

## Far-Out Guide to the Solar System

### Introduction

This teacher's guide helps students learn about the Sun, planets, moons, dwarf planets, asteroids, and comets that make up our fabulous Solar System. Books in the series take readers on a voyage to discover the diversity of objects moving about in space: how they got there, what they are made of, how they relate to the overall system circulating around the Sun, and what the future holds for them. Full-color photographs and illustrations, and engaging text that includes quotes from real space scientists, capture readers' attention as they take a ride through our neighborhood in the Universe. Sidebars, factsheets, and timelines add information that not only educates but entertains readers.

### National Standards

This series supports [Science and Language Arts](#). Go to [www.enslowclassroom.com](http://www.enslowclassroom.com) and/or [www.enslow.com](http://www.enslow.com) and click on the Curriculum Correlations tab. Click on your state, grade level, and curriculum standard to display how any book in this series backs up your state's specific curriculum standard.

### Classroom Activities

Activities linking to the five curriculum areas: Reading/Language Arts; Math, Science; Social Studies; and the Arts, can be found in this teacher's guide. Hands-on activities and a reproducible handout encourage readers to use comprehension and vocabulary skills relating to the book's subject. Some activities can be reworked to use with any book in the series.

### Guided Reading Level: N

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### Where to Find More Information About Titles in this Series:

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Titles in this series:	Library Edition ISBN:	Paperback Edition ISBN:
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### Titles in this series can be purchased through all major vendors or directly from:

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40 Industrial Road, Box 398 Berkeley Heights, NJ 07922-0398  
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Teacher's Guide for  
**Far-Out Guide to Asteroids and Comets**

Asteroids are basically just big rocky, metallic objects that orbit the Sun. Most are in a belt between the orbits of Jupiter and Mars, but some are beyond Saturn and others cross Earth's path. Comets are balls of ice and rock that orbit the Sun. They are in the outer regions of our solar system. As they approach the Sun, the comets' ice melts and streaks out behind like a 'tail. In this book, readers discover more fascinating facts about these objects in space: what makes an asteroid different from a comet, how an asteroid affected the dinosaurs, what are some famous comets and why don't we see them very often, will Earth be hit by a giant meteor, and more, including what spacecraft is uncovering about these space travelers. Readers get the facts straight from real scientists who work on programs that study the Universe.

**Introduction, pages 4–7** Read the title, *Far-Out Guide to Asteroids and Comets*, aloud and have students discuss the cover photograph. Then browse a few pages, pointing out text features such as the Contents, Index, headings, photo captions, text boxes, maps, and labeled diagrams. Read the first sentence on page 5 and explain that the author is using a descriptive text structure to help readers visualize, or create pictures in their minds. The author selects details that appeal to readers' five senses (sight, hearing, smell, taste, touch). Invite students to share what they visualize when they read the description of chunky, swirling cloud. Encourage students to use their visualization skills as they read the book. Point out the fact box on page 7 and stress that it adds important information that relates to or supports information in the main text.

**Chapter 1, pages 8–26** Read aloud the first sentence on page 8 and stress the word *since*. Explain that words like *since*, *first*, *then*, *next*, and *finally* signal a sequence text structure. The author tells events in the order they happened. Add that sometimes there are no signal words, but readers can infer the sequence from the text. Encourage students to make sequence charts on which to list events in order as they read. Point out that this will help students better understand the relationships between events. Direct attention to the question at the end of the first paragraph on page 18. Tell students that authors often ask questions to get readers involved and tempt them to read on to find the answers. Skim and scan the *At a Glance*, *Fast Facts*, and *Timeline* pages together and stress that they summarize information for readers.

**Chapter 2, pages 27–35** As students read the chapter, encourage them to continue to visualize and to record the voyage of *Stardust* from launch to landing and beyond on their sequence charts. Point out that the chapter title tells us the main idea of this chapter, what comets look like up close. Remind students that the main idea is what the text is mostly about. Sentences and paragraphs give details that support that main idea. Have students look for important details as they read, then make concept webs with a *comets* in a center circle and details like *three main parts* and *Stardust catches dust* in smaller circles around it. Let partners share and compare their results.

**Chapter 3, pages 36–43** Let students partner-read and discuss what is ahead for Pluto-like worlds. Have partners continue to track and record any sequences of events, then share and compare their sequence charts. Draw attention to the *Words to Know*, *Find Out More*, and *Index* pages that follow the chapter. Point out how such information can help readers find information more easily.

**After Reading** Ask students to share what they learned from the book. To draw out personal responses, ask: *What one thing about asteroids and comets did you find most interesting? What do you think should be done to make sure a NEO does not smash into Earth? Would you recommend this book to a friend? Why or why not?*

Activities linking to Reading/Language Arts, Math, Science, Social Studies, and the Arts on the page that follows. Make copies of the Handout on the last page. Read the directions aloud, then let students do the page independently. Answers: 1. c, 2. g, 3. e, 4. b, 5. a, 6. h, 7. f, 8. d.

## Activities The Five Curriculum Activities

### **SAFETY WARNING:**

Before doing any activity, make sure students do not have allergies to items needed. Students will be working around dry ice and ammonia, both of which must be handled responsibly. An adult should always be in charge when these materials are around. Always review directions and safety rules with students before they begin a project.

### **Reading/Language Arts activity:**

Ask students to imagine they have discovered an NEO that is headed for a collision with Earth. Have them work alone or with a partner to write a fictional narrative about whom they would tell and what they would do to prepare for the impact. Encourage students to illustrate their work, then share it with classmates.

### **Math activity:**

Direct attention to the map on page 13 that shows the many asteroids and comets. Point out it would be impossible to count all the objects in the picture, so people just have to estimate how many are there. Have students practice estimating and the testing their estimates. Place counting cubes on a table and give each student a small cup. Ask how many cubes they estimate, or think, the cup will hold. Say, *An estimate has to make sense, Would it make sense to estimate that the cup could hold 100 cubes? Just 3 cubes?* Have students write their estimates, then fill their cups with cubes and count how many they used. Were their estimates close? Invite each student to share results using this sentence frame, *My estimate was \_\_\_ and the cup held \_\_\_ so I (was/was not) close.*

### **Science activity:**

Make a comet in front of the class. Wear safety goggles. Line a large plastic mixing bowl with a plastic garbage bag. Pour 1 cup of water in the bowl, then add 1 teaspoon of sand or dirt. Stir well. Add a dash of ammonia and a dash of dark corn syrup. Stir until well mixed. In another garbage bag, place 1 cup of dry ice and crush it with a hammer. (Be sure to wear gloves when handling dry ice to keep from being burned.) Add the crushed dry ice to the mixing bowl. Stir vigorously until mixture is almost frozen. Use the plastic liner to carefully lift the "comet" from the bowl and shape it into a snowball. Unwrap the comet as soon as it holds its shape. Place the comet where students can observe it safely during the day as it turns directly from a solid to a gas. Have students draw what they see as small jets of gas escape from small holes in the frozen water. At the end of the day, dispose of the remaining material carefully.

### **Social Studies activity**

Remind students that on page 19 they learned that the diameter of an asteroid could be up to 564 miles. (Can be rounded up to 600) Let students practice using map scales. Provide state road maps. Ask students to find cities that are approximately as far away from your city as the diameter of an asteroid.

### **Arts activity:**

Have students complete the solar system mural they started when reading *Far-Out Facts About Mercury*. Suggest students create a dance, each person portraying a planet, moon, dwarf planet, asteroid, comet, or the Sun. Let students use any music they think would work as they rotate and revolve around the Sun in their various orbits.

**Handout**

**Crack the Code**

Use the Code key to help you decode each word. Then draw a line to its meaning.

Code Key																	
A	B	C	D	E	F	H	I	L	M	N	O	P	R	S	T	U	Z
7	12	34	21	9	4	31	13	20	23	17	16	35	11	2	14	5	27

1. 7 2 14 9 11 16 13 21

— — — — —

a. a meteorite that crashed on Earth

2. 34 16 23 9 14

— — — — —

b. dirt-covered lumpy snowball  
part of a comet

3. 7 15 16 15 31 13 2

— — — — —

c. hunk of rock and metal

4. 17 5 34 20 5 9 2

— — — — —

d. where *Meteor Crater* is

5. 23 9 14 9 16 11 13 14 9

— — — — —

e. asteroid that will be close  
to Earth in 2029

6. 34 16 23 7

— — — —

f. first space probe to fly through  
a comet's tail

7. 2 14 7 11 21 5 2 14

— — — — —

g. looks like a fuzzy star with a tail

8. 7 11 13 27 16 17 7

— — — — —

h. cloud formed by gas from  
a melting comet