

Disciplinary Literacy in Science and Mathematics: Using Literacy to Unlock Content Knowledge

Rachel Lang Daniels

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educational service center
of Central Ohio



Contact Information

Rachel Lang Daniels

Adolescent Literacy Specialist

SST 11, ESC of Central Ohio

Rachel.Daniels@escoco.org

614.542.4188



Participant Outcomes



To understand the concept of disciplinary literacy as outlined in Ohio's Plan to Raise Literacy Achievement

To explore how knowledge is constructed within the disciplines

To discuss practices in order to implement disciplinary literacy in Science and Mathematics



Opening Reflection

What is Disciplinary Literacy?

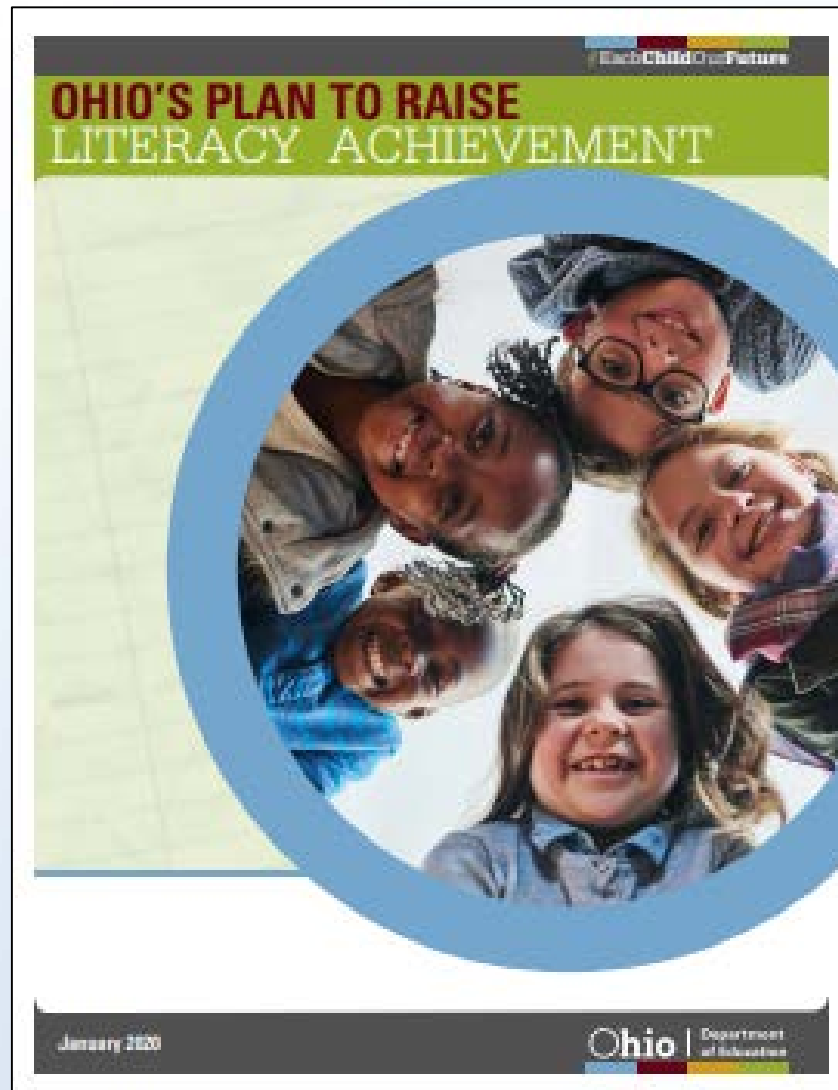
Disciplinary literacy moves beyond the common strategies used across all content areas and focuses on the unique strategies experts use to engage with text in an academic discipline.

(Shanahan, 2012)

- 
- Create
 - Communicate
 - Evaluate



Adolescent Literacy



Scarborough's Reading Rope

STRANDS OF EARLY LITERACY DEVELOPMENT

LANGUAGE COMPREHENSION

BACKGROUND KNOWLEDGE
(facts, concepts, etc.)

VOCABULARY
(breadth, precision, links, etc.)

LANGUAGE STRUCTURES
(syntax, semantics, etc.)

VERBAL REASONING
(inference, metaphor, etc.)

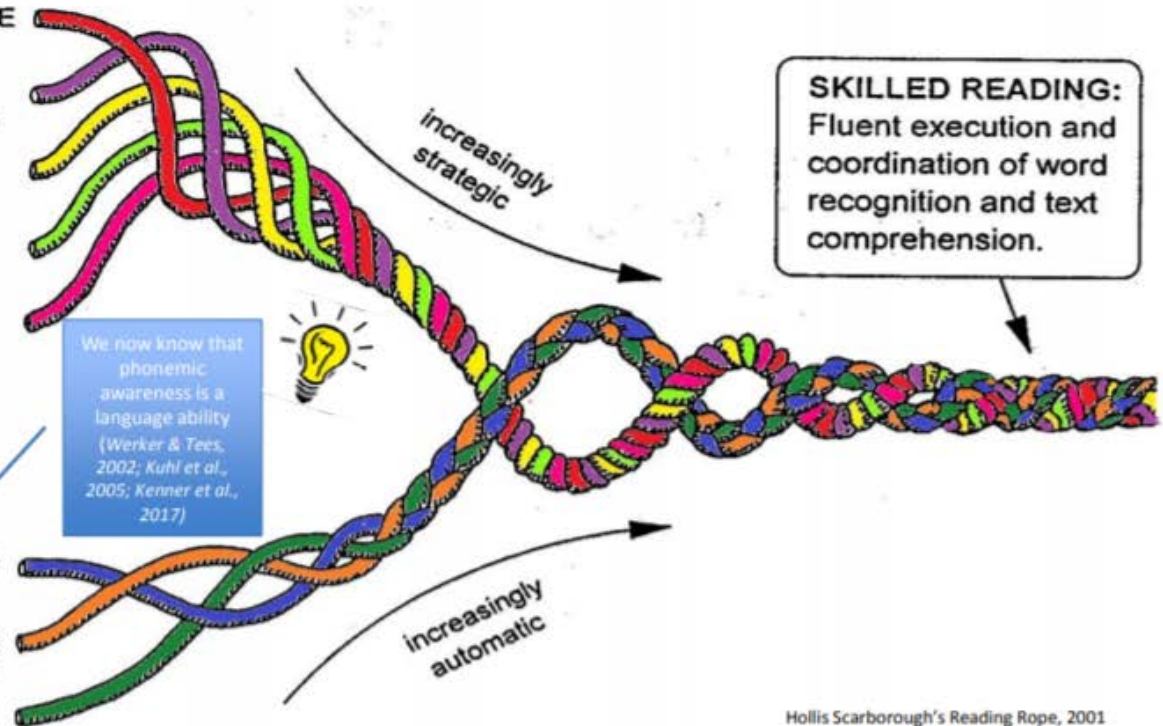
LITERACY KNOWLEDGE
(print concepts, genres, etc.)

WORD RECOGNITION

PHONOLOGICAL AWARENESS
(syllables, phonemes, etc.)

DECODING (alphabetic principle,
spelling-sound correspondences)

SIGHT RECOGNITION
(of familiar words)



Hollis Scarborough's Reading Rope, 2001



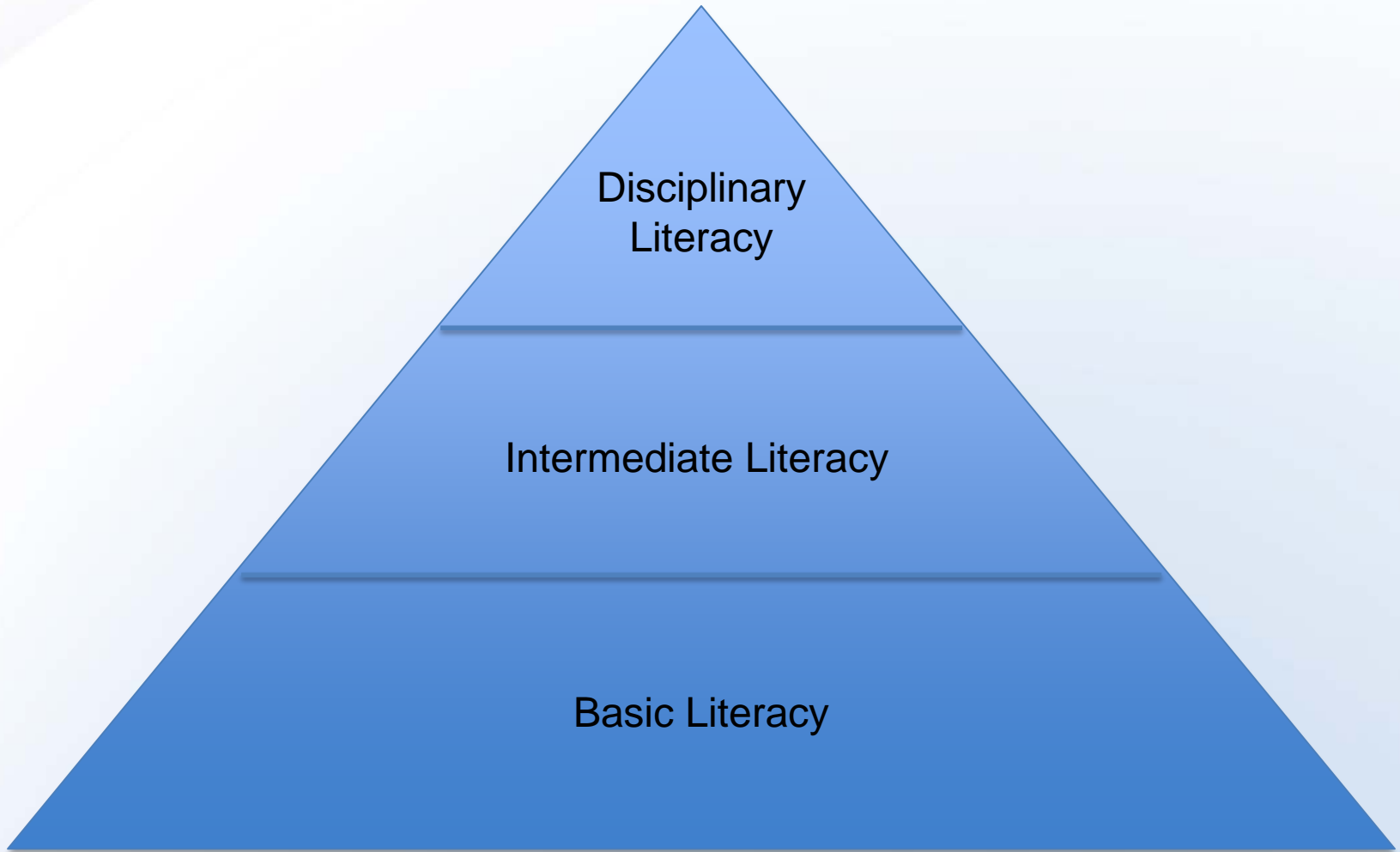
Evidence-Based Practices

| | |
|--|-------------------|
| Provide explicit vocabulary instruction | Strong Evidence |
| Provide direct and explicit comprehension strategy instruction | Strong Evidence |
| Provide opportunities for extended discussion of text meaning and interpretation | Moderate Evidence |
| Increase student motivation and engagement in literacy learning | Moderate Evidence |
| Make available intensive and individualized interventions for struggling readers that can be provided by trained specialists | Strong Evidence |

IES Practice Guide, 2008



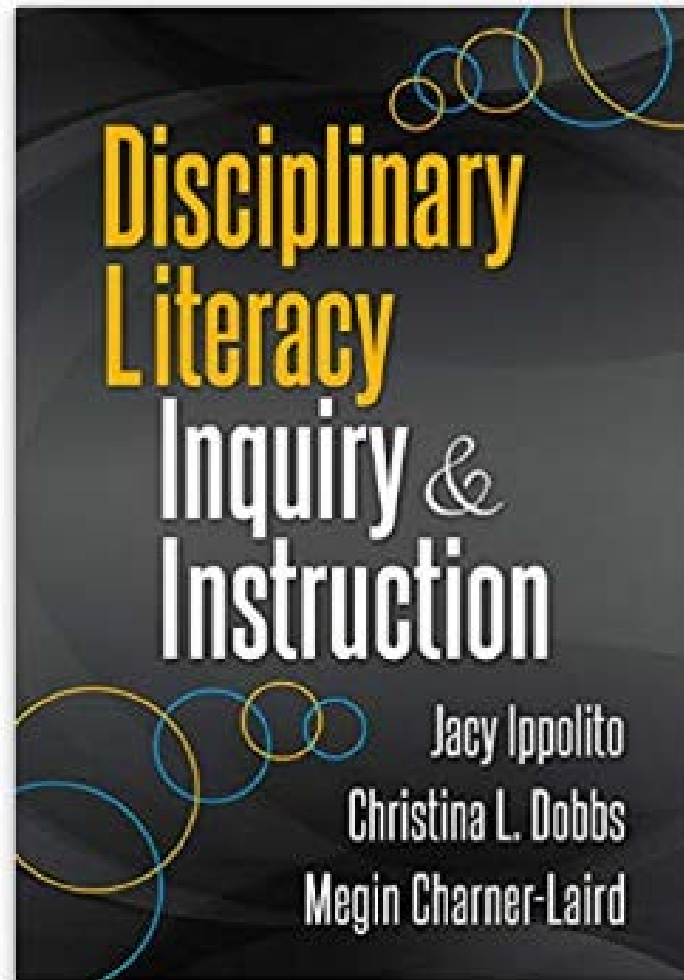
Increasing Literacy Specialization

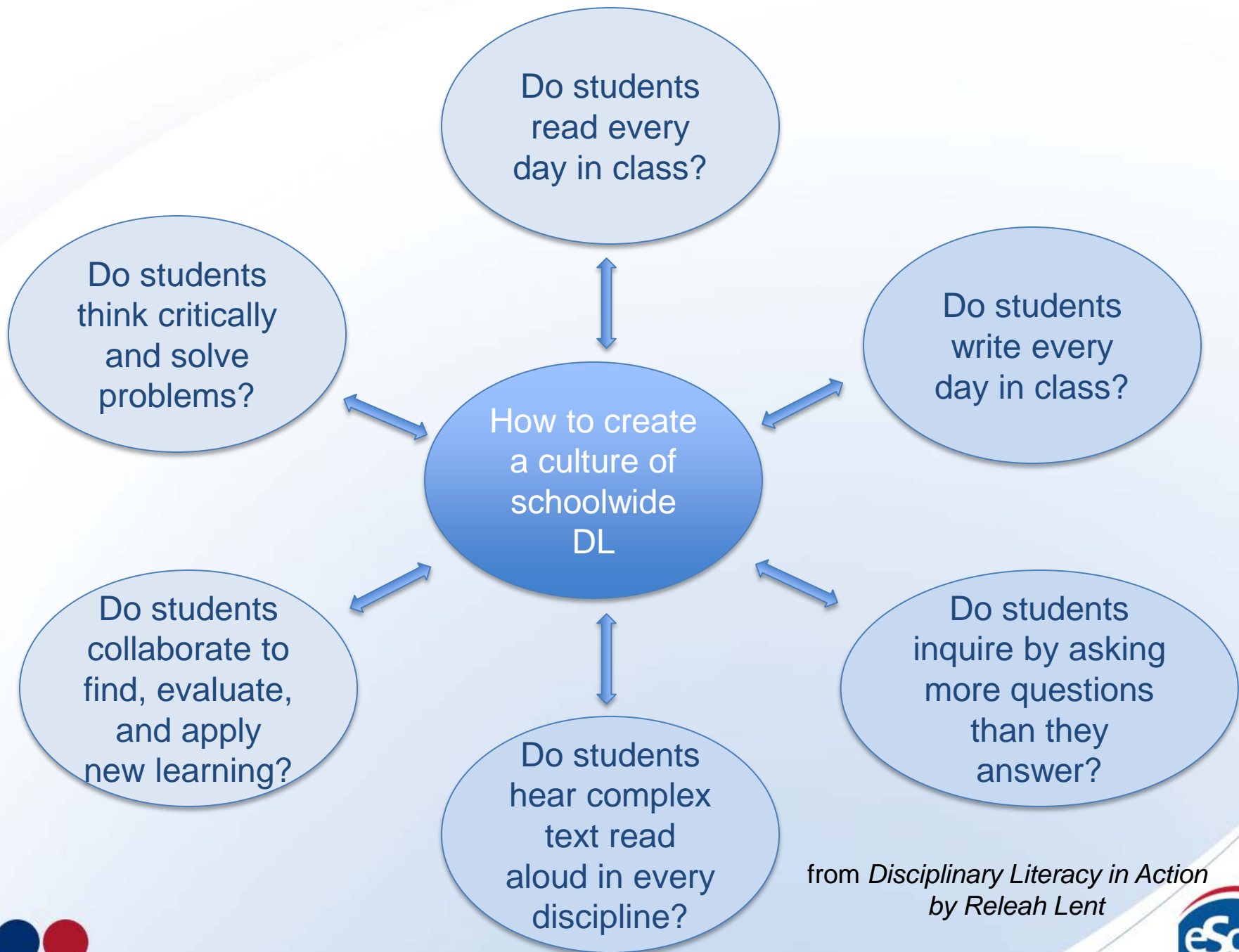


Shanahan (2008)



Learning from the experts

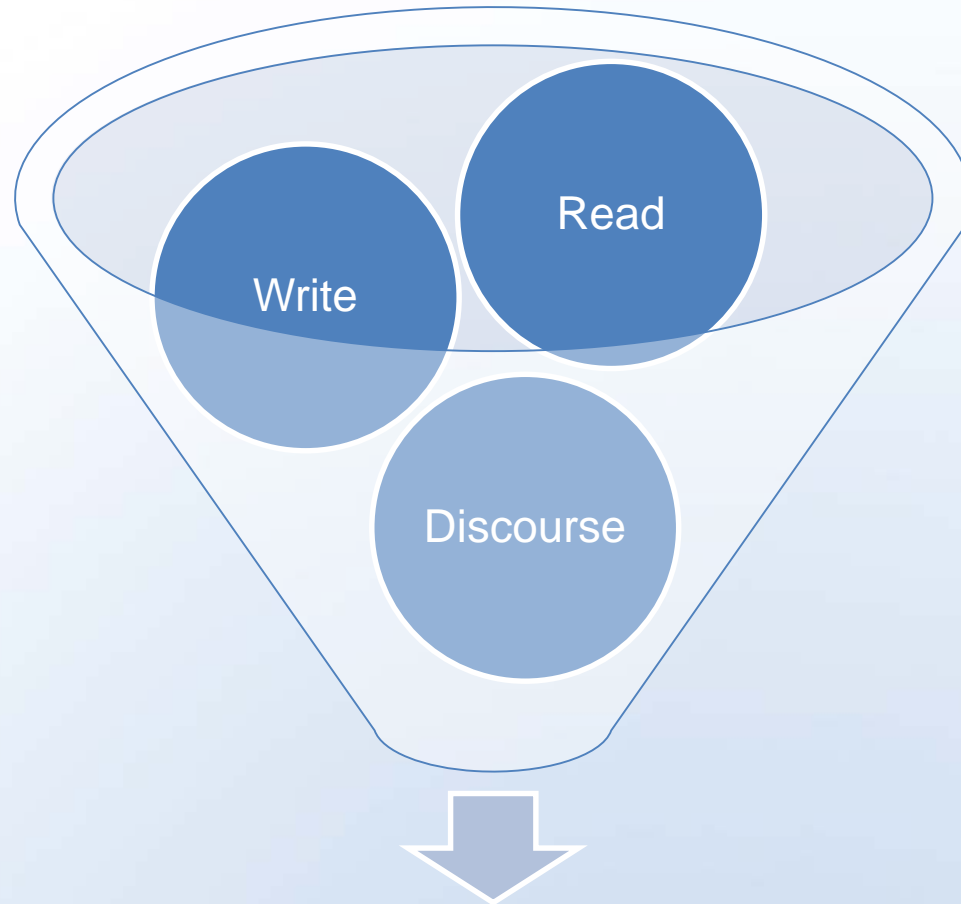




from *Disciplinary Literacy in Action*
by Releah Lent



In Every Class, Every Day



Disciplinary Literacy



Discussion

In what ways do the disciplines of Social Studies/History and ELA create, communicate and evaluate information?

What texts are read? What kinds of writing is utilized? In what ways are communication skills critical in these disciplines?



Social Studies/History



Reflect on Social Studies/History



Disciplinary Literacy Approaches

Introduction: This document provides examples of discipline-specific approaches and resources¹ as related to disciplinary literacy.

| Discipline | Approach | Practices | Vocabulary Examples | Resources |
|-----------------------|---|---|---|---|
| Social Studies | Historians consider multiple perspectives when reading and writing historical accounts and arguments. | <ul style="list-style-type: none"> Notice source and context. Analyze accounts that present conflicting interpretations. Reference language of causality and chronology Determine how ideas are communicated. Approach texts specific to purpose and text source. Writing argumentative texts using accurate historical data. | <ul style="list-style-type: none"> Primary Secondary Source Causality Chronology | <p>Literacy in the Disciplines: A Teacher's Guide for Grades 5-12: Chapter 2, pp. 30-35. (Wolsey, Lapp, 2017)</p> <p>Disciplinary Literacy Strategies in Content Area Classes (Shanahan, 2015, p. 8-15)</p> <p>Stanford History Education Group (SHEG): Historical Thinking Chart</p> <p>Thinking Like a Historian (Wineburg, 2010)</p> |
| Mathematics | <p>Mathematicians read carefully, evaluating the meaning of each word or symbol and apply logic to their reading.</p> <p>Mathematicians use precise vocabulary to describe and defend their work.</p> | <ul style="list-style-type: none"> Learn accurate definitions Reread Read equations with appropriate directionality Detect errors Read for evidence and interpret visuals Identify representation Express regularity in repeated reasoning | <ul style="list-style-type: none"> Difference Distribution Properties Expression Terms Factorization Binomials | <p>Literacy in the Disciplines: A Teacher's Guide for Grades 5-12: Chapter 2, pp. 19-23. (Wolsey, Lapp, 2017).</p> <p>Disciplinary Literacy Strategies in Content Area Classes (Shanahan, 2015, p. 3-5)</p> <p>A Literature Review on Disciplinary Literacy: How do Secondary Teachers Apprentice Students into Mathematical Literacy? (Hillman, 2013).</p> <p>Tennessee Math Standards, pp. 9-12</p> |

¹ Reference to any resource, organization, activity, product, or service does not constitute or imply endorsement by the Tennessee Department of Education.



Discussion-- Social Studies/History

At your table discuss your observations from the video as well as the approaches, practices and vocabulary noted in the Disciplinary Literacy Approaches document.



English Language Arts

a closer look
INSIDE
the **CLASSROOM**

**ENGAGING
STUDENTS
IN AUTHENTIC
READING
AND WRITING**



Reflect on English Language Arts



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Discussion—English Language Arts

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Writing in the Disciplines

| Social Scientists | Students of English |
|---|--|
| Create timelines with accompanying narratives | Utilize a process: drafting, revising, editing |
| Utilize information and/or evidence from multiple sources | Understand how to flexibly use feedback, organization, details, elaboration and voice to enhance meaning |
| Organize conflicting ideas or perspectives into a whole | Employ effective techniques for argumentation |
| Systemize large quantities of information | Avoid formulaic writing |
| Summarize social or political consequences of an event | Employ literacy techniques and devices appropriately |
| Use the past as a mirror to the present | Use mentor texts |
| Rely on primary and secondary sources | Adapt communication for various audiences |



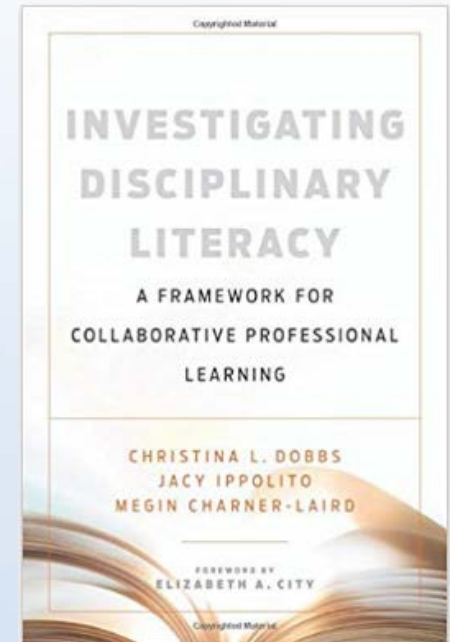
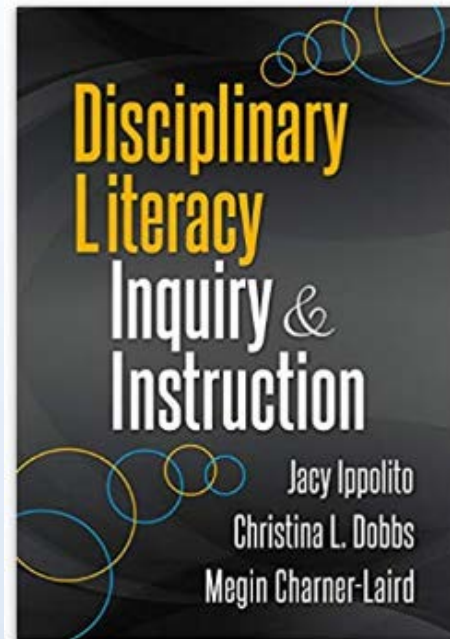
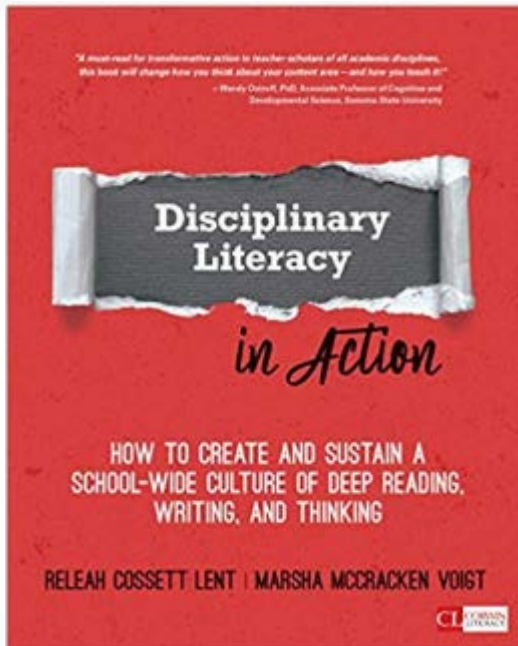
Closing Reflection



Confirm or correct what you know about disciplinary literacy. Share with a colleague.



Resources to Explore



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www.facebook.com/escofcentralohio



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