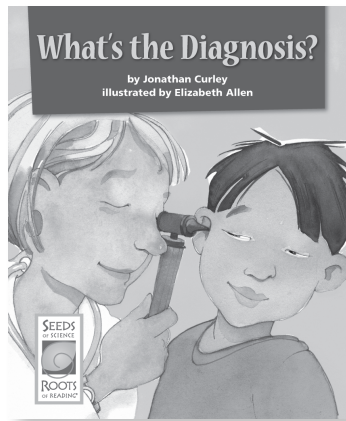


Making Sense of Data in Science Texts

with *What's the Diagnosis?*
from *Seeds of Science/Roots of Reading*®



Introduction

This strategy guide introduces an approach for teaching students to make sense of data presented in science books. The ability to interpret data is particularly important in science, where information is often communicated and summarized visually in tables, graphs, and diagrams. This guide includes an introductory section about the strategy of making sense of data, a general overview of how to teach this strategy with many science texts, and a plan for teaching students to make sense of data with the *Seeds of Science/Roots of Reading*® book *What's the Diagnosis?*

Book Summary

What's the Diagnosis? tells about the work of Elaine Davenport, a real doctor who specializes in pediatric medicine. The introduction describes how an important part of Dr. Davenport's job is making diagnoses when patients are sick. The book then presents two fictional accounts that are based on Dr. Davenport's actual experiences with patients. First, Dr. Davenport makes a diagnosis of the cause of a boy's sore throat. As Dr. Davenport gathers evidence, readers learn how doctors make diagnoses, including asking questions and checking symptoms. Next, readers meet a patient who has an upset stomach. Readers can use the evidence collected by Dr. Davenport to make their own diagnosis of this patient.

About This Book

Reading Level

Guided Reading Level*: O

Key Vocabulary

diagnosis, evidence, explanation, observe, pediatrician

Text Features

bold print, diagrams, glossary, headings/subheadings, illustrations, labels, table of contents, tables, text boxes

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

Science Background

Recording and Organizing Data

Scientists often collect and record data in the course of their work. They represent this data in many formats, such as tables, narrative notes, graphs, or diagrams. Data can be recorded in different ways depending on the nature of the investigation and what the scientist is trying to learn. The way in which data are organized plays a significant role in interpreting and drawing conclusions from the data. Reorganizing data in a new way can often lead to new findings.

Human Body Systems

It is useful to think of the human body as a system—or a group of parts that interact. The human body is a system that is made of smaller systems, such as the digestive system and respiratory system. Each body system is made of organs, or parts, that work together to perform a function. Each system contributes to the overall functioning of the entire body. If any one part in a system stops working or is removed, it will affect the entire system—which is why it is so important to maintain good health. When we go to the doctor with a problem, the doctor collects evidence to make an explanation, or diagnosis, of the problem based on her knowledge of human body systems.

About Making Sense of Data in Science Texts

Information in science texts is often communicated using visual representations of data, such as tables, graphs, maps, and diagrams. These representations are commonly used to present large amounts of data in a concise manner. Tables, graphs, maps, and diagrams organize data, draw attention to relationships, and explain information that is difficult to describe in words. The ability to make sense of data is essential for learning about science, since understanding science texts often hinges on the correct interpretation of this kind of information.

Teaching Students to Make Sense of Data in Science Texts

The following guidelines can be used to teach students how to make sense of data in content-rich texts.

- Begin by choosing one format of data representation on which to focus, such as tables, graphs, maps, or diagrams. Find texts that include data presented in the format you have chosen.
- Have students examine the data in the text. Ask them to describe what they notice about the way the data are organized and presented. For example, students may observe that tables have rows and columns. (See the box on this page for examples of common features of each data representation.)
- Demonstrate how to interpret data organized in the format you selected as your focus. Think aloud as you interpret a table, graph, map, or diagram, referring to specific features.
- Pose some sample questions that can be answered with the data presented. Demonstrate how to use the table, graph, map, or diagram to answer questions, and then have students practice answering questions.
- Invite students to share conclusions they draw from the data. Ask questions such as, “What do you notice?” and “What can

Features of Data Representations in Science Texts

Tables: title, row labels, column labels, the way in which each cell refers to a column and a row

Graphs: title, labels, key, axes

Maps: title, labels, key, scale

Diagrams: title, labels, key, symbols (such as arrows)

you explain using the data from this (table, graph, map, or diagram)?”

- Pose questions that encourage students to draw conclusions from the data presented. When eliciting responses, invite students to explain the information they considered in order to arrive at their answers.
- Discuss the purpose of organizing data in the chosen format. Ask students why scientists (and authors) might use this particular format to present information.
- Compare different representations of data. Once students have learned about several formats for representing data, guide them toward making comparisons between features that are similar or different across the various representations. For example, you might point out that both graphs and maps usually include a key to help the reader understand the meaning of colors or symbols.
- Guide students in creating their own data representations based on information you gather in class. For example, you might gather data on students’ preferences for ice-cream flavors or about the weather over several days.
- You might also consider reorganizing data presented in a familiar text into a new format and describing how the two representations are similar and different.
- After students are familiar with several different ways data is represented in books (tables, graphs, maps, and diagrams), invite them to include these formats in their informational writing.

Title: Diagnosing an Upset Stomach	
throwing up	yes
fever	yes
ate raw food	yes
pain on right side of stomach	no
took a bumpy trip	no

Making Sense of Data in *What's the Diagnosis?*

What's the Diagnosis? contains data tables that show evidence for the diagnosis of two different health problems. Work with your students to make sense of the data in these tables using the steps below.

Getting Ready

1. Recreate the Diagnosing an Upset Stomach table (shown above) on the board or a piece of chart paper, leaving out the data in the two columns (shown in green).
2. Make a copy of the Data Table copymaster for each student.

During Class

1. Explain to students that a doctor is a type of scientist who gathers evidence to explain things that happen in the human body. Tell them that in *What's the Diagnosis?*, Dr. Davenport collects evidence to help her figure out what is wrong with her patients.
2. Familiarize your students with the features of tables (title, columns, rows) by previewing the table on page 10 of the book. Explain that the book contains several tables that summarize information so it is easier to understand.
3. Read *What's the Diagnosis?* in a way that is consistent with your classroom routines, giving students as much independence as possible. Instruct students to stop reading after page 15.
4. Return to the table on page 10. Explain that this table shows data for all the possible causes of a sore throat. Discuss how Dr. Davenport uses these data to consider possible diagnoses.

5. Then, review the table on page 14 that shows the evidence Dr. Davenport gathered to make a final diagnosis. Ask students to compare this table with the table on page 10. Ask how Dr. Davenport used evidence. [She found the possible cause that matched all the patient's problems.]
6. Invite students to read pages 16–21. Have them pay attention to the evidence that will be used to diagnose an upset stomach.
7. When students have finished reading, direct their attention to the Diagnosing an Upset Stomach table you prepared before class. Distribute a Data Table student sheet to each student. Have students record the title of the data table on their student sheets.
8. Show students how to record the key information from the “Evidence” column from the table on page 19. Fill out the left-hand column on the board as students do the same on their student sheets.
9. Explain that the table on page 19 lists possible causes of the patient's problem and that students must make the diagnosis themselves by reading carefully. Model how to reread page 16 to find evidence for throwing up. Record “yes” next to “throwing up” in the table on the board. Have students do the same on their student sheets.
10. Have students reread pages 16–21 and record “yes” or “no” in the right-hand column next to each piece of evidence.
11. Debrief the information students discovered from their reading. As students share their responses with the class, record them on the data table on the board.
12. Ask, “What's the diagnosis?” “How do you know?” Have students answer these questions on the lines below the table on their student sheets.

Independent Extension

Have students read pages 22–23 of *What's the Diagnosis?* After reading, ask students to respond in writing to the question: “How do doctors use evidence to help people?”

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 3–4

Nine engaging student books are now available from *Digestion and Body Systems* and *Variation and Adaptation*, 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 3–4 units (*Weather and Water* and *Light Energy*) are currently in development and will be available in late 2009.

<i>Digestion and Body Systems</i>	
Strategy	Student Book
Analyzing Part-to-Whole Relationships	<i>Systems</i>
Teaching About the Nature and Practices of Science	<i>Secrets of the Stomach</i>
Teaching Process Description Writing	<i>Voyage of a Cracker</i>
Searching for Information in Science Texts	<i>Handbook of Body Systems</i>
Making Sense of Data in Science Texts	<i>What's the Diagnosis?</i>
<i>Variation and Adaptation</i>	
Strategy	Student Book
Teaching Scientific Comparison Writing	<i>Blue Whales and Buttercups</i>
Using Discourse Circles	<i>The Code</i>
Using Visual Evidence to Make Inferences	<i>Mystery Mouths</i>
Teaching About the Nature and Practices of Science	<i>Evidence from the Past</i>

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.seedsofscience.org



Variation and Adaptation Science and Literacy Kit



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.

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