



Energy, Motion, and Force

Lesson 1 What are some kinds of energy?

Lesson 2 What are magnets?

Lesson 3 What are position and motion?



How do energy and forces make objects move?

Trace the path of the roller coaster with your finger. **Tell** how the roller coaster cars move.



Texas Essential Knowledge and Skills

TEKS 6A Investigate the effects on an object by increasing or decreasing amounts of light, heat, and sound energy such as how the color of an object appears different in dimmer light or how heat melts butter. **6B** Observe and identify how magnets are used in everyday life. **6C** Trace the changes in the position of an object over time such as a cup rolling on the floor and a car rolling down a ramp. **6D** Compare patterns of movement of objects such as sliding, rolling, and spinning.

Process TEKS: 1A, 1C, 2A, 2C, 2D, 2E, 3B, 4A

How does heat affect an object?

- ❑ 1. Put pats of butter in three separate cups.
- ❑ 2. Place Cup A under a gooseneck lamp. Turn the lamp on. Set Cup B on a shelf. Place Cup C in a refrigerator.
- ❑ 3. **Observe** the pats of butter after an hour.

Explain Your Results

4. **Communicate** How do the pats of butter look after an hour?



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

5. **Draw Conclusions** Which pat of butter has changed the most? Explain why it changed the most.

Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

Materials

gooseneck lamp



3 pats of butter



goggles



3 clear plastic cups

Inquiry Skill

You can **communicate** when you write what you observe.

Texas Safety LAB RULES

Wear your safety goggles. Do not touch the lamp after it is turned on. Do not eat the butter.



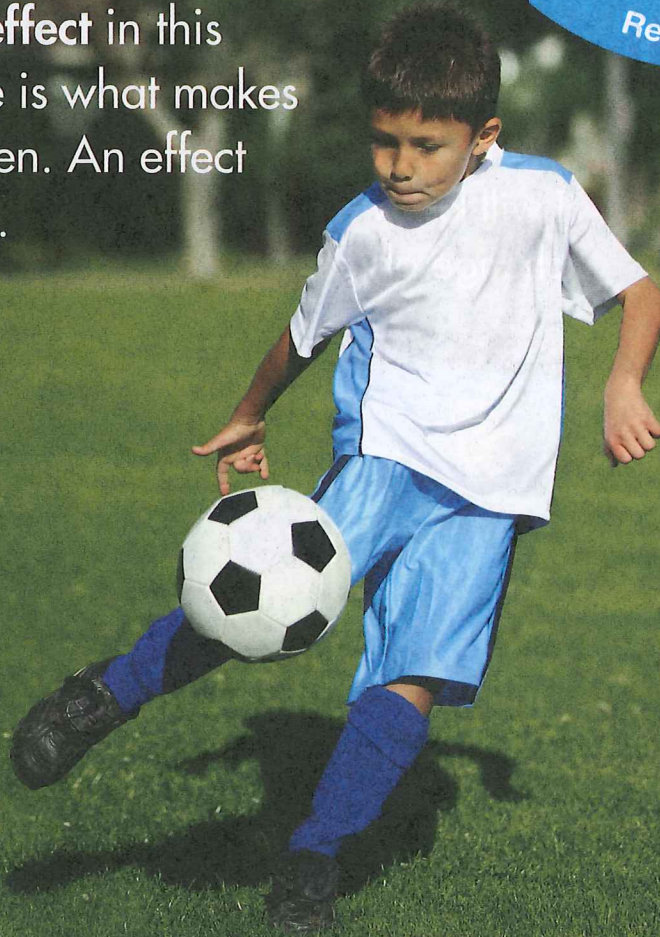
Connect to

Reading

Read Together

Focus on Cause and Effect

You will practice the reading skill **cause and effect** in this chapter. A cause is what makes something happen. An effect is what happens.



Practice It!

This boy is playing soccer. The boy kicks the ball. The ball goes far. **Write** the effect of the boy kicking the ball.

Cause

The boy
kicks the ball.

Effect



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line. The area is currently blank for writing.



What are some kinds of energy?

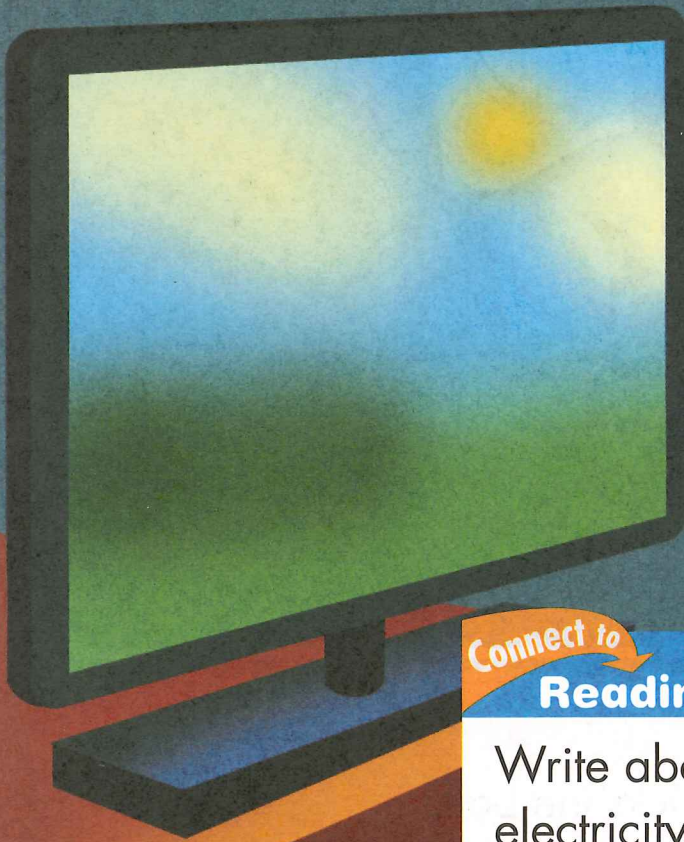


I will know **TEKS 6A**

I will know how energy can change objects. (Also **1A, 2E**)

Vocabulary

energy
electricity
vibrate



Connect to

Reading

Write about something you use that needs electricity. Tell why you use the object.

 **ELA TEKS 21B**



Handwriting practice lines consisting of solid top and bottom lines with a dashed middle line. There are four sets of these lines for writing.

TEKS 6A, 1A, 2E

How does the amount of light affect color?

- 1. Darken the classroom. Hold the flashlight high above the picture so that it shines on the entire picture.
- 2. **Observe** how the colors in the picture look.
- 3. Move the flashlight closer to the picture.
- 4. **Observe** the colors of the picture where it is well lit and not so well lit.
- 5. Continue steps 3 and 4 until the flashlight touches the paper.

Materials



flashlight



color picture in a book



Texas Safety
LAB RULES
Do not shine the light in anyone's eyes.



Explain Your Results

6. **Communicate** What happens to the colors?



7. **Infer** Why does this happen?

Energy

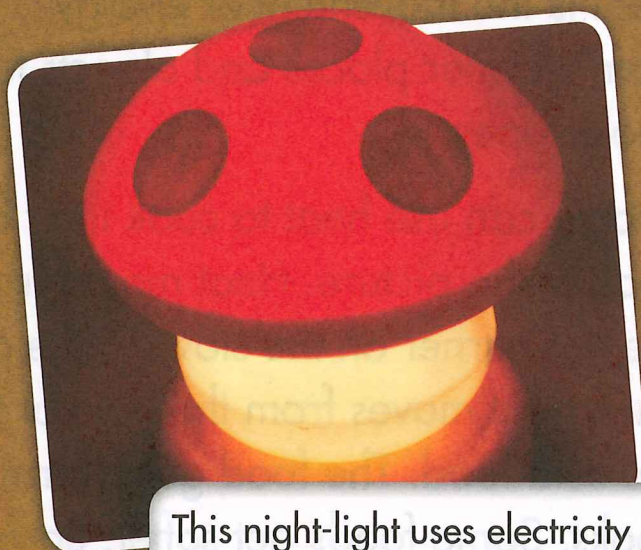
People use energy in many ways. **Energy** is the ability to do work or cause change. A car needs energy to move. A toaster needs energy to make toast. A spaceship needs energy to launch into space.

The children in the picture are using energy. A computer needs energy to work. A computer uses electricity. **Electricity** is one kind of energy.



The computer uses electricity.

Think about what happens when an air conditioner is turned on. The air conditioner uses electricity to cool your home. Electricity can warm your home too. A heater or a furnace can use electricity to warm your home.



This night-light uses electricity to provide light in a dark room.

This fan uses electricity to move air around your home.




Look at the fan in the picture. The fan uses electricity. **Tell** how you use electricity in your home.

Heat

Heat is the movement of energy from warmer places and objects to cooler ones.

People can use heat to cook their food. Look at the picture. Heat moves from the hot burner on the stove to the pot. Then heat moves from the hot pot to the cold food. The food gets warm and cooks. Some foods get softer. Some foods may melt. Butter melts as it gets warmer.

Draw arrows on the picture to show how heat is moving.

Heat from the stove cooks the food. 

Light Energy

Light is another form of energy. Light comes from many sources. A lamp uses electricity to make light. A fire gives off light when it burns. Most light sources give off heat too.

The sun is our main source of light. Light travels from the sun to Earth. People, animals, and plants need the sun's light to live.

Underline the words that tell what light is.

Circle the sources of light in the picture.



Light and Color

You need light to see. The amount of light affects how well you see. The amount of light also affects how colorful objects look. Colors look brighter when an area is well lit. As light decreases, colors look darker. In very low light, you may not be able to tell what color objects are.

Explain whether the colors of trees and buildings look duller on a sunny day or a rainy day.



Handwriting practice lines consisting of a solid blue top line, a dashed blue middle line, and a solid pink bottom line. There are four sets of these lines provided for writing.



Objects look dark and less colorful in low light.

Sound

Sound is also a form of energy. Sound is made when an object vibrates. **Vibrate** means to move quickly back and forth. A vibrating object makes the air around it vibrate. The vibrations travel through the air in waves. You hear the sound when the vibrations reach your ears.

You can describe sound by its volume. Volume is how loud or soft a sound is. Suppose you hit a drum hard. The drum would vibrate strongly. The drum would make a loud sound. If you just tap it, the drum would not vibrate very much. The sound would be soft.

Cause and Effect Write what causes a cymbal to make sound.



Handwriting practice lines consisting of four sets of horizontal lines. Each set includes a solid top line, a dashed middle line, and a solid bottom line. A yellow pencil is positioned at the start of the first line.



The drum and cymbals make sounds when they vibrate.



Quick Lab

Volume

Work with a partner. Use your voice to make a sound. Have your partner describe the volume of the sound.

Take turns.  **TEKS 6A**



What are magnets?



I will know **TEKS 6B**

I will know how people use magnets.

(Also **2D**, **2E**, **4A**)

Vocabulary

attract

repel

Connect to

Math

Math TEKS 10A

Students tested 2 magnets. They tested how many paper clips each magnet could pick up. Then they made a pictograph.

Paper clips picked up

Magnet A	
Magnet B	

Key: Each stands for 2 paper clips.

How many paper clips did each magnet pick up?
Multiply the number of paper clips by 2 to find out.

Magnet A $3 \times 2 =$ _____

Magnet B $5 \times 2 =$ _____

Which magnet is stronger? _____



Quick Lab

TEKS 6B, 2D, 2E, 4A

What kind of objects are magnetic?

- 1. **Predict** which materials you think will be attracted to a magnet. Divide the materials into 2 piles.
- 2. **Test** your prediction. Hold the magnet close to each object.
- 3. **Record** what you observe.

Materials

magnet toothpick
 penny paper clip
 aluminum foil crayon
 screw

Is the object magnetic?						
	toothpick	penny	metal paper clip	aluminum foil	crayon	screw
Magnetic?						

Explain Your Results

4. **Interpret Data** What items are attracted to the magnet? What are the objects made of?

5. **Draw Conclusions** Look at your chart. What can you conclude about the objects that magnets attract?

Magnets

Magnets can push or pull some metal objects.

Magnets attract some metal objects.

Attract means to pull toward.

Magnets can repel other magnets.

Repel means to push away.

The ability to attract and repel objects is a property of matter.

Cause and Effect **Circle** the objects that are attracted to the magnet.

Draw an **X** on the objects that are not attracted.

Tell why some of the objects were not attracted to the magnet.



Everyday Uses of Magnets

People use magnets every day. Magnets can hold artwork on refrigerators. Magnets can keep doors closed. Magnets can hold bracelets together. Magnets can sort metal in a recycling center. Magnets are in cars and computers. Magnets connect the cars of toy trains. Magnets even move some real trains. Strong magnets lift and move the trains. Strong magnets lift and move the trains.



Magnets connect the cars of this toy train.



An electromagnet separates metal from other materials.



Magnets move this train along its track.



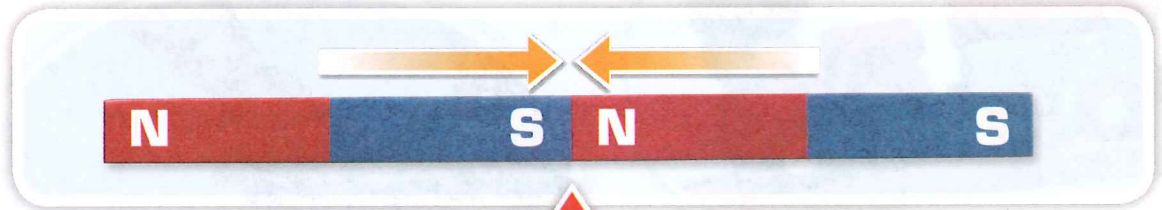
Draw a way you use magnets.

Magnet Poles

Magnets have poles. A pole is the place on a magnet that has the strongest push or pull. Look at the poles of the magnets. The N stands for north pole. The S stands for south pole.




Put like poles together.
They repel each other.

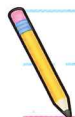


Put opposite poles together.
They attract each other.

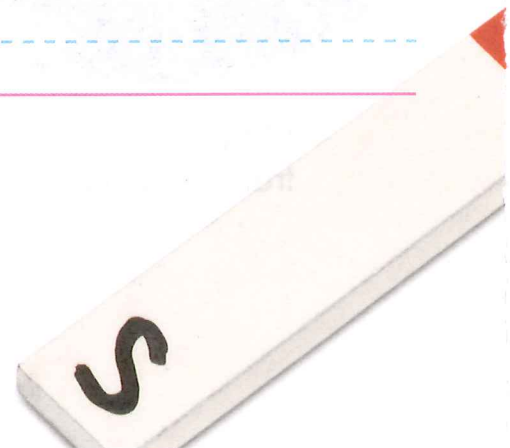
Lab zone Quick Lab

Magnets and Movement
Get two magnets. Use one magnet to pull the other magnet. Use one magnet to push the other magnet. Tell what happens when you try to put the two magnets together.  **TEKS 6B, 2E**

Write why the north and south poles are attracted to each other.



Four sets of horizontal writing lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.



How Magnets Move Objects

A magnet can move some things without touching them. Look at the picture below. The spoon is moving toward the magnet. The magnet is not touching the spoon. The force of the magnet pulls the spoon.



Cause and Effect

Draw an arrow to show which way the train will move.





What are position and motion?

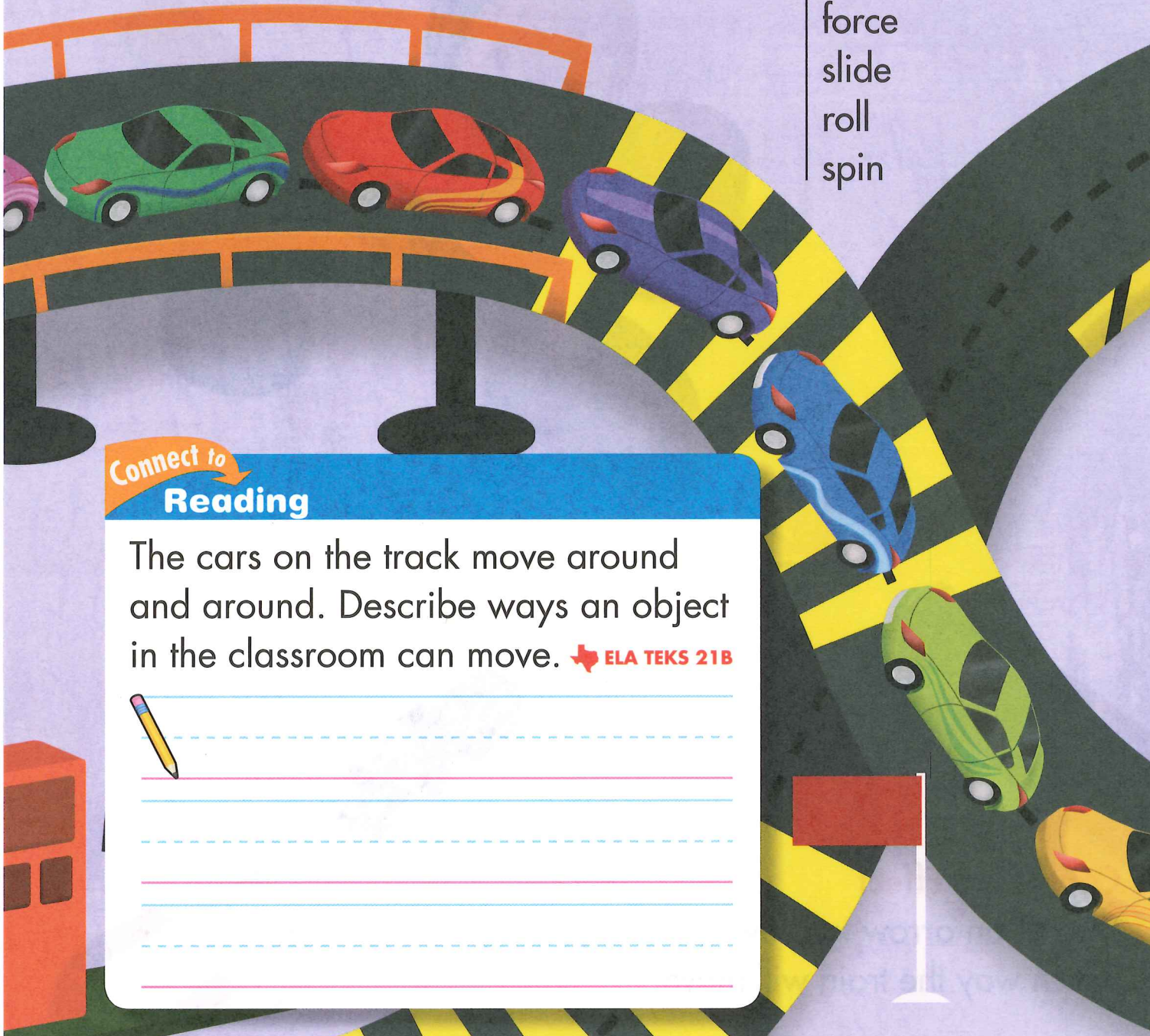


I will know **TEKS 6C, 6D**

I will know how objects change position. (Also **2E, 4A**)

Vocabulary

- position
- motion
- force
- slide
- roll
- spin



Connect to

Reading

The cars on the track move around and around. Describe ways an object in the classroom can move. **TX ELA TEKS 21B**



Handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) with a dashed blue line in the middle of each set.

TEKS 6C, 6D, 1A, 2C, 2E, 4A

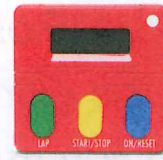
What happens when a cup rolls?

1. Roll a cup to a partner. Push the cup.
Record the time.
2. Record how far the cup rolls and how it moves.
3. Repeat steps 1 and 2 two more times. Each time push the cup harder.

Materials



cup



timer

Texas Safety
LAB RULES
Handle science tools carefully.

	For how long does the cup roll?	How far does the cup roll?	Does the cup roll straight or in a curve?
First roll			
Second roll			
Third roll			

Explain Your Results

4. **Communicate** What was the shortest amount of time you recorded? What was the longest amount of time? Why do you think there was a difference?

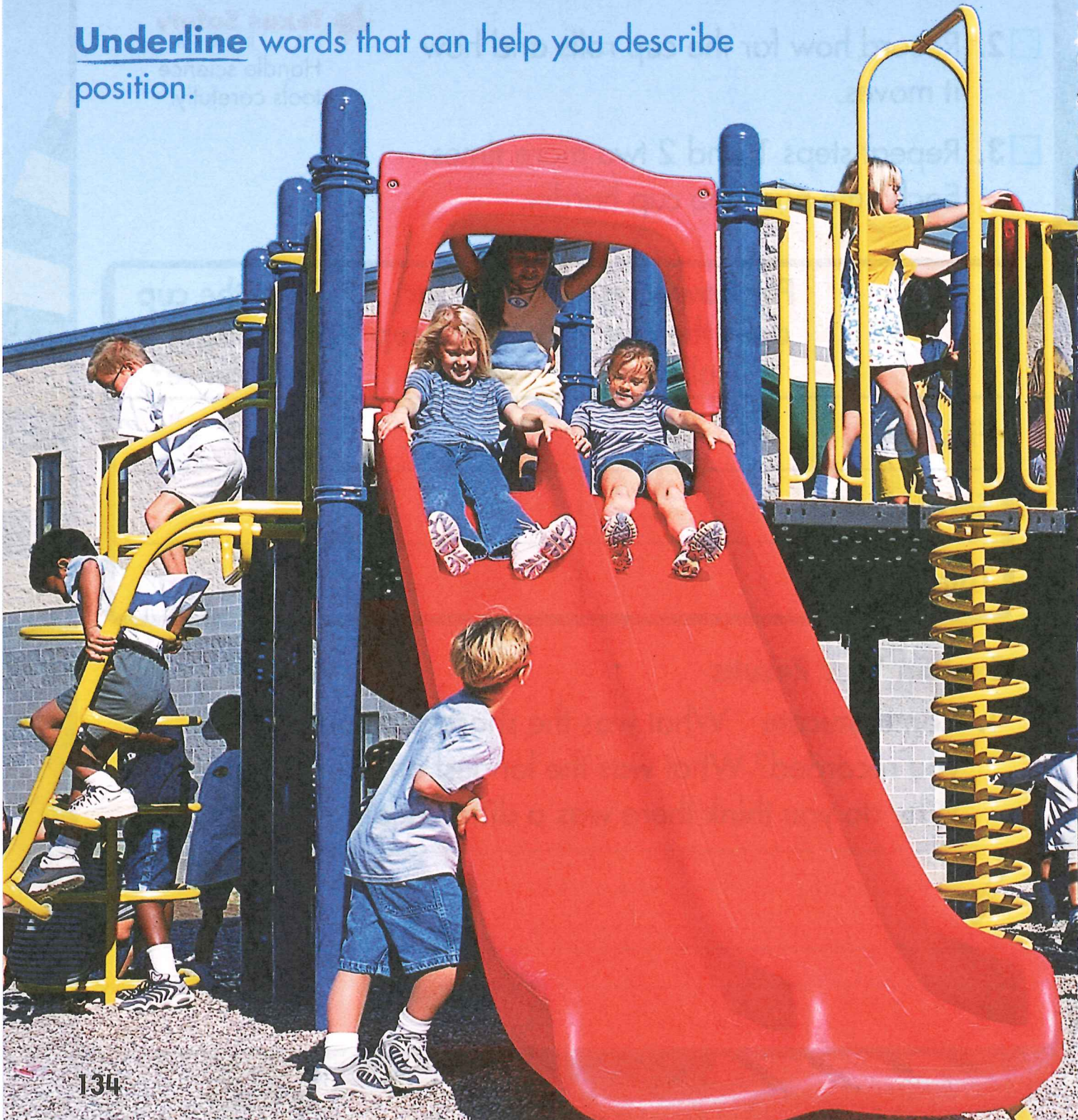


Position

You can use words to describe the position of an object. **Position** is where an object or person is. The words left and right describe position. You can use words such as in front of, next to, and behind to help you describe position too.

The bars are to the right of the slide.

Underline words that can help you describe position.



Look at the picture of the playground. You can use an object that does not move to tell position. The slide does not move. A boy is to the left of the slide.

Write a sentence about the position of a classroom object. **Underline** the words in your sentence that describe position.



Motion

Motion is the act of moving. Objects can move in different ways. Objects can roll. Objects can spin or slide. They can move back and forth and fast and slow. Objects change position as they move. Suppose you push a toy truck across the floor. The truck moves in a straight line. The truck changed position as it was moving.

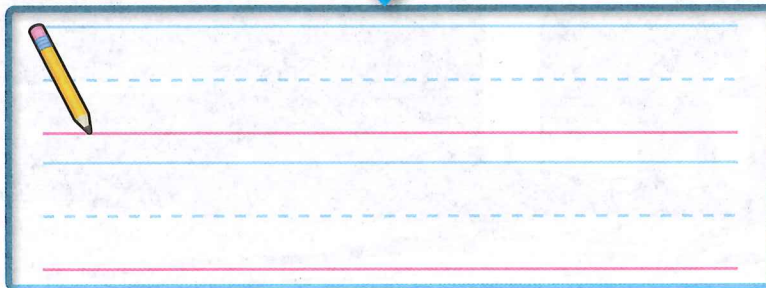
You may move the truck in a zigzag pattern. This means you push the truck one way and then another way.

Cause and Effect Write the effect of pushing the toy truck.

Cause

You push the truck
across the floor.

Effect



Demonstrate how the merry-go-round moves.



Draw lines to show how the shoelaces were moved in a zigzag pattern.

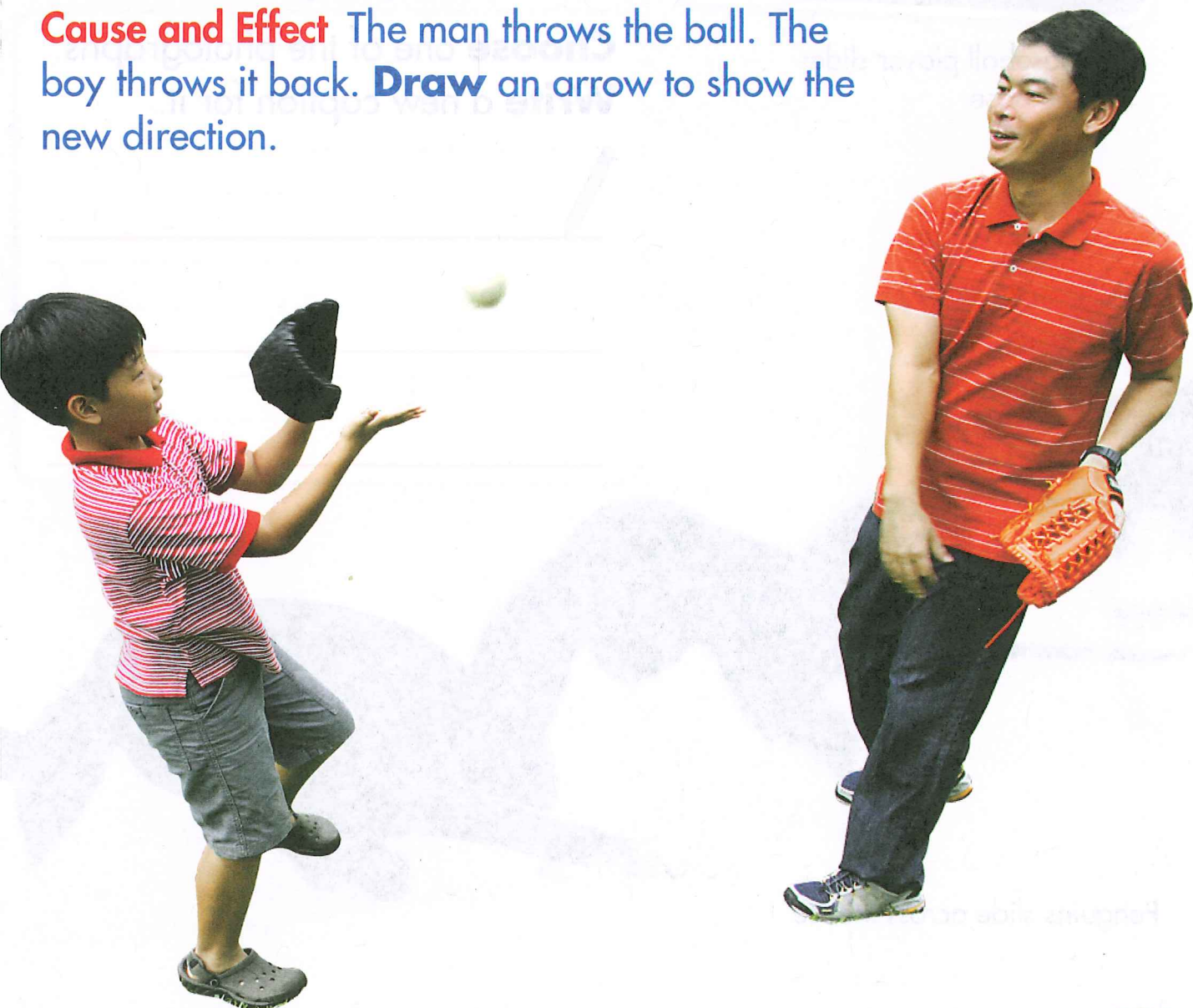
Force

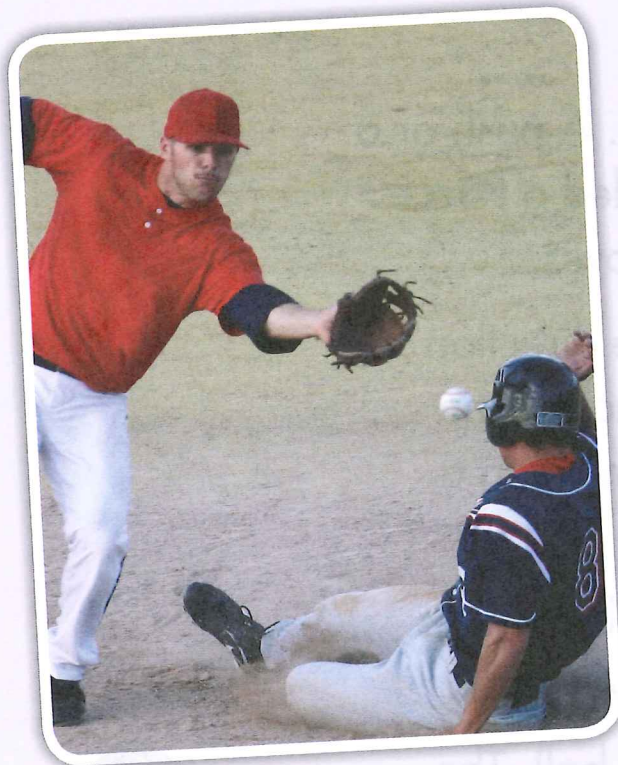
You can move things in different ways. A push or a pull that makes something move is called a **force**. A force changes the way an object moves.

An object will change its motion in the direction it is pushed or pulled. Suppose you change the direction of the force. The object will move in a different direction.

Someone throws a ball to you. The ball changes direction and position when you throw it back.

Cause and Effect The man throws the ball. The boy throws it back. **Draw** an arrow to show the new direction.





This baseball player slides into the base.

Sliding

Objects move in many different ways. Sliding is one way an object can move. Something **slides** when it moves smoothly along a surface. Sliding changes the position of an object. The object moves from one place to another. You can slide a counting chip across your desk. You can slide down a playground slide.

Choose one of the photographs.
Write a new caption for it.



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line. There are four such sets of lines provided for writing.



Penguins slide across the ice.

Rolling and Spinning

Another way of moving is rolling. To **roll** is to move by turning over and over. When objects roll, they move from place to place. Round objects can roll easily. Wheels are round and roll easily. Logs are round. They can be rolled too.

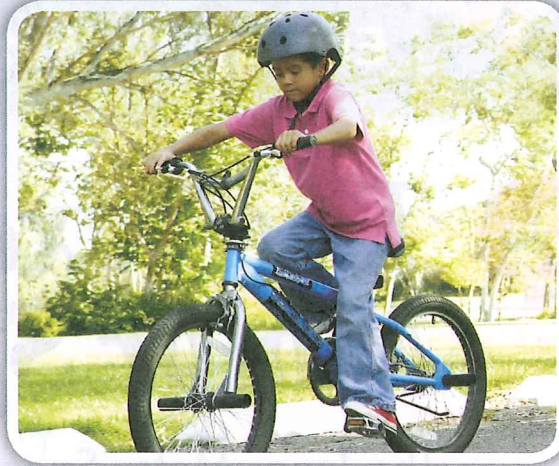
Spinning is another way of moving. To **spin** is to twirl around and around. A spinning object does not move from place to place. It stays in the same place. A merry-go-round spins. It turns around and around a center point. The merry-go-round does not move from place to place.

Underline what to roll means.

Circle what to spin means.

Compare how objects move.

Tell how they move when they spin, roll, and slide.



The bicycle wheels roll, so the bicycle moves forward.



A top spins around and around.



Quick Lab

Down the Ramp

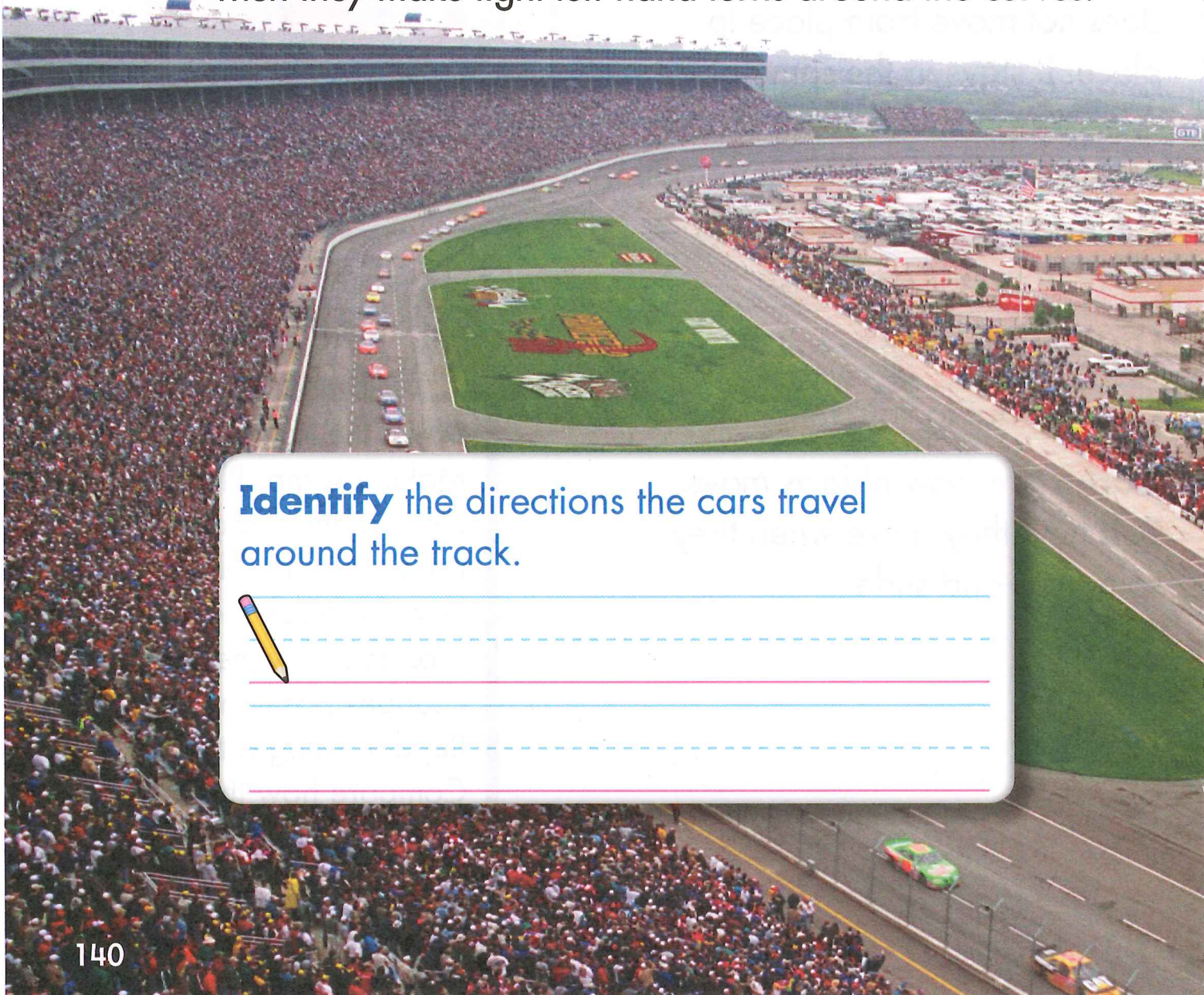
Make a ramp. Place a block at the top of the ramp. Push it. Observe how the block moves. Observe how the block changes position. Repeat, using a toy car. Compare how the block and the toy car move.

 **TEKS 6C, 6D**



The Texas Motor Speedway

The Texas Motor Speedway is in Fort Worth, Texas. Some of the best drivers in the world race there. More than 200,000 fans watch the action. The track is shaped like an oval. Drivers go straight on parts of the track. Then they make tight left-hand turns around the curves.

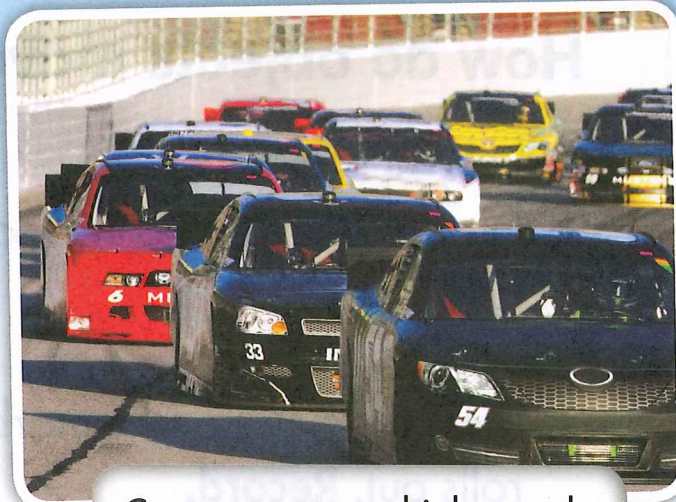


Identify the directions the cars travel around the track.



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

The track is one and one-half miles around. The cars go around and around the track. Cars zigzag through traffic. They reach speeds of more than 150 miles per hour. Cars race for 500 miles. The car that finishes first is the winner.



Cars race at very high speeds.



A crew checks a car that stops for gas and a tire change during the race.

Tell how the cars move on the track.

How do objects move?

Follow a Procedure

1. Drop a marble in a curved tube.
2. **Measure** how far the marble rolls out. **Record.**
3. Make the tube straight. Drop the marble in the tube.
4. Measure and record.

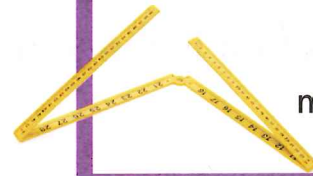
Materials



clear plastic tube



small metal marble

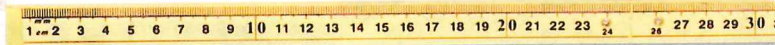


meterstick

Inquiry Skill

You can record to show what you **measure**.

Gravity pulls the marble down.
The tube makes the ball curve.



Distance Rolled

Shape of Tube	How far did the marble roll? (cm)
Curved	
Straight	

Analyze and Conclude

5. **Draw a Conclusion** Fill in the blank.

The marble rolled farther in the  _____ tube.

6. Try to make the marble go farther. Try different shapes.
Draw or tell how you made the marble go farther.



Producing Electricity

TEXAS 1C

Texas is using wind to produce electricity.

Texas produces a lot of electricity. Texas produces more electricity than any other state. Texas uses natural gas to produce electricity. It uses coal. It uses other sources of energy too. Texas is using new technologies. These include wind and solar energy. Texas is the nation's leading producer of wind energy. Texas gets lots of sunshine. Texas can use energy from the sun. Wind and solar energy are clean sources of energy. They are renewable energy sources too.



Solar panels use energy from the sun to warm this building.

Why is wind energy good for producing electricity?



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

Vocabulary Smart Cards

attract
electricity
energy
force
motion
position
repel
roll
slide
spin
vibrate

Play a Game!

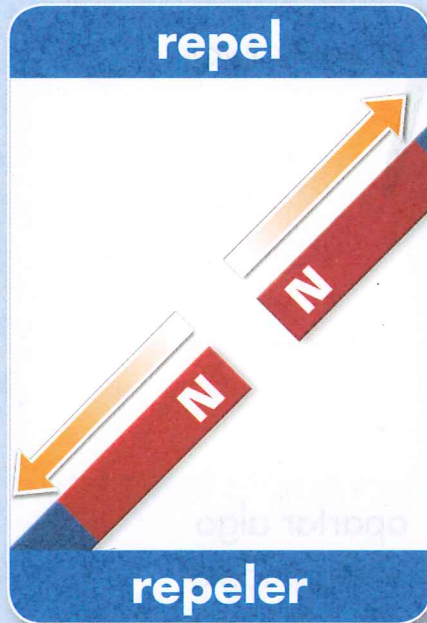
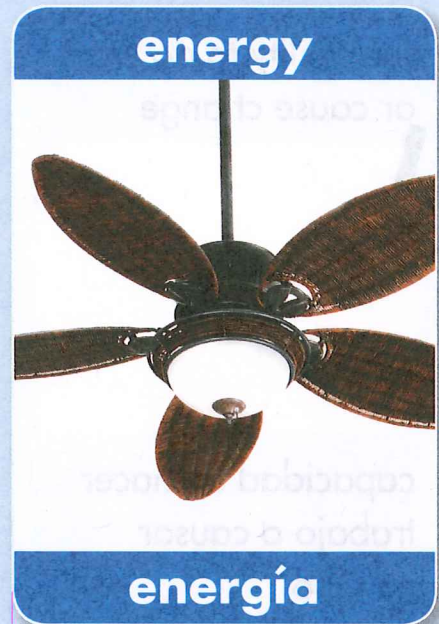
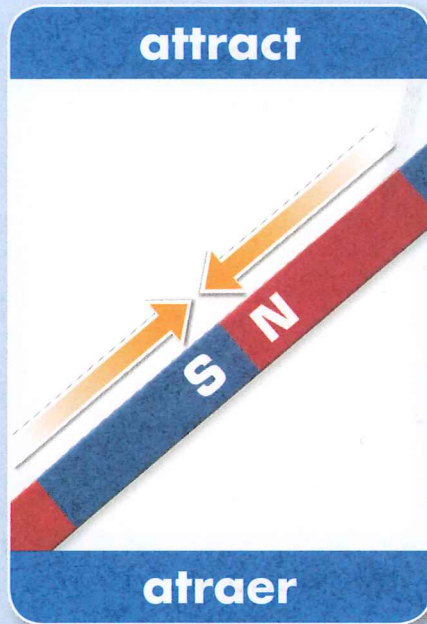
Cut out the cards.

Work with a partner.

Pick a card.

Say clues about the word.

Have your partner guess the word.



the ability to do work
or cause change



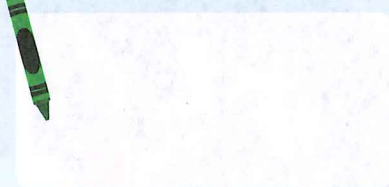
capacidad de hacer
trabajo o causar
cambio

to pull toward



jalar hacia sí

a kind of energy that
can flow through
wires and make light
and heat



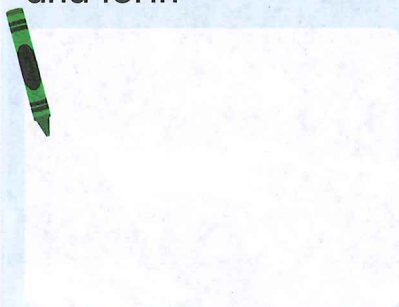
tipo de energía que
puede fluir por cables
y generar luz y calor

to push away



apartar algo
empujándolo

to move quickly back
and forth



moverse rápidamente
hacia delante y hacia
atrás

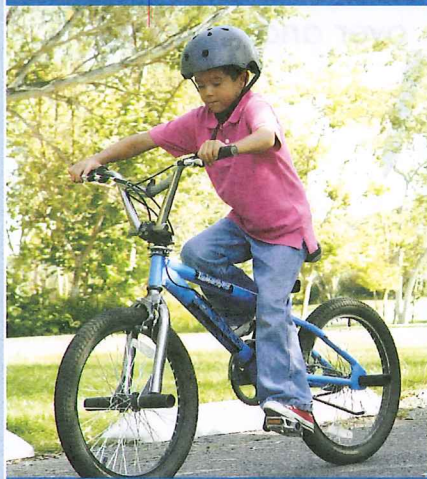
where an object or a
person is



lugar donde está una
persona u objeto



roll



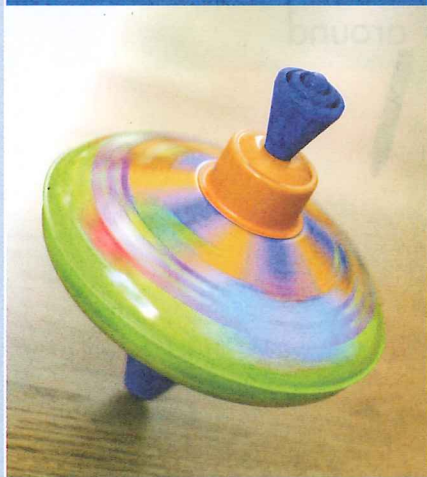
rodar

force



fuerza

spin



girar

motion



movimiento

slide



deslizarse



a push or pull that
makes something
move



empujón o jalón que
hace que algo se
mueva

to move by turning
over and over



mover dando vueltas

the act of moving



el acto de moverse

to twirl around and
around



dar vueltas alrededor
de un punto

to move smoothly
along a surface



moverse suavemente
a lo largo de una
superficie





TEKS Practice

Lesson 1 TEKS 6A

1. **Identify** What could you do to melt butter?

Circle the letter.

A decrease heat

C add heat

B decrease sound

D decrease light

2. **Explain** how a painting in dim light would look different from how it looks in bright light.



Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 2 TEKS 6B

3. **Vocabulary Complete** the sentence.

Like poles on magnets _____ each other.

4. **Apply Write** why two magnets can keep the door of a cabinet closed.

Handwriting practice lines consisting of a solid top line, a dashed middle line, and a solid bottom line.

TEKS Practice

5. **Tell** about one way you use magnets.



Lesson 3  TEKS 6C, 6D

6. **Apply Draw** lines to show two ways the car can move.



7. **Identify** How does a penguin move across the ice on its belly?

Circle the letter.

A slides

B spins

C rolls

D flips

8. **Draw** an arrow pointing left.

TEKS Practice

9. **Compare Write** how rolling, sliding, and spinning are alike and different.



Chapter 3

Lesson 1 What are some kinds of energy?



 **TEKS: 6A**

Lesson 2 What are magnets?



 **TEKS: 6B**

Lesson 3 What are position and motion?



 **TEKS: 6C, 6D**

★ TEKS Practice: Chapter Review

Read each question and circle the best answer.

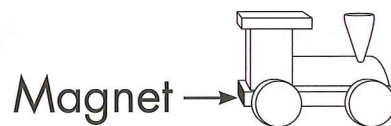
- 1 Aiden put an ice cube in a pan. Then he put the pan in a warm place. The picture shows what happened.



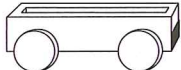
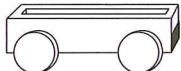
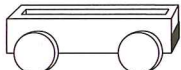
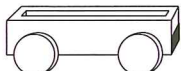
Which of the following describes a food doing the same thing when heat energy increases?

- A Butter melts.
- B A popcorn kernel pops.
- C A piece of bread turns brown.
- D An egg cooks.

- 2 Look at the toy train engine.



Which car will the train engine pull?

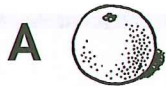
- F  ← Wood
- G  ← Glass
- H  ← Plastic
- J  ← Metal

★ TEKS Practice: Cumulative Review

3 Maya's teacher gives her a bag with a "mystery solid" inside. Maya cannot use her eyes to look in the bag. She can use only her other senses to collect information about the solid. The picture shows Maya's notes.

Is a solid
Makes no sound
Has a round shape
Has no smell
Feels rough

Which object has properties that match Maya's notes?



If you have trouble with . . .

Question	1	2	3
See chapter (lesson)	3 (1)	3 (2)	2 (1, 2)
TEKS	6A	6B	5A

How does a seesaw work?

Materials



toy car



eraser



pennies



ruler with plastic cups (prepared by teacher)

Ask a question.

How can a smaller person lift a bigger person on a seesaw? Use a ruler to find out.

Make a prediction.

1. If you move one cup closer to the middle of a ruler, will you need more or fewer pennies to lift the other cup?
 - (a) more pennies
 - (b) fewer pennies

Plan a fair test.

Use two cups that are the same size.

Inquiry Skill

You plan an **experiment** when you design a way to answer a scientific question.

Design your test.

- 2. Make a seesaw model. Draw it in the chart.
- 3. List your steps.



Do your test.

- 4.** Follow your steps.

Collect and record data.

- 5.** Fill in the chart.

Tell your conclusion.

- 6.** When did you use fewer pennies?



- 7. Communicate** How can a smaller person lift a bigger person on a seesaw?

Texas



Unit

C

Earth Science

