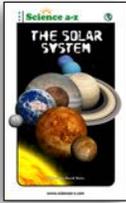


## INTRODUCTION



This book is available at three reading levels, as indicated by the one, two, or three dots beside the Science A–Z logo on the front cover.

This guide offers general instructions that can be used with any or all of the leveled books. When appropriate, tips are provided for modifying the instruction for a specific level. The dots in this guide indicate elements of the instruction that are only applicable to certain book levels.

- can only be used with low level
- can only be used with middle level
- can only be used with high level
- | can be used with low and middle levels
- | can be used with middle and high levels
- | can be used with all three levels

## BOOK SUMMARY

The book *The Solar System* takes the reader on an imaginary trip through our solar system. In the process, it provides details about the Sun, planets, moons, asteroids, dwarf planets, and comets. Data tables contain each planet’s diameter, distance from the Sun, periods of rotation and revolution, and number of moons, allowing the reader to compare the planets. Readers will also find special features containing additional high-interest facts about the main parts of our solar system. The book highlights the fact that Earth is unique because it is the only known habitable place in the solar system.

Labeled photographs and diagrams support the text.



BEFORE READING

Preview the book title, cover, and table of contents with students. Ask them to predict what the book will be about. Invite students to preview the remainder of the book, looking at images and captions as well as special features, section heads, and the glossary. Encourage them to use this information to continually make and revise their predictions while reading.

### Vocabulary

Instruction for the unit’s vocabulary terms can be found in the *Unit Guide*. It defines core and other key science terms, and suggests resources you can use to teach vocabulary before, during, or after the reading.

These terms are found in the glossary. Certain terms are only found in certain book levels, as noted.



asteroid	comet	core ⋮
crater	dwarf planet	gas giant
gravity	moon	orbit
planet	satellite ⋮	star
terrestrial ⋮⋮		

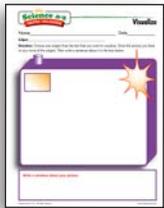
## Reading Strategy

### Visualize

Explain to students that good readers often visualize, or create pictures in their mind, as they read. As students read this book, they may be able to visualize what each object in the solar system would look like up close. They may also be able to visualize how these objects move in relation to one another. Encourage students to share what they have seen if they have looked at the planets with their eyes, through binoculars, or through a telescope. Then help them visualize as they read about more objects in the solar system.

**Think-aloud:** *Whenever I read a book, I often pause to create a picture or make a movie in my mind of what the author is describing. This helps me keep track of everything I have read and makes the reading more enjoyable. I know that good readers do this when they read, so I am going to visualize what is being described in this book as I read.*

- ⋮⋮ Model visualizing as students read about Mercury (page 8). Have students create pictures, diagrams, or other images in their mind or on paper to show how much bigger the Sun would look from Mercury than it looks from Earth. You can also have students drop marbles into a pan of flour to help them visualize how craters formed on Mercury.



Download and print the *Visualize Graphic Organizer*. Have students choose a new idea, object, or process from the book to visualize. They can draw a picture of it in the camera box and then write a sentence about it in the space below. Encourage students to continue visualizing as they read the rest of the book.

**TIP** The *Graphic Organizer* can also be used with each of the *Quick Reads*.

As students read, they should use other reading strategies in addition to visualizing.



The book begins with an explanation of what solar systems are, and it points out that ours is not the only solar system in the universe. After students read this section, check for understanding by having them describe in their own words what a solar system is, perhaps even modeling such a system with their hands or with other objects. (Retelling)

Review the key science terms in each section before students read. Encourage students to read one section at a time and then discuss in pairs, in groups, or as a class what they read. (See *Discussion Questions*.)

Students can read the special features of the book to build on the concepts within each section. Some vocabulary terms can be reinforced in these features.

### Comprehension Skill Focus

#### *Interpret Charts, Graphs, and Diagrams*

Explain to students that there are many different ways for an author to provide the reader with information. While many books use illustrations or photographs, some books (such as *The Solar System*) also use charts, graphs, and/or diagrams. Good readers study these graphic aids to understand more about the book's content.

Have students turn to page 11. Discuss what the table on this page contains (facts about Mars).

**Think-aloud:** *When I read about something that may be new to me or may be confusing, I look at the charts, graphs, or diagrams to help me understand it better. The writing in this section explained some important information about the planet Mars, but I'm sure there is much more to know about Mars than what I read in those paragraphs. This table gives me more details about Mars, and it can help me compare it to other planets, since I've noticed that each planet has a similar table on its page.*

Encourage students to examine other visual aids in the book. Have them explain what each one means. Ask questions based upon the content of various visual aids, and then have students find the most useful table or diagram in order to locate the answer. Students can also make up their own questions and call upon classmates to answer them.

Examples:

- Does Mercury have an atmosphere? p. 6
- About how far is Saturn from the Sun? p. 14
- Which planet is larger, Uranus or Neptune? pp. 15–16
- What is inside the dwarf planet Ceres? p. 18

Discuss with the class whether they feel that interpreting a chart or reading the paragraphs is a more efficient way to understand the information in a book. Have them support their responses.

As students read, they should use other comprehension skills in addition to interpreting charts, graphs, and diagrams.

### Discussion Questions



Use the *Discussion Cards* during or after reading. The cards are structured so they can be used for whole-group discussion or assigned to individuals, pairs, or groups. Choose the activity that best serves your purposes. It may be helpful to allow students to use their book and completed *Graphic Organizer* as they try to answer the questions. Here are some suggested activities:

- Divide the class into groups and have each group discuss the questions from a section of the book. Then have groups report their responses to the class.
- Have all groups discuss all the questions and then discuss the similarities and differences among the groups' answers.
- Place discussion cards at centers and have groups talk about or write their responses as they rotate through them.
- Have each student choose a card and write an answer on the back. Collect the cards and review them with the whole class.
- Assign certain questions to groups or individuals for homework.

Each question can be answered with certain book levels, as noted with dots in the upper-left corner. You may want all students to think about all the questions, even if their book level is not noted on certain cards. The book section or topic most closely related to the question appears on each card. Question types are noted in parentheses.

*All questions can be answered with all three book levels except where noted.*

### **Introduction**

- What is a solar system? (understanding)
- Where can other solar systems besides our own be found? (remembering)
- What else lives in our solar system besides people? (applying)

### **The Sun**

- How is the Sun similar to and different from other stars? (analyzing)
- What is *fusion*? (understanding)
- About how much of the mass in the solar system is contained in the Sun? (remembering)

### **The Planets**

- How do scientists group the planets? (remembering)
- How would you remember the order of the planets? (applying)

### **The Terrestrial Planets**

- How is Mercury similar to and different from the Moon? (analyzing)
- Why would the Sun look larger from Mercury than from Earth? (understanding)

- Could people live on Venus? Why or why not? (evaluating)
- What kind of place on Earth would be most similar to the surface of Venus? (evaluating)
- What are two things Earth has that make it a good place for living things? (remembering)
- Why is Mars sometimes called the Red Planet? (understanding)
- What would you need in order to spend a week on Mars? (applying)

### **Asteroids**

- What are asteroids, and where can they be found? (remembering)
- What materials would you use to make a model of the asteroid belt? (evaluating)
- How have scientists linked asteroids to dinosaurs? (understanding)

### **The Gas Giants**

- How would you identify Jupiter from a group of planet photographs? (applying)
- Are people more likely to try to land a spacecraft on a gas giant or a terrestrial planet? Why? (analyzing)
- What do the Sun and Jupiter have in common? (understanding)

- How would you feel if your planet had more than sixty moons? (evaluating)
- Why do the surfaces of Jupiter and Saturn have streaky bands of color? (understanding)
- What are Saturn's rings made of? (remembering)
- Could a person sit on one of Saturn's rings? (applying)
- Why is Uranus blue-green in color? (understanding)
- Why is Neptune so cold? (analyzing)
- If a Neptune year (one revolution) began in the Earth year 2000, when would that year end? (applying)
- How would you describe the group of planets in our solar system overall? (evaluating)

#### *Dwarf Planets*

- What makes dwarf planets different from actual planets? (understanding)
- |▪ Where is the Kuiper Belt, and what can be found there? (remembering)

#### *Moons of the Solar System*

- Why is the word *moon* sometimes written with a capital *M*? (understanding)
- How do some scientists think the Moon formed? Do you agree? (analyzing)
- |▪ Why does the same side of the Moon always face Earth? (understanding)
- Do you think we would learn more by sending a spacecraft to a planet or to a moon? Why? (creating)

#### *Comets*

- What are the parts of a comet? (remembering)
- Why does a comet's tail face away from the Sun when it gets close to it? (understanding)

#### *Conclusion*

- What tools would you use to observe the solar system? (applying)
- Do you think new solar systems discovered in the universe will be as interesting as ours? (creating)



Encourage students to reread the book.

### Reflect on the Reading Strategy: *Visualize*

Review the strategy of visualizing. Invite students to share how this strategy helped them understand what they read.

### Enduring Understanding

In this book, students have read about many interesting places in our solar system. Discuss the following with students:

- *What makes Earth different from any other place in our solar system?*

### Home Project

When the skies are clear in your area, have students and their families keep a nightly observation journal plotting the location and appearance of planets in the night sky. Send home information on where to look for certain planets at this time of year in your local area. Encourage students and their families to use binoculars and telescopes (if available), and invite them to share their observations with the class. Venus, Jupiter, and Saturn are often visible with the naked eye or with binoculars. Mars and Mercury are sometimes observable through common telescopes. Read the *Using the Internet* section in the *Unit Guide* for tips on finding websites that describe what can be seen in your local night sky.

### Assess

Download and print the *Unit Quiz*.

Use the *Nonfiction Retelling Rubric* to assess understanding.

Quick Check: For individual or group assessment, have students respond orally or in writing to the following question:

- *What are the eight planets of our solar system, listed from nearest the Sun to farthest from the Sun?*

