

# FORCES AT WORK

by Beverly Harris



## STRATEGIES & SKILLS

### Comprehension

Strategy: Reread

Skill: Author's Purpose

### Phonics

Long *a*: *a, ai, ay, ea, ei, eigh, ey*

### Vocabulary Strategy

Similes

### Vocabulary

amazing, force, measure, objects, proved, speed, true, weight

### Content Standards

#### Science

Physical Science

Word count: 352\*\*

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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 do the earth's forces affect us?

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**PAIRED  
READ**

Machines to Push and Pull . . .17

A force pushes or pulls something. Forces can make objects move.

*Pushing is a force.*



Michael Newman/PhotoDisc





*Pulling is a force too.*

You push a door. It opens.  
You pull a door. It shuts.

**STOP AND CHECK**

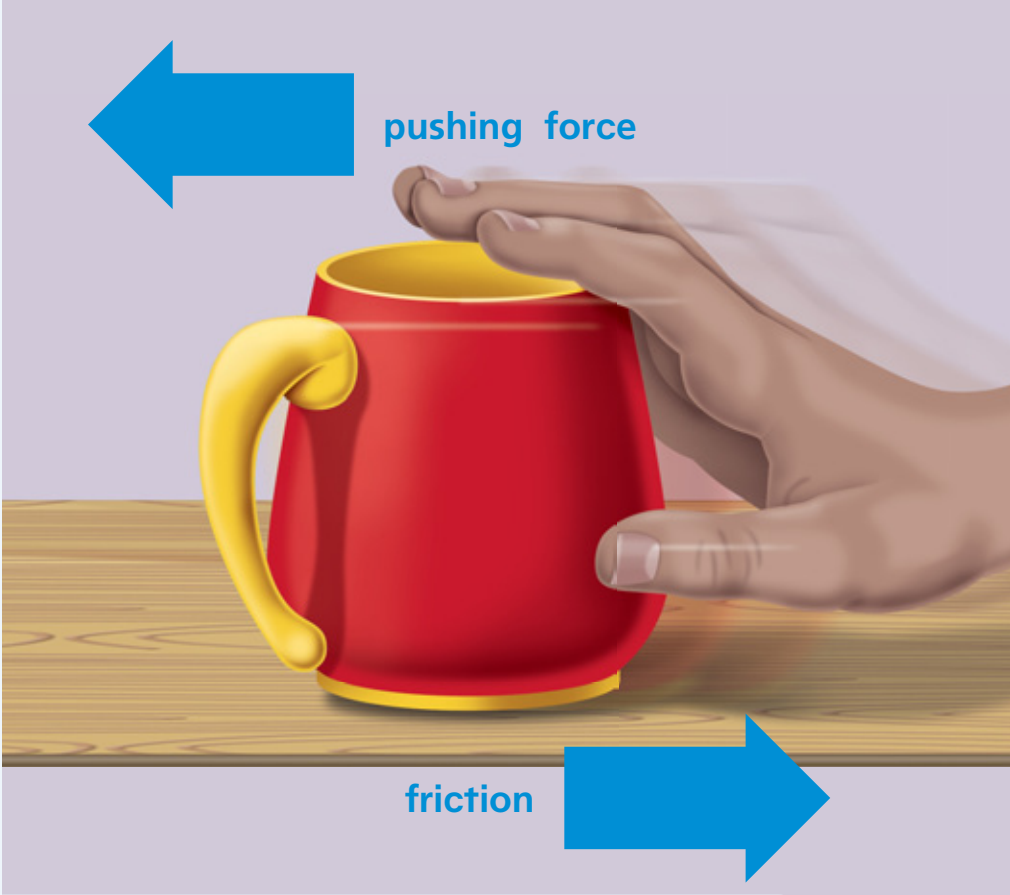
What is a force?



*Gravity pulls the tomatoes toward the ground.*

Gravity is a force. It pulls objects to Earth.

Drop a pencil. It falls. Gravity pulled it. It's true! You proved gravity works!



*Friction slows down the mug when it is pushed.*

Friction is another force. Friction happens when two things rub against each other. It makes things move more slowly.



You can see friction work.  
Visit a park. Watch.

A girl sits on a slide. Gravity  
pulls her down. Her clothes  
rub on the slide. Friction  
changes her speed.

*Smooth things, like a slide, make  
less friction than bumpy things.*







*The ball moves faster over short grass than long grass.*

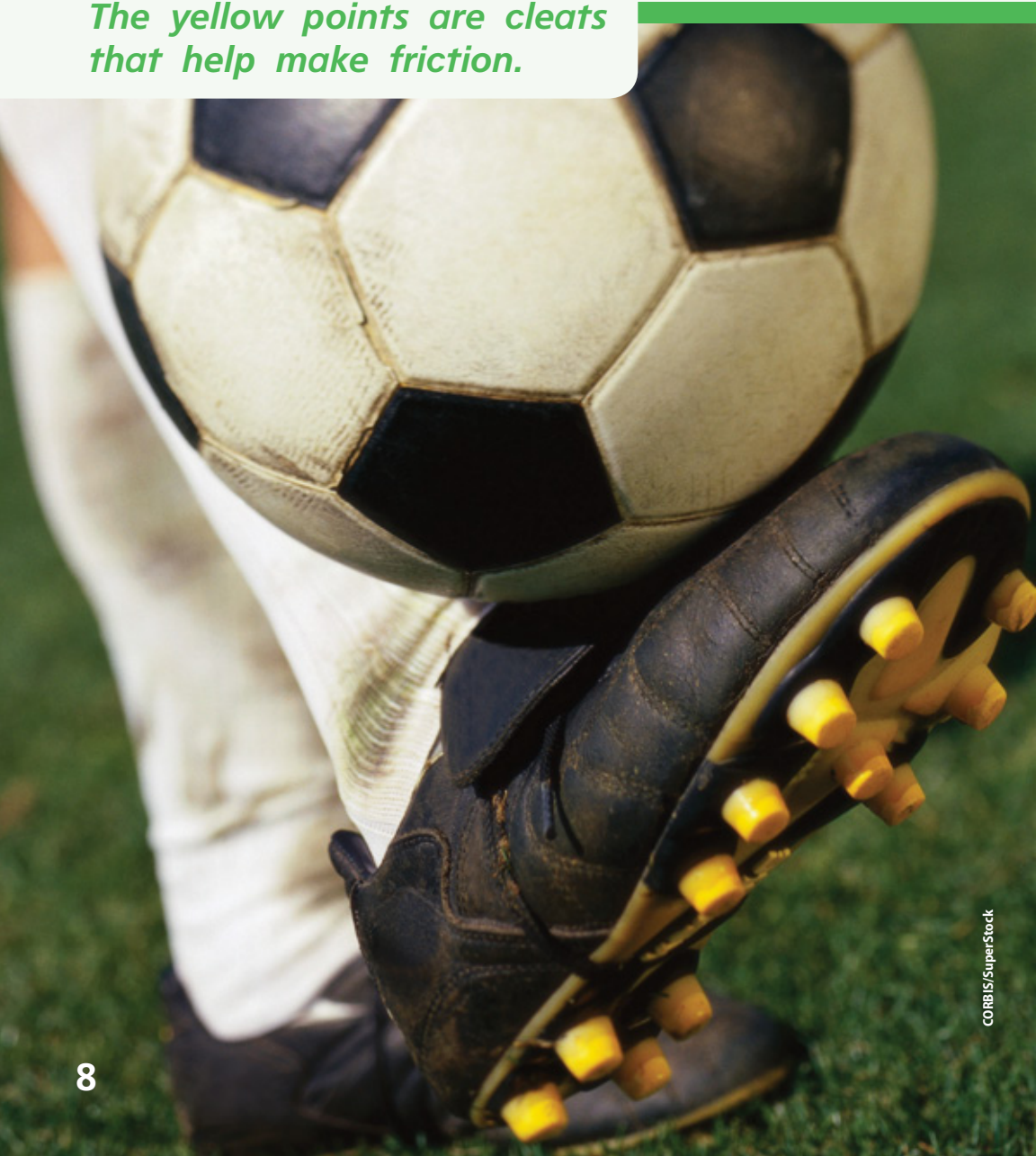
Children play soccer. They kick the ball. It rubs the grass. This makes friction between the grass and the ball. The ball slows down.

**STOP AND CHECK**

What is friction?  
What does it do?

Friction helps the children.  
Their shoes dig into the  
ground. The friction keeps  
the children from slipping.

*The yellow points are cleats  
that help make friction.*





*A kick pushes the ball up high.*

One player kicks the ball up. Gravity pulls it down. There is friction between the ball and the air. The ball slows down.

**STOP AND CHECK**

How does friction affect a soccer game? How does gravity affect it?



A skater uses friction too.  
The skates roll over the path.  
There is some friction, so the  
skater does not fall.

*Friction between the ground  
and the skate helps the  
skater push off.*







*The skater can stop safely.*

The skater wants to stop and puts the stopper down. It drags on the ground. Friction helps the skater stop.



*Pushing on the pedals  
makes the bike go.*

A boy rides a bike. He uses the brakes to stop. The brakes grab the wheels. That causes friction. The bike slows down and stops.

**STOP AND CHECK**

How does a boy on a bike use friction?

Sometimes we want less friction. That is why a football is pointed. It does not make much friction in the air. It zips through the air like a rocket.

*The football's shape helps the ball go faster.*



Swimmers put on suits. Their suits make less friction with the water. The swimmers can swim like fish!

Forces are everywhere. Where do you see them?



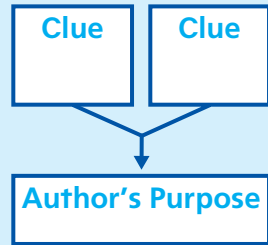


*Some swimmers wear special suits so they can swim faster.*

# Respond to Reading

## Summarize

Use the chart to summarize *Forces at Work*.



## Text Evidence

1. What makes *Forces at Work* an informational text? **Genre**
2. Why do you think the author wrote this book? **Author's Purpose**
3. What is a football compared to on page 13? **Similes**
4. Write about how you use forces. **Write About Reading**

## Compare Texts

Machines help us push and pull.

# Machines to Push and Pull

Gravity gives objects weight. We can measure weight. Some things are heavy. They are hard to move.

Machines are tools. They help us work against gravity. Amazing!

Force	Push	Pull
Moving a grocery cart	X	
Playing Tug-of-War game		X
Hitting a baseball	X	



The workers use a ramp to move the piano safely.

## Ramps

A ramp is a simple machine. One end is on the ground. The other is lifted up. People can slide a heavy object up the ramp. That is easier than lifting it.



## Levers

A lever is a simple machine too. It helps lift heavy things. A wheelbarrow is a lever.



A wheelbarrow is good for moving heavy loads.



### Make Connections

How does friction affect us?

#### Essential Question

Think about a person using a wheelbarrow. Is there any friction? **Text to Text**

# Focus on Science

**Purpose** To see friction at work

## What to Do

**Step 1**

Work with a partner. Get a toy car with wheels and a wooden block. Go to a place with no carpet.

.....

**Step 2**

Take turns pushing the car and block along the floor. Use the same force. Which item goes farther?

.....

**Step 3**

Do this again on a carpet. What happens?

**Conclusion** Tell how the activity shows friction at work.

# Thinkmark

## The Topic

What is *Forces at Work* mostly about?

## Vocabulary

What new words did you learn in the text?

## Author's Purpose

Why did the author write *Forces at Work*?

## Make Connections

Which of the examples from *Forces at Work* have you seen?

Which of the tools from *Machines to Push and Pull* have you used or seen?