

READING Adventures

Welcome, Reader!

In this magazine, you will explore places from the Milky Way to Death Valley, from the Alaska Range to the African savannah. You'll investigate animals as big as a colossal squid and as small as a honeybee.

You'll read poems and articles about wild storms and outer space, and you'll interact with nature through lots of fun activities.

Your adventure begins as soon as you turn the page!



"Moon" from *Space Songs* by Myra Cohn Livingston. Text copyright © 1988 by Myra Cohn Livingston. Reprinted by permission of the author c/o Marian Reiner, Literary Agent. "Satellites" from *Space Songs* by Myra Cohn Livingston. Text copyright © 1988 by Myra Cohn Livingston. Reprinted by permission of the author c/o Marian Reiner, Literary Agent. "Twelve Below" from *Letters from Maine* by May Sarton. Copyright © 1984 by May Sarton. Reprinted by permission of W. W. Norton & Co. "Desert Day" from *Central Heating: Poems About Fire and Warmth* by Marilyn Singer. Text copyright © 2005 by Marilyn Singer. Reprinted by permission of Alfred A. Knopf, an imprint of Random House Children's Books, a division of Random House, Inc. "Straight Talk" by Nikki Grimes. Copyright © by Nikki Grimes. Reprinted by permission of Curtis Brown Ltd. "An evenly balanced word W H A L E..." from *Words with Wrinkled Knees: Animal Poems* by Barbara Juster Esbensen. Text copyright © 1986 by Barbara Juster Esbensen. Reprinted by permission of Wordsong, a division of Boyds Mills Press, Inc. "Snow" from *A Pocketful of Poems* by Nikki Grimes. Text copyright © 2001 by Nikki Grimes. Reprinted by permission of Houghton Mifflin Harcourt Publishing Company. "The Elephant" by Hilaire Belloc. Reprinted by permission of PFD. "The Wind" from *Mummy Took Cooking Lessons and Other Poems* by John Ciardi. Text copyright © 1990 by Judith C. Ciardi. Reprinted by permission of Houghton Mifflin Harcourt Publishing Company.

2014 Edition

Copyright © by Houghton Mifflin Harcourt Publishing Company

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying or recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner unless such copying is expressly permitted by federal copyright law. Requests for permission to make copies of any part of the work should be addressed to Houghton Mifflin Harcourt Publishing Company, Attn: Contracts, Copyrights, and Licensing, 9400 Southpark Center Loop, Orlando, Florida 32819.

Printed in the U.S.A.

ISBN: 978-0-547-88880-4

24 25 26-0928-20 19 18

4500708503

C D E F G

If you have received these materials as examination copies free of charge, Houghton Mifflin Harcourt School Publishers retains title to the materials and they may not be resold. Resale of examination copies is strictly prohibited.

Possession of this publication in print format does not entitle users to convert this publication, or any portion of it, into electronic format.

Lesson
26

Space Trash 4
by Mary Carvlin

How the Milky Way Came to Be 10
by Mary Janisch

Poetry Place

Moon 12
by Myra C. Livingston

Satellites 13
by Myra C. Livingston

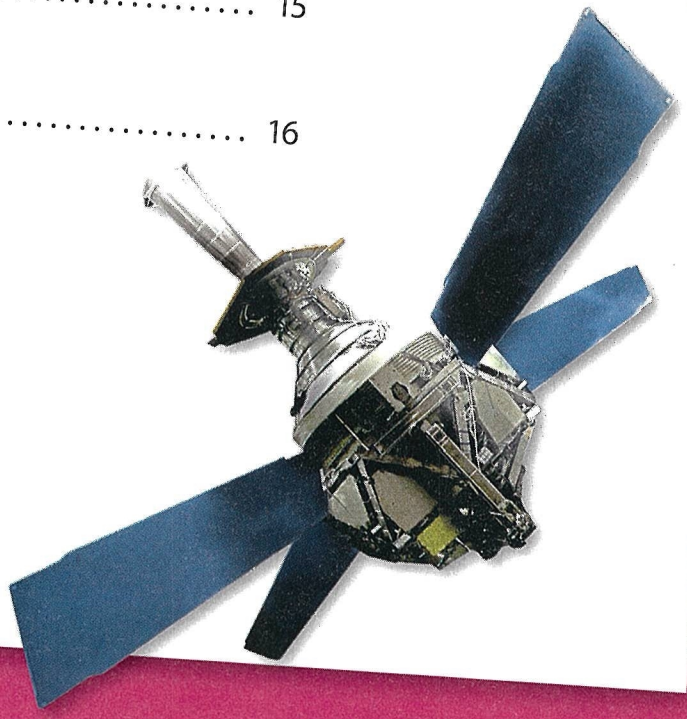
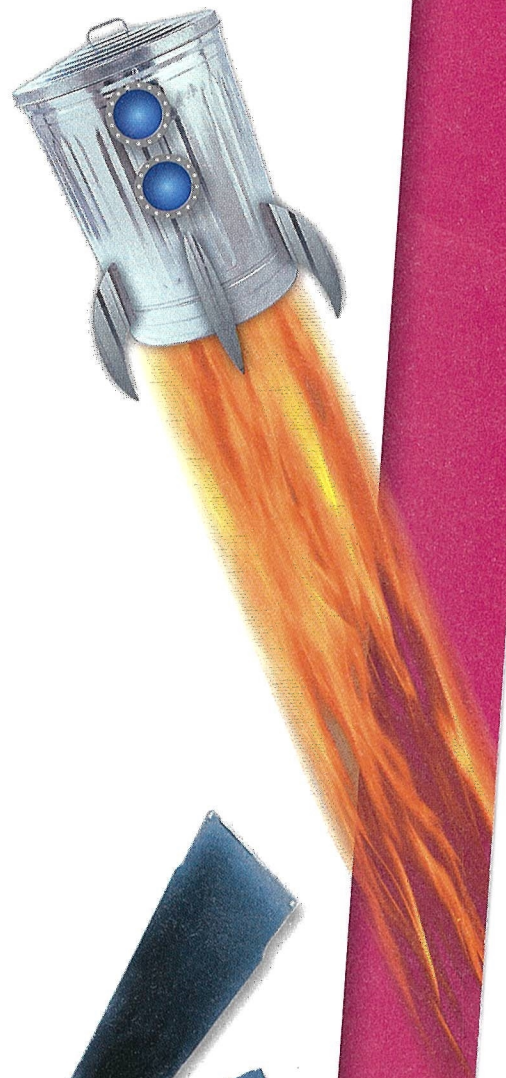
Activity Central

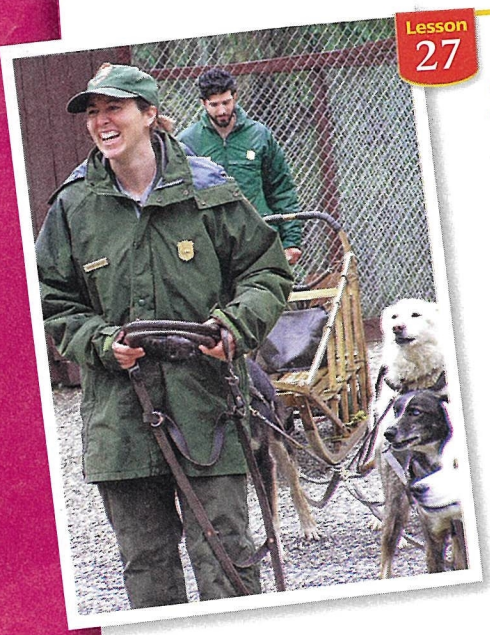
Clean Up Space! 14

Look Up! Shape Poems 15

Your Turn

Catch That Trash! 16





Lesson 27

Denali Dog Sled Journal 18
by Terry Miller Shannon

A Harsh Land of Beauty 26
by Patricia Ohlenroth

Poetry Place

Twelve Below 28
by May Sarton

Desert Day 29
by Marilyn Singer

Activity Central

Extreme Museum 30

Letter Play 31

Your Turn

Stay Alive! 32



Lesson 28

Vanishing Act 34
by Linda Johns

The Smart Swarm 42
by Mary Carvlin

Poetry Place

Bee, I'm Expecting You 44
by Emily Dickinson

Straight Talk 45
by Nikki Grimes

Activity Central

The Shape of Nature 46

Swarming Shapes 47

Your Turn

A Mystery of Nature 48



Elephants on the Savannah..... 50
by Beth Geiger

A Colossal Catch..... 58
by Mary Janisch

Poetry Place

The Elephant..... 60
by Hilaire Belloc

An evenly balanced word WHALE... 61
by Barbara Juster Esbensen

Activity Central

Comic Creativity 62

True or False? 63

Your Turn

Speaking Up for the Animals 64



Storm Chasers..... 66
by Karen Ingebretsen

Whiteout! The Great Blizzard of 1888..... 72
by Katie Sharp

Poetry Place

Weather Anonymous..... 74

In the Night from *Papago Indians* 74

Snow by Nikki Grimes 75

The Wind by John Ciardi 75

Activity Central

Weather in a Box..... 76

Capture It with a Caption 77

Your Turn

Caught in a Storm..... 78

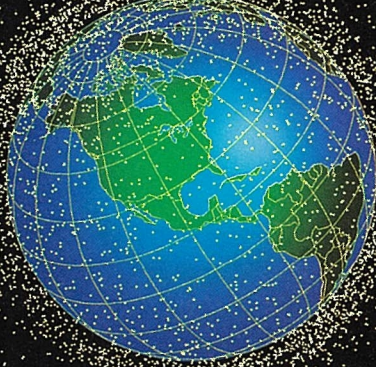


SPACE

Oxygen pack. Check. Tether cord. Check. Cameras. Check. Thermal gloves. Check. Astronaut Ed White was ready.

Boosting himself out of the *Gemini 4* hatch, White began America's first space walk. It was 1965. White beamed as he floated at the end of his twenty-five-foot tether, shooting photographs. Too soon, the spectacular walk ended. White made his way slowly back to the spacecraft. But before he handed his gear to his fellow astronaut, he dropped a spare glove! That glove joined an assortment of odds and ends we call space trash.

Over the years, the trash circling around our globe has grown. Space shuttle *Atlantis* astronauts lost a couple of bolts in space. *Discovery* astronauts lost a spatula while repairing their shuttle with special



putty. A camera, bits of broken equipment, and even garbage bags tossed out by the Mir space station have added to the debris in space. At least 10,000 pieces of junk measuring four inches or larger are orbiting our planet. The United States space program tracks this trash because even though the debris is way up in space, it could cause us big problems here on earth if it hits something.

TRASH

IT STARTED WITH THE SATELLITES

For fifty years now, people have been sending objects into space. Some of those things have been brought safely down to earth, but others have been left in space to drift.

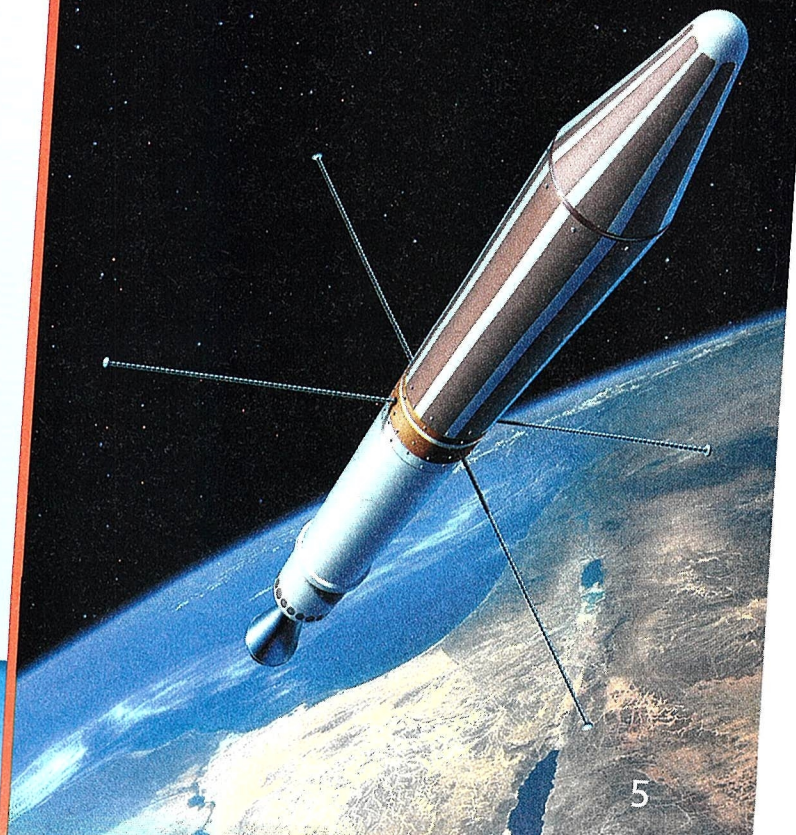
It all began in 1957, when the Soviet Union launched *Sputnik 1*, the world's first artificial satellite. A satellite is anything that revolves around a planet and is held in orbit by the gravitational pull of the planet. Our moon, for instance, is a natural satellite. Artificial satellites are objects that people make and send into space.

To launch satellites out of Earth's atmosphere and into space, rockets must travel at least 18,000 miles per hour and fly more than 120 miles into the sky. Such rockets have several powerful engines, a large supply of fuel, and a *payload*. The payload is the object being sent into the sky, like a satellite. When the rocket fires its engines one after another, the

used-up parts of the rocket fall away and become part of space trash.

Sputnik 1 circled Earth every 96 minutes. The United States launched its first satellite, *Explorer 1*, the next year. Scientists used *Explorer 1* to measure how much radiation Earth had in its atmosphere. Today, about 850 satellites orbit our planet.

Explorer 1, launched in 1958

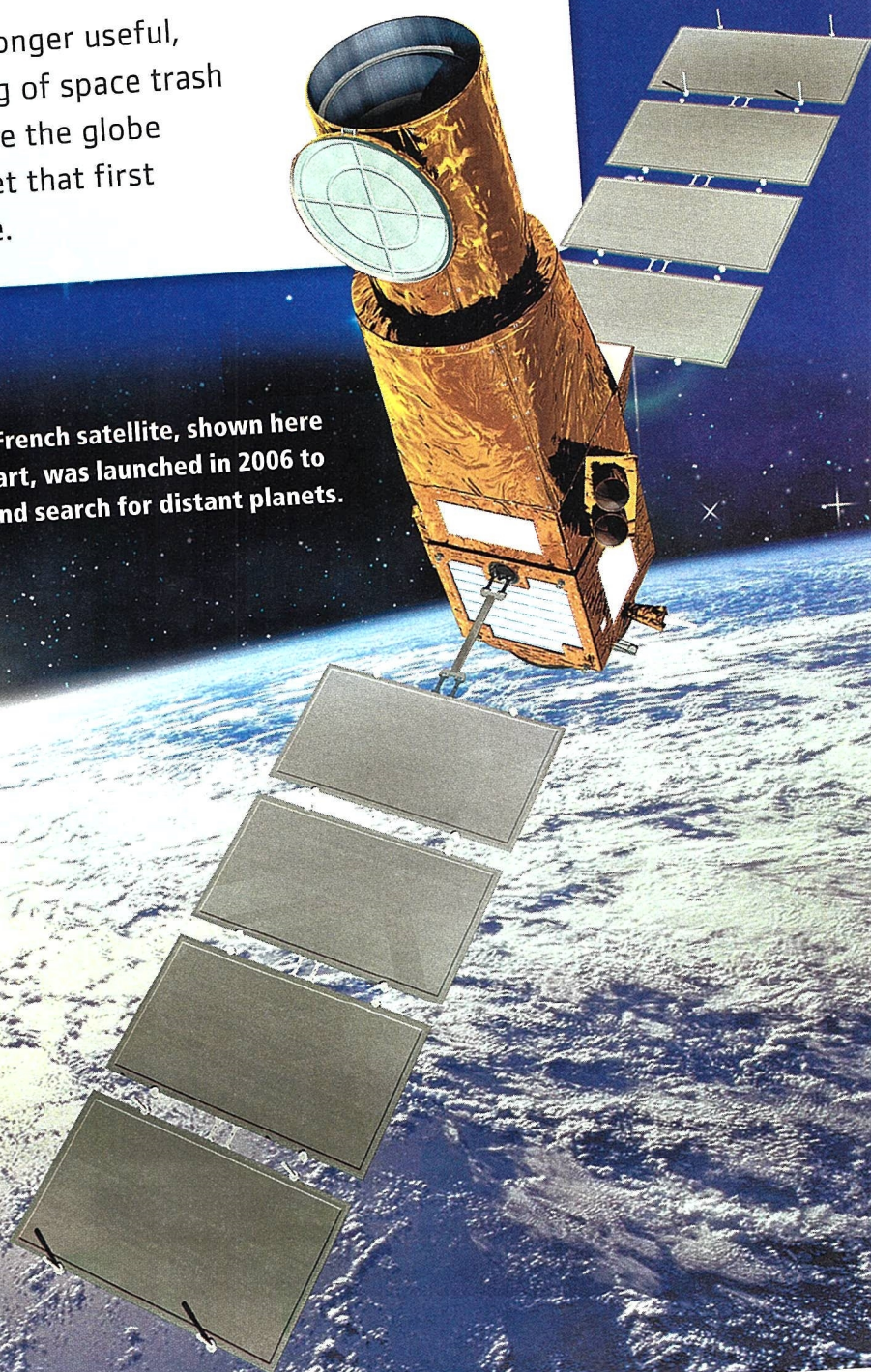


We use satellites every day. When you send a text message or use your cell phone to make a call, a satellite in space sends and receives your messages.

Satellites also bring television programs from all over the world to people's homes. They send meteorologists (scientists who study the weather) pictures of cloud formations from high above so that the meteorologist on the morning news can tell us whether to bundle up for snow or to grab an umbrella for rain. Some car passengers use satellites about 12,000 miles above us to track where they are on a digital map located on the car dashboard.

When satellites are no longer useful, they become part of the ring of space trash around the Earth. They circle the globe with the pieces of the rocket that first brought them up into space.

The Corot, a French satellite, shown here in computer art, was launched in 2006 to study stars and search for distant planets.



IN AND OUT OF ORBIT

Around our planet lies a sixty-mile-thick blanket of air called our atmosphere. The farther from Earth, the thinner the air becomes. Gravity also becomes weaker. Satellites and space trash orbit outside Earth's atmosphere and remain in orbit because of their speed, or velocity. Earth's gravity holds such objects just enough to keep them from flying off into outer space.

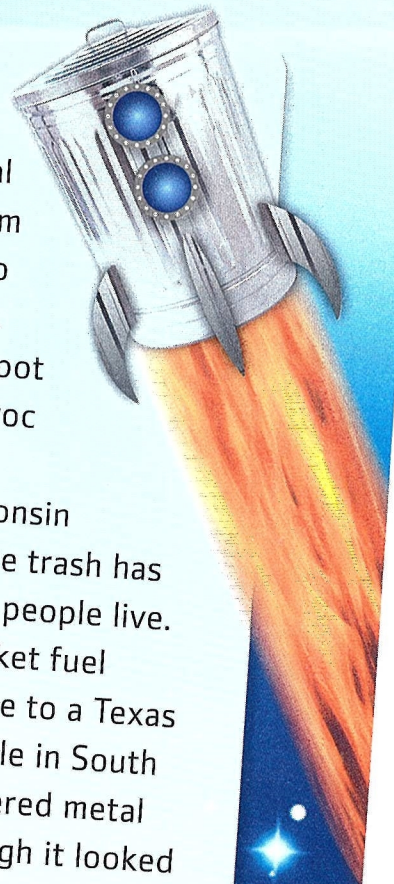
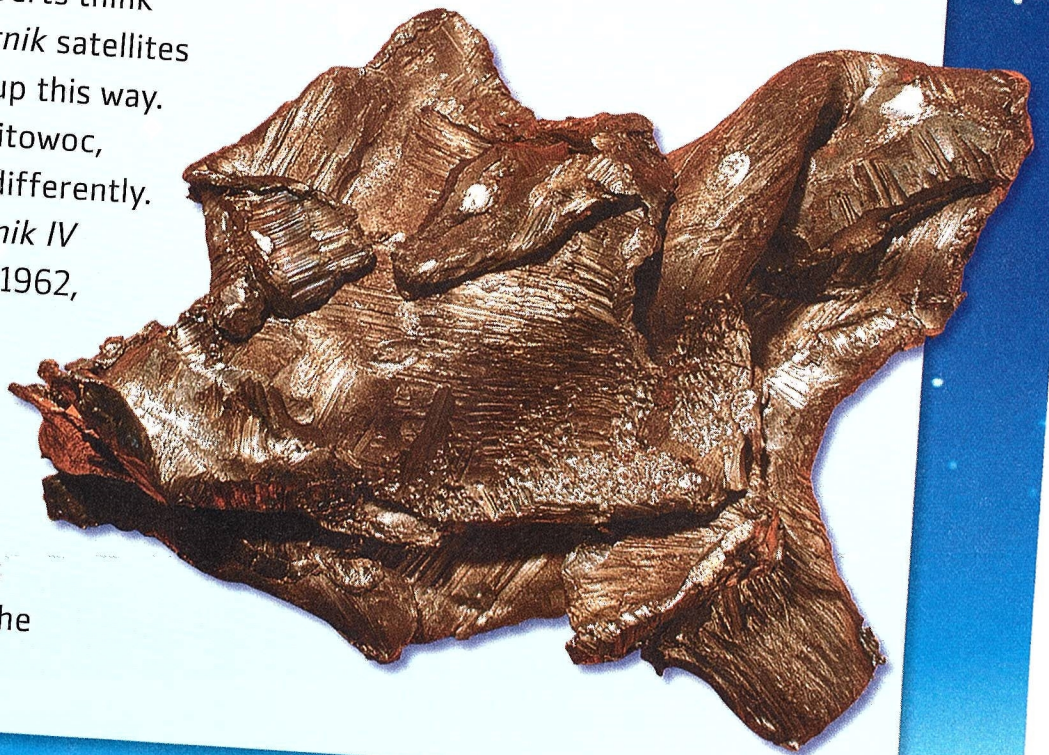
After many, many orbits, a satellite begins to lose velocity. Gravity wins the battle and pulls the object downward. It then drops to Earth at an extremely fast speed. This speed creates intense heat that makes the object burn. Spacecraft also heat up when they enter the atmosphere on a trip back to earth.

Russian space experts think *Sputnik I* and the *Sputnik* satellites that followed burned up this way. But the people of Manitowoc, Wisconsin, see things differently. They believe that *Sputnik IV* landed in their town in 1962, right in the middle of Eighth Street. A big chunk of metal lay embedded into the middle of the street, while two police officers puzzled over it. Finally, the townspeople sent the

20-pound lump of metal to Washington, D.C. From there, it was returned to the Soviet Union. Today, a brass ring marks the spot on the street in Manitowoc where the chunk landed.

The incident in Wisconsin wasn't the only time space trash has fallen into an area where people live. In 1997, a 500-pound rocket fuel tank landed in a field close to a Texas farmhouse. In 2000, people in South Africa found a large, battered metal tank in a dusty field. Though it looked like a giant ostrich egg, it was a piece of space trash that had fallen to earth.

This chunk of space metal smashed the roof of a house in Oberhausen, Germany in 1999.





In this artist's simulation, a sliver of metal collides with a satellite's solar panel.



WHY WORRY?

While most objects that reenter the Earth's atmosphere burn up, scientists agree that some space trash can survive the fall to earth. Most of this junk they expect to fall into areas with few or no people, such as the world's vast ocean, desert, or tundra areas.

Even though it's extremely unlikely that falling space trash will harm anyone, there's a good reason to worry about space trash. This junk can hit other spacecraft.

An object must travel 17,000 miles per hour to stay in orbit. An object the

size of a tennis ball traveling at that speed could seriously damage weather satellites, space telescopes, and other instruments used for gathering information.

Even things as small as chips of paint could damage other objects at such high speeds. A chip of paint made a nick in a window of the space shuttle *Challenger*. Scientists believe the dangers of this whirling junk belt around our planet will continue to grow, as objects continue colliding and creating more debris.

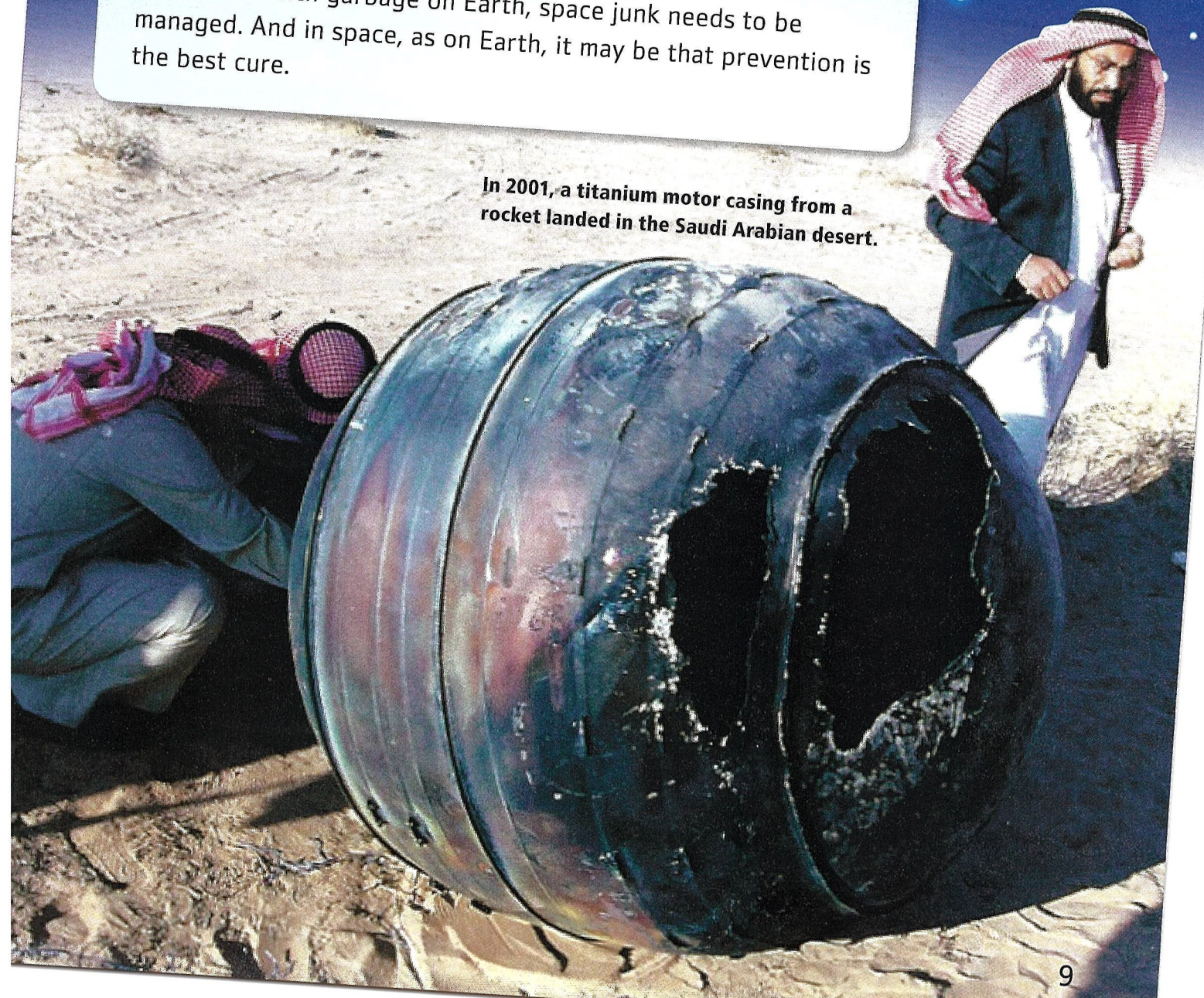
CLEAN UP TIME!

More than 400 people have traveled in space. Right now, astronauts live on the International Space Station. Scientists are working hard to find ways to keep these astronauts safe from speeding space trash. The National Aeronautics and Space Administration (NASA) even has a special office to deal with the problem.

Scientists have considered ways to get rid of used rockets and payloads in space. One way would be to just shoot used satellites far into outer space. Another way would be to create a special space ship that would travel around snatching and destroying these objects. Still another way would be to zap the trash with powerful lasers.

Just as with garbage on Earth, space junk needs to be managed. And in space, as on Earth, it may be that prevention is the best cure.

In 2001, a titanium motor casing from a rocket landed in the Saudi Arabian desert.



How the Milky Way



Long ago, when time began, there were only a few stars in the sky. When people looked up at night, the sky was almost completely black.

At that time people depended on corn for their food. They would dry some of the corn and grind it into cornmeal. They stored the cornmeal outside in large baskets. During the cold winters, people would use cornmeal to make delicious corn bread and mush.

One morning when an elderly couple went to fetch some cornmeal, they found their basket overturned. Cornmeal was scattered all over the ground. The couple was upset. Stealing was unheard of in Cherokee villages. Who could have done such a thing?

As they looked more closely at the ground, they noticed what looked like a dog's paw prints. But these paw prints were huge. No dog they had ever seen was that size.

The couple went quickly to tell the other villagers about what had happened. After hearing the story, the people decided the dog must have been a spirit dog. They didn't want the dog coming back to their village, so they made a plan.

Came to Be:

A Cherokee Tale



When the dog returned, they would frighten it away. That night, people collected all their drums and rattles and hid behind the cornmeal basket, waiting.

Suddenly they heard what sounded like a flock of birds with their wings all flapping at once. A doglike shape came down from the sky. It landed near the cornmeal basket. The dog stuck its nose inside and began to eat the cornmeal.

Jumping out from behind the basket, the villagers banged their drums and shook their rattles. They

made the biggest racket they could. The frightened dog ran from the village with the people chasing it. It ran to the top of a hill and leaped into the sky, the cornmeal falling from its mouth.

The dog ran across the black sky until it was out of sight. The cornmeal that had fallen from its mouth made a pattern of stars. The Cherokee call this pattern of stars *Gil'liutsun stanun' yi*, which means "the place where the dog ran."

And that's the story of how the Milky Way came to be.



MOON

By Myra Cohn Livingston

Moon remembers.

Marooned in shadowed night,

white powder plastered
on her pockmarked face,
scarred with craters,
filled with waterless seas,
she thinks back
to the Eagle,
to the flight
of men from Earth,
of rocks sent back in space,
and one
faint
footprint
in the Sea of Tranquility.

Monitors of steel,
these space detectives seek
clues to the beginning of our galaxy.
Informers of the energy of stars, of gamma rays;
weighted with sensors,
They listen, watch, and speak
of radiation, solar flares,
atmospheric density.

Stalking magnetic fields,

they serve out their days.

SATELLITES

By Myra Cohn Livingston



CLEAN UP SPACE!

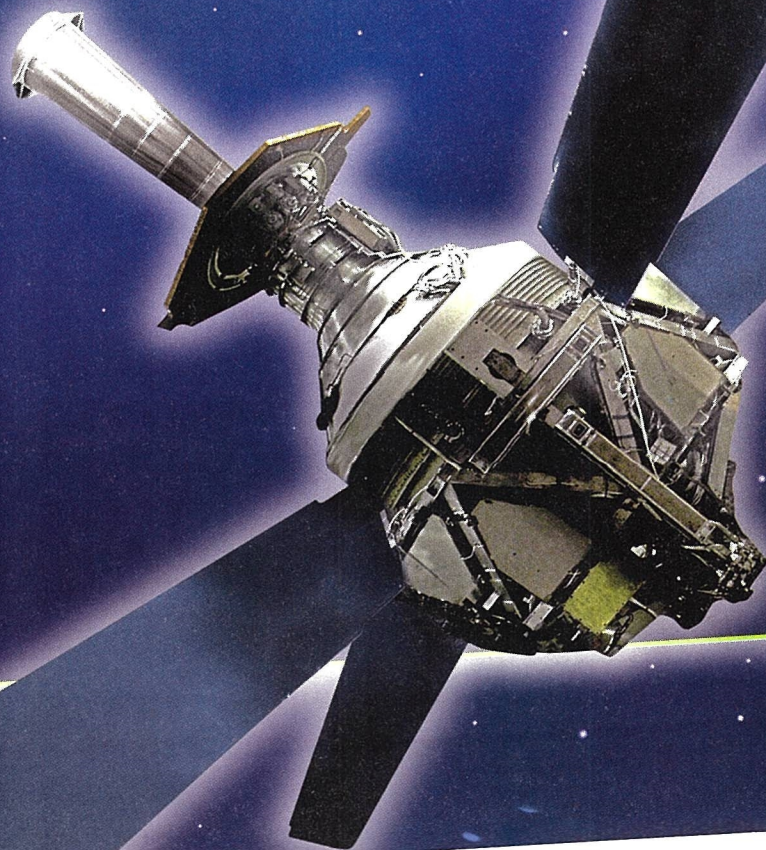
Imagine you are a board game manufacturer. Working with a partner, or in a small group, create a game in which the goal is to clean up the debris floating around in space. Write a set of rules and instructions that make it clear how the game is played and how it's won. Include a set of "chance" cards to make the game more interesting. After you've created the instructions, design the board. Once your game is complete, swap with other groups and play.



Your Turn

Catch That Trash!

In "Space Trash," you learned about the thousands of pieces of space debris and the dangers they pose. How do we get rid of this trash? Design a device to clean up space trash. Imagine that you're applying for a patent for your invention. Draw a picture of the trash picker, label its parts, and write a statement explaining how it works.



In your statement, make sure you explain:

- why the trash picker is important.
- how the device works and who operates it.
- what provides its energy source. Sunlight? Batteries?
- what happens to the trash when it's retrieved.

