



SCIENCE DISSECTED

Reading Within Each Discipline: Strategies to Integrate the English Language Arts Common Core State Standards into Science Lessons

Many teachers voice the complaint that, “My students can’t read the textbook!” Most likely, the problem is not the students’ inability to read as in decoding the words; however, the students might lack the skills to organize and comprehend the information. Some students might need assistance when reading informational (nonfiction) texts. The Common Core State Standards (CCSS) emphasize reading informational texts across subject areas. According to the CCSS for Reading, “the vast majority of reading in college and in the workforce training programs will be sophisticated nonfiction.” Therefore, the CCSS are designed to prepare students for life after graduation.

The reading standards for literacy in science and technical subjects list the reading and comprehension skills that secondary students should possess by the end of each grade span (e.g. 6-8th, 9-10th, and 11-12th grade). [Access the CCSS for ELA here](#). As students progress through the grade levels, students should be able to comprehend texts of increasing complexity. Appendix B of the CCSS contains exemplars of text complexity and sample performance tasks for informational texts within each grade band and across different subject areas. [Access the CCSS Appendix B here](#). The CCSS do not contain a proposed science curriculum. Each school district decides on the appropriate science curriculum to meet their science standards. The exemplars supplied in Appendix B are meant to provide teachers with sample texts that represent the appropriate complexity for each grade span. Teachers can use this information to prepare their science lessons and include texts that match the complexity of the exemplars.

Reading is a complex task that involves interpreting graphic symbols, comprehending information, and processing the author’s message. By the time students graduate from high school, they should be able to independently and proficiently comprehend the texts that are commonly used in college and in the workforce. Students who frequently read a variety of materials typically have more advanced vocabularies and comprehension skills. Teachers should not interpret the “text” in the standards for literacy in science to solely mean the textbook. Too often textbooks are used passively and the students do not learn how to effectively and independently interpret the text to encourage further interest in a subject. Expanding learning beyond the textbook empowers students to learn outside the classroom and exposes them to topics and different perspectives that might not be found in an adopted textbook. Teachers should introduce their students to a broad array of supplemental science texts including science journals, current event articles, and valid websites.

In order to be ready by exit, students need to be able to apply a variety of comprehension strategies automatically and independently. Although the reading strategies are often considered the task of the English language arts teacher, comprehension strategies work best when they are used across the curriculum.

Key Points of the CCR Anchor Standards for Reading

- ◆ The standards establish a “staircase” of increasing complexity to meet the demands of college and career-level reading comprehension.
- ◆ When reading scientific and technical texts, students should be able to gain knowledge from the use of diagrams and data that are used to convey information and illustrate concepts.
- ◆ Students must be able to read complex informational texts with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction.

Science teachers can help prepare their students to meet the requirements of the common core reading standards by integrating effective reading strategies and grade-level appropriate texts into their lessons. The following reading strategies can be used in any classroom. Since there is no “one size fits all” approach to teaching reading comprehension, it is the teacher’s responsibility to decide which strategies will work best with his/her students.

Strategy to Use Before Reading: Text Preview and Prediction (Pre-reading)

The beginning of the school year is the perfect time to acquaint students with their textbooks. Broadly speaking, a textbook can be any book used in the classroom; this might include novels, reference books, or other works of non-fiction which may or may not be designed exclusively for schools (articles, journals, magazines, etc.). With modifications, this strategy can be used with any type of reading material not only to introduce and reinforce how to use text features, but also to help students understand the importance of previewing and predicting before reading. We often assume students are familiar with text features, but this can be a faulty assumption. If you plan to use any type of text in your classroom, teaching students how to use their texts effectively is time well spent.

During Reading: Think-Aloud

The Think-Aloud strategy is used to slow down the reading process and shows students how skilled readers construct meaning from a text. When teaching struggling readers, teachers need to take what they do implicitly and make it explicit for their students. This strategy allows students to hear the teacher model the process as she reads or discusses an idea. For example, teachers might instruct their students to read a section in the textbook and take notes. Although note-taking is a process that is implicit for the teacher, some students might not know how to process the information that they read and construct it in an outline format. Teachers can model their thinking processes using the Think-Aloud strategy to model the activation of prior knowledge, developing questions, decoding the meaning of texts, monitoring understanding, and applying the information as they read.

After-Reading: One-Sentence Summary

The one-sentence summary strategy works well when students are required to read informational text such as a section in their textbook or a scientific article. The process works by chunking the text one paragraph at a time and encourages group discussion to identify the central idea and summarize the information.

What to do:

- ◆ Separate students into groups of three or four. One person in the group is chosen to keep the group on-task.
- ◆ Read one paragraph silently (the group leader makes sure that all group members know where the paragraph starts and ends).
- ◆ After everyone in the group has finished reading the paragraph, the group discusses the central idea(s).
- ◆ The group comes to a consensus about one or two central ideas.
- ◆ Each group member writes down the central idea(s).

| Before Reading | During Reading | After Reading |
|---------------------------|--|-------------------------------|
| Activate prior knowledge | Visualize content | Summarize what was read |
| Review unknown vocabulary | Reread to clarify confusion | Synthesize new information |
| Brainstorm related ideas | Self-question to monitor understanding | Generate new questions |
| Generate questions | Observe text structure | Discuss and share information |

The ELA Common Core State Standards are available at: http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf

The ELA Appendices can be accessed at: <http://www.corestandards.org/the-standards>