

Helping Students Read Science Textbooks

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Reading specialists are in agreement that science teachers can use science textbook reading activities in ways that significantly impact on students' development of reading skills in general and skills in comprehending scientific texts in specific (Vacca & Vacca, 1998). Additionally, reading experts are in agreement that the effectiveness of science teachers in facilitating students in acquiring and developing skills in these areas is highly dependent upon the relevance and timing of reading instruction. For example, the common practice of having students read textbook passages as a means of introducing a new unit, topic, lesson or concept is not supported by reading research. Rather, students should first do a science activity designed to create interest and a need to know and then be directed to turn to the textbook for additional insights and information (which have been made relevant and interesting through the introductory experiential activity). Once a relevant textbook passage is introduced, it matters greatly how teachers direct students to approach the reading task. Thus, we need to understand about how students read to offer better approaches.

Round robin reading does little (1) to ensure that students learn the content of a written passage, (2) to help students practice the specific skills need in comprehending science texts, and (3) to give them experience in improving their reading ability. The first problem with round robin reading is that it creates counterproductive anxiety. At any given moment in this process it is likely that the student who is reading aloud is more mindful of fears of making mistakes, being corrected by others, or being laughed at for making mistakes than he or she is of the science content being read. Simultaneously, students who struggle with reading aloud are trying to count ahead to determine which paragraphs they are going to be asked to read and, once those paragraphs are found, these students are busy rehearsing them. The more proficient readers are either distracted by reading ahead while someone is reading aloud next to them or by resisting the temptation to read ahead, at their more natural and comfortable pace. Not many students are thinking about the science content within the text being read aloud—which is supposed to be the heart of the lesson. All of these concerns are compounded by the second problem, which is that reading aloud takes much longer than reading silently. Thus, a great deal of instructional time, which is surely a limited and valued resource, is being wasted on an activity that is of limited value, at best, and that is possibly destructive to student learning. There must be better alternatives.

Fortunately there are a number of alternatives to round robin reading that do help students become better readers in general and more critical and comprehending readers of science texts and other scientific literature in specific. Here are some strategies that will help you help your students become better consumers of their textbooks:

1. Demonstrate specific reading strategies.
2. Walk students through a study skills sequence.
3. Model stopping at designated points and having students verbalize what they think they have learned.
4. Facilitate students sharing strategies they use to make sense of the text.

Teachers can demonstrate specific reading strategies they use. For example, if you come to something you don't understand while reading, it can be helpful to skip over it and move on to the end of the sentence or paragraph. Getting bogged down with reading every word or trying to totally understanding every point can negatively impact comprehension. Trying to take in everything can create a situation in which a reader actually comprehends nothing. We suggest the teacher model this strategy by pointing out an exact point in the text where she skipped over a particular word or phrase and how she dealt with making it make sense. She could say, "Students, when I came to this point on page 67, I didn't understand the phrase 'alternation of generations.' I knew it had something to do with reproduction in plants since that is what the sub-heading said, but I didn't know. So I kept reading. At the end of the paragraph, I stopped and asked, 'how can I make sense of this?' I decided it had something to do with the number of chromosomes. Try this strategy today if you come to something you don't understand as we read the next chapter."

Teachers can walk students through a study skills sequence. As students prepare to read the text silently, the teacher could demonstrate ways to prepare for reading. Before reading chapter two, the teacher could walk them through the chapter, demonstrating specific study skills.

The teacher could say something like; "Here is what I do as I prepare to read a chapter. I look at the chapter title. What is it? I then ask myself what kinds of things might be included in this chapter and I make a prediction about what I think I might learn. Next, I read all the sub-headings, asking the same question. Let's do that. What will we be reading about? As I walk through the chapter, I look at pictures, graphs, tables, and charts. I read the captions under all of these. Let's do this together. Again, what do you think we might be learning about? When I have completed my initial survey of the chapter, I ask myself questions I might have about the topic. Now, I go back and read. At the end of each section, I stop and ask what I have learned, what is beginning to

make sense, and what connections can I make? Let's do this as we read this chapter."

Teachers can ask students to stop their reading at designated points and share what they are learning. At the beginning of the reading assignment, teachers could ask students to pair up or assign them to small groups. The teacher then points out several designated stopping points. These work best at the end of a section, or at the end of a page. At the stopping point, each member of the group has to "Say Something" (Short Harste, 1996) to the rest of the group. They can explain a concept they understand, share connections they are making to other learning, ask a question, or make a prediction about further reading.

Teachers can have students read the text silently or in small groups, then read specific passages aloud from the text to support concepts discussed. Instead of simply reading the text and answering the questions at the end of the chapter, students can read certain passages to illustrate points they are trying to make in the discussion. This is more effective than reading the whole chapter aloud because it is focused and serves an authentic purpose.

Teachers can ask students to read the text silently, pausing to mark points they had difficulty reading. As students read the assigned chapter, have students use sticky notes to mark one or two points at which they struggled. Then, as discussion of the chapter begins, several students could share with the class, the trouble they experienced and the strategies they used to solve the problem. Students benefit from hearing how their peers create meaning as they read. We have found this to be a most powerful demonstration in our classrooms.

Obviously, the ability to read and comprehend is an essential skill for our students. If we understand the process and take a little bit of time to demonstrate and practice effective strategies, we can support students in their growth as readers while we also help develop their ability to know and understand science.

References

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