



PaSLP Essential Element 6

Essential Element 6: Disciplinary Literacy

Learning information in the academic disciplines is enhanced when teachers provide students with supported experiences and opportunities to read, write, talk, and think deeply in service of content learning. This allows students to experience deep disciplinary literacy as a means of learning content.

Rationale

According to the 2015 National Assessment of Educational Progress (NAEP) results, while science scores for students in fourth and eighth grades have increased, twelfth grade science scores have stagnated (National Center for Education Statistics, 2015). Moreover, twelfth grade literacy scores have not changed much since the early 1970s (National Center for Education Statistics, 2013). Yet, demands for higher literacy levels for jobs, civic engagement, science and health, and for academic success have increased (Shanahan & Shanahan, 2008; Ippolito, Lawrence, & Zaller, 2013). The NAEP data suggest that students may have developed general literacy skills, “but not the specialized strategies, vocabulary and knowledge base required for understanding complex discipline specific texts” (Lee & Spratley, 2010, p. 2).

Although some general comprehension strategies (e.g., summarizing, predicting, and visualizing) and heuristics (such as study guides), for understanding texts are useful across disciplines (Heller & Greenleaf, 2007; Chauvin & Theodore, 2015), every academic discipline tends to use literacy differently to construct knowledge and to communicate that knowledge (Shanahan & Shanahan, 2014). What counts as evidence for reasoning, and what is important to specify, differs from discipline to discipline. The student who can read a physics text with understanding may not be able to comprehend and interpret the themes in *Macbeth*. “The differences among the texts of different disciplines result in unique challenges for readers” (Shanahan & Shanahan, 2008, p. 53).

The PA Core Standards acknowledge the importance of *disciplinary literacy*, that is, the discrete ways reading and writing are used in specific disciplines (Chauvin & Theodore, 2015) by including literacy standards for English Language Arts and Literacy in History, Science, and Technical Subjects. The standards also acknowledge that content area teachers can most effectively help students develop disciplinary literacy because they best know and understand the importance and use of literacy within their disciplines. According to Fang and Coatoam (2013, p. 628), disciplinary literacy:

“Is grounded in the beliefs that (a) school subjects are disciplinary discourses recontextualized for educational purposes, (b) disciplines differ not just in content, but also in the ways this content is produced, communicated, evaluated, and renovated, (c) disciplinary practices such as reading and writing are best learned and taught within each discipline, and (d) being literate in a discipline means having an understanding of both disciplinary content and disciplinary habits of mind (i.e., ways of reading, writing, viewing, speaking, thinking, reasoning, and critiquing).”



PaSLP Essential Element 6

Disciplinary literacy goes far beyond using a “set of strategies or tools brought into the disciplines to improve reading and writing of subject-matter texts” (Moje, 2008, p. 99); it is using literacy in the service of understanding the discipline itself. “To develop complex knowledge in any discipline, students need opportunities to read, reason, investigate, speak, and write about the overarching concepts within that discipline” (McConachie, et al., 2006, p.1). Disciplinary literacy, using literacy as it is used in the discipline, is necessary if students are going to be proficient in both the content and the means of communicating it.

Implications

Content area literacy is different from disciplinary literacy. “Content area reading *prescribes* study techniques and reading approaches that can help someone to comprehend or to remember text better (with little regard to type of text), whereas, disciplinary literacy emphasizes the description of unique uses and implications of literacy use within the various disciplines” (Shanahan & Shanahan, 2012, p. 8). At the same time, specific content-area literacy strategies such as “summarizing, predicting, and visualizing” can enhance student learning (Chauvin & Theodore, 2015). Thus, content area literacy strategies can assist students with making meaning from text and should certainly be used. However, disciplinary literacy instruction deepens student thinking and learning within each discipline. This movement toward disciplinary literacy is an important one that results in many significant implications for instruction.

Chauvin and Theodore (2015, p. 4) suggested that teachers beginning to use literacy strategies within their content area, take into consideration the following three principles: “(1) the content objective guides the lesson, (2) the text selection reflects the content, and (3) the literacy strategy is selected as a tool to help students access the discipline-specific text more effectively and efficiently.” They also suggested that the approach to content instruction should emphasize the skills for 21st century literacy: critical thinking, communication, collaboration, and creativity (See Essential Element 4). In other words, the emphasis in content area learning should not only be on understanding content, but also on teaching “students how to think and how to learn” (Chauvin & Theodore, 2015, p. 3).

Because of the emphasis on disciplinary learning in the middle and high school, this section begins with implications for teaching at the secondary level and follows with implications for elementary and preschool.

Grades 6-12

Each of the core disciplines is discussed below with guidance focused on both reading and writing.

Disciplinary Literacy in English Language Arts (ELA) While the authors of the Common Core State Standards (CCSS) defined students’ literacy development as a responsibility that cuts across all content areas and technical subjects, they also cited “the unique, time-honored place of ELA teachers in developing students’ literacy skills” (Common Core State Standards [CCSS], 2010 p. 4). Similarly, within the discipline of ELA, literature (stories, drama, and poetry),



PaSLP Essential Element 6

has held a time-honored place. With the increasing emphasis on career and college readiness as students move through the grades, the CCSS support NAEP in requesting that all teachers, including ELA teachers, incorporate more informational texts into their instruction. For ELA teachers, this request means giving more attention to literary nonfiction (e.g., essays, speeches, biographies, and autobiographies, among others) than has generally been the case to help students meet the changing literacy demands of an information-rich world. In addition to becoming more skilled at handling this sub-genre of informational text (i.e., literary nonfiction), students are expected to work with texts of increasing complexity and with multiple texts simultaneously. In the PA Core Standards for English Language Arts for Grades 6-12, students are expected to “integrate information presented in different media or formats as well as in words, to develop a coherent understanding of a topic or issue” (Standard CC.1.2.6.G, p. 6).

Writing in English Language Arts According to Applebee and Langer (2013), typical writing instruction in the ELA classroom focuses on preparing students for high-stakes testing. Yet, to prepare students to be future ready, students in ELA should engage in writing for a variety of audiences and purposes through a range of writing products. In the PA Core Standards for English Language Arts, students are expected to write across a variety of text types including opinion or argumentative, informative or explanatory, and narrative. Academic writing products in English language arts may include literary analysis, rhetorical analysis, research paper, argument, definition essay, evaluation, causal paper, narrative, proposal, and annotated bibliography (Olson, 2014). In addition, the PA Core Standards state that students should be able to “use technology, including the internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information, and to display information flexibly and dynamically” (CC.1.4.9-10.U, p. 25). There are several characteristics of effective writing instruction that enable students and teachers to meet the demands of the more rigorous standards (Applebee & Langer, 2013). These characteristics include:

- Curricular cohesion;
- An emphasis on authentic discussion practices promoting student inquiry;
- Opportunities for students to collaborate around complex tasks;
- Explicit instruction in writing strategies; and
- A process writing approach that recognizes that writing is recursive and rhetorical.

As teachers who traditionally distinguish themselves by the amount of explicit attention they give to reading and writing, ELA teachers are in a unique position to take up the disciplinary literacy charge outlined for them by the PA Core Standards. Specifically, ELA teachers will need to give increasing attention to supporting students in learning how to:

- Grapple with complex texts including essays, speeches, and biographies, among others, and tasks related to those texts in ways authentic to the discipline. ○ Literacy Design Collaborative Module



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PaSLP Essential Element 6

- Understand, analyze, and use literary nonfiction and other informational texts (including non-print) that reflect the ways knowledge is mediated in contemporary culture.
- Make significant links between the disciplinary ways of reading, writing, and thinking in the classroom and their literacy practices in their out-of-school time.
- Move from literal comprehension to higher-order thinking skills such as analysis and interpretation of single texts of multiple genres, and to synthesize meaning across several texts to complete reading and writing tasks as part of their normal instruction. 97
 - Literacy Design Collaborative Module: American Dream: Reality, Promise or Illusion?

Again, ELA teachers are in a unique position because their main professional organization, National Council for Teachers of English (NCTE) has outlined standards related to these skills, as well as ways to address them in a variety of other documents, such as:

- <http://www.ncte.org/positions/21stcenturyliteracy>
- <http://www.ncte.org/positions/literacy>
- <http://www.ncte.org/positions/standards>

Disciplinary Literacy in Math Mathematicians read and write to participate in problem solving. The difference is that the type of text read, and the form of writing, is unique. Reading and writing in mathematics often occurs simultaneously and requires one to move fluidly between different representations of the work, such as:

- Diagrams
- Language
- Symbols
- Real world context
- Concrete models

Mathematical text is complex. It contains more concepts per sentence and paragraph than other types of text. It uses symbols and numbers and may not travel in typical left-to-right fashion. It often has accompanying graphics (graphs or diagrams), which must be understood to make meaning complete. Vocabulary words used often have unique meanings in mathematics. Readers of mathematics approach mathematics text as a puzzle to be solved, investigate for patterns and relationships, and scrutinize how math is reported in real-world applications (Lent, 2016). In addition, mathematics readers have to pay attention to small words such as *the*, *and*, *is*, or *any*, which can often be skipped over while reading other types of text (Kenney, Hancewicz, & Heuer, 2005).



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According to Shanahan, Shanahan, and Misischia (2011), readers of mathematics typically:

- Engage in intensive rereading of text to determine correctness and whether an error is present.
- Focus on the texts and representations themselves, not the author of the text.
- Examine mathematical text and consider whether the content can be reconciled with previous knowledge or an example.
- Use text structure to identify problems and solutions.
- Value mathematical equations and prose equally.

In addition to reading in mathematics, the PA Core Standards for Mathematical Practice encourage vibrant, interactive classroom environments where students are engaged in discussions about mathematics that not only help students to construct content knowledge, but also support student learning (Waggoner, 2015). Specifically, PA Core Standards for Mathematical Practice (2014, p.2) ask students to, “make sense of problems and persevere in solving them.” Classroom communities that encourage collaborative sense-making are also those that encourage students to engage in mathematical talk. In these classrooms with active math talk communities, students have frequent opportunities to articulate their own mathematical reasoning and hear and learn from their classmates’ reasoning.

According to Waggoner (2015), teachers can build math talk classroom communities by discussing why mathematical discussions are critical to the learning process, teaching active listening and responding with supportive feedback, providing math talk sentence stems, and supporting students to be able to both explain and justify their reasoning. Rawding and Wills (2012) offered math talk stems such as “I agree with ___ because...,” “I have a different perspective than ___ because...,” or “I chose this method because...”

Writing in Mathematics

Although writing in mathematics is complex, providing students with opportunities to write can improve their understanding of mathematical concepts (Applebee & Langer, 2013). Writing in mathematics can take various forms including: journal entries where students document what they are learning and doing in mathematics, explanations on how to solve a problem, and essays on how to prove something mathematically (Urquhart, 2009). In the PA Core Standards for Mathematical Practice, students must also be able to “construct viable arguments and critique the reasoning of others.”

Writing:

- Involves producing the same forms of text: mathematical language, symbols and numbers, and graphics;
- Is not just about what was done to solve the problem, but why it was done using sound mathematical reasoning; and
- Must communicate with precision.



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Effective practices for the teaching of writing in mathematics include (Applebee & Langer, 2013):

- Asking students to provide written justification for when a mathematical statement is true, or a conclusion is accurate;
- Encouraging regular written communication of mathematical ideas through various representations including graphs, diagrams, and written prose;
- Including various types of authentic, real-world writing tasks where students can demonstrate their understanding of mathematical principles; and
- Providing students with mentor text and rubrics that clarify writing expectations in mathematics.

These unique qualities of reading and writing in mathematics are reflected in the PA Core Standards for Mathematical Practice.

Other useful resources include:

- Disciplinary Literacy in Mathematics (2017)
- Promoting Mathematical Argumentation (2016)
- Integrating Writing in Mathematics (2011)
- Construct Viable Arguments in Mathematics (2017)
- Mathematics Assessment Project
- Math Design Collaborative

Disciplinary Literacy in Science Science literacy instruction in the various disciplines of science (e.g., biological sciences, environmental sciences, physical sciences, etc.) should engage students in making sense of scientific texts as a form of scientific inquiry. “When science literacy is conceptualized as a form of inquiry, reading and writing activities can be used to advance scientific inquiry, rather than substitute for it” (Pearson, Moje, & Greenleaf, 2010, p. 459). Initial learning experiences in the sciences should include hands-on investigations, experiments, and field experiences, so students can then engage in reading, writing, speaking and listening in order to make sense of and document their inquiry process and findings. In fact, the skills that help make sense of scientific phenomena are consistent, if not identical, to those needed to formulate meaning during reading. A shared skill set includes:

- Predicting and hypothesizing;
- Sequencing events;
- Observing and noting details;
- Questioning;
- Visualizing;
- Making sense of data;
- Compare and contrast;
- Linking cause and effect;



PaSLP Essential Element 6

- Making inferences;
- Drawing conclusions;
- Constructing arguments based on evidence;
- Determining meaning of vocabulary; and
- Communicating ideas.

“Reading in science requires an understanding of academic language, knowledge of the protocols and style of science writing, and the development of critical thinking skills for examining ideas, data, and evidence” (Grant, Fisher, & Lapp, 2015, p. 53). When this instruction is done well, it creates a reciprocal relationship between scientific understanding and literacy. One informs the other, resulting in positive impacts in both science, and reading and writing. Conversely, minimizing or ignoring the need to address literacy within the discipline of science is to create a dependency on the teacher for all background knowledge, which places the learner in a passive role and undermines the ways in which the discipline of science occurs.

Scientific reading:

- Is densely packed with a high proportion of discipline-specific and technical words; and
- Often includes elaborate charts and diagrams which illustrate text concepts.

Readers of science read to:

- Search for answers to relevant questions;
- Clarify their understanding of a scientific principle or phenomenon;
- Verify or augment their understanding of a scientific phenomenon;
- Understand how a scientific phenomenon is important in a theoretical or practical sense; and
- Validate descriptions of experiments and interpretations of results.

Readers of science attend to:

- Precise definitions of technical terms which denote both concepts and processes;
- Images, charts, and graphs to illustrate the text;
- Descriptions of experiments and results;
- Explanations of scientific phenomenon;
- Surprising results that which reveal misconceptions; and
- Source validity.

Writing in Science

Traditionally, writing in science has been limited to copying notes and writing lab reports; however, writing is used as a tool to communicate scientific thinking and research within a scientific community (Lent, 2016). “A writer of science must be able to ask questions, seek answers, and make connections to other knowledge” (Grant, Fisher, & Lapp, 2015, p. 109). A Pennsylvania scientist working for Eurofins recently stated, “if you didn’t write it, it never happened” (M. Rodak, personal communication, November 16, 2016). According to Grant, Fisher & Lapp, 2015, p. 109),



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PaSLP Essential Element 6

“To help students comprehend the nature of science in a way that allows them to be able to write about the content, teachers need to present problem-based activities that allow collaboration, discussion, and the generation of ideas. Such activities will provide students with material from which they may compose science-based writings.”

According to Olson (2014), academic writing products in the laboratory sciences include lab reports, poster presentations, research papers, arguments, research proposals, journal articles, or literature reviews. In engineering, academic writing products include research reports, lab reports, progress reports, article critiques, memos, technical descriptions, annotated bibliographies, and proposals (Olson, 2014). Teachers who use writing as a tool for thinking also incorporate interactive scientific journals where students can document observations, collect data, chart processes, or draw illustrations (Lent, 2016). 101

Scientific writing has the following characteristics (Lent, 2016):

- Technical and precise vocabulary;
- Accuracy and brevity versus elaboration or craft;
- Passive voice; and
- Language in conjunction with numeric data, illustrations, or charts.

References for teachers include:

- How Students Learn: Science in the Classroom (2005)
- Taking Science to School: Learning and Teaching Science in Grades K-8 (2007)
- Clarifying Literacy in Science (2017)
- Literacy for Science: Exploring the Intersection of the Next Generation Science Standards and Common Core for ELA Standards (2014)
- Talk Science Primer (2012)
- Vocabulary: The Language of Science (2017)
- Literacy Design Collaborative Lessons for Science (2017)

Disciplinary Literacy in Social Studies While all academic disciplines depend heavily on the development of strong literacy skills, the social studies (comprising the content areas of civics and government, economics, geography, and history) require continuous skill development in reading and writing connected text and visual images (such as political cartoons, photographs, and maps).

Literacy in social studies includes the ability to:

- Learn to access information effectively and efficiently;
- Interpret primary and secondary sources;
- Evaluate the credibility of sources;
- Establish a context in time, culture, place, etc. (chronological thinking, folklore, societal norms);
- Focus on cause and effect (the idea, purpose, motivation, intent, and delivery);



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PaSLP Essential Element 6

- Understand advanced geographic information systems;
- Access and understand U.S. Supreme Court decisions; and
- Critique different market economies.

The literacy skills required to search, manage, and discern the credibility, reliability, and validity of historical sources are dependent upon careful practice, and guided experience. Historical thinking is at its core a search for accuracy in interpretation of ideas and events from the people who were witnesses or participants. Readers of history approach text as an investigation (curious, inquisitive, and probing) to discover the authenticity, credibility, and validity of the source. Primary and secondary sources are read with application of background knowledge related to time, place, and societal norms for the time. Sources are evaluated and interpreted for the idea, purpose, motivation, intent, and delivery of their construction.

Common disciplinary reading practices used in social studies include the following:

- Sourcing - a consideration of where information comes from, who the authors are, and the type of document;
- Contextualization - a consideration of when a text was written and associated influences; and
- Corroboration - a consideration of agreements and disagreements across multiple texts (Shanahan, Shanahan, & Misischia, 2011; Wineburg, Martin, & Monte-Sano, 2013).

Writing in Social Studies

According to the National Council for the Social Studies (NCSS) (2016, p. 182), “challenging social studies instruction makes use of regular writing and the analysis of various types of documents, such as primary and secondary sources, graphs, charts, and data banks.” Products from writing in the Social Studies can become evidence of student understanding of the concepts in the PA Core Standards. They can write about topics and concepts that align to the PA Core Standards for History, Civics and Government, Economics, and Geography. Academic writing in the social studies can include the response paper, historiographical essay, research paper, argument, article critique, timeline, interview, news article, and speech (Olson, 2014; Lent, 2016). Students can create such products to demonstrate continuity and change, contributions of individuals and groups, principles of government, physical characteristics of places and regions, comparisons of economic systems or international relationships.

According to Applebee and Langer (2013), effective practices that contribute to the successful teaching of writing in social studies include:

- Inviting students to develop discipline-based interpretations of issues or events by investigating the original contexts that surrounded an issue or event, as well as those contexts in which it was written about over time;



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PaSLP Essential Element 6

- Engaging students in writing tasks that require analysis and synthesis of available information, including sourcing, contextualization, and corroboration of primary and secondary sources;
- Requiring a wide variety of writing tasks for various audiences and purposes; and
- Providing students with rubrics that clarify expectations for various types of writing in history and social studies.

Evidence-based writing instruction emphasizes the importance of writing to construct knowledge, as well as to communicate it (Hotchkiss & Hougen, 2012). The PA Core Standards for Writing in History and Social Studies require that students engage in both informational, explanatory, and argumentative writing. Informational and explanatory writing can include reports of past events that highlight actions, ideas, people, and locations. Explanatory writing requires students to analyze and synthesize information about complex historical ideas or events and provides a description of the results using comparison-contrast and cause-effect text structures. Argumentative writing requires students to analyze and synthesize information to construct logical arguments with reason and supporting evidence, such as examining court cases or preparing for a debate and civil discourse.

References for teachers include:

- Teaching for Historical Literacy (2012)
- Library of Congress Teacher Resources
- Library of Congress: Using Primary Sources
- Reading Like a Historian Videos:
 - Corroboration
 - Contextualization
 - Sourcing
- National Council for the Social Studies C3 Literacy Collaborative Series (2017):
 - Reading Informational Text
 - Argument Writing
 - Communicating Conclusions and Taking Informed Action
- Historical Thinking Chart
- Facing History Mini-Tasks: Literacy Design Collaborative Lesson Collection



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The following information compares literacy across four disciplines, indicating challenges and providing recommendations to enhance literacy instruction.

Disciplinary Literacy

English Language Arts:

Overview: Disciplinary literacy in ELA engages students in oral and written exchanges of ideas around challenging texts. It is characterized by the type of inquiry, analysis, and interpretation used by experts in fields, including language and literature studies, among others.

Specific Literacy Skills

- Read, write, and talk about texts including both literary and informational works to understand their meaning, craft, and structure.
- Draw inferences and cite textual evidence to support analysis and interpretation.
- Integrate knowledge and ideas within single texts, as well as across texts of increasing complexity.
- Produce original written works of various text types including argumentative, informative or explanatory, narrative, and text dependent analysis.
- Research to build and present knowledge.
- Draw evidence to support analysis, reflection, and research when writing.

Challenges

- Traditional discourse patterns in classrooms are characterized by: closed-ended questions focusing on the recall of information, an atomistic approach to analysis and interpretation of texts, a predominant focus on canonical literary fiction, and a focus on writing primarily as product.

Recommendations

- Include more informational texts as students move through the grades; apprentice students in interpretive tasks that span ideas across entire texts and multiple texts by single or multiple authors; engage students with challenging texts.



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Mathematics:

Overview: Math literacy instruction is embedded in the solving of problems from the concrete to the abstract.

Specific Literacy Skills

- Define and use discipline-specific words
- Make sense of charts, diagrams, and symbols to solve problems
- Contextualize and define mathematical symbols

Challenges

- Reread for correctness and to find errors
- Unlike common language, words in mathematics must be used with precision
- For example, “the” is very different from “a”

Recommendations

- Read to make sense of the solutions of others. Write solutions in multiple representations
- Diminish focus on the “one right answer” and increase focus on communicating solutions precisely, including why the solution is valid

Science:

Overview: Science literacy instruction is a form of scientific inquiry that models the way the larger scientific community builds background knowledge prior to developing new research questions and investigations.

Specific Literacy Skills

- Gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts.
- Describe experiments, talk, and write about results.
- Define and use discipline-specific words.
- Ask questions as they read about what is new.
- Question (orally and in writing) the facts, design of experiments and interpretations of results.

Challenges

- The primary challenge is the density of scientific text.
- Each sentence is packed with a high proportion of technical and specialized vocabulary.
- Science reading is like learning a foreign language for some students.



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Recommendations

- Incorporate regular opportunities for reading and writing as an aspect of a scientific inquiry
- Use high leverage practices for teaching vocabulary
- Apprentice students in the skills to make sense of complex diagrams and charts

Social Studies:

Overview: Social studies literacy (history, economics, geography, and civics) includes the ability to analyze oral and written communication in understanding the past through scrutiny of primary and secondary sources. It requires knowledge and analysis of economic laws, human behavior, individual rights, and the common good of society.

Specific Literacy Skills

History

- Analyze, evaluate, and differentiate primary and secondary sources.
- Question authenticity of author or source.
- Look for evidence of bias within text and within self.
- Based on historical evidence, create historical explanations or interpretations.
- Use names, dates, and other facts as anchors to assist in making historical interpretations.

Economics

- Use economic laws and data to analyze economic behavior and make predictions of economic activity.
- Use data to explain vital concepts and trends.

Civics

- Read, research, write, and discuss documents, events, and cases that shape citizenship, government policy, and societal norms.

Geography

- Employ data, research, and readings in analysis of human-environmental interactions.

Challenges

- Traditional textbooks tend to present information as authoritative, whereas historical reasoning requires interpretation and analysis.
- Therefore, it is important for teachers to incorporate materials for all disciplines from outside the realm of traditional textbook publishing companies.
- Teachers should emphasize the development of 21st century learning skills and redesign educational experiences to emphasize literacy as well as strict content.



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Recommendations

- Incorporate experiences and “real world” sources that enhance the development of literacy skills and relevancy to the lives of students.
- Use primary and secondary source documents with emphasis on recognizing biases in sources, comparing evidence, situating evidence in context, and accounting for different perspectives, multiple causes, and results.

Grades K-5

Disciplinary literacy is most often thought of as appropriate for secondary students and teachers; however, the foundation for disciplinary literacy is developed from the very beginning. Children develop concepts and vocabulary that are crucial to understanding disciplines in the early years before they begin formal education. Elementary students have rich opportunities to develop disciplinary language and conceptual foundations for more intensive study in the secondary years.

In primary and intermediate grades, children can begin to develop the vocabulary and the conceptual thinking necessary for success in disciplinary literacy. Interactive, informational book read-alouds in the elementary grades can lead to understanding vocabulary and comprehension of concepts associated with science and social studies. Read-alouds with narratives can lay the foundation for understanding literature. According to CCSS (2010), informational texts should have a prominent place in elementary classrooms, accounting for fifty percent of classroom reading. For some children, these texts provide an entry to literacy that narratives do not. For all children, these texts provide background knowledge for a later focus on disciplinary literacy.

There are several ways that elementary teachers can prepare students for disciplinary reading including helping students to read a wide range of text types, providing students with opportunities to integrate information from multiple sources on a single topic, and teaching content-specific vocabulary within text. According to Shanahan and Shanahan (2014, p. 637), in the elementary grades, “we should teach students the way reading in various fields differs rather than only expecting students to apply the same general lens across everything they read.” In the primary grades, few differences exist between informational subject-area texts, but as students enter the upper elementary grades, the differences start to become more apparent. Students in the intermediate grades should be exposed to a wide range of text types in the study of each discipline, and teachers can help students begin to distinguish the differences between text types, purposes, and structure within a content area, and from one content area to another (Fang & Coatoam, 2013; Shanahan & Shanahan, 2014).

The PA Core Standards for English Language Arts (K-5) also emphasize the reading of multiple text types by encouraging the integration of knowledge and ideas both within and across different types of text. For example, in the PA Core Standards (grades K-5), students are asked to examine how information in words as well as via illustrations and visuals contributes to the meaning of a single text (CC.1.2.G). By Grade 5, the same standard, CC.1.2.5.G, asks students to, “draw information from multiple print or digital sources, demonstrating the ability to locate an



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PaSLP Essential Element 6

answer to a question quickly or solve a problem efficiently.” This future-ready skill of synthesizing information from multiple texts is reinforced in the PA Core Standards for Reading in ELA, History and Social Studies, and Science and Technical Subjects (Grades 6-12). The progression of this standard across grade levels is one illustrative example of the increasing expectations for students in the elementary grades to transition from learning to read to reading to learn in the disciplines.

Students in Grades K-5 should have opportunities to:

- Become familiar with text structures found in both narratives and in informational text;
- Recognize that narratives have a beginning, middle, and end;
- Recognize that most informational books do not have to be read cover-to-cover;
- Learn about settings, characters, problems, events, and resolutions;
- Understand character motivation, a very important element in more complex narratives;
 - pdesas.org
- Experience description, cause and effect, problem and solution, compare and contrast, and generalization and examples in nonfiction texts, as well as expository text structures that will be important in social studies, science, and math;
- Develop academic vocabulary. (This task is particularly important for English Learners and for students who find learning to read and write more difficult);
- Be introduced to morphology because much of the discipline-specific vocabulary in science is built on Latin and Greek roots: seismograph, magnitude, dermatitis;
- Practice using graphs, tables, charts, and illustrations to extend understanding of informational books;
- Learn to use book supports (such as tables of contents, indexes, and glossaries) and internet searching strategies to prepare for the more complex tasks they will face in the disciplines;
 - pdesas.org
- Learn to make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias; and
 - Literacy Design Collaborative Module 5th Grade Social Studies:
- Practice writing different kinds of informational texts: persuasive texts, reports, recounts, and procedural texts.

Birth – Age 5

Although disciplinary literacy is emphasized at the secondary level, the foundation for understanding the disciplines can be laid in the early preschool years. 108

- Parents, caregivers, child care centers, and libraries can introduce young children to the concepts and the vocabulary of disciplines through direct experience with items (such as living and nonliving) and through reading “concept” books with children. These books can introduce children to vocabulary and ideas that can later inform disciplinary understanding.



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PaSLP Essential Element 6

- Concrete experiences with real items (such as examining vegetables or experimenting with things that float) help children to develop vocabulary and beginning disciplinary concepts.
- Interactive read-alouds are an effective way to engage young children with disciplinary ideas and vocabulary. Encouraging children to point out illustrations of various items, such as animals, vehicles, colors, articles of clothing, and parts of the body helps them internalize the vocabulary necessary for these areas and form conceptual categories. Read-alouds also introduce children to informational and narrative “book language.”
 - www.cybils.com
 - www.readingrockets.org
- Asking children to group items according to function, color, sound, etc. can prepare children to organize their knowledge and develop categories, a very important thinking skill for later learning.
- Having children talk about their observations of the world around them helps them to be better observers and encourages them to use vocabulary.
- Read-alouds and discussion of academic vocabulary prepare children to meet the demands of disciplinary literacy as they continue through elementary and secondary school.