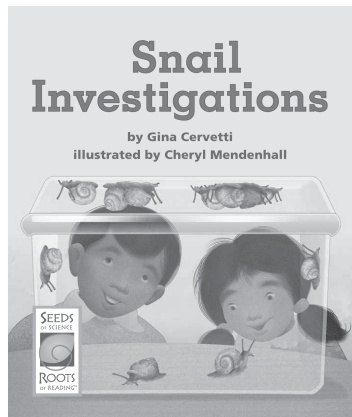


# Making Sense of Data in Science Texts

with *Snail Investigations*  
from *Seeds of Science/Roots of Reading*<sup>™</sup>



## 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*<sup>™</sup> book, *Snail Investigations*.

## Book Summary

*Snail Investigations* depicts a series of investigations conducted by students at Scott School who want to find out how to build a successful habitat for their snails. The book models the process of conducting an investigation; it follows students as they investigate different aspects of the terrarium habitat they are building. It introduces basic steps of the inquiry process: asking a question, devising and implementing a way to investigate the question, recording observations, making explanations, and asking new questions. The book includes many examples of data tables. In addition to modeling key parts of the inquiry process, the book also conveys interesting information about snails and habitats.

## About This Book

### Reading Level

Guided Reading Level\*: L

### Text Features

book description, table of contents, glossary, headings, bulleted lists, about the author, bold print, illustrations, tables

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

## Science Background

An investigation is any systematic effort to find out about something. Investigations include all the ways scientists study the world, such as conducting experiments, systematic observations, using models, reading and summarizing the research of others, etc. There is a common misconception that there is only one correct scientific method. In fact, scientific investigations happen in a variety of valid ways. For example, not every scientific investigation is an experiment. Experiments are important and very useful, but there are many other approaches to inquiry and many different investigation procedures. Scientists engage in different types of investigations based on the question(s) they are asking, the phenomena involved, and the tools available. At the core of all scientific investigation is inquiry—a constant process driven by questions about how the world works. Inquiry includes reading to find out what others have learned, posing questions, making predictions, planning investigations, gathering and analyzing information, reflecting on what was learned in the light of new evidence, and proposing explanations. It generates new questions and further investigations. Scientific inquiry requires the use of critical and logical thinking, consideration of alternative explanations, and the ability to change one's ideas based on new evidence.

## About Making Sense of Data in Science Texts

Information in texts is often communicated using visual representations such as tables, graphs, maps, and diagrams. These representations are commonly used in content-rich texts to:

- present large amounts of information in a concise manner,
- organize information to highlight relationships, and
- explain information that is difficult to describe in words.

The ability to make sense of visual representations of information is particularly essential for science, as comprehension of science texts often relies on the correct interpretation of this information.

## Teaching Students to Make Sense of Data in Science Texts

The following guidelines can be used to teach how to make sense of data in any content-rich text that contains visual representations of data.

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

## 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, axes, labels

**Maps:** title, key, scale

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

this (graph, table, map, diagram)?” Pose specific questions that encourage students to draw conclusions from the data presented. When eliciting responses, invite students to explain what information they considered in order to arrive at their answers.

- Discuss the purpose of organizing data in the chosen format. Ask students why authors (and scientists) might use this particular format to show 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, 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 representation of information based on data that you gather in class. For example, you might gather data on students’ preferences for ice-cream flavors or you might gather data about the weather over several days.
- You might also consider reorganizing data presented in a familiar text into a new format and talking about how the two representations are different.
- After students are familiar with several different ways data is represented in books (tables, diagrams, graphs, and maps), invite them to include these formats in their expository writing.

Do Snails Prefer Light or Dark?		
	Dark	Light
Snail 1	3	0
Snail 2	3	0
Snail 3	0	3
Snail 4	1	2
Snail 5	3	0

## Making Sense of Data in *Snail Investigations*

*Snail Investigations* contains a number of data tables that present information collected by the students in the book. You can work with your students to make sense of these tables using the procedures described below.

### Getting Ready

1. Recreate the Do Snails Prefer Light or Dark? table (shown above) on a piece of chart paper, leaving out the data in the Dark and Light columns.
2. Make a copy of the Data Table copymaster for each student.

### During Class

1. Read the book in a way that is consistent with your classroom routines, giving students as much independence as possible.
2. After reading, call students' attention to the two tables on page 10. Point out that tables are organized in rows (across) and columns (up and down). Demonstrate how to find information in a table by looking at the intersection of the column and row headings. Ask students to look over the two tables on page 10. Ask what they notice about which surfaces the snails chose. Then, ask students to find information in the first table. Ask, "In Trial 2, what surface did Snail 2 choose?" [Paper.] "Snail 3?" [Sand.] "Which surface was chosen most often?" [Paper, four times.]
3. Have students look at the second table on page 10. Point out that this table is a summary of the information in the first table. It shows that, in total, the snails chose paper four times (as students already determined). Pose the following questions: "Which surfaces didn't get

chosen at all?" [Small rocks and sandpaper.] "If you were making a habitat for a snail, what would you use on the bottom of the terrarium? Why?" [Paper, soil, or foam. Snails don't seem to prefer rough or bumpy materials.]

4. Have students turn to page 13. Focus their attention on the How Much the Snails Ate table. Call on a few students to share what they notice. Then, pose the following questions: "What food was all eaten?" [Lettuce.] "Were there any foods that didn't get eaten at all?" [No.]
5. Tell students you are going to reorganize the data shown in the three tables on page 19 into one table that shows how many times each snail chose a light place or a dark place. Post the Do Snails Prefer Light or Dark? class chart that you prepared before class. Distribute a copy of the Data Table student sheet to each student and have them complete the title, row, and column headings to match the class chart. Then have students help you fill in each of the cells by looking at the three tables on page 19 and figuring out how many times, in total, each snail chose a light place and a dark place. Record this data on the class chart and have students fill in their own Data Tables.
6. Ask, "Why do you think authors and scientists make tables? How do tables help you understand information?" [The same information would be confusing written out in words. They make it easy to make comparisons.] Point out that the way Aman set up his tables on page 19 made it easy for him to record what the snails did as he observed them, while the one you have just created makes it easier to see the results. Tell students that authors and scientists also organize their data in different ways depending on what they want to show.

### Independent Extension

Have students examine the tables on page 19 and the class chart you created. On the bottom of their Data Table student sheets, have students write answers to the following questions: "Did more snails choose the light or the dark? How do you know? Did different snails make different choices? How do you know? What does Aman's investigation show? How do you know?"



## 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* website (<http://www.seedsofscience.org/strategyguides.html>).

## Available Student Books for Grades 2–3

Twenty-three engaging student books are now available, each with a corresponding strategy guide. The books are part of the *Seeds of Science / Roots of Reading*™ curriculum program described on page 6. Four *Gravity and Magnetism* student books and strategy guides will be available in 2009.

Soil Habitats	
Strategy	Student Book
Using Discourse Routines with Science Texts	<i>Into the Soil</i>
Using the Cognates Strategy	<i>Walk in the Woods</i>
Connecting Science Words and Everyday Words	<i>What Are Roots?</i>
Teaching About the Nature of Science	<i>Talking with a Habitat Scientist</i>
Teaching Text Structure	<i>Handbook of Forest Floor Animals</i>
Using Text Features	<i>Earthworms Underground</i>
Taking Notes Based on Observations	<i>My Nature Notebook</i>
Making Sense of Data in Science Texts	<i>Snail Investigations</i>
Using Discourse Circles	<i>Without Soil</i>
Shoreline Science	
Strategy	Student Book
Teaching Vocabulary with Science Texts	<i>Beach Postcards</i>
Teaching Concept Mapping	<i>What Belongs on a Beach?</i>
Teaching Scientific Explanations	<i>Gary's Sand Journal</i>
Interpreting Visual Representations	<i>What's Stronger? The Forces That Cause Erosion</i>
Using Text Features	<i>What Lives on a Sandy Beach?</i>
Teaching About Multiple Meaning Words	<i>My Sea Otter Report</i>
Searching for Information in Science Texts	<i>Handbook of Sandy Beach Organisms</i>
Teaching Text Structure	<i>The Black Tide</i>
Teaching About the Nature of Science	<i>Shoreline Scientist</i>
Designing Mixtures	
Strategy	Student Book
Using Discourse Circles	<i>What If Rain Boots Were Made of Paper?</i>
Using Anticipation Guides	<i>Solving Dissolving</i>
Teaching Scientific Explanations	<i>Handbook of Interesting Ingredients</i>
Teaching Text Structure	<i>Jelly Bean Scientist</i>
Teaching About the Nature of Science	<i>Jess Makes Hair Gel</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](http://www.seedsofscience.org)



***Soil Habitats 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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