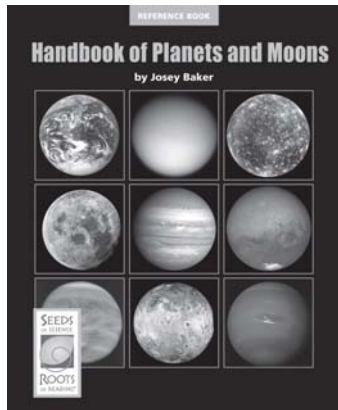


Teaching Scientific Comparison Writing

with *Handbook of Planets and Moons*
from *Seeds of Science/Roots of Reading*[®]



Introduction

This strategy guide introduces an approach for teaching students to write a scientific comparison. Comparison writing encourages careful observation and helps students explain how two things are similar and how they are different. This guide includes an introductory section about scientific comparison writing, an overview of one approach for teaching students to write a scientific comparison using information found in many science texts, and a plan for teaching scientific comparison writing with the *Seeds of Science/Roots of Reading*[®] book *Handbook of Planets and Moons*.

Book Summary

Handbook of Planets and Moons is a reference book that provides information about eight planets and ten moons in our Solar System. Each entry is divided into two sections. One section describes the conditions on the planet or moon (e.g., surface features, atmosphere, and temperature). The other section describes the exploration of the planet or moon. In addition, each entry has information about the planet's or moon's location in our Solar System, as well as close-up photographs that show the surface of the planet or moon in detail. Data tables provide key information at a glance. A short section at the end of the book provides information about other objects in our Solar System, such as comets and asteroids.

About This Book

Reading Level

Guided Reading Level*: R

Key Vocabulary

conditions, data, exploration, planet, surface feature

Text Features

bold print, captions, diagrams, glossary, headings, illustrations, index, photographs, subheadings, table of contents, tables

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

Science Background

Our Solar System is made of the Sun, eight planets, and at least 150 moons. In addition, there are many other types of objects in our Solar System, including asteroids, comets, and Kuiper Belt objects. The Sun, located at the center of our Solar System, is by far the largest object—it contains over 99% of the mass in our Solar System. All planets orbit the Sun. The planets vary greatly in size. Mercury is the smallest planet, with a diameter of just under 5,000 kilometers; Jupiter is the largest planet, with a diameter of just over 140,000 kilometers. Planets also vary greatly in their distances from the Sun. Mercury is 58 million kilometers from the Sun; Neptune is 4.5 billion kilometers from the Sun. Moons are natural satellites of planets. (Other objects, such as asteroids or Kuiper Belt objects, can also have moons.) Some planets have many moons, such as Jupiter, which has at least 63 moons. Other planets, such as Mercury and Venus, do not have any moons. Conditions vary greatly among the planets and moons in our Solar System—some are composed of ice, others are composed of rock, and still others are composed mostly of gas. Planets and moons have many different kinds of surface features, such as craters, mountains, oceans, geysers, and volcanoes.

About Scientific Comparison Writing

Scientists make comparisons after carefully observing what they are studying. These comparisons help scientists understand the relationships among things in the natural world and are the basis of classification. A scientific comparison explains how two or more things are both similar and different. Typically, a scientific comparison draws specific parallels between two or more things by beginning with a description of similarities, followed by a discussion of differences. The language of comparison (e.g., *alike*, *similar*, *different*, *in contrast*) is used to signal when similarities and differences are being discussed. Writing a scientific comparison encourages attention to detail and can help students better understand science ideas.

Teaching Scientific Comparison Writing

The following guidelines can be used to teach scientific comparison writing using information found in many science texts.

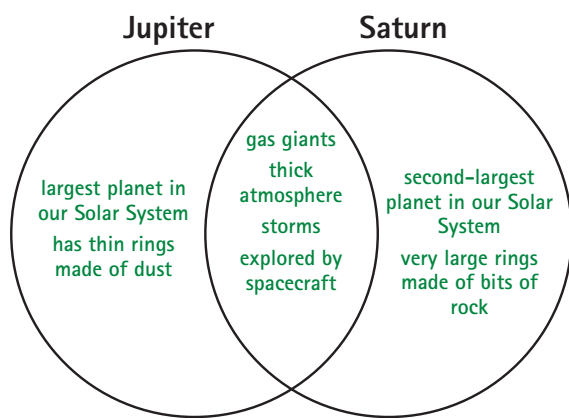
- Select a text that provides information about two things that can be compared. Good choices include books about groups of things in the natural world, such as animals, plants, rocks and minerals, or objects in our Solar System.
- Introduce the word *characteristic* by explaining that characteristics are things you can observe, such as how something looks or what it does. For example, if you have chosen a book about our Solar System, you could point out that a characteristic of planets is that they are spherical.
- As students read the text you have selected, ask them to look for descriptions of characteristics. Have students observe characteristics shown in photographs as well. It is often helpful to have students discuss these observations with a partner.
- Choose two things from the book that can be compared. Draw a Venn diagram on the board and label the two circles (e.g., “planets” and “moons”).
- Have students help you complete the Venn diagram. List similarities where the circles

Comparison Words

Similarities	Differences
alike	even though
similar	different
both	but
too	while
in the same way	although
similarly	in contrast
the same as	on the other hand

overlap and differences where they do not overlap. As you record students’ ideas, use brief phrases.

- Use the process of shared writing to construct a scientific comparison. First, explain that scientific comparisons begin with a topic sentence that tells what is being compared. With students’ help, write a topic sentence on the board, such as “Planets and moons are the same in some ways and different in other ways.”
- Have students talk you through turning the notes from the Venn diagram into two or three sentences that describe similarities. Use the words from the “Similarities” column in the box at the top of this page as needed.
- As you write the scientific comparison with the students’ help, point out that a transition sentence is needed to signal a shift from similarities to differences. Provide an example, such as “While planets and moons are alike, there are also ways that they are different.”
- Using the Venn diagram, create two or three sentences that describe differences. Use the words from the “Differences” column in the box at the top of this page as needed.
- Explain that scientific comparisons end with a conclusion that explains what was learned by making the comparison. Provide an example, such as “Planets and moons are similar in many ways but also have differences that allow us to classify them.”
- Find opportunities to make comparisons throughout a unit of study. You may want to use the Scientific Comparison Writing copymaster (included in this guide) to support students’ writing as you give them more independence.



Teaching Scientific Comparison Writing with *Handbook of Planets and Moons*

Getting Ready

1. Make a copy of the Scientific Comparison Writing copymaster for each student.
2. Make a class chart that lists comparison words, using the box on page 2 as a guide.
3. Draw a Venn diagram on the board and label one circle “Jupiter” and the other “Saturn.” You will fill in the circles with students during class; sample student responses are in green.

During Class

1. Introduce *Handbook of Planets and Moons* and ask students to read the Introduction on pages 4–5. Briefly discuss the different types of information contained in the book.
2. Direct students’ attention to the Venn diagram you made on the board and explain its purpose—to show how two things are alike and different. Tell students that they will read to compare and contrast Jupiter and Saturn.
3. Ask students to use the table of contents on page 3 to find the sections of the book that contain information about Jupiter and Saturn. Then, have students read the book in a way that is consistent with your classroom routines, giving them as much independence as possible.
4. After reading, ask students to identify ways in which Jupiter and Saturn are alike and different. Have students refer to the text as they discuss. In addition to using the main entries for the two planets, you may wish to encourage students to use the data tables on pages 44–45 for more information.

5. Use the Venn diagram to record students’ ideas. List similarities where the circles overlap. List differences where the circles do not overlap.
6. Distribute a Scientific Comparison Writing student sheet to each student. Point out the organizational supports for paragraph structure included on their student sheets. Provide needed support for them to craft a well-developed scientific comparison paragraph using the information in the Venn diagram.
7. First, have students write a topic sentence that introduces what is being compared. [Jupiter and Saturn are similar in some ways and different in other ways.]
8. Next, ask students to write about ways that Jupiter and Saturn are similar. Have them use the middle section of the Venn diagram and the Comparison Words chart for reference. [Both Jupiter and Saturn are gas giants with thick atmospheres. They both have visible storms on their surfaces.]
9. Have students write a transition sentence that signals a shift from similarities to differences. [While Jupiter and Saturn are alike, they are also different in many ways.]
10. Encourage students to write two or three sentences about how Jupiter and Saturn are different. Have them refer to the outer sections of the Venn diagram and the Comparison Words chart for reference. [Jupiter is larger than Saturn. Saturn’s rings are large and clearly visible, while Jupiter’s are thin.]
11. Have students write a concluding sentence that explains what they learned by making the comparison. [Even though Jupiter and Saturn are the two largest planets in our Solar System, they differ in many ways.]

Independent Extension

Have students work with a partner to select two moons from *Handbook of Planets and Moons*. Have each partner read about one of the moons and examine the photographs closely. Then, have partners discuss how the moons are alike and different. Encourage students to use comparison words as they talk about similarities and differences.

Name _____ Date _____

Scientific Comparison Writing

Title of book: _____

(Topic sentence)

(Similarities)

(Transition sentence)

(Differences)

(Conclusion)

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

Eighteen 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. Nine *Aquatic Ecosystems* student books and strategy guides will be available in summer 2010.

<i>Planets and Moons</i>	
Strategy	Student Book
Connecting Science Words and Everyday Words	<i>Exploring Planets and Moons</i>
Using Science Text to Visualize	<i>Spinning Through Space</i>
Taking Notes Based on Observations	<i>Observing the Moon</i>
Using the Cognates Strategy	<i>How Big Is Big? How Far Is Far?</i>
Teaching Scientific Comparison Writing	<i>Handbook of Planets and Moons</i>
Using Discourse Circles	<i>What About Pluto?</i>
Teaching About How Scientists Use Models	<i>Planetary Scientist</i>
Using Anticipation Guides	<i>Tomato Landers</i>
Promoting Word Consciousness	<i>Technology for Exploration</i>
<i>Chemical Changes</i>	
Strategy	Student Book
Teaching Scientific Explanation Writing	<i>Chemical Reactions Everywhere</i>
Posing Investigation Questions	<i>Handbook of Chemical Investigations</i>
Teaching Text Structure	<i>What Happens to the Atoms?</i>
Teaching Procedural Writing	<i>Bursting Bubbles: The Story of an Improved Investigation</i>
Promoting Word Consciousness	<i>Communicating Chemistry</i>
<i>Models of Matter</i>	
Strategy	Student Book
Teaching Summary Writing	<i>Made of Matter</i>
Using Roundtable Discussions	<i>Break It Down: How Scientists Separate Mixtures</i>
Interpreting Visual Representations	<i>Phase Change at Extremes</i>
Teaching About How Scientists Make Inferences	<i>Science You Can't See</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.deltaeducation.com



Planets and Moons 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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