

# Improving Reading Skills in the Science Classroom

By: Teaching Today

Science texts are often more challenging for students than other text types. This article contains strategies teachers can use to increase reading comprehension, helping students make sense of complicated science concepts.

Most teachers agree that sound reading skills are essential for learning science concepts. However, science texts are often more challenging for students than other text types. The difference in how students feel about reading science content versus reading narrative often surfaces in elementary school as a relatively minor problem. By middle and high school, when reading difficulty and volume have increased, a serious negative impact on science learning can result.

Compounding this problem, science teachers often lack the expertise and interest in teaching reading. When instruction is planned around minimizing reading weaknesses however, students receive fewer opportunities for reading practice and support, and a critical science instructional tool goes unused.

Fortunately, the disparity between a reading teacher's goals and those of a science teacher is not as large as it may seem. While it is true that most science teachers are not reading experts, their teaching methodologies share at least one important characteristic. Effective reading and science teachers integrate the acquisition of skills with the understanding of content. Science teachers can build on this to help their students become more proficient readers.

Begin by considering these questions:

- Do your students know why they are being asked to read a given text?
- Do your students apply prior knowledge and experience to the reading?
- Do your students look for typographic and text structure cues to help them identify critical elements?
- Do your students ask themselves questions while they are reading?
- Are your students sufficiently comfortable with science vocabulary to enable them to concentrate on ideas and concepts in the reading?
- Do your students appear engaged rather than bored during reading assignments?

If the answers to any of these questions are "no" or "rarely," there is room for increasing reading efficiency and success in your science classroom. Consider the issues and possible solutions described below.

## Issue One: Vocabulary

Science vocabulary can be daunting for students, particularly for those with low literacy. Imagine a student who encounters the unknown word "metamorphosis" in a passage. The student passes over the word, hoping to discover meaning further in the text, only to find detailed descriptions of the larva, pupa, and adult insect stages. Confusion results and the student may become nervous, tired, or unable to concentrate. They may simply choose to give up. How can this issue be approached?

- **Focus on vocabulary prior to reading.** When possible, link the new term to an experiment, diagram, demonstration, piece of equipment, or prior learning experience.
- **Make dictionaries available.** If possible, have a dictionary on each desk during reading assignments.
- **Teach students to use the dictionary when they encounter the first unknown word.** Skipping unknown words in hopes of defining them through context reduces science literacy.
- **Have students create "Science Signs," or flash cards for new vocabulary.** Put the term on the front. The definition and a sentence or representative diagram should go on the back, as well as any information which links this term to prior or concurrent learning.
- **Manage a "Science Sign Sort" activity.** Have students create categories and sort their Science Signs of both new and mastered vocabulary appropriately.

## Issue Two: Detailed Concepts and Relationships

Reading about certain complicated science concepts, such as the laws governing genetics and inherited traits, requires concentration and focus from even the best readers. Low-literacy students, who have likely experienced past reading frustration and failure may be reluctant to even try. Consider these strategies for addressing this issue.

- **Manage reading assignments with purpose.** Make sure students know why they are reading given passages. Provide guidelines about specific areas of focus and goals for reading.
- **Teach students to use text clues to identify critical information.** Titles, subheadings, paragraph groupings, graphics, and summary statements are used by writers to organize information. Understanding this structure can help students manage their reading.
- **Encourage questioning and hypothesis formation during reading.** Ask students to jot down questions or ideas which occur to them while reading. Provide time to discuss their thoughts.
- **Teach students to look for key terms which imply relationships between variables.** Words like "since," "when," "affect," "consequently," "although," "effect," "if," and "because" signal the discussion of related variables.
- **Evaluate student comprehension frequently throughout a series of reading assignments using a variety of methods.** Have students describe the new concept through a diagram, graph, hands-on demonstration, or journal entry.

## Issue Three: Multi-Step Processes and Cycles

Many science concepts revolve around a sequence or cycle of events. For students who are reading about stellar evolution, for example, it is not only the star types that are important. The order, timing, and triggers for movement from one stage to another must also be understood. Comprehending multiple steps in sequential order requires a different type of reading approach. Below are some strategies which can provide assistance with this issue.

- **Preview text structure with students.** Identify text cues which indicate the beginning, middle, end, or key parts of a sequence.
- **Increase student interaction with the reading.** Group discussion, problem-solving, and hands-on activities related to the reading can increase responsiveness and motivation.
- **Have students create flow charts, diagrams, and sketches.** Creating physical representations of written steps can increase retention of sequential information.
- **Break the reading of long sequences into smaller numbers of steps.** Assign a small portion of text, then pause for discussion and questions. When possible, have students predict further steps in the sequence before moving forward.
- **Utilize student-created Science Signs to sequence key steps in a process or cycle.** The visual and tactile components of this type of activity can increase retention of sequential information.

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