



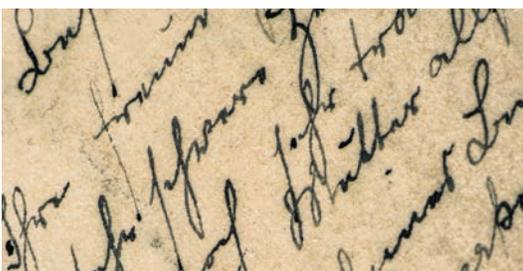
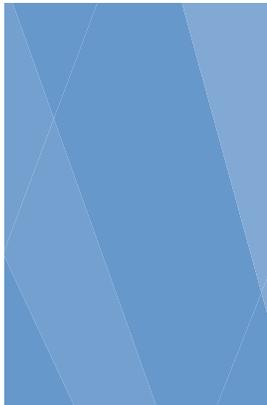
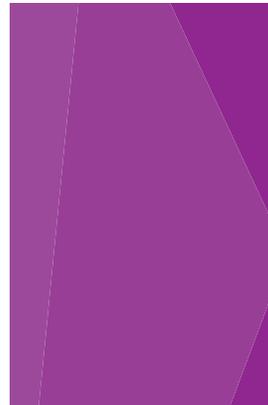
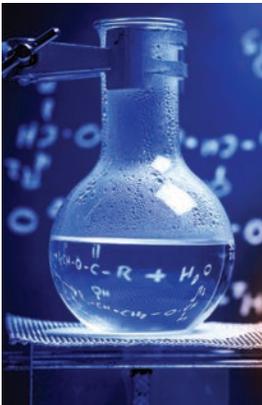
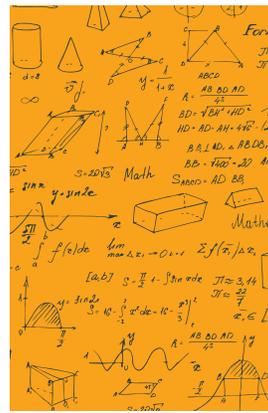
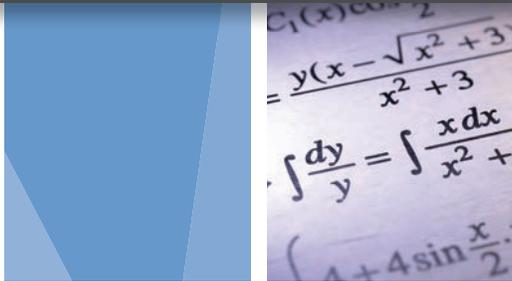
Department of  
Education

Carmen Fariña, Chancellor



## CIPL PROFESSIONAL LEARNING SERIES:

# An Educator's Guide to Disciplinary Literacy



# NYC Department of Education

**Carmen Fariña**

Chancellor  
Department of Education

**Phil Weinberg**

Deputy Chancellor  
Division of Teaching & Learning

**Anna Commitante**

Senior Executive Director  
Office of Curriculum, Instruction & Professional Learning

52 Chambers Street  
New York, NY 10007

# Acknowledgments

This guide is a publication of the  
Office of Curriculum, Instruction & Professional Learning,  
under the leadership of Anna Commitante.

## **Primary Writers**

Janna Robin, Nicole Chilla, Melanie Gardner

## **Primary Research**

Janna Robin

## **Sample Disciplinary Lesson Plans**

Joseph Schmidt—Social Studies

Kerry Cunningham—Mathematics

Adaliz Gonzalez—Science

Thank you to all team members who lent their content expertise.

## **Bibliography and Permissions**

Daley Ramirez

Acknowledgments also to the offices and individuals throughout the Department of Education who read drafts and offered comments and feedback.

## **Graphic Design, Proofreading, and Publishing**

Vanguard Direct

This guide is a tool for schools to support professional learning and Disciplinary Literacy practices for pedagogical staff. The guide contains suggestions and best practices for schools and does not represent DOE policy or contractual obligation. School staff may utilize this guide to their discretion. The Department reserves the right to make changes to the guide at any point in time.



# Table of Contents

## Introduction

1

## Disciplinary Literacy

WHY DISCIPLINARY LITERACY NOW?	3
WHAT DO I NEED TO KNOW ABOUT DISCIPLINARY LITERACY?	5
DISCIPLINARY LITERACY IN THE SUBJECT AREAS	6
WHAT DOES DISCIPLINARY LITERACY LOOK LIKE IN PRACTICE?	7
BIBLIOGRAPHY	10

3

## Disciplinary Literacy in Math

WHAT DO THE COMMON CORE STATE STANDARDS SAY ABOUT MATHEMATICAL LITERACY?	11
HOW DO STUDENTS READ IN MATH CLASS?	12
WHAT IS THE IMPORTANCE OF DISCUSSION IN MATH CLASS?	14
SAMPLE MATH LESSON PLAN	21
BIBLIOGRAPHY	26

11

## Disciplinary Literacy in Science

DISCIPLINARY LITERACY IN SCIENCE	29
HOW DO STUDENTS READ IN SCIENCE?	32
WHAT ROLE DOES DISCOURSE PLAY IN SCIENCE?	35
WHAT IS SPECIAL ABOUT WRITING IN SCIENCE?	36
DISCIPLINARY LITERACY IN SCIENCE AND THE COMMON CORE STATE STANDARDS	40
SAMPLE SCIENCE LESSON PLAN	48
BIBLIOGRAPHY	51

29

## Disciplinary Literacy in Social Studies

SOCIAL STUDIES EDUCATION AND DISCIPLINARY LITERACY	53
WHAT IS CRITICAL THINKING IN SOCIAL STUDIES?	55
WHAT IS READING IN SOCIAL STUDIES?	56
WRITING IN SOCIAL STUDIES	58
SOCIAL STUDIES IN THE ELEMENTARY SCHOOL CLASSROOM	61
DISCIPLINARY LITERACY IN SOCIAL STUDIES AND THE COMMON CORE STATE STANDARDS	62
SAMPLE SOCIAL STUDIES LESSON PLAN	79
BIBLIOGRAPHY	95

53



# INTRODUCTION



# Introduction

## What is Disciplinary Literacy?

**Disciplinary Literacy** is best defined as the typical ways of thinking, doing, speaking, writing, and representing within the context of a given discipline (or content area). If we are to effectively utilize this approach for instruction, we need to first work toward a common definition.

The CCSS specifically set requirements for English language arts (ELA) as well as for literacy in science, history/social studies, and technical subjects. The standards highlight that in the same way that students learn to read, write, speak, listen, and use language effectively as part of a comprehensive ELA curriculum, they must also understand and use “the literacy skills and understandings required for college and career readiness in **multiple disciplines**” (CCSS). This means that in order for students to be taught to read, write, listen, speak, think critically, and perform in different ways and for different purposes within the disciplines, teachers must explicitly call out the ways in which each discipline approaches its content. Many have referred to this approach as giving students what Doug Buehl (2009) calls “insider knowledge.”

To avoid the mistake of approaching Disciplinary Literacy as one more thing for an ELA teacher to do, we should work toward understanding that academic learning in the disciplines may actually involve approaches to reading, writing, listening, speaking, and thinking that differ from the approaches of the language arts teacher. By helping our students learn the specific literacies of the disciplines, we can deepen their learning of specific content and subject matter.

The Institute for Learning at the University of Pittsburgh points out that students need to develop along two dimensions to become literate in a content area or discipline. First, they must develop their knowledge of core concepts, big ideas, and the driving questions within a discipline. Then they must also grow the habits of mind in that discipline. They must develop the ways of investigating, reasoning, reading, writing, talking, and problem solving that are unique to the discipline. From a practical perspective, basic literacy skills are of first and foremost importance and one cannot entertain a Disciplinary Literacy approach without them. What is important to understand is that when reading a newspaper article or a lab report, other very specific literacies come into play.

## What is Content-Area Literacy?

### How is it different from Disciplinary Literacy?

Content-area literacy generally refers to using the language arts teacher’s approaches to reading, writing, listening, speaking, and thinking in the content areas (or disciplines). This is when teachers of Social Studies, Science and Math are utilizing the generic reading strategies such as summarizing, highlighting, note taking, KWL (what students **K**now, What students **W**ant to know, and what students **L**earned), etc., to help students understand and remember text.

Catherine Snow’s research (2010) however, revealed that middle and high school students are not able to successfully comprehend texts in science (or math or social studies) as well as texts of fiction. This underscores the need for instruction in which content-area teachers consider how the processes of reading, writing, and discourse are used within their specific disciplines.

Shanahan and Shanahan (2008) describe Disciplinary Literacy as **advanced literacy instruction embedded within and tightly connected to content areas**. In their pyramid model of literacy, you can see how the advanced work of Disciplinary Literacy instruction fits in with and builds upon the other two types of literacy instruction.

**Disciplinary Literacy:**

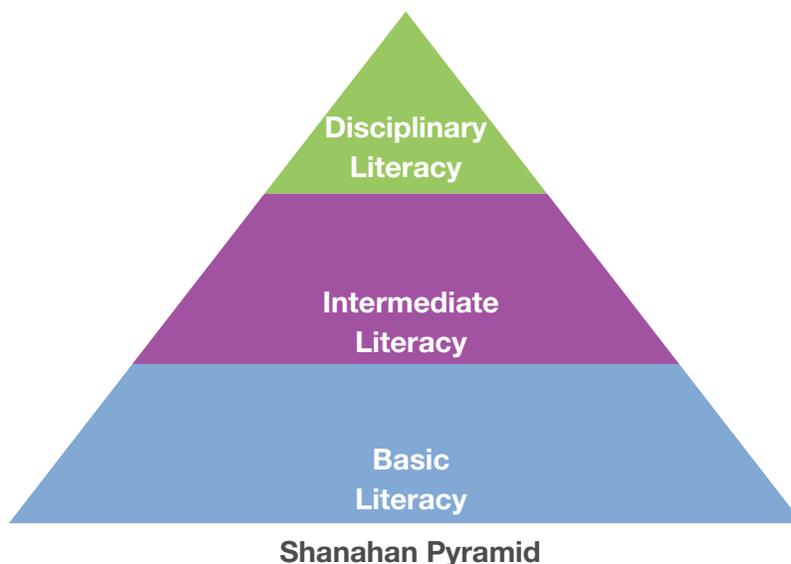
Literacy skills specific to history, science, mathematics, literature, or other subject matter.

**Intermediate Literacy:**

Literacy skills common to many tasks, including generic comprehension strategies, common word meanings, and basic fluency.

**Basic Literacy:**

Literacy skills such as decoding and knowledge of high-frequency words that underlie virtually all reading tasks.



Shanahan also stresses that Disciplinary Literacy engages learners with content in “ways that mirror what scientists and mathematicians do to inquire and gain understanding.”

Disciplinary Literacy matters because most college and workplace required reading involves content-dense texts. This means that we must teach the content of the disciplines as well as the meaningful ways that reading, writing, discussion, and representing are constructed within that discipline.

A teacher employing Disciplinary Literacy approaches may try to engage students in sourcing when using a historical text since that is what historians do when they read; while a teacher using content-area literacy approaches might encourage students to use Cornell notes or a KWL, since such techniques can help readers organize and remember information from any text. No one can argue that both approaches are important, however, while note-taking is a useful skill, sourcing is critical when reading historical texts.

In essence, Disciplinary Literacy is about getting students to participate in ways that mimic how experts within a particular discipline behave, while content-area literacy has focused primarily on helping students employ good reading and study skills.

Disciplinary Literacy is new for most educators and some might argue that students are not scientists, mathematicians, or historians. But if we want students to succeed in using and understanding the diverse and complex texts created by scientists, mathematicians, and historians, we must also teach them explicitly how.

Anna Commitante  
Senior Executive Director  
Office of Curriculum, Instruction & Professional Learning

# DISCIPLINARY LITERACY NOW

DISCIPLINARY LITERACY  
NOW



# Why Disciplinary Literacy Now?

## Secondary education poses unique challenges

While the conversation around Disciplinary Literacy can begin in upper elementary school grades, it is critical that it become a part of the work of secondary schooling. Not only are students in secondary school becoming more deeply immersed in specific content areas, but they are also expected to read, write, respond, and argue within those content areas using the literacy practices specific to each. The texts of each discipline require specific practices from our students. **The call to Disciplinary Literacy is the call to explicitly embrace those skills and support students in their application across content-area classrooms.** This poses a unique challenge for secondary students because they may need to shift back and forth between utilizing discipline-specific literacy skills in five or six different disciplines within the course of one school day. In addition, “ALL the disciplines are changing and we need to keep up with that.”<sup>1</sup> As such, attending to Disciplinary Literacy across a school community may need to be the focus of a professional learning cycle or series in a school.

Along with the challenges of Disciplinary Literacy there are also possibilities, which can be exciting for teachers. **The instructional procedures that have proven successful in students’ literacy development are based on engagement with text, and the practices and strategies for Disciplinary Literacy build on this work.** With attention to Disciplinary Literacy, students build understanding of how to engage with texts in each discipline using the specific skills of that discipline. Not only will this support students in engaging more deeply with the content of each discipline, but preliminary trends suggest Disciplinary Literacy has the potential to have a significant impact on students in a variety of ways. Shanahan and Shanahan assert that not only is Disciplinary Literacy good for higher-level students because it “promotes deeper and more sophisticated thinking” that pushes students to engage with the “highest levels of interpretation,” but there is a “very real” possibility that Disciplinary Literacy approaches would also be successful with less proficient readers.<sup>2</sup> **Disciplinary Literacy is a critical literacy—it builds an understanding of how knowledge is produced in the discipline, rather than just building knowledge within it.**<sup>3</sup>

**Part of a teacher’s job is to open as many doors as possible for students, and this can be accomplished by letting them know and understand the work of experts and their unique discourses.** “To learn deeply in a subject area, then, young people have to have access to the ways that conventions of disciplinary knowledge production and communications can be routinely or more explicitly challenged and reshaped; such knowledge gives young people the power to read critically across various texts and various disciplines. Through this access, they can become critical readers and thinkers.”<sup>4</sup>

<sup>1</sup> Elizabeth Birr Moje, *Foregrounding the Disciplines in Secondary Literacy Teaching and Learning: A Call for Change* (2008). doi:10.1598/JAAL.52.2.1

<sup>2</sup> Shanahan and Shanahan (2012).

<sup>3</sup> Moje (2008).

<sup>4</sup> Carol D. Lee and Anika Spratley, (2006), in Moje, (2008).

## From Content Area Literacy to Disciplinary Literacy

In traditional secondary schooling, teachers are expected to be masters of their content and schools have operated under the assumption that students' literacy skills (acquired mostly in ELA classes) will transfer to other disciplines naturally. **However, with the new demands of the Common Core, educators must now attend to the explicit literacy strategies within each discipline.** Teaching generic reading and writing strategies, while helpful to a degree, doesn't help students understand the nuances and skills required of each discipline. Educators must now explicitly support students in learning those skills.

**While every teacher is not a teacher of reading, every teacher must support the overall literacy development of his or her students, specifically as it relates to the subject matter.**

For example, argument writing in a history class using primary source documents is not the same as writing a scientific hypothesis using data sets from a lab. Disciplinary Literacy demands that we explicitly teach students the nuanced differences between the two, so they can fully engage in the content and literary practices of each discipline. Students need to learn how to “engage in practices that will help them solve specific problems with disciplinary texts.”<sup>5</sup>

Traditionally, content-area literacy strategies articulate in general terms what good readers do.<sup>6</sup>

- ask questions
- make predictions
- test hypotheses
- summarize
- monitor understanding and use fix-up strategies

It has been less common to focus on the demands that are specific to the content areas. While these more general strategies have their place and value, to further students' understanding of these skills as they relate to individual content areas requires attending to Disciplinary Literacy.

**What is different about Disciplinary Literacy is the focus on giving students an insider's perspective specific to that discipline rather than on creating a toolbox of generic literacy strategies.** The use of “generalizable” content strategies helps serve students with general reading comprehension, but as students move up through middle and high school, they need to learn the specific literacy skills of each discipline in order to engage fully in each discipline. “To become competent in a number of academic content areas requires more than just applying the same old skills and comprehension strategies to new kinds of texts. It also requires skills and knowledge and reasoning processes that are specific to particular disciplines.”<sup>7</sup> Disciplinary Literacy requires the learner to acknowledge that the literacy skills in each content area *are* different, and instruction must reflect that.

<sup>5</sup> Cynthia Hynd-Shanahan, (2013), “What Does It Take? The Challenge of Disciplinary Literacy,” in *Journal of Adolescent & Adult Literacy*, 57, no. 2, p. 94.

<sup>6</sup> Lee and Spratley, (2010), *Reading in the Disciplines: The Challenges of Adolescent Literacy*  
[https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf)

<sup>7</sup> Rafael Heller and Cynthia L. Greenleaf, (2007), p. 10, in Doug Buehl, (2011), *Developing Readers in the Academic Disciplines*, p.13.

# What do I need to know about Disciplinary Literacy?

## Reading and writing in the disciplines is different

Reading is commonly viewed as a basic set of skills that are widely applicable and adaptable to all kinds of texts and purposes.<sup>8</sup> However, sole emphasis on generic reading skills presumes all texts are the same when they are not. Readers don't read all texts the same ways and writers don't write all texts the same ways.

As one moves along the continuum of literacy, what is learned becomes less *generally* useful proving that most students need instruction in more sophisticated genres, specialized language conventions, disciplinary "norms of precision and accuracy," and higher-level processes of interpretation.<sup>9</sup> In literacy development, progressing higher in the literacy pyramid means learning more sophisticated and therefore less generalizable skills and routines.

**Disciplinary Literacy requires knowledge of topics in a particular field (the specific discipline or content). "If you don't know content, you will have a difficult time understanding the texts, and if you don't understand the texts, you are unlikely to learn content."**<sup>10</sup>

## Secondary school and Disciplinary Literacy

Of course the seeds of Disciplinary Literacy can be planted in any grade. But what does Disciplinary Literacy look like across the secondary grades? To read like a scientist or write like a poet are concepts that students can start to become familiar with in the upper elementary grades. This can support students in secondary school, when they are expected to switch between different content areas and their relevant literacy practices seamlessly.

Members of every profession have unique ways of producing, discussing, and sharing information, getting readers' attention, debating, or responding to criticism. **Disciplinary Literacy is really about making clear what literacy means in each discipline/content area as it relates to the content itself.**

Teachers need to provide students with chances to study the discourses they are learning in relation to the related practices,<sup>11</sup> especially as "readings become longer and more full of content, increasingly varied in style, vocabulary, text structure, purpose, and intended audience."<sup>12</sup>

The average secondary student is expected to engage in the discourses of multiple subjects throughout the day. However, by the time secondary students are facing complex disciplinary texts, literacy instruction is either absent or consists of general reading strategies and study skills associated with content-area literacy.<sup>13</sup> Instead, the focus should be on the "difference in reading skills: where in some classes they read written instructions to the letter, while in others they should read with skepticism, or question the author's assumptions, or analyze style."<sup>14</sup>

<sup>8</sup> Shanahan and Shanahan, (2008), *Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy*.

<sup>9</sup> Shanahan and Shanahan, (2008).

<sup>10</sup> Lee and Spratley, (2010), *Reading in the Disciplines: The Challenges of Adolescent Literacy*, 3.  
[https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf).

<sup>11</sup> Moje, (2008), *Foregrounding the Disciplines in Secondary Literacy Teaching and Learning: A Call for Change*  
doi:10.1598/JAAL.52.2.1

<sup>12</sup> Heller and Greenleaf, (2007), *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*.  
<http://all4ed.org/wp-content/uploads/2007/06/LitCon.pdf>

<sup>13</sup> Shanahan and Shanahan, (2008), *Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy*, 45.

<sup>14</sup> Heller and Greenleaf, (2007), *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*.  
<http://all4ed.org/wp-content/uploads/2007/06/LitCon.pdf>

## Spotlight on a Study

### *Expert project funded by Carnegie Corporation*

One of the requirements of a study funded by the Carnegie Corporation was to involve members of the arts and sciences to rethink responses to adolescent literacy. Teams were created: two disciplinary experts (university professors), two teacher educators, two high school teachers, and two researchers (the Shanahans). Research design “reflected our assumptions that teachers in disciplines resist literacy strategy instruction when that instruction is promulgated by individuals who are literacy experts without particular content knowledge.”

**Year 1:** The Shanahans worked with specialists in math, chemistry, and history to identify sophisticated and appropriate reading skills that would allow students to move forward in those subject areas, and then they began studying how to help students learn these skills.

**Year 2:** They tried to implement these new strategies in urban high schools and in their secondary school teacher prep programs.

Although the disciplines share commonalities in their use of academic language, there are differences in how the disciplines “create, disseminate, and evaluate knowledge, and these differences are instantiated in their use of language.”

Expert teams did not like the ideas of “across the content area” strategies, and the researchers asked them for a critique. They also requested the teams propose strategies they thought could help students learn from their texts.

*(Shanahan and Shanahan 2008)*

## Disciplinary Literacy in the Subject Areas

Traditional approaches to reading strategies usually recommend students predict, infer, clarify, visualize, summarize, use graphic organizers, look for key ideas in the text, take notes, or skim and scan.<sup>15</sup> While these strategies are valuable, many of them assume that students can already make sense of the dense and complicated language in academic texts. The differences among the texts of different disciplines result in unique demands for readers and teachers need to provide “tools for deconstructing texts, sentence by sentence, to help students process unfamiliar discourse patterns and talk about how meaning is constructed through language choices.”

Disciplinary Literacy means making explicit the differences in specific reading and writing applications in order to help students get at the content deeply. Students can learn to recognize this common pattern of information flow and learn to code-switch among disciplines. Disciplinary Literacy can serve as an “avenue” to meet the needs of students to learn discipline-specific content and to address the demands of the CCSS.<sup>16</sup>

<sup>15</sup> Deshler, Ellis & Lenz (1996); Fisher, Brozo, Frey & Ivey (2007); Vacca and Vacca 2005; in Fang and Schleppegrell (2008), *Reading in Secondary Content Areas: A Language-Based Pedagogy*.

<sup>16</sup> Mandarino and Wickens (2014)

## Putting It Into Practice

One characteristic of academic literacy is nominalization—the transformation of a verb to a noun. It happens in all subjects, but for different purposes and to different effects. For example, science nominalization is often used to demonstrate how a scientific process can apply in a variety of other contexts. Rather than saying salt dissolved, science texts often say salt goes through a “process of dissolution.”<sup>17</sup> This language specifically has students focus on the process aspects of dissolution and their effects on a substance, in this instance, salt. In science “[n]ominalization serves to move a phenomenon from the particular or specific to the abstract or general. The term dissolution can be used to describe the process that occurs with a variety of substances, and it should be learned apart from its association with salt.” This is just one of the discipline-specific skills in a content area that students need to be taught to engage with specifically when reading disciplinary texts.

### Disciplinary Literacy and the CCSS

Shifts in the CCSS promote:

- deeper close reading of complex texts and the use of multiple texts.
- increased non-fiction *across all disciplines*.
- literacy standards in science, social studies, and technical subjects.<sup>17</sup>

These literacy shifts are meant to help students *think* more deeply in the discipline, with the understanding that reading is the primary way of building content knowledge. **The promise of Disciplinary Literacy is that it focuses on knowledge production of content instead of knowledge banking.**<sup>18</sup>

According to the CCSS, instruction should include a rich variety of texts for students to read. By increasing the range of texts, teachers increase opportunities for working with complex texts that vary in levels of “abstraction, cohesiveness, and conceptual density.”<sup>19</sup> For writing, the shifts in the CCSS require not only knowledge of expository and persuasive structures that are discipline specific, but also discipline-specific writing tasks.<sup>20</sup>

## What Does Disciplinary Literacy look like in Practice?

### Classrooms using disciplinary literacy approaches are discourse communities

Researchers talk about communication among different groups as “social practices,” which acknowledge that learning is community based, and students need to read, write, and talk *with others* to learn the discipline.<sup>21</sup>

<sup>17</sup> Pickett (2000), in Shanahan & Shanahan (2008). *Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy*.

<sup>18</sup> Manderino and Wickens, (2014). Addressing Disciplinary Literacy in the Common Core State Standards. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensirj2014.pdf>

<sup>19</sup> Manderino and Wickens (2014).

<sup>20</sup> Manderino and Wickens (2014).

<sup>21</sup> Heller and Greenleaf, (2007). *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*. <http://all4ed.org/reports-factsheets/literacy-instruction-in-the-content-areas-getting-to-the-core-of-middle-and-high-school-improvement/>

Since each discipline has its own language, practices, and understandings that allow insiders and experts greater access to the content, Disciplinary Literacy asks educators to unlock those practices, language conventions, and assumptions to allow students to be part of the deeper learning by navigating those practices.

Habits of practice define discourse and discourse communities and these habits become essential to the ways of knowing, thinking, doing, and acting in those disciplines.<sup>22</sup> Secondary teachers therefore have to help students “access these discipline-specific ways of thinking and acting and the texts engendered by these processes.”<sup>23</sup> **Then they not only engage in many discourse communities, but also know *how* and *why* they are engaging in them, and what those engagements mean for them and others in terms of larger social contexts.**<sup>24</sup>

## Teacher as mentor and student as apprentice

**Students need instruction and guided practice to become insiders and to read, write, and think in ways that are characteristic of specific academic disciplines.** It is helpful to think of Disciplinary Literacy learning as an apprenticeship or mentorship wherein students learn from a teacher who is an expert in the discipline. Over time, through repeated classroom experiences of modeling and observation, active practice, scaffolding, coaching, and guided reflection, students become increasingly independent in carrying out academically rigorous work.<sup>25</sup>

The goal is to mentor students so they can access texts and information easily in all disciplines, as well as those they are most interested in personally. They have to know how to be insiders in each discipline. Otherwise, their ability to learn stalls and they begin to rely on being told or shown the meaning of the content because they have not developed the capacity to independently access this knowledge.<sup>26</sup>

## Teachers make students “insiders” in the discipline

In Disciplinary Literacy, there is a distinction between *content knowledge*, which is knowledge about the field of study (e.g., World War I), and *discipline knowledge*, which is “knowledge about the way knowledge is created, communicated, and shared within a discipline.”<sup>27</sup>

Important Considerations:

- **Inquiry** is at the heart of disciplinary practice.
- The CCSS identify **specific goals for reading in the disciplines**.
  - For example, **CCSS.ELA-LITERACY.RST.9-10.2**:  
Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

<sup>22</sup> Gee (2007), in Manderino and Wickens, (2014).

<sup>23</sup> Moje (2011), 54, in Manderino and Wickens, (2014).

<sup>24</sup> New London Group (1996), in Moje, (2008), *Foregrounding the Disciplines in Secondary Literacy Teaching and Learning: A Call for Change*.

<sup>25</sup> Stephanie McConachie and Anthony Petrosky, (2010), *Content Matters: A Disciplinary Literacy Approach to Student Learning*.

<sup>26</sup> Buehl (2011). *Developing Readers in the Academic Disciplines*.

<sup>27</sup> Hynd-Shanahan (2013).

- Students also need to be able to **reason and argue with disciplinary texts** according to the CCSS using multiple texts.
  - For example, **CCSS.ELA-LITERACY.RH.9-10.6**:  
Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.
- Lessons that focus on **argumentation** benefit from teacher modeling and think-alouds about how they arrive at the argument made in the text; “this requires a shift from telling the content to collaborative interrogation of the content through text. This will require more time and a need to rethink content coverage.”<sup>28</sup>
- **Spoken discourse** provides students with the scaffolded opportunity to develop academic and disciplinary discourse and build ownership through enhanced knowledge of the language of the discipline. Furthermore, spoken discourse serves as a precursor to writing and supports students in transferring their academic conversations to written demonstrations of their knowledge in the discipline.<sup>29</sup>
- Integrated **multimodalities** represent the increasing number of kinds of texts that students read on- and offline (graphs, charts, videos, photographs, diagrams, audio, artistic representations, 3-dimensional figures, symbolic notations). Multimodalities can help students access more complex written text and ideas. Findings suggest that while multimedia texts may provide more access to struggling readers, they are not enough to develop strong disciplinary readers—even though they work to complement more complex written texts.<sup>30</sup>
- Consider **engagement**. How do you build knowledge and engage students with texts of the discipline? This points to the importance of considering multiple types of texts and new media.<sup>31</sup>
- **Prior Knowledge** can influence what we understand, what we attend to, and what perspectives we take. This has strong implications for supporting struggling adolescent readers. “The ability to comprehend written texts is not a static or fixed ability, but rather one that involves a dynamic relationship between the demands of texts and the prior knowledge and goals of readers. It is because of this dynamic relationship that teaching reading in the academic disciplines is so important.”<sup>32</sup>
- Making students insiders provides them with opportunities to examine how the **norms of knowing, doing, and communicating within a discipline** are constructed. **Each norm is not just “doing” the discipline, but is also a social construction within a discipline**, which means their rules can be questioned and changed. Because they’re insiders, they can be part of reconstructing “rules,” especially in day-to-day practices.<sup>33</sup>

<sup>28</sup> Manderino and Wickens (2014). *Addressing Disciplinary Literacy in the Common Core State Standards*. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>.

<sup>29</sup> Manderino and Wickens (2014).

<sup>30</sup> Mandarion (2012). in Manderino and Wickens, (2014). *Addressing Disciplinary Literacy in the Common Core State Standards*.

<sup>31</sup> Moje (2008). *Foregrounding the Disciplines in Secondary Teaching and Learning: A Call for Change*  
doi:10.1598/JAAL.52.2.1

<sup>32</sup> Moje 2008.

<sup>33</sup> Moje 2008.

# Bibliography

- Buehl, Doug. *Developing Readers in the Academic Disciplines*. Newark, DE: International Reading Association 2011.
- Draper, Roni Jo. "School Mathematics Reform, Constructivism, and Literacy: A Case for Literacy Instruction in the Reform-Oriented Math Classroom." *Journal of Adolescent and Adult Literacy* 45 no.6 (2002): 520–529. <http://jwilson.coe.uga.edu/EMAT7050/Students/Ramsey/DraperMathLiteracy.pdg.pdf>
- Fang, Zhihui, and Mary J. Schleppegrell. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. Michigan: University of Michigan Press, 2008.
- Heller, Rafael, and Cynthia Greenleaf. *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*. Washington, DC: Alliance for Excellent Education, 2007. <http://all4ed.org/reports-factsheets/literacy-instruction-in-the-content-areas-getting-to-the-core-of-middle-and-high-school-improvement/>
- Hynd Shanahan, Cynthia. "What Does It Take? The Challenge of Disciplinary Literacy." *Journal of Adolescent and Adult Literacy* 57, no.2 (2013): 93–98. doi:10.1002/JAAL.226
- Lee, Carol D., and Anika Spratley. *Reading in the Disciplines: The Challenges of Adolescent Literacy*. New York: Carnegie Corporation of New York, 2010. [https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf)
- Manderino, Michael, and Corinne Wickens. "Addressing Disciplinary Literacy in the Common Core State Standards." *Illinois Reading Council Journal* 42 no.2 (2014): 28–39. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>
- McConachie, Stephanie M., and Anthony R. Petrosky. *Content Matters: a Disciplinary Literacy Approach to Improving Student Learning*. San Francisco, CA: Jossey-Bass, 2010.
- Moje, Elizabeth Birr. "Developing Socially Just Subject-Matter Instruction: A Review of the Literature on Disciplinary Literacy Teaching" *Review of Research in Education* 31 no.1 (2007): 1–44. doi:10.3102/0091732X07300046001
- . "Foregrounding the Disciplines in Secondary Teaching and Learning: A Call for Change." *Journal of Adolescent and Adult Literacy* 52, no.2 (2008): 96–107. doi:10.1598/JAAL.52.2.1
- Shanahan, Timothy, and Cynthia Shanahan. "Teaching Disciplinary Literacy to Adolescent: Rethinking Content Area Literacy." *Harvard Educational Review* 78 no.1 (2008): 40–60.
- . "What is Disciplinary Literacy and Why Does it Matter?" *Topics in Language Disorders* 32 no.1 (2012):7–18. .doi:10.1097/TLD.0b013e318244557a
- Sizer, Theodore R. *Horace's Compromise: The Dilemma of the American High School*. Boston: Houghton Mifflin, 1984.

# DISCIPLINARY LITERACY IN MATH

DISCIPLINARY LITERACY  
IN MATH



# What Do the Common Core State Standards Say about Mathematical Literacy?

The Common Core State Standards for Mathematics (CCSSM), guided by the Standards for Mathematical Practices (SMPs), offer approaches that support students' mathematical literacy by making them more than just equation-solvers. The standards require that **young mathematicians have facility with all aspects of the discipline—as deep thinkers of math, as participants in mathematical discussion, and as readers and writers of the language of mathematics.**

The standards emphasize the development of students' conceptual understanding, procedural skill, fluency, and flexible application in and out of the classroom. **They require that students learn and transfer more complex approaches to mathematical content, and that they are able to explain their solutions to tasks with viable arguments.**<sup>1</sup> Because of these expectations, writing and discussion are central to engaging in the CCSSM.

**The preface to the CCSSM speaks to the importance of mathematical literacy, which is centered on constructing and defending mathematical argument,** or asking questions such as: Why is the solution constructed a correct one? Why does it work? A mathematically literate student would be able to write, speak, and most importantly, argue about the chosen solution path. The preface stresses that mathematical argument involves “making conjectures and building a logical progression of statements to explore the truth of these conjectures... justifying conclusions, communicating them to others, and responding to the arguments of others.” **Therefore, the preface to the CCSSM implicitly defines mathematical literacy to be the ability of students to:**

- understand and solve complex problems.
- read and comprehend complex tasks.
- write, speak about, and question their own and others' solution paths.

## Putting It Into Practice

The math class ritual of “I, we, you,”—so ingrained that it has become a cultural script—in which the teacher introduces a new topic, they lead the class in trying out an example, and then students work independently on practice problems, is no longer the way math is taught. The “answer-getter” strategies taught in this teaching pattern are easily forgotten and not transferrable.

*(Green 2014)*

<sup>1</sup> Codruta Temple and Kathleen Hinchman in *Best Practices in Adolescent Literacy Instruction* (2014).

# How Do Students Read in Math Class?

## Challenges of mathematical reading

**Reading in math presents its own set of challenges.** These challenges are due to the fact that there are more concepts per sentence than any other type of text. Mathematical texts are written in a very compact style, there is very little redundancy, and texts contain words as well as numeric and non-numeric symbols. In addition, a page may not be laid out so that the eye travels in the traditional left-to-right pattern. There may be diagrams that need to be interpreted so students can determine whether the information is helpful or merely distracting. Finally, most math textbooks contain sidebars and pictures that can be either related or unrelated to the task at hand.<sup>2</sup> This means that mathematical literacies are different from traditional literacies that students are regularly exposed to; these literacies need to be explicitly taught within the context of the math classroom.

Rich math tasks that students are working with are complex for all the reasons listed above, and for the challenging mathematical content with which they ask students to engage. **Students may need help reading rich math tasks. They may need to hear a teacher think aloud as he/she makes sense of the problem statement and explanatory and supportive information.** The very structure of math tasks is different from the structure of texts with which students often interact, which traditionally have a topic sentence early in the paragraph that the remaining sentences support. In mathematics texts, the main idea often comes at the end of the task or paragraph, and is often in the form of a question, statement, or directive. Students need to learn how to read through these rich tasks to figure out the main idea, then read it again to determine what details and numbers relate to the question being posed. However, students aren't done at this point. **Visualization is now key to understanding what a task is asking a student to do**, as they must visualize the context and apply those strategies they think will lead to a solution using only the appropriate data from the text.<sup>3</sup>

This is why it is important for teachers to use pre-reading questions to reinforce the idea that a task has to make sense. They can make sure students understand what the task is asking them to do by posing guiding questions such as: "Are we clear on the meaning of the words?" "Does the context help?" "Does my understanding incorporate everything I've read?"<sup>4</sup> Asking guiding questions does not mean interpreting the task for students, which is the default of many teachers who may want the students to "get to the math." **Rather, early opportunities for writing about, or discussing, a math task is the sense-making phase, when students can write or talk about what they find confusing and ask for specific clarification.** They can also write or talk about their understanding of the task, so that other students may hear correct interpretations, or a teacher can correct misunderstandings. With unclear tasks, students can be asked to interpret and reformulate the initial problem. It is important to help students become aware of the assumptions they make in a given task and how they may lead to solution paths different from those selected by their peers.<sup>5</sup>

<sup>2</sup> Diana Metsisto (2005). *Reading in the Mathematics Classroom in Literacy Strategies for Improving Instruction*.

<sup>3</sup> Diana Metsisto (2005).

<sup>4</sup> Diana Metsisto (2005).

<sup>5</sup> Nadia Stoyanova Kennedy (2012). *What Are You Assuming?*

## Functional Language Analysis

Functional Language Analysis is a theory of Disciplinary Literacy that looks at the language demands of a discipline and is particularly useful when working with English Language Learners. Take for example the following math problem, likely to be found in any math textbook.

**At time 0, a tank contains 4lb of salt dissolved in 100 gal of water. Suppose that the brine containing 2lb of salt per gallon of water is allowed to enter the tank at a rate of 5 gal/min and that the mixed solution is drained from the tank at the same rate. Find the amount of salt in the tank after 10 minutes.**

This word problem has it all, and it isn't even a really rich math task. It has uncommon non-math vocabulary (brine), a mix of numbers and words (at time 0), including abbreviations (lb), the "topic sentence" at the end of the problem, and very dense text. In addition, the word problem uses mathematical symbolism (numbers, equations) and mathematical expressions (e.g., rate expressed as gal/min). Students also need to recognize the language features that tell them what the math problem is asking of them.

"Repackaging" of meanings is a common way to create mathematical concepts in order to manipulate and transform them into problems to be solved. Passive voice constructions, such as "allowed to enter" and "is drained," let the writer maintain a focus on the flow of water, rather than on the person who does the acts, but this can be hard for students to follow. **Teachers can address these challenges by discussing the language feature explicitly, noting how it can be used to solve the problem.**

*(Fang & Schleppegrell 2008)*

In a study that brought together university scholars, teacher educators, and secondary school content teachers to discuss how they read and make sense of chemistry, history, and mathematical texts,<sup>6</sup> the mathematicians emphasized rereading and close reading as two of their most important strategies. One of the mathematicians explained that, unlike in other disciplines, even function words are important: "the" has a different meaning from "a." Students tend to want to read for the gist, but this doesn't work for math. Math requires precision of meaning and teachers need to plan incisive questions to get students to dig deeply into the text or task with precision.

<sup>6</sup> Cynthia Shanahan and Timothy Shanahan (2008), *Teaching Disciplinary Literacy to Adolescent: Rethinking Content Area Literacy*.

## Vocabulary

Reading, writing, and speaking all require precise vocabulary, which can prove to be a challenge for students. For example, key terms in math often mean different things in other contexts (e.g., prime,

### Try this!

**Modified Frayer Model:** Five boxes with the vocabulary word in the middle. Label the boxes: **definition, examples, non-examples, facts or characteristics**, and a **visual representation**. As a class, in groups, or individually, students fill out the Frayer Model. It can also be used as an informal assessment during or after class.

### Try this!

Write a task in the middle of a piece of chart paper, and draw boxes for each student in a group to work out their own solution. Students can have conversations about the different approaches they took to answering the task, or write reflections on how their work compares to their peers, what they learn from it, or what questions it raises.

division, mean), and math vocabulary includes terms that are not words, but symbols. Graphic representations, while essential in math reading and writing, may also be confusing because of variations in formatting (e.g., bar versus line graphs) or because the graphics are not consistently read in the same direction.<sup>7</sup> This can be particularly challenging since being able to visualize a math task or term is a very important part of task analysis and the problem-solving process. In fact, any classroom **“Word Walls” should have visual as well as written definitions** for math terms whenever possible. Mathematics vocabulary is best taught after students have explored a concept so they are not put off by definitions they cannot memorize, or words or terms they find intimidating. This can be especially true for English Language Learners.

Evidence from the cognitive sciences supports the theory that students can make more sense of math and math concepts if they are embedded in a problem. This supports the value of spending time “exploring interesting mathematics situations, reflecting on solutions methods, examining why the methods work, comparing methods, and relating methods to those used in previous situations.”<sup>8</sup>

## What is the Importance of Discussion in Math Class?

Students’ mathematical and social learning is enhanced when they engage in cooperative work around challenging tasks and conversation about those tasks. Recent research also reveals that classroom discussion—ways of thinking, representing, talking, agreeing, and disagreeing—is central to what students learn about mathematics.<sup>9</sup>

**Students’ perceptions of a discipline come from the tasks or problems with which they are asked to engage.**

*(Lappen, et al. 2005)*

If teachers engage students in rich tasks that allow for the depth of understanding, then **discussion becomes a vital part of mathematics instruction**, especially when coupled with the emphasis the CCSSM has on defending arguments.

<sup>7</sup> Joan M. Kenney, et al. (2005). *Literacy Strategies for Improving Mathematics Instruction*.

<sup>8</sup> Lappen (2014). *Connected Mathematics 3*.

<sup>9</sup> Lappen (2014).

Equally important is writing in the math class.

**Writing can be both a precursor and a follow-up to discussion.** Students prepare their arguments, put in writing how they constructed them, reflect on their process or what they learned from peers, and make sure they understand the day's instructional objective.

Class discussion can happen at any time throughout the class period, beginning with the introduction of the task. In fact, research suggests using discussion as a way of introducing math vocabulary terms, since understanding develops when students hear and use specific vocabulary in context. Researchers suggest using classroom discussion to introduce mathematically specific terms. "It is important to avoid a premature rush to impose formal mathematical language: students need to develop an appreciation of the need for precise definitions and for communicative power of conventional mathematical terms by first communicating it in their own words."<sup>10</sup> Discussion plays a part even after the teacher has ensured students know what the task is asking. Discussion can continue between students as they tackle their task, allowing students to share and make sense of their work, and also be part of a teacher's summative assessment to make sure the key learning objectives of the day were met.

## The teacher's role in discussion

The first rule of any discussion is to establish a classroom culture of safety and risk-taking. Students have to feel comfortable enough among their peers and teacher to offer their solutions, hypothesize answers, make mistakes, ask questions, learn from each other, and change their opinions.

## Benefits of Reflective Writing

- build deeper understanding
- think through different ways to solve a problem
- explain a solution method
- justify a solution or explanation
- decide what to do next
- identify what you wonder about
- make connections to prior knowledge
- consider how confident you feel about your solution path

*The Critical Thinking Consortium: Tools for Thought*

There are five representations of mathematical concepts we want our students to practice talking about. The more representations through which a student can understand mathematical content, and the more connections they can make between them, the deeper the understanding they have.

### Example: $24 \times 7 = 168$

**Contextual:** Can I solve this as well as write a story problem that works with it?

**Symbolic:** Can I solve it as an operation? Even understand its inverse? ( $168/7=24$ )

**Visual:** Can I model it with a drawing, diagram, or physical model (like an array)?

**Physical:** Have students use manipulatives to create 24 groups of 7.

**Verbal:** And then I talk about it. It's not enough just to compute  $24 \times 7 = 168$ . Students need to be able to reason verbally through a problem as well.

**Success in problem-solving is related to students' ability to move between representations.** Students should view

representations as "tools they can use to help them solve problems, rather than as an end in themselves."

*(NCTM 2014)*

<sup>10</sup> Joan M. Kenney, et al. (2005). *Literacy Strategies for Improving Mathematics Instruction*.

## Consider a five-step framework for moving toward a classroom centered on discussion.

Students and teachers move together through levels, from a classroom where the teacher plays the prominent role in getting students to articulate their mathematical thinking to one in which the students have the important roles. Consider:

1. How the teacher supports student engagement.
2. Who serves as the questioner and what kinds of questions are posed.
3. Who provides what kind of explanations.
4. How mathematical representations are used.
5. How much responsibility students share for the learning of their peers and themselves.

(NCTM 2014)

## Response Logs are not just for ELA

“It no longer suffices to say that a student doesn’t know how they arrived at an answer, they just ‘did.’ They are expected to scaffold the solution process for the audience (teacher, class) in a way that leads up to the answer”

(Kenney et al. 2005)

Students can make entries before, during, and after working through a task.

**Before:** What do I hypothesize? What will be challenging? What previous knowledge do I already have that will be helpful to me?

**During:** How is it going? What am I finding challenging? What am I learning? What am I learning from my peers?

**After:** What did I learn? What am I still confused about? How does today’s work connect with work we have done previously? What questions do I want to ask? How does my solution fit with my hypothesis?

## Questions to ask yourself during formative assessments:

1. What are the students learning?
2. Where are there misunderstandings/misconceptions?
3. What should my next lesson have as its objective?
4. What can I learn from my students’ partially correct answers?
5. What must the students understand before we can progress?

(adapted from Kenney et al. 2005)

For teachers, managing classroom discussions requires a familiarity and comfort with the mathematical content being taught so that they can track students’ unpredictable reasoning. Teachers need to be clear about the connections between the goals and instruction and connections between and across the lessons. Therefore, it is essential to keep in sight the overall goals of instruction to steer students clearly.<sup>11</sup>

Teachers have to consistently monitor the work students are doing to get a sense of where students are understanding and misunderstanding. **Both group work and class discussion are useful ways to collect formative assessment data on the disciplinary literacy practices in your classroom.** Feedback is essential to formative assessment, and discussions allow teachers to give immediate feedback to students. “In particular, feedback allows students to compare how their thinking correlates with that of others in the class as well as the conventional mathematical ideas. It also allows students opportunities to reconsider and revise their thinking from the ‘first draft’ stage to a more ‘final’ version.”<sup>12</sup>

<sup>11</sup> Kenney, et al. (2005).

<sup>12</sup> NCTM (2013).

As teachers monitor the work of students, they can also consider how to use that work during class discussion to summarize the lesson. Thoughtful sequencing is essential because the discussion allows students to present different solutions to a certain problem in a way that the presentations build upon one another and help develop deep mathematical understanding while building students' understanding of disciplinary literacy in mathematics.

## Some suggestions for sequencing

Sequence	Purpose
Present a strategy used by the majority of the class before one that only a few students used.	Validates the work that students did and makes the beginning of the discussion more easily accessible.
Begin with a strategy that is more complete—that uses drawings or materials—before one that is more abstract—that uses algebra, for example.	Validates less sophisticated approaches and allows for connections between concrete and abstract.
Present either contrasting or related strategies right after each other.	Makes it easier for the class to make comparisons. <span style="float: right;"><i>(Smith et al. 2009)</i></span>

## How do I create mathematical discussion?

1. Attend to classroom culture
2. Choose high-level mathematical tasks
3. Anticipate strategies that students might use to solve tasks and monitor their work
4. Allow student thinking to shape discussions
5. Plan questions, while being prepared to let student work guide conversation
6. Keep the learning objective in mind
7. Be strategic about telling new information
8. Select and sequence the ideas to be shared in the discussion
9. Use teacher discussion moves to move the conversation forward
10. Draw connections and summarize the discussion

*(adapted from Briñceo)*

## Types of questioning

The questions teachers ask, or teach students to ask one another, are essential in uncovering understanding and misconceptions, while teaching students the disciplinary literacy work embedded in mathematics. Certain types of questions support students in different purposes and approaches.

**For example, questions can be either funneling or focusing questions.**<sup>13</sup>

A **funneling** question is when a teacher uses a set of questions to lead students to a desired, pre-established procedure or conclusion, while giving limited attention to student responses that do not follow the desired trajectory. In a **focusing** question, the teacher pays close attention to what the students are thinking and saying, encourages them to communicate their thoughts clearly, and expects them to be reflective of what they and their classmates say. The teacher is open to a task being solved in multiple ways. The teacher plans questions and outlines key points for the discussion based on content knowledge related to the topic, and what students know. The questions and teaching points he or she plans become key parts of the learning for the day.

---

<sup>13</sup> NCTM, *Principles to Action* (2014).

## Sample Funneling/Focusing Questioning

Funneling	Focusing
<p><b>T:</b> What do you notice about the graph? <i>(waits briefly)</i> Do you see a pattern in the data? <i>(waits briefly again)</i> What are the measures of center for the pennies?</p> <p><b>S1:</b> The mean is about 12.9 years, and the median is about 9 years.</p> <p><b>T:</b> What does the box plot tell us about the variability of the data?</p> <p><b>S2:</b> It has a long tail on one side.</p> <p><b>T:</b> That may be true, but what about the interquartile range—the IQR? What does it tell us?</p> <p><b>S3:</b> Where most of the pennies occur.</p> <p><b>T:</b> Is that really what the IQR tells us? What does each part of the box plot stand for?</p> <p><b>S4:</b> Each part is 25%.</p> <p><b>T:</b> Yes, so what else?</p> <p><b>S5:</b> The middle is 50% of the pennies and is from 3 to 19 years old.</p> <p><b>T:</b> Good. What can we say about pennies on the basis of this information?</p> <p><b>S6:</b> That most of them are about 10 years old.</p> <p><b>T:</b> But since these are pennies, what does that tell us about all coins?</p> <p><b>S7:</b> The coins will be about 10 years old.</p> <p><b>T:</b> Well, 10 years is for pennies, but this wouldn't necessarily be the same for, say, quarters. Why not?</p>	<p><b>T:</b> What things do you notice or wonder about the age of pennies?</p> <p><b>S1:</b> It doesn't seem like very many of them are very old.</p> <p><b>T:</b> What about the graph makes you say that?</p> <p><b>S1:</b> There's a big mound for newer pennies.</p> <p><b>T:</b> Is there anything else you notice?</p> <p><b>S2:</b> I found the interquartile range and saw that most pennies are from 3 to 19 years old.</p> <p><b>T:</b> Explain what the interquartile range tells us.</p> <p><b>S2:</b> It is where most of the pennies occur.</p> <p><b>T:</b> What do you mean by "most of the pennies"?</p> <p><b>S2:</b> Well, I mean the middle 50%. I thought the graph made it hard to tell where things really were. It doesn't look normal, so I couldn't use the middle 68% thing we talked about.</p> <p><b>T:</b> I'm not sure I understand. Can someone else comment on what she is saying?</p> <p><b>S3:</b> She means that since there's a tail, the graph isn't like the normal curves we studied. If it were, we could approximate where the most likely ages are—like 68% of the data would be within one standard deviation of the mean.</p> <p><i>(More discussion follows, and the students determine that 75% of the pennies are not more than 19 years old).</i></p> <p><b>T:</b> Would I be correct if I said that a fifty-cent piece would probably be no more than 19 years old?</p> <p><b>S4:</b> Yes, because these coins were a random sample, and that means we can generalize.</p> <p><b>S5:</b> But we looked at pennies, so we can't generalize to quarters. People use pennies more.</p> <p><b>T:</b> What do you mean by that?</p> <p><b>S5:</b> Pennies may wear out. We don't know about other coins from our sample, because quarters would be a different population.</p>

The chart below outlines some question types you can teach explicitly to students.

Question Type	Description	Sample Questions
<b>Gathering Information</b>	<ul style="list-style-type: none"> <li>■ Students recall facts, definitions, or procedures.</li> </ul>	<ul style="list-style-type: none"> <li>■ What does the = sign tell you?</li> <li>■ What is the formula for finding the area of a rectangle?</li> </ul>
<b>Probing Thinking</b>	<ul style="list-style-type: none"> <li>■ Students explain, elaborate, or clarify their thinking, including sharing the steps they took in solution methods for completing a task.</li> </ul>	<ul style="list-style-type: none"> <li>■ As you drew the number line, what decisions did you make so that you could represent seven-fourths on it?</li> <li>■ Can you show and explain more about how you used the table to find the answer to the task?</li> </ul>
<b>Making the Mathematics Visible</b>	<ul style="list-style-type: none"> <li>■ Students discuss mathematical structures and make connections among mathematical ideas and relationships.</li> </ul>	<ul style="list-style-type: none"> <li>■ How does that array relate to multiplication and division?</li> <li>■ In what ways might normal distribution apply to this situation?</li> </ul>
<b>Encouraging Reflection and Justification</b>	<ul style="list-style-type: none"> <li>■ Students demonstrate their deeper understanding of their reasons and actions, including making an argument for why their solution is valid.</li> </ul>	<ul style="list-style-type: none"> <li>■ How might you prove that 51 is the solution?</li> <li>■ How do you know that the sum of two odd numbers will always be even?</li> </ul>

All of the pieces outlined above, from argumentation to visualization to sequencing to questioning, work together to support students' mathematical literacy. Attending to the disciplinary literacy of mathematics helps students become mathematical experts in their field and gives them access to deep mathematical understanding.<sup>14</sup>

<sup>14</sup> NCTM, *Principles to Action* (2014).

# Sample Math Lesson Plan

Teacher:

Class: Algebra I

Date:

<b>Unit:</b>	Enlarging 3-D Shapes	
<b>Lesson Objective/Teaching Point</b>	<b>Sequence: Lesson 4 of 6</b>	
<ul style="list-style-type: none"> <li>■ Students explore ratios from a numerical, geometric, and algebraic perspective.</li> <li>■ Students manipulate 3-D shapes by certain scales.</li> <li>■ Students calculate surface area and volume of 3-D shapes.</li> <li>■ Students investigate patterns that emerge when shapes are enlarged.</li> </ul>	<p>Students have built an understanding of linear functions and proficiency with <math>y = mx + b</math>. Students can use the slope and y intercept to assist them in creating a graph. This unit begins to examine nonlinear functions. This section of Unit Four focuses on ratio. Students use ratios to construct proportions and describe relationships between quantities.</p>	
<b>Standards Content</b>		
<p><b>HSF.LE.A.3</b> Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p> <p><b>See structure in equations.</b>  <b>HSA.SSE.A.1</b> Interpret expressions that represent a quantity in terms of its context.</p> <p><b>Create equations that describe relationships.</b>  <b>HSA.CED.A.1</b> Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i></p> <p><b>Analyze functions using different representations.</b>  <b>HSF.IF.C.8</b> Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p><b>Build a function that models a relationship between two quantities.</b>  <b>HSF.BF.A.1</b> Write a function that describes the relationship between two quantities.</p> <p><b>Math Practice Standard 3:</b> Construct viable arguments and critique the reasoning of others.</p> <p><b>Math Practice Standard 4:</b> Model with mathematics.</p> <p><b>Math Practice Standard 7:</b> Look for and make use of structure.</p> <p><b>Math Practice Standard 8:</b> Look for and express regularity in repeated reasoning.</p>		
<b>Resources/Materials</b>		
<ul style="list-style-type: none"> <li>■ Warm-Ups/Progress Reports</li> <li>■ Cuisenaire Rods</li> <li>■ <i>Warm-Up 4-4</i> and <i>Enlarging a 3-D Shape</i> worksheets</li> <li>■ Wipe-off boards</li> <li>■ Document camera to display tables and models for the discussion</li> </ul>		

Please note this task does not deal with exponential functions.

The Math Practice Standards are an excellent way to support students in learning the specific literacy practices in Mathematics. For example, having students construct viable arguments and critique the reasoning of others helps them strengthen their mathematical reasoning using argumentation and evidence practices to support.

The wipe-off boards provide students with a space to share some of their "rough draft" thinking about the mathematics with their partner.

Allows for students to model their thinking in front of the whole class.

## Warm-Up (5–10 minutes)

Please see warm-up on page 24

This writing activity gives students the opportunity to communicate in writing, using language as precisely possible, regarding conceptual ideas around cubic measurement.

## Introduction (10 minutes)

Draw a rectangle on the board (3 by 5 units is good).

- Ask the class to double the dimensions of each side of the rectangle—what would the new rectangle look like?
- When the groups worked on doubling a rectangle, what exactly happened? How many dimensions did they change?
- Triple the dimensions of the original rectangle and see what happens.
- When the groups worked on tripling the rectangle, what exactly happened? How many dimensions did they change?

Precision of mathematical language is a key component of disciplinary literacy in mathematics. The difference between a rectangle and a cube changes the mathematics students will practice. Pay attention to the students' precision of language and ask specific questions that connect the literacy practice of precise vocabulary to the mathematical equation to help students build that disciplinary literacy skill in mathematics.

## Student Practice: Doubling the Cube (5-15 minutes)

- Ask students what a **cube** would look like if you doubled each of the dimensions?
- Based on the question above, students actually work together for a few minutes to compute the surface area and the volume of the doubled cube.
- Record any equations that students used to come up with for both the surface area and the volume.

You may want to use a model or drawing to illustrate some of the expressions that are part of the equations the students come up with.

Students discuss their solutions for the doubled surface area of the cube and volume.

This whole group discussion will provide the lead-in for the rest of the tasks. It can also provide students with a scaffold as they work to complete the tasks.

## Group/Independent Work (15–20 minutes)

Students work in pairs to solve the new ratios as the 3-D shape is enlarged. Record solutions on the *Enlarging 3-D Shape Part One* worksheet. (The 2:1, doubled cube was already solved and discussed whole group, so most students will start in with the tripled 3:1.)

- Students can use the white single-unit cubes and the **white boards** to construct the different stages. (White boards are useful for sketching out the stages and as a visual support to justify their thinking.)
- The pairs should record their solutions when they agree on an answer or record questions to support the share-out and focused free-write later.
- As you circulate around the room, make decisions regarding the summary/share. Pick a pair of students to fill in and explain the 3:1 row., the 4:1 row, and so on.

The whiteboards give kids the space to sketch out their models as they reason through the quantities. It can also be used as an aid in justifying their thinking to their partner.

New Compared to Original	New Surface Area	New Volume
1:1	6 cm <sup>2</sup>	1 cm <sup>3</sup>
2:1		

You can level this share and have a more struggling pair present the 3:1 ratio data.

## Assessment

The warm-up exercise can give you an idea of the students' conceptual understanding of cubic measurement.

Take note of how students calculate the new surface area and volume of the doubled cube.

Are they using previous data to build on?

Are they able to explain the patterns that are generated?

The information from the focused free-write is crucial in determining how much the students have learned.

Students should be encouraged to bring up the 3-D cube model to help explain the surface area and volume.

Students should have to articulate the mathematical relationships they discovered to support their ability to construct viable arguments, explain them, and critique the arguments of others.

## Wrap-Up/Summary Discussion (15 minutes)

Using the document reader, the student pairs present/fill in the rows of data for the increasing ratios.

Leave the X:1 row for a group discussion.

The central question here is, "How does this ratio relate to any size cube?"

### Focused Free-Write (FFW)

- What did you learn today about volume and surface area and how they change when you increase the size of a shape?
- Describe what you found confusing or difficult today—you can write questions if you have them.
- How could the X:1 ratio relate to any size cube on your table?
- Teacher tells students how today's lesson connects to the lesson before it and what they will learn next.

This second writing opportunity is an excellent formative assessment as well as another opportunity for students to reflect on their learning—both the important math ideas and areas where they may be struggling.

# Warm-Up 4-4

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Complete today's warm-up in the space below.

Each number is worth two pts.

1. Take one white cube from the tray on your table.
2. What does volume mean? How would you describe it to someone?
3. The length, width, and height of the cube are 1 cm each. What is the volume of the cube?
4. What is surface area? How would you describe it to someone?
5. What is the surface area of the white cube?

The Academic Vocabulary embedded in this warm-up can be used to support students in deepening their conceptual understanding of the mathematics involved. Plan specific follow-up questions to get students to understand the relationships and difference between the words and how changing one word alters the math involved.

# Enlarging a 3-D Shape

## Part One

Each group selects one of the ratios given below and constructs the shape. Once the shape has been constructed, calculate the surface area and volume for your new shape. Try to fill in as much of the table as time allows. We'll discuss the X:1 ratio as a class.

New Compared to Old	New Surface Area	New Volume
1:1	6 cm <sup>2</sup>	1 cm <sup>3</sup>
2:1		
3:1		
4:1		
5:1		
6:1		
X:1		

Explain any patterns you see in the table above:

# Bibliography

- Briceneo, Sami. "Texas Webinar Series: What is the Value of Mathematical Discourse and How Do I Create It?" Carnegie Learning, Inc. 2014. <https://www.carnegielearning.com/resources-support/events-webinars/webinars/mathematical-discourse-value-create>
- Common Core State Standards (Standards for Mathematical Practice) <http://www.corestandards.org/Math/Practice/>
- Draper, Roni Jo. "School Mathematics Reform, Constructivism, and Literacy: A Case for Literacy Instruction in the Reform-Oriented Math Classroom." *Journal of Adolescent and Adult Literacy* 45 no.6 (2002): 520–529. <http://literacy473.weebly.com/uploads/9/1/6/7/9167715/schoolmathematicsreformconstructivismandliteracy.pdf>
- Fang, Zhihui, and Mary J. Schleppegrell. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. Michigan: University of Michigan Press, 2008.
- Faulkner, Valerie N. "Why the Common Core Changes Math Instruction." *Phi Delta Kappan* 95 no.2 (2013): 56–63. doi:10.1177/003172171309500213
- Gillis, Victoria. "Disciplinary Literacy." *Journal of Adolescent and Adult Literacy* 57 no.8 (2014): 614–622. doi.org/10.1002/jaal.301
- Green, Elizabeth. "Why Do Americans Stink at Math?" *New York Times Magazine*, July 23, 2014. [http://www.nytimes.com/2014/07/27/magazine/why-do-americans-stink-at-math.html?\\_r=2](http://www.nytimes.com/2014/07/27/magazine/why-do-americans-stink-at-math.html?_r=2)
- Heller, Rafael, and Greenleaf Cynthia. *Literacy Instruction in the content areas: Getting to the core of middle and high school improvement*. Washington, DC: Alliance for Excellent Education, 2007. <http://all4ed.org/wp-content/uploads/2007/06/LitCon.pdf>
- Hinchman, Kathleen, and Heather K. Sheridan-Thomas. *Best Practices in Adolescent Literacy Instruction, Second Edition (Solving Problems in the Teaching of Literacy)*. New York, NY: Guilford Press 2014.
- Ishii, Drew K. "Constructivist Views of Learning in Science and Mathematics. ERIC Digest" *ERIC Clearinghouse for Science Mathematics and Environmental Education* (2003). <http://www.ericdigests.org/2004-3/views.html>
- Kennedy, Nadia Stoyanova. "What Are You Assuming?" *Mathematics Teaching in the Middle School*. 18 no.2 (2012): 86–91.
- Kenney, Joan M., Euthecia Hancewicz, Loretta Heuer, Diana Metsisto, and Cynthia T. Tuttle. *Literacy Strategies for Improving Mathematics Instruction* 2005.
- Kenney, Rachael H., Melanie Shoffner, and David Norris. "Reflecting to learn mathematics: supporting PSMT's pedagogical content knowledge with reflection on writing prompts in mathematics education" [http://www.math.purdue.edu/~rhkenney/Kenney\\_Homepage/Links\\_to\\_Publications\\_files/ReflectivePractice\\_Kenneyetal\\_Final.pdf](http://www.math.purdue.edu/~rhkenney/Kenney_Homepage/Links_to_Publications_files/ReflectivePractice_Kenneyetal_Final.pdf)
- Lappen, Glenda, Elizabeth Difanis Phillips, James T. Frey, and Susan N. Friel. *A Guide to Connected Mathematics 3: Understanding, Implementing, and Teaching*. Pearson 2014.
- Lee, Carol D., and Spratley Anika. *Reading in the Disciplines: The Challenges of Adolescent Literacy*. New York: Carnegie Corporation of New York, 2010. [https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf)
- Manderino, Michael, and Corrine Wickens. "Addressing Disciplinary Literacy in the Common Core State Standards." *Illinois Reading Council Journal* 42 no.2 (2014): 28–39. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>
- McConachie, Stephanie M. and Anthony R. Petrosky. *Content Matters: a Disciplinary Literacy Approach to Improving Student Learning*. San Francisco, CA: Jossey-Bass, 2010.
- Michigan Department of Education "Writing Across the Curriculum" [http://www.michigan.gov/documents/mde/SSWAC\\_225020\\_7.pdf](http://www.michigan.gov/documents/mde/SSWAC_225020_7.pdf)
- Moje, Elizabeth Birr. "Foregrounding the Disciplines in Secondary Teaching and Learning: A Call for Change." *Journal of Adolescent and Adult Literacy* 52, no.2 (2008): 96–107. <http://www.clemson.edu/aophub/documents/call%20for%20change.pdf>
- National Council of Teachers of Mathematics (NCTM). *Principles to Actions: Ensuring Mathematical Success for All*. 2014.
- . "Benefits of Discussion: What Does Research Say the Benefits of Discussion in Mathematics Class Are?" *Research Brief* (2013):1–6. doi:10.1598/JAAL.52.2.1
- Ozgen, Kemel and Bindak Recep. "Determination of Self-Efficacy Beliefs of High School Students towards Math Literacy." *Educational Sciences: Theory and Practice* 11 no.2 (2011):1085–1089. <http://files.eric.ed.gov/fulltext/EJ927392.pdf>
- Perkins, David. "Teaching for Understanding." *American Educator: The Professional Journal of the American Federation of Teachers*. 17, no 3. (1993): 28–35. <http://www.exploratorium.edu/ifi-archive/resources/workshops/teachingforunderstanding.html>
- Phillips, Donna C., Bardsley Kester, Ellen Mary, Thomas Bach, and Kathleen Gibb-Brown. "But I Teach Math!" *Education* 129 no.3 (2009): 467–472. [http://www.utdanacenter.org/umln/downloads/atlanta10/kendall\\_butiteachmath\\_umln2010.pdf](http://www.utdanacenter.org/umln/downloads/atlanta10/kendall_butiteachmath_umln2010.pdf)

- Ratzel, Marsha. "The Talking Cure: Teaching Mathematical Discourse." *Education Week Teacher* (online only) 2012. [http://www.edweek.org/tm/articles/2012/12/31/tln\\_ratzel\\_talkingcure.html](http://www.edweek.org/tm/articles/2012/12/31/tln_ratzel_talkingcure.html)
- Rubenstein-Avila, Elaine, and Alisa G. Lechie. "Meaningful Discipline-Specific Language Instruction for Middle School Students for Whom English Is an Additional Language" in *Best Practices in Adolescent Literacy Instruction, Second Edition (Solving Problems in the Teaching of Literacy)*, Hinchman, Kathleen and Sheridan-Thomas Heather K., eds. New York, NY: Guilford Press, 2014.
- Shanahan, Cynthia. "Reading and Writing Across Multiple Texts" in *Best Practices in Adolescent Literacy Instruction, Second Edition (Solving Problems in the Teaching of Literacy)*, Hinchman, Kathleen and Sheridan-Thomas Heather K., eds. New York, NY: Guilford Press, 2014.
- Shanahan, Cynthia, Timothy Shanahan, and Cynthia Misischia. "Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry." *Journal of Literacy Research* 43 no.4 (2011): 393–429. <http://jlr.sagepub.com/content/43/4/393.full.pdf+html>
- Shanahan, Timothy and Shanahan Cynthia. "Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy." *Harvard Educational Review* 78 no1. (2008): 40–59. <http://schools.nyc.gov/NR/rdonlyres/E69AD5B4-7C7C-4662-9F59-F3BFA9933FA0/0/ShanahanArticle061909.pdf>
- Shanahan, Timothy, and Shanahan Cynthia. "What is Disciplinary Literacy and Why Does it Matter?" *Topics in Language Disorders* 32 no.1 (2012): 7–18. <http://snces.ncdipi.wikispaces.net/file/view/10What+Is+Disciplinary+Literacy+and+Why+Does+it+Matter.pdf>
- Sheridan-Thomas, Heather K. "Assisting Struggling Readers with Textbook Comprehension" in *Best Practices in Adolescent Literacy Instruction, Second Edition (Solving Problems in the Teaching of Literacy)*, Kathleen Hinchman and Sheridan-Thomas Heather K., eds. New York, NY: Guilford Press, 2014.
- Smith, Margaret M., Elizabeth K. Hughes, Randi A. Engle, and Mary Kay Stein. "Orchestrating Discussions" *Mathematics Teaching in the Middle School* 14 no. 9 (2009): 549–556. <https://www.math.ksu.edu/~cjbalm/Quest/OrchestratingDiscussion.pdf>
- Temple, Codruta, and Kathleen Hinchman. "Fostering Acquisition of Mathematics Language" in *Best Practices in Adolescent Literacy Instruction, Second Edition (Solving Problems in the Teaching of Literacy)*, Kathleen Hinchman and Sheridan-Thomas Heather K., eds. New York, NY: Guilford Press, 2014.
- Tools for Thought Collection. The Critical Think Consortium. <http://tc2.ca/t4tlessons.php>
- U.S. Department of Education. "Teaching Math to Young Children." Institute of Education Sciences, 2013. [http://ies.ed.gov/ncee/wwc/pdf/practice\\_guides/early\\_math\\_pg\\_111313.pdf](http://ies.ed.gov/ncee/wwc/pdf/practice_guides/early_math_pg_111313.pdf)
- Wu, Hung-His. "Phoenix Rising: Bringing the Common Core State Mathematics Standards to Life." *American Educator* 35 no.3 (2011): 3–13. <http://files.eric.ed.gov/fulltext/EJ943718.pdf>



# DISCIPLINARY LITERACY IN SCIENCE



# Disciplinary Literacy in Science

There are two strands of scientific literacy: **fundamental science literacy**, which puts the importance of language and thinking at the forefront, and **derived science literacy**, which engages students in applying what they know to their world and social issues that have science relevancy.<sup>1</sup> When teaching science, it is important to take into consideration the two strands of scientific literacy and how they can be used to help students construct meaning of scientific concepts. Similar to other disciplines, **deep scientific knowledge is often assumed by texts**; this assumption requires students to not only grapple with domain-specific words but also with words that are used in other contexts. “Carryover knowledge” is required; this means that science knowledge builds on the text that comes right before and right after it, and assumes that readers can make the transitions and follow the vocabulary.<sup>2</sup>

Good science instruction should address metacognition as the tool for making meaning of science concepts. **This includes approaching reading and writing as an interactive process that allows students to construct meaning.** Therefore, science teachers need to provide explicit, real-time instructional strategies that allow for authentic scientific inquiries and professional practices.<sup>3</sup> Incorporating scientific inquiry into classroom science encourages the shift from memorization to a focus on scientific practices and discourse.<sup>4</sup> **Inquiry-based science includes opportunities for students to develop an understanding of science through investigative hands-on activities, but needs to be balanced with reading and writing experiences as well.** Teachers, therefore, have to know when this method is appropriate and when it best serves instructional goals.

The Framework for K-12 Science Education calls out these as standard science and engineering practices:

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument, using evidence
8. Obtaining, evaluating, and communicating information

(National Research Council 2012)

Science educators have identified four different types of scientific inquiry that differ in purpose. Each form of inquiry below is appropriate for students in grades K-12:

- **Confirmation:** students confirm a principle through an activity when the results are known in advance.
- **Guided:** students investigate a teacher-presented question using a student-designed/selected procedure.
- **Structured:** students investigate a teacher-presented question through a prescribed procedure.
- **Open:** students investigate questions that are formulated through a student-designed/selected procedure.

These can be strategically scaffolded so students learn how to conduct investigations and become more independent over time, becoming scientific investigators by conducting open inquiry investigations.

(Banchi and Bell 2008)

<sup>1</sup> Doug Beuhl. *Developing Readers in the Academic Disciplines* (Newark, DE: International Reading Association 2011).

<sup>2</sup> Doug Beuhl (2011).

<sup>3</sup> Larry D. Yore. “Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities” *Journal of Deaf Studies and Deaf Education* 5, no.1 (2000): 105–122, doi: <http://dx.doi.org/10.1093/deafed/5.1.105>

<sup>4</sup> Rowena Douglas, Michael P. Klentschy, Karen Worth and Wendy Binder. *Linking Science and Literacy in the K–8 Classroom*. (NSTA Press, 2006): 163–181.

## What is expected of students in reading science?

Science texts differ from other texts because they present **greater demands on working memory management, comprehension strategies, and the use of background knowledge.**<sup>5</sup> The majority of science texts that students read requires more than their attention span can allow. Readers with effective and efficient strategies for focusing their attention are more likely to identify the connections in the text that matter, thus leading to greater comprehension.

Many science teachers are aware of how complex science texts can be. Despite their complexity, science educators are able to understand science texts because they are familiar with the material. Therefore, **science teachers may underrate the challenge of the texts because of how well they know the material.** Science texts contain various content-dense grammatical elements that require students to make sense of text structures before they can begin to comprehend the content. The excerpt below demonstrates how an author can use text structures to make a few sentences of content dense:

**The cells that line the nasal cavities have cilia, tiny hairlike extensions that can move together like whips. The whiplike motion of these cilia sweeps the mucus into the throat, where you swallow it.**<sup>6</sup>

The excerpt above contains technical vocabulary (e.g., cells, nasal cavities, cilia) that refers to specialized science content. To make the first sentence content heavy, the author uses two long noun groups and grammatically repackages words. While this type of text structuring is done to help convey the science concept, it also challenges readers to understand the language.<sup>7</sup> In addition to grammatical **repackaging**, science texts use **nominalization**. The process of nominalization allows authors to change words in order to highlight technical vocabulary. Scientific explanations use a wide array of technical words that students need to understand in order to develop their own understanding of scientific theories, concepts, and ideas. Science texts use technical vocabulary to enforce rigidity and discourage flexibility in science, because the concepts are about things and processes, not impressions or interpretations.<sup>8</sup>

### Technical words in science include:

- naming words (trachea, chromosome, mitochondria, cerebellum, atom).
- classifying words (arthropoda, omnivore).
- process words (photosynthesis, hybridization, refraction).
- describing words (deciduous, nocturnal).
- everyday words with technical meaning (factor, frequency, force, matter, charge, fault, solid, sponge).

(Fang and Schleppegrell 2008)

Note: It is important to develop students' awareness of technical vocabulary and engage them in using these words in multiple ways as they learn.

<sup>5</sup> Paul van den Broek. "Using Texts in Science Education: Cognitive Processes and Knowledge Representation" *Science* Vol. 328 no. 5977 (April 23, 2010): 453–456, <http://www.sciencemag.org/content/328/5977/453.full>

<sup>6</sup> Science Voyages in Zhihui Fang and Mary J. Schleppegrell. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. (Ann Arbor, Michigan: University of Michigan Press, 2008)

<sup>7</sup> Fang and Schleppegrell, *Reading in Secondary Content Areas*. (2008).

<sup>8</sup> Cynthia Shanahan, Timothy Shanahan, and Cynthia Mischia. "Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry" *Journal of Literacy Research* 43(4) (2011): 393–429, <http://jlr.sagepub.com/content/43/4/393.full.pdf+html>

**“Definitional and conceptual use of technical vocabulary is key to building students’ understanding of both key essential components and how those parts connect to the working of a whole concept.”<sup>9</sup>**

A science teacher reading the above excerpt could assume that the most difficult element to comprehend is the technical vocabulary (e.g., cells, nasal cavities, cilia); however, what teachers often do not realize is that background knowledge is equally important. **Adding to the complexity of the written text, science texts also use visuals, such as mathematical expressions, graphic displays, and prose. The ability to comprehend these elements is also crucial to the understanding of the text.**<sup>10</sup>

In these situations, vocabulary might be reviewed and if students still do not understand the text, teachers might resort to telling and demonstrating the science, rather than expecting students to read about it to gain greater background knowledge.<sup>11</sup> When the text is challenging, interpreting the text for students might move the pace of teaching; however, it ultimately undermines student learning and builds a dependency on the teacher.<sup>12</sup> Therefore, it is important for teachers to build in time and strategies that help students to acquire needed skills and learn independently without constant mediation from the teacher.

## How do experts read in science?

Scientists who work in labs have reported that they spend a significant amount of time reading.<sup>13</sup> Scientists take their time reading articles, often highlighting and making notes as they go. When they are unclear about a statement made, they think critically about it, look up references, and check calculations.<sup>14</sup> Scientists read explanations of theories and procedures, research studies, and communications by other scientists. **Knowledge of the cognition and processes in which science experts engage can help science educators as they are planning to support their students’ scientific literacy.**

## Try this! with ELLs

**Functional Language Analysis** is a theory of disciplinary literacy that looks at language demands of a discipline and is particularly useful when dealing with English Language Learners. ELL Pedagogy suggests that these students need to engage in instructional practices that support academic literacy development and content area learning, which includes interacting with the text, asking and answering text-based questions, and focusing on the text structures and discourse features of different types of texts.

*(Fang & Schleppegrell 2008)*

Science teachers can encourage students to routinely use the following strategies to help them understand a text:

- **Take notes** to clarify ideas
- **Challenge** or question the text
- **Stop** occasionally to evaluate whether the text is understood
- **Reread** to revise understanding
- **Predict** what will come next

*(Interactive Reading Guides in Reading Strategies)*

<sup>9</sup> Hoing (2010) in Michael Manderino and Corrine Wickens. “Addressing Disciplinary Literacy in the Common Core State Standards” *Illinois Reading Council Journal* (42)2 (Spring 2014): 28–39. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>

<sup>10</sup> Shanahan, Shanahan, and Misischia. “Analysis of Expert Readers in Three Disciplines.”

<sup>11</sup> Beuhl. *Developing Readers in the Academic Disciplines* 2011.

<sup>12</sup> Beuhl (2011).

<sup>13</sup> Guthrie (1984).

<sup>14</sup> Mallow (1991) in Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities.*

## Wineburg's study of disciplinary reading:

- **Sourcing:** consideration of text source or author perspective—use of text source as a non-interpretive selection factor
- **Contextualization:** consideration of when text was written and the influences on it—time placement of source is important in determining value of information, given the rapid changes in scientific information
- **Corroboration:** consideration of agreements or similarities and disagreements or differences across texts—text is corroborated to identify material difference that could explain outcome differences.
- **Text structure:** consideration of how information in a text is organized—use text structure to locate information and to support understanding
- **Graphic elements:** consideration of pictures, charts, tables, and other graphics—different text elements seen as overlapping information that has to be translated and compared
- **Critique:** examination of plausibility of scientific info and its congruence with other scientific information (but suspending criticality when reading unfamiliar content)
- **Rereading or close reading:** close reading is important to help students figure out nuance and differences in and between texts; rereading is focused on information identified to be important
- **Interest:** science texts must match the reader's scientific interests and actively separate the new and known information to allow greater attention to the new

(Shanahan, Shanahan, and Misischia 2011)

## How Do Students Read in Science?

The way experts read in science is the example of what successful readers of science texts do. Drive, Newton, and Osborne (2000) indicate that **having students engage in practices that align with those of real scientists not only provides them with a more accurate image of science, but also benefits their learning of science concepts and processes.**<sup>15</sup>

Successful readers of science texts realize that:

- science words are labeled for ideas; science ideas are based on experiences; and in a science text is stored description of explanations, ideas, events, and patterns.
- science is not an absolute truth, and that a science text is a form of interpretive ideas resulting from the scientific enterprise.
- science text must be evaluated for plausibility, completeness, and interconnectedness by seeing if the message rings true with what is already known, evidence, observation, and by assessing the logic and plausible reasoning of the text's patterns of argumentation.<sup>16</sup>

<sup>15</sup> Douglas et al. *Linking Science and Literacy in the K–8 Classroom*.

<sup>16</sup> Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities*.

On the other hand, a synthesis of science learning and science reading has revealed that most students:

- have limited strategies for when they don't comprehend something.
- lack the appropriate scientific knowledge to interpret the text.
- lack the ability to judge what is most important.
- lack procedural and conditional knowledge and the ability to employ methods strategically.
- lack understanding of the “bilingual” character (math and linguistic features) of a science text.<sup>17</sup>

This means that in order to become successful readers of science texts, students must:

- develop awareness of technical vocabulary.
- learn to deconstruct nominalization in science texts.
- engage in the use of scientific and technical words through discourse and writing.
- analyze words when reading aloud.
- practice the use of language when conducting hands-on and laboratory activities.<sup>18</sup>
- engage in the same Disciplinary Literacy strategies as real life scientists (see Wineburg's study of the ways of disciplinary reading).

## Reading strategies

Now that the need for reading and writing in a scientist's practice is understood, **teachers must begin to think of literacy in science as a way to help students deepen independent scientific reading in the context of the science curriculum.**<sup>19</sup> An essential step toward learning from a text is the formation of coherence.<sup>20</sup> Students who believe that science texts are absolute and have little flexibility in constructing meaning have a limited repertoire of strategies that will allow them to develop the coherence of a text.<sup>21</sup> The reading strategies listed on the following page can help students develop coherence by reading science texts in ways that are similar to how science experts read them. When used thoughtfully, these strategies can greatly promote science learning.

### Try this!

When reading aloud, stop and ask questions about words and sentences. Naming, process, describing, and technical words are worth the discussion for better understanding. Use visual representations and associate words with examples that are familiar to students.

Note: Good for Secondary Students. Teachers should be careful not to direct students to highlight the right information. Allow students to develop their own understanding of the text first.

(Moje et al. 2010)

<sup>17</sup> Larry D. Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities*. 2000.

<sup>18</sup> Fang and Schleppegrell. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. (2008).

<sup>19</sup> Elizabeth Moje, LeeAnn M Sutherland, Tanya Cleveland, and Mary Heitzman, “Integrating Literacy Instruction into Secondary School Science Inquiry: The Challenges of Disciplinary Literacy Teaching and Professional Development.” (University of Michigan, n.d.), <http://www-personal.umich.edu/~moje/pdf/MojeEtAlScienceLiteracyTeachingStrategies2010.pdf>

<sup>20</sup> Paul van den Broek. “Using Texts in Science Education: Cognitive Processes and Knowledge Representation” 2010.

<sup>21</sup> Yore (2000).

**Reading Aloud:** Oral reading of short, interesting segments can stimulate discussion, generate interest, and provide a model of good reading.<sup>22</sup>

**Concept Maps:** Concept maps are extremely powerful. They are evolved from schematic webs and they stress causality, functionality, application, and hierarchical relationships between concepts and concept clusters. They serve as cognitive thinking tasks and provide valuable informal assessment for students and teachers.<sup>23</sup>

**Preview Guide:** A preview guide allows students to activate prior knowledge and create a purpose for reading. It also allows readers to figure out whether they were correct in predicting the answers to pre-reading questions. Emphasis of this strategy is on the discussion of ideas both before and after reading as a way of setting a purpose and evaluating and synthesizing what one has read and learned. This activity can be used with all reading levels before reading begins.<sup>24</sup>

**Interactive Reading Guides:** An interactive reading guide scripts a text and walks students through it as if a tour guide were conducting them through the text. These guides provide prompts for foundational comprehension processes, which include making connections to background knowledge, generating questions, creating sensory images, inferring, determining importance, and synthesizing. Additional strategies integrated into the prompts can include rehearsing, elaborating, and organizing.

## Try this!

After reading short passages, test and/or confirm scientific concepts and ideas with short experiments. Read again to compare text with experience gained through experiment.

(Tweed 2009)

**Predictive Questions:** Readers answer a set of predetermined questions before they read; discuss and provide rationale for those responses, read the passage to search for the answers to the questions, and then examine their predictions in light of what they read.

**Way of Concept Mapping:** A group of 3-4 students can brainstorm the important concepts covered on index cards, and then together decide on the placement of the cards on chart paper in a hierarchy. Then they establish the relations or connections between concepts to form propositions. Propositions are then connected to other propositions, forming conceptual clusters. Cross-links between conceptual clusters can be established to integrate major ideas. (Yore 2000)

## Try this!

**Prediction Guide:** Pose about five true or false statements based on the facts of the text. Record student responses without discussion. Allow students to read the text and then review and check their answers. Lead a follow-up discussion to clarify and explain the correct answer.

Note: This can also serve as a pre-assessment to indicate students' prior content knowledge.

## Try this!

Use interactive reading guides to provide a scaffolded context for students to work a complex text as partners or perhaps teams of three or four.

(Buehl 2011)

<sup>22</sup> Moje, et al. "Integrating Literacy Instruction into Secondary School Science Inquiry," (2010).

<sup>23</sup> Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities*.

<sup>24</sup> Moje, et al. (2010).

## Comparing Traditional Study Guides and Interactive Reading Guides

Traditional Study Guides	Interactive Reading Guides
Literal focus on getting the facts	Stimulate thinking about information
Emphasis on content	Teach how to learn while reading
Individual centered	Collaborative problem solving
Discussion after reading	Discussion during reading
Look for answers	Consider author intent (why)
Memorize and answer questions	Synthesis: Construct knowledge <sup>25</sup>

## What Role Does Discourse Play in Science?

Scientists collect data, make sense of theories, create new ones, and explain and interpret old data through argumentation and critique. They also attempt to identify weaknesses and limitations of hypotheses, evidence, and theories through informal conversations in laboratory meetings, symposia, and formal peer review. Arguments in science can be verbal or written and are commonly reliant on supporting visualizations in the form of graphs, charts, or symbolic models.

The science classroom benefits from mirroring similar discourse processes of scientists. **Research shows that opportunities for students to engage in collaborative discourse and argumentation offer a means of enhancing student conceptual understanding, skills, and capabilities with scientific reasoning, and bring a sense of scientific community in classrooms.**<sup>26</sup>

### Discourse strategies

- Provide students with opportunities to build scientific vocabulary and engage in peer discussions that support the development of scientific explanations.
- Prepare well-designed questions that probe prior knowledge and understanding that will help to adjust instruction and/or sequence of lessons.
- Present concepts through the use of multiple representations that will make them more meaningful and accessible to all learners.
- Promote small group discussions that will allow the negotiation of meaning and connection of abstract concepts to everyday experiences.
- Provide opportunities in which students explore the nature of science; promote skepticism and openness when discussing data, methods, and results of investigations.

Scientific discourse serves as a bridge between reading and writing; learning how to talk and write in different genres in science contributes to the development of structured and coherent ideas.<sup>27</sup>

<sup>25</sup> Beuhl. *Developing Readers in the Academic Disciplines*.

<sup>26</sup> Moje, Collazo, Carillo, and Marx (2001); Newton, Drive and Osborne (1999); Kelly (2007); Rivard and Straw (2000) in Jonathan Osborne "Arguing to Learn in Science: The Role of Collaborative, Critical Discourse" *Science Magazine* Vol. 328. No. 5977 (2010): 463–466, doi: <http://www.physics.emory.edu/faculty/weeks/journal/osborne-sci10.pdf>

<sup>27</sup> Kelly (2007); Rivard and Straw (2000)

# What is Special About Writing in Science?

In their day-to-day work, scientists write lab reports, research papers, briefs, proposals, and patent applications. Writing in science requires conceptual knowledge as well as traditional literacy strategies. This is why it is important for teachers to address literacy in science as an integration of disciplinary literacy activities that deepen students' writing skills in the context of the curriculum. Science courses should have explicit writing tasks and instruction embedded into the authentic context of scientific inquiry. Writing-to-learn tasks in the science class provide authentic means by which to learn scientific vocabulary, writing mechanics, patterns of argumentation, and technical genre used in scientific writing and science professions.<sup>28</sup> Tasks and instructions should be designed to make scientific language clear, noting the purpose of the particular genre, the author's responsibilities, the relationship between arguments, evidence, and claims, and what, when, and how to use specific writing strategies.

## Ways to deepen lab reports:

- Have students develop their own scientifically oriented questions and have them attempt to answer the questions through many types of hands-on investigations.
- Have students extend their new understandings and apply them to new situations.
- Have students write about findings from another group.
- Have students add a paragraph about current research on the topic under investigation.

## Principles that should guide the development of writing-to-learn tasks in science:

- Keep science content central in the writing process.
- Help students structure and synthesize their knowledge.
- Provide a real audience for student writers that will “value, question, and provide supportive criticism.”
- Spend time prewriting, collecting information from various sources, sharpening focus, and planning strategically.
- Provide ongoing teacher support, guidance, and explicit instruction.
- Encourage revisions and redrafts based on supportive criticism to address conceptual questions and clarify misunderstandings.
- Clarify the differences between revision and editing.

<sup>28</sup> Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities*. 2000.

## Scientific Genres:

There are five main genres of writing in science (narrative, description, explanation, instruction, and argumentation). Of these, narrative writing is used the least in science. See descriptions of the others below.

- **Description** involves personal, common-sense, and technical descriptions, as well as informational and scientific reports and definitions. Descriptive writing will often be structured by a chronological series of events; scientifically established classification strategies, systems, taxonomies; or accepted reporting structures of information (who, what, when, where, and why).
- **Explanation** involves sequencing events in a cause-effect pattern. Explanations attempt to link established ideas or models with observed effects (if...then).
- **Instruction** involves ordering a sequence of procedures to specify a manual, experiment, recipe, or direction. Instructions can effectively use a series of steps in which the sequence is dictated by tested science.
- **Argumentation** involves logical ordering of reasoning to persuade someone in an essay, debate, report, or review. Arguments attempt to establish the boundaries and conditions of the issue and then to logically discredit opposing viewpoints in order to support their own, or establish alternative interpretations.

Note: Genres are flexible, and the writer has to know enough about each one to address the function or purpose of the writing.

(Yore 2000)

### Students need to have extensive prior knowledge about science concepts in order to be successful science writers.

Prior knowledge about a particular science concept would include:

1. recognition that science is inquiry while technology is design.
2. how scientists use evidence, arguments, and claims to formulate interference chains.
3. awareness of the relationships among science, technology, society, and the environment.
4. understanding of unifying concepts of science.
5. knowledge of scientific concepts.<sup>29</sup>

### Writing strategies

Most science writing uses a knowledge-telling model of writing to evaluate students' understanding.<sup>30</sup> Using the knowledge-transforming model as an operational framework helps to establish conditions for discovery in which student writers would be challenged to synthesize text and experiences in order to produce, not reproduce, knowledge. Usually, students select a topic, recall understanding, draft a product, and produce a final piece. Science writing strategies include effective use of the dual nature of science language (mathematics and English), graphic displays of data, scientific terminology, scientific metaphors, visuals, and the alignment of genre, purpose, language, and audience.<sup>31</sup>

<sup>29</sup> Larry D. Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities*. (2000).

<sup>30</sup> Rivard (1994) in Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities* 2000.

<sup>31</sup> Yore (2000).

## Try this!

**Good for high school students:** A read-write activity can be used with many students to teach the strategies of summarizing and reflecting in order to improve understanding. The assignment and reflection should each have a word limit of about 125. Students can attach the original article to their paper so the teacher can check for accuracy and understanding. While the audience is the teacher, the student has to realize the teacher hasn't read the article, so the paper must be written in a way to inform the uninformed reader, thus providing an authentic audience.

(Yore 2000)

**Reaction Paper:** Reaction papers allow students to make connections with ideas in their summaries and other articles.

**Notebooking:** Notebooks are an essential tool in which students display their understanding and thinking in science, record their questions and hypotheses, collect and analyze data, and draw conclusions about their investigations. These inform scientific explanations about the natural world, phenomena, and macro-concepts essential to explain the natural world.

**Text Impressions:** Text impressions are meant to further engage students in the text and in learning the meaning of a concept and its related vocabulary. This strategy is based on McGinley and Denner's (1998) *Story Impressions* which requires students to link the selected words together by producing their own text, think about everyday meanings of these words, and to work with words and meanings before reading.<sup>32</sup>

### Some of the entries found in science notebooks are:

- Scientific illustrations, sketches, or technical drawings along with their proper description or explanation. This can accompany observations made through controlled experiments or fieldwork investigations.
- Tables, charts, and graphs that record and organize data, results, and observations.
- Graphic organizers which help students organize their ideas to recognize and to communicate connections and relationships.
- Notes and practice problems as a record of ideas, observations, and descriptions of information from multiple sources, including notes taken from lectures, hands-on experiences, videos, research, equations, or vocabulary.

(Hargrove et al. 2003)

## Guidelines for Supporting Students' Construction of Scientific Explanations

1. Access students' prior knowledge about explanations
2. Generate criteria for explanations
3. Make the framework explicit
4. Model the construction of explanation
5. Provide students with practice opportunities
6. Practice critiquing explanations
7. Provide students with feedback
8. Provide opportunities for revision

Although the guidelines appear as a list of steps in a linear process, they do not, in fact, occur only in that order.

(Douglas et al. 2006)

<sup>32</sup> Moje, et al. "Integrating Literacy Instruction into Secondary School Science Inquiry" 2010.

**Scientific Explanations:** Constructing scientific explanations allows students to take part in an important inquiry practice and promotes greater science literacy.

**Collaborative Explanatory Essay:**

Explanatory essays encourage conceptual change, depth of processing, connecting isolated ideas, and clarification of patterns of evidence, claims, and arguments. Students work in small groups to explore topics using a variety of resources, but individually write the essay.<sup>33</sup>

**Inquiry Paper:** Bringing together reading and writing into one assignment enhances students' science reading strategies and comprehension of print material. Writing about what they have just read encourages them to organize their reactions and respond thoughtfully to the subject matter. Use of periodical literature can help make a connection between science and everyday life.

**Used successfully with middle school students:**

Students are required to keep a reading log in which they write down what they predicted they would be reading about, based on text features (e.g., title, pictures, headings). They write down key pieces of information that may or may not have agreed with their predictions. These ideas become the “raw material” for their Inquiry Papers. The summary consists of the main idea with supporting ideas of who, what, where, when, why, and how. Students then reorganize (transform) the summary or key ideas into visual representations (e.g., flow chart, concept map, chart) to show how the ideas are connected. The third section of the Inquiry Paper asks students to choose three words that were important to the concept discussed in reading. If any of the words are unfamiliar, definitions are included in the Inquiry paper. In the final section students come up with three questions that occurred to them during the reading. At least two have to be science based. The purpose of the questions is to get the reader involved with the topic and to further understand or clarify the ideas. The audience of other students responds with questions, positive comments, related readings, or activities.

*(Yore 2000)*

<sup>33</sup> Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities* (2000).

# Disciplinary Literacy in Science and the Common Core State Standards

The CCSS incorporate specific literacy skills and knowledge in the reading and writing standards for science. Below is a chart of the expectations for reading and writing in science, and how teachers can use the standards to set goals for their teaching and students' learning. While there are not discipline-specific standards for speaking and listening, the elements of spoken discourse (which can be combined with reading and writing) are essential to further develop literacy skills for learning science content.

## CCSS Science/Technical subjects 9–10 Grade band

CCSS Reading	What students need to know	What teachers need to teach
<b>Key Ideas and Details:</b>		
<p><b>CCSS.ELA-LITERACY.RST.9–10.1</b></p> <p>Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p>	<ul style="list-style-type: none"> <li>■ How to cite</li> <li>■ How to find relevant evidence</li> <li>■ How to comprehend scientific and technical texts</li> <li>■ How to analyze</li> <li>■ How to read closely for specific purposes</li> </ul>	<ul style="list-style-type: none"> <li>■ Rules of proper citation</li> <li>■ How to find evidence from text</li> <li>■ Comprehension strategies for scientific texts</li> <li>■ Textual analysis</li> <li>■ Close reading for varied, specific purposes</li> </ul>
<p><b>CCSS.ELA-LITERACY.RST.9-10.2</b></p> <p>Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p>	<ul style="list-style-type: none"> <li>■ What a central idea is, and how to determine it</li> <li>■ The significance of the conclusion of a text</li> <li>■ How to read closely (for how a text describes or explains a process, phenomenon or concept)</li> <li>■ How to summarize</li> </ul>	<ul style="list-style-type: none"> <li>■ How to determine an author's central idea</li> <li>■ How to identify and make meaning from a conclusion</li> <li>■ Close reading for varied, specific purposes</li> <li>■ The skill of summarizing</li> </ul>
<p><b>CCSS.ELA-LITERACY.RST.9-10.3</b></p> <p>Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p>	<ul style="list-style-type: none"> <li>■ How to follow procedures in an experiment or as outlined by a text.</li> </ul>	<ul style="list-style-type: none"> <li>■ How scientific procedures are written, with attention to measurements, safety regulations and the use of specific tools and equipment</li> </ul>

*continued on next page*

CCSS Reading	What students need to know	What teachers need to teach
<b>Craft and Structure:</b>		
<p><b>CCSS.ELA-LITERACY.RST.9-10.4</b></p> <p>Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to Grades 9–10 texts and topics.</p>	<ul style="list-style-type: none"> <li>■ Scientific vocabulary and symbols</li> </ul>	<ul style="list-style-type: none"> <li>■ Domain-specific vocabulary, including symbols and non-written text (e.g., tables, charts, graphs)</li> <li>■ How to determine the meaning of words using prefixes, suffixes, and roots of words in their scientific context, and its difference from their use of outside science</li> </ul>
<p><b>CCSS.ELA-LITERACY.RST.9-10.5</b></p> <p>Analyze the structure of the relationships among concepts in a text, including relationships among key terms. (e.g., force, friction, reaction force, energy).</p>	<ul style="list-style-type: none"> <li>■ How to analyze a text for key concepts and strategic use of vocabulary</li> </ul>	<ul style="list-style-type: none"> <li>■ Key content concepts</li> <li>■ Scientific vocabulary and why/how an author uses it</li> </ul>
<p><b>CCSS.ELA-LITERACY.RST.9-10.6</b></p> <p>Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.</p>	<ul style="list-style-type: none"> <li>■ How to analyze a text to determine an author’s scientific purpose</li> <li>■ How to identify the scientific questions an author is trying to answer</li> </ul>	<ul style="list-style-type: none"> <li>■ How to identify an author’s purpose</li> <li>■ How to identify the key question a science text is addressing</li> </ul>
<b>Integration of Knowledge and Ideas:</b>		
<p><b>CCSS.ELA-LITERACY.RST.9-10.7</b></p> <p>Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p>	<ul style="list-style-type: none"> <li>■ How to translate information expressed in a table, chart, or graph, etc., into text, and know how to extrapolate text into tables, charts, graphs, etc.</li> </ul>	<ul style="list-style-type: none"> <li>■ How to read and understand scientific information represented in visual text structures</li> <li>■ How to represent written text into visual text structures</li> </ul>
<p><b>CCSS.ELA-LITERACY.RST.9-10.8</b></p> <p>Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem.</p>	<ul style="list-style-type: none"> <li>■ How to analyze a text for how an author provides reasons for their argument; follow the trajectory of evidence towards that purpose</li> </ul>	<ul style="list-style-type: none"> <li>■ Textual comprehension and analysis towards an author’s purpose for writing</li> <li>■ Evaluation of text, evidence, and connection to central idea</li> </ul>

*continued on next page*

CCSS Reading	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.RST.9-10.9</b></p> <p>Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p>	<ul style="list-style-type: none"> <li>■ How to make meaning from multiple sources of information (including their own experiments), and determine similarities, differences, and extensions of arguments made within each text, or their prior knowledge</li> </ul>	<ul style="list-style-type: none"> <li>■ How to read across multiple texts for multiples purposes (e.g., compare/contrast)</li> </ul>
<b>Range of Reading and Level of Text Complexity:</b>		
<p><b>CCSS.ELA-LITERACY.RST.9-10.10</b></p> <p>By the end of Grade 10, read and comprehend science/technical texts in the Grades 9–10 text complexity band independently and proficiently.</p>	<ul style="list-style-type: none"> <li>■ How to use scaffolded literacy instruction to independently read scientific texts at grade-level</li> </ul>	<ul style="list-style-type: none"> <li>■ Progression of the complexity of reading in specific scientific genres</li> <li>■ Scaffold reading towards the point of independence               <ul style="list-style-type: none"> <li>— Graphic organizers to organize thinking</li> <li>— Interactive Reading Guides</li> </ul> </li> </ul>

CCSS Writing	What students need to know	What teachers need to teach
<b>Text Types and Purposes:</b>		
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1</b></p> <p>Write arguments focused on <i>discipline-specific content</i>.</p> <p><b>CCSS.ELA-LITERACY.WHST.9-10.1.A</b></p> <p>Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p>	<ul style="list-style-type: none"> <li>■ How to make a claim</li> <li>■ How to make a counterclaim</li> <li>■ How to organize writing to coherently address claims, counterclaims, reasons, and evidence</li> </ul>	<ul style="list-style-type: none"> <li>■ How to make a claim</li> <li>■ How to make a counterclaim</li> <li>■ How to organize scientific writing</li> <li>■ How to write so that claims and counterclaims are integrated with reasons and evidence</li> <li>■ How to identify reasons and evidence</li> <li>■ How to recognize claims in a text</li> <li>■ Evaluation of relevance and reliability of evidence</li> </ul>

continued on next page

CCSS Writing	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.B</b></p> <p>Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p>	<ul style="list-style-type: none"> <li>■ How to develop a claim and counterclaim with support from text</li> <li>■ How to use text to provide evidence for both claim and counterclaim</li> <li>■ How to understand and be able to write about strengths and weaknesses of both claims and counterclaims based on evidence</li> <li>■ How to follow the norms of scientific writing</li> <li>■ How to write for an appropriate audience</li> </ul>	<ul style="list-style-type: none"> <li>■ How to analyze texts for claims</li> <li>■ Determining and writing about counterclaims</li> <li>■ How to use <i>relevant</i> textual evidence to support both claims and counterclaims</li> <li>■ The structures of the genres of scientific writing</li> <li>■ How to adapt writing for specific audiences</li> <li>■ Talk about who these audiences might be (addressed in earlier standard)</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.C</b></p> <p>Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p>	<ul style="list-style-type: none"> <li>■ How to use writing/organizational techniques to create and sequence written text that leads the reader smoothly through claims, counterclaims, reasons and evidence</li> </ul>	<ul style="list-style-type: none"> <li>■ Writing and organizational techniques that are suitable to types of writing</li> <li>■ How to match claims and counterclaims with reasons and evidence</li> <li>■ Model connections and transitions when writing; use transition words and clauses</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.D</b></p> <p>Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<ul style="list-style-type: none"> <li>■ How to write appropriately for different scientific genres that require a particular style and tone</li> </ul>	<ul style="list-style-type: none"> <li>■ Different genres of scientific writing</li> <li>■ How to translate informal and colloquial writing into a formal tone appropriate for genre</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.E</b></p> <p>Provide a concluding statement or section that follows from or supports the argument presented.</p>	<ul style="list-style-type: none"> <li>■ How to use significant points from writing to support a unique conclusion</li> </ul>	<ul style="list-style-type: none"> <li>■ How conclusions stem from what has already been written, but are not merely summaries</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2</b></p> <p>Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p>	<ul style="list-style-type: none"> <li>■ How to write in multiple scientific genres</li> </ul>	<ul style="list-style-type: none"> <li>■ Introduce and model writing in multiple scientific genres</li> </ul>

*continued on next page*

CCSS Writing	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.A</b></p> <p>Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<ul style="list-style-type: none"> <li>How to use format and structure of scientific writing to organize thinking when writing scientific texts</li> </ul>	<ul style="list-style-type: none"> <li>Organizational structure of scientific writing, including formatting that aids reader in following what the writer is presenting</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.B</b></p> <p>Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.</p>	<ul style="list-style-type: none"> <li>How to use relevant and purposeful evidence (e.g., examples and quotations) and information in order to develop writing to address the audience’s needs</li> </ul>	<ul style="list-style-type: none"> <li>How to choose the most relevant information from text to support the author’s writing</li> <li>When and how to include quotations</li> <li>When and how to determine what rhetorical device (e.g., examples, definitions) to use to strengthen writing for a particular audience</li> <li>Different audiences for scientific writing</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.C</b></p> <p>Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p>	<ul style="list-style-type: none"> <li>How to develop a cohesive piece of writing using writing techniques that strengthen the author’s presentation of concepts and content</li> </ul>	<ul style="list-style-type: none"> <li>Norms of scientific writing (e.g., transitions and sentence structure)</li> <li>Model and scaffold students in writing cohesive texts where logic and reasoning is clear and furthers the author’s purpose</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.D</b></p> <p>Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</p>	<ul style="list-style-type: none"> <li>How to use scientific vocabulary to express ideas and support a specific genre and meet the needs of a particular audience</li> </ul>	<ul style="list-style-type: none"> <li>Scientific vocabulary specific to the topic of student writing</li> <li>How to write with scientific vocabulary to convey content, provide context in ways that make sense for the genre and the audience</li> </ul>

*continued on next page*

CCSS Writing	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.E</b></p> <p>Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<ul style="list-style-type: none"> <li>■ How to write in a formal style and objective tone</li> <li>■ How to use scientific norms in writing</li> </ul>	<ul style="list-style-type: none"> <li>■ Help students write from informal, colloquial language to scientific language that supports particular genres of scientific writing</li> <li>■ The style of science writing (e.g., role of the author, objective tone, conventions of the disciplines)</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.F</b></p> <p>Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	<ul style="list-style-type: none"> <li>■ How to write conclusions that support and reinforce the preceding information in writing without just summarizing</li> </ul>	<ul style="list-style-type: none"> <li>■ Model conclusions of scientific genres</li> <li>■ Strategies to write conclusions that do more than just summarize what the student has just written, but support the importance of implications of the content the writer has presented</li> </ul>
<b>Production and Distribution of Writing:</b>		
<p><b>CCSS.ELA-LITERACY.WHST.9-10.4</b></p> <p>Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	<ul style="list-style-type: none"> <li>■ How to develop and organize writing that meets the needs of the purpose of the text and addresses the appropriate audience</li> </ul>	<ul style="list-style-type: none"> <li>■ Who are the readers of scientific texts, and what they expect from the writing</li> <li>■ How to identify the different styles of scientific writing</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.5</b></p> <p>Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p>	<ul style="list-style-type: none"> <li>■ How to engage in the writing process from prewriting to reconceptualizing a plan for writing based on the most important content, the purpose for writing, and the needs of the audience</li> </ul>	<ul style="list-style-type: none"> <li>■ Model and engage students in the writing process, emphasizing more than just the final product</li> <li>■ How to focus on what the audience expects from a particular genre of scientific writing</li> </ul>

*continued on next page*

CCSS Writing	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.WHST.9-10.6</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>■ How to work together and in groups to take advantage of technological resources in order to best and creatively present final writing products</li> <li>■ How to communicate learning and findings online and by using technological platforms</li> </ul>	<ul style="list-style-type: none"> <li>■ How to judge the validity of a scientific website</li> <li>■ The best web applications for scientific writing and presentation</li> <li>■ How to integrate multiple technology resources to enhance writing and further purpose</li> <li>■ How to start blogs, websites, or use apps to communicate learning in innovative ways</li> </ul>
<b>Research to Build and Present Knowledge:</b>		
<p><b>CCSS.ELA-LITERACY.WHST.9-10.7</b></p> <p>Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>	<ul style="list-style-type: none"> <li>■ How to use the research process</li> <li>■ How to generate questions and plan research for questions or topics</li> <li>■ How to control the scope of the question or the topic</li> <li>■ How to work with, and synthesize from, multiple sources</li> <li>■ How to share knowledge</li> <li>■ How to determine reliability of resources</li> <li>■ How to conduct advanced searches for information</li> </ul>	<ul style="list-style-type: none"> <li>■ Research skills (including question development, using reliable internet and text resources that can help a student adjust a problem or question)</li> <li>■ How to determine research questions and subjects that help you conduct research, show challenge of broad research, and more scholarly results of sub-questions</li> <li>■ Synthesis (across multiple sources in a way that shows understanding of problem or question)</li> <li>■ How to integrate research with own analysis</li> </ul>

*continued on next page*

CCSS Writing	What students need to know	What teachers need to teach
<p><b>CCSS.ELA-LITERACY.WHST.9-10.8</b></p> <p>Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p>	<ul style="list-style-type: none"> <li>■ How to choose the best evidence from multiple sources to support writing and integrate it effectively</li> <li>■ How to write original text</li> <li>■ How to cite appropriately</li> </ul>	<ul style="list-style-type: none"> <li>■ How to determine reliability and validity of online and print sources</li> <li>■ How to search for and read sophisticated online sources in a way that allows students to use the best evidence and content that supports their purpose for writing</li> <li>■ How to use a combination of online and print resources to write across texts</li> <li>■ Plagiarism</li> <li>■ Citations</li> </ul>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.9</b></p> <p>Draw evidence from informational texts to support analysis, reflection, and research.</p>	<ul style="list-style-type: none"> <li>■ How to use research sources as support for answering question or addressing topic</li> <li>■ How to reflect using different texts and genres, evaluating criteria</li> </ul>	<ul style="list-style-type: none"> <li>■ Determining relevant evidence</li> <li>■ How to integrate research with own analysis</li> </ul>
<b>Range of Writing:</b>		
<p><b>CCSS.ELA-LITERACY.WHST.9-10.10</b></p> <p>Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<ul style="list-style-type: none"> <li>■ How to write a variety of responses to science prompts in multiple time frames, multiple purposes, and for multiple audiences</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrating diverse writing into science instruction (e.g., writing on-the-spot responses to new information, exit slips, parts of lab reports, metacognitive reflections, written products of group work; extended analyses in lab reports)</li> </ul>

# Sample Science Lesson Plan

Teacher:

Class: **Great Chemistry Section** Date:

<b>Unit:</b>	Moles/Stoichiometry		<p>The main teaching point of this series of lessons is scientific language literacy. Students are expected to know how to name chemical compounds by reading a chemical formula, write balanced chemical equations, summarize what happens when combining two reactants, and classify chemical reactions.</p>
<b>Lesson Objective/Teaching Point:</b>		<b>Sequence: Lesson 4 of 7</b>	
<ul style="list-style-type: none"> <li>■ Students classify chemical reactions by their types.</li> <li>■ Students identify the characteristics of the different types of chemical reactions.</li> <li>■ Students write balanced chemical equations for each of the reactions conducted in the laboratory activity.</li> </ul>		<ol style="list-style-type: none"> <li>1. Writing the skeleton equation</li> <li>2. Balancing Chemical Equations</li> <li>3. Types of Chemical Reactions</li> <li>4. Classifying Chemical Reactions</li> <li>5. Understanding Net Ionic Equations</li> <li>6. Predicting the Formation of a Precipitate</li> <li>7. Writing and Balancing Net Ionic Equations</li> </ol>	
<b>Standards Content</b>	<b>Common Core Learning Standards</b>		
<p><b>NYS Chemistry Physical Setting Standard 4:</b></p> <p><b>Key Idea 3:</b> Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p> <p><b>P.S. 3.2b:</b> Types of chemical reaction include synthesis, decomposition, single replacement, and double replacement.</p> <p><b>MST Standard 6–Interconnectedness:</b></p> <p><b>Common Themes</b></p> <p><b>Key Idea 2:</b> Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.</p> <p><b>Key Idea 5:</b> Identifying patterns of change is necessary for making predictions about future behavior and conditions.</p>		<p><b>RST.9-10.3:</b> Follow precisely a multistep procedure carrying out the experiment, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p> <p><b>WHST.9-12.2:</b> Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p>	<p>Some observations to make while working collaboratively: ask students to read the procedure aloud to each other, explain steps in their own words, and ask clarification questions when necessary before and during the experiment.</p> <p>Students demonstrate proficiency of this standard by writing a brief final report that summarizes/describes the characteristics of each type of chemical reaction, based on their experience conducting the lab experiment. This will accompany the lab report.</p>

## Resources/Materials

- Lab Notebook
- Lab worksheet and report
- Chemicals and equipment described in the lab worksheet

## Introduce the Lesson/Motivate Students (10 minutes)

In previous lessons, students learned how to write and balance chemical equations, demonstrating an application of the Law of Conservation of Mass. As an introduction, they also learned the main characteristics for each type of reaction. During this part of the lesson, students review writing chemical equations for combination, decomposition, single-replacement, double-replacement, and combustion reaction, allowing the teacher to assess their level of understanding.

Complete the chemical reaction and balance the equation by providing the products that will form.	Type of Chemical Reaction	How do you know?
$\text{Ca (s)} + \text{I}_2$		
$\text{FeO}$		
$\text{F}_2 \text{ (aq)} + \text{HBr}$		
$\text{Ba (s)} + \text{O}_2$		
$\text{Ba(NO}_3)_2 + \text{H}_2\text{SO}_4 \text{ (aq)}$		

This “Bell Ringer” exercise serves as an engaging activity for students to align their mindset with the class, to practice their chemical equation writing. This exercise also serves as a formative assessment, checking for understanding on the types of chemical reactions. Formatively assess at the point in the lesson in which content can be redirected in order to move forward or reinforce the concept.

Asking students to explicate how they know something using evidence from the text or a lab supports them in the practices of argumentation using scientific evidence and arguments that are specific to scientific literacy.

Students will participate in a whole class discussion of the previous exercise. Next, introduce the laboratory as an **exploration and structured inquiry activity for students**, and discuss its learning goal. Make sure students quietly read safety precautions and procedures first, answering the pre-lab question individually. A class discussion of safety in the lab for this activity follows.

## Model/Teach (5–10 minutes)

Model how to conduct the first chemical reaction (iron + acetic acid [vinegar]) by conducting a demonstration, asking students to record their observations of the chemical reaction, including changes in color, temperature, state of matter, sounds, production of a gas or other changes they notice.

### Group/Independent Work (45 minutes)

Groups of students will follow the appropriate procedures (see appendix to this lesson plan) to investigate four other chemical reactions and classify them accordingly.

1. Hydrogen peroxide (added to yeast)
2. Copper sulfate and iron
3. Copper sulfate and zinc
4. Sodium hydrogen carbonate and acetic acid (vinegar)

Students will record their observations and write a lab report that will describe the procedures followed, an analysis of their results, and a discussion regarding their conclusions and the evidence that supports their conclusion.

### Assessment

Observe the students while they conduct the experiments, focusing on their ability to follow procedures, use scientific tools to measure and pour chemicals, and their ability to follow safety rules in the lab.

Provide a rubric for students to evaluate each other's lab reports. Students should understand that they will provide each other with positive feedback and questions for clarification on procedures, the comparison of their predictions to their results, and an identification and discussion of possible areas errors made while conducting the experiment.

The lab report will serve to inform individual as well as whole-class understanding of chemical reactions, how to predict the products of a variety of chemical reactions, different types of chemical reactions, and how to write and balance chemical equations.

### Wrap-Up/Summary Discussion (15 minutes)

Once all groups finalize their experiments, have a whole-class discussion of their observations and their results. Ask students how they distinguish one chemical reaction from another and what specific characteristics may help them classify chemical reactions into different categories.

Remind students to finish their laboratory reports by writing a summary describing all the types of chemical reactions they investigated.

Teacher explains how today's lesson connects to the lesson before and the lesson after it.

This is a good moment to remind students that following the procedure precisely and accurately will obtain correct and accurate results. If steps are skipped or not properly followed the procedure will yield wrong or undesired results.

This **STRUCTURED INQUIRY ACTIVITY** will lead students to answer a question by predicting outcomes, following precisely a given procedure, writing detailed observations for each chemical reaction, and then analyzing by classifying reactions and writing its balanced chemical equation. Please see the attached activity.

When students are conducting the experiment, formatively assess how well they follow precise instructions by using a rubric or checklist that would include questions that determine readiness to conduct this lab.

To extend the literacy components of the lesson, set up a structured discussion here and have students discuss the different reactions they saw and how they relate to net ionic reactions.

# Bibliography

- Banchi, H., and R. Bell. "The Many Levels of Inquiry." *Science and Children* 46 no.2 (2008): 26–29.  
<http://www.miseagrant.umich.edu/lessons/files/2013/05/The-Many-Levels-of-Inquiry-NSTA-article.pdf>
- Buehl, Doug. *Developing Readers in the Academic Disciplines*. Newark, DE: International Reading Association, 2011.
- CCSS Science/Technical Subjects 9–10 grade band. <http://www.corestandards.org/ELA-Literacy/RST/9-10/>
- Douglas, Rowena, Michael P. Klentschy, and Karen Worth, eds. *Linking Science and Literacy in the K-8 Classroom*. NSTA Press, 2006.
- Hargrove, Tracy, and Nesbit Catherine. "Science Notebooks: Tools for Increasing Achievement Across the Curriculum." *ERIC Digest* 2003.  
<http://files.eric.ed.gov/fulltext/ED482720.pdf>
- Lee, Carol D. and Spratley Anika. *Reading in the Disciplines: The Challenges of Adolescent Literacy*. New York: Carnegie Corporation of New York, 2010.  
[https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf)
- Manderino, Michael, and Corrine Wickens. "Addressing Disciplinary Literacy in the Common Core State Standards." *Illinois Reading Council Journal* 42 no.2 (2014): 28–39. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>
- Moje, Elizabeth Birr. "Foregrounding the Disciplines in Secondary Teaching and Learning: A Call for Change." *Journal of Adolescent and Adult Literacy* 52, no.2 (2008): 96–107. doi:10.1598/JAAL.52.2.1
- Moje, Elizabeth, LeeAnn M. Sutherland, Tanya Clevelan, and Mary Heitzman. *Integrating Literacy Instruction into Secondary School Science Inquiry: The Challenges of Disciplinary Literacy Teaching and Professional Development*. University of Michigan Press 2010. <http://www-personal.umich.edu/~moje/pdf/MojeEtAlScienceLiteracyTeachingStrategies2010.pdf>
- Osborne, J. "Arguing to Learn in Science: The Role of Collaborative, Critical Discourse." *Science Magazine* 328 no. 5977 (2010): 463–466. <http://www.physics.emory.edu/faculty/weeks/journal/osborne-sci10.pdf>
- Quinn, Helen, Heidi Schweingruber, and Thomas Keller. *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press, 2012.
- Rivard (1994) in Yore. *Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities* 2000.
- Schleppegrell, Mary J., and Zhihui Fang. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. Michigan: University of Michigan Press, 2008.
- Shanahan, Timothy, and Shanahan Cynthia. "Teaching Disciplinary Literacy to Adolescent: Rethinking Content Area Literacy." *Harvard Educational Review* 78 no.1 (2008): 40–60.  
<http://schools.nyc.gov/NR/rdonlyres/E69AD5B4-7C7C-4662-9F59-F3BFA9933FA0/0/ShanahanArticle061909.pdf>
- Shanahan, Cynthia, Timothy Shanahan, and Cynthia Misischia. "Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry." *Journal of Literacy Research* 43 no.4 (2011): 393–429. <http://jlr.sagepub.com/content/43/4/393.full.pdf+html>
- Sutherland, LeeAnne M., Katherine L. McNeill, Joseph S. Krajcik, Kalonda Colson. "Supporting Middle School Students in Developing Scientific Explanations" The University of Michigan. [http://www-personal.umich.edu/~krajcik/Sutherland\\_et\\_LiteracyNSTA.pdf](http://www-personal.umich.edu/~krajcik/Sutherland_et_LiteracyNSTA.pdf)
- Tweed, Anne. *Designing Effective Science Instruction: What works in Science Classrooms*. NSTA Press. Arlington, VA. 2009.  
<http://static.nsta.org/files/PB243Xweb.pdf>
- Van den Broek, Paul. "Using Texts in Science Education: Cognitive Processes and Knowledge Representation" *Science* 328 no. 5977 (2010):453–456. <https://www.sciencemag.org/content/328/5977/453.full.pdf>
- Yore, Larry D. "Enhancing Science Literacy for All Students with Embedded Reading Instruction and Writing-to-Learn Activities." *Journal of Deaf Study and Deaf Education* 5 no.1 (2000):105–122. <http://jdsde.oxfordjournals.org/content/5/1/105.full.pdf+html>



# DISCIPLINARY LITERACY IN SOCIAL STUDIES

DISCIPLINARY LITERACY  
IN SOCIAL STUDIES

# Social Studies Education and Disciplinary Literacy

While the CCSS do not dictate social studies content, they do recognize the demands that content-rich texts place on readers. The standards for literacy in history/social studies outline the essential skills and practices students need to skillfully comprehend the complex ideas and content presented by such texts.

The Social Studies Practices outlined in the **New York State K–12 Social Studies Framework**<sup>1</sup> also reinforce the social science and historical thinking skills that students must develop throughout their K–12 education in order to be prepared for civic participation, college, and careers.

Another important national document, the **C3 Framework**, delineates four dimensions that all reference Disciplinary Literacy. *Dimension 1* involves developing questions and planning inquiries as well as making ELA/CCSS connections, *Dimension 2* is Applying Disciplinary Concepts and Tools, *Dimension 3* is Evaluating and Using Evidence, and *Dimension 4* is Communicating and Taking Informed Action. The objectives of the C3 Framework are to “a) enhance the rigor of the social studies disciplines; b) build critical thinking, problem solving, and participatory skills to become engaged citizens; and c) align academic programs with the Common Core State Standards for English Language Arts and Literacy in History/Social Studies.”<sup>2</sup>

## What are Historical Thinking Skills?

**Disciplinary Literacy (DL) in social studies consists of the reading, writing, speaking, and listening skills that allow students to learn social studies content as they engage in the practices of social scientists and historians.** Often referred to as “historical thinking skills” (HTS), both DL and HTS stress specific ways to comprehend and communicate in social studies. To teach social studies effectively (especially history), teachers must consciously integrate skills and content.

**Dimension 3: Evaluating and Using Evidence** includes the skills students need to analyze information and come to conclusions in an inquiry. These skills focus on **gathering and evaluating sources**, and then **developing claims and using evidence to support those claims**. Students use various technologies and skills to find information and to respond to thoughtful questions with well-reasoned explanations and evidence-based arguments. Through rigorous analysis of sources and application of information from those sources, students make evidence-based claims that form the basis for their conclusions. Although Dimension 3 includes a sophisticated set of skills, even the youngest children need to give reasons for their ideas. As they progress through the grades, students learn more advanced approaches related to these skills. In the subsection “Developing Claims and Using Evidence,” students generate claims and identify evidence to support those claims.

<sup>1</sup> The Social Studies practices can be found on pages 17–21 in the introduction to the NYS K–12 Social Studies framework <https://www.engageny.org/resource/new-york-state-k-12-social-studies-framework>

<sup>2</sup> C3Framework. <http://www.socialstudies.org/c3>

## Schools of thought on Historical Thinking skills

Historical Thinking Project	National Center for History in the Schools	Stanford History Education Group	College Board AP History
<p>Historical and geographical thinking concepts, known in Canada as the Big Six Historical Thinking Concepts include: <i>historical significance, primary source evidence, continuity and change, cause and consequence, historical perspectives, and ethical dimensions of historical interpretations.</i></p>	<p>The NCHS at UCLA serves as a connection point between academic historians and K–12 educators. NCHS presents five skill categories: <i>chronological thinking, historical comprehension, historical analysis and interpretation, historical research capabilities, and historical issues and decision making.</i></p>	<p>Based on cognitive science research, SHEG emphasizes the use of primary sources to support the analysis of history. Their Historical Thinking Skills chart delineates <b>Evaluation of Evidence Skills:</b> <i>sourcing, corroboration, contextualization, and close reading</i> as well as <i>scaffolds</i> to support students’ transition from reading to writing about history through questions and prompts. Additionally, SHEG has listed <b>Historical Knowledge Skills</b> which describe ways of knowing about the past, including: <i>historical information, significance, periodization, and narrative.</i></p>	<p>The College Board has organized the Historical Thinking Skills taught and assessed on the Advanced Placement U.S. History and Advanced Placement World History into four categories: <i>Chronological Reasoning, Comparison and Contextualization, Crafting Historical Arguments from Historical Evidence, and Historical Interpretation and Synthesis.</i> The College Board is refocusing its revision on the skills and the delineated sub-skills:</p> <ol style="list-style-type: none"> <li><b>1. Chronological Reasoning:</b> historical causation, patterns of continuity and change over time, periodization</li> <li><b>2. Comparison and Contextualization:</b> comparison, contextualization</li> <li><b>3. Crafting Historical Arguments from Historical Evidence:</b> historical argumentation, appropriate use of relevant historical evidence</li> <li><b>4. Historical Interpretation and Synthesis:</b> interpretation, synthesis</li> </ol>

# What is Critical Thinking in Social Studies?

Critical thinking in history stems from three practices connected to Historical Thinking: **questioning**, **selection**, and **historical imagination**. **Questioning** lies at the heart of social studies and history and ultimately leads to deeper historical inquiries and interpretations. **Selection** pertains to what and how the historian (or student) chooses to study, question, or interpret in terms of time period, subject matter, theory, etc.<sup>3</sup> **Historical imagination** is at play when the historian takes into account the humanity of the individuals and groups being studied.

Most textbooks don't necessarily require critical thinking. Their traditional narrative style hides the work of the author or historian. Textbooks tend to present history as linear and objective, and students are usually not taught to question or think about content critically. Typically, social studies classes use a single textbook, follow its sequence, and engage students in topics through skilled storytelling.<sup>4</sup> The trouble with this is that history can be interpreted in many different ways, and part of being an expert reader of history means thinking critically about these interpretations.

However, "learning to think like a historian" is not as prominent in secondary history or social studies instruction as it should be.<sup>5</sup> While teachers should engage students in the "story" of history and make their lectures engaging narratives, they should also supplement instruction with disciplinary knowledge and critical thinking. Former teacher and current professor at the University of Michigan, Cynthia Hynd, wrote about what she observed in high schools. She found students taking notes on information about events that were mentioned in lectures, but when the teacher started to explore interpretations, their pens went down. Students "...did not appear to understand that the analysis of history is what historians value."<sup>6</sup> No one was taking notes on the critical thinking the teacher was (perhaps insufficiently) modeling.

In college, it is assumed that students have sophisticated social studies reading and writing practices, as well as critical thinking skills. For example, beginner courses require students to read multiple texts in addition to the textbook. They are typically required to read several novels, original source documents, and essays, including the writings of authors who were alive during the time period being studied. For students to do this work in college, they need explicit instruction in what it means to read history across different types of texts, how to read those texts differently, compare interpretations, and make an argument for a particular view of history.

**An example:** Students were asked to explain how Benjamin Franklin exemplified the principles of the Enlightenment based upon their knowledge of the Enlightenment from textbooks, lectures, and what Franklin himself wrote. (This assignment correlates to the CCSS standard that requires synthesis across multiple texts) (Hynd)

This is why critical-thinking skills are so important. Critical thinking supports students in a variety of ways in both personal and professional endeavors. Whether analyzing daily news or voting at the polls, students are expected to make informed and critical decisions. Critical thinking is a necessary skill and is particularly important in the Disciplinary Literacy practices of social studies.

<sup>3</sup> Julie Golia and Robin M. Katz, "Choosing the Right Documents," TeachArchives.org, <http://www.teacharchives.org/articles/document-selection/>

<sup>4</sup> Cynthia R. Hynd. *Teaching Students to Think Critically Using Multiple Texts in History*. 1999.

<sup>5</sup> Hynd (1999)

<sup>6</sup> Hynd (1999)

# What Is Reading in Social Studies?

In a study Shanahan, Shanahan, and Misischia conducted on how expert historians read texts on topics they didn't know about versus how high school students read those same texts (even with prior knowledge of the historical event), there were significant differences. Historians engaged in **sourcing** (they focused on the credentials of the author of the text and took into account the genre of the writing). They engaged in **contextualization** (they thought about the time period in which the particular text was published, and tried to imagine the social, cultural, and political climate at the time that may have influenced the author). They engaged in **corroboration** (as they read each text, they compared and contrasted the viewpoints in the multiple texts—both in the study and on their own). The researchers came to the conclusion that historians were interpreting the texts as arguments or as ways for historians to represent their perspectives, not as a collection of facts to be learned; “they see themselves as detectives searching for evidence among primary sources to a mystery that can never be completely solved.”<sup>7</sup> **High school students, on the other hand, didn't do a lot of sourcing, contextualization, or corroboration—most often they seemed to be reading to learn the facts. They also focused on what was common across texts and ignored contradictory information. These differences outline the explicit supports students need in order to be apprenticed into the discipline.**<sup>8</sup>

According to Hynd, students who learn to think of what they read (and hear and see) as “acts of communication by an author, or an actor who exists in a timeframe, belongs to certain groups, has an agenda, and is operating in a system of power can evaluate the message rather than merely understand it at a perfunctory level”<sup>9</sup> are more likely to question what they read and are told, notice what is similar and different across different sources of information, look for the perspective of the source, and examine assumptions. Students who understand how information is created in the first place are more likely to look at it critically. This critical eye improves their understanding not only of history, but of the mixed messages they encounter as citizens. “Thinking critically about history is akin to thinking critically about the present.”<sup>10</sup>

## Language in social studies texts

History texts typically present and repackage information and students can learn to recognize common patterns of recycling information. A focus on language can also help students become aware of the point of view being presented, which is an important aspect of critical reading. The sentence “*However, this new wealth was not evenly distributed,*” suggests that the historian may be raising concerns about the growth in productivity and profits. The conjunction “however” signals this change in focus, and the next paragraphs of the text develop the problems that arose from the uneven distribution of wealth. Another characteristic of historical language is to use abstract language to attribute cause. For example “the rising of productivity” attributes agency to nonhuman factors (such as institutions or agencies), and students need to understand that there are real historical actors behind the abstract “institutional” agents. Considering the perspectives abstractly helps students recognize how implicit and explicit interpretation is always present in historical texts.<sup>11</sup> These skills of Disciplinary Literacy in social studies need to be explicitly taught to students in order for them to become expert readers of social studies and history texts.

<sup>7</sup> Cynthia Hynd. *Teaching Students to Think Critically Using Multiple Texts in History*. 1999.

<sup>8</sup> Cynthia Shanahan, Timothy Shanahan, and Cynthia Misischia. *Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry*. 2011.

<sup>9</sup> Hynd (1999).

<sup>10</sup> Hynd (1999).

<sup>11</sup> Shanahan and Shanahan. *Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy*. 2008. <http://schools.nyc.gov/NR/rdonlyres/E69AD5B4-7C7C-4662-9F59-F3BFA9933FA0/0/ShanahanArticle061909.pdf>.

# How Historians Read

**Sourcing: consideration of text source or author perspective**—explicit and thorough consideration of author’s perspective

QUESTIONS FROM STANFORD HISTORY EDUCATION GROUP

- Who wrote this?
- What is the author’s perspective?
- Why was it written?
- When was it written?

---

**Contextualization: consideration of when text was written and influences on it**—important interpretive device; concerns about what authors knew and how they knew it

---

**Corroboration: consideration of agreements or similarities and disagreements or differences across texts**—intertextual connections are essential for determining the author’s argument and for interpreting perspective differences

QUESTIONS FROM STANFORD HISTORY EDUCATION GROUP

- Do the documents agree? If not, why?
- What are other possible documents?
- What documents are most reliable?

---

**Text structure: consideration of how the information in the text is organized**—use text structure to determine the relationship between narrative elements and the author’s argument

---

**Graphic elements: consideration of pictures, charts, tables, and other graphics**—historians said they evaluated graphics in the same way as written text, but in think-alouds did not evidence this

---

**Critique: critical analysis** is essential and must be thorough to determine the author’s credibility—reading to critique is a central reading stance in historical reading

---

**Rereading or close reading**—close reading is important; rereading is focused on information identified as important

QUESTIONS FROM STANFORD HISTORY EDUCATION GROUP

- What claims does the author make?
- What evidence does the author use?
- What language (words, phrases, images, symbols) does the author use to persuade the document’s audience?
- How does the document’s language indicate the author’s perspective?

---

**Interest:** selection of texts that match with the reader’s historical interests using personal interpretive perspectives for examining author perspectives

---

**Later on in this chapter, we will see how these characteristics are present in students’ writing.**

In history texts, nominalization (using a word that is not a noun as a noun) and the resulting abstractions do exist, but they occur more frequently with general terms. *(Schleppegrell 1994 in Shanahan & Shanahan 2008)*

**“The enlargement of the nation’s capacity to produce weapons, the advent of the aeroplane, and the improvement in worldwide communication systems through the telegraph, improved the likelihood that the United States would enter the war.”**

An expert knows after reading this passage that the U.S. produced weapons, developed a usable airplane, and used the telegraph to communicate with other countries, but that is not the point of the sentence (plus, aeroplane may throw some students). *(Shanahan & Shanahan 2008)*

## Writing in Social Studies

Not all historical writing is argument and counterargument. Common genres of history include (a) historical recount (to retell events in sequence); b) historical account (to account for *why* things happened in a particular sequence); (c) historical explanation (to explain past events by examining cause and effect); and (d) historical argument (to advocate a particular interpretation).<sup>12</sup> Students should engage in a variety of reading and writing practices in social studies to help them hone their skills in each of these types of writing in the discipline.

To understand how high school students learn to write in history classrooms, researcher Chauncey Monte-Sano observed three teachers in three different schools and collected student work throughout the year. It was as a result of this study that she “saw that teaching writing does not mean giving up on, or compromising, the teaching of history.”<sup>13</sup> She found good history essays had the following characteristics:

- Students did something to set themselves apart as historians and writers.
- They wrote arguments using the sources, not a summary of the sources or a description of the events asked about in the question.
- They transitioned from reporting other people’s interpretation to creating their own.

This transition often requires a change in thinking about history—from viewing it as a discipline based on memorizing unrelated facts to a subject in which one *critically* thinks about sources or other people’s interpretations in order to form their own perspective. **Having an individual opinion about events or people that others have already interpreted is very challenging, but an important shift for students.**

<sup>12</sup> Coffin (1997), in Shanahan, Shanahan, & Misischia. *Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry*. (2011).

<sup>13</sup> Chauncey Monte-Sano (2012).

## Quotations have to be carefully chosen and in direct support of your argument.

Sometimes a student excerpts too much from a source. You rarely want to use a big chunk of text. It may be helpful for initial note-taking, but eventually you'll have to whittle it down (readers often jump right over quotes).

If you do choose a big quote, here are some suggestions to keep your readers engaged.

- Preface the quotation (e.g., “Because he speaks with such grace and insight, it is worth quoting Pericles at some length.”)
- Tell your reader what to look for in advance (e.g., “Note how, in the following passage, Pericles consistently emphasizes an instrumental approach to memory...”)
- Following the quote, keep your reader on track or even looking back, by analyzing what you've just quoted, or making clear it is crucial for what is coming next. (e.g., “Pericles' injunction to his countrymen would only become more urgent in the coming years, as a dreadful plague and military setbacks challenged Athenian confidence.”)
- Whatever you quote should bolster the position you are taking. Keep in mind that just because someone says something doesn't make it true. For example, a source may be speaking before the outcome of an event was known, or a source may have a limited perspective.
- Quotes are strongest when reinforced with similar assertions from other perspectives.
- These considerations are especially important to keep in mind when using primary sources. They often require context, and context often means you have to do enough background research to provide it. (Cullen 2013)

**A historical argument**—conventional argumentation requires that students have a claim, evidence to support it, and warrants that explain the way the evidence supports the claim. Monte-Sano found that essays may have had these elements, but were still lacking. She looked more closely at the essays that were both well structured *and* had a strong historical sense, and found five things they had in common that relate to Wineburg's characteristics of reading history: **factual and interpretive accuracy, persuasiveness of argument, sourcing of evidence, corroboration of evidence, and contextualization of evidence**. She found the strongest essays weren't just arguments; they were arguments that “integrated historical thinking into the use of evidence.”<sup>14</sup>

**Accuracy**—factual and interpretive statements in students' essays indicated their accuracy and were quite straightforward.

**Persuasiveness of evidence**—it can be challenging in history to get students to use evidence at all, but **what varied in the essays Monte-Sano examined was the strength of the evidence selected**. “The choices you make: *which* sources you use, *how much* of those sources you use, the *sequence* in which you use them—fall into the realm of exposition.” Specificity of evidence is also key, and another compelling rhetorical device is direct quotations from a historical source to support the argument. Counterevidence would also need to be persuasive.<sup>15</sup>

The most obvious and important form of exposition is evidence that supports your argument. Evidence can be: facts, quotations, examples of what you are talking about—showing rather than telling. Students receive this same mantra in ELA.

Examples are best and most compelling when you can offer more than one. Multiple illustrations of a point make the reader have more faith in the writer.

(Cullen 2013)

<sup>14</sup> Monte-Sano. *Reading, Thinking, and Writing About History: Teaching Argument Writing to Diverse Learners in the Common Core Classroom, Grades 6-12*. (2012).

<sup>15</sup> Cullen, Jim. *Essaying the Past: How to Read, Write, and Think about History*, second edition. West Suffex, UK: Wiley-Blackwell 2013.

**Sourcing of evidence**—historians note the source of their evidence and consider how credible it is in order to develop interpretations of the past. When a student integrates documents into a written work, he or she acknowledges who is speaking—when, to whom, and why—or at least takes those considerations into account while building and defending the argument.

**Corroboration of evidence—in making the case for an argument, the stronger essayists recognized how a combination of varied documents come together to support a claim.**

For example, one student used quotations from two documents to support a point. He corroborated his points in a specific and compelling way. Essays with lower levels of corroboration may have quoted a document, but did not cite, refer to, or paraphrase additional sources to support his point.

**Contextualization of evidence**—whether and how students placed their essays in historical context made a significant difference in the quality of the essay. Context can include many things: the occasion upon which a document is written or spoken, a document’s audience and the audience’s perception about the author, the time and place of a document’s creation, what happened before and after it was created, the author’s purpose, “the climate of opinion” when it was written, and rhetorical and linguistic norms of the time. In one strong example, a student offered background knowledge that helped the reader understand the historical perspective and causation. She noted the climate of opinion and what happened before and after the event. She noted that the U.S.S.R was communist while the U.S. was interested in preserving capitalism, which is important because the U.S. wanted to intimidate the Soviet Union by demonstrating its nuclear capabilities.<sup>16</sup>

**Counterargument** is an essential part of historical discourse that you should add to your “bag of tricks” when you write an essay.

Some essay assignments will ask you to weigh in on controversial topics, and you may find yourself taking a minority view. This means you really have to understand the “tenor” of the debate and represent all sides (there are often more than two).

Counterargument lies at the very heart of an essay. The prevailing view is presented as concisely as possible, as well as the reasons for it. The author also makes it clear that the essay is going to go in a different direction.

Counterargument is articulated not only in the introduction—though it has a “home” there. Counterargument should also weave through the body of the essay. Sometimes a writer will give a sentence, paragraph, or section that offers a different view, and signal a concession or acknowledgment with words like “it is true that...” or “while it’s certainly the case that...” Then the writer follows up with a topic sentence that begins with “still” or “nonetheless” or “yet” to signal the argument will be taking a very different direction

Just like we’re told in writing stories, “show, don’t tell.” It is never enough to tell a reader what to think; good writers must show why they think the way they do, not only by using relevant evidence, but also by acknowledging counterevidence that may contradict that point of view. That gains the writer credibility.

Sometimes the issue with evidence is not that it is clearly evidence or counterevidence, but it can be ambiguous, depending on how the author uses it.

*(Cullen 2013)*

<sup>16</sup> Monte-Sano, (2012), *Reading, Thinking, and Writing About History: Teaching Argument Writing to Diverse Learners in the Common Core Classroom, Grades 6-12* p.297.

# Social Studies in the Elementary School Classroom

While the Common Core State Standards do not have specific literacy standards for social studies (or science and technical subjects) until middle school, **there are many ways elementary school teachers can start students on the path to historical thinking and Disciplinary Literacy**. The first, most obvious example is looking at informational texts—understanding their structures and how they are different from fictional texts. But they can do more. Elementary school teachers can create learning opportunities in which students look closely at images, documents, maps, newspapers, and cartoons based on a historical question.

Teachers can also plan learning activities in which students are provided with strategically placed opportunities to engage in discussion about each other’s observations, reflections, and questions. Elementary school students can begin to use the historical questions defined by the Stanford History Education Group. The questions are grounded in historical scholarship and debate, open to multiple interpretations, drive students to look at documents for evidence, and are interpretive (open-ended) and evaluative (invite judgment). In addition, students can be exposed to procedural concepts and begin to look at accounts and sources, evidence, reliability, context, and historical significance.

Below is an example of the learning experiences a teacher might create around a historical event, such as the Boston Massacre, in elementary versus middle school.

Elementary	Middle
<ul style="list-style-type: none"><li>■ use abridged accounts</li><li>■ have students create a brief sentence or paragraph comparing and contrasting different accounts of an event</li><li>■ ask well-planned questions to support students in drawing evidence from a text, map, or historical cartoon</li></ul>	<ul style="list-style-type: none"><li>■ more accounts of greater complexity</li><li>■ practice the document-based question (DBQ) with conflicting accounts to build evidence-based interpretation and argument building</li></ul>

*(VanSledright 2014)*

# Disciplinary Literacy in Social Studies and the Common Core State Standards

This chapter has outlined what is distinct about the literacy demands of social studies in Grades 6–12. The standards incorporate these specific literacy skills and knowledge in the reading and writing standards for social studies. Below is a chart of the expectations for reading and writing in social studies, and how teachers can use the standards to set goals for their teaching and students' learning. While there are no discipline-specific standards for speaking and listening, the elements of spoken discourse (which can be combined with reading and writing) are essential to further develop literacy skills in the service of learning social studies content. Included in the Reading Standards portion of the chart are ways you might connect each standard to the Social Studies Practices as well as to the Advanced Placement Historical Thinking Skills.

## Sample: Grade 9–10 Grade Band

CCSS RH Reading 9–10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection *	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.RH.9-10.1</b></p> <p>Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.</p>	<ul style="list-style-type: none"> <li>■ How to cite evidence</li> <li>■ How to recognize primary and secondary sources</li> <li>■ How to select and analyze specific evidence</li> <li>■ How to pay attention to the details of the source</li> </ul>	<ul style="list-style-type: none"> <li>■ How to cite evidence</li> <li>■ How primary and secondary resources are different, and what different kinds of information they yield</li> <li>■ How to choose and analyze specific evidence</li> <li>■ How to attend to the details of sources</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.3.</b> Analyze evidence in terms of content, authorship, point of view, bias, purpose, format, and audience.</p>	<p><b>Interpretation</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and create diverse interpretations of the past—as revealed through primary and secondary historical sources—by analyzing evidence, reasoning, contexts, points of view, and frames of reference.</p>

*continued on next page*

\*SS Practices can be found on pages 17–21 in the Introduction to the Framework

CCSS RH Reading 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.RH.9-10.2</b> Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.</p>	<ul style="list-style-type: none"> <li>How to recognize the central idea of a primary or secondary source</li> <li>How to summarize sources in a way that traces how events/details develop</li> </ul>	<ul style="list-style-type: none"> <li>How to determine the central idea of a primary source</li> <li>How to determine the central idea of a secondary source</li> <li>How to summarize</li> <li>How to read and summarize to trace the development of key ideas or events throughout the text</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A1.</b> Identify, describe, and evaluate evidence about events from diverse sources (including written documents, works of art, photographs, charts and graphs, artifacts, oral traditions, and other primary and secondary sources).</p>	<p><b>Appropriate use of relevant historical evidence</b></p> <p>Historical thinking involves the ability to identify, describe, and evaluate evidence about the past from diverse sources (written documents, works of art, archaeological artifacts, oral traditions, and other primary sources), with respect to content, authorship, purpose, format, and audience.</p> <p>Historical thinking involves the ability to extract useful information, make supportable inferences, and draw appropriate conclusions from historical evidence.</p> <p>Historical thinking involves the ability to understand such evidence in its context, recognize its limitations, and assess the points of view that it reflects.</p>
<p><b>CCSS.ELA-LITERACY.RH.9-10.3</b> Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.</p>	<ul style="list-style-type: none"> <li>How to recognize a series of events</li> <li>How to analyze the series of events in detail</li> <li>How to understand cause and effect and chronology</li> </ul>	<ul style="list-style-type: none"> <li>How to recognize a series of events</li> <li>How series of events are analyzed</li> <li>How to read and understand cause and effect</li> <li>How to read and understand chronology</li> </ul>	<p><b>Chronological Reasoning and Causation</b></p> <p><b>B.1.</b> Articulate how events are related chronologically to one another in time and explain the ways in which earlier ideas and events may influence subsequent ideas and events.</p>	<p><b>Historical Causation</b></p> <p>Historical thinking involves the ability to identify, analyze, and evaluate multiple cause-and-effect relationships in a historical context, distinguishing between the long-term and proximate.</p>

*continued on next page*

CCSS RH Reading 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<b>Craft and Structure:</b>				
<p><b>CCSS.ELA-LITERACY.RH.9-10.4</b></p> <p>Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.</p>	<ul style="list-style-type: none"> <li>■ How to use context clues</li> <li>■ How vocabulary words are used in a text</li> </ul>	<ul style="list-style-type: none"> <li>■ How domain-specific words are defined through context clues</li> <li>■ Domain-specific vocabulary that describes political, social, or economic aspects of history/social science.</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.6.</b> Deconstruct and construct plausible and persuasive arguments using evidence.</p>	<p><b>Interpretation</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and create diverse interpretations of the past—as revealed through primary and secondary historical sources—by analyzing evidence, reasoning, contexts, points of view, and frames of reference.</p>
<p><b>CCSS.ELA-LITERACY.RH.9-10.5</b></p> <p>Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.</p>	<ul style="list-style-type: none"> <li>■ How texts are structured in different ways</li> <li>■ Why structure is important in advancing your argument</li> </ul>	<ul style="list-style-type: none"> <li>■ How texts are structured in different ways</li> <li>■ How structure affects the emphasis of key points, advances an explanation or analysis</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.2.</b> Identify, compare, and evaluate multiple perspectives on a given historical experience.</p>	<p><b>Historical Argumentation</b></p> <p>Historical thinking involves the ability to define and frame a question about the past and to address that question by constructing an argument. A plausible and persuasive argument requires a clear, comprehensive, and analytical thesis, supported by relevant historical evidence—not simply evidence that supports a preferred or preconceived position. Additionally, argumentation involves the capacity to describe, analyze, and evaluate the arguments of others in light of available evidence.</p>

*continued on next page*

CCSS RH Reading 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.RH.9-10.6</b></p> <p>Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.</p>	<ul style="list-style-type: none"> <li>■ What point of view is and how to determine it by a given author</li> <li>■ How to compare and contrast texts about the same topic for details that reveal the author's point of view</li> </ul>	<ul style="list-style-type: none"> <li>■ Point of view, and how details in texts about the same topic reveal the points of view of authors</li> </ul>	<p><b>Chronological Reasoning and Causation</b></p> <p><b>B.6.</b> Recognize that choice of specific periodization favors or advantages one narrative, region, or group over another narrative, region, or group.</p> <p><b>B.8.</b> Describe, analyze, evaluate, and construct models of historical periodization that historians use to categorize events.</p>	<p><b>Periodization</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and construct models of historical periodization that historians use to categorize events into discrete blocks and to identify turning points, recognizing that the choice of specific dates favors one narrative, region, or group over another narrative, region, or group; therefore, changing the periodization can change a historical narrative.</p> <p>Moreover, the particular circumstances and contexts in which individual historians work and write shape their interpretations and models of past events.</p>
<b>Integration of Knowledge and Ideas</b>				
<p><b>CCSS.ELA-LITERACY.RH.9-10.7</b></p> <p>Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.</p>	<ul style="list-style-type: none"> <li>■ How to use charts, graphs, etc., online or in print to help make sense of, or add to, what the text itself is saying</li> </ul>	<ul style="list-style-type: none"> <li>■ What quantitative data and analysis are</li> <li>■ How to determine the meaning/purpose of quantitative analysis and data</li> <li>■ How quantitative analysis and data add meaning to the written text, online, or in print</li> </ul>	<p><b>Geographic Reasoning</b></p> <p><b>D.4.</b> Recognize and interpret (at different scales) the relationships among patterns and processes.</p> <p><b>D.5.</b> Recognize and analyze how place and region influence the social, cultural, and economic characteristics of civilizations.</p>	<p><b>Patterns of continuity and change over time</b></p> <p>Historical thinking involves the ability to recognize, analyze, and evaluate the dynamics of historical continuity and change over periods of varying lengths, as well as relating these patterns to larger historical processes or themes.</p>

*continued on next page*

CCSS RH Reading 9--10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.RH.9-10.8</b></p> <p>Assess the extent to which the reasoning and evidence in a text support the author's claims.</p>	<ul style="list-style-type: none"> <li>■ How to recognize author's reasoning and evidence</li> <li>■ How to know what makes strong evidence</li> <li>■ How to determine author's claims</li> <li>■ How to compare reasoning and evidence to claims</li> <li>■ How to determine whether the author has used appropriate evidence and claims to support the argument</li> </ul>	<ul style="list-style-type: none"> <li>■ What author's reasoning and evidence is in a text</li> <li>■ What makes strong reasoning and evidence</li> <li>■ How reasoning and evidence are tied to claims</li> <li>■ How reasoning and evidence can support a claim</li> <li>■ When an author uses appropriate reasons and evidence to support a claim</li> </ul>	<p><b>Civic Participation</b></p> <p>Explain differing philosophies of social and political participation and the role of the individual leading to group-driven philosophies.</p>	<p><b>Synthesis</b></p> <p>Historical thinking involves the ability to arrive at meaningful and persuasive understandings of the past by applying all the other historical thinking skills, by drawing appropriately on ideas from different fields of inquiry or disciplines, and by creatively fusing disparate, relevant (and perhaps contradictory) evidence from primary sources and secondary works. Additionally, synthesis may involve applying insights about the past to other historical contexts or circumstances, including the present.</p>
<p><b>CCSS.ELA-LITERACY.RH.9-10.9</b></p> <p>Compare and contrast treatments of the same topic in several primary and secondary sources.</p>	<ul style="list-style-type: none"> <li>■ How primary and secondary sources differ</li> <li>■ How to recognize the topic in a primary or secondary source</li> <li>■ How to compare and contrast how primary and secondary sources treat the same topic</li> </ul>	<ul style="list-style-type: none"> <li>■ How primary and secondary sources differ</li> <li>■ How to recognize the topic in a primary or secondary source</li> <li>■ How to compare and contrast how primary and secondary sources treat the same topic</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.3.</b> Identify and compare similarities and differences among historical developments over time and in different geographical and cultural contexts.</p> <p><b>C.4.</b> Describe, compare, and evaluate multiple historical developments (within societies; across and between societies; in various chronological and geographical contexts).</p>	<p><b>Comparison</b></p> <p>Historical thinking involves the ability to describe, compare, and evaluate, in various chronological and geographical contexts, multiple historical developments within one society and one or more development across or between different societies.</p> <p>Historical thinking also involves the ability to identify, compare, and evaluate multiple perspectives on a given historical experience.</p>

*continued on next page*

CCSS RH Reading 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<b>Range of Reading and Level of Text Complexity:</b>				
<b>CCSS.ELA-LITERACY.RH.9-10.10</b>				
By the end of Grade 10, read and comprehend history/social studies texts in the Grades 9–10 text complexity band independently and proficiently.				

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<b>Text Types and Purposes:</b>				
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1</b> Write arguments focused on discipline-specific content.</p> <p><b>CCSS.ELA-LITERACY.WHST.9-10.1.A</b> Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.</p>	<ul style="list-style-type: none"> <li>How to make a claim</li> <li>How to make a counterclaim</li> <li>How to organize writing to coherently address the claims, counterclaims, reasons, and evidence</li> </ul>	<ul style="list-style-type: none"> <li>How to make a claim</li> <li>How to make a counterclaim</li> <li>How to organize historical writing</li> <li>How to integrate writing so that claims and counterclaims are integrated with reasons and evidence</li> <li>How to identify reasons and evidence</li> <li>How to recognize claims in a text</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.3.</b> Analyze evidence in terms of content, authorship, point of view, bias, purpose, format, and audience.</p> <p><b>A.4.</b> Describe, analyze, and evaluate arguments of others.</p> <p><b>A.5.</b> Make inferences and draw conclusions from evidence.</p>	<p><b>Historical Argumentation</b></p> <p>Historical thinking involves the ability to define and frame a question about the past and to address that question by constructing an argument. A plausible and persuasive argument requires a clear, comprehensive, and analytical thesis, supported by relevant historical evidence—not simply evidence that supports a preferred or preconceived position. Additionally, argumentation involves the capacity to describe, analyze, and evaluate the arguments of others in light of available evidence.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.B</b></p> <p>Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.</p>	<ul style="list-style-type: none"> <li>■ How to develop a claim and counterclaim with support from text.</li> <li>■ How to use text to provide evidence for both claim and counterclaim</li> <li>■ How to understand and be able to write about strengths and weaknesses of both claims and counterclaims based on evidence</li> <li>■ How to follow the norms of historical writing</li> <li>■ How to write for an appropriate audience</li> </ul>	<ul style="list-style-type: none"> <li>■ How to analyze texts for claims</li> <li>■ How to determine and write about counterclaims</li> <li>■ How to use relevant textual evidence to support both claims and counterclaims</li> <li>■ How genres of historical writing are structured</li> <li>■ How to adapt writing for historical audiences</li> </ul>	<p><b>Civic Participation</b></p> <p><b>F1.</b> Demonstrate respect for the rights of others in discussions and classroom; respectfully disagree with other viewpoints and provide evidence for a counterargument.</p> <p><b>F4.</b> Participate in persuading, debating, negotiating, and compromising in the resolution of conflicts and differences.</p>	<p><b>Synthesis</b></p> <p>Historical thinking involves the ability to arrive at meaningful and persuasive understandings of the past by applying all the other historical thinking skills, by drawing appropriately on ideas from different fields of inquiry or disciplines and by creatively fusing disparate, relevant (and perhaps contradictory) evidence from primary sources and secondary works. Additionally, synthesis may involve applying insights about the past to other historical contexts or circumstances, including the present.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.C</b></p> <p>Use words, phrases, and clauses to link the major sections of the text; create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p>	<ul style="list-style-type: none"> <li>■ How to use writing/organizational techniques to create and sequence written text that leads the reader smoothly through claims, counterclaims, reasons, and evidence</li> </ul>	<ul style="list-style-type: none"> <li>■ How to use writing and organizational techniques that are suitable to different types of writing</li> <li>■ How to match claims and counterclaims with reasons and evidence</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.1.</b> Define and frame questions about events and the world in which we live, form hypotheses as potential answers to these questions, use evidence to answer these questions, and consider and analyze counter-hypotheses.</p>	<p><b>Interpretation</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and create diverse interpretations of the past — as revealed through primary and secondary historical sources — by analyzing evidence, reasoning, contexts, points of view, and frames of reference.</p>

*continued on next page*

<p><b>CCSS WSHT Writing 9-10</b></p>	<p><b>What students need to know</b></p>	<p><b>What teachers need to teach</b></p>	<p><b>Possible NYSED Social Studies Practice Connection</b></p>	<p><b>Advanced Placement Historical Thinking Skills</b></p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.D</b> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<ul style="list-style-type: none"> <li>How to write appropriately for different historical genres that require a particular style and tone</li> </ul>	<ul style="list-style-type: none"> <li>How historical writing is composed of different genres</li> <li>How to translate informal and colloquial writing into a formal tone appropriate for genre</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.1.</b> Identify similarities and differences among geographic regions across historical time periods, and relate differences in geography to different historical events and outcomes.</p> <p><b>C.5.</b> Recognize the relationship between geography, economics, and history as a context for events and movements and as a matrix of time and place.</p>	<p><b>Comparison</b></p> <p>Historical thinking involves the ability to describe, compare, and evaluate, in various chronological and geographical contexts, multiple historical developments within one society and one or more development across or between different societies.</p> <p>Historical thinking also involves the ability to identify, compare, and evaluate multiple perspectives on a given historical experience.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.1.E</b> Provide a concluding statement or section that follows from or supports the argument presented.</p>	<ul style="list-style-type: none"> <li>How to use significant points from writing to support a unique conclusion</li> </ul>	<ul style="list-style-type: none"> <li>How conclusions stem from what has already been written, but are not merely summaries</li> </ul>	<p><b>Chronological Reasoning and Causation</b></p> <p><b>B.4.</b> Distinguish between long-term and immediate causes and multiple effects (time, continuity, and change).</p>	<p><b>Patterns of continuity and change over time</b></p> <p>Historical thinking involves the ability to recognize, analyze, and evaluate the dynamics of historical continuity and change over periods of varying lengths, as well as relating these patterns to larger historical processes or themes.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2</b></p> <p>Write informative/explanatory texts, including the narration of historical events, historical procedures/experiments, or technical processes.</p>	<ul style="list-style-type: none"> <li>How to write in multiple historical genres</li> </ul>	<ul style="list-style-type: none"> <li>How to write in multiple historical genres through modeling</li> </ul>	<p><b>Chronological Reasoning and Causation</b></p> <p><b>B.7.</b> Relate patterns of continuity and change to larger historical processes and themes.</p>	<p><b>Periodization</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and construct models of historical periodization that historians use to categorize events into discrete blocks and to identify turning points, recognizing that the choice of specific dates favors one narrative, region or group over another narrative, region or group; therefore, changing the periodization can change a historical narrative. Moreover, the particular circumstances and contexts in which individual historians work and write shape their interpretations and models of past events.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.A</b></p> <p>Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	<ul style="list-style-type: none"> <li>How to use format and structure of historical writing to organize thinking when writing social studies/historical texts</li> </ul>	<ul style="list-style-type: none"> <li>How the organization of historical writing, including formatting, aids the reader in following what the writer is presenting</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.6.</b> Connect historical developments to specific circumstances of time and place and to broader regional, national, or global processes and draw connections to the present (where appropriate).</p>	<p><b>Contextualization</b></p> <p>Historical thinking involves the ability to connect historical developments to specific circumstances in time and place, and to broader regional, national, or global processes.</p>

*continued on next page*

<p><b>CCSS WSHT Writing 9-10</b></p>	<p><b>What students need to know</b></p>	<p><b>What teachers need to teach</b></p>	<p><b>Possible NYSED Social Studies Practice Connection</b></p>	<p><b>Advanced Placement Historical Thinking Skills</b></p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.B</b> Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p>	<ul style="list-style-type: none"> <li>How to use relevant and purposeful evidence (e.g., examples and quotations) and information in order to develop writing to address the audience's needs</li> </ul>	<ul style="list-style-type: none"> <li>How to choose the most relevant information from text to support the author's writing</li> <li>When and how to include quotations</li> <li>When and how to determine what rhetorical device (e.g., examples, definitions) to use to strengthen writing for a particular audience</li> <li>Who are the different audiences for historical writing</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.2.</b> Identify, describe, and evaluate evidence about events from diverse sources (including written documents, works of art, photographs, charts and graphs, artifacts, oral traditions, and other primary and secondary sources).</p>	<p><b>Appropriate use of relevant historical evidence</b></p> <p>Historical thinking involves the ability to identify, describe, and evaluate evidence about the past from diverse sources (written documents, works of art, archaeological artifacts, oral traditions, and other primary sources), with respect to content, authorship, purpose, format, and audience.</p> <p>Historical thinking involves the ability to extract useful information, make supportable inferences, and draw appropriate conclusions from historical evidence.</p> <p>Historical thinking involves the ability to understand such evidence in its context, recognize its limitations, and assess the points of view that it reflects.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.C</b></p> <p>Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p>	<ul style="list-style-type: none"> <li>How to develop a cohesive piece of writing using writing techniques that strengthen the author's presentation of concepts and content</li> </ul>	<ul style="list-style-type: none"> <li>Norms of historical writing (e.g., transitions and sentence structure)</li> <li>How to write cohesive texts in which logic and reasoning are clear and further the author's purpose</li> </ul>	<p><b>Civic Participation</b></p> <p><b>F5.</b> Participate in persuading, debating, negotiating, and compromising in the resolution of conflicts and differences.</p>	<p><b>Synthesis</b></p> <p>Historical thinking involves the ability to arrive at meaningful and persuasive understandings of the past by applying all the other historical thinking skills, drawing appropriately on ideas from different fields of inquiry or disciplines, and creatively fusing disparate, relevant (and perhaps contradictory) evidence from primary sources and secondary works. Additionally, synthesis may involve applying insights about the past to other historical contexts or circumstances, including the present.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.D</b></p> <p>Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</p>	<ul style="list-style-type: none"> <li>How to use historical vocabulary to express ideas and support a specific genre and meet the needs of a particular audience</li> </ul>	<ul style="list-style-type: none"> <li>Historical vocabulary specific to the topic of student writing</li> <li>How to write with historical vocabulary to convey content, provide context in ways that make sense for the genre and the audience</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.2.</b> Identify, compare, and evaluate multiple perspectives on a given historical experience.</p> <p><b>C.3.</b> Identify and compare similarities and differences among historical developments over time and in different geographical and cultural contexts.</p>	<p><b>Comparison</b></p> <p>Historical thinking involves the ability to describe, compare, and evaluate, in various chronological and geographical contexts, multiple historical developments within one society and one or more development across or between different societies.</p> <p>Historical thinking also involves the ability to identify, compare, and evaluate multiple perspectives on a given historical experience.</p>

*continued on next page*

<p><b>CCSS WSHT Writing 9-10</b></p>	<p><b>What students need to know</b></p>	<p><b>What teachers need to teach</b></p>	<p><b>Possible NYSED Social Studies Practice Connection</b></p>	<p><b>Advanced Placement Historical Thinking Skills</b></p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.E</b> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	<ul style="list-style-type: none"> <li>■ How to write in a formal style and objective tone</li> <li>■ How to use historical norms in writing</li> </ul>	<ul style="list-style-type: none"> <li>■ How to advance from informal, colloquial language to historical language that supports a particular genre of historical writing</li> <li>■ Teach the style of history writing (e.g., role of the author, objective tone, conventions of the disciplines)</li> </ul>	<p><b>Economics and Economics Systems</b> <b>E.6.</b> Analyze government economic policies and the impact on the national and global economy</p>	<p>.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.2.F</b> Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	<ul style="list-style-type: none"> <li>■ How to write conclusions that do more than just summarize preceding writing; rather support and reinforce the information in the writing</li> </ul>	<ul style="list-style-type: none"> <li>■ How to use conclusions of historical genres</li> <li>■ Strategies for writing conclusions that do more than just summarize what the student has just written, but support the importance of implications of the content the writer has presented</li> </ul>	<p><b>Chronological Reasoning and Causation</b> <b>B.3.</b> Identify, analyze, and evaluate the relationship between multiple causes and effects.</p>	<p><b>Historical Causation</b> Historical thinking involves the ability to identify, analyze, and evaluate multiple cause-and-effect relationships in a historical context, distinguishing between the long-term and proximate.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.WHST.9-10.4</b></p> <p>Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	<ul style="list-style-type: none"> <li>How to develop and organize writing that meets the needs of the purpose of the text and addresses the appropriate audience</li> </ul>	<ul style="list-style-type: none"> <li>Who are the readers of historical texts, and what they expect from the writing</li> <li>What are the different styles of historical writing</li> </ul>	<p><b>Economics and Economics Systems</b></p> <p><b>E.5.</b> Use economic indicators to analyze the current and future state of the economy.</p>	<p><b>Interpretation</b></p> <p>Historical thinking involves the ability to describe, analyze, evaluate, and create diverse interpretations of the past—as revealed through primary and secondary historical sources—by analyzing evidence, reasoning, contexts, points of view, and frames of reference.</p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.5</b></p> <p>Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p>	<ul style="list-style-type: none"> <li>How to engage in the writing process from prewriting to reconceptualizing a plan for writing based on the most important content, the purpose for writing, and the needs of the audience</li> <li>How the writing process involves more than just the final product</li> </ul>	<ul style="list-style-type: none"> <li>How to focus on what the audience expects from a particular genre of historical writing</li> </ul>	<p><b>Chronological Reasoning and Causation</b></p> <p><b>B.2.</b> Identify causes and effects using examples from different time periods and courses of study across several grade levels.</p>	<p><b>Patterns of continuity and change over time</b></p> <p>Historical thinking involves the ability to recognize, analyze, and evaluate the dynamics of historical continuity and change over periods of varying lengths, as well as relating these patterns to larger historical processes or themes.</p>

*continued on next page*

<b>CCSS WSHT Writing 9-10</b>	<b>What students need to know</b>	<b>What teachers need to teach</b>	<b>Possible NYSED Social Studies Practice Connection</b>	<b>Advanced Placement Historical Thinking Skills</b>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.6</b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>How to work together and in groups to take advantage of technological resources in order to best and creatively present final writing products and extend them past the information that is presented</li> </ul>	<ul style="list-style-type: none"> <li>How to judge the validity of a historical website</li> <li>What are the best web applications for historical writing and presentation</li> <li>How to integrate multiple technology resources to enhance writing and further purpose</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.5.</b> Make inferences and draw conclusions from evidence.</p> <p><b>A.7.</b> Create meaningful and persuasive understandings of the past by fusing disparate and relevant evidence from primary and secondary sources and drawing connections to the present.</p>	<p><b>Synthesis</b></p> <p>Historical thinking involves the ability to arrive at meaningful and persuasive understandings of the past by applying all the other historical thinking skills, by drawing appropriately on ideas from different fields of inquiry or disciplines and by creatively fusing disparate, relevant (and perhaps contradictory) evidence from primary sources and secondary works. Additionally, synthesis may involve applying insights about the past to other historical contexts or circumstances, including the present.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>Research to Build and Present Knowledge</b></p> <p><b>CCSS.ELA-LITERACY.WHST.9-10.7</b></p> <p>Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, while demonstrating understanding of the subject under investigation.</p>	<ul style="list-style-type: none"> <li>■ How to use research process</li> <li>■ How to generate own questions and plan research for own or assigned questions</li> <li>■ How to control scope of question</li> <li>■ How to work with, and synthesize from, multiple sources</li> <li>■ How to share knowledge</li> <li>■ How to determine reliability of resources</li> <li>■ How to conduct advanced searches for information</li> </ul>	<ul style="list-style-type: none"> <li>■ How to develop research skills (including question development, using reliable Internet and text resources that can help a student adjust a problem or question)</li> <li>■ How to determine research questions and subjects that help you conduct research, show challenge of broad research, and more academic results of sub-questions</li> <li>■ How to synthesize (across multiple sources in a way that shows understanding of problem or question)</li> <li>■ How to integrate research with own analysis</li> </ul>	<p><b>Geographic Reasoning</b></p> <p><b>D.1.</b> Ask geographic questions about where places are located, why their location is important, and how their locations are related to the location of other places and people.</p> <p><b>D.2.</b> Identify, describe, and evaluate the relationships between people, places, regions, and environments by using geographic tools to place them in a spatial context.</p>	<p><b>Contextualization</b></p> <p>Historical thinking involves the ability to connect historical developments to specific circumstances in time and place, and to broader regional, national, or global processes.</p>

*continued on next page*

<p><b>CCSS WSHT Writing 9-10</b></p>	<p><b>What students need to know</b></p>	<p><b>What teachers need to teach</b></p>	<p><b>Possible NYSED Social Studies Practice Connection</b></p>	<p><b>Advanced Placement Historical Thinking Skills</b></p>
<p><b>CCSS.ELA-LITERACY.WHST.9-10.8</b> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p>	<ul style="list-style-type: none"> <li>■ How to choose the best evidence from multiple sources to support writing and integrate it effectively</li> <li>■ How to write original text</li> <li>■ How to cite appropriately</li> </ul>	<ul style="list-style-type: none"> <li>■ How to determine reliability and validity of online and print sources</li> <li>■ How to search for and read sophisticated online sources in a way that allows students to use the best evidence and content that supports their purpose for writing</li> <li>■ How to use a combination of online and print resources to write across texts</li> <li>■ How to avoid plagiarism</li> <li>■ How to handle citations</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b> <b>A.4.</b> Describe, analyze, and evaluate arguments of others.</p>	<p><b>Appropriate use of relevant historical evidence</b> Historical thinking involves the ability to identify, describe, and evaluate evidence about the past from diverse sources (written documents, works of art, archaeological artifacts, oral traditions, and other primary sources), with respect to content, authorship, purpose, format, and audience.  Historical thinking involves the ability to extract useful information, make supportable inferences, and draw appropriate conclusions from historical evidence.  Historical thinking involves the ability to understand such evidence in its context; recognize its limitations, and assess the points of view that it reflects.</p>

*continued on next page*

CCSS WSHT Writing 9-10	What students need to know	What teachers need to teach	Possible NYSED Social Studies Practice Connection	Advanced Placement Historical Thinking Skills
<p><b>CCSS.ELA-LITERACY.WHST.9-10.9</b></p> <p>Draw evidence from informational texts to support analysis, reflection, and research.</p>	<ul style="list-style-type: none"> <li>How to use research sources as support for answering question or addressing topic</li> <li>How to determine relevant evidence</li> </ul>	<ul style="list-style-type: none"> <li>How to integrate research with own analysis</li> </ul>	<p><b>Comparison and Contextualization</b></p> <p><b>C.3.</b> Identify, compare, and evaluate multiple perspectives on a given historical experience.</p>	<p><b>Comparison</b></p> <p>Historical thinking involves the ability to describe, compare, and evaluate, in various chronological and geographical contexts, multiple historical developments within one society and one or more development across or between different societies.</p> <p>Historical thinking also involves the ability to identify, compare, and evaluate multiple perspectives on a given historical experience.</p>
<b>Range of Writing:</b>				
<p><b>CCSS.ELA-LITERACY.WHST.9-10.10</b></p> <p>Write routinely over extended timeframes (time for reflection and revision) and shorter timeframes (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<ul style="list-style-type: none"> <li>How to write a variety of responses to historical prompts in multiple timeframes, multiple purposes, and for multiple audiences</li> </ul>	<ul style="list-style-type: none"> <li>Integrating diverse writing into social studies/historical instruction (e.g., writing on-the-spot responses to new information, exit slips, parts of metacognitive reflections, written products of group work; extended analyses in essays)</li> </ul>	<p><b>Gathering, Using, and Interpreting Evidence</b></p> <p><b>A.1.</b> Define and frame questions about events and the world in which we live, form hypotheses as potential answers to these questions, use evidence to answer these questions, and consider and analyze counter-hypotheses.</p>	<p><b>Historical Argumentation</b></p> <p>Historical thinking involves the ability to define and frame a question about the past and to address that question by constructing an argument. A plausible and persuasive argument requires a clear, comprehensive and analytical thesis, supported by relevant historical evidence—not simply evidence that supports a preferred or preconceived position. Additionally, argumentation involves the capacity to describe, analyze, and evaluate the arguments of others in light of available evidence.</p>

# Sample Social Studies Lesson Plan

Teacher:

Class:

Date:

<b>Unit:</b> An Age of Revolution and Empire (1750–1914 C.E.)	
<b>Lesson Objective/Teaching Point:</b>	<b>Sequence: Lesson 3 of 6</b>
Students will analyze primary sources looking for evidence of content, authorship, point of view, and bias and analyze how documents support a claim about the Haitian Revolution.	<p><b>Inquiry Question for the mini-unit:</b> Should the Haitian Revolution be viewed as an extension of the French Revolution or as a separate event?</p> <p><b>Focus Question:</b> How can sourcing documents better help us make claims about history?</p>
<b>Standards: Content</b>	<b>Common Core and NYSED SS Practices</b>
<p><b>10.2: ENLIGHTENMENT, REVOLUTION, AND NATIONALISM: The Enlightenment called into question traditional beliefs and inspired widespread political, economic, and social change. This intellectual movement was used to challenge political authorities in Europe and colonial rule in the Americas. These ideals inspired political and social movements.</b></p> <p>The content standards highlight content knowledge on which it is important to focus student learning.</p> <p><b>Political Revolutions 10.2c</b></p> <ul style="list-style-type: none"> <li>French Revolution (1799–1815 C.E.)</li> </ul> <p><b>Independence Movements in Latin America (1792–1830 C.E.)</b></p> <ul style="list-style-type: none"> <li>Resistance, rebellion, and revolution in the Caribbean and Latin America</li> <li>Influence of the French Revolution on these movements, Atlantic World as a conduit for the spread of the ideals of liberty</li> <li>Class and/or racial subjugation as a precursor to revolution</li> <li>Simon Bolivar, José de San Martin</li> <li>Haitian Constitution (1801, 1804, 1805)</li> </ul>	<p><b>CCLS</b></p> <p><b>RH.9-10.1</b> Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.</p> <p><b>RH.9-10.9</b> Compare and contrast treatments of the same topic in several primary and secondary sources.</p> <p><b>NYSED SS Practices</b></p> <p><b>Gathering, Using, and Interpreting Evidence</b></p> <ul style="list-style-type: none"> <li>Identify, describe, and evaluate evidence about events from diverse sources (including written documents, works of art, photographs, charts and graphs, artifacts, oral traditions, and other primary and secondary sources).</li> <li>Analyze evidence in terms of content, authorship, point of view, bias, purpose, format, and audience.</li> <li>Create meaningful and persuasive understandings of the past by fusing disparate and relevant evidence from primary and secondary sources and drawing connections to the present.</li> </ul> <p>The Common Core Standards focus on skills students need to learn, practice, and receive feedback on throughout the lesson.</p> <p>The NYSED Social Studies practices support teachers and students in highlighting skills specific to the discipline of social studies that students engage with and receive feedback on throughout the lesson.</p>

### Chronological Reasoning and Causation

- Describe, analyze, evaluate, and construct models of historical periodization that historians use to categorize events.

### Comparison and Contextualization

- Identify, compare, and evaluate multiple perspectives on a given historical experience.
- Connect historical developments to specific circumstances of time and place and to broader regional, national, or global processes and draw connections to the present (where appropriate).

### Resources/Materials

- Displayed Napoleon Bonaparte quote
- Documents:
  - Blank *Sourcing Protocol*<sup>1</sup> (2 copies per student)
  - Annotated *Sourcing Protocol* (for students who need a completed example)
  - Napoleon Bonaparte Quote
  - *Saint Domingue Constitution of 1801* excerpt
  - *The Haitian Constitution of 1805* excerpt<sup>2</sup>
  - Exit Slip
  - Rubric

### Introduce the Lesson/Motivate Students (10 minutes)

- Explain that the class is going to engage in the skill of “sourcing” documents. Clarify the importance of sourcing and the value of evaluating sources vs. reading texts as fact. Remind students of the lesson objectives from the previous lessons about the Haitian Revolution and the struggle to transition from colony to state.
- Explain that the lesson for today has four major parts: an introduction to sourcing excerpts; teacher-modeled sourcing using the *Sourcing Protocol*; using the protocol to source a document on their own; and an assessment that compares and contrasts the documents they sourced.

<sup>1</sup> Signed by Toussaint Louverture, Given at Cap Français, this 14 Messidor, year IX [July 3, 1801] of the French Republic, one and indivisible. Original translation by Charmant Theodore. June 2000.  
[http://thelouvertureproject.org/index.php?title=Haitian\\_Constitution\\_of\\_1801\\_\(English\)](http://thelouvertureproject.org/index.php?title=Haitian_Constitution_of_1801_(English))

<sup>2</sup> 1805 Constitution of Haiti, May 20, 1805. Promulgated by Emperor Jacques I (Dessalines). Printed in the New York Evening Post. July 1805. Accessed and modified context from Haiti Page, maintained by Bob Corbett.  
<http://www2.webster.edu/~corbetre/haiti/history/earlyhaiti/1805-const.htm>

- Distribute blank copies of the *Sourcing Protocol*. (Share the completed Annotated Sourcing Protocol at the end of this lesson with students who need to see a completed sample.)
- Display and/or distribute copies of a quote by Napoleon (below) regarding the intentions of the Haitian Revolution. Ask students to consider the question: How useful a resource is Napoleon's quote for historians seeking to understand the intentions of the Haitian Revolution?<sup>3</sup>

**And so I will speak of liberty in the free portion of Saint-Domingue [i.e., the French part]; I will confirm slavery...in the enslaved portion of Saint-Domingue [i.e., the Spanish portion], and I will reserve the right to soften and limit slavery, where I maintain it, and to re-establish order and introduce discipline, where I maintain liberty...They [the people of Saint-Domingue] make less sugar when they were slaves, but they provide us, and serve us as we need them, as soldiers. If we have one less sugar mill, we will have one more citadel occupied by friendly soldiers.<sup>4</sup>**

- Explain to students that their responses can be framed as statements or questions.
- **Sourcing Considerations:**
  - Where did the quote come from? Does the fact that it was translated and excerpted from a secondary source influence its validity and utility to represent people's intentions during revolution?
  - Does the quote provide sufficient evidence to demonstrate the intentions of anyone other than Napoleon. At what point in the Haitian Revolution was this quote said?
  - What other information can you pull from sourcing this document to help assess a document's usefulness?
- **Content Considerations:**
  - Whose intentions are reflected in the quote? Does Napoleon Bonaparte's point of view represent the intentions of the French people? Does his quote reflect the intentions of the post-Revolution government as a whole?
  - Did Napoleon's position or intentions change?
  - Does Napoleon's quote reflect the position of the French vis-à-vis Saint Domingue/Haiti for the entire Haitian Revolution?
- Record student responses and encourage students to consider the different ways they assessed the usefulness of the source.
- Once complete, transition to an explanation of sourcing and its utility to historians.

Recognizing the reader's prior knowledge and abilities is an important if frequently overlooked aspect of text complexity. If students do not know who Napoleon Bonaparte is, responding to the text and the prompt becomes much more difficult. Some contextual understanding is required to successfully source most documents.

This question supports students in beginning to understand how sourcing documents shapes understandings of history. The question is specific enough to create space for students to source without explicitly having to tell them to do so or how to do so.

Keep in mind that this quote does not reflect Napoleon's position vis-à-vis Haiti or the Haitian people for the entirety of the revolution. The archival record belies Napoleon's practical position and intention in this quote in relation to the French Revolution.

Sourcing questions help students learn to critique a text and practice the Social Studies practice of gathering evidence and questioning texts.

Content questions support students in connecting Social Studies content to the act of sourcing which supports students in learning the social studies content in the current unit and learning the skills of sourcing to apply later to other units.

<sup>3</sup> Stanford History Education Group's assessment materials are available at the following site: <http://beyondthebubble.stanford.edu/> (login required)

<sup>4</sup> Napoleon Bonaparte (1800), recorded in Laurent Dubois, *Avengers of the New World* (Cambridge: Harvard, 2004).

## Model/Teach (10-15 minutes)

- Teacher models how to use the *Sourcing Protocol* with the Saint Domingue Constitution of 1801 excerpt.
- Focus attention on the *Sourcing Protocol* and explain that it is a step-by-step process through which they break down primary source documents. Walk students through the protocol, stopping at each step to explain the purpose of it and how it will provide them with valuable information for assessing the validity and utility of the source. Instruct students to annotate the document and put the steps in their own words. To help internalize their understanding of the process, encourage pupils to ask questions about why the step is useful and how to do it.

**NOTE TO TEACHER:** The *Sourcing Protocol's* expectation that students read or consider the context of a document reinforces that **Disciplinary Literacy skills do not work in a vacuum. Historical Thinking Skills should be taught and practiced through an integrated approach.**

- **(Step 1) Context:** Read the context and make connections to prior knowledge. The context provides background to the document that is essential to understanding it. It can give clues that are helpful when completing subsequent steps.
  - **(Step 2) Source Information:** Read the source information. Make inferences about the nature of the document before reading it and pay attention to features such as date and origin.
  - **(Step 3) Perspective:** Make inferences to identify the point of view from which the document was written. This should include date and origin details, particularly from the source information provided.
  - **(Step 4) Read the Document:** While reading, continue to make inferences and connections to prior knowledge.
  - **(Step 5) Purpose:** Make an educated guess as to what the author of the document hoped to convince people of. This should be based on your analytical reading of the source information, as well as its date, origin, and perspective.
  - **(Step 6) Bias:** Identify any viewpoint expressed in the document that favors or opposes a particular concept, group, or interpretation of the historical event.
- Solicit feedback from students about the process and engage clarifying questions.
  - With understanding of the process solidified, have students turn to the first document in the document packet, the *Saint Domingue Constitution of 1801* excerpt (the *Sourcing Protocol* Version).
  - Display the *Saint Domingue Constitution of 1801* excerpt (the *Sourcing Protocol* Version) on the interactive white board.
  - Model use of the *Sourcing Protocol* by completing the worksheet together with the class. Students may have questions about the protocol during this process.

The *Sourcing Protocol* can be offered to support the sourcing of a document. Over time, however, this should be removed as most scaffolds are, in order not to become a crutch.

Although students should be expected to rely on information from the document's **Context Statement**, it is essential that the teacher draws on students' prior knowledge and/or provides further context for the drafting of the constitution. Some information for students to consider: Louverture's status as a former enslaved person and his manumission prior to the revolution; his decision to include hereditary rule; the fact that the constitution was short-lived; and that Louverture was captured shortly after the constitution was written. These facts, which can also be gleaned from the document, are essential for comparing this version with the second document (*Saint Domingue Constitution of 1801* excerpt).

### Group/Independent Work (10-15 minutes)

- Distribute to the students the second document, *The 1805 Constitution of Haiti* and a new blank *Sourcing Protocol*.
- Explain to students that they will complete the *Sourcing Protocol* for the document independently. Remind them of the subjective nature of sourcing and that there is often no “right answer.” However, stress the importance of drawing on evidence to explain the perspective, purpose, and bias of a document.
- Explain that they will have the opportunity to work with others once they complete the process and that together, collegially, they will arrive at a stronger and deeper understanding.
- As students complete *The Sourcing Protocol*, circulate and provide assistance when necessary.
- After students have read and sourced the 1805 Constitution, have students turn-and-talk to answer the following questions:
  - How might this document be useful for understanding the intentions of the revolutionaries in Haiti?
  - What about this document might make it not very useful as a source for understanding their intentions?
- Ask students to share some of their responses with the whole group.

The Common Core advocates that teachers do not modify or translate language in a primary source. However, providing scaffolding through the inclusion of a background or context narrative gives access to students who might lack prior knowledge necessary to appropriately contextualize and source a document.

### Wrap-Up (10-15 minutes)

- To draw the lesson’s skill development to a close discuss the following questions:
  - How can sourcing documents better help us make claims about history?
  - What did you learn about sourcing?
  - What did you struggle with? What questions remain unanswered?
- As a means of wrapping up the activity and building to the mini-unit’s summative assessment, students will complete the Exit Slip: Sourcing, which will ask them to consider the two constitutions and the quote by Napoleon to decide which one is most useful for answering the inquiry question:
  - Should the Haitian Revolution be viewed as an extension of the French Revolution or as a separate event?
- Students should have 10–15 minutes to complete the Exit Slip. If students are having difficulty structuring their written response, a graphic organizer or sentence starters may be provided.

Note that the question is asked in an open-ended manner so students are given the opportunity to argue multiple points using the Primary and Secondary source evidence they will encounter and analyze throughout the mini-unit.

## Assessment

- The Exit Slip: Sourcing can be used to assess student's emerging mastery of sourcing primary source documents. The Exit Slip: Sourcing prompts students to write a short paragraph presenting their selection of the three documents that they believe best supports their current position on the inquiry question. The assessment prompts students to apply evidence gained through sourcing the three documents to support their selection.
- Following collection of The Exit Slip: Sourcing, use a rubric to interpret student written responses. This assessment is intended as a diagnostic tool to identify evidence that students are developing sourcing skills and other historical/social studies thinking practices. Provide students with one piece of feedback about their response to guide their future sourcing activities.

# Sourcing Protocol

**Directions:** Read, text code, annotate, and source (identify perspective, purpose, and bias based on inferences made from the source information) the documents. Then source the documents in the sourcing boxes provided below. Here is a step-by-step guide for how to source documents. It is expected that the essay will include discussion and analysis based on this sourcing.

Sourcing can be done in many ways, but the steps provided below are a good way to begin:

**Step 1:** Text code the source information, particularly focusing on date and origin.

**Step 2:** Text code the source context and make inferences about its meaning.

**Step 3:** Based on the source information, determine the perspective(s) of the document.

**Step 4:** Read the document, paying specific attention to claims/counterclaims that hint at motive and bias.

**Steps 5 & 6:** Based on inferences made during the previous three steps, identify purpose, motive, and bias.

After students are familiar with the *Sourcing Protocol*, one way to gradually remove scaffolds is to remove the first page that delineates each step of the process, while leaving the second page that labels each step. This way students know the steps for reading and sourcing a primary source but must recall what information is to be gleaned from the steps.

## Document #

Context provided to give background to document **STEP 1**

Document text **STEP 4**

**SOURCE:** Source Information **STEP 2**

Source the document by providing an educated guess about each of the following features:

<b>Perspective:</b> <b>STEP 3</b> (Be sure to include analysis of date and origin.)	<b>Purpose:</b> <b>STEP 5</b> (Be sure to include an analysis of the source information and the document itself.)	<b>Bias:</b> <b>STEP 6</b> (Does the document express a point of view that favors or opposes anything? If so, how so and how do we know?)
Identify the point of view from which the document was written. This should include date and origin details, particularly from the source information provided.	Make an educated guess as to what the creator of the document was trying to accomplish with the document. This should be based on your analysis of the source information, date, origin, and perspective.	Identify any viewpoint expressed in the document that favors or opposes a particular concept, group, or interpretation of the historical event.

## Document 1: Saint Domingue Constitution of 1801 excerpt (Sourcing Protocol version)

**Context:** The constitution was put into effect on July 8, 1801. The Governor-General of Saint Domingue, Toussaint Louverture, sent the document along with a letter to Napoleon Bonaparte, Emperor of France. Louverture called for the 1801 Saint Domingue constitution to be written by his appointed assembly, partly in response to France's new constitution, which identified a need for differing laws between France and its colonies.

STEP 1

### Saint Domingue Constitution of 1801 (excerpt)

#### On Inhabitants

Art. 3 — There can be no slaves on this territory; servitude has been forever abolished. All men are born, live and die there free and French.

#### On Religion

Art. 6 — The Catholic religion, Apostolic and Roman, is the only one publicly professed.

#### On Men in Society

Art. 12 — The Constitution guarantees individual freedom and safety. No one can be arrested except by virtue of a formally expressed order, issued by a functionary who the law gives the right to arrest and detain in a publicly designated place.

Art. 13 — Property is sacred and inviolable. Every person, either by himself or his representatives, has the free disposal and administration of that which is recognized as belonging to him. Whoever infringes upon this right renders himself criminal towards society and responsible as concerns the person troubled in his property.

#### On Legislation

Art. 19 — The regime of the colony is determined by the laws proposed by the governor and rendered by an assembly of inhabitants who gather at fixed periods in the center of the colony under the title of Central Assembly of Saint-Domingue.

#### On the Government

Art. 28 — The Constitution names as governor Citizen Toussaint Louverture, General-in-Chief of the army of Saint-Domingue and, in consideration of the important services that the general has rendered to the colony in the most critical circumstances of the revolution, and per the wishes of the grateful inhabitants, the reins are confided to him for the rest of his glorious life.

Art. 39 — He shall supervise and censor by the authority of his commissaries, all writings designed for printing on the island; he shall cause to be suppressed all those coming from abroad that would tend to corrupt mores or trouble the new colony; he shall punish the authors or colporteurs, according to the severity of the situations.

Art. 40 — If the Governor is informed of some plot against the tranquility of the colony, he shall immediately proceed to the arrest of the presumed authors, instigators or accomplices; after having them undergo extra-judiciary questioning, he shall cite them in front of a competent tribunal.

STEP 4

**SOURCE:** Signed by Toussaint Louverture, Given at Cap Français, this 14 Messidor, year IX [July 3, 1801] of the French Republic, one and indivisible, Original translation by Charmant Theodore, June 2000.  
[http://thelouvertureproject.org/index.php?title=Haitian\\_Constitution\\_of\\_1801\\_\(English\)](http://thelouvertureproject.org/index.php?title=Haitian_Constitution_of_1801_(English))

STEP 2

Source the document by providing an educated guess about each of the following features:

Perspective:	Purpose:	Bias:
<p data-bbox="365 247 505 306">STEP 3</p>	<p data-bbox="755 247 894 306">STEP 5</p>	<p data-bbox="1144 247 1284 306">STEP 6</p>

The very first time that students fill out this organizer can allow a teacher the opportunity to check for student understanding of the categories, as well as student ability to note evidence for each column. When first using the protocol, it is advised that teachers present a less complex text to make it easier to check for understanding of the three categories.

## Document 1: Saint Domingue Constitution of 1801 excerpt

**Context:** The constitution was put into effect on July 8, 1801. The Governor-General of Saint Domingue, Toussaint Louverture, sent the document along with a letter to Napoleon Bonaparte, Emperor of France. Louverture called for the 1801 Saint Domingue constitution to be written by his appointed assembly, partly in response to France's new constitution which identified a need for differing laws between France and its colonies.

### Saint Domingue Constitution of 1801 (excerpted)

#### On Inhabitants

Art. 3 — There can be no slaves on this territory; servitude has been forever abolished. All men are born, live and die there free and French.

#### On Religion

Art. 6 — The Catholic religion, Apostolic and Roman, is the only one publicly professed.

#### On Men in Society

Art. 12 — The Constitution guarantees individual freedom and safety. No one can be arrested except by virtue of a formally expressed order, issued by a functionary who the law gives the right to arrest and detain in a publicly designated place.

Art. 13 — Property is sacred and inviolable. Every person, either by himself or his representatives, has the free disposal and administration of that which is recognized as belonging to him. Whoever infringes upon this right renders himself criminal towards society and responsible as concerns the person troubled in his property.

#### On Legislation

Art. 19 — The regime of the colony is determined by the laws proposed by the governor and rendered by an assembly of inhabitants who gather at fixed periods in the center of the colony under the title of Central Assembly of Saint-Domingue.

#### On the Government

Art. 28 — The Constitution names as governor Citizen Toussaint Louverture, General-in-Chief of the army of Saint-Domingue and, in consideration of the important services that the general has rendered to the colony in the most critical circumstances of the revolution, and per the wishes of the grateful inhabitants, the reins are confided to him for the rest of his glorious life.

Art. 39 — He shall supervise and censor by the authority of his commissaries, all writings designed for printing on the island; he shall cause to be suppressed all those coming from abroad that would tend to corrupt mores or trouble the new colony; he shall punish the authors or colporteurs, according to the severity of the situations.

Art. 40 — If the Governor is informed of some plot against the tranquility of the colony, he shall immediately proceed to the arrest of the presumed authors, instigators or accomplices; after having them undergo extra-judiciary questioning, he shall cite them in front of a competent tribunal.

**SOURCE:** Signed by Toussaint Louverture, Given at Cap Français, this 14 Messidor, year IX [July 3, 1801] of the French Republic, one and indivisible, Original translation by Charmant Theodore, June 2000.  
[http://thelouvertureproject.org/index.php?title=Haitian\\_Constitution\\_of\\_1801\\_\(English\)](http://thelouvertureproject.org/index.php?title=Haitian_Constitution_of_1801_(English))

Source the document by providing an educated guess about each of the following features:

Perspective:	Purpose:	Bias:

## Document 2: Constitution of Hayti 1805 (Excerpt)

**Context:** The constitution of 1805 officially named the nation Haiti and named Jean-Jacques Dessalines emperor. Tensions were growing among leaders of the revolution, however. The document below was translated into English, printed in the *New York Evening Post*, July 15, 1805, and signed by Henri Christophe. The Constitution, Haiti's second, was presented on May 20, 1805.

### CONSTITUTION OF HAYTI 1805 (excerpt)

We, H. Christophe, Clerveaux, Vernet, Gabart, Petion, Geffard, Toussaint, Brave, Raphael, Roamin, Lalondridie, Capaix, Magny, Daut, Conge, Magloire, Ambrose, Yayou, Jean Louis Franchois, Gerin, Mereau, Fervu, Bavelais, Martial Besse...

As well in our name as in that of the people of Hayti, who have legally constituted us faithfully organs and interpreters of their will, in presence of the Supreme Being, before whom all mankind are equal, and who has scattered so many species of creatures on the surface of the earth for the purpose of manifesting his glory and his power by the diversity of his works, in the presence of all nature by whom we have been so unjustly and for so long a time considered as outcast children.

Do declare that the tenor of the present constitution is the free spontaneous and invariable expression of our hearts, and the general will of our constituents, and we submit it to the sanction of H.M. the Emperor Jacques Dessalines our deliverer, to receive its speedy and entire execution.

#### Preliminary Declaration

Art. 1. The people inhabiting the island formerly called St. Domingo, hereby agree to form themselves into a free state sovereign and independent of any other power in the universe, under the name of empire of Hayti.

Art. 2. Slavery is forever abolished.

Art. 3. The Citizens of Hayti are brothers at home; equality in the eyes of the law is incontestably acknowledged, and there cannot exist any titles, advantages, or privileges, other than those necessarily resulting from the consideration and reward of services rendered to liberty and independence.

Art. 4. The law is the same to all, whether it punishes, or whether it protects.

Art. 12. No whiteman of whatever nation he may be, shall put his foot on this territory with the title of master or proprietor, neither shall he in future acquire any property therein.

Art. 14. All acception (sic) of colour among the children of one and the same family, of whom the chief magistrate is the father, being necessarily to cease, the Haytians shall hence forward be known only by the generic appellation of Blacks.

#### Of the Government

Art. 19. The Government of Hayti is entrusted to a first Magistrate, who assumes the title of Emperor and commander in chief of the army.

Art. 20. The people acknowledge for Emperor and Commander in Chief of the Army, Jacques Dessalines, the avenger and deliverer of his fellow citizens. The title of Majesty is conferred upon him, as well as upon his august spouse, the Empress.

#### Of Worship

Art. 50. The law admits of no predominant religion.

Art. 51. The freedom of worship is tolerated.

**CONSTITUTION OF HAYTI (excerpt) cont.**

We, the undersigned, place under the safeguard of the magistrates, fathers and mothers of families, the citizens, and the army the explicit and solemn covenant of the sacred rights of man and the duties of the citizen.

We recommend it to our successors, and present it to the friends of liberty, to philanthropists of all countries, as a signal pledge of the Divine Bounty, who in the course of his immortal decrees, has given us an opportunity of breaking our fetters, and of constituting ourselves a people, free civilized and independent.

Signed

H. Christophe, & (as before)

Having seen the present constitution:

We, Jacques Dessalines, Emperor I of Hayti, and Commander in Chief of the Army, by the grace of God, and the constitutional law of the state, Accept it wholly and sanction it, that it may receive, with the least possible delay, its full and entire execution throughout the whole of our Empire. And we swear to maintain it and to cause it to be observed in its integrity to the last breath of our life.

At the Imperial Palace of Dessalines, the 20th May 1805 second year of the Independence of Hayti, and of our reign the first.

**DESSALINES**

By the Emperor, Juste Chanlatte, Sec. Gen

**SOURCE:** The 1805 Constitution Of Haiti, May20, 1805. Promulgated by Emperor Jacques I (Dessalines), Printed in the New York Evening Post, July 15, 1805. Accessed and modified context from Haiti Page, maintained by Bob Corbett. <http://www2.webster.edu/~corbetre/haiti/history/earlyhaiti/1805-const.htm>

**Source the document by providing an educated guess about each of the following:**

Perspective:	Purpose:	Bias:



The three documents we discussed in class today are listed below. Identify the document that least supports **your answer** to the question:

Should the Haitian Revolution be viewed as an extension of the French Revolution or as a separate event?

- a. Napoleon Bonaparte quote (1802) recorded in Laurent Dubois, *Avengers of the New World* (2004)
- b. Saint Domingue Constitution of 1801 excerpt
- c. The Haitian Constitution of 1805 excerpt

Using your sourcing and evidence from the document, write a brief paragraph explaining why this document **LEAST** supports your interpretation of the Haitian Revolution. Cite specific evidence in your response.

---

---

---

---

---

---

---

---

---

---

It is significant to understanding of SS literacy that students understand that as they read new sources their answers can change. Most social sciences—history in particular—are interpretive disciplines. Students hypotheses can and should change. Therefore, their answer to the question “Should the Haitian Revolution be viewed as an extension of the French Revolution or as a separate event?” can change after each lesson. They should be looking to find evidence that challenges their assumptions, about the past.

# Rubric: Historical Thinking Skills

	4	3	2	1	0
<b>Sourcing</b>	Clear demonstration of a strong understanding of the quality and reliability of sources used; interpretation of sources founded on an equally strong evidence-based argument	Occasional but consistent evaluation of specific sources' quality and reliability, but not as direct or consistent as 4	Sources based on an individual characteristic; limited or inconsistent evidence of who created the document, the purpose for the documents creation or potential bias represented in the document; may have historical errors present	Limited and indirect evaluation and consideration of specific sources' quality and reliability; glaring misrepresentations or misinterpretation of the purpose for the document's creation or potential bias represented in the document; historical errors present	No evidence of evidence cited in a discipline-specific way
<b>Citing Evidence</b>	Direct reference to specific accounts; evidence analyzed in terms of content for relevant characteristics including: authorship, point of view, bias, purpose, format, and audience	Direct reference to specific accounts; evidence analyzed in terms of content for relevant characteristics including: authorship, point of view, bias, purpose, format, and audience, but not as consistently, clearly, or directly as a 4	Indirect reference to specific accounts (at least two); evidence analyzed inconsistently in terms of content for relevant characteristics including: authorship, point of view, bias, purpose, format, and audience	Limited use of specific accounts (at least one); limited use of relevant sourcing characteristics	No evidence of evidence cited in a discipline-specific way

Modified from: Bruce VanSledright, *Assessing Historical Thinking and Understanding: Innovative Designs for New Standards*, (New York: Routledge, 2014).

**Citing evidence is an important skill highlighted in the CCLS. However, the Core Standards RH.1, whole mentioning “features as the date and origin” of a source, do not directly call out sourcing as a disciplined-based literacy skill. When developing rubrics that are aligned to social studies literacy beyond what is offered in the CCLS, it may be necessary to differentiate general literacy from social studies or history literacy.**

# Bibliography

- Adas, Michael. *Dominance by Design: Technological Imperatives and America's Civilizing Mission*. Cambridge: The Belknap Press of Harvard University Press, 2006.
- "Beyond the Bubble." Stanford History Education Group. Stanford University 2014. <http://beyondthebubble.stanford.edu/>
- Buehl, Doug. *Developing Readers in the Academic Disciplines*. Newark, DE: International Reading Association 2011.
- Common Core State Standards Initiative English Language Arts Standards: History/Social Studies Grade 9–10. <http://www.corestandards.org/ELA-Literacy/RH/9-10/>
- Cullen, Jim. *Essaying the Past: How to Read, Write, and Think about History*, second edition. West Suffex, UK: Wiley-Blackwell 2013.
- Dubois, Laurent. *Avengers of the New World: The Story of the Haitian Revolution*. Cambridge, MA: Belknap Press of Harvard University Press, 2004.
- Draper, Roni Jo. "School mathematics reform, constructivism, and literacy: a case for literacy instruction in the reform-oriented math classroom." *Journal of Adolescent and Adult Literacy* 45, no.8 (2002): 520-529. <http://literacy473.weebly.com/uploads/9/1/6/7/9167715/schoolmathematicsreformconstructivismandliteracy.pdf>
- Fang, Zhihui, and Mary J. Schleppegrell. *Reading in Secondary Content Areas: A Language-Based Pedagogy*. Michigan: University of Michigan Press, 2008.
- Gillis, Victoria. "Disciplinary Literacy." *Journal of Adolescent and Adult Literacy* 57 no.8 (2014): 614–622. doi:org/10.1002/jaal.301
- Haitian Constitution of 1801 Signed by Toussaint Louverture, Given at Cap Français, this 14 Messidor, year IX [July 3, 1801] of the French Republic, one and indivisible, Original translation by Charmant Theodore, June 2000. [http://thelouvertureproject.org/index.php?title=Haitian\\_Constitution\\_of\\_1801\\_\(English\)](http://thelouvertureproject.org/index.php?title=Haitian_Constitution_of_1801_(English))
- Heller, Rafael, and Cynthia Greenleaf. *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement*. Washington, DC: Alliance for Excellent Education, 2007. <http://all4ed.org/wp-content/uploads/2007/06/LitCon.pdf>
- Hynd-Shanahan, Cynthia. "What Does It Take? The Challenge of Disciplinary Literacy." *Journal of Adolescent and Adult Literacy* 57, no.2 (2013): 93–98. doi: 10.1002/JAAL.226
- Hynd, Cynthia R. "Teaching students to think critically using multiple texts in history." *Journal of Adolescent and Adult Literacy* 42 no. 6 (1999): 428–436. [http://www.studentachievement.org/wp-content/uploads/Teaching\\_Stdts\\_to\\_Think\\_Critically\\_SS\\_Hynd\\_1999.pdf](http://www.studentachievement.org/wp-content/uploads/Teaching_Stdts_to_Think_Critically_SS_Hynd_1999.pdf)
- Irvin, Judith L., John P. Lunstrom, Cynthia Lynch-Brown, and Mary Friend Shepard. *Enhancing Social Studies Through Literacy Strategies*. National Council for the Social Studies: Washington, DC. 1995. <http://files.eric.ed.gov/fulltext/ED414209.pdf>
- Lee, Carol D., and Anika Spratley. *Reading in the Disciplines: The Challenges of Adolescent Literacy*. New York: Carnegie Corporation of New York, 2010. [https://www.carnegie.org/media/filer\\_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny\\_report\\_2010\\_tta\\_lee.pdf](https://www.carnegie.org/media/filer_public/88/05/880559fd-afb1-49ad-af0e-e10c8a94d366/ccny_report_2010_tta_lee.pdf)
- Millard, Fillmore, President of the United States of America to His Imperial Majesty the Emperor of Japan. Letter. November 13, 1852. Visualizing Cultures Archive. Massachusetts Institute of Technology. [http://ocw.mit.edu/ans7870/21f/21f.027/black\\_ships\\_and\\_samurai/presletter.html](http://ocw.mit.edu/ans7870/21f/21f.027/black_ships_and_samurai/presletter.html)
- Manderino, Michael, and Corrine Wickens. "Addressing Disciplinary Literacy in the Common Core State Standards." *Illinois Reading Council Journal* 42 no.2 (2014): 28-39. <http://www.literacyinlearningexchange.org/sites/default/files/manderinowickensircj2014.pdf>
- McConachie, Stephanie M., and Anthony R. Petrosky. *Content Matters: a Disciplinary Literacy Approach to Improving Student Learning*. San Francisco, CA: Jossey-Bass, 2010.
- Moje, Elizabeth Birr. "Developing Socially Just Subject-Matter Instruction: A Review of the Literature on Disciplinary Literacy Teaching." *Review of Research in Education* 31 no.1 (2007):1–44. <https://collaborate.education.purdue.edu/edci/Secondary%20Literacy/Moje%202007.pdf>
- . "Foregrounding the Disciplines in Secondary Teaching and Learning: A Call for Change." *Journal of Adolescent and Adult Literacy*. 52, no.2 (2008): 96–107. doi: 10.1598/JAAL.52.2.1
- Monte-Sano, Chauncey. *Reading, Thinking, and Writing About History: Teaching Argument Writing to Diverse Learners in the Common Core Classroom, Grades 6-12*. New York: Teachers College Press 2014.
- Perrl, Curtis L. "Comment: The Return of Revisionism," *Journal of British Studies* 44 no.1 (2005) doi: <http://dx.doi.org/10.1017/S0021937100019869>.
- Shanahan, Cynthia, Timothy Shanahan, and Cynthia Misischia. "Analysis of Expert Readers in Three Disciplines: History, Mathematics, and Chemistry." *Journal of Literacy Research* 43 no.4 (2011): 393-429. <http://jlr.sagepub.com/content/43/4/393.full.pdf+html>
- Shanahan, Timothy, and Cynthia Shanahan. "Teaching Disciplinary Literacy to Adolescent: Rethinking Content Area Literacy." *Harvard Educational Review* 78 no.1 (2008):40-60. doi: <http://dx.doi.org/10.17763/haer.78.1.v62444321p602101>
- . "What is Disciplinary Literacy and Why Does it Matter?" *Topics in Language Disorders* 32 no.1 (2012): 7-18. <http://ssnnces.ncdpi.wikispaces.net/file/view/10What+Is+Disciplinary+Literacy+and+Why+Does+it+Matter.pdf>

- Sizer, T.R. *Horace's Compromise: The Dilemma of the American High School*. Boston: Houghton Mifflin 1984.
- The 1805 Constitution Of Haiti, May 20, 1805. Promulgated by Emperor Jacques I (Dessalines). Printed in the *New York Evening Post*, July 15, 1805. Accessed and modified context from Haiti Page, maintained by Bob Corbett.  
<http://www2.webster.edu/~corbetre/haiti/history/earlyhaiti/1805-const.htm>
- New York State Education Department. *New York State K-12 Social Studies Framework*.  
<https://www.engageny.org/resource/new-york-state-k-12-social-studies-framework>
- UCLA Department of History: National Center for History in the Schools.  
<http://www.nchs.ucla.edu/history-standards/historical-thinking-standards/2.-historical-comprehension>
- VanSledright, Bruce. *Assessing Historical Thinking and Understanding: Innovative Designs for New Standards*. New York: Routledge, 2013.
- Wineburg, Sam, and Daisy Martin. "Reading and Rewriting History." *Educational Leadership*, vol. 62 no.1 (2004): 42-45.  
[http://www.ascd.org/ASCD/pdf/journals/ed\\_lead/el200409\\_wineburg.pdf](http://www.ascd.org/ASCD/pdf/journals/ed_lead/el200409_wineburg.pdf)

# Sample Lesson Plan

Teacher:

Class:

Date:

Unit:	Focus Question:
Lesson Objective/Teaching Point:	Sequence: Lesson X of X
Content or Discipline Standards:	
Common Core Learning Standards in Literacy:	
Resources/Materials:	
Introduce the Lesson/Motivate Students: (10 minutes)*	
Model/Teach: (5–10 minutes)	
Group/Independent Work: (10–15 minutes)	
Assessment:	
Wrap-Up:	

