Texts for Close Reading™

FORCES AND *Interactions*

Benchmark EDUCATION

Forces and Interactions

Student Objectives

I will be able to:

- **Read and analyze literary and informational texts about forces and interactions.**
- **Share ideas with my peers.**
- **Build my vocabulary knowledge.**
- **Conduct research to write an opinion essay.**

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Tips for Text Annotation

As you read closely for different purposes, remember to annotate the text. Use the symbols below. Add new symbols in the spaces provided.

Symbol	Purpose
underline	Identify a key detail.
☆	Star an important idea in the margin.
1 2 3	Mark a sequence of events.
magma	Circle a key word or phrase.
?	Mark a question you have about information in the text. Write your question in the margin.
!	Indicate an idea in the text you find interesting. Comment on this idea in the margin.

Your annotations might look like this.

Notes

I like the way Cinderella expresses herself.

I wonder why Cinderella puts up with her mean stepsisters?

2 (1) Next, I ran to add kindling to the fires in their rooms. I would not have heard the end of it ! if my stepsisters' large, ugly feet touched a cold floor. There was no kindling in either room, (2) so I had to run to the backyard to gather up twigs and sticks. (3) Thorns cut my fingers and briars stuck in my hair. ☆

3 ? My older stepsister demanded soft-boiled eggs. My younger stepsister yelled for medium-boiled eggs. I flew to the kitchen to make their breakfasts. I toil round the clock.

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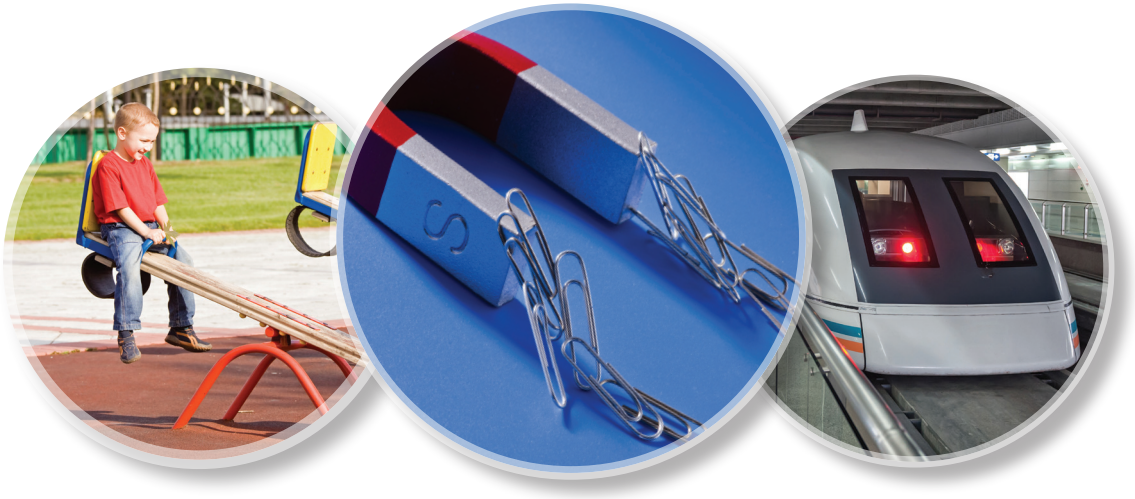
Table of Contents



Essential Question

How does understanding science help us achieve our goals?

Remember to annotate as you read.

Notes

Poems of Movement:

Robert Louis Stevenson was a Scottish writer, most famous for his novel Treasure Island. *In 1885, he published a book of poems called* A Child's Garden of Verses. *These are two poems from that book that explore forces and motion in rhyming verse.*

The Swing

How do you like to go up in a swing,
Up in the air so blue?
Oh, I do think it the pleasantest thing
Ever a child can do!

Up in the air and over the wall,
Till I can see so wide,
Rivers and trees and cattle and all
Over the countryside—

Till I look down on the garden green,
Down on the roof so brown—
Up in the air I go flying again,
Up in the air and down!

Notes

The Wind

I saw you toss the kites on high
And blow the birds about the sky;
And all around I heard you pass,
Like ladies' skirts across the grass—
O wind, a-blowing all day long,
O wind that sings so loud a song!

I saw the different things you did,
But always you yourself you hid.
I felt you push, I heard you call,
I could not see your self at all—
O wind, a-blowing all day long,
O wind that sings so loud a song!

O you that are so strong and cold,
O blower, are you young or old?
Are you a beast of field and tree,
Or just a stronger child than me?
O wind, a-blowing all day long,
O wind, that sings so loud a song!

Short Read 2

Remember to annotate as you read.

Notes

What Makes Things Move?

by Kathy Furgang

1 What is motion? Motion, or movement, is any change in the position of an object. What causes movement? Forces cause movement.

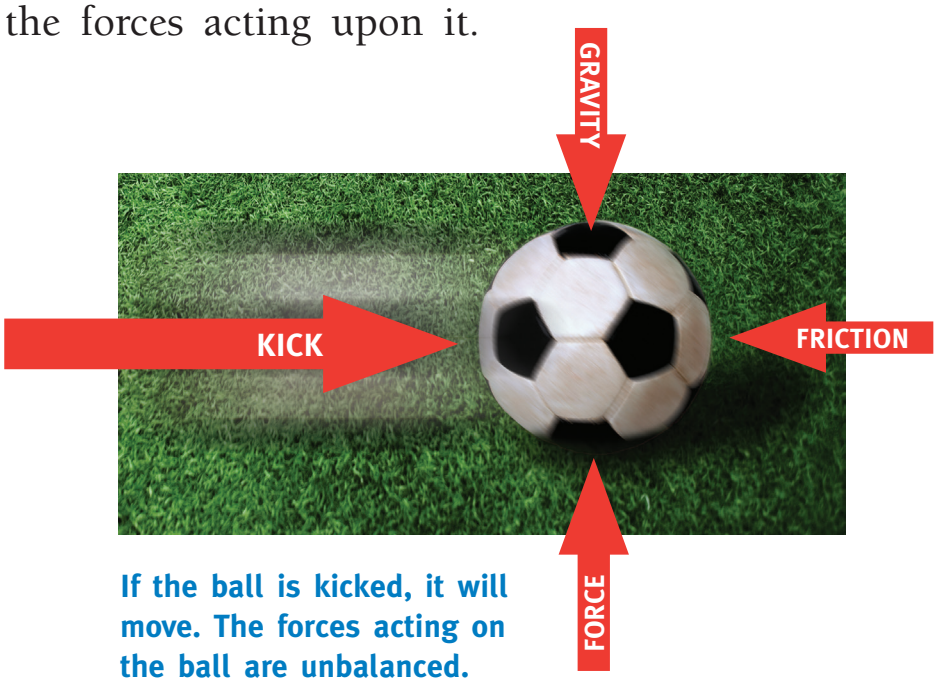
2 All objects on Earth have forces acting on them at all times. A force can be a push or a pull. Each force has both strength and direction. Gravity is a strong force. Gravity pulls objects down toward Earth's surface. At the same time, the ground also pushes up against objects. When an object is "at rest," it stays in place. The forces acting upon the object are balanced. When the forces acting on an object are unbalanced, an object will move.

This ball is at rest. The forces acting on the ball are balanced. The sum of all these forces is zero.

Notes

3 If a ball is resting on the ground, then the forces acting upon it are balanced. If someone kicks the ball, then it will move. The kick is a force pushing on the ball. The ball will move in the direction of the kick. A strong kick will push the ball, making it move quickly. A gentle kick will still push the ball. However, the ball may not move as fast, or travel as far.

4 The speed of a moving object is measured by how far it moves each second. The speed of the moving ball depends on the strength of the kick. It also depends on the other forces acting on the ball. As the ball rolls along, the ball rubs on the ground. Friction is a force that will slow the ball down as it moves. If the ball is kicked up into the air, then gravity will pull the ball back down to the ground. A gust of wind can change the direction of a ball. How fast will the ball move? Where will it go? The answers depend on the speed and direction of the forces acting upon it.



If the ball is kicked, it will move. The forces acting on the ball are unbalanced.

Notes

5 Often, the movement of an object cannot be predicted. Other times, objects may move in more predictable ways. Ocean tides move in a pattern. Earth moves in a pattern, too. If we can observe patterns in an object's movement, then we can predict how it will move. Think of a playground swing. It hangs from two chains on a swing set. When the swing is pulled back and released, it will move freely back and forth. Gravity keeps the swing in motion. The swing continues to move back and forth until friction between the air and the swing slows it down to a stop.

6 The swing is just like the pendulum of a clock. The clock pendulum will also swing back and forth. The length of the pendulum will determine how long it takes the pendulum to move back and forth. People use these patterns to predict movement and track time. They have used pendulums to detect earthquakes. Pendulums are used to guide ships and aircraft.

A see-saw moves up and down in a pattern. The riders can predict the motion of the see-saw.

A clock pendulum moves from side to side. Its length and weight will determine how it moves.

Scientists use pendulums in many interesting ways. Some are very useful. Others are just plain fun!

Notes

Make Your Own Pendulum

Materials:

- ruler
- 2 pieces of masking tape
- 1 meter (3 feet) of string
- 4-cm (1.5-in.) table tennis ball
- large straw
- clock or stopwatch

Procedure:

How does a force applied to an object affect the speed or direction of that object in motion?

1. Using the materials listed, draw a design for your pendulum.
2. Find a permanent fixture that is "at rest." Then attach your pendulum to that object.
3. Make a data chart to record predictions and observations.

Action	Force	Prediction	Observation
Blow on pendulum			
Tap with hand			
Tap with paper			
Apply no force			

4. Write your predictions in the chart. What will happen when you apply each force to the pendulum while it is in motion?
5. First, pull the pendulum back and release. Then blow on the pendulum. Record your observations.
6. Next, pull the pendulum back and release. Then tap the pendulum with a hand. Record your observations.
7. Next, pull the pendulum back and release. Then tap the pendulum with a piece of paper. Record your observations.
8. Last, pull the pendulum back and release. Then apply no force. Record your observations.
9. Review your data. Analyze your results:

   - How did your predictions compare with your results?
   - Which force caused the greatest movement?
   - Which force caused the least movement?
   - What are three things that can happen when force is applied to a moving object?

Word Study Read

Remember to annotate as you read.

Notes

The Tortoise and the Hare

by Aesop

1 Long ago, there lived two friends. One was named Tortoise, and the other was called Hare. Tortoise moved at his own slow pace. Hare was the opposite. She sped all over the forest, flashing her teeth and letting everyone know how quick she was.

2 One day, Hare saw Tortoise creeping along the woodpath. Hare called out: "You are such a slow-poke. I am so much faster than you!"

3 Tortoise stiffened. "Well, let's have a race. We will see who is faster."

4 Hare laughed. She was faster than a jack-rabbit, so she accepted the challenge.

5 The race began at daybreak. Bird sounded the horn. Within seconds, Hare was many yards ahead. Soon Hare could not see Tortoise. Hare was so far ahead that she stopped at a tree. "I am bone-tired. I am more than halfway done with the race. I'll rest here for a while," she told herself. Soon she fell asleep.

6 Meanwhile, Tortoise plodded on, soon passing the sleeping Hare. When finally Hare awoke, she sped for the finish line, but Tortoise had already crossed the line. All the animals cheered. Hare had bragged too soon.

BuildReflectWrite

Build Knowledge

Make inferences and draw conclusions about the texts.

Inferences and Conclusions
1. Why do you think the author wrote the poems "The Swing" and "The Wind"?
2. Choose one of the poems. How would you interpret it?
3. What forces are acting upon a leaf that is falling from a tree?
4. How is a see-saw like a pendulum?
5. What causes a sailboat to move? What causes a sailboat to stop?

Reflect

How does understanding science help us achieve our goals?

Based on this week's texts, write down new ideas you have about the essential question.

Research and Writing

Opinion

Meteorology, geology, and engineering are all fields that involve studying forces and interactions. In your opinion, which of these careers is most interesting? Conduct research to learn about these fields, and write an essay stating and supporting your opinion using the information you have learned.

Choose Your Topic

Conduct a pre-search to choose the field of study you would like to explore. Construct three or more guiding questions to help you focus your research on the information you will need to write your opinion essay.

Remember to annotate as you read.

The Great Tug-of-War

retold by Beverley Naidoo

Notes

1 Long long ago, Mmutla the hare lived in a cave halfway up Kololo Hill. He stayed out of the humans' way most of the time. He took special care to avoid the young boys. Didn't they boast how their arrows were even swifter than Ntsu the eagle? Mmutla always kept his ears pricked up for her. Ntsu sailed so silently, so sky-high, that she could hide herself as a tiny speck. But she could dive to earth faster than Mmutla could blink. He had no wish to take his first and last flying lesson in the grip of Ntsu's sharp claws! No, thank you!

2 One morning Mmutla woke up with his nose tingling. Outside, Sun was spreading his red tentacles into the sky above Lenong Mountain on the far side of the valley. The color quickly drained out of Moon's dark cloak. Mmutla sat watching her stars fade away, one by one. He listened to the early morning sounds around him. He heard a twitch here. He heard a tweak there. Some birds twittering, a sudden skittering. Nothing unusual. Nothing he couldn't handle!

Notes

3 Mmutla set off, scrambling over rocks, down into the gray-green bush and the long veld[1] grass. He was heading towards the water hole and those tender green shoots that sprouted near the water. He was leaping to the bottom of Kololo Hill when *CRREAKK! CRRACKK! CRASSHH!* A morula tree plunged towards him.

4 *SWOOOOSSSHHH!* It almost whipped off his nose and then pinned him down.

5 Tlou the elephant loomed over him. Tlou swirled his trunk, snapped off a branch as if it were a twig and stuffed the sweet-smelling fruit into his mouth. His jaw chewed steadily as he glared at Mmutla through his deep sunken eyes. Mmutla tried to look calm, although his heart was throbbing.

1 *veld:* refers to the open grasslands of Southern Africa

Notes

6 "Good Morning, Tlou," he began.

7 Tlou chewed and chomped but said nothing.

8 "I said good morning, Tlou," Mmutla shouted.

9 *SWISH!* Tlou waved his trunk in the air and raised one of his feet so that it hovered just above Mmutla's nose.

10 "WHAT DO YOU WANT, PIPSQUEAK? NO ONE INTERRUPTS MY BREAKFAST!"

11 "No need to be rude, Tlou! Just because you're biggest, you think you're the strongest! If we had a tug-of-war, I could beat you any day!"

12 Well, Tlou was so surprised that with one mighty sweep he lifted up the morula tree so that he could see Mmutla more clearly.

13 "You? You pipsqueak? *P-W-W-WOOOH-H-H-H!*" The elephant blew out a trunkful of air. It would have blown the little hare sky-high if he hadn't jumped aside as quick as a tick.

14 "Tomorrow morning, when Sun peeps over the mountain, I'll come with a rope. Then you'll see!" Mmutla boasted.

Notes

15 Without waiting for an answer, he scampered away towards the water hole. There he found Kubu the hippo with her eyes half-closed, bathing in the water.

16 "Good morning, Kubu," he began.

17 Kubu stared at Mmutla and said nothing.

18 Kubu closed her eyes and, without a word, disappeared under the water. Mmutla watched the bubbles and waited. When Kubu's head reappeared, he shouted, "I said good morning, Kubu!"

19 Kubu opened her mouth so wide that Mmutla could see past all her teeth down into the great cave of her throat. When she completed her yawn, she boomed, "WHAT DO YOU WANT, PIPSQUEAK? NO ONE INTERRUPTS MY MORNING NAP!"

20 "No need to be rude, Kubu! Just because you're biggest, you think you're the strongest! If we had a tug-of-war, I could beat you any day!"

21 "You? You, pipsqueak? *P-W-W-WAA-W-HHH!*"

22 The hippo spluttered a mouthful of water.

23 It would have drowned the little hare if he hadn't jumped aside as quick as a cricket.

Notes

24 "Tomorrow morning, when Sun peeps over the mountain, I'll come with a rope. Then you'll see!" Mmutla boasted. Without waiting for an answer, he scurried away.

25 All that day Mmutla worked hard at making an extra long, extra strong rope. He had only just finished by the time Sun had traveled far across the land and was giving way to Moon. Before going to sleep, Mmutla wound up the rope and hung it over a branch of the live-long tree hanging over the entrance to his cave.

26 The next morning Mmutla woke even before Sun began to send his red and orange warnings to Moon. By the time Sun was creeping over Lenong Mountain, the little hare was leaping down Kololo Hill. The long, strong rope was hung over one shoulder.

27 Sure enough, Tlou the elephant was there at the bottom of the hill! He pretended to take no notice of Mmutla and carried on munching.

Notes

28 "Good morning Tlou, I've brought the rope! You take this. I'll take the other end and run over there." He pointed to some very thick bushes. "When I'm ready to pull, you'll hear me whistle like this: *Www-hhhhh-hee-ee-ee-ee-ee-www-hhhhh-hee-ee-ee!!!!*"

29 Mmutla whistled softly, then held his breath until Tlou began to wind the rope around his single tusk and trunk. (His other tusk was lost in a fight but that's another story.)

30 Quick as a riverbank fly, Mmutla hopped towards the thick bushes, calling back towards Tlou, "You'll soon see that I'm stronger!"

31 But Mmutla did not stop at the bushes. He still had more rope as he bounded on down to the water hole.

32 Kubu the hippo pretended to take no notice and sank beneath the water. Mmutla waited for her eyes to rise.

33 "Good morning, Kubu! I've brought the rope. You take this. Do you see those bushes? I've left the other end just behind them. I'll run and get it and when I'm ready to pull, you'll hear me whistle like this: *Www-hhhhh-hee-ee-ee-ee-ee-www-hhhhh-hee-ee-ee!!!!*"

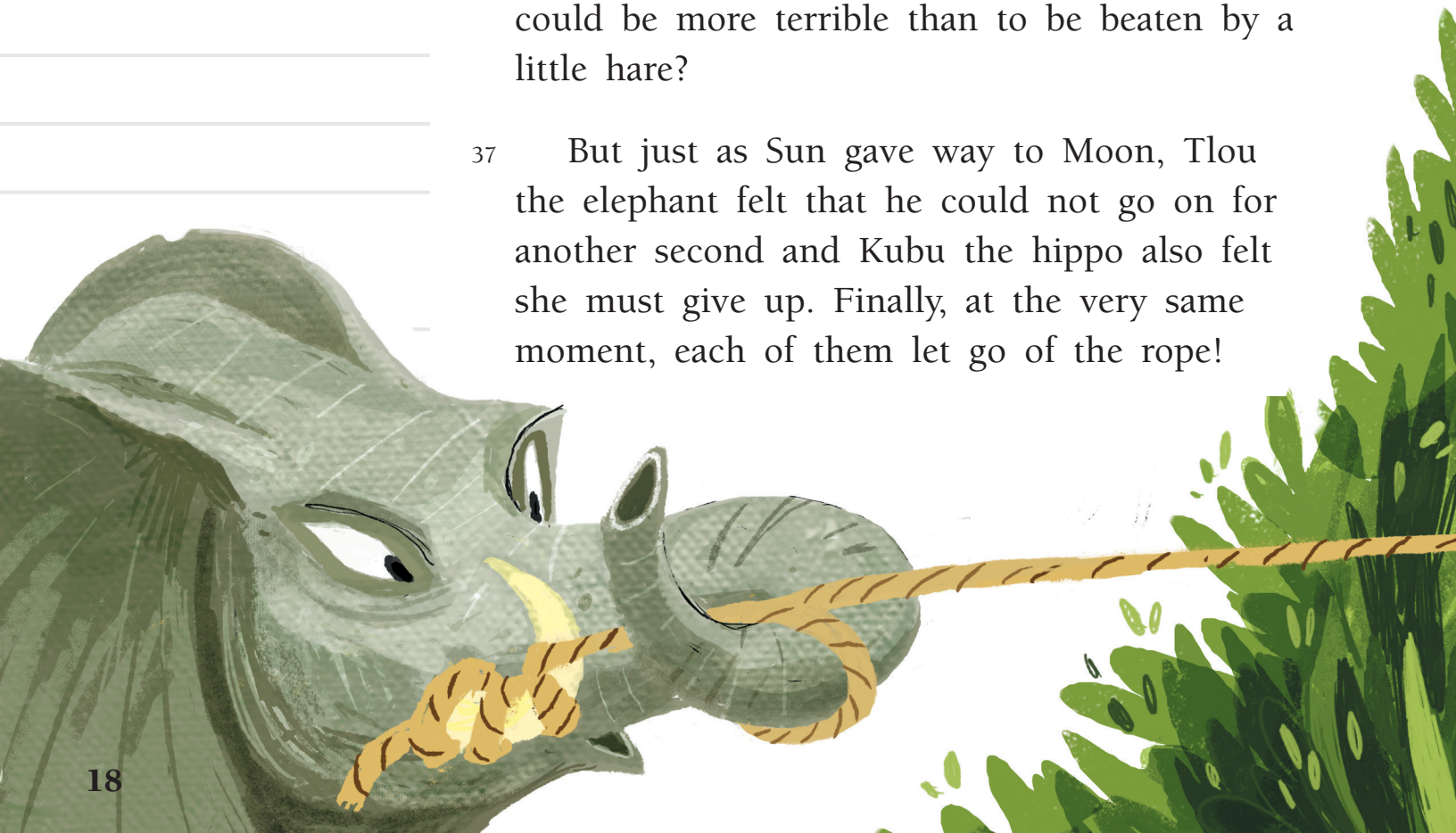
34 Mmutla whistled softly, then held his breath until Kubu clutched the rope tight within her jaws. Quick as a klipspringer, Mmutla skipped to the thicket of bushes.

Notes

35 As soon as he had hidden himself well, Mmutla took a deep, deep breath and whistled—this time for all he was worth. From each end he could hear as Tlou and Kubu began to pull. They pulled and tugged, tugged and pulled. Mmutla made a little peephole for himself on each side of his hideout. First it was Tlou humping and thumping. Next, it was Kubu shaking and quaking. Great drops of sweat poured off Tlou—almost enough to make a river—while Kubu splashed so wildly that she might have emptied the water hole! Mmutla laughed so much that he was nearly sick! He didn't know who looked funnier, Tlou or Kubu.

36 The tug-of-war continued from Sun Up until Sun Down. Neither Tlou nor Kubu wanted to give up because neither wanted to lose. What could be more terrible than to be beaten by a little hare?

37 But just as Sun gave way to Moon, Tlou the elephant felt that he could not go on for another second and Kubu the hippo also felt she must give up. Finally, at the very same moment, each of them let go of the rope!



Notes

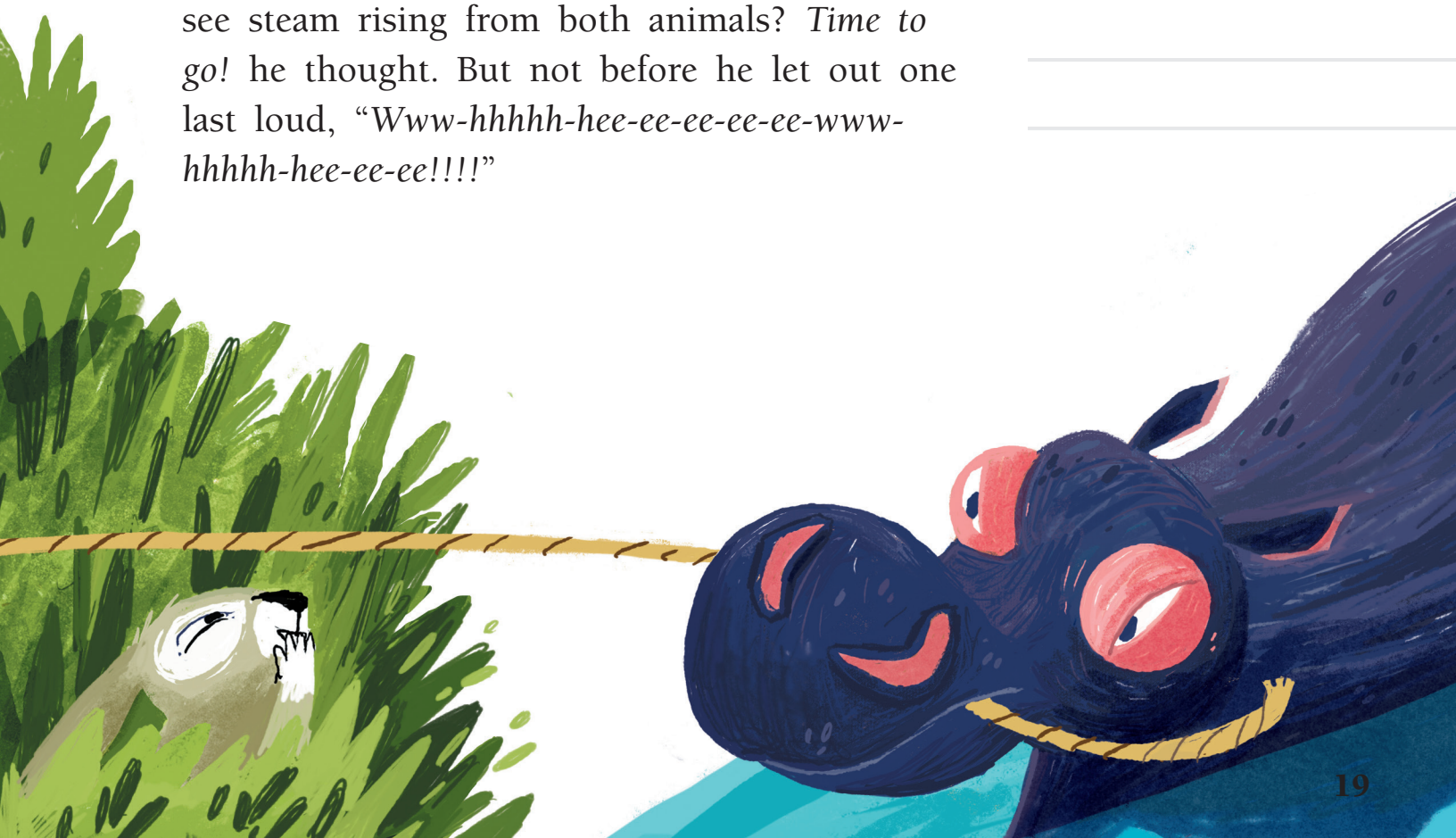
38 Kubu gasped for great gulps of air and collapsed out of sight. Tlou panted like he had never panted before and dragged himself to the water hole. There he slapped and slurped up gigantic dollops of water. (Luckily there was some left!) He swallowed so much so fast that he got hiccups.

39 While he was hiccupping, Kubu came up for another gulp of air. Her mouth was open wide enough to swallow an elephant. Kubu saw Tlou and Tlou saw Kubu and in an instant they knew what had happened!

40 "WERE YOU—?" snorted Tlou.

41 "WERE YOU—?" spluttered Kubu.

42 Was it Mmutla's imagination that made him see steam rising from both animals? *Time to go!* he thought. But not before he let out one last loud, "*Www-hhhhh-hee-ee-ee-ee-ee-www-hhhhh-hee-ee-ee!!!!*"



Word Study Read

Remember to annotate as you read.

Notes

The Merchant's Donkey

1 One day a merchant was leading his donkey homeward from the seashore. They had gone to port to get goods to sell. On this day, the donkey carried a heavy load of salt. When the pair came to a river, the donkey slipped and fell. The sacks of salt tipped and melted away into the river.

2 The donkey was delighted to find how much lighter his burden had become. To his amazement, he could move more quickly, now that he had so little to carry. The donkey finished the journey very happily. The next day the pair returned to the port for another load of salt. On the way home, the donkey had a stroke of cleverness, and pretended to fall. The sacks tipped again into the water.

3 The angry merchant detected the animal's seeming happiness. He suddenly realized what the donkey was up to. So, he turned and drove the donkey back to the seashore. This time he loaded him up with two baskets of sponges. This load was even easier to haul. The donkey was the picture of contentment. Yet, hoping to make it even lighter still, at the river the donkey pretended to fall again. But this time, when he had scrambled to his feet, he was overcome with sadness. The donkey dragged himself homeward with a load ten times heavier than before. The merchant's slyness had taught that donkey a lesson he would not soon forget.

BuildReflectWrite

Build Knowledge

Answer the following questions about "The Great Tug-of-War."

Questions
1. What was the "The Great Tug-of-War" about?
2. Why was it impossible for either Kubu or Tlou to win?
3. Were the forces on the rope balanced or unbalanced?
4. What might have happened if Mmutla and Kubu or Tlou actually had a tug-of-war?

Reflect

How does understanding science help us achieve our goals?

Based on this week's texts, jot down new ideas you have about the guiding question.

Research and Writing

Opinion

Meteorology, geology, and engineering are all fields that involve studying forces and interactions. In your opinion, which of these fields is most interesting? Conduct research to learn about careers in these fields, and write an essay stating and supporting your opinion using the information you have learned.

Conduct Research

Use your guiding questions to conduct research this week. Gather information from at least three sources, including both print and online sources. Use your sources to plan your opinion essay.

Extended Read 2

Remember to annotate as you read.

Notes

Investigate Magnetism

by Drake Conyers

1 It is early morning at the scrapyard. The crane operator adjusts her hard hat and climbs up into the control compartment of the crane. She turns the key and starts the engine. She flips on the control panel. Then she moves a series of levers to adjust the lifting arm. Workers shout orders over the low hum of the crane. She puts the arm in position, raising it high into the sky. Then she swings it over a massive heap of scrap metal. The pulley attached to the crane holds a large, round metal disc. It looks like a giant hockey puck dangling over the old pipes, car parts, and metal scraps of every shape and size.

Different-sized magnets exert different levels of magnetic force.

Notes

2 The crane operator awaits the signal from the ground crew. When all is clear, she lowers the enormous magnet into the scrap pile. Then she flips on the electromagnet. Pieces of iron and steel scream and screech as they are drawn out of the scrap heap. Tailpipes and sheet metal scraps are pulled instantly to the powerful magnet by invisible force. It almost looks like a magic trick. Tons of steel and iron scraps now float in midair, affixed to the overhead magnet.

3 She lifts and moves the load from the mixed metal junk pile over to a large recycling container. When the load is safely over the container, she turns off the electromagnet. The iron and steel scrap metal are released from the magnetic force. They drop in a clanking and clambering heap into the giant bin. She then moves the crane to lift another load. It isn't a magic trick. It's magnetic force at work.

4 This is just one way we use magnets. In truth, every modern device uses magnetism to work. Motors, computers, phones, gift cards—they all use magnets to work.

5 A magnet is an object that has a pulling force that attracts other magnetic materials. Some magnets are naturally occurring. Lodestone is a type of magnetized rock made of magnetite. It can attract iron or steel. Lodestone was first observed centuries ago.

Notes

6 Today it is believed that lodestone may become magnetized when struck by lightning. People can also make magnets out of certain metals, such as iron, steel, nickel, and cobalt.

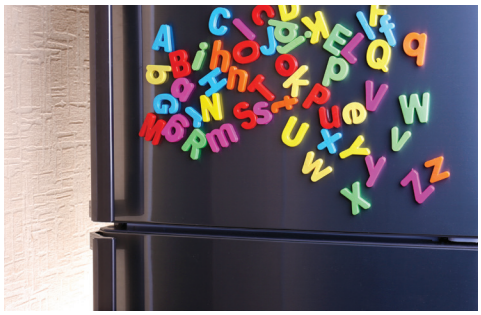
7 Metals, like all matter, are made of trillions of tiny particles. These tiny particles are called atoms. Inside each atom are even smaller particles. Electrons spin and float around the nucleus inside the atom. In cases where there are unpaired electrons, the electrons group together. These groups can move together in one direction. This is what causes the magnetic properties in certain metals.

8 When the forces of the electrons are unbalanced, certain metals will have magnetic properties. Iron and steel are two such metals. You can explore this yourself. First, get a piece of steel. Next, rub the piece of steel in one direction repeatedly with a magnet. This will affect the electron particles inside the metal and magnetize the steel atoms. Finally, test and observe the steel's new properties.

pyrrhotite

magnetite

Lodestone is a magnetized form of the mineral magnetite. Pyrrhotite is another type of rock that has magnetic properties. Both of these types of magnets can be found in nature.



Pieces of iron or steel can be magnetized by stroking the metal with a magnet. Artificial magnets are made in different shapes and sizes for different purposes.

Notes

9 All magnets have what is called a magnetic field. This area of magnetic force is generated by unbalanced electron particles inside the metal. Magnetic fields and their forces are invisible. However, the effects of their power can be observed. Magnetic fields vary in strength. For example, a weak magnet may slide down the front of the refrigerator when placed atop a piece of paper. Meanwhile, an industrial-sized magnet can lift a refrigerator twenty feet into the air!

A lodestone compass works on the principle that magnets align themselves with Earth's North and South Poles.

Lodestone Technology

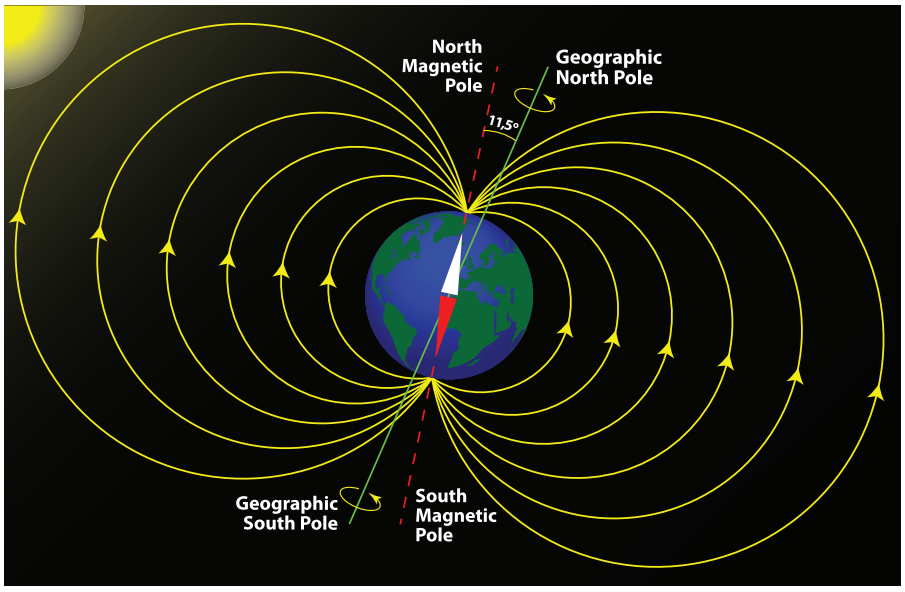
People first encountered magnetism in the sixth century BCE. Ancient people noted that a rock, later called "lodestone," attracted bits of iron. By 300 BCE, pieces of lodestone were tied to string and used as the first compasses. Over time, lodestone ("way stone") became central to navigation, helping sea captains travel and chart unknown waters.

But how did lodestone become magnetized in the first place? Many early theories suggested it was struck by lightning. Lodestone is found at shallow depths, not buried deeply within Earth's crust. This fact helps support the lightning theory. In a recent study, NASA scientist Dr. Peter Wasilewski was able to magnetize magnetite with electrical charges similar to lightning in the Goddard Space Flight Center lab. He is now working to prove the theory outdoors.

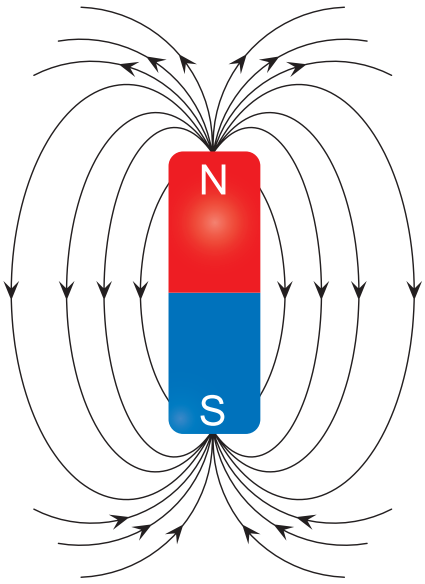
Notes

10 Typically, magnets have a north pole and a south pole. The power of a magnet is strongest near its poles. When two magnets are placed near one another, they are attracted to the opposing poles. The north pole is "south-seeking" and is attracted to the south pole. The south pole is "north-seeking" and is attracted to the north pole. If the north pole of one magnet is placed next to the north pole of another magnet, the two poles will push away from each other. The same thing will happen if two south poles are placed next to each other. In other words, unlike poles attract and like poles repel. Earth has north and south poles, too. That is because Earth is actually a giant magnet. Earth's core is a churning ball of iron that produces Earth's magnetic field.

Magnetic fields have a north and south pole, just like Earth.



Earth's magnetic field

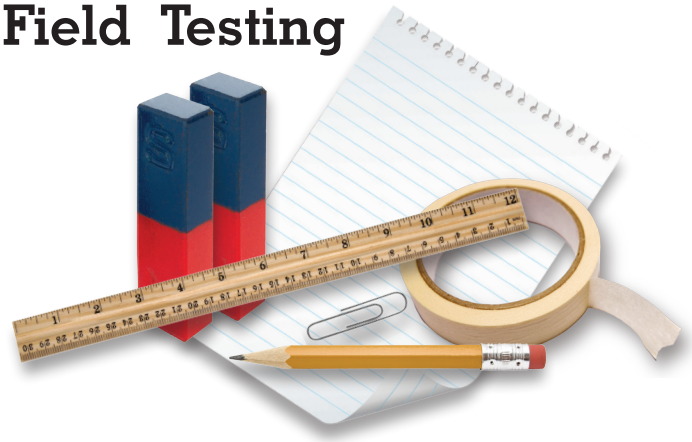


magnetic field

Magnetic Field Testing

Materials:

- 2 bar magnets
- masking tape
- 1 paper clip
- ruler
- notebook paper
- pencil



Procedure:

1. Ask yourself: Does the size of a magnet affect its magnetic force? Write a prediction that answers this question.
2. Then make a data chart to record your observations.

Distance:	2 cm (1 inch)	5 cm (2 inches)	7 cm (3 inches)
Single Magnet			
Double Magnet			

3. Tape the ruler to a table or your desk.
4. Tape the magnet to the desk so that one of its poles aligns with the 0 cm (0 inch) mark on the ruler.
5. Hold a paper clip flat on the desk at the 2 cm (1 inch) mark. Then release it. Observe and record what happens in a data chart. Place a check mark in the "yes" column if it is attracted to the magnet. Check the "no" column if it does not respond.
6. Hold a paper clip flat on the desk at the 5 cm (2 inches) mark. Then release it. Observe and record what happens in a data chart.
7. Continue testing each distance and recording the results.
8. When you have completed the tests for the single magnet, take the other magnet and tape it to the first (remember that unlike poles attract).
9. Then repeat the tests with the double magnet and the paper clip. Record your results for each distance.

Ask yourself:

How is the size of a magnet related to its magnetic field?

What are some other ways you could test this question?

Notes

Notes

11 Electric currents also generate a magnetic field. The most powerful magnets in the world are electromagnets. An electromagnet uses an electric current to produce its magnetic field. The magnetic field disappears when the electromagnet is turned off.

The MagLab in Tallahassee, Florida, builds magnets to do important jobs like medical imaging. It is home to the most powerful magnets in the world.

Maglev **is short for "magnetic levitation." This high-speed maglev train uses repellent electromagnets to float along the track, instead of using wheels.**

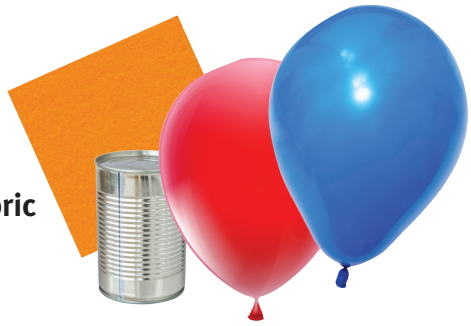
Notes

Static Electricity

Walk across a carpet with stockinged feet and touch a doorknob. Some materials have an electric charge without even being plugged in. Objects with an electric charge either attract or repel one another. Like magnetic poles, particles with the same electric charge repel, or move away from, one another. Particles with opposite electric charges attract one another. This means that a positive charge and a negative charge attract. Sometimes electric charges build up on an object. When an electric charge builds up on an object and does not move it is called static electricity. You can test static electricity yourself!

Materials:

- **2 balloons**
- **1 empty aluminum can**
- **1 piece of woolen felt or fabric**



What will happen when two balloons charged with static electricity are placed next to each other?

1. **Write a prediction.**
2. **Rub the two balloons one by one against the woolen fabric, then try moving the balloons together.**
3. **Record your observations. Do they attract or repel each other?**
4. **Rub one of the balloons back and forth on your hair, then slowly pull it away.**
5. **Record your observations.**
6. **Predict what will happen when a balloon charged with static electricity is placed next to an aluminum can.**
7. **Rest an aluminum can on its side on a table. After rubbing the balloon on your hair, hold the balloon close to the can and observe what happens. Does it roll toward it or away? Slowly move the balloon away from the can and see what happens.**
8. **Record your observations.**
9. **Ask yourself:**

- **What causes the balloon to attract or repel certain objects?**
- **What evidence tells you static electricity is present?**

Word Study Read

Remember to annotate as you read.

Notes

Why Didn't I Think of That?

1 Think of an everyday problem. It's likely that an inventor has come up with a clever invention to solve it. Of course, some inventions solve big problems. There are many smaller ones, however, that offer solutions to pesky and problematic daily issues.

2 You pop a frozen pizza into the oven. Ten minutes later, out it comes. As you roll the cutter over the pizza, the toppings fall off. You're lucky if your slice doesn't slide off the spatula as you put it on your plate. What a mess! Here's a solution: a pizza scissors spatula. It lets you snip, snip, snip, and serve. And you have only one tool to clean up.

3 Maybe you want spaghetti. But twirling the long noodles onto your fork is a perpetual frustration. A self-twirling spaghetti fork transforms your pasta nightmares into yummy dreams. This battery-powered fork twirls at 22 revolutions per minute. In a blink, you have a fork of coiled spaghetti ready to eat. What a transformation!

4 These inventions already exist. Maybe you can invent the next big thing. Think of a problem that could be solved with a gadget. Sketch out a plan. Then get to work. Maybe someone else will say, "Why didn't I think of that?"

BuildReflectWrite

Build Knowledge

Answer the following questions based on this week's reading.

Questions About Physical Changes of Matter
1. How can you magnetize a piece of iron?
2. If you touch the south pole of a bar magnet to the south pole of an electromagnet, will the magnets repel or attract?
3. How can physical changes be described?
4. What can investigating physical changes in matter tell us about our world?

Reflect

How does understanding science help us achieve our goals?

Based on this week's texts, write down new ideas you have about the guiding question.

Research and Writing

Opinion

Meteorology, geology, and engineering are all fields that involve studying forces and interactions. In your opinion, which of these careers is most interesting? Conduct research to learn about these fields, and write an essay stating and supporting your opinion using the information you have learned.

Write Your Opinion Essay

Use your research results to draft, revise, and edit your opinion essay. Share your opinion essay with your peers.

Support for Collaborative Conversation

Discussion Prompts

Share a new idea or opinion . . .

I think that _____.

I notice that _____.

My opinion is _____.

An important event was when _____.

Gain the floor . . .

I would like to add _____.

Excuse me for interrupting, but _____.

That made me think of _____.

Build on a peer's idea or opinion . . .

I also think that _____.

In addition, _____.

Another idea is _____.

Express agreement with a peer's idea . . .

I agree with [Name] because _____.

I agree that _____.

I think that is important because _____.

Respectfully express disagreement . . .

I disagree with [Name] because _____.

I understand your point of view, but I think _____.

Have you considered that _____?

Ask a clarifying question . . .

What did you mean when you said _____?

Are you saying that _____?

Can you explain what you mean by _____?

Clarify for others . . .

I meant that _____.

I am trying to say that _____.

Group Roles

Discussion Facilitator:
Your role is to guide the group discussion and make sure that everyone has the chance to participate.

Scribe:
Your job is to record the ideas and comments your group members share.

Timekeeper:
You will keep track of how much time has passed and help keep the discussion moving along.

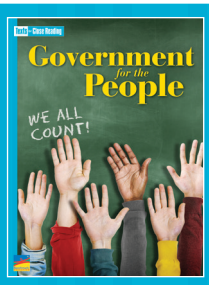
Encourager:
Your role is to motivate and support your group members.

Making Meaning with Words

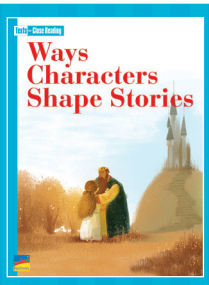
Word	My Definition	My Sentence
affixed (p. 23)		
balanced (p. 6)		
bounded (p. 17)		
clutched (p. 17)		
loomed (p. 13)		
observed (p. 23)		
plunged (p. 13)		
predicted (p. 8)		
scampered (p. 15)		
spluttered (p. 15)		

Build Knowledge Across 10 Topic Strands

Government and Citizenship

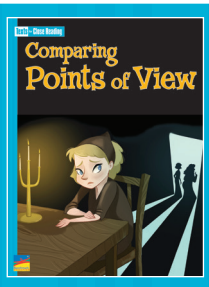


Character

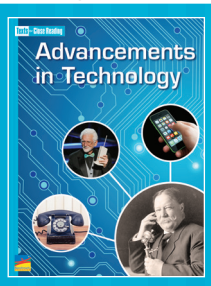


Life Science

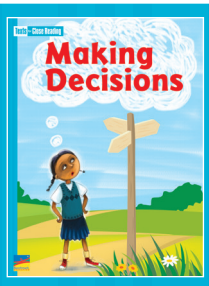
Point of View



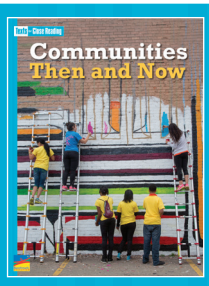
Technology and Society



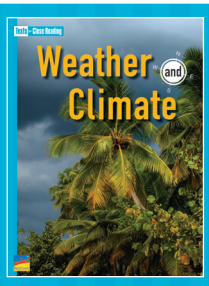
Theme



History and Culture

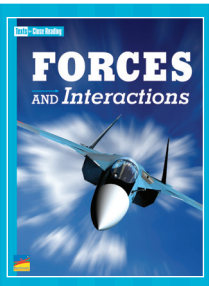


Earth Science



Economics

Physical Science



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