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Introduction: How to Use This Book

The focus of this research-based book is to demonstrate how to incorporate more writing in the science class. Increasing the use of writing is a key way to promote stronger literacy in the content areas. Research shows that using writing in science is the best way to help students understand the complex concepts and terms introduced in the content areas. This book provides science teachers with the information needed to implement writing activities and assignments that correlate with science objectives and goals. The strong research connection in this book helps tie what teachers actually do in the classroom with the most current research available.

Part 1: Writing to Learn in Science

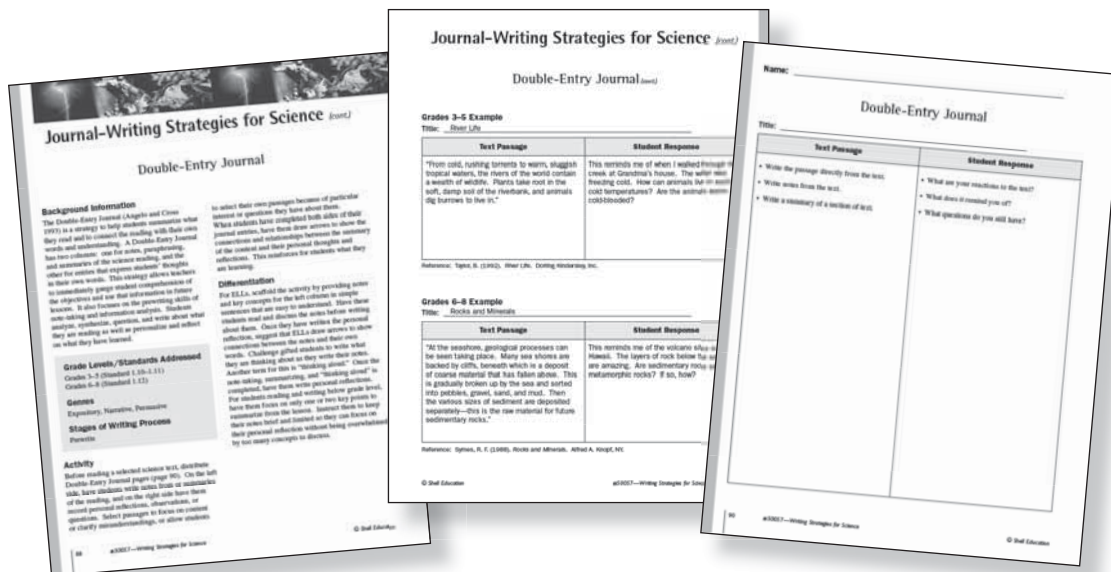
This section is composed of strategies for using writing to learn in science. These include vocabulary development, previewing and reviewing, journal-writing, note-taking, and diagramming and mapping. These strategies use writing as a tool for students to process and personalize what they learn so that they are able to synthesize and break down the complex science terms and concepts.

Part 2: Writing to Apply in Science

This section offers strategies for using writing to apply new knowledge in science: authoring skills, summarizing, and writing applications in all genres. These strategies provide opportunities to utilize the entire writing process to compose a piece of writing that incorporates their science knowledge. Teachers may wish to use strategies from Part 1 as building blocks for working toward these application assignments.

Part 3: Assessment

This section describes several holistic assessment options for writing in the science classroom. Each strategy listed in the book includes the purpose for and benefits of the strategy and its connection to writing and science, the grade levels for which it is appropriate, and the McREL standards that it meets. A step-by-step activity description follows, along with variations, if appropriate, and differentiated instruction to accommodate all types of students. These alterations and suggestions are written for English Language Learners, gifted students, and students who are reading and writing below grade level.





Writing Strategies for Previewing and Reviewing in Science *(cont.)*

Probable Passages

Background Information

The Probable Passages strategy (Wood 1984) incorporates writing directly into a science lesson. This strategy is primarily used with basal readers but Readence, Bean, and Baldwin (1981) suggest that this strategy can be adapted for use with expository text. Its focus is to use key concepts or terms to make predictions about the content of a text. Students use key terms or concepts provided by the teacher to write short passages that could appear in the text. The goal is not necessarily to have their information correct the first time. The goal is to write using the types of language and sentence structure common to the genre and use the process of analyzing the information against a reliable source.

Grade Levels/Standards Addressed

Grades 1–2 (Standards 1.1–1.2)

Grades 3–5 (Standards 1.1–1.2)

Grades 6–8 (Standards 1.1–1.2)

Genres

Expository, Summary, Narrative, Persuasive

Stages of Writing Process

Prewrite, Draft, Revise

Activity

Before reading a selected science text, distribute the Probable Passages activity sheet (page 63). Introduce the topic and write the key vocabulary words on the board or overhead. Discuss the meanings of these words, and then call on students to define and use the words orally in sentences.

Once students are familiar with the words, have them look for relationships among the words in the same way that writers look for related information while composing a rough draft. *Which word might be a main idea? Which words have common meanings or definitions? Which words go together? Which words are examples of another word?* You may want to construct a simple outline or diagram of how the words might be related as a quick prewriting scaffold. Then instruct students to write a short passage using the outline. There is no strict format to follow except that the key words must be utilized. Allow time for students to share their passages with partners or table team for feedback and input. After reading the selected science text, have students compare and contrast their Probable Passages with the text. This step is key because students are analyzing their own writing against published writing to verify information.

Differentiation

Provide clear, simple definitions and visuals of the key terms for ELLs to refer to as they write their paragraphs because it might be difficult for them to use complex terms they have just learned. Provide sentence frames and examples of how to write a paragraph for the ELLs as well. Instruct gifted students to write more than a paragraph or provide additional words for them to incorporate. Also, challenge them to write the passage and leave the key words blank then exchange with a partner to see if they can fill in the blanks. For students reading and writing below grade level, spend individual time in a writing conference working through the writing of the paragraph. Also, provide definitions for the key terms.

Writing Strategies for Previewing and Reviewing in Science *(cont.)*

Probable Passages *(cont.)*

Grades 1–2 Examples

Key Concepts:

webbed, paddles, turtle, soft-shelled

Prewrite:

turtle
webbed
soft-shelled
paddles

Probable Passage:

A turtle lives in water. The webbed feet of the turtle help the turtle swim. The turtle has a soft-shelled back. The turtle paddles through the water.

How does your passage compare to the text?

My information is correct. The book uses longer sentences.

Grades 3–5 Examples

Key Concepts:

agile, bat, skim, grip, strong teeth, wings, hibernates

Prewrite:

bat
agile, wings, skim
grip
strong teeth
hibernates

Probable Passage:

The bat is a nocturnal creature. This agile animal flies and skims through the air with its wings at night. The bat grips onto the tree so it doesn't fall off. It has very strong teeth. The bat hibernates in the winter.

How does your passage compare to the text?

Both paragraphs are organized. I wrote mostly simple sentences. Next time I will try to combine information and make my sentences longer and more descriptive.

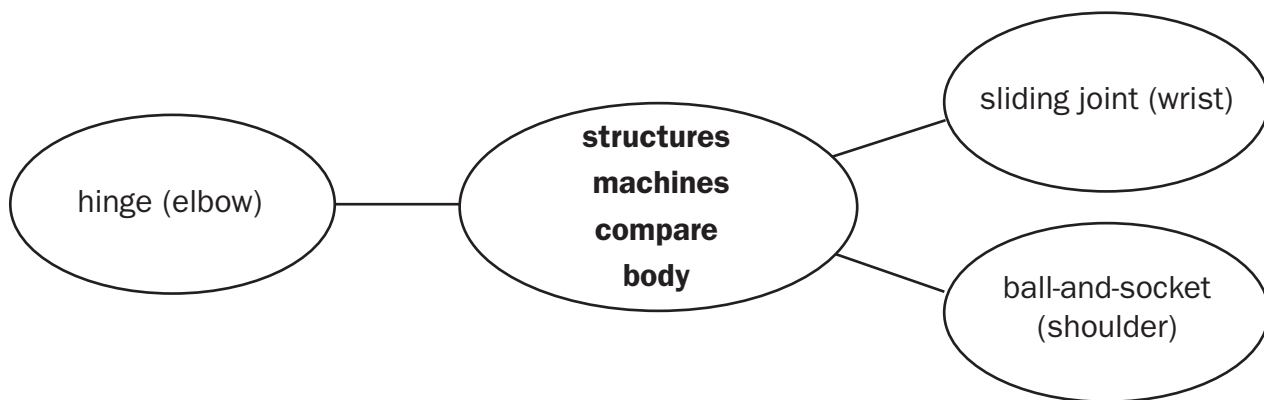
Writing Strategies for Previewing and Reviewing in Science *(cont.)*

Probable Passages *(cont.)*

Grades 6–8 Examples

Key Concepts:

hinge, ball-and-socket, sliding joint, machines, compare, body, structures

Prewrite:**Probable Passage:**

There are structures in machines that can be compared to parts of the human body. A hinge joint is like the elbow joint. A ball-and-socket is like the shoulder joint. And a sliding joint is like the wrist joint.

How does your passage compare to the text?

I wrote a good topic sentence and gave each detail its own sentence. The text also gave a definition of each type of joint, which I did not. That made the information clearer. My passage and the text both gave examples of each joint, which was helpful to readers. I think that I used the word “like” too many times.

Name: _____

Probable Passages

Directions: Write down the key concepts for the lesson. Use a prewriting strategy and then write a probable passage using these words. After reading, compare your passage to the text.

Key Concepts:

Prewrite:

Probable Passage:

How does your passage compare to the text?
