

Exploring **Science**

through Literacy

Grades K-5

English & Spanish

Literacy and Content Support for the Next Generation Science Standards (NGSS)

- Leveled science readers support core ideas from the NGSS
- Combine literacy skills and science content development in each lesson
- National Geographic images and Explorers capture student interest



Supplemental Support for the Next Generation Science Standards

Leveled science readers support Disciplinary Core Ideas from the NGSS. Multiple reading levels provide core idea content, and National Geographic images and graphics capture student interest. Online Teacher's Guides support science content and literacy skills enhancement in the same lesson.

19 titles per grade

Grades K–2 Components

Support reading skills development and introduce core ideas in science topics based on the NGSS.

Become an Expert

- Designed for small group reading
- Three reading levels on the same Big Ideas topic
- Groups share and compare what they learn from their title

What Plants and Animals Need
Animals must have air, water, food, and **shelter** or space. Plants must have air, water, light, and space.

Animals must have plants or other animals for food.

Plants must have air, water, light, and space.

Animals must have air, water, food, and **shelter** or space. Plants must have air, water, light, and space.

A **shelter** is a safe place where a living thing can make its home and grow.

Explore On Your Own

- Designed for independent reading
- Three reading levels on the same Big Ideas topic
- Further exploration on topics that interest students

This is a mountain. It is not a volcano. But some mountains are volcanoes.

Write About Big Books

- Models persuasive writing
- Used as a basis for students to write their own science opinion piece

Lots of insects come out in summer.

You can see grasshoppers hop.

You can see fireflies glow.

You can see butterflies fly.

18 books per grade

Grades 3–5 Components

Continue more advanced literacy skills development with engaging National Geographic images and National Geographic Explorers who introduce students to real-world science.

- Designed for whole class or small group reading
- Differentiate with identical content and images at 3 reading levels per title
- Each title contains 3-4 articles written in a variety of genres
- High-interest, student-centered topics

FLIGHT AROUND THE GLOBE
BARRINGTON IRVING is a pilot and an educator. In 2007 at age 23, Irving became the youngest person and first African American to fly solo around the globe. Irving also founded "Explorers Academy," an organization that teaches students about aviation.

READING OBJECTIVES

- Determine the main ideas and explain how key details support the main ideas.
- Determine the meaning of science words.
- Use text features to locate information.

SCIENCE OBJECTIVES

- Understand how work, forces, and forms of energy are demonstrated in roller coasters.

Wild Coasters
Science Article

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SCIENCE OBJECTIVES

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READING STANDARDS

Discuss the main ideas of a text; recount the key details and explain how they support the main idea.

Determine the meaning of general academic and domain-specific words and phrases as used in relevant texts and subject matter.

Use text features and search tools (e.g., keywords, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.

NEXT GENERATION SCIENCE STANDARDS

PS.2.A: Forces and Motion

- Explain how an unbalanced force can change the motion of an object. Analyze data to compare the magnitude of forces acting on an object and the resulting change in the object's speed or direction of motion. (Boundary Question and conceptual, but not quantitative addition of forces are used at this level.) (2-PS2-1)
- The patterns of an object's motion in various situations can be predicted and measured when that pattern exhibits a regular pattern. Future motion can be predicted from it. Boundary: Technical terms, such as magnitude, velocity, momentum, and force, are not introduced at this level, but the concepts that some quantities need to be used and how they are described are developed.) (2-PS2-2)

Summary "Wild Coasters" describes how the fastest, highest, and longest roller coasters in the world use forces, work, energy of motion, and stored energy to create thrilling rides.

BUILD BACKGROUND FOR THE GENRE

Ask students to describe the kinds of information they might expect to read in a science article. Tell them that "Wild Coasters" is a science article with the following elements:

- It uses facts, details, and examples to present information about a science topic.
- The text is organized using headings and has specialized vocabulary.
- Information is presented through photos and fact boxes.

BUILD VOCABULARY & CONCEPTS

- work
- gravity
- energy of motion
- stored energy
- force

Remind students that **Using Context Clues** is a strategy to infer the meaning of an unfamiliar word. They can "read around" the word, or read a few sentences before and after it, to make meaning from the context. Remind them to look at the photographic, too.

Another strategy to try is **Becoming Wordkeepers**. Explain that a wordkeeper is responsible for knowing the meaning, part of speech, and spelling of a certain word. The word's meaning is especially important. Tell students they can go to the wordkeeper to learn about the word and its meaning. Ask for a volunteer to be the wordkeeper for work. Write the word on a card and give it to the wordkeeper.

Discuss the meaning of work as given on page 10, and have the wordkeeper write it on the back of the card. Follow the same steps with the other words.

Point out other important words in the selection, such as *launch*, *slope*, *launch*, and *air time*. Designate a wordkeeper for each of these words and any words that might be unfamiliar to students.

READ

The **content goal** for *Roller Coasters* is for students to learn how different forces (including gravity and magnetism) and changes between stored energy and energy of motion move roller coaster cars. "Wild Coasters" explains how the force of gravity, stored energy, and energy of motion make different types of roller coasters exciting. Point out the **Read to find out** statement at the top of page 10 in the student book: *Read to find out how forces make roller coasters so wild.*

Help students with the **comprehension goal** of accessing content by activating and connecting to background knowledge. Model by reading aloud the details that support this main idea. Then have pairs use the subheads as hints for the main ideas in other sections.

Determine Main Ideas Explain that figuring out main ideas in a text. Model by saying: *As I read, I want to figure out the main ideas, or most important information, to help me understand what I read. When reading informational text, if there are subheadings, I know they might be useful. Subheadings often give readers hints about what is most important. On page 14, the subhead is "Highest." That gives me a hint that the main idea is that Kingda Ka is the highest roller coaster. Have students turn and talk about the details that support this main idea. Then have pairs use the subheads as hints for the main ideas in other sections.*

Determine Word Meaning Have students read the last paragraph on page 12 and notice the terms *energy of motion* and *stored energy* are bold. Say: *Writers of informational text often put key words in bold. So when I'm reading and see bold type, I know it's important that I understand what those words mean. If I'm unfamiliar with the words, I read the sentences before and after to help me figure out the meaning. Have student pairs "read around" the terms to determine the meanings. Then, as a class, work on a consensus meaning for each term.*

Use Text Features Say: *Bold words are one kind of text feature. There are other text features that help us locate information quickly. Have students look at the box of information about Formula Rossa on page 13. Ask: What kind of information is given? (location, opening date, and length, height, and speed of the coaster) Explain that this text feature helps readers locate information quickly and easily compare different roller coasters. Have student pairs use this text feature to compare and contrast the length, heights, and speeds of the roller coasters.*

WRITE & ASSESS

You may want to have students do a "quick write" to assess understanding. It's always helpful to have students reflect on both the content and their thinking process.

- What are some ways that forces make roller coasters wild?
- What surprised you most about these wild roller coasters?

Online Teacher's Guides Grades K-5

The online Teacher's Guides include activities to extend content vocabulary and increase reading, writing, and speaking skills while addressing the core science concepts.

- Introduce science background and vocabulary
- Combine science content and literacy instruction in one lesson
- Includes ELL support
- Additional writing and research activities increase engagement

Use Exploring Science through Literacy to supplement Exploring Science

During instruction from Exploring Science, use related Exploring Science through Literacy titles to extend informational text reading and expand science content knowledge on specific Disciplinary Core Ideas.

Use Exploring Science as the basis for Disciplinary Core Idea instruction

People Change Land

Human activities change the environment. People build roads and houses. They plant crops and build dams. These actions use space that once provided habitats for living things. When people cut down trees for wood, they change the forest. Some forest animals move to other places with trees, but others may die.

But people have ways to save wild plants and animals. People can plant young trees to replace the trees that are cut down for wood. Families can plant native trees and wildflowers in their yards. These plants provide food and shelter for birds, insects, and other animals.

When trees are cut down for wood, the forest environment changes.

Next Generation Science Standards | DISCIPLINARY CORE IDEAS
LS2: Ecosystem Dynamics, Functioning, and Resilience
 From the environmental factors in which they exist, plants and animals have evolved mechanisms to survive. The availability, characteristics, and distribution of living organisms are shaped by their interactions with one another and with their physical environment, and by natural and human-induced changes to those interactions.

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Wrap It Up!

- 1. List** What are some human activities that change the environment?
- 2. Cause and Effect** How does cutting down trees in a forest affect the animals that live there?
- 3. Make Judgments** What do you think is a good way to protect the animals that live in forests? Explain.

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Grade 3 Example
 LS2.C: Ecosystem Dynamics, Functioning, and Resilience
 LS4.D: Biodiversity and Humans

Use Exploring Science through Literacy to extend reading on the same topic

Grade 3 Example
 Tropical Rain Forest Adventure

GENRE: Opinion Piece **Read to Find out: why we should save the rain forests.**

Saving the Rain Forests

by Julia Osborne

Why would anyone destroy a rain forest?

Some people cut down trees to make room for crops or cattle. Others chop down trees to sell the wood or make paper. Still others want to build roads and cities.

Earth's rain forests are in danger. More than half of them have been cut down or burned. If people continue to remove trees, scientists worry that the rain forests could be gone in 100 years!

It's important to save our rain forests. They're valuable to wildlife, people, and the environment. Their beauty is enjoyed by people around the world.

Millions of plants and animals live in rain forests. When forests are cut down, there's no place for their creatures to live. They might go **extinct**, or no longer exist on Earth.

When trees are cut down, there are no roots to hold the soil in place. Wind and rain carry it away. Trees can no longer grow on the bare land. Water rushes down hills. Floods destroy farms and villages.

18 **19**