is complex and requires the students to be metacognitively aware of their understanding and to deploy a range of self-regulatory behaviors to ensure that gaps in understanding and errors in reasoning are rectified.

In general, this class of activities corresponds to a range of comprehension repair and learning processes designed to build a richer, more accurate representation of text meaning, even in the face of comprehension failures. Clarifying meaning specifically presupposes sufficient mastery of the language-skills key practice, use and understand

language, to have high levels of metalinguistic awareness as a tool to support comprehension repair. As a consequence, we have represented that practice using a shadowed Figure 2 placed mostly behind the figure labeled "Clarify Meanings."

The clarify meanings phase of the building and sharing knowledge key practice is consistent with the literature on metacognition and self-regulation.[6] Although precise definitions of the term *metacognition* tend to vary, researchers generally agree that metacognition is the state of being aware of one's understanding (Hacker et al., 2009) and is often described as involving a set of processes including planning, monitoring, and evaluating (Schraw, 1998). Whereas metacognition is more reflective, self-regulation is more behavior directed (P. Alexander, 2012); in reading, self-regulation involves the set of actions to correct misconceptions or repair gaps in understanding.

Although a relationship exists between skilled reading and metacognition (Oakhill, Hartt, & Samols, 2005) and metacognition and learning (Thiede, Anderson, & Therriault, 2003), research has shown that many students are not very accurate at judging their own learning. According to one review of the literature, students' judgments of learning are accurate less than 30% of the time (Maki, 1998). More recent reviews confirm the relative inaccurate nature of self-judgments of learning (Dunlosky & Lipko, 2007). Such low levels of monitoring accuracy have led some researchers to theorize about the causes of students' poor judgments. One view holds that student monitoring ability is often poor because students have not learned information at a deep level (see Dunlosky & Lipko, 2007). In support of this view, metacomprehension accuracy increases when students read texts in ways that force deeper processing. For example, summarizing text (Thiede & Anderson 2003), rereading text (Rawson, Dunlosky, & Thiede, 2000), and generating key words (Thiede, Dunlosky, Griffin, & Wiley, 2005) before making judgments of learning have all been found to improve metacomprehension accuracy. Presumably, metacognitive ability improves learning by providing students with the wherewithal to notice when comprehension breaks down and also the ability to repair it.

In terms of the building and sharing knowledge practice, students need to ask whether they are understanding the passage, whether the information presented in the text is consistent, and whether there are any outstanding gaps. If there are comprehension problems, students need to repair them by using strategies such as those mentioned in the previous section. Additionally, some of the other strategies listed in Table 1 also might be especially useful when the source of comprehension difficulty stems from not understanding specific words or phrases, including word formation, definition and lookup, multiple meanings, sentence context, and logical analysis. Collectively, strategies, metacognitive awareness, and self-regulation help to keep learning on track. The iterative nature of these processes can necessitate their need at any stage of reading: before, during, or after reading the text.

Consolidate Knowledge

The clarify meanings aspect is designed to increase student awareness of their understanding and to take action to repair any problems that detract from the global coherence of their mental model of text. While these metacognitive and self-regulatory behaviors are critical in building a coherent mental model, they are not enough. Coherent mental models also need to be deep and long-lasting. Students need to build rich representations that endure over time and are flexible over a wider range of situations (Healy et al., 1993). In short, students need to consolidate what they have read and learned.

To achieve these aims, the consolidate knowledge phase of the key practice includes several design features. First, rich situation models require that students integrate their background knowledge with the text (Kintsch, 1998, 2012). In an assessment or learning context, this integration can be facilitated by conjoining the goal setting and activating knowledge phase discussed earlier with the consolidate phase discussed here. When activating knowledge, students are encouraged to retrieve knowledge that is relevant to the text; however, since students have not read the text at this point, they cannot integrate it with what they already know. The consolidation phase makes the integration between the text and prior knowledge possible.

This solidifying process of integrating knowledge with the text is at the heart of the reading strategy called the Know-Want-Learn (KWL) technique (Cantrell, Fusaro, & Dougherty, 2000; Lewis, Wray, & Rospigliosi, 1994; Ogle, 1986). During the KWL strategy,[7] students preview key sections of the text, generate questions they have about confusing parts, read the text, answer the questions, and finally report what they have learned and how it connects to what they know. The last two steps, tying up loose ends by answering outstanding questions and explicitly indicating what they learned in relation to what they know, are essential steps in the consolidate phase. Focusing on what one has learned necessarily entails the integration of what one knew before reading with what one gained afterward. Concentrating

effort on the learning of new information underscores the importance of the text in making a lasting impression on the student.

Knowledge integration is a key part of the consolidate process; however, there are other ways to improve the stability of the mental representation of what was read. A second technique is to draw upon other reading strategies to ensure that what was read sticks with the reader over time (McNamara, 2007). These strategies include relatively simple techniques such as rereading (Cioffi, 1986; Millis & King, 2001) and testing oneself on the content of what was read (i.e., the testing effect; see McDaniel, Anderson, Derbish, & Morrisette, 2007); more global strategies such as summarization (Franzke et al., 2005; Thiede & Anderson, 2003) and the creation of graphic organizers that capitalize on text structure (S. Goldman & Rakestraw, 2000; Meyer & Ray, 2011; Meyer & Wijekumar, 2007); and more demanding strategies such as self-explanation (Chi et al., 1994; McNamara, 2004; McNamara, O'Reilly, Best, & Ozuru, 2006). Rereading and self-testing are designed to strengthen the memory for text by reactivating the information and ensuring that it is learned. Summarization and the creation of graphic organizers are designed to simplify the text into its key elements so that it is more manageable and thus more memorable and stable. Self-explanation is designed to deepen the mental representation by using strategies from elaboration, making bridging inferences, or making the causal relations in text more prominent.

In addition to increasing the stability of the memory representation of what was read, skilled readers deploy other techniques to ensure the flexibility of the mental models they form. Toward this end, a third recommendation is that a reader reviews the concepts, principles, and issues discussed in text from multiple perspectives, points of view, or sources. This review can, in part, be achieved by requiring the student to read multiple texts on the topic in question (S. Goldman, Lawless, Pellegrino, Braasch, & Gomez, 2011; S. Goldman, 2012; S. R. Goldman, 2004; McCrudden et al., 2011; Rouet & Britt, 2011; Strømsø, Bråten, & Britt, 2010). Multiple texts contain information on similar topics but are often written by different authors, represent different perspectives, and may represent different genres. This variety can help expand the context of learning and the readers' scope in understanding. The use of multiple texts is at the heart of the research and inquiry key practice, so we include it here as a possible way to enhance the flexibility or robustness of students' mental models.

Fourth, richer models of text understanding are facilitated when students apply and attempt to transfer what they have learned to new situations (O'Reilly & Sheehan, 2009; Sabatini et al., 2013). If students are to read and learn at deeper levels, they should be able to do more than recall or recite what they have learned. Students should also be able to extract themes, principles, and concepts and then organize that knowledge to form deeper, more stable, and more flexible representations that they can then flexibly apply to new situations and source materials.

To summarize, skilled readers deploy a range of postreading strategies designed to consolidate their understanding. Students need to consider what they have learned from the text and integrate it with their existing background knowledge. New information can be added to existing background knowledge, or in some cases, it may modify it. However, the aim of the consolidate phase is not limited to knowledge integration. Students need to use a variety of strategies to strengthen their understanding to ensure that their mental model is rich and lasting. This effect can be achieved by requiring students to elaborate, self-explain, reread, or test themselves on the content. The flexibly of their representations can be facilitated by broadening the context for learning (e.g., requiring students to integrate multiple texts) and by requiring students to apply what they know to new situations (i.e., transfer). As discussed below, the process of conveying what was learned may also facilitate consolidation.

Convey Knowledge

The prior four elements in the building and sharing knowledge key practice are designed to develop deep, accurate, coherent, integrated, flexible, and lasting mental models of the text. However, reading and writing skills are social activities (Deane et al., 2008; Deane et al., 2012; Gorin, O'Reilly, Sabatini, Song, & Deane, 2014; Sabatini et al., 2013; Snow, 2002), and at a high level, a common goal of literacy activities is to communicate a message to an intended audience. In light of efforts to promote 21st-century skills (Partnership for 21st Century Skills, 2004, 2008) and college and career readiness (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), the communicative and social element of literacy has gained new ground.

In the CBAL ELA model, proficient students should not only be able to read and understand texts, but they should also be able to communicate, through writing or speaking, what they have read and learned (Deane et al., 2008; Deane et al., 2012). Appropriate communication is bound by the purpose of the communication and the intended audience. The

message may need to be carefully tailored to include the appropriate focus, amount of detail, and use of language and rhetoric that will engage and inform that audience.

According to Grice (1975), people generally follow a set of basic rules when communicating. For instance, the cooperative principle states that people should: "Make your contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (Grice, 1975, p. 45).

When people communicate, unwritten rules ensure that communication flows and people understand what is said. This cooperative idea is further elaborated in the now famous four Grecian maxims: quality, quantity, relation, and manner. The quality maxim states that people should only state true information and not say anything without evidence to back it up. The principle of quantity states that people should say enough so that the message is fully understood but not too much to avoid over-complicating the issue. The relevance maxim states that communications should present only information that is relevant to the topic, and unnecessary tangents should be avoided. The maxim of manner basically states that communications should be structured, concise, and avoid ambiguity and unnecessarily difficult and obscure language. While the Grecian maxims and Grice's (1975) general philosophy have been criticized (see W. Davis, 1998), they are a useful heuristic to consider when communicating (Saul, 2001), as well as a source for criteria to use in assessments that measure communication skill.

More concretely, the class of activities used to convey knowledge comprises a range of writing skills needed to organize and present information to an audience. Conveying knowledge specifically presupposes sufficient mastery of the emergent-writing key practice, write down words and ideas, to effectively support students as they seek to convey knowledge that they have gained through informational reading. That earlier practice is represented using a shadowed figure placed mostly in the background of the part of Figure 2 labeled "Convey Knowledge."

Altogether, proficiency in modern literacy contexts requires that students can communicate their deep knowledge and tailor the message to facilitate the intended impact for targeted listeners and readers. Conveniently for assessment, we can also state that understanding includes the ability to communicate or convey that understanding via writing or other representations. Thus, the act of communicating one's understanding of a text becomes an evidence source for evaluating comprehension.

An Example Assessment

Thus far, we have discussed the theoretical, conceptual, and empirically motivated elements of the building and sharing knowledge key practice. In this section, we provide an example of an assessment that is designed to model aspects of the building and sharing knowledge phases and how they might be useful for instruction. Recall that one of the purposes for creating a key practice is to motivate the development of a family of related assessments. These families may differ not only in the texts and topics used in the assessments, but also in which phases are emphasized in the key practice. In other words, the scope of any key practice is large, and as a result, no one assessment will likely cover all aspects of every phase in a key practice. Complete coverage would be handled across several assessments with different skill foci. With this in mind, we describe one building and sharing knowledge key practice assessment called "dolphin intelligence" that does cover a range, but not all aspects, of the building and sharing knowledge practice.

The aim of the dolphin intelligence assessment is to help facilitate and model students' ability to learn and convey what they have learned from text. At a high level, the assessment provides a realistic purpose for reading a collection of thematically related but diverse sources on the topic of dolphin intelligence. The sources include an informally written informational text, a research-based text, a video, a cartoon, and a case study. The assessment covers a wide range of skills: identify relevant sources and search results, extract key ideas and supporting details, use notes, provide vocabulary definitions and use context to infer word meanings, engage in metacognitive and self-regulatory behaviors, construct a graphic organizer, evaluate parts of a summary, correct erroneous parts of a summary, produce a written summary, and write an informed essay.

Collectively, the above skills and the culminating writing task are very complex. Implementing them in a traditional style of assessment that is decontextualized and not structured is likely only to reveal that lower performing students cannot do many of these complex tasks. The advantage of the scenario-based assessment design, as well as the processes in the key practice, is that it helps to ensure that the assessment is more revealing of student partial knowledge and skill development. In addition, the assessment is designed to model good practice and provide information that is useful for instruction.

To achieve these aims, the assessment design is structured in a particular sequence of tasks. At the beginning of the assessment, the test takers are given a clear purpose for reading sources, including a context, task goals, and a culminating outcome writing assignment. In particular, the students are given the following instructions:

> To prepare for this year's science fair, your class has divided into teams. Each team will research a different topic about dolphins. Your team has decided to focus on the topic of dolphin intelligence because dolphins are known to be very smart. With your team, you will gather information about dolphin intelligence and create a poster. Then, on your own, you will write a report that answers these two questions: In what ways are dolphins intelligent? How do we know? The poster and your report will be displayed for parents and other visitors at the science fair.

In congruence with the first phase of the building and sharing knowledge key practice, set goals and activate prior knowledge, students are given explicit information for what is expected of them (i.e., write an essay), what particular questions they need to answer, and who is the audience. These goals are aimed to help set up the context and to structure further reading and writing.

To supplement this phase, the test takers are then given more specific goals that outline the structure of the assessment:

Task 1: Getting started
Task 2: Learning about dolphin intelligence
Task 3: Finalizing the poster
Task 4: Writing your report

Each of these tasks is mapped onto targeted levels in relevant learning progressions, as explained in Table 2. Since this is designed as a sixth-grade assessment, most of the targeted levels are in the middle of the scale, at learning progression Levels 2 and 3. Note that the design reflects specific constraints — we have prioritized some progressions over others and have not sampled any one progression across many levels. Other scenario-based assessments might be more focused, covering multiple levels of a single learning progression, but our goal in this assessment design was to assess critical skills appropriate for sixth grade in a sequence that models how those skills are relevant to the task of building and sharing knowledge from informational texts.

In Task 1, test takers are asked to evaluate the relevance of both library and Web search results. These items are designed to focus test takers' attention on aspects that are relevant to the broader task goals. In a formative assessment context, teachers could also provide a measure of student background knowledge on the topic of animal intelligence. If students have little prior understanding of the topic, an orienting video could be viewed to build up student background knowledge before they read. With this background, students with low knowledge would be better prepared to read the texts.

Task 2 in the assessment is primarily designed to measure the understand the text phase of the key practice. To build up their understanding of the topic, students are presented with a relatively easy informational text that is written in an informal way. This text is designed to introduce the topic and build up initial understanding before presenting the more demanding tasks that appear later. Questions in this task require the students to select the main idea from a list of student notes. This task helps both to support and model the note-taking strategy as well as to support the skill of extracting key ideas by first asking an item that requires a selected response rather than a more difficult constructed response (which will come later in the assessment). Requiring easier item types early in the assessment is likely to build more student confidence than if harder items were required early on.

This item is followed by another sequenced item on vocabulary. First, test takers are asked to provide a definition of key vocabulary terms. This task is designed to measure whether students can independently complete a constructed response task without any help. This task is followed up by an item that measures partial understanding. In the following item, students are provided with their prior constructed response definition, and then they are asked to select some words from the text that help provide clues to the words meaning. To support this process, a selection of words in the text is highlighted to reduce the difficulty. Collectively, this item supports the strategy of inferring word meanings from context. Moreover, during this item, the student also has the option of changing his or her original constructed response answer now that the task has directed attention to the supporting context. This option serves as a way to model the metacognition and self-regulation or clarify meanings phase of the key practice.

Next, students are provided with summary guidelines that outline the characteristics of a good summary. This presentation is designed to model good practice. After the guidelines are presented, test takers are asked to select the main idea

Table 2 Correlation of Tasks and Skills (how this assessment measures targeted skills)

Test section	Strategy or skill	What the test assesses	Learning progression mapping
Task 1	Previewing a text and predicting what it is mostly about	Whether students can accurately judge whether a source will be relevant after reading a brief description of its content (such as an Internet or library search result)	Table A3, Interpretive column, Levels 2 to 3
Task 2.1	Determining central ideas	Whether students can recognize which of multiple alternatives is an accurate representation of the main idea of a text	Table A6, Interpretive column, Levels 1 to 2
	Inferring meaning from cues in the text, fitting new knowledge in with prior knowledge, finding out more	Whether students can define what a word means in context	Table A10, Interpretive column, Levels 2 to 3
		Whether students can identify context cues to infer meanings of difficult words	Table A13, Levels 2 to 3
	Identifying main ideas Identifying details Synthesizing ideas and information from different parts of a text	Whether students can organize main ideas and details in a single graphic organizer	Table A6, Interpretive column, Level 2 Table A6, Interpretive column, Level 3 Table A7, Level 3
	Identifying Main Ideas	Whether students can link the main ideas expressed in a cartoon and a targeted text.	Table A6, Interpretive column, Levels 1 to 2
Task 2.2	Evaluating summaries	Whether students can identify flaws in other students' summaries	Table A6, Levels 1 to 3—links to all three columns
	Paraphrasing	Whether students can identify exact quotes or recognize accurate paraphrases	Table A9, Expressive column, Levels 2 to 3
Task 2.2	Writing summaries	Whether students can summarize an interview	Table A6, Expressive column, Levels 1 to 3
Task 3	Clarifying understanding, expecting to achieve coherence	Whether students can organize information effectively using hierarchical graphical organizers	Table A8, Deliberative column, Level 3
Task 4	Communicating knowledge Defining audience, adapting explanations	Whether students can write an accurate report that synthesizes information across multiple text sources.	Table A14, Expressive and Deliberative columns, Levels 2 to 3

and the supporting details from a simulated set of student notes. This task is more demanding than the easier task that only asks for one main idea. In this way, the assessment gets progressively more difficult but still offers the notes as support. To help support integration, a following task requires the test takers to connect the key idea of the article with a cartoon on the topic. This task not only supports integration processes, but also the visualization strategy in the understand-the-text phase.

The next series of tasks is designed to help students organize the important information. This occurs in the context of building a larger, more complicated graphic organizer. Because the information is complex, the assessment is designed to structure this task over the course of the assessment. Instead of building up the complex graphic all at once, the process is broken down into a series of small steps whereby smaller pieces are built one at a time. After each section is built, it is added onto the prior sections until the final product is completed near the end of the assessment. To support skill development, each test taker selects concepts for the graphic organizer cells from simulated student notes. Again, this task supports the note-taking strategy and the graphic organizer strategy, while simultaneously modeling the task in a more approachable way (i.e., using selected response as opposed to constructed response). To further support development, some of the graphic organizer cells are partially filed out, to help the students orient themselves to the task.

Later in Task 2, test takers are given a second, more detailed text that provides deeper information. This text is more difficult than the first text, as the author discusses empirical research on the topic of dolphin intelligence. Subsequent tasks require each test taker to evaluate simulated students main ideas with a set of criteria. Other tasks require the test taker to identify a problem in a simulated student's main idea and detail list. A subsequent task requires the test taker to suggest an alternative for one of the incorrect parts of the simulated student response. This task helps support metacognitive and self-regulatory processing in the clarify meanings phase. It also helps identify where a student is having difficulty: with identifying an error or with fixing it.

A subsequent task presents the test takers with a video in which they are asked to summarize it in a constructed response format. This task represents the most difficult part of summarization: producing a summary. This task not only helps support the consolidate phase of the key practice but, in conjunction with prior tasks, also helps identify weakness in component summary skills. Earlier tasks measure student ability to identify a main idea, identify details, identify a problem, and fix a problem. If only the constructed response summary task was given, there would not be any information on whether a student could do the pieces that feed into the more complex written response. Having a collection of these subcomponents is potentially useful for diagnosis and instruction, as it potentially can help locate the particular skill area in need.

In Task 3, test takers are given a new text that provides a case study of dolphin intelligence. Subsequent tasks require each test taker to use student notes to build up the prior graphic organizer until it is fully completed. The final task, Task 4, is designed to assess the convey knowledge phase of the assessment. In this task, test takers are asked to write a report that answers the questions posed at the beginning. With the help of the sources they read in earlier sections, students have the appropriate content knowledge to form a coherent and deep answer. To further support this process, this section provides a range of writing tools to help scaffold the process. These tools include a set of references to cite, a writing checklist, and a planning tool (graphic organizers and charts). The checklist reviews the task goals (In what ways are dolphins intelligent? How do we know?), provides a task structure, and has a checklist for the use of engaging language and mechanics (e.g., spelling, grammar).

Collectively, the dolphin intelligence assessment is illustrative of several aspects of scenario-based assessment and the building and sharing knowledge key practice. Clear goals and expectations are set at the beginning, information is built up over time, supports are given, and complex tasks are broken down. Taken together, these design features help model skilled performance while at the same time provide information on partial skill development. With this design, the assessment becomes both a model for strategic processing and a tool for identifying weakness in component skills.

Summary and Conclusion

The purpose of this paper is to provide an overview of the building and sharing knowledge key practice. In doing so, we have discussed a type of assessment design — scenario-based assessment — that is intended to target deeper understanding with a set of thematic source materials. This design, while bridging some gaps in assessing a richer construct of reading and writing, nonetheless does not necessarily yield transparent inferences about what students can and should be able to do. To bridge this gap, we introduced the notion of key practices, which are a set of associated reading and writing skills that are designed to serve particular literacy goals. By creating a broad, but meaningful set of key practices, it is our hope that those practices will help students (and their teachers) to focus on the critical skills needed to succeed in literacy activities in the 21st century.

More specifically, this paper has provided the rationale, definition, and empirical underpinnings for one such key practice called building and sharing knowledge. This key practice outlines the critical skills necessary to understand and communicate what is learned from text. The practice is divided into four parts. First, students set goals and activate relevant background knowledge to facilitate subsequent reading. During reading, students deploy a variety of reading strategies to build a coherent mental model of the text. When misconceptions or gaps in understanding are encountered, students use metacognitive and self-regulatory skills to correct any problems to keep understanding on track. Deep, stable, and flexible understanding is facilitated by requiring students to consolidate what they read with their background knowledge. Finally, students are expected to convey and communicate what they have read to targeted audiences and adjust their communications accordingly. Collectively, the building and sharing knowledge key practice is foundational to other, higher order key practices and remains itself a critical 21st-century literacy skill set.

Notes

1 A broad goal of the multidisciplinary, CBAL initiative is to leverage the literature in the learning sciences to produce assessments that are manageable, targeted, and useful for instruction in English language arts, mathematics, and science.
2 As an exception, note that National Assessment of Educational Progress (NAEP) Reading and the *SAT*® Verbal are examples of two assessments that do include some questions that span more than one passage. The *TOEFL iBT*® Read, Listen and Write task also involves the integration of multiple sources that span across modality (visual and auditory).
3 For more information on scenario-based assessment see O'Reilly and Sabatini (2013).
4 Elements of the previewing strategy are also central to the commonly used "Know-Want-Learn" (K-W-L) reading strategy (see Cantrell, Fusaro, & Dougherty, 2000; Lewis, Wray & Rospigliosi, 1994; Ogle, 1986).
5 While there have been debates about the precise differences between a skill and a strategy (Afflerbach, Pearson, & Paris, 2008), the term *strategy* is used here to refer to the set of techniques that are directed toward improving understanding and are sometimes a part of larger, more holistic, reading interventions.
6 Metacognition and self-regulation are related but distinct concepts (Dinsmore, Alexander, & Loughlin, 2008). They are discussed together here to reflect their symbiotic nature.
7 The KWL and previewing strategies are widely used in many different ways by educators. The purpose here is not to discuss these differences, but introduce the larger concepts for illustration purposes.

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Appendix

Revised Learning Progressions Relevant to Building and Sharing Knowledge (Tables A1 to A14)

Table A1 Genre Differentiation (Social/Discourse: Activate Knowledge)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	**Diff-1-I-A** Recognizes a range of familiar written forms and has some sense of what kind of content they are likely to contain.	**Diff-1-I-L** Little understanding of text structure not directly represented in physical format of text.	**Diff-1-E-A** Produces short texts focused on particular goals such as persuading or telling a story.	**Diff-1-E-L** Imitation of genre features imperfect, emphasizing formulaic elements ("once upon a time").	**Diff-1-D-A** Can apply strategies that leverage turn-based conversational structures to generate content.	**Diff-1-D-L** May be unable to apply conversational content generation strategies outside an oral dialog.
Foundational	**Diff-2-I-A** Can fluently comprehend short texts whose organization is prototypical for common text genres.	**Diff-2-I-L** Variations from prototypical genre patterns can pose serious risks to comprehension.	**Diff-2-E-A** Can adopt different organizing principles to produce short texts appropriate for each of the common genres.	**Diff-2-E-L** There is relatively little ability to adapt text patterns to the specific needs of a particular writing task.	**Diff-2-D-A** Can exploit genre templates as text analysis and generation strategies.	**Diff-2-D-L** Genres are understood as formal objects. Associated reasoning skills may be weak.
Basic	**Diff-3-I-A** Can fluently comprehend multiple-paragraph texts, adjusting expectations and reading strategies to suit the genre.	**Diff-3-I-L** May be misled by surface cues and insensitive to relationships implied by content alone.	**Diff-3-E-A** Can adopt different (and genre-appropriate) organizing principles to produce multiple-paragraph texts in multiple genres.	**Diff-3-E-L** May rely on a small set of one-size-fits-all templates rather than varying the rhetorical structure to fit the kind of argument being made.	**Diff-3-D-A** Controls meta-language that supports discussion and analysis of text structure in different genres.	**Diff-3-D-L** Coordination of text interpretation and planning with reasoning may be fragile, leveraging prototypical text patterns, not deeper comprehension.
Intermediate	**Diff-4-I-A** Is sensitive to both the formal features and the forms of reasoning characteristic of specific genres.	**Diff-4-I-L** May not be sensitive to disciplinary differences among specialized genres of the same general type.	**Diff-4-E-A** Can produce texts whose content is driven by the forms of reasoning most appropriate to each major genre type.	**Diff-4-I-L** May not control the range of forms needed to participate in specialized discourse communities.	**Diff-4-D-A** Can differentiate evaluations of text quality to reflect differences in genre priorities.	**Diff-4-D-L** May not have internalized genre- or discipline-specific analytical strategies.

Table A1 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Advanced	**Diff-5-I-A** Interprets texts accurately but flexibly, taking into account differences in disciplinary and genre expectations.	n/a	**Diff-5-E-A** Writes flexibly in a variety of genres, changing structural and stylistic features appropriately given differences in discipline, genre, audience, task, and purpose.	n/a	**Diff-5-D-A** Applies a variety of analytical strategies to develop content appropriate to a wide range of disciplines and genres.	n/a

Table A2 Print Cue Sensitivity (Print: Activate Knowledge)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Can generally accurately interpret sentence- and word-level graphical signals such as punctuation marks and conventional spelling.	May show little awareness of text macrostructure.	Can produce texts that largely conform to standard spelling and punctuation rules, applying the concept that the written text should provide necessary cues to allow the reader to recover tone and intonation, not just the pronunciation of individual words.	May show inconsistencies and infelicities in choice of paragraph breaks, headings, and similar elements.	Can use strategies that scan a text looking for important cues such as capitalization, use of italics, and other indications that particular words or phrases in the text should be given special attention. This includes simple uses of textual apparatus such as scanning the cover page or reading the back cover.	May not understand the specific implications of particular punctuation and formatting choices.
Foundational	Correctly interprets graphical elements that indicate local discourse elements in the main text, including paragraph indentation, headings, and titles.	Awareness of text macrostructure may be limited to explicitly marked elements.	Produces texts in which paragraph boundaries and headings are used appropriately to encourage understanding; reads such breaks with appropriate pauses and intonation.	May use graphical elements for formatting page-level information inconsistently or inappropriately.	Can use strategies that scan a text, singling out elements likely to be important, such as headings and the beginnings of paragraphs.	May focus on the body of the text, ignoring other elements and failing to infer how they are related to the body.
Basic	Correctly interprets graphical elements that indicate relations between different parts of the page, such as bulleted lists, call-out boxes, footnotes, legends, and the like.	May have difficulty integrating all the elements of a complex text, especially if it includes cross-text linkages of any kind.	Uses appropriate graphical elements such as bulleted lists, callout boxes, footnotes, and legends to clearly express the intended relationships between different parts of a formatted text.	May fail to mark quoted elements, titles, and similar elements with appropriate graphical indicators.	Can use strategies that focus on elements in a text outside the main body (such as callout boxes, tables, illustrations, and graphs) to identify concepts that should be understood and kept in focus while reading the body of the text.	

Table A2 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	Correctly interprets graphical elements that indicate quotation and reference to other texts, including quotation marks, underlining, and italics.	May not be fluent enough with text structure to conceptualize a document as an object.	Produces texts in which quotations, references, and other uses of external material are properly cued by quotation marks, underlining, italics, block indents, footnotes, and other orthographic cues.	May neglect to produce or make errors in producing textual apparatus such as a reference section or a table of contents when the type of text being produced requires it.	Can use strategies that identify quotes, sources, authorities cited, and other such elements to prepare for a more detailed read where these elements may need to be given special attention and processing.	
Advanced	Correctly interprets elements of the larger textual apparatus such as title pages, tables of contents, or indices.	n/a	Understands how to produce tables of contents, indices, and other kinds of textual apparatus.	n/a	Understands and can effectively apply the kinds of comprehension strategies supported by standard textual apparatus such as tables of contents and indices.	n/a

Table A3 Word Associations (Verbal: Activate Knowledge)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	1. Shows implicit sensitivity to word associations including both conceptual and syntactic relationships among words.	Metalinguistic awareness of word associations is limited. Associations made between words tend to focus on perceptual and episodic relationships in context, or on syntagmatic (adjacency-based) associations.	1. Given a stimulus, can produce one or two strong associates.	May show little control over the type of association produced.	1. Can apply comprehension and brainstorming strategies that recursively use associations to create lists of potentially relevant ideas.	May not be able to constrain the process of chaining to stay focused on the same type of relationship or to stay within a single topic or conceptual focus.
Foundational	2. Has developed sufficient metalinguistic awareness of word associations to scan a text to locate words that related or similar to a cue word.	Perception of associations that depend on abstract conceptual relations may be limited.	2. Given a stimulus, can (a) produce a list of associates drawn from the same broad conceptual category, or (b) produce a list of associates that capture important features or attributes of the stimulus.	Ability to generate specific types of association tends not to be fine-grained.	2. Can apply comprehension and brainstorming strategies that involve scanning a text or generating examples to compile lists of words that illustrate a theme or concept.	Ability to provide explicit descriptions of the principle that unifies a list of related words may be limited.
Basic	3. Can skim or scan a text to determine whether specific ideas or types of information are present, including abstract conceptual categories or relations.	May have difficulty distinguishing between different types of information; scanning for more than one type of information may be very difficult to accomplish in a single pass.	3. Given a stimulus, can produce associates using very specific conceptual relationships, such as kinship relations, contrasts of size, etc.	May lack the metalinguistic resources needed to target specific relationships spontaneously without scaffolding.	3. Can apply strategies that require identification of abstract conceptual relations, such as those needed to perform classic analogy tasks.	Control of differences among specific conceptual relations may be effortful; thus ability to do the kind of analysis needed to support analogical reasoning will be challenging except for salient, easy examples.

Table A3 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	4. Can skim or scan a text to identify multiple types of information, stopping at candidate locations to categorize the information found.	May lack the cognitive capacity to build an explicit model of content that requires many different relationships to be recognized and held in mind simultaneously.	4. Controls the metalinguistic resources needed to explicitly discuss, describe, and thus to focus on specific conceptual relationships, and thus can perform tasks that generate associated content to focus on specific types of information.	May have difficulty identifying key conceptual elements and relations in a complex text where those are left implicit (not stated explicitly).	4. Can apply strategies that require skimming and scanning a text, analyzing conceptual relationships, and generating notes that identify ideas and relationships that appear to be important.	May have difficulty moving beyond a piecemeal, atomistic representation of conceptual information. Tasks that require integration and synthesis may be a significant challenge.
Advanced	5. Can used skimmed or scanned information to create concept maps or other explicit representations of the knowledge a text addresses.	n/a	5. Can fluently identify and express abstract relationships implicit in a text, and can use these to generate associated ideas that are relevant to and useful to support reasoning about the explicit information expressed by that text.	n/a	5. Can apply explicit strategies for mapping out the conceptual content of a domain, whether to support comprehen-sion/synthesis or exposition of content, such as brainstorming to produce accurate, detailed concept maps for a specific knowledge domain.	n/a

Table A4 Knowledge-Telling (Conceptual: Activate Knowledge)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	1. Can evaluate whether a partially produced sentence is on target or off, relative to the idea one has in mind.	Judgments tend to focus on surface relevance—same or different topic.	1. Can produce a brief commentary or explanation on a topic, using a short text or idea held in focus as a stimulus.	The length of the text produced tends to be limited to a few sentences.	1. Can apply generate-and-test strategies, in which one generates part of what one has in mind, pauses, considers what has been produced, and makes another attempt if unsuccessful.	The complexity of the stimulus that can be held in mind is limited, with fluency achieved only for words or short phrases.
Foundational	2. Can evaluate whether an explanation of the content of a text is complete or incomplete.	Evaluations will pick up on obvious gaps that need to be filled in, but may not be driven by any larger purpose that would help focus further elaboration.	2. Can apply iterative self-explanation strategies in which one attempts to freely interpret and explain what some portion of a text means, without worrying too much about overall accuracy, and then adds a bit more explanation if the first attempt does not seem adequate.	Text production is additive; there may be little coherence from one part to the next.	2. Can apply closed-loop idea-generation strategies by rereading text as one produces it.	There is a serious risk of going on tangents that will not serve the larger purpose for which the idea generation is being applied.
Basic	3. Can determine on the fly which of several freely-associated ideas seems most promising and interesting.	While evaluations may be driven by a clear focus/sense of relevance, they may not be driven by a clear purpose that takes the audience and context into account.	3. Can apply freewriting strategies in which one produces text very quickly, focusing on explaining what one thinks. The results of freewriting can then be mined to extract them most useful ideas and phrasings.	Text production is not driven by an overall strategy and so explores the subject opportunistically without a clear overall structure.	3. Can apply reflective strategies in which knowledge telling is focused on clarifying one's own thoughts and understandings in an ambiguous situation.	Clarification of ideas is a by-product of the process, and may not be under strategic control where the thinker systematically explores a range of possibilities.

Table A4 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	4. Can determine on the fly which of several freely associated ideas seems most appropriate to a particular purpose and audience.	May not be able to handle the cognitive loads necessary to evaluate ideas not only with respect to relevance and audience, but also in the light of a prior discourse.	4. Can apply freewriting strategies in which one imagines a specific purpose and audience, produces text structured to suit to that situation, and mines the results for materials that can be adapted to the task at hand.	It may be difficult for the writer to assume a persona other than his/her own for brainstorming purposes.	4. Can apply reflective strategies in which one imagines a specific situation and uses knowledge telling to explore the consequences of those assumptions.	It may be difficult for reflection to proceed fluently when it requires the thinker to assume major counterfactuals and model circumstances far removed from the thinker's own experience.
Advanced	5. Can determine on the fly which of several freely associated ideas is most related to ideas that have been advanced in an ongoing discourse.	n/a	5. Can apply freewriting strategies in which one assumes one or more roles that imitate other participants in a discourse and produces text consistent with the persona one has adopted, and then mines the result for materials that can be adapted to the actual task.	n/a	5. Can apply reflective strategies in which one uses knowledge telling to explore the options logically available to the participants in a discourse.	n/a

Table A5 Discourse Fluency and Control (Discourse: Understand the Text)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	**Disc-1-I-A** Can generate questions and expectations about what will come next based upon the information that a text has presented thus far.	**Disc-1-I-L** The ability to generate questions is likely to be highly dependent upon high levels of prior knowledge that makes it obvious what questions need to be asked.	**Disc-1-E-A** Can develop a simple text by choosing a focus (a specific purpose or question to be addressed) and using it as a cue to retrieve information from memory.	**Disc-1-E-L** Maintaining a focus over successive sentences may be difficult, leading to a tendency for each sentence to provide the associative cues that stimulate production of the next sentence.	**Disc-1-D-A** Can apply strategies that use asking and answering questions as a method for developing textual content.	**Disc-1-D-L** It may be difficult for students to ask a coordinated series of questions; thus, students may ask what seem like a random series of questions, without achieving any overall sense of focus.
Foundational	**Disc-2-I-A** Can scan a text, looking for information, using the topical structure of the text to predict relevance, and evaluating how relevant different sections of the text are to a selected focus.	**Disc-2-I-L** Scanning is likely to be overly influenced by surface features such as headers or keywords without considering overall meaning or text structure.	**Disc-2-E-A** Can fluently traverse the points in a mental plan (in the first instance, a simple text template), shifting focus to generate content relevant to each point in turn.	**Disc-2-E-L** Plans can only be fluently carried out if they can be treated like a list or some other simple structure. Hierarchically organized plans may be difficult to implement or hold in memory.	**Disc-2-D-A** Can apply iterative strategies for planning and text comprehension (such as concept maps, brainstorming, and freewriting) where information is generated piecemeal then organized later.	**Disc-2-D-L** Success at iterative planning and organization depends upon outsourcing the cognitive load for text content and organization to some physical representation, reducing the generation and organization of content to small steps that can be carried out piecemeal.
Basic	**Disc-3-I-A** Given a specific purpose and focus, can scan a text or table of contents, using its hierarchical structure to efficiently find relevant content.	**Disc-3-I-L** May not make effective use of alternate ways of accessing text content, such as indexes and cross-references.	**Disc-3-E-A** Can fluently handle complex text-generation tasks that require maintaining focus across a hierarchy of goals and subgoals.	**Disc-3-E-L** May not be able to generate hierarchical plans flexibly, relying instead on genre-specific prototypes like the five-paragraph essay.	**Disc-3-D-A** Can apply hierarchical grouping and regrouping strategies to organize and generate content and to consolidate one's comprehension of the relationships among the parts.	**Disc-3-D-L** May prefer purely local structural changes and may not be open to major restructuring or large changes in content.

Table A5 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	**Disc-4-I-A** Builds an accurate, coherent mental model of text content that includes connections between ideas that crosscut the basic outline structure.	**Disc-4-I-L** May understand text organized according to default school genres more accurately than genres specific to more specialized discourse communities.	**Disc-4-E-A** Can fluently and flexibly produce complex texts whose outline structure is clear and organically connected to the content, while making effective use of formal devices such as cross-references, footnotes, and indices to indicate connections between different text parts.	**Disc-4-E-L** May lack sufficient control over production of important disciplinary genres, leading to an inability to participate in specific discourse communities.	**Disc-4-D-A** Can apply indexing, cross-referencing, and annotation strategies to identify connections within a text that crosscut its basic hierarchical structure.	**Disc-4-D-L** May lack a clear sense of relevance and importance of ideas in major disciplinary matrices, limiting the effectiveness of strategies for analyzing cross-cutting content.
Advanced	**Disc-5-I-A** Recovers all aspects of text structure: the basic outline, cross-references and other interconnections and relations with sources, taking into account genre and disciplinary differences among texts.	n/a	**Disc-5-E-A** Can fluently and flexibly produce complex texts in a wide variety of disciplines and genres whose outline structure is clear and organically connected to the content, while making effective use of formal devices such as cross-references, footnotes, and indices to indicate connections between different text parts.	n/a	**Disc-5-D-A** Controls strategies for organizing textual content according to a variety of alternative or even simultaneous organizing principles, taking into account considerations specific to particular genres and disciplines.	n/a

Table A6 Summarization (Discourse: Understand the Text)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	**Sum-1-I-A** Can recognize the main topic of a text or conversation and remember its more salient details.	**Sum-1-I-L** Ability to recognize the main idea may be limited, particularly for written texts; salient details may be remembered more clearly than unifying thesis or topic statements.	**Sum-1-E-A** Can state the main topic of a text or conversation, and/ or retell much of the content from memory.	**Sum-1-E-L** There may be little ability to focus on a specific main idea— responses will tend to be words or short phrases focusing on a general topic, not a specific claim or idea, and may fail to distinguish between original and summarized content.	**Sum-1-D-A** Can apply analysis strategies based upon considering several ideas mentioned in a text or conversation and then grouping them to identify important themes, or ranking them to distinguish main ideas from details.	**Sum-1-D-L** Ranking and grouping may require significant cognitive effort and may only be feasible if the number of items to be compared is very small.
Foundational	**Sum-2-I-A** Can reliably identify a statement or sentence that represents the central point, theme, or moral of a short text, and accurately distinguish the main point from salient details.	**Sum-2-I-L** Ability to integrate main ideas with subordinate ideas may be limited, leading to fragmentation or misunderstanding of longer, more complex texts.	**Sum-2-E-A** Can summarize a paragraph or other short text in a single written sentence by stating its main point or theme in one's own words, and Can explain how a particular detail supports the main point of a paragraph or other short text.	**Sum-2-E-L** Ability to elaborate on the main idea in a summary may be limited. Summaries may be restricted to restatements of the main idea, with little disciplined ability to include subpoints, and may be extended inappropriately by including opinions and elaborative inference.	**Sum-2-D-A** Makes regular use of **Elaboration strategies** (starting with a statement and finding or generating details that support it) and **Generalization strategies** (starting with a collection of details and extracting a central idea or theme).	**Sum-2-D-L** Analysis and elaboration may be limited by constraints on the clarity and complexity of the main idea developed or elaborated upon. When the best move is to elaborate on and limit the main idea, incoherence or incompleteness may result instead.

Table A6 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Basic	**Sum-3-I-A** Can accurately rate the relative importance/centrality of different parts of a text based upon its content, and coordinate such judgments to identify the parts of a text (such as thesis and topic sentences) that express the main idea and major subpoints.	**Sum-3-I-L** May have difficulty recovering implicit topic and thesis structure where the key ideas are not expressed succinctly and clearly in single clauses or sentences, or in evaluating accuracy or recognizing exact quotations.	**Sum-3-E-A** Can create a text summary that includes both the central thesis or theme and major subpoints, accurately representing the macrostructure of the summarized text, avoiding reuse of exact language from the source.	**Sum-3-E-L** May have difficulty adjusting the level of detail included in a summary in ways appropriate to specific tasks and purposes.	**Sum-3-D-A** Can apply highlighting strategies that mark important sentences and passages in a text for later review and analysis.	**Sum-3-D-L** May have difficulty modulating highlighting decisions to reflect both text structure and relevance to a specific task or purpose.
Intermediate	**Sum-4-I-A** Can identify and paraphrase the main and subordinate ideas in a complex text where much of the structure is implicit and can only be inferred from the content; can accurately evaluate accuracy of a summary.	**Sum-4-I-L** May misinterpret the structure of texts written in unfamiliar disciplinary genres.	**Sum-4-E-A** Can appropriately vary the level and selection of detail included in a summary, depending on the purpose for which the summary is being written.	**Sum-4-E-L** May use a limited range of summary forms, without sensitivity to the requirements of summarizing for different, important genres of source text.	**Sum-4-D-A** Can effectively apply analytical highlighting strategies that use different colors or markings to capture different aspects of a text's content and signal their relation to a particular purpose for analysis.	**Sum-4-D-L** May not have effective strategies for selecting the kind of content analysis that may be appropriate in important disciplinary contexts.
Advanced	**Sum-5-I-A** Interprets the structure of texts accurately and flexibly in light of their rhetorical purpose and disciplinary context.	n/a	**Sum-5-E-A** Can produce a variety of different kinds of summaries to support the needs of different audiences and purposes and to reflect differences in the structure of the source text, distinguishing among synopsis, abstract, précis, and other specific types.	n/a	**Sum-5-D-A** Can select analysis strategies appropriate to specific text types and disciplinary contexts, such as literary close reading or historical analysis of source texts, showing sensitivity to both text structure and specific disciplinary concerns.	n/a

Table A7 Outlining (Discourse: Understand the Text)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	**Outline-1-I-A** Can recognize salient structural elements of books and other printed or electronically published materials, including such elements as covers, titles and headings, chapters, indexes, and glossaries.	**Outline-1-I-L** Understanding of how these elements function may be limited, and use may be less than fully fluent.	**Outline-1-E-A** Able to produce at least simple oral versions of different genres such as stories and reports that demonstrate awareness of perceptually salient differences among different text types.	**Outline-1-E-L** Understanding of text structure may be entirely implicit and disconnected from a functional, situated understanding of the form to be used.	**Outline-1-D-A** Can deploy search strategies that take advantage of the structural elements of books (chapters, page numbers, verse or line numbers, tables of contents, and indices); and comparable elements for electronic literature (menus, icons, key words, search tools) to locate particular information or passages of interest.	**Outline-1-D-L** Use of these strategies may not be familiar or automated and thus may require support and significant cognitive effort.
Foundational	**Outline-2-I-A** Has mastered key metalinguistic vocabulary for structural elements in text (e.g., paragraph, section, chapter, verse, stanza, scene, etc.) and can use these terms to identify parts of texts.	**Outline-2-I-L** There may be limited ability to deal with more than one part of a text at a time or to deal with relationships among different parts of the same text.	**Outline-2-E-A** Is able to conceptualize text content in terms of key organizational elements (e.g., causal/temporal sequences, comparison, problem/solution, general idea, and illustration) and can produce text segments following these schemes.	**Outline-2-E-L** Ability to produce text segments that carry out particular organizational schemes may be effortful and handled best when they can be treated like individual turns in a conversation.	**Outline-2-D-A** Can deploy simple strategies to plan or represent text structure, using straightforward organizing tools such as T-charts and lists (e.g., lists of characters, lists of major plot points, lists of reasons or examples).	**Outline-2-D-L** Organizers may be treated as task-specific templates rather than being understood as abstract representations of text structure.

Table A7 Continued

Level	Interpretive		Expressive		Deliberative	
	Achievement	Limitation	Achievement	Limitation	Achievement	Limitation
Basic	**Outline-3-I-A** Can interpret formal markers of document structure (different levels of headings, outline numbering systems, transitional phrases, etc.) to recover a hierarchical understanding of the relative importance and centrality of different parts of a text.	**Outline-3-I-L** May be overly reliant on formal indicators of text structure and insensitive to mismatches between the logical and formal structure of text content.	**Outline-3-E-A** Can produce texts in which hierarchical text structure is signaled by formal markers, such as headings, transitional phrases, indentation, and other cues.	**Outline-3-E-L** May treat outline structure as a formal object and insert content with inadequate regard to coherence and logical structure.	**Outline-3-D-A** Can apply strategies that use hierarchical multilevel graphical representations such as outlines and tree diagrams to represent text macrostructure.	**Outline-3-D-L** Outlining strategies may be insufficiently sensitive to structural differences among genres; alternate structures and complex links across sections may be ignored.
Intermediate	**Outline-4-I-A** Can reliably identify places where the formal hierarchy of a document is in tension with the implicit structure of its content.	**Outline-4-I-L** May rely too strongly on surface features of texts written for specific disciplines.	**Outline-4-E-A** Can fluently produce texts organized to support a structure that is suitable for specific emphasis, audience, and purpose.	**Outline-4-E-L** May have difficulty producing versions of the same content for different discourse communities and genres.	**Outline-4-D-A** Outlines fluently in a variety of genres; can apply multidimensional graphical organizing tools such as complex tables and charts to the task of organizing content.	**Outline-4-I-L** May have difficulty selecting the kinds of graphical tools that will be most useful in organizing content for important disciplinary text genres.
Advanced	**Outline-5-I-A** Can efficiently infer a variety of connections and potential ways to organize material that may not be explicitly indicated by formal features of the text being read.	n/a	**Outline-5-E-A** Can fluently produce alternatively structured versions of the same content, changing the structure and emphasis to suit a particular audience, purpose, and disciplinary matrix.	n/a	**Outline-5-D-A** Can apply a variety of graphical tools to organize content according to multiple organizing principles, selecting appropriate tools for the content, audience and purpose.	n/a

Table A8 Knowledge-Based Inference (Discourse: Understand the Text)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Can generate expectations about what will come next in a text that are justified based upon the information that a text has presented thus far.	May be insensitive to implausible continuations and therefore not make necessary inferences where bridging inferences are necessary.	Can generate at least one reasonable continuation if a story or a simple explanation is interrupted partway through.	Accuracy of inference may be limited and may only make use of immediate context, not a situation model built up over the whole text so far.	Can deploy prediction strategies based upon asking salient questions about a text based upon one's understanding of what is likely to come next.	May have difficulty holding multiple questions to be answered in mind while also absorbing textual content.
Foundational	Can distinguish between plausible and implausible continuations based upon the information presented in a text thus far.	May only make the most obvious and salient inferences to account for inconsistencies and gaps in the information provided.	Can generate multiple plausible continuations if a story or a simple explanation is interrupted partway through.	May easily lose track of coherence relationships among parts of the text where those are not explicitly signaled.	Can deploy prediction strategies based upon multiple questions that are important (given the text thus far) but which have not yet been answered.	May have difficulty representing text content explicitly in any abstract form and may tend instead to focus on details.
Basic	Can generate linking inferences that account for (relatively) unexpected text segments by drawing upon information that can be deduced from the propositional content of the preceding text.	The standard of coherence may be relatively low, and so less-obvious inferences may not be drawn when they should be.	Can elaborate a text by inserting explicit connections and explanations linking new information to information given earlier in the text.	May have difficulty drawing inferences that are simultaneously inferences of implicit text macrostructure relationships and also involve integration of details of the text base with background knowledge.	Can deploy model-building strategies that support comprehension and retention of textual information by deliberately finding and listing a variety of relationships among elements in the text.	May have difficulty deploying self-explanation strategies in which one explicitly and metacognitively represents a breakdown in understanding and forms an explicit hypothesis about what a more appropriate interpretation should have been.

Table A8 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	Can generate bridging inferences that account for (relatively) unexpected text segments by drawing upon generally shared background knowledge, even when not particularly salient.	May be insensitive to information derived from knowledge of the social context, if that context is not thoroughly familiar.	Can elaborate a text by inserting plausible explanations based on applications of background knowledge to the specific situation being described.	May have difficulty simultaneously carrying out detailed inferences based on the phrasing of the text while also inferring nonliteral aspects of the text's intended meaning.	Can deploy model-building strategies by listing and making explicit one's hypotheses or explanations for unexpected events or statements (self-explanation).	May have difficulty combining conceptual with contextual reasoning when making inferences about textual content.
Advanced	Can generate contextualizing inferences that account for (relatively) unexpected text segments by linking them to features of the social situation, purpose, and audience.	n/a	Can elaborate a text by adding information that motivates textual content by relating it to the social situation, purpose, and audience.	n/a	Can deploy contextualization strategies that support interest and engagement by identifying and listing ways in which features of a text are motivated by its situation, purpose, and audience.	n/a

Table A9 Paraphrase (Verbal: Understand the Text)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Recognizes synonyms and near-synonyms.	Has difficulty dealing with paraphrase relations that depend on syntactic rearrangements as well as changes in wording.	Achieves clarity of expression primarily by avoiding use of unfamiliar words or phrases or complex sentence structures.	Attempts to paraphrase mostly take the form of substitution of synonyms.	Can deploy editing strategies in which one adds synonyms or short explanatory phrases (glosses) to clarify a text.	Paraphrasing is typically restricted to simple substitutions or explanatory elaborations.
Foundational	Can recognize when two expressions are direct paraphrases or restatements of the same underlying proposition, involving some combination of synonyms and syntactic rearrangement.	Recognition of paraphrase may be limited to relatively short phrases and clauses.	Can produce multiple simple paraphrases (alternative ways to express the same proposition or simple statement) by substituting synonyms or applying simple sentence transformations.	Ability to paraphrase may tend to be restricted to phrases and clauses; paraphrase over more complex sentences or longer text units may often be too complex to carry out successfully.	Can deploy simple paraphrase-based editing strategies in which one generates a different expression of one's intended meaning and substitutes it for the original, unclear text.	May have difficulty in evaluating the accuracy of one's own paraphrases, particularly as they extend beyond short phrases or clauses.
Basic	Can recognize when two passages are roughly equivalent paraphrases, because they express the same simple propositions but combine them differently, possibly using different terms for key ideas.	May have difficulty recognizing unmarked quoted material when it is embedded in a longer paraphrase.	Can read a passage and paraphrase it accurately in one's own words.	May have difficulty combining paraphrase with other tasks such as a critique or an evaluation.	Can deploy comprehension strategies in which one reads a passage, paraphrases it, and then compares the original to the paraphrase to determine where one's understanding of the original passage may have been deficient.	May have difficulty using paraphrase in combination with other strategies such as annotation.
Intermediate	Can recognize and distinguish parallel passages and exact quotes shared across a pair of texts.	May have difficulty tracking the provenance of ideas in a complex text based on sources.	Can paraphrase selected information from a source and embed that paraphrase effectively into a longer text.	May not have mastered the textual conventions for inclusion of material from a source in a longer text.	Can deploy comprehension strategies in which annotations (paraphrases of selected information) are used to create and sustain richer knowledge of key facts and details from a source text.	May have difficulty evaluating the accuracy of a paraphrase or revising a paraphrase to improve its accuracy.

Table A9 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Advanced	Given a published, edited text, can distinguish which parts of the text represent the author's original ideas and which represent information paraphrased and inserted from some other source.	n/a	Can use appropriate syntactic devices (e.g., indirect speech, direct speech/quotation marks, tags) to mark information paraphrased or quoted from sources.	n/a	Can deploy editing strategies in which iterative paraphrasing of unsatisfactory sections of a text is used to explore and clarify one's intended meaning.	n/a

Table A10 Definition/Lookup (Verbal: Clarify Meanings)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Has acquired at least some principles needed to use lexical resources such as alphabetization.	Responses to definitions may focus entirely on salient features or equate word meaning with the whole context.	Attempted definitions provide some form of information about the target word.	Information provided in an attempt to provide a definition may be minimal or tangential (dog ~ "animal;" clown ~ "in a circus;" wet ~ "when it rains").	Can deploy exploration strategies in which examples are systematically classified as belonging (or not belonging) to the category defined by a word.	There may be very limited awareness of why an example fits or does not fit the category, and significant idiosyncrasies in the categorization judgments that are made.
Foundational	Can perform simple dictionary lookups using alphabetical order to find and apply a definition. Understands definitions as explanatory phrases or sentences.	Responses to definitions may ignore key cues provided by the standard syntactic form of the definition.	Attempted definitions provide important information needed to understand a word.	Definitions are not reliably presented in standard form. May provide descriptions rather than true definitions (dog ~ "A dog has four legs").	Can deploy attribute-identification strategies that examine exemplars or prototypes and concrete defining attributes (birds fly, mammals have fur). Can deploy abstraction strategies in which several examples (or several uses of a word) are grouped under a general description.	There may be limited fluency/accuracy at identifying exemplars or in determining which attributes are necessary or sufficient.
Basic	Can use multiple features of a dictionary, such as checking part of speech, or finding different meanings and deciding which is used in a specific context. Is sensitive and makes effective use of the cues provided by a standard definition (part of speech, semantic type, distinguishing features).	Self-monitoring ability may be limited, so that a reader may not recognize when they need to look up a word, resulting in under- or over-use of lexical tools during reading. Application of definitions may not always be accurate.	Produces definitions in standard form (genus + differentiae).	May not always identify the correct features to provide a complete and accurate definition.	Can deploy formal definitional strategies (genus and differentiae) in which examples are systematically analyzed to determine necessary and sufficient conditions, including abstract concepts and relations. Can deploy reference-based strategies using	May lack sufficient metalinguistic awareness to reason explicitly about definitions or to explain why a specific definition is (or is not) correct.

Table A10 Continued

Level	Interpretive		Expressive		Deliberative	
	Achievement	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
					resources such as a thesaurus and a dictionary to identify related words and determine which word would best convey a specific meaning.	
Intermediate	Can accurately apply definitions (determine whether a definition fits a specific examples). Can effectively self-monitor understanding to regulate use of lexical resources so that they are only used when they will effectively support comprehension.	May not be clear on differences among lexical tools (dictionaries for different purposes, thesauruses, etc.) and thus may not select the right tool for a specific purpose.	Proposes definitions that correctly fit collections of known cases.	May not always be effective at identifying all the special cases that need to be taken into account to produce an accurate general definition.	Can deploy metalinguistic strategies in which meaning is explicated using such concepts as connotation, denotation, and synonym. In particular, can develop understanding of connotation and denotation using contrastive strategies in which differences of meaning are illustrated by taking words with similar meanings and contrasting them across a range of cases.	May not be sensitive to connotations or fine shades of difference in meaning, leading to incorrect conclusions about how a concept should be defined.
Advanced	Can use a variety of specialized lexical resources as needed to support reading, writing and thinking.	n/a	Can engage fluently in definitional discourse (e.g., Socratic dialogs) where definitions are proposed and tested by means of thought experiments.	n/a	Can deploy analytical strategies to identify fine differences in meaning among words, using contextual evidence to provide a nuanced understanding of how closely related terms differ, and drawing out the implications of particular word choices in and across texts.	n/a

Table A11 Word Formation (Verbal: Clarify Meanings) [was analogy]

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Can recognize known words, identify word boundaries, and locate repeated words in a text.	Associates words with similar spellings, pronunciations, and/or meanings but without analysis of internal structure, which can lead to mistaken guesses about word identities during reading.	Implicitly controls those aspects of regular word formation (e.g., inflection and highly productive prefixes and suffixes such as *un-* and *-ness*) that occur in oral language from an early age.	Lacks awareness of affixes as separate elements of words with the same meaning and spelling repeated across words.	Understands the concept of the word as a combination of pronunciation, spelling, and meaning that needs to be memorized.	Treats words as basically phonological units. Does not clearly distinguish between orthographic word forms, conceptual meanings, and referents; tends to confuse homographs and homophones.
Foundational	Identifies inflectionally related forms of the same word. Recovers the meanings of previously unseen words that are a combination of known roots and highly productive affixes.	Does not apply knowledge of prefixes, bound roots, or suffixes explicitly and consistently to support inferences about what an unfamiliar word actually means.	Consistently spells inflectional variants of words correctly, following regular spelling patterns. When writing, freely produces derived words containing productive, semantically unambiguous affixes with fixed spellings such *as pre-, -ness, -able, -ful*, and *-er.*	Limited knowledge of Latinate affixes. Limited knowledge of affixes with multiple meanings, multiple spellings, or variant pronunciations.	Can apply analogical strategies for analyzing word structure that depend on identification of word-internal meaningful elements (prefixes, suffixes, roots). Distinguishes orthography of a word from referent or conceptual meaning, and thus can recognize and deal with homonyms, homophones, and homographs.	Ability to recognize morphological regularities depends heavily on the morphological pattern being transparent (easy to recognize) and productive (appearing in a significant number of words to which the student has been exposed).

Table A11 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Basic	Recovers the meanings of previously unseen Latinate words that involve relatively productive prefixes and suffixes, especially suffixes such as *-al, -ity, -ize,* and *-ence* that function primarily to transfer a known meaning to a different part of speech.	Shows relatively little awareness of the meaning of bound roots that do not appear as independent words.	When writing, freely produces derived Latinate words that require a part of speech shift, especially suffixes such as *-al, -ity, -ize,* and *-ence.*	Still tends to overgeneralize regular patterns (such as the use of *-ness* to form nouns from adjectives) over less regular patterns (such as the use of *-ity* for the same purpose).	Can systematically analyze word families to identify their roots and affixes and use such analysis to formulate hypotheses about the meanings of specific affixes and bound roots.	Vulnerable to making spurious generalizations where the meaning of a derived word is actually different from the meaning that would be predicted from the meaning of its constituents.
Intermediate	Recovers the meanings of previously unseen Latinate words even when they involve rare or ambiguous affixes, bound roots, and other sources of difficulty.	Shows relatively little awareness of rarer morphological patterns that reflect borrowings from languages other than Latin, French, and Greek.	When writing, freely produces derived forms following regular Latinate morphology for a wide range of prefixes, suffixes, and bound roots.	When guessing at the correct derived form for a particular root, may still prefer the most common or base form over irregular variants.	Has generally mastered irregularities in word formation, including key elements such as distinct independent vs. combining forms for Latin and Greek roots.	May not be fully sensitive to irregularities that derive from source language, such as the preference of Greek and Latin affixes to attach respectively to Greek and Latin roots.
Advanced	Recovers the meaning of previously unseen words that involve morphological patterns and root forms that go beyond the Latinate core for academic vocabulary.	n/a	Is aware of the language origins of borrowed forms; understands the meaning of a wide range of bound root forms and applies this knowledge effectively to guess the meaning of technical vocabulary.	n/a	Is aware of and can explicitly analyze the relationship between English morphology and morphological patterns in source languages such as Latin, French, and Greek.	n/a

Table A12 Multiple Meanings (Verbal: Clarify Meanings)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Can distinguish between words they know and words they have not previously encountered.	Tends to operate on the assumption that a word has one meaning, no matter how it is used in a sentence.	Uses common, everyday vocabulary in multiple senses, including zero derivation (*a cook, to cook*). Creatively extends word usage to cover novel situations.	May have little conscious awareness of the choices being made as words are produced, leading to such problems as confusion of homonyms.	Can identify concrete features that motivate extended uses of words (the sink drooled—because the water was coming out slowly).	Little awareness of ambiguity or of the relationships between different senses of the same word. May have difficulty identifying abstract properties and functional relationships when reasoning about relationships among ideas.
Foundational	Can distinguish homonyms and identify which of several known meanings a word has in sentence context.	Still tends to assimilate new meanings to known meanings, and therefore to misinterpret unfamiliar uses of familiar words.	Produces the correct forms of grade-appropriate homonyms in context.	Confusion of homonyms may persist for grammatical function words and other common words with very general meanings.	Is explicitly aware of lexical ambiguity and can manipulate such ambiguities to create puns and other forms of word play.	Little explicit awareness of abstract, functional relationships among meanings.
Basic	Can recognize novel words used in a written sentence context and make reasonable guesses as to their meanings.	Understanding of metaphoric word senses may not be systematic, reflecting piecemeal acquisition of individual uses rather than comprehension of the underlying system of metaphor.	Accurately distinguishes among most homonyms. Coins new words and uses them productively following regular patterns of metonymy and zero derivation.	Production of metaphoric word senses may not be systematic, reflecting piecemeal acquisition rather than comprehension of the underlying system of metaphor.	Can identify abstract features (relationships and functions) that motivate metaphoric extensions of a word's basic meaning.	May have difficulty recognizing ambiguities based on sentence structure.
Intermediate	Flexibly interprets words in written sentence contexts, even in relatively rare metaphorical extensions.	Ability to understand rarer metaphorically-motivated meanings uses may be hindered by lack of domain-specific and disciplinary knowledge needed to motivate the metaphor.	Produces a wide range of metaphorical and metonymic extensions from the prototypical meaning of a word.	May lack sensitivity to the ease with which particular meanings or metaphors will be understood by others.	Is explicitly aware of ambiguities that derive from sentence structure (not just individual word meanings) and can manipulate such ambiguities to create various forms of humor or wordplay.	May still have difficulty in reasoning about the kinds of abstract, functional relationships exploited by systems of conceptual metaphor.

Table A12 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Advanced	When reading in a specialized discourse, can recognize technical uses of words and make reasonable inferences about their precise meaning based on constraints imposed by that disciplinary context.	n/a	Effectively controls the way a word is used to keep the intended sense clear in context.	n/a	Can analyze systems of metaphors (for instance, a poetic conceit) to clarify the meaning that a word has in context.	n/a

Table A13 Sentence Context (Verbal: Clarify Meanings)

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	Can recognize that a sentence sounds odd when it is syntactically ill-formed, semantically incoherent, or pragmatically unlikely.	Cannot distinguish why a sentence sounds odd; makes no clear distinction between ungrammaticality and implausibility.	Can usually produce fluent, well-formed speech in which words are typically used accurately and meaningfully in context.	Has little metalinguistic awareness or control over word choice.	Can generate attempted repairs of odd-sounding sentences, reflecting implicit understanding of what the text ought to have said.	Corrections may reflect misconceptions and actually contradict the explicit meaning of the sentence.
Foundational	Distinguishes between grammatical ill-formedness and problems with the meaning or plausibility of a sentence. Can make reasonable guesses about what a word might mean by substituting other words (potential synonyms) that might go in the same context.	Not proficient at focusing on or analyzing how specific aspects of the sentence context constrain what a word means.	Controls word choice well enough to consider and propose alternative words to express a desired meaning.	May be insensitive to constraints on usage, leading to awkward, inappropriate word choices when using words that fall outside of daily oral vocabulary.	Can identify different parts of speech and reason about what part of speech a word belongs to by substituting other words of the same part of speech, based on a general awareness that different kinds of words go in different places in a sentence.	Awareness of sentence structure may be limited, leading to inaccurate judgments about which part of speech a word functions as in a specific sentence context.
Basic	Distinguishes semantic ill-formedness from problems with the plausibility of the situation described by a sentence. Infers key features of word meanings from use in sentence context, particularly semantic types (ontological categories).	May not be accurate at distinguishing incidental information provided by sentence context from definitional features.	Is generally sensitive to usage constraints and avoids obvious problems or errors. Controls word choice well enough to select the more accurate, precise word consistently when given a choice.	May be insensitive to connotations and fine shades of meaning that would justify one word choice as more appropriate and effective than another.	Can generate sentences that illustrate the meaning of a word.	Conscious awareness of usage patterns or of key features of meaning may be limited, resulting in too-general or misleading sentences being generated.

Table A13 Continued

	Interpretive		Expressive		Deliberative	
Level	**Achievement**	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	Is generally sensitive to connotation and fine shades of meaning, and therefore can identify places in a text where specific word choices create a particular tone or overall impression.	May have difficulty providing explicit explanations for how particular word choices exploit semantic and other features of a word or in inferring subtler aspects of word meaning from context.	Can reliably identify places in a text where word choice can be improved.	May have difficulty working independently to provide explicit suggestions on how a text can be improved by specific word choice changes.	Can explicitly analyze a range of different uses of a word in a sentence to make a case about exactly what a word means and how it should be used.	May have difficulty modeling how another person may have made a specific set of word choices, or why.
Advanced	Accurately infers a wide range of definitional and linguistic features for specific word meanings from use in sentence context, including connotations, criteria features, and patterns of usage.	n/a	Controls word choice well enough both to propose and evaluate alternatives and to independently make effective changes that improve wording.	n/a	Can explicitly analyze how a particular set of word choices reflect specific purposes, attitudes, or judgments.	n/a

Table A14 Framing an Exposition (Discourse, Convey Knowledge)

Level	Interpretive		Expressive		Deliberative	
	Achievement	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Preliminary	**FrExp-1-I-A** Can restate facts about a topic after reading or listening to a straightforward exposition.	**FrExp1-I-L** May have no sense of relative importance of information, leading to seemingly random recall of details.	**FrExp-1-I-A** Can produce a simple text that identifies a topic and supplies one or more statements related to the topic.	**FrExp-1-E-A** May provide little structure beyond providing a list of facts.	**FRExp-1-D-A** Understands expectations for factual inquiry; can apply strategies that elicit information by asking and answering questions.	**FrExp-1-D-A** May have a limited sense of relevance and a limited ability to focus on one specific topic.
Foundational	**FrExp-2-I-A** Can identify the topic sentence of an informational paragraph and explain details' relation to topic sentences using syntactic cues such as connectives (because, for instance).	**FrExp-2-I-L** May be much better at understanding intersentence relationships when formally cued and miss them when they are left implicit.	**FrExp-2-E-A** Can produce a coherent, focused paragraph that introduces and develops a topic, while clearly indicating logical relations among ideas.	**FrExp-2-E-L** May have a limited ability to evaluate what kinds of elaborations are most needed to elaborate on a particular point.	**FrExp-2-D-A** Can apply strategies using conceptual relations as cause-effect or statement-example to explore a topic.	**FrExp-2-D-L** May rely on an overly limited set of strategies such as finding examples.
Basic	**FrExp-3-I-A** Infers the structure of a complex exposition with embedded elaboration (including definition, comparison, causal explanation, and illustration), correctly interpreting cues that indicate the function of subordinate text segments.	**FrExp-3-I-L** May fail to recognize conceptual relationships implied by the text but not explicitly highlighted by text structure.	**FrExp-3-E-A** Can write a multiple-paragraph exposition that successfully carries out a series of subordinate rhetorical goals such as comparison, causal explanation, and illustration, providing appropriate structural markers and transitional cues to convey a clear understanding of the topic.	**FrExp-3-E-L** Templates for producing expository text may still be rigid and bound to specific social contexts and occasions.	**FrExp-3-D-A** Can carry out strategies that develop explanatory subgoals by enabling reader or writer to isolate and focus on particular organizational principles, such as comparison, causal explanation, and illustration.	**FrExp-3-D-L** May show limited flexibility in combining and embedding multiple organizational patterns.

Table A14 Continued

Level	Interpretive		Expressive		Deliberative	
	Achievement	**Limitation**	**Achievement**	**Limitation**	**Achievement**	**Limitation**
Intermediate	**FrExp-4-I-A** Can formulate questions that identify content in an exposition that is missing, unclear, or underspecified; can identify and explain why parts of a text seem unclear, vague, or uninformative.	**FrExp-4-I-L** May not have sufficient knowledge within community/discourse to resolve coherence problems that require high prior knowledge.	**FrExp-4-E-A** Can frame a document whose introduction, body, and conclusion link effectively with the knowledge and interests of the audience account, and which therefore provide appropriate illustrations, explanations, and elaborations.	**FrExp-4-E-L** May not differentiate specific forms of exposition appropriate to specialized communities and discourses.	**FrExp-4-D-A** Can apply editing and revision strategies that generate questions to be answered and connections to be made, given a mental model of the knowledge and interests of an intended audience.	**FrExp-4-D-L** May fail to consider priorities and expectations for a particular context or discipline.
Advanced	**FrExp-5-I-A** Can analyze in detail how an expository text presents its subject matter, identifying what the text highlights and what it deemphasizes or obscures, taking full account of disciplinary knowledge and norms for the text's intended discipline and genre.	n/a	**FrExp-5-E-A** Can write a variety of different genres of expository text in many important disciplinary contexts, varying the organization, level of detail, and other elements to suit the audience, discipline, genre, task, and purpose.	n/a	**FrExp-5-D-A** Can apply strategies that analyze content relationships within and among expository texts, organizing a body of material according to common principles.	n/a

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