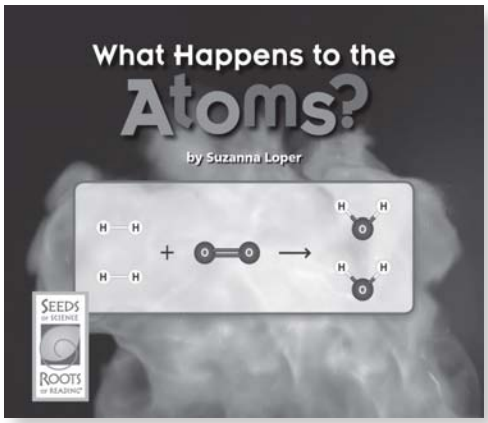
Teaching Text Structure

with *What Happens to the Atoms?* from *Seeds of Science/Roots of Reading*®



Introduction

This strategy guide introduces an approach for teaching students how to identify a book's text structure. Text structure refers to how a text is organized; understanding this organization can support reading comprehension. Identifying text structure is especially important when reading science texts, which are often organized around conventional structures such as cause–effect or compare–contrast. This guide includes an introductory section about text structure, a description of how to teach this strategy with many science texts, and a plan for teaching text structure with the *Seeds of Science/Roots of Reading*® book *What Happens to the Atoms?*

Book Summary

In *What Happens to the Atoms?* readers learn that during a chemical reaction, atoms rearrange to form new substances. The book describes two investigations in which chemical reactions occur (mixing baking soda and vinegar and letting steel wool rust) and one investigation in which a chemical reaction does not occur (mixing sugar and water). Diagrams depict what happens to the atoms in each investigation. An explanation of what is taking place on a molecular level is also provided for each investigation. At the end of the book, readers are invited to consider what happens to the atoms in an exciting reaction—sodium and chlorine combining to make ordinary table salt.

About This Book

Reading Level
Guided Reading Level*: S

Key Vocabulary
atom, chemical reaction, molecule, product, reactant

Text Features
bold print, captions, diagrams, glossary, headings, illustrations, labels, photographs, table of contents, text boxes

*Guided Reading Levels based on the text characteristics from Fountas and Pinnell, *Matching Books to Readers.*

Science Background

All matter is composed of atoms. Atoms are the tiny building blocks of matter, and molecules are groups of atoms joined together in a particular way. A substance is made of only one kind of atom or molecule—for example, gold (composed of gold atoms) and water (water molecules, made up of hydrogen and oxygen atoms) are substances. During chemical reactions, substances change to form new substances. The substances present at the beginning of a chemical reaction are called the reactants, and the new substances present at the end of a chemical reaction are called the products. To understand chemical reactions, it is helpful to know what is happening with the atoms and molecules involved. As a chemical reaction occurs, the atoms of the reactants rearrange and join together in new ways, forming the products. If substances are mixed together, and the atoms and molecules do not rearrange, a chemical reaction has not occurred. For example, when sugar and water mix, it is not a chemical reaction. Although the atoms are rearranged during a chemical reaction, there are always the same number and kind of atoms present at the end of the reaction that were present at the beginning of the reaction.

About Text Structure

Text structure refers to the ways that authors organize information in text. For example, some texts are organized as a chronological sequence of events, while others compare two or more things. Teaching students to recognize the underlying structure of content-rich texts can help students focus attention on key concepts and relationships, anticipate what is to come, and monitor their comprehension as they read. Students can learn to identify a text's structure by paying attention to signal words. Signal words link ideas together, show relationships, and indicate transitions from one idea to the next. Each text structure is associated with different signal words (shown in the box on this page). Text structure can also be taught using graphic organizers, which visually represent the relationships among key ideas. Graphic organizers can be particularly helpful for English Language Learners and struggling readers who can use these visual tools to help understand and organize information.

Text Structure Signal Words

- **cause–effect:** therefore, as a result, leads to, so, because of, thus, in order to, if...then
- **problem–solution:** fortunately, unfortunately, therefore, trouble, problem, issue, challenge, answer, solution, conclusion
- **compare–contrast:** different from, the same as, similar to, as well as, but, compared to, in contrast, however, like, unlike, more, less
- **time–order:** first, next, then, last, finally, meanwhile, following, before, after, on [date]
- **description:** for example, for instance, in addition, also, too, some, most, all, other
- **question–answer:** what, where, why, who, how, when, does

Teaching Text Structure

The following guidelines can be used to teach students about text structures that are common to content-rich texts.

- Select an appropriate text. Note that some texts may utilize more than one text structure. When introducing text structure, select a text (or portion of a text) that has one easily identifiable text structure.
- Create a graphic organizer that represents the text's structure and draw it on the board. You can also make individual copies for students, if desired. (For graphic organizers that can be used to teach various text structures, see www.seedsofscience.org/strategyguides.html)
- Introduce text structure. Before reading the selected text, explain that texts are organized in different ways. The way that authors organize the text is called the text's structure. Knowing how a text is structured can help students understand what they are reading.
- Introduce signal words. Explain that readers can tell how a text is organized by paying attention to signal words, which are words that show relationships among ideas. Preview the signal words that are found in the text. Model paying attention to these words by reading a portion of the text aloud and pointing out signal words that are used.
- Read and practice using signal words. Have students finish reading the text and remind them to use signal words to help them pay attention to how the text is organized.
- Introduce the graphic organizer. Explain that the graphic organizer is a way of showing how this text is structured. Make sure students understand which parts of the graphic organizer correspond to particular parts of the text.
- Record information on the graphic organizer. Have students help you complete the graphic organizer on the board using ideas from the text. You can also have students complete individual graphic organizers.
- Review how focusing on text structure helps students understand what they read. Remind students to pay attention to text structure as they read other texts. Teach other text structures and associated signal words as needed.

Question–Answer Text Structure

Question	Answer
What happens when you mix baking soda and vinegar?	a gas is created, the atoms rearrange to form new products
What happens when you mix sugar and water?	the sugar dissolves in the water, a chemical reaction does NOT happen
What happens when you let steel wool rust?	iron and oxygen combine to form iron oxide (rust)

Teaching Text Structure with *What Happens to the Atoms?*

Getting Ready

1. Make a copy of the Question–Answer Text Structure copymaster for each student.
2. Create a blank Question–Answer Text Structure chart on the board using the example above. You will fill in the chart with students during class; sample responses are shown in green.

During Class

1. Introduce *What Happens to the Atoms?* and activate prior knowledge by inviting students to share what they already know about atoms.
2. Distribute copies of the book and explain that it has a question–answer text structure, which means that it uses questions to organize the information presented. Point out that the title itself poses a question and that this question reflects the main idea of the book.
3. Direct students' attention to the table of contents on page 3 and ask them to identify the questions for each investigation in the book. Record these questions on the Question–Answer Text Structure chart on the board.
4. Point out that each question begins "What happens when...?" Tell students that as they read each section, they should pay attention to what happens to the atoms during each investigation.
5. Read the book in a way that is consistent with your classroom routines, giving students as much independence as possible.
6. After reading, lead a brief class discussion of the main ideas in the book. Refer back to the Introduction on pages 4–7, as necessary, to help clarify ideas about atoms.
7. Refer to the Question–Answer Text Structure chart and explain that the class will reread different sections of the book to locate information related to each question.
8. Distribute a Question–Answer Text Structure student sheet to each student. Assign students (or allow students to choose) one question to answer and have them record it in the "Question" column on their student sheets.
9. Give students several minutes to locate and reread information from the book to answer their questions. (You may wish to remind students to use visual information in addition to text to find the answers to their questions.) Also, remind students to focus on what is happening to the atoms. Instruct students to record notes in the "Answer" column on their student sheets.
10. After students finish recording, pose the first question and ask students who found the answer to that question to share their ideas. Discuss, synthesize, and paraphrase the ideas, and then record an answer on the chart on the board as students share. Repeat this process for the remaining two questions.
11. Discuss how knowing the structure of the text helped students organize the information and understand what they read.

Independent Extension

Have students turn to page 23 of *What Happens to the Atoms?* which invites readers to think of their own explanations for a chemical reaction. Have students consider the question "What happens when sodium and chlorine combine to make table salt?" and write their own explanations of how they think table salt is made.

Name _____ **Date** _____

Question–Answer Text Structure

Title of Book: _____

Question	Answer

About Strategy Guides

A six-page strategy guide is available for each *Seeds of Science / Roots of Reading*® student book. These strategies support students in becoming better readers and writers. They help students read science texts with greater understanding, learn and use new vocabulary, and discuss important ideas about the natural world and the nature of science. Many of these strategies can be used with multiple titles in the *Seeds / Roots* series. For more information, as well as for additional instructional resources, visit the *Seeds / Roots* Web site (**www.seedsofscience.org/strategyguides.html**).

Available Student Books for Grades 4–5

Nine engaging student books are now available from *Models of Matter* and *Chemical Changes*, each with a corresponding strategy guide. The books are part of the *Seeds of Science/Roots of Reading*® curriculum program described on page 6. Eighteen student books from the remaining grade 4–5 units (*Planets and Moons* and *Aquatic Ecosystems*) are currently in development and will be available in spring and summer 2010.

Chemical Changes	
Strategy	**Student Book**
Teaching Scientific Explanation Writing	*Chemical Reactions Everywhere*
Posing Investigation Questions	*Handbook of Chemical Investigations*
Teaching Text Structure	*What Happens to the Atoms?*
Teaching Procedural Writing	*Bursting Bubbles: The Story of an Improved Investigation*
Promoting Word Consciousness	*Communicating Chemistry*
Models of Matter	
Strategy	**Student Book**
Teaching Summary Writing	*Made of Matter*
Using Roundtable Discussions	*Break It Down: How Scientists Separate Mixtures*
Interpreting Visual Representations	*Phase Change at Extremes*
Teaching About How Scientists Make Inferences	*Science You Can't See*

Extend Learning with *Seeds of Science/Roots of Reading*®

The strategy featured in this guide is drawn from the *Seeds of Science / Roots of Reading*® curriculum program. *Seeds / Roots* is an innovative, fully integrated science and literacy program.

The program employs a multimodal instructional model called "Do-it, Talk-it, Read-it, Write-it." This approach provides rich and varied opportunities for students to learn science as they ***investigate*** through firsthand inquiry, ***talk*** with others about their investigations, ***read*** content-rich books, and ***write*** to record and reflect on their learning.

Take advantage of the natural synergies between science and literacy instruction.

- Improve students' abilities to read and write in the context of science.
- Excite students with active hands-on investigation.
- Optimize instructional time by addressing goals in two subject areas at the same time.

To learn more about *Seeds of Science / Roots of Reading*® products, pricing, and purchasing information, visit **www.deltaeducation.com**

***Chemical Changes* Science and Literacy Kit**

SEEDS OF SCIENCE / ROOTS OF READING®

Developed at Lawrence Hall of Science and the Graduate School of Education at the University of California at Berkeley.

Seeds of Science/Roots of Reading® is a collaboration of a science team led by **Jacqueline Barber** and a literacy team led by **P. David Pearson** and **Gina Cervetti**.

Published and Distributed by
Delta Education ...because children learn by doing.®
A member of School Specialty Science

ISBN: 978-1-60395-962-9
90000 >
9 781603 959629

1337256 ***What Happens to the Atoms?*** **Strategy Guide**

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