

Narrative
Nonfiction

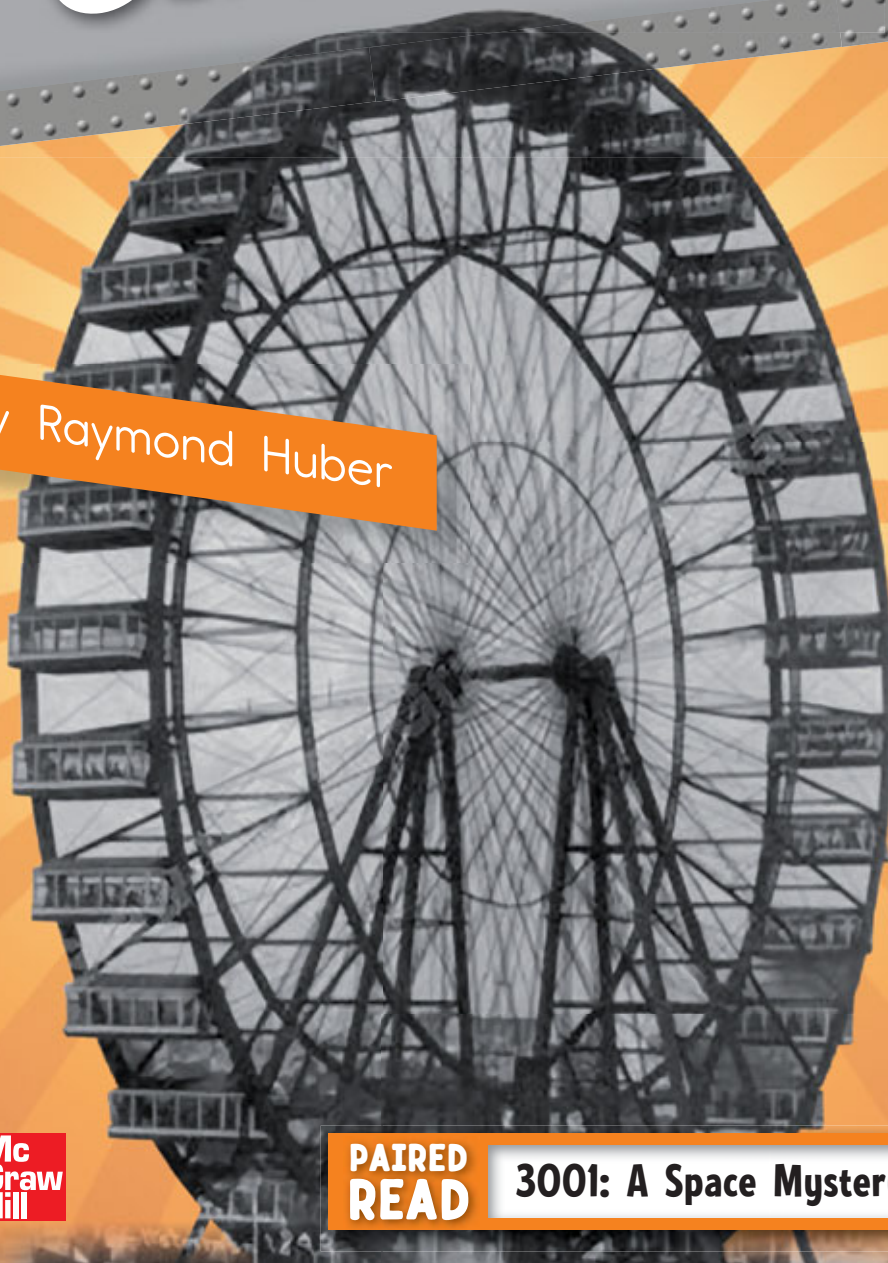
GEORGE'S GIANT WHEEL

by Raymond Huber

Mc
Graw
Hill

PAIRED
READ

3001: A Space Mystery



STRATEGIES & SKILLS

Comprehension

Strategy: Reread

Skill: Cause and Effect

Vocabulary Strategy

Definitions and Restatements

Vocabulary

accelerate, advantage,
capabilities, friction, gravity,
identity, inquiry, thrilling

Content Standards

Science

Physical Science

Word Count: 861**

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**The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.



Essential Question

How can science help you understand how things work?

GEORGE'S GIANT WHEEL

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Chapter 1

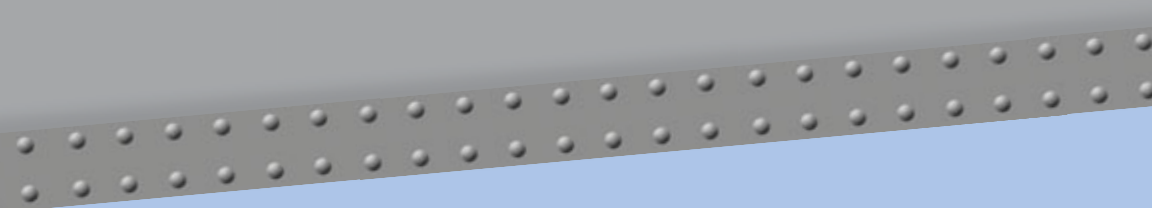
A GIANT IDEA

In 1891, people were planning a world's fair in Chicago. The fair would show new science and technology.

People would be able to see new inventions such as electric lights. There would be games and rides. The people who organized the fair also wanted something special. They wanted something unique that would amaze everyone.



The people who organized the fair wanted millions of people to visit.



In 1889, there was a world's fair in France. The Eiffel Tower was built for the fair. It was a tall structure made from steel and iron.

The people who organized the Chicago fair wanted something better. They asked people to come up with ideas.

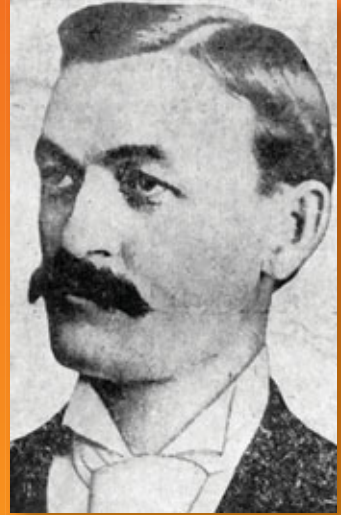
An **engineer** named George Ferris had an idea. He wanted to build a big wheel that people could ride on.

His invention became known as the Ferris wheel. Building the wheel was a huge achievement.



The Eiffel Tower was the entrance to the world's fair in Paris.

Ferris wanted to make a wheel that would be over 260 feet tall. It would carry more than 2,000 people at one time!



George Ferris was an engineer who built bridges from steel.

Ferris's idea was for the wheel to be like the **design** of a bicycle wheel. It would be made of metal. It would turn around an **axle**. It would have metal **spokes** from the axle to the two steel **rims**. The spokes would hold up the rims. This would help make them stronger.

People would ride in cars that would hang between the rims. As the wheel turned, the cars would go up and then back down again. The views would be amazing!

Passengers riding the Ferris wheel had a fantastic view of the fair.



At first, people thought Ferris's idea was crazy. They thought that the wheel would be too heavy. It might even fall over. Others thought the passenger cars might fly off into the air. The people running the fair turned down Ferris.



George Ferris had many capabilities. He had built bridges and tunnels for the railroad. He knew his idea would work.

Ferris spent months working on his idea. Other engineers agreed that the wheel would work and would be safe. At the end of 1892, Ferris was told he could build his wheel.



Building the Fair

The building of the fair began before Ferris was told he could build the wheel. Two hundred new buildings were built. Canals and fountains were built, too.

STOP AND CHECK

Why did some people think that George Ferris's idea wouldn't work?

THE WORK BEGINS

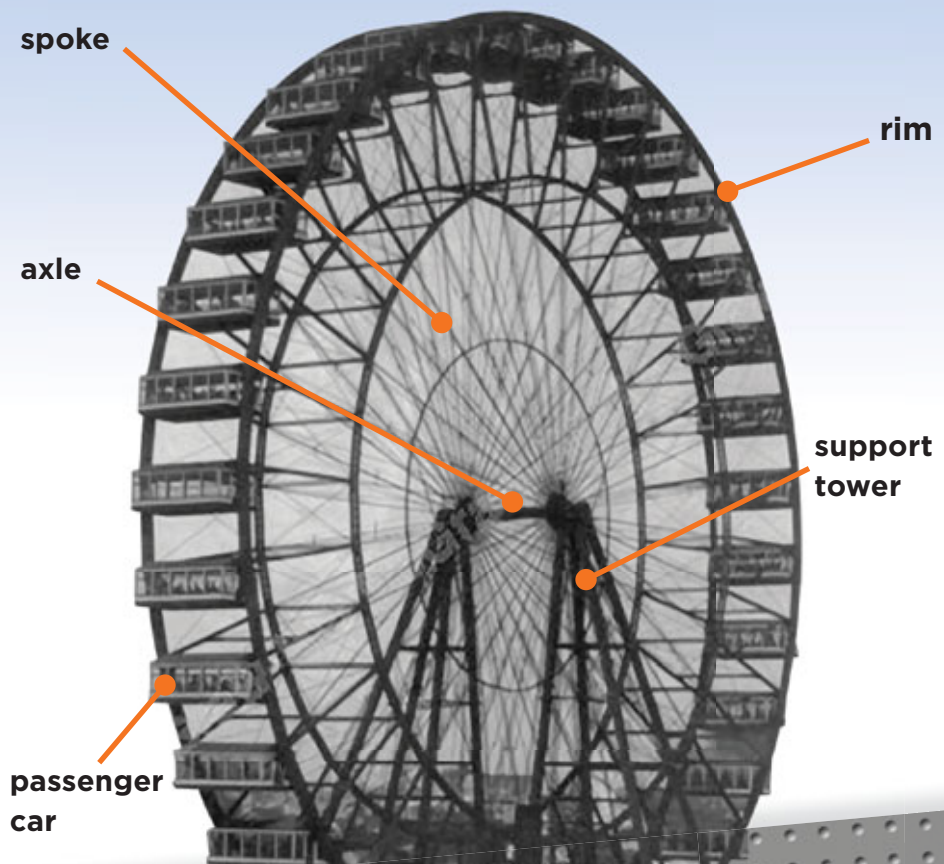
Workers began to build Ferris's wheel in January 1893. They didn't have much time. The fair was opening in May.

Ferris's monster wheel would be very heavy, so the workers made deep foundations. They built two towers on top of the foundations. Then a big steel axle was hung between the two towers.

At the time, the axle for Ferris's wheel was the largest piece of steel ever made in the United States.

Next workers attached the rims of the wheel to the axle with long steel spokes. They added more metal to make the wheel stronger. Then the passenger cars were joined to the rims of the wheel.

Parts of the Wheel



Every object needs a **force** to make it move. Two steam engines were built to move the wheel. The engines gave the force that made the wheel turn. When the engine was started, the wheel would slowly accelerate.

The wheel also needed another force to make it stop moving. Ferris used a special brake. The **friction** from the brake made the wheel stop.

STOP AND CHECK

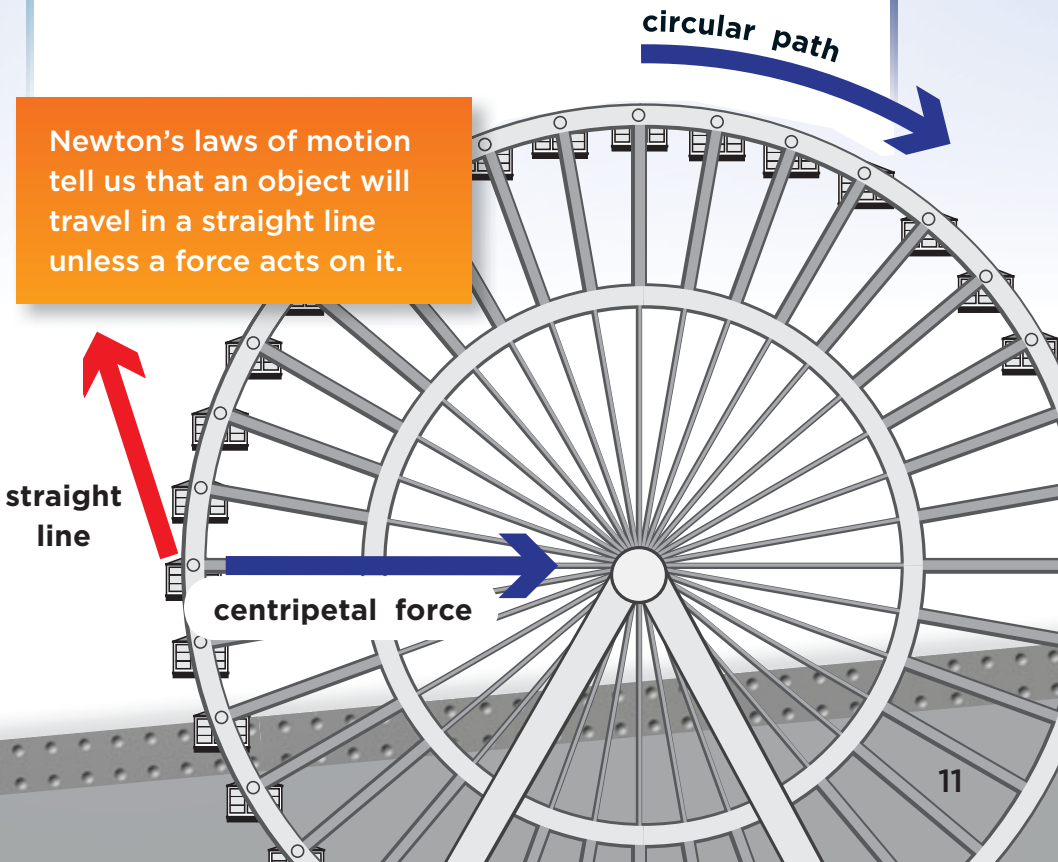
What made the Ferris wheel turn?

Flying Off into the Air

Some people thought the cars on the wheel might fly off into the air. But centripetal force keeps this from happening.

When an object moves in a circle, centripetal force pulls the object toward the center of the circle. It's like swinging a ball on a string. The string acts as the centripetal force. The spokes on the Ferris wheel acted as the centripetal force. They kept the cars moving in a circle.

Newton's laws of motion tell us that an object will travel in a straight line unless a force acts on it.



Chapter 3

AN EXCITING RIDE

Ferris's wheel was finished in June 1893. On June 21, people came to see it working. Ferris gave a speech, then blew a whistle. A band played, and the wheel began to turn.

Measurements of Ferris's Wheel

Foundation: 35 feet deep

Height: 264 feet

Circumference: 825 feet

Tower height: 140 feet

Weight of axle: 46 tons

Passenger cars: 36

Capacity: 2,160 people

Total weight: 2,200 tons

Each passenger car could carry 60 people.



The wheel was a big hit at the fair. Many people wanted to go for a ride. It cost 50 cents. A ride was about 20 minutes long. People had an amazing view of Chicago. More than one and a half million people took the thrilling ride.



The Columbian Exposition was open for six months. More than 27 million people visited the fair.

George Ferris had a great idea. He took advantage of what he knew about engineering and science to make his idea come true.

George Ferris died in 1896. His idea was later used in many fun parks. Big wheel rides are now called Ferris wheels.

STOP AND CHECK

How can you tell that the Ferris wheel was a success?

The Singapore Flyer is the world's tallest Ferris wheel today.



Respond to Reading

Summarize

Summarize how George Ferris's wheel worked. Use your graphic organizer to help.

Cause	→	Effect
	→	
	→	
	→	
	→	

Text Evidence

1. How do you know that *George's Giant Wheel* is narrative nonfiction? **GENRE**
2. In Chapter 1, why did George Ferris come up with his idea? **CAUSE AND EFFECT**
3. What does the word *unique* on page 2 mean? Use context clues to help you figure out the meaning. **DEFINITION AND RESTATEMENT**
4. Reread Chapter 3. Write about how people felt about the wheel after it was completed.
WRITE ABOUT READING

Compare Texts

Read about how a boy's knowledge of science helps him look at a space station in a new way.

3001: A Space Mystery

Inside a space station, a boy was looking for his mother. He had been looking out the window at Earth. When he turned around again, he saw that she was gone. The boy raced around a corner and met a man. He identified himself as Captain Sanchez.

“Are you lost?” asked Captain Sanchez.

“I can't find my mother,” the boy said.

The captain touched a radio.

“This is Captain Sanchez. I’ve found a boy. He has lost his mother. I don’t know his identity.”

“Let’s take a ride to the hub,” Captain Sanchez said to the boy.

A few minutes later, they were in a shuttle in zero gravity. The boy could see the whole space station. The hub was in the center. Long spokes joined the hub to the outer wheel. The wheel was slowly turning.



“It’s a good design,” Captain Sanchez said. “A force acts through the spokes and keeps the outer parts of the station from flying off into space.”

“Centripetal force!” the boy said. “Just like in a Ferris wheel.”

“Yes,” said Captain Sanchez. “How do you know so much about science?”

“I’m named after the famous scientist Sir Isaac Newton. My name is Newt Isaacs.”

The captain’s radio beeped, and a voice said, “We have an answer to your inquiry. A mother is looking for her son. His name is Newt Isaacs.”

“Tell his mother we have found her son,” said Captain Sanchez.



Make Connections

What did Newt find out about the space station?

ESSENTIAL QUESTION

How did science help George Ferris and Newt Isaacs understand about wheels? **TEXT TO TEXT**

Glossary

axle (*AK-suhl*) the rod at the center of a wheel
(page 4)

design (*di-ZIGHN*) a plan that shows how something will look when it's made (page 4)

engineer (*en-juh-NEER*) a person who makes and builds things (page 3)

force (*fohrs*) a push or a pull (page 10)

friction (*FRIK-shuhn*) when two things rub against one another (page 10)

rims (*rims*) the edges of a wheel (page 4)

spokes (*spohks*) bars that connect the center of a wheel to the outside edge (page 5)

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– building, 8–10

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Focus on Science

Purpose To show how centripetal force works

Procedure

Step 1

Tie a piece of string to a small eraser.
.....

Step 2

Go outside into an open space.
.....

Step 3

Whirl the eraser around over your head.
.....

Step 4

Watch what happens when you let go
of the string.

Conclusion What have you learned about forces? Centripetal force makes the eraser move in a circle when you are whirling the string. Next time, whirl the string faster. What happens when you let the string go? Write about what you learned from this experiment.

Literature Circles

Nonfiction

Thinkmark

The Topic

What is *George's Giant Wheel* mostly about?

Text Structure

How does the author organize information in *George's Giant Wheel*?

Vocabulary

What new words did you learn in the text?

What helped you understand their meanings?

Conclusions

What conclusions did you make from the text?

What important things you did you learn?

Make Connections

What other forces do you know about?