LESSON **2** TEACHER'S GUIDE

Dust from Comets

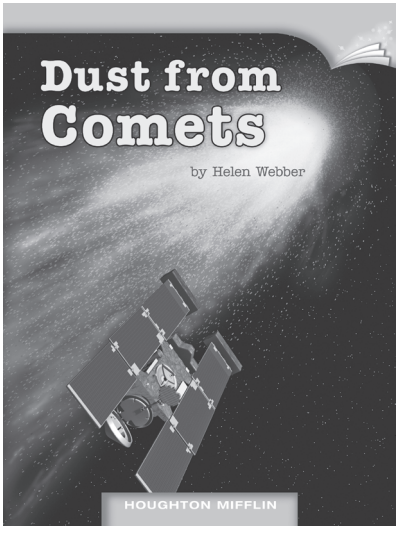
by Helen Webber

Fountas-Pinnell Level U

Informational Text

Selection Summary

Scientists sent the spacecraft *Stardust* into space to collect data from Comet Wild 2. The spacecraft took photographs and collected comet dust. Scientists use dust samples to learn about comets, the solar system, and the beginnings of life.



Number of Words: 1,735

Characteristics of the Text

Genre	• Informational text
Text Structure	• Third-person narrative • Chronological description of *Stardust* mission
Content	• Solar system bodies other than planets, such as comets • Goals, methods, and findings of the *Stardust* space mission • Analysis of data learned from comet dust
Themes and Ideas	• Curiosity about space, solar system • Effects of science and technology on space exploration • Influence of data analysis on current space theories
Language and Literary Features	• Language descriptive of space exploration • Conversational language
Sentence Complexity	• A mix of short and complex sentences • Italics for terms, name of spacecraft
Vocabulary	• Many technical terms, some of which might not be familiar to English language learners, such as *asteroid, coma, comet, meteoroid, aerogel, periscope*. Cultural references such as *NASA* (p. 3).
Words	• Multisyllable words such as *astronomers, asteroids, experiments*
Illustrations	• Illustrations and photographs support the text and add interest • Captions in text boxes explain details of illustrations and photographs
Book and Print Features	• Sixteen pages of text, plus a table of contents • Easy-to-read chapter headings and run-in subheadings

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978-0-547-30971-2 1 2 3 4 5 6 7 8 9 10 0940 15 14 13 12 11 10 09

Dust from Comets by Helen Webber

Build Background

Help students use their knowledge about our solar system to visualize the selection. Build interest by asking a question such as the following: *Have you ever seen a star moving through the sky?* Read the title and author and discuss the cover illustration. Tell students that informational text will provide facts and details about the *Stardust* mission.

Frontload Vocabulary

Some everyday words may be unfamiliar to English learners. Before reading, check understanding of the following words: *dust, clue, sky, star, sun, Earth, rock, planet, life.*

Introduce the Text

Guide students through the text, reading the captions, noting important ideas and helping with unfamiliar language and vocabulary so they can read the text successfully. Call their attention to any important labels. Here are some suggestions:

Page 3: Explain that this is an article about a space mission. **Suggested language:** *This is the introduction to the article. The chapter heading means that the space mission involves a "meeting" with a comet. Read the caption and look at the illustration of the* Stardust. **Cultural Support:** *Give background about NASA.*

Page 8: Discuss the *Stardust* spacecraft's mission. *Read the first sentence:* The *Stardust* project's mission was to bring comet dust back to Earth. **Ask:** *What do you think scientists can learn from comet dust?*

Page 9: Read the caption. Tell students that the *Stardust* took 72 photos of the comet with an **acute**, or extremely sharp, camera system. **Ask:** *How would an* **acute** *camera system provide scientists with clues about comets?*

Page 13: Point out the photograph of Comet Wild 2 and read the captions aloud. *The Stardust collected dust from the comet named Comet Wild 2. Look at the photograph of the comet.* **Ask:** *How would you describe Comet Wild 2?*

Turn back to the beginning and read to find out how scientists collected and studied comet dust and what they learned from it.

Target Vocabulary

acute – extremely sharp or keen, p. 9

adjusted – have changed and improved something, p. 12

axis – a real or an imaginary straight line that goes through the center of a spinning object, p. 12

delicate – fragile, p. 4

flawed – having mistakes, p. 15

function – work or operate, p. 10

operator – someone whose job is to use or control a machine or vehicle, p. 12

simulate – to imitate something in a way that is very close to the real thing, p. 11

tethered – tied to something, p. 14

version – a form of something that varies from other forms of the same thing, p. 16

Read

Have students read silently while you listen to individual students read aloud. Support their understanding of the text as needed.

Remind students to use the Question Strategy TARGET STRATEGY as they read. Tell them to think about questions scientists had about comets when they designed this mission.

Discuss and Revisit the Text

Personal Response

Invite students to share their personal responses to the text.
Suggested language: *What do you think is most interesting for the scientists who study comet dust?*

Ways of Thinking

As you discuss the text, help students understand these points:

Thinking Within the Text	Thinking Beyond the Text	Thinking About the Text
• Comets are small bodies, made of rock, ice, and minerals, that exist in our solar system. • The *Stardust* space mission took photographs and collected dust from Comet Wild 2. • Scientists hope to learn more about comets, and our solar system by studying comet dust.	• Bodies in space have intrigued people all over the world for centuries. • Advances in technology will make it easier for scientists to collect space materials and study the materials. • By studying real data, such as space dust, scientists come up with more questions and new ways of thinking about the solar system.	• Chapter headings, and section subheadings give clues about the content to follow. • Illustrations with captions in text boxes further explain the text. • The glossary at the end of the article lists and defines technical and other unfamiliar words from the text.

Choices for Further Support

- **Fluency** Invite students to participate in choral reading. Remind them to use punctuation, including dashes, as well as sentence structure and content, as a guide for when to pause.
- **Comprehension** Based on your observations of the students' reading and discussion, revisit parts of the text to clarify or extend comprehension. Remind students to go back to the text to support their ideas.
- **Phonics/Word Work** Provide practice as needed with words and word parts, using examples from the text. Have students define the word *astronomer* based on its use on pages 4 and 5. Point out the Greek root *astro-*, meaning "star." Ask students to name other words that share a root with *astronomer (astronomy, astronaut)*.

Writing about Reading

Critical Thinking

Have students complete the Critical Thinking questions on BLM 2.10.

Responding

Have students complete the activities at the back of the book, using their Reader's Notebook. Use the instruction below as needed to reinforce or extend understanding of the comprehension skill.

Target Comprehension Skill

Text and Graphic Features TARGET SKILL Remind students that they can examine the illustrations and captions to help them better understand the text in the selection. Model how to add details to the Graphic Organizer, using a "Think Aloud" like the one below:

Think Aloud

The caption for the photograph on page 4 tells how the planets revolve around the sun. The caption for the illustration on page 7 shows where the Asteroid and Kuiper Belts are located. Both are graphic features that aid understanding.

Practice the Skill

Have students share their examples of other articles in which text and graphic features support the facts and details contained in the selection.

Writing Prompt: Thinking Beyond the Text

Have students write a response to the prompt on page 6. Remind them that when they think beyond the text, they use their personal knowledge to reach new understandings.

Assessment Prompts

- What is this article mainly about?
- How does the author organize the information in this article?
- Which sentences on pages 4 and 5 support the idea that people have been interested in comets for a long time?

English Language Development

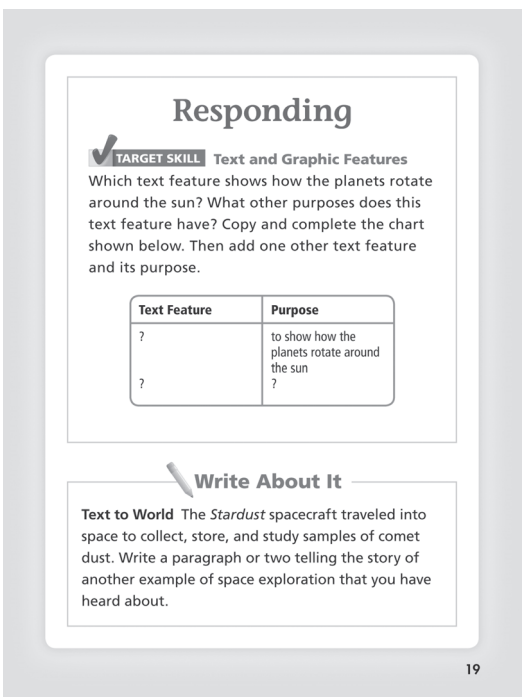
Reading Support Pair English-speaking and English language learners so that they can check their understanding with each other.

Vocabulary The selection contains the acronym NASA (page 3). Explain to students that NASA is an acronym, a word formed from the initials of several words. Tell students that NASA stands for National Aeronautics and Space Administration.

Oral Language Development

Check student comprehension, using a dialogue that best matches your students' English proficiency. **Speaker 1** is the teacher, **Speaker 2** is the student.

Beginning/Early Intermediate	Intermediate	Early Advanced/ Advanced
Speaker 1: What is the *Stardust*? **Speaker 2:** a spacecraft **Speaker 1:** What did the *Stardust* collect? **Speaker 2:** comet dust **Speaker 1:** Where did *Stardust* get the comet dust? **Speaker 2:** Comet Wild 2	**Speaker 1:** What was the job of the Sample Return Capsule? **Speaker 2:** It collected comet dust and carried the dust back to Earth. **Speaker 1:** How is Comet Wild 2 different from other comets? **Speaker 2:** The surface of Comet Wild 2 is pocked, not smooth like other comets.	**Speaker 1:** How did scientists learn about Comet Wild 2? **Speaker 2:** They sent a spacecraft, the *Stardust*, out to the comet. The spacecraft took photographs and collected comet dust. Then it carried the dust back to Earth for scientists to study.



Responding

TARGET SKILL Text and Graphic Features

Which text feature shows how the planets rotate around the sun? What other purposes does this text feature have? Copy and complete the chart shown below. Then add one other text feature and its purpose.

Text Feature	Purpose
?	to show how the planets rotate around the sun
?	?

Write About It

Text to World The *Stardust* spacecraft traveled into space to collect, store, and study samples of comet dust. Write a paragraph or two telling the story of another example of space exploration that you have heard about.

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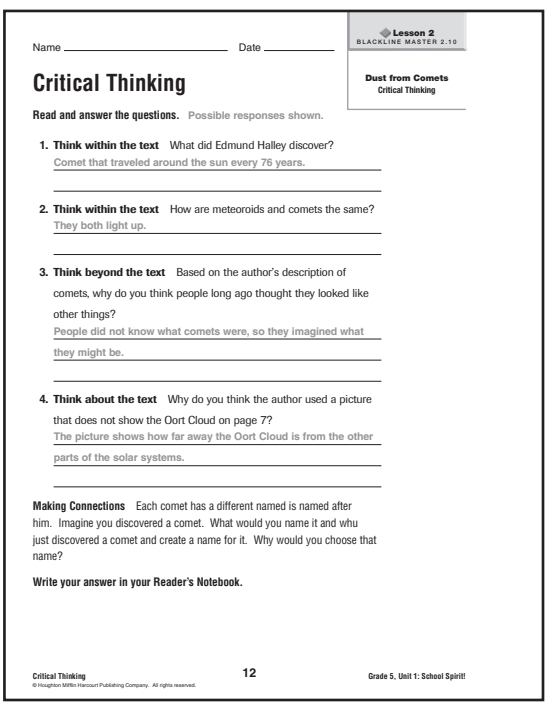

Name _____ Date _____

Lesson 2 BLACKLINE MASTER 2.10

Dust from Comets
Critical Thinking

Critical Thinking

Read and answer the questions. Possible responses shown.

1. **Think within the text** What did Edmund Halley discover?
Comet that traveled around the sun every 76 years.

2. **Think within the text** How are meteoroids and comets the same?
They both light up.

3. **Think beyond the text** Based on the author's description of comets, why do you think people long ago thought they looked like other things?
People did not know what comets were, so they imagined what they might be.

4. **Think about the text** Why do you think the author used a picture that does not show the Oort Cloud on page 7?
The picture shows how far away the Oort Cloud is from the other parts of the solar systems.

Making Connections Each comet has a different named is named after him. Imagine you discovered a comet. What would you name it and whu just discovered a comet and create a name for it. Why would you choose that name?

Write your answer in your Reader's Notebook.

Critical Thinking 12 Grade 5, Unit 1: School Spirit!

Name _____ Date _____

Dust from Comets

Thinking Beyond the Text

Think about the questions below. Then write your answer in one or two paragraphs.

Remember that when you think beyond the text, you use your personal knowledge to reach new understandings.

What are the benefits of the Stardust mission and other space missions? Do you think these benefits are worth the money that is spent on the space missions? Why or why not? Explain your answer, giving examples from the selection.

Name _____ Date _____

Critical Thinking

Read and answer the questions.

1. **Think within the text** What did Edmund Halley discover?

_____

_____

2. **Think within the text** How are meteoroids and comets the same?

_____

_____

3. **Think beyond the text** Based on the author's description of comets, why do you think people long ago thought they looked like other things?

_____

_____

_____

4. **Think about the text** Why do you think the author used a picture that does not show the Oort Cloud on page 7?

_____

_____

_____

Making Connections Each comet has a different name. Imagine you just discovered a comet and created a name for it. Why would you choose that name?

Write your answer in your Reader's Notebook.

Student _____ Date _____

Dust from Comets • LEVEL U

Dust from Comets
Running Record Form

page	Selection Text	Errors	Self-Corrections
10	A Sample Return Capsule was attached to the spacecraft. This capsule collected samples of comet particles and dust. The capsule analyzed and stored the samples. Then the whole spacecraft went back to Earth. When the spacecraft got near Earth, the capsule detached from the spacecraft. The capsule used a parachute to return to Earth with the samples of comet dust.		
11	Inside the Sample Return Capsule was a special device. The device was shaped like a tennis racket. The device held many thin blocks of aerogel, a strong, lightweight material. The device folded out of the capsule to collect comet dust.		
	Comments:	**Accuracy Rate** (# words read correctly/100 × 100) _____ %	**Total Self-Corrections** _____

Behavior	Code	Error
Read word correctly	✓ cat	0
Repeated word, sentence, or phrase	® cat	0
Omission	cat	1

Behavior	Code	Error
Substitution	cut cat	1
Self-corrects	cut SC cat	0
Insertion	the ^cat	1
Word told	T cat	1

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