Strategies for Secondary Literacy Instruction:

When Students Continue to Struggle

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Introduction

When children fail we are quick to blame the child, the family, previous teachers, or the environment. However, it can be far more impactful to reflect on how we can adjust our practices to meet our students where they are at. One way we can do this is by explicitly modeling higher order thinking skills. By middle school, we shift away from elicit instruction focusing instead on evaluating application. Instead of teaching children how to identify symbolism, we ask them to find it. Instead of teaching them how to think through and form a logical argument, we expect them to make one. Instead of teaching them how to read text, we expect them to not only independently read, but to use what they read to deepen their conceptual understanding of content. This handbook suggests that instead of leaving students to independently navigate text, we can more explicitly teach disciplinary literacy skills that allow students to more successfully access text for learning. As middle schoolers are expected to acquire more knowledge through reading, this handbook focuses on deepening our understanding of how to help students become better readers, in order to become better learners.

This handbook will provide an overview of recent findings in secondary literacy research on text and teacher variables to support disciplinary literacy skills, provide insight into how students struggle with content area literacy, and strategies for disciplinary literacy instruction. The same strategies still work, but hopefully these findings will give insight into how to better aid struggling students who might not respond to even the best of efforts. While this text is in no way comprehensive, it is a start. One area that is not covered thoroughly is text structures, for more information on text structures, how to teach students to recognize and understand these structures, please see Klingner, Vaughn, and Boardman (2007).

Rationale

Why do we need to pay more attention to secondary literacy?

As the job market changes, jobs require higher levels of literacy than they did thirty years ago while 40 percent of American high school graduates lack the literacy skills that employers are seeking (Achieve, Inc., 2005; Arc, Phillips, & McKenzie, 2000). This comes as no surprise as approximately 32 percent of high school graduates enter college requiring remedial English courses (ACT, 2005). Advanced literacy skills are necessary for both academic and later life success, determining the type of job students obtain, which ultimately determines income level. Research has found that literacy levels are even predictive of health maintenance (Berkman et al., 2004), avoiding the criminal justice system (Beck & Harrison, 2001), increasing social and civic involvement (Kirsch, Jungeblut, & Jenkins, 1993), and ultimately determining one's ability to be informed of public issues (Venezky, Kaestle, & Sum, 1987). Despite recent policy changes over the last decade that focus on early literacy interventions, data continues to show that students are not improving and American adolescents continue to fall behind their age-matched peers in other countries (Kirch et al., 2003).

Since the passage of No Child Left Behind, legislation has focused on bringing research-based literacy instruction into every classroom. However, most of the research has focused on primary grades. A majority of the emphasis has been on early and fast intervention as a means to fix literacy problems before they become too big. Because current policy and interventions are targeted at the early grades little attention is being paid to the secondary level (Shanahan & Shanahan, 2008). NAEP scores for the last ten years show that while primary students are responding to intervention and making some gains that those gains begin to

disappear by 8th grade and continue to diminish through the rest of high school (Perle et al., 2005). What test scores are starting to show is that early reading gains aren't translating to more complex reading skills; skills that students need in order to engage in secondary level text (Shanahan & Shanahan, 2008).

Despite advances in literacy instruction in the early grades, little is known about how to effectively implement literacy at the secondary level. This has led to vast differences between elementary and secondary literacy instruction, teacher reading preparation, and certification requirements. Additionally, little funding is provided for secondary literacy instruction (federal support in 2008 put funding for primary interventions at $300 million and secondary interventions at $30 million). This lack of priority, dissemination of information, and funding at the secondary level has led to content area teachers not using or knowing how to use strategy instruction to enhance their teaching, hindering student growth (Conley, 2008). As teacher knowledge and instructional ability are one of the most important influences on what students' learn, this handbook attempts to bolster teacher knowledge of disciplinary strategy and instructional approaches to support student learning (Darling-Hammond, 1998). This handbook attempts to remediate this by providing an overview of recent research in secondary literacy strategies for content area teachers, and additional resources to help secondary teachers enhance literacy instruction in their classroom.

Literature Review

Literacy skills, specifically in reading, can be broken down into two processes, bottom up word recognition and top down comprehension, the ultimate goal being comprehension. Gough

and Tunmer (1986) created what is now referred to as the Simple View of Reading, which defines reading comprehension as the product of decoding ability and listening comprehension (RC = D x LC). As either decoding or listening comprehension increase, so does reading comprehension. For a better understanding of the role vocabulary plays in comprehension, one can look to the four-part processing model for word recognition or Scarborough's reading rope (Paulson & Moats, 2010; Scarborough, 2001).

The four-part processing model breaks the process down slightly more, representing reading as an interaction of phonological processing, orthographic processing, context processing, and meaning processor (Paulson & Moats, 2010). In this model, phonological processing and orthographic processing work together to allow students to decode a word after which the meaning processor (vocabulary) and context processing support comprehension. Similarly, Scarborough's reading rope (2001) broke reading down into top down language comprehension skills (i.e. background knowledge, vocabulary, language structures, verbal reasoning, and literacy knowledge) and bottom up word recognition skills (i.e. phonological awareness, decoding, and sight recognition) that work together to produce skilled, fluent readers. This handbook focuses on strategies for developing student's meaning processor, context processor and overall top down language comprehension skills. Before we can do that, it is important to understand what factors influence comprehension of text.

Flood, Lapp, & Jensen (2003) highlight variations in reader variables (age, ability, affect, motivation, background knowledge, personal connection to text), text variables (genres, types, features, considerateness), educational-context variables (environment, task, social grouping, purpose), and teacher variables (knowledge, experience, attitude, pedagogical approach) as

influencing reader comprehension. Carlisle (1991) noted that students must understand basic language (syntax and semantics), sentence by sentence relationships (identifying and tracking), and rhetorical structures and how they connect ideas (e.g., problem-solution, cause-effect, comparisons, descriptions, classifications). Teachers must develop student's awareness of how ideas relate to one another, and provide significant practice with various text structures (specifically explicit instruction in approaching text structure to gain knowledge). Additionally, teachers must take into account text variables to consider include text complexity (vocabulary, cohesion, syntax, semantics, lexical density, and knowledge demands) and considerateness (structure, coherence, unity, and elaboration) (Slater & Graves, 1985) when planning reading activities. For more information on text complexity see Common Core State Standards English Language Arts Appendix A.

What does literacy look like in the secondary classroom?

Though some students are able to develop these skills and sensitivities naturally through frequent exposure and practice with written and spoken text, some students struggle to develop these strategies on their own and require more explicit instruction. However, at the secondary level, instruction tends to focus on global strategies to improve fluency, summarizing, identifying the main idea and details, predicting, tapping prior knowledge, pre-teach vocabulary, and supporting pre-reading, during reading, and post-reading to improve comprehension across content areas. These strategies increase critical thinking and improve writing in content areas, though they stop short of helping students understand how language functions to convey meaning in content specific text (Shanahan & Shanahan, 2008).

After two years of research with content area experts, high school teachers, and linguists, Shanahan and Shanahan (2008) found that what students really need is not content area instruction and general strategies, but disciplinary specific literacy instruction. They believe that through a combination of content area literacy strategies (current practices) and disciplinary literacy instruction, students will learn how to approach texts like experts and thus reach higher levels of comprehension.

When monitoring regular readers, they found that most students apply general reading strategies across all content areas and never adjust their reading to match the text. Unfortunately, disciplines use language differently and require readers to approach the reading and analysis of discipline specific text in different ways. If students do not adjust their reading, they often miss the main points of the text. Based on their findings, Shanahan and Shanahan proposed the literacy triangle as a framework for organizing literacy skills (Figure 1).

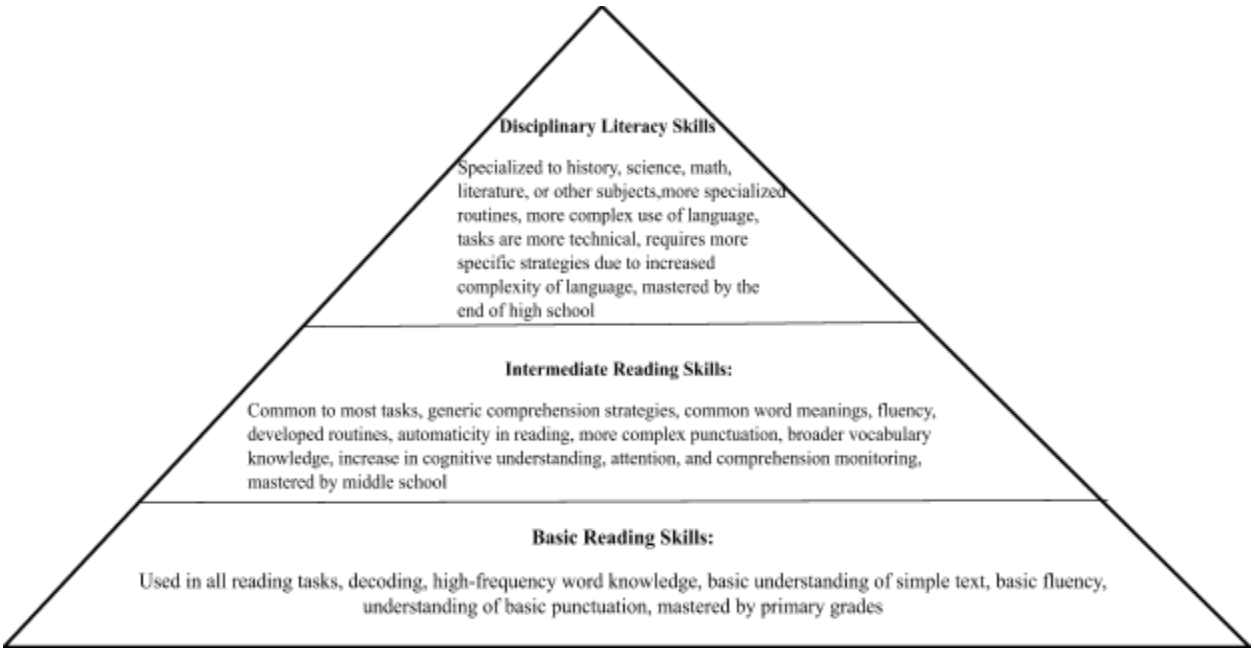

Figure 1. Adapted from Shanahan and Shanahan (2008) Literacy Triangle.

At the foundation of the triangle is basic reading skills that are used in every task and are often the focus of intervention and instruction in the primary grades. From about fourth grade through middle school, teachers shift focus to intermediate reading skills. It is at this point that you start to see drops in reading ability and late emerging reading disabilities start to appear (Leech, Scarborough, and Rescorla, 2003). These students have good basic reading skills, but begin to struggle with the intermediate skills as more emphasis is placed on comprehension and critical thinking. The focus of this handbook is the middle and top level of the pyramid.

The middle level of the triangle contains intermediate literacy skills, content area literacy strategies that target background knowledge, vocabulary, and comprehension. Students begin learning how to monitor their comprehension and how to select appropriate strategies to meet their reading needs. At the top of the pyramid, disciplinary literacy skills are subject specific skills that help students navigate the challenges that come with reading more complex text in high school.

Why should we extend disciplinary literacy to special education?

Kennedy and Ihle (2012) expands upon Shanahan and Shanahan's 2008 article in regards to its implications for special education teachers. Kennedy and Ihle propose that since a large number of special education students receive a good portion of their content area instruction in the general education classroom, training for special education teachers at the middle and high school level should begin to focus more on understanding disciplinary literacy. Their role would be to assist general education teachers in helping special education students with comprehension of content area text. This article looks to provide special education teachers with a better

understanding of what disciplinary literacy is, how it impacts student comprehension, as well as instructional suggestions. By teaching students with special needs disciplinary skills, we provide more equitable access to content area knowledge.

While Kennedy and Ihle agree that basic literacy skills need to be taught, basic literacy instruction is often disconnected from content area instruction and focusing solely on these skills can result in students unable to access a large portion of the curriculum. Biancarosa & Snow (2006) made recommendations for comprehensive literacy reform at the secondary level to support the inclusion of special education students (see Appendix B).

How do students struggle with disciplinary literacy?

Kennedy and Ihle (2012) review of research came to find three main areas of disciplinary literacy that students struggle with: discourse, vocabulary, and word choice.

Discourse.

Discourse includes how text, teachers, and experts talk about and present knowledge varies across content areas and can be goal dependent (Shanahan & Shanahan, 2008). Students struggle with the following areas of discourse:

1) The type of text and how the text introduces and connects ideas, events, and logical relationships (the more connected and organized the easier it is) (Carlisle, 1991)

a) Students are more familiar with narrative and take longer to understand expository text structures

b) Expository text have a larger variety of text structures, often change text structure in the middle of a paragraph, and thus can be harder to follow (Carlisle, 1991); especially true in science and history

2) Lack of background knowledge in content area, limited exposure to text types, or limited vocabulary (Torgesen, Houston, & Rissman, 2007)

3) Students with disabilities often read less and thus have less experience and sensitivity to text structures and nuances (Carlise, 1991)

4) Cognitive level issues that lead to poor working memory, inefficient storage and retrieval, slow processing, and logical reasoning skills (Johnson et al., 2010)

5) Expressive and receptive language ability account for a large amount of differences in reading comprehension scores; students may understand a word they hear, but not necessarily recognize it in text (Johnson et al., 2010)

a) Receptive - content area text is more complex in vocabulary, technical content, and use of complicated sentences to convey ideas that heavily relies on students making inferences while following the author's logic (Harman, 2009)

b) Expressive – if students only have a lower level understanding of information, they can recall information with prompting, but struggle to generate knowledge independently

Vocabulary.

Vocabulary accounts for up to 50% of reading comprehension (Stahl & Nagy, 2006). In order to have adequate reading comprehension of text, researchers believe students must be able to comprehend between 90 to 95 percent of the words in the text (Nagy & Scott, 2000). Most

vocabulary is learned through incidental learning; however, content area literacy requires more direct and explicit instruction to help students reach the level of understanding needed to process content area text. Content area vocabulary can be technical (math), requires various connections between subcategories (science), or relies on metaphor to label events or periods (history). Additional strategies for teaching content area vocabulary are provided in Appendix A. Students struggle with the following areas of vocabulary:

1) Struggle to develop a deeper understanding of discipline-specific vocabulary, technical terms, understanding new word meanings well enough to understand discipline specific text (Shanahan, 2009)

2) Lack of understanding of language norms and how language is used to convey meaning in subject-specific context (Moje, Dillion, & O'Brien, 2000)

3) As text gets more difficult, authors do not always provide context clues to help students figure out unknown words, students can no longer rely on context clues and other intermediate literacy skills

4) Vocabulary is part of a larger, more abstract, concept that places heavy demands on students' understanding of text structure and inferencing abilities (Kennedy & Ihle, 2012)

Word Order.

Shanahan and Shanahan (2008) found that experts in science, social studies, and math all use subject specific grammar. These patterns contain subtle nuances regarding how ideas are connected and what information is the main idea or subordinate ideas. How these words are structured may depend on whether the author is trying to describe, indicate cause-effect, or show

comparisons. And all of these patterns may require different strategies or approaches to reading and understanding. Students struggle with the following factors of word order:

1) Subject-specific text uses subject-specific grammar patterns that many students are unfamiliar with or do not have much exposure to (Kennedy & Ihle, 2012)

a) How noun phrases may be used to change verbs to nouns

b) How causal/temporal words may link or create longer phrases

1) Causal - if/then, as a result, because, caused, led to, thus, in order to

2) Temporal – first, next, then, afterward, continuing on, in the end

3) Description – for example, for instance, this particular, specifically, such as, attributes of, qualities of, characteristics of

4) Problem/Solution – problem, question, puzzle, hazard, issue, need to prevent; solution, answer, response, reply, rejoinder, return, to solve the problem, to set the issue at rest

2) Text may have long gaps between ideas and co-references, students often need guidance in learning how to unpack dense text and track information as they read (Kennedy & Ihle, 2012)

Disciplinary Literacy Strategies

Teaching literacy skills in content areas allows teachers to teach a large number of students with a variety of reading abilities how to use complex reasoning in ways required by specific discipline areas (Lee & Spratley, 2010). In order to assist students in developing these skills, teachers should understand how experts in their field read and make sense of subject area text.

Ideally strategy instruction should include a metacognitive component that not only teaches steps, but teaches the logic of the specific strategy, and how to decide when to use it. Some strategies may work well in history, but may not be applicable in science and students should be made aware of which strategies are the most useful for each content area. For example, Greek and Latin roots and affixes are useful in the meaning processing of science vocabulary as it is often derived from these languages. However, it may not be appropriate or necessary for other classes. Strategy instruction should match the knowledge that students are supposed to gain (Shanahan & Shanahan, 2012).

What can teachers do to support students in content area instruction?

First, teachers need to determine prerequisite skills students require before entering the classroom and end of the year objectives. Once these skills and objectives have been selected, teachers can identify ways to assess present skill levels and identify strategies that will support students in the mastery of the course objectives. Disciplinary strategy instruction focuses on giving students the tools to independently break down text and create new meaning within a variety of text structures and task situations. The following is a list of suggested activities to guide disciplinary literacy instruction.

Instructional Strategies for Disciplinary Literacy Instruction	
Systematic instruction of text structure, vocabulary, and word order:	a) Keep a class-wide reference chart of: 1) common text structures and their features 2) common syntax (chart in Kennedy & Ihle, 2012) 3) subject-specific vocabulary b) Teach how identifiers, ordering words, describing words, main subjects, and prepositional phrases in text convey meaning within their content area c) Teach how narrative and expository text is different and how each require different strategies

Instructional Strategies for Disciplinary Literacy Instruction Cont.	
Pre-reading strategies to frontload meaning:	a) Check, activate, and build prior knowledge b) Identify and teach specialized vocabulary (Appendix A) c) Pre-teach and practice the skills or strategies needed for the text: 1) how to identify certain information 2) how to make comparisons 3) how to evaluate evidence and sources 4) how to read diagrams 5) how to synthesize information across sources/text d) Teach students how to make abstract ideas concrete e) Teach students how to deconstruct complex sentences f) Teach students how to read visuals and diagrams and how to connect them to written explanations g) Teach students how experts in that field reason and evaluate claims
During reading strategies to help make meaning:	a) Identify for students what specific features you want them to notice as you read aloud b) Demonstrate the skills you want students to apply and model your thinking using SHORT passages c) Allow students to practice and receive feedback immediately after you model d) Provide graphic organizers that: 1) create visual representations of the sequence of events 2) highlight text structure features (e.g. main idea-detail, cause-effect, classifications) 3) organize points-of-view, sources of evidence, or compare and contrast claims across information sources e) Create a reference table of text structure and genres and tips for how students can identify and make sense of main and subordinate ideas f) Prepare discipline relevant questions for students to use to guide reading (e.g. classroom conversation should focus on how students make sense of text and how they can use text to increase their knowledge and understanding of a concept)
Follow-up reading activities to assess and extend understanding:	a) What should students have learned from the text and how can they demonstrate that learning 1) what do all, most, and a few students need to know or do? b) How will you support students who missed the key ideas?
Establishing and supporting a culture of high expectations	a) Scaffold learning 1) select text at or slightly above student level for initial skill instruction 2) as students master text strategies, slowly increase the difficulty level and remove supports 3) model thought process in using strategies that will help students tackle text barriers and increase comprehension b) Provide support through prompting, questioning, and sufficient practice with new concepts so that students become confident in their ability as readers c) Build routines in strategy instruction and usage

Adapted from: Kennedy and Ihle (2012), Lee and Spratley (2010), Shanahan and Shanahan (2008), and Wood and Blanton (2009).

Language Arts

This section focuses only on what students need to know in terms of Language Arts text, as most secondary literacy skills instruction takes place within the Language Arts classroom, despite reading demands being placed on students across content areas. This places a huge responsibility on Language Arts teachers to provide adequate instruction across a vast array of

text structures and language skills. Examples of Language Arts specific literacy skills include identifying and tracking story elements, determining literal vs. implied meaning, analyzing themes, recognizing text structure, and understanding genres.

Though students may struggle with literature, it is important that teachers do not avoid complex text. Complex text allows students the opportunity to approach difficult ethical dilemmas and gain insight into human behavior. This can be crucial for students who struggle with reading as many of these students can most likely relate to situations characters face and stand to gain valuable knowledge from reading how characters face these situations. Restricting access to complex text prevents students from gaining experience with more complex thinking tasks. Below is a list of skills students need in order to engage more complex text. Using the strategies listed above, teachers can identify strategies that target specific task demands.

Students need to:
1) Understand rhetorical tools used in a variety of narratives (fictional, autobiographical, or semi-autobiographical, biographical): a) examples include: satire, symbolism, irony, and point of view b) students should be aware of how to recognize signals of their use in text and be able to draw on strategies to help them understand the message 2) Understand that text may be open to a variety of interpretations 3) Understand how authors use language to create an imaginary world 4) Understand how different text structures require different reading purposes and strategies 5) Have prior knowledge of typical human behavior and internal motivators in order to understand character motives and actions 6) Be able to create a literal representation of text, then create an interpretive representation of the text by using prior knowledge and information provided in the text (Nokes, Dole, & Hacker, 2007)

Social Studies

While social studies texts have worked to become more accessible, many textbooks still are written above grade level and contain difficult vocabulary and syntax making explicit

instruction essential. Oftentimes, social studies teachers will use independent reading assignments as the primary source of knowledge acquisition or as a precursor to group discussions. To help ensure all students are able to participate in class discussion, consider the following:

Social studies difficulties include:	
Vocabulary-level difficulties	1) More general 2) Metaphorical (e.g., The Great Depression exemplifies features of the time…) 3) Often lacks context, making it hard to use context clues 4) Consists heavily of names of: people, places, and events that are connected to a specific time, but may no longer bear relevance in student's lives 5) Grouped by time period or other features 6) May be domain specific: related to government, political science, geography, economics, and civics
Text-level difficulties	1) Students lack experience with a variety of social studies text structures a) students don't know how to approach informational text and often read it like narrative b) students don't know how to corroborate information across sources 2) Students fail to make logical (i.e. causal or temporal) connections while reading because: a) references to the same event may not be located next to each other or indirect, thus students fail to recognize connections between actions that may lead to certain events b) text includes irrelevant information c) each sentence may contain a number of ideas that students have to process d) reliance on pronouns (e.g. "it", "which" and "them") can be hard for students to follow e) text presents a large amount of information with limited description, thus students fail to keep track of people or events 3) Students don't understand bias and read text as 100% fact a) students lack strategies or processes to analyze the validity, reliability, or credibility of a source b) students struggle to keep track of changing points of views

Students need to:
1) Understand their role of interpreting the evidence a) Be aware of the author's bias as well as their own biases and how these alter their understanding of events b) Analyze the quality of evidence and be able to identify what makes a source more reliable than other sources and where to find reliable sources 2) Connect how the information they are learning fits in with the time period and with what they already know a) Make comparisons between text and events b) Identify cause and effect relationships between events

3) Identify language that is used to describe causal and temporal relations of events
    a) Unpack noun phrases and their role in creating meaning in social studies text
    b) Recognize when phrases change word meanings from concrete to abstract, or simplify concepts
    c) Know when noun phrases describe observations, claims, metaphorical events, time periods, and evidence
4) Create meaning from unstated relationships as social studies text often lacks enough details for students to make sense of the text (Beck, McKeown, Sinatra, & Loxterman, 1991)
5) Experience a variety of historical writing (political documents, legal documents, newspaper articles, letters, diaries, first/second hand documents of an event, published proceedings, archival data).

Adapted from Torgesen, Houston, and Rissman (2007), Lee and Spratley (2010), and Nokes, Dole, and Hacker (2007).

A common strategy for increasing comprehension of social studies text is through the use of heuristics. Heuristic activities help students work through contradictions in understanding and text, compare and contrast events, people, places, or time periods in order to find patterns, and can help students sort through different types of evidence and make distinctions between them (Nokes, Dole, & Hacker, 2007).

Social Studies discipline-based questions to guide student's reading:

- What kind of speech/writing is this? What self-interest might one expect from this writing?
- Who is the audience? How is the text crafted to address this audience?
- What words/phrases might have different meanings now than they did at that time?
- What knowledge is presumed that a reader of that era would already know?
- Are there any contradictions or tensions between knowledge the author presumes and knowledge from other historical documents on similar events?
- What can we infer about the author's motives/biases? Of others in the text?
- What is the overall text structure?

Adapted from Lee and Spratley (2010)

Science

Scientists create knowledge through experimentation, design, and analysis of results. The purpose of science reading is to gain full understanding of a concept, its related processes, and its relationship to the physical environment. Scientists have to decide whether they take a critical

approach to reading or focus on reading to learn. While reading, scientists may pay attention to the name of the author and the lab in which they do research as a means to establish credibility. However, most focus their energy on transforming and synthesizing new information, a complex cognitive skill. Before students are expected to read science text independently, recognize that students may struggle with the following areas:

Science vocabulary difficulties include:

1) Varies widely by disciplines that fall under the heading of science
2) Low frequency and often not used outside of science
3) Words grouped based on the process they describe or by classifications
4) Common words take on a different meaning in science (e.g. work)
5) Greek and Latin is used to indicate meaning and relationships between words
6) May be domain specific: physical science, physics, life science, medicine, earth science, chemistry, biochemistry, and astronomy
7) Symbols and letters take the place of words or may indicate a process
8) Use of categories and taxonomies that represent conceptual relationships captured in a single word
    a) Capture form/function relationships regarding physical characteristics, behavioral patterns and positions in evolutionary history
    b) Requires understanding the multiple and/or nested relations

Science text specific difficulties:

1) Higher lexical density than other content areas
    a) More words per clause, total number of words, and percent of content specific words within a passage (Fang, 2004)
2) Requires understanding of how evidence and extensive research is used to make scientific predictions
    a) Students must identify the evidence that supports predictions
    b) Students must be able to evaluate evidence and sources for reliability, validity, and credibility
3) Requires students to be proficient in identifying causal (cause-effect) and/or temporal (event sequence) relations
4) Relies on using symbols or letters to represent information (e.g. chemical formulas or equations)
5) Structures change mid-paragraph depending on the purpose, so students have to switch purposes
    a) Track observations, predictions, and evidence
    b) Providing descriptions of objects or processes
    c) Describe classifications
    d) Indicate how new information fits in with old
6) Uses words as specialized modifiers (e.g. catabolic pathway) that may change or alter the meaning of a regular word (e.g. pathway)
7) Uses a variety of visual diagrams to supplement written text
    a) Students must be able to process both the text and picture and then use both to create an overall representation of the concept
    b) Students who have little practice with this often struggle to do this independently

Students need to:
1) Use diagrams, structures, visualizations, and graphs to create meaning a) Accurately read diagrams, structures, visualizations, and graphs b) Connect the information provided in a graph with written explanations c) Use text and visual representations to create a complete picture of a concept or process 2) Process large amounts of technical vocabulary a) Identify how science vocabulary is derived from Greek/Latin b) Recognize the relationships of vocabulary within a concept and across concepts and how Greek/Latin parts can help give clues to their relationships 3) Approach different types of scientific text a) Read abstracts, section headings, figures, tables, diagrams, maps, drawing, photographs, reference lists, and endnotes b) Use parts can to make predictions or to signal what the text is talking about, or what readers should be looking for (Lee & Spratley, 2010) c) Recognize and make sense of causal and temporal relations within text 4) Understand how science uses language to convey meaning a) Defining complex technical terms through the use of embedded clauses (an invisible gas, called water vapor,) b) Using nominal apposition to introduce terms or define terms (animals that eat plants, herbivores, may be found) 5) Evaluate scientific evidence and sources a) understanding scientific arguments based on scientific reasoning b) know where to find reliable sources or how to determine the reliability of a source

Adapted from Torgesen, Houston, and Rissman (2007) and Lee and Spratley (2010).

Math

Students read math texts to get the gist or the main idea, but this is not always an appropriate method for reading math text. Like scientists, mathematicians ignore the author and focus solely on the process of making absolute sense of the text and understanding how each word contributes to the meaning. Math requires very precise reading in which students must tune into specific words that hold an exact meaning. Understanding math texts relies heavily on a student's logical reasoning ability and strong understanding of foundational math skills and concepts. As students move up, texts often assume students have mastered certain topics or principals. In order to read the text successfully, students need to know these assumptions. While more math texts attempt to be more considerate, by removing reading requirements and

providing explicit explanation and definitions, this often is not helpful. Once in college, students will be required to tackle text that requires students to break down mathematical reasoning from postulates to theorems and then construct proofs from this information.

Math vocabulary difficulties include:

1) Words rarely used outside of math leading to limited exposure and opportunities to practice
2) Largely abstract, unequivocal, collective, and compact
    a) e.g. Trapezoid – students must have cumulative, experiential knowledge that incorporates the understanding of lines, planes, concepts of parallel, polygons, and quadrilaterals and their relationship for students to fully understand
3) Hierarchical, relying on prior knowledge of concepts
4) Context specific definition, words hold meaning largely depending on their context
5) Uses common words that take on a different meaning when used in math (e.g. prime)
6) Relies heavily on abbreviations to represent measurements
7) Relies heavily on symbols or letters to convey meaning, meaning changes

Math text difficulties include:

1) Understanding of how language functions (e.g. strong awareness of language correlates with strong algebra scores)
2) Understanding logical relations and the use of logical reasoning to solve problems
3) Specific understanding of words in order to understand their function within the context of a problem
4) Creating mental representations of meaning from diagrams
5) Identifying which is information is and is not relevant to a problem
    a) Understand how information serves to add to or alter a mathematical problem
    b) Interpret the use of letters, symbols, and numbers to convey meaning
    c) Understand how symbol organization completely changes the meaning

Students need to:

1) Have extensive experience with reading word problems and equations
    a) Have strong understanding of math terms, their definition, and how they function within mathematical problems
    b) Read problems and translate the words into mathematical calculations
    c) Read numerical equations and translate them into conceptual understanding
2) Understand text and their connection to graphical representations
3) Understand the role of the variables and numbers in text and equations
4) Have strong logical reasoning skills and understanding how mathematics uses language to convey meaning

Math specific questions to guide understanding:
• What is the purpose of this text? To teach or explain? To give directions? To describe a situation or problem? To add information to previous learning? What type of problem is it? • What do I already need to know how to do in order to understand this text or problem? • What symbols or operations are used or needed and what do they mean in the context of the problem? • What keywords are used to give clues as to what operations should be used (e.g. more than, altogether)? How do these keywords function within the context of the entire problem? • What evidence is provided? Is the evidence accurate or relevant to the problem? How does the evidence add or change what was already presented? • How do the diagrams or visuals help to convey meaning? What type of diagram is it? Is all information present or do I have to calculate missing information?

Adapted from Torgesen, Houston, and Rissman (2007), Lee and Spratley (2010), and Nokes, Dole, and Hacker (2007).

Summary

As each discipline has a unique way of using language to convey meaning, teachers must teach students discipline specific strategies. When reading content area text, students struggle with discourse, vocabulary, and word order. To support comprehension, teachers should create lesson plans that factor in variables that influence reading comprehension (student, teacher, environment, and educational) and common areas of difficulty. Lesson plans should clearly identify discipline specific strategies to support students before, during, and after reading. Teachers should demonstrate expert analysis of content area text, model their thinking, and provide ample opportunities to practice disciplinary specific reading strategies with feedback. All students, including those with reading difficulties, should be provided access to disciplinary literacy instruction so that they are not barred from accessing content area text, and ultimately deeper conceptual understanding. The rest of this handbook provides checklists, lesson plan templates, and examples to support teachers in developing disciplinary literacy instruction.

Additional research on secondary disciplinary literacy

Berkeley, S., Marshak, L., Mastropieri, M. A., & Scruggs, T. E. (2011). Improving student comprehension of social studies text: A self-questioning strategy for inclusive middle school classes. *Remedial and Special Education*, *32*(2), 105–113. (Social Studies)

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Guidelines and Suggestions for Strategy Instruction

Selecting materials for instruction

Research has linked text considerateness to student comprehension (Fang, 2004). As a result it is important that before planning instructional reading that you check for specific factors that may make text more or less considerate.

Text Consideration Checklist
1) Lay-out __ Font-size __ Amount of white space __ Use of color __ Summary __ Guiding questions or objectives listed at the start __ Is it possible for students to make notes or comments in the margins? __ Pictures (quantity, do they match the text or are they confusing?) __ Headings (are they present? If so, are they helpful in making sense of the passage?) __ Questions to check for understanding at the end __ Vocabulary (listed at the start of the chapter? Highlighted throughout? Definitions located nearby?)
2) Text __ Sentence length __ Word Length __ Passage length __ Cohesion (concepts presented in a logical order, text explains itself) __ References (clear pronoun usage, ideas referred to specifically) __ Ellipses (remove phrases that should be repeated, e.g. Where are you going? To town. Instead of using I'm going to town.) __ Substitution (general word is substituted for another word, e.g. saying the "pink one" instead of saying the actual name of the object) __ Conjunctions and Transitions ("and" is less cohesive, transitions are more cohesive) __ Grammar and Word Choice __ Grammar structure (natural, technical, specific to a certain era) __ Word choice (technical, non-technical, function words, word clusters, phrases, unique representations, common roots) __ Vocabulary (amount, type) __ How much prior knowledge is required for the reader to be able to access the text __ Is the topic familiar or relevant to the student __ Does the text embody familiar settings or values __ Will the text evoke curiosity, surprise, or puzzlement to help motivate the reader __ Is the text directly relevant to the course topic or student's interest

Adapted from Literacy Instruction for Adolescents chapter 3 by Patrick McCabe.

The basics of strategy instruction

Many students have never been explicitly taught strategies to help them understand how to independently approach various reading tasks.

General Strategy Instruction	
Should teach students how to:	**Which includes:**
1) Build comprehension	● Activate background knowledge ● Making inference (what we know + what we read = draw conclusions) ● Summarizing ● Predicting ● Clarifying ● Questioning ● Visualizing ● Monitoring ● Synthesizing ● Evaluating ● Connecting
2) Solving unknown vocabulary	● inside word strategies: identifying word parts (e.g. prefix, suffix, root, base, cognates, and word families) ● outside word strategies: context clues ● using resources: dictionaries, internet
3) Understand text structures	● Compare-contrast ● Problem-solution ● Cause-effect ● Chronological / sequence ● Descriptive ● Story features (e.g. plot, setting, conflict)s ● Definition-examples ● Classification
4) Use text features to create meaning	● Headings ● Captions ● Illustrations (e.g. charts, diagrams, tables, graphs) ● Bold/italicized words ● Glossary ● index

Adapted from Fisher, Frey and Ross (2009) in Literacy Instruction for Adolescents.

Strategy instruction should include:

1) Check, Activate, and Build Prior Knowledge: Research continues to find that one of the most important contributors to reading comprehension is a student's prior knowledge. Without sufficient prior knowledge, even the strongest readers will struggle to make sense of the text. As children come to us with varied levels of knowledge, it is essential that every lesson begins with some sort of activity to check what the students already know, activating their knowledge in a way that will help them make connections with the text, and to build any knowledge that may be missing. If the child cannot read the text, they also cannot learn from the text. It is essential that teachers use readable text, to help students build background knowledge.

Checking, Activating, and Building Prior Knowledge
• **Concept inventories:** short answer or multiple choice tests that target key objectives or concepts. This can also include assessment of pre-requisite skills. Designed to check what students already know as well as identify any misconceptions that may need to be cleared up • **Concept map:** a circle in the middle contains the topic, lines coming off the circle contain ideas or knowledge that students have regarding that topic. This information can be collected in groups or individually. Encourage students to expand on or group information into categories • **KWL chart:** students write out what they know about the topic. • **Minute response:** teacher poses a topic relevant question and students have one minute to write their response on an index card. Teachers collect the cards and scan them quickly to check what students know. Students can then add or modify their responses as they learn more about the topic. • **Anticipatory guides:** students are given a handout with a series of topics or statements on the left and then two columns titled agree or disagree at the top (these titles may change depending on your purpose). You can also include two columns for before reading and after reading (Appendix A.) • **Memory matrix:** the left column contains a list of words related to the topic. The top row contains a list of features of the words in the left column. Students check off the features that match the words. (Appendix A.) • **Image brainstorm:** project an image that is related to the topic or reading. Give students 2 minutes to brainstorm a list of everything they can about the topic. • **Picture books:** read a relevant picture book that addresses the topic or skill you are about to cover. • **ABC brainstorming:** write a keyword or the topic on the white board. Students individually, or as pairs, or as a whole class select words that fit that topic using letters in alphabetical order (e.g. Slaver – Africans, Boats, Chains…)

2) Ample teacher modeling: Includes demonstrating the process of reading, selecting a strategy, applying the strategy, and checking for successful use of the strategy. **Initial instruction should not require extensive reading, but focus on passages that allow students to apply specific strategies or skills they are learning to mastery.** Teachers should think aloud, demonstrating the thinking process as well as the strategy steps.

Reading demonstrations should include questions that demonstrate the metacognitive and cognitive processes involved in reading during the pre-reading, during reading, and after reading stages. Students with disabilities struggle with these processes because: (1) they spend more time and energy decoding than comprehending; (2) they rarely activate background knowledge or attempt to make connections to prior learning while reading; (3) they rarely stop to ask whether or not they understand what is happening; (4) when they don't understand, they often fail to attempt to use fix up strategies to help them make meaning. Klingner, Vaughn, and Boardman (2007), recommend that teachers consider demonstrating the following questions during these phases:

Stage	Questions
Before reading (have students first preview the text, chapter titles, headings, bolded words, pictures, etc)	● What do you think this passage might be about? ● Why do you think that? ● What do you already know about this topic?
During reading (mark sections where students should stop to answer these questions)	● What were you thinking while you read? ● Were there any parts that you didn't understand or struggled to understand? ● What did you do when you came to these parts? ● Were there any words you didn't understand? ● What did you do when you came to these words? ● Did this passage make sense? Why or why not?
After reading	● Who or what was the most important thing in that section? What did they do that was important? ● How does this fit in with what you already know about this topic? Does it make sense? Why or why not?

Demonstration Reading & Think Alouds

1) Explain to students how experts in the field make meaning from content area text
2) Discuss relevant comprehension skills (not every skill fits every situation)
    a) Visualizing b) Predicting c) Determining importance
    d) Solving unknowns e) Reading graphs f) Analyzing text structure
    g) Analyzing text features h) Making inferences i) Self-monitoring
    j) Summarizing k) Unpacking tricky syntax/grammar
    l) Making connections to prior knowledge
3) Stop frequently to talk about how you are analyzing what is happening
    a) Pick stopping points that may be confusing or challenging for students
    b) Provide verbal/visual cues of when you'll start thinking aloud
4) Take time to write thoughts on board
5) Allow students opportunities to reflect on which skill or strategy you were using
6) Slowly transition responsibility to students
    a) Demonstrate
    b) Practice on shorter passages as a group
    c) Practice on shorter passages with a peer
    d) Practice alone with the opportunity to teach strategy to peer or class
7) Provide list of questions to guide thinking:
    a) What do I think I will learn? (predicting)
    b) What text structure does this passage follow? (text structure)
    c) What do I know about this topic? (activating prior knowledge)
    d) Do I understand what I just read? (self-monitoring)
    e) Can I picture what is happening like a movie in my head? (visualizing)
    f) What do the headings, pictures, diagrams tell me about what I'm reading? (text features)
    g) What does this word mean in context? (vocabulary)
    h) What can I do to help me better understand? (fix-up strategies)
    i) What was the most important point? What facts support this? (Main idea/detail)
    j) What new information did I learn from this passage? (summarizing)
8) Practice with feedback
    a) Class discussion b) Take notes c) Peer conversations
9) Have students reflect on how demonstration reading has shifted how they read.

3) Scaffolded instruction: Teachers should be aware of each students' level and determine how much support they may need to reach the targeted objective. While students are learning a new skill, teachers should provide frequent feedback and various levels of prompting. As students demonstrate greater ability to use strategies independently and accurately, teachers should begin to systematically remove support and increase student responsibility. Scaffolding does NOT

mean giving students the answers, but instead using guided questions to move students through the thought process required to come to the answer.

4) Student specific prompting: Not all students need the same level of prompts to help them retrieve learned information or to complete tasks. Prompts should start out the least invasive and gradually get more invasive and students continue to demonstrate an inability to independently perform the required task. For example, a student doesn't understand how to answer a question (from least invasive to most):

Students can:	Teacher should:
Student has an answer but is unsure if it is correct or is capable of finding the information independently:	Ask the student to explain their evidence and logic for reaching their answer
Student needs some guidance in breaking down the question or finding the answer:	Use guiding questions (Where do you think you could find the information? Think back to …, Does xx make sense, why not? Let's break this question down into parts, what is it asking you first?)
Student needs more explicit directions on how to break down the question:	Guide them through the thought process and steps that will help them break the task down into more manageable chunks. "If I were to do this task I would first ask myself…., then I would …." have students completed the process with you. Make sure to check that they understood how you broke the task down after locating the answer.
Students are not at a stage to follow your modeling and need direct instructions:	Model the steps and thought process, possibly identify the answer, and have them repeat it.

All student responses to prompts should be provided with positive or constructive feedback. Resist the urge to immediately tell students the answer and, if the student is capable, make sure to have them repeat back the thought process (Sindelar et al., 1986).

Explicit Strategy Instruction Checklist
1) Identify the __ course objectives __ appropriate materials __ pre-requisite skills (what do students to know/do before the lesson) 2) Assess what students already know or can already do 3) Identify __ areas where students will need additional support __ pre-, during-, post-reading strategies to target areas of need and support mastery of objectives __ build strategy instruction and use into every lesson __ have students take notes, create anchor charts, or posters for students to reference __ strategies should be taught in pairs or more to aid in cognitive processing __ learning how to use a strategy independently can take weeks for many students 4) Demonstrate strategy use (I do) __ explicitly teach the strategies you want students to use consistently throughout the year __ teach the purpose of the strategy and how it can help students create understanding __ teach students how to select the appropriate strategy __ model thinking while using the strategy (every time you teach a new strategy) 5) Guide students in using the strategy (we do) __ use text at student's level when first practicing a strategy __ use shorter text selections __ be prepared to give frequent and immediate feedback 6) Allow students to use the strategy independently (you do) __ prepare prompts and questions to help scaffold independent use of the strategy __ slowly remove supports and gradually increase demands __ consider creating strategy cue cards for students who struggle to use strategy independently 7) Peer instruction - allow students to teach a strategy to a peer to solidify understanding 8) Assess students ability to select and use strategies independently __ throughout the year reteach or demonstrate the strategy to support consistent use __ introduce new strategies as necessary and as students demonstrate mastery of old ones

Appendix A. Teaching Content Area Vocabulary

Breadth and depth of vocabulary skills are critical to reading comprehension across content areas and if often built through exposure. In the case of content area vocabulary, students have limited exposure outside of class to these words making acquisition difficult. This section details features of content area vocabulary and covers implications for instruction.

Categories of Content Area Vocabulary:	
Category	**Definition**
Technical term	Words and phrases that represent particular concepts. e.g. Trapezoid, Socialism, Photosynthesis, Symbolism
Nontechnical term	General words that represent multiple meanings. e.g. Organization, Force, Timeline
Function words, Word clusters, and Phrases	Content area often contains frequently occurring words or phrases that indicate relations, ideas, or processes. e.g. is divisible by, composed primarily of, the results of which
Unique Representations	Content specific words that hold symbolic representations and abbreviations. e.g. numerical representations, chemical formulas
Common Roots	Common roots or prefixes for words that fall within the same domain. e.g. demo-, bio-, geo-

Adapted from Harmon, Wood, and Medina (2009), Vocabulary Learning in Content Areas.

Levels of Vocabulary Words and Instruction		
Level	**Type of Words**	**Type of Instruction**
Level 1	General terms, more commonly found in day to day oral and written language. Largest number of words, general understanding is specific	1) Increase breadth and depth 2) Lots of repeated exposure to rich oral and written language through interactions with peers, adults, and their environment 3) Increase amount of time, level of engagement, comprehension and variety Implicit instruction, less time and effort spent teaching each word
Level 2	Words that may take on different meanings in different content areas, but are not necessarily crucial to understanding the content. Some less technical terms and phrases that may be repeated throughout domain specific text. Fewer words than found in Level 1, understanding that words may take on new meaning in different context	1) Independent word study 2) Word learning strategies to support reading 3) Explicit pre-teaching 4) Teacher directed vocabulary instruction A mix of implicit and explicit instruction and a moderate amount of time spent teaching each word
Level 3	Key content area terms that are crucial to understanding the precise meaning of text. Essential to concept formation. The fewest number of words that hold the most meaning to the content area, deeper understanding and ability to read and use these words is required	1) Explicit instruction 2) Effort to increase student exposure to these words as they aren't often found outside of the content area Significant time should be spent explicitly and directly engaging in discussion and practice of these words

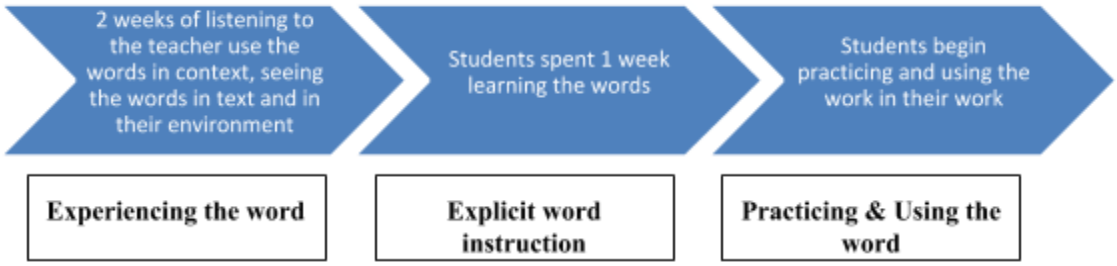
Adapted from Stahl and Nagy (2006) A Comprehensive Approach to Vocabulary Learning

Implications for Instruction and Learning	
Consideration	**What it looks like**
Vocabulary learning is tied to conceptual understanding	● Students engage in study of words as they relate to the bigger picture ● Vocabulary is crucial to describing events of a time periods (e.g. slavery, fugitives, abolition) or processes (e.g. carbohydrates, synthesis, photosynthesis) ● Students internalize these words so that they are able to read more efficiently and express their knowledge about topics more precisely
Explicit instruction in content-area vocabulary builds and supports conceptual understandings	● Struggling readers need a model of effective strategy use to help them contextualize, connect, demonstrate, and apply word meaning ● Careful selection of terms to teach ● Careful thought put into how to introduce words ● Consideration of student knowledge and level of understanding of vocabulary ● Selection of appropriate tasks for learning and practicing words ● Definition, meaningful context, examples of what the word is and is not ● Activities that help students learn words that represent familiar concepts ● Tasks for new words that represent complex and difficult concepts ● Analogies, semantic feature analysis grids, semantic maps, structure overviews, visual representations
Explicit instruction involves multiple, varied, and meaningful experiences with words	● 12 or more meaningful encounters (McKeown et al., 1985) ● Presenting words in context ● Presenting words in semantically related categories ● Requiring students to use or produce the word to complete tasks (discussions) ● Require students to create connections between target and related words ● Meaningful prompts to brainstorm key ideas related to key terms ● Asking meaningful questions about key word ● Push students to go beyond simply providing a definition ● Combine vocabulary words into one sentence ● Vary activities throughout the year ● Incorporate technology

Implications for Instruction and Learning Cont.	
Consideration	**What it looks like**
Vocabulary learning occurs implicitly in content-area classrooms for most students (poor readers require explicit instruction)	● Activate word knowledge through activating background knowledge ● Require students to draw inferences related to word meaning from text ● Associate word meanings by making connections and asking questions ● Require students to use words through synthesis ● Use questioning, discussion, and critical thinking to increase exposure to rich oral language ● Provide opportunities to read rich text, widely and frequently ● Increasing prior knowledge will increase student's ability to learn new words (Carlisle, Fleming, & Gudbrandsen, 2000)
The structure of expository texts can impact vocabulary learning	● The type and amount of support the passage gives students in solving unknown words ● Text cohesion ● Text should clarify cause-effect relationship, use analogies to connect familiar concepts with new concepts, provide explanations of the morphemic structure of words
Classroom instructional time for learning vocabulary is necessary and must be sufficient	● Students should be provided ample opportunities to hear and use words ● See "Suggested Vocabulary Instruction Timeline"
Metacognitive awareness of vocabulary learning fosters independent learning in the different content areas	● Provide direct instruction in how students can use independent word learning strategies ● Encourage students to raise student's desire to learn new words (model it) ● Teach students to use context clues, study word structure, word origins, use reference texts ● Provide instruction in prefix, suffix, and roots of subject specific words

Adapted from Harmon, Wood, and Medina (2009), Vocabulary Learning in Content Areas.

Teaching content area vocabulary



In the first week, teachers are using list 1 with a focus on increased exposure to the words before they are taught. In week 2, teachers continue using list 1 words and begin using list 2 words. During week 3 students begin learning list 1, while using list 2 and adding list 3 in the classroom. During week 4 students begin learning list 2, continue practicing list 1 and teachers continue to use list 3 and begin using list 4.

Week	Teacher using	Students learning
1	List 1	
2	List 1 and 2	
3	List 2 and 3	List 1
4	List 3 and 4	List 2

Adapted from Beers, K. (2003).

Beers (2003) suggests that teachers select fewer words and spend more time teaching and practicing those words. Vocabulary should go passive or rote learning, to ensure student engagement. Teachers can split words amongst students and have students work in pairs to go into greater depth and then teach those words to their peers. Teachers should create graphic organizers that are specific to the knowledge that is relevant to their content area. Graphic organizers should include a space for the (1) word, (2) definition, (3) key word or analogy, (4) what the word is and is not, (5) visual representation, and (6) correct usage of the word.

Vocabulary Sheet

Word:

Part of speech:

Definition:	Used in a sentence:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Synonym:	Antonym:

Keyword, Analogy, or Picture:

Examples of content area vocabulary instruction:

Harmon, Wood, and Medina (2009) suggest teachers use one of four types of vocabulary instruction depending on the instructional goal: (1) introduction (see above), (2) Integration, (3) Clarification, (4) Identification, and (5) Linguistic Attention.

Integration Activity	
a) Purpose:	Describe semantic relationships that exist between words and ideas
b) Used when:	The goal is to help students learn new concepts
c) Activity:	Concept Circles 1) Provide four related words, one in each quadrant 2) Students must guess the "answer" or how the words are connected

Example: **Answer:** Sedimentary Rocks (they are all examples of)

Clarification Activity	
a) Purpose:	Differentiating between easily confused words, or words with multiple meanings
b) Used when:	The goal is to refine word meaning, clear up confusion
c) Activity:	Word-detective

Example:

Word	Word-level Clues	Context Clues	Predicted Word Meaning	Actual Word Meaning
Geology	*Clues*: Ology means study. *Guess:* study of something.	*Clues:* engaged in exploring in search of metals, oils, and other resources;	Study of the Earth's resources	Study of the Earth

Identification Activity	
a) Purpose:	Focus on visualizing and using mnemonics to help students create a connection between their prior knowledge and new concepts
b) Used when:	Identifying terms, people, events, places, descriptions, procedures
c) Activity:	Key Word 1) Students write a definition 2) Students pick words that sound the same or elicit the meaning 3) Students explains their choice of key word 4) Students create an image that links the keyword to the definition
	Analogies 1) Students pick a procedure or set of words they are trying to remember 2) Students pick a real world example that could represent the procedure

Example:

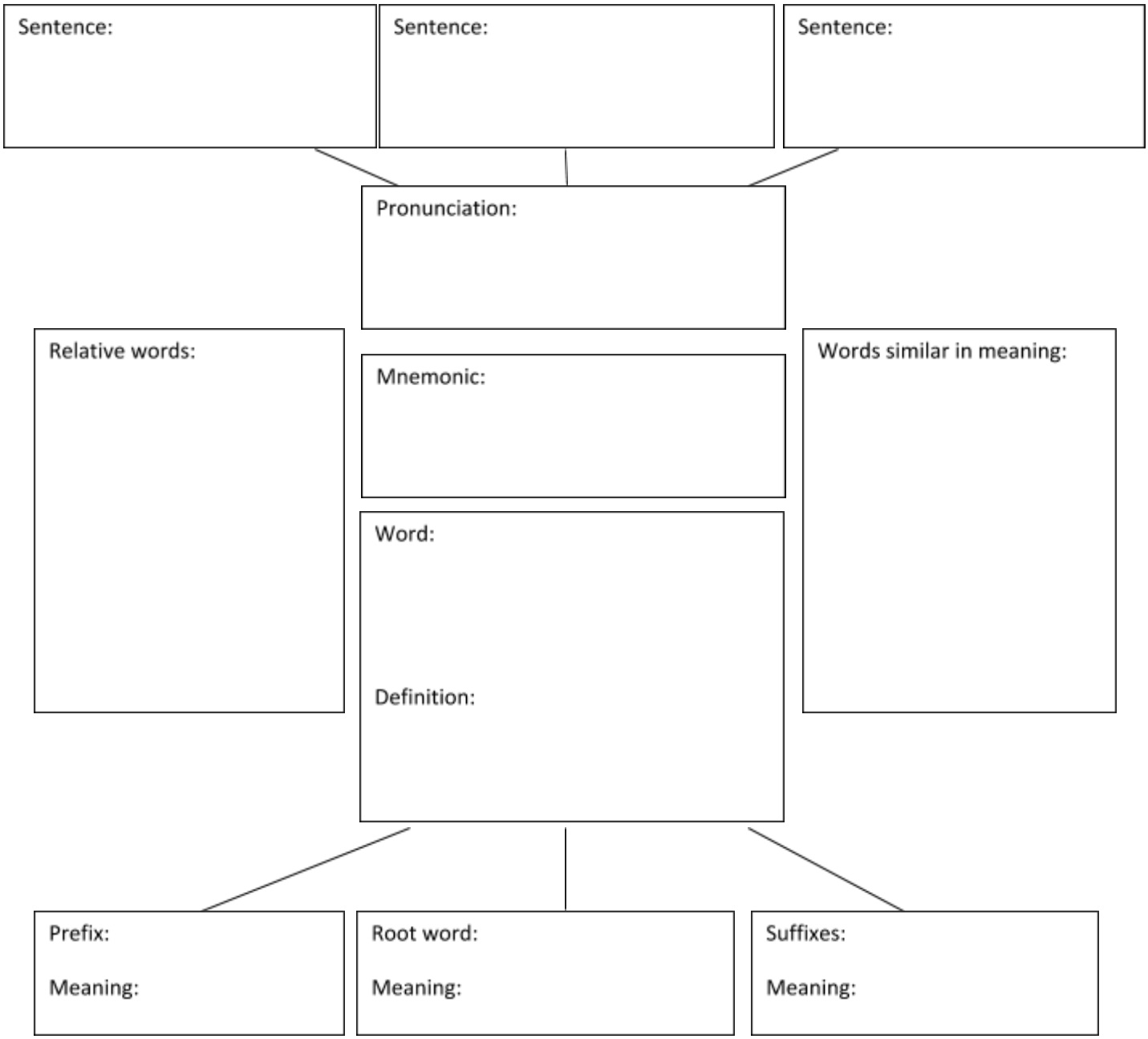
Word	Definition	Key Word	Explanation	Image
Numerator	The number above the fraction line	Number 1	The number one stands on top of the podium	The number one with a trophy on top of the denominator

Example:

Cell membrane is like a bouncer allowing certain people in or out of the cell.	
	

Linguistic Attention Activity	
a) Purpose:	Morphemic analysis of prefixes, suffixes, roots, and word relationships to help develop deeper word understanding,
b) Used when:	About 60% of words have recognizable meaning (Nagy & Anderson, 1984)
c) Activity:	Word Family Tree 1) Students are given a key word and reference books, materials 2) Parts of the tree: word, definition, pronunciation, memory clue, ancestor or root word, related words, words with similar meaning, and three sentences using the word (can be taken from other sources)

Example:


Sentence:
Sentence:
Sentence:
Pronunciation:
Relative words:
Mnemonic:
Words similar in meaning:
Word:
Definition:
Prefix:
Meaning:
Root word:
Meaning:
Suffixes:
Meaning:

Appendix B. Recommendations for School-Wide Literacy Reform

While implementing all aspects may not be possible, it is recommended that programs include professional development, formative, and summative assessment along with selected instructional and teacher level recommendations that meet the needs of their students.

Adapted from Biancarosa & Snow (2006); Carnegie Review (2010); Torgesen (2007)

Classroom Level Recommendations	
What it is:	**What it looks like:**
Professional development	Long term and ongoing, coaching, observations and feedback on use of instructional strategies
Direct, explicit comprehension instruction that extends into secondary school	Summarizing, self-monitoring, content area strategies, discipline-specific strategies
Effective instructional principles embedded in content	a) L.A. teachers use content area text b) Content area teachers teach instruction, practice in reading/writing skills specific to subject area
Motivation and self-directed learning	Building motivation to read and learn by providing strategies for reading skills they'll need after HS
Text-based collaborative learning	Students interact w/each other around a variety of text
Strategic tutoring	Intense, individualized reading, writing, and content instruction
Diverse texts	Texts at a variety of difficulty levels and on a variety of topics
Intensive writing	Including instruction connected to writing tasks students have to master in HS and beyond

Student Data and Decision-Making Recommendations	
What it is:	**What it looks like:**
Ongoing formative assessment of students	a) Formal/informal screening measures to target students for intervention and instructional groups b) Informal, daily assessment of students progress c) Formal assessment used to evaluate program effectiveness d) Formal/informal progress monitoring 1) 3-4 times a year for all students 2) Monthly for struggling students 3) Weekly/biweekly for students needing intervention e) Monitor accuracy, fluency, vocabulary, and comprehension strategies f) End of year outcome assessments
Diagnostic testing	Informal/Formal diagnostic tests for students who are not responding to instruction (use informal methods as much as possible)
Data should answer the following questions:	
a) What proportion of students are able to meet grade-level standards at the end of each grade? If the number is low, general improvements in all areas of literacy instruction are needed. **b) Are there particular reading skills or standards that a large number of students struggle with on progress monitoring or year-end outcome tests?** This information should guide professional development and instructional planning. **c) Are interventions provided to students strong enough to increase their ability to meet grade-level standards?** Using regular progress monitoring, teachers should be able to evaluate the effectiveness of interventions on student outcomes and determine if interventions need to be strengthened, modified, or changed. **d) What proportion of students in each classroom and grade level are becoming more proficient readers?** Do specific students or teachers struggle? This can be used to target specific classrooms, students, or teachers for additional support.	

School Level Recommendations	
What it is:	**What it looks like:**
Create a Plan	
A sustained plan to ensure the needs of all students are being met	A schedule that allows for sufficient instructional time: 2 – 4 hours of literacy instruction and practice that takes place in LA and content areas
A school plan that ensures that all students' needs are being met:	a) At the beginning of the year schools should determine: 1) Which students are at special risk of not being able to meet grade-level standards by the end of the year? This information should be used to alter teachers to who may need additional support, plan interventions, and allocate resources. b) During the year: 1) Which students are making adequate progress, which may need additional, or improved support? Use this to shift instructional approach, increase instructional time, reduce group sizes, increase rate of learning c) Identify students' individual reading strengths and weaknesses.
A plan for professional development to ensure all teachers are adequately prepared to meet the needs of their students instructionally	Time for teacher teams that allow teachers to meet and plan, observe and provide feedback
Gather Materials	
Acquisition of materials to ensure all teachers have the necessary resources to meet the needs of all of their students	a) Access to technology as a tool for and topic of literacy instruction b) Means of rewarding and maintaining motivation for both teachers and students c) School-wide data management system that allows teachers to record and access data on students

Leadership & Instructional Specialist Recommendations	
What it is:	**What it looks like:**
Are is trained not only in literacy strategies but also in methods of conducting observations and providing feedback	Principals and teachers who have a solid understanding of how to teach reading and writing and who can act as instructional facilitators
Hire on-sight literacy specialist that are capable of providing teachers with strategies and suggestions for instruction	a) Help teachers select appropriate and effectives materials and strategies to use in their classroom b) Each teacher should have books at various instructional levels c) Help evaluating data and making instructional or intervention decisions d) Help selecting supplemental materials and programs e) Selecting books or articles that teachers can study together
Conduct decision-making meetings that help teachers evaluate the effectiveness of instruction for students who are struggling	a) Attendance for all who are necessary to make decisions b) Systematic method of reviewing data c) Recording decisions and delegating responsibility for follow-up
Oversee comprehensive and coordinated literacy program	a) Interdisciplinary, interdepartmental and possibly connected with outside organizations within the community b) School-wide screening to identify students with difficulties early. This may help catch students who have late-emerging reading difficulties that weren't caught in elementary school.

Appendix C. Additional Reading

Disciplinary Literacy

1) Lee, C.D., & Spratley, A. (2010). *Reading in the disciplines: The challenges of adolescent literacy.* New York, NY: Carnegie Corporation of New York.

The paper provides a comprehensive look at disciplinary literacy in social studies, science, and math. The authors give a detailed account of how students may struggle in each subject area, supplying teachers with specific strategies not found in the Shanahan and Shanahan (2008) article.

2) Moje, E.B. (2010, March). *Disciplinary literacy: Why it matters and what we should do about it.* Slideshow presented at the National Reading Initiative Conference, New Orleans, LA. http://www.slideshare.net/nationalwritingproject/disciplinary-literacy-why-it-matters-and-what-we-should-do-about-it

This presentation goes through the basics of disciplinary literacy and attempts to answer the questions: (1) What is disciplinary literacy?, (2) Why does disciplinary literacy matter?, and (3) What can be done about disciplinary literacy? Moje explains exactly what teachers should be addressing in their classroom in regards to disciplinary text and possible roadblocks for implementing disciplinary literacy strategies in the classroom. This is a great follow-up read for the Lee and Spratley article.

3) Schleppegrell, M. J. (2004). *The Language of Schooling: A Functional Linguistics Perspective*. Lawrence Erlbaum.

This text looks at how language is used in schools versus how it is used socially by students. The focus is on how text is constructed, analyzes text through the lens of a linguist, and then uses this knowledge to describe how ELL students, students who speak non-standard dialects, and students with learning disabilities may struggle with these texts. Chapters 5 and 6 explicitly cover text and grammar features that are specific to each content area in order to help teachers develop a deeper understanding of disciplinary literacy.

4) Shanahan, T. (2010). What it means to teach disciplinary literacy. Retrieved from http://ctl.uoregon.edu/pd/cf10/presentation/1018

This site contains videos and explanations regarding disciplinary literacy as presented by Dr. Shanahan. The presentation comes with handouts and covers the triangle model discussed in this handbook.

5) Read Wisconsin. (xx). 6-12 Reading Resources: Disciplinary Literacy. Retrieved from http://www.readwisconsin.net/audience---6-12-disciplinary-literacy

This webpage is a collection of links to websites that include materials and activities for disciplinary literacy.

6) Davis, L. (Ed.). (2013). *Common core literacy lesson plans: Ready-to-use resources.* Larchmont, NY: Eye on Education.

The book focuses on providing teachers with model lesson plans for teaching specific literacy skills found in the Common Core State Standards for grades 9 – 12. There are 35 lesson plans ready for immediate implementation along with appendices with additional guidance for how to select complex text, lesson plan templates, and rubrics and writing samples. Each lesson plan includes handouts, assessments, additional resources and ideas

for differentiation. The lessons focus on disciplinary literacy skills such as analyzing text structure and syntax to help better understand what the text is trying to convey. This book attempts to help teachers teach higher level reading skills and can be easily adapted to subject-area lessons. The language lessons would prove exceptionally useful in helping students analyze content-area syntax and grammar.

Teaching ELL students or students with learning disabilities

1) Kennedy, M. J., & Ihle, F. M. (2012). The old man and the sea: Navigating the gulf between special educators and the content area classroom. *Learning Disabilities Research & Practice, 27*(1), 44-54. Doi: http://dx.doi.org/10.1111/j.1540-5826.2011.00349.x

The authors of this text believe that students with learning disabilities (LD) receive a majority of their instruction in content area classrooms, that they need to be taught disciplinary literacy skills. However, no such intervention exists at this time. In hopes of alleviating some of the strain caused by the demands of disciplinary literacy, the authors provide disciplinary literacy strategies for special education students.

2) Beers, K. (2003). *When kids can't read: What teachers can do?* Portsmouth, NH: Heinemann.

This book offers a comprehensive look at how teachers can help readers improve their skills, attitudes, and confidence in reading. The book includes examples of how students struggle, student work, well-defined strategies, materials, and recommended book lists. Beers discusses how to select and teach strategies, and then applies this model to a list of suggested strategies. Chapters also include information on teaching fluency, vocabulary, decoding, and spelling. While there is little emphasis on specific content area strategies, this would provide a good start for almost any teacher.

Teaching reading comprehension and general strategy instruction

1) Klingner, J.K, Vaughn, S., and Boardman, A. (2007). *Teaching reading comprehension to students with learning difficulties.* New York, NY: Guilford.

This book discusses reading comprehension and provides an extensive list of general reading comprehension strategies from start to finish. Entire chapters are dedicated to vocabulary instruction, understanding text structures, and instructional practices to improve comprehension. Most importantly, they include an entire section on multicomponent approaches to strategy instruction. This chapter provides an in depth look at different strategies to target different content area literacy skills and very explicit steps for strategy instruction.

2) Rozmiarek, R. (2006). *Improving reading skills across the content areas: Ready-to-use activities and assessments for grades 6-12*. Thousand Oaks, CA: Corwin Press.

This book provides information on 100 reading activities that have been found to be effective with all types of students. Activities are grouped into sub skills and skill-building activities that help set the purpose for reading, and connect to prior knowledge. Activities include strategies for vocabulary terms and concepts, identifying significant information, visualizing text, and learning how to ask questions to help develop deeper understanding, drawing conclusions, analyzing text structure, and evaluating the author's viewpoint.

3) WestEd. (2011). Strategic literacy initiative. Retrieved from https://www.wested.org/project/strategic-literacy-initiative/

This initiative provides resources and professional development opportunities for middle and high school teachers. The link includes resources for teachers and administrators including research papers, list of content specific resources to help teachers incorporate literacy strategies

into their lessons, as well as actual lesson plans that help students understand disciplinary literacy and the demands it places on them.

4) Wood, K.D., & Blanton, W.E. (Eds.). (2009). *Literacy instruction for adolescents: Research-based practices*. New York, NY: The Guilford Press.

Focused on overall literacy instruction, the text establishes a case for improving literacy instruction and advocates for continuing reading instruction into middle and high school. Part one, discusses areas of consideration and implications for literacy instruction. This section provides teachers with strategies and suggestions for how to improve motivation and instructional approaches to teaching literacy within content areas for all learners. Part two covers specific research-based instructional practices that have been shown to increase student performance.

5) Daniels, H., and Steineke, N. (2011). *Texts and lessons for content-area reading.* Portsmouth, NH: Heinemann.

Discussing how good readers think, how skillful collaborators act, and how to use reading activities to add to the subject-matter text, this book includes 23 strategy lessons that focus on comprehension strategies or collaboration skills that are aligned with the Common Core. These lessons use high interest articles from popular magazines and news sources. It includes 10, 45- to 50-min text-set lessons that align with curricular topics. The authors include a list of differentiated texts, scripted teacher lessons with think alouds to model critical reading, and explanations to help guide teachers through the use of the lessons.

6) Doty, J.K., Cameron, G.N., and Barton, M.L. (2003). *Teaching reading in social studies*. Aurora, CO: McRel.

This manual uses research to provide strategies for instruction and learning that target text features. The introduction covers how students make learning from text using prior knowledge, metacognition, and other cognitive factors. The manual provides generic strategy suggestions for engaging and supporting these factors. It also consists of 32 strategies that can be used in secondary education classrooms. The strategies cover a range of topics from vocabulary, narrative text, expository text, and reflection. The authors provide very explicit steps on how to teach the strategy within the classroom.

7) Hurst, C.O., and Otis, R. (1999). *Using literature in the middle school curriculum.* Worthington, OH: Linworth Publishing.

This text provides lessons using themes and books found across curriculums that focus predominantly on intermediate literacy skills. Section one covers classroom teaching techniques and mini-lessons on how to conduct classroom discussions and literature groups around text. Section two discusses the themes and topics that can be used across a variety of subjects. Section three gives a brief overview of authors' techniques used in literature and a list of mentor texts for student practice. The last section focuses on books that can be used across subject areas, activities, strategies for instruction and reading, as well as related novels.

Recommendations for program implementation

1) Torgesen, J., Houston, D., & Rissman, L. (2007). *Improving literacy instruction in middle and high schools: A guide for principals.* Portsmouth, NH: RMC Research Corporation, Center on Instruction.

This text focuses on a series of suggestions and requirements for literacy instruction at the middle and high school levels; covering specific literacy goals and then discussing elements

of instruction required to meet these goals. The authors use this information to create a list of elements required for school-wide literacy reform.

2) Schoenbach, R., Greenleaf, C., & Murphy, L. (2012). *Reading for understanding: How reading apprenticeship improves disciplinary learning in secondary and college classrooms.* San Francisco, CA: Jossey-Bass.

This is an update of the 1999 text of the same name. The text focuses on using the reading apprenticeship model to help students grasp and tackle disciplinary literacy, a method proven to increase student reading achievement. The book provides a framework for improving reading and subject area learning for all students. The authors provide tools for classroom use as well as case study examples. They also link implementation with the subject area literacy and the Common Core Standards. Most importantly, they provide concrete instructional and assessment tools for teachers to use in implementing and monitoring the program's effectiveness.

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