ENERGY at the AMUSEMENT PARK

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CHAPTER 1

ENERGY ALL AROUND!

Put on some comfy shoes and get ready! You're about to enter an amusement park! You'll fly through the air on your favorite rides, scream as loud as you can, and eat some delicious treats. It will be a great day! But have you ever wondered what makes all this fun possible? Energy works behind the scenes all around an amusement park.

Energy is the power to do work. People use energy in different ways. Energy cannot be created or destroyed. But energy can be changed, or transformed.

How is energy at work in an amusement park? Energy can become motion for rides that spin, flip, and dive. Energy can become heat you can feel, light you can see, and sound you can hear.

What are you waiting for? Let's see how energy is involved in all the park's hair-raising thrills!

Energy changes to become motion for rides all over an amusement park.

CHAPTER 2

POTENTIAL AND KINETIC ENERGY

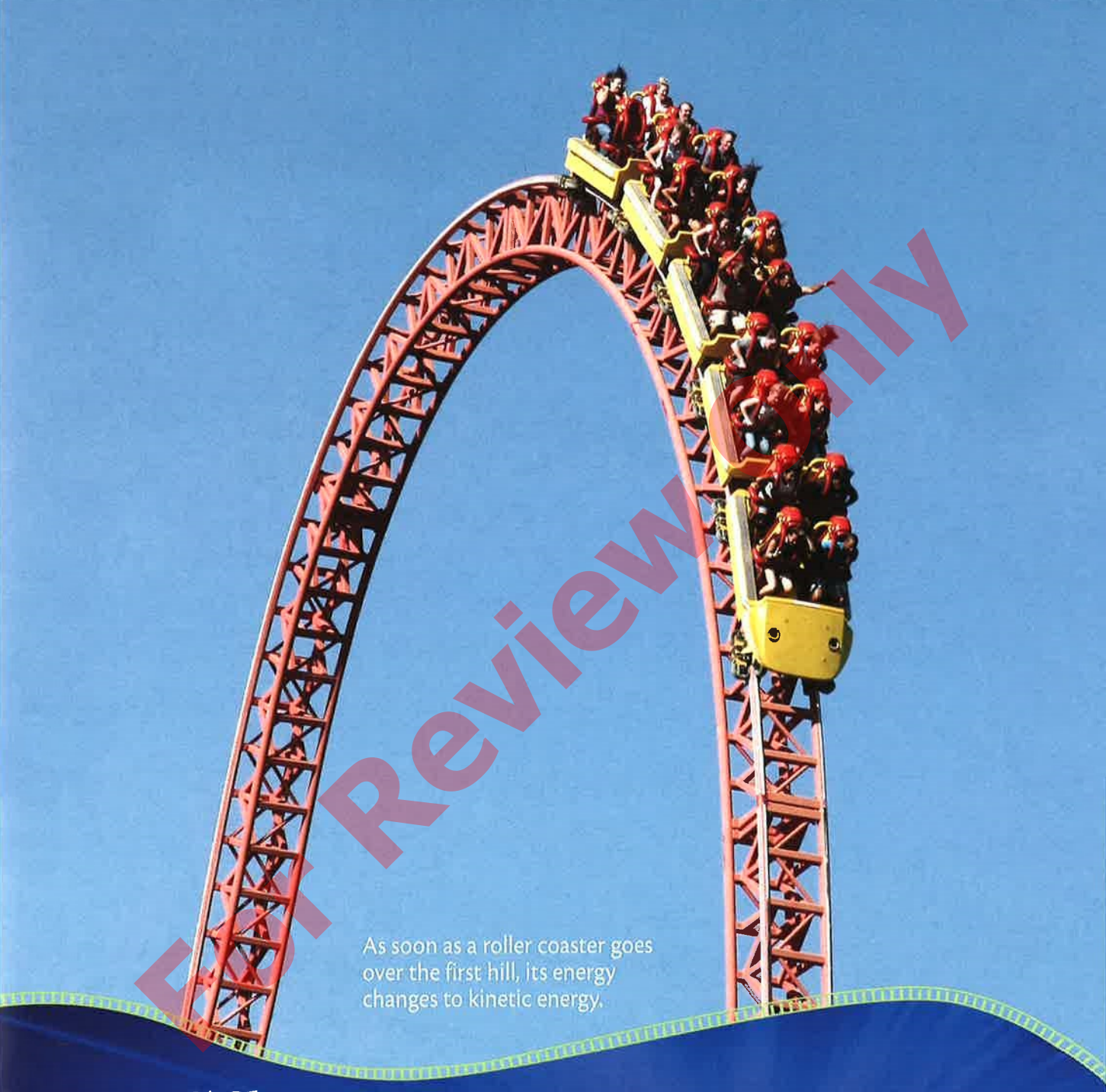
Click, click, click. You're on the biggest, wildest roller coaster at the park. The cars inch up the first hill. It's high—really high! That clicking sound comes from a machine. It pulls the cars up the hill with a cable.

The hill is high for a reason. As the cars climb higher, they gain more **potential energy**. The cars will use this stored energy to zoom around the track.

As soon as the cars inch over the hill, the potential energy changes to **kinetic energy**. Gravity pulls the cars down the hill. This force attracts all objects toward Earth's center. *"Aaaahhhh!"* Riders scream and laugh as they free fall. The cars rush up and down the track. They zip around twists and turns. The hills get smaller and smaller. The cars have less and less kinetic energy to move. Soon the ride slows to a stop.

kinetic energy—the energy of a moving object

potential energy—the energy stored within an object, waiting to be released



As soon as a roller coaster goes over the first hill, its energy changes to kinetic energy.

FACT

When you're in free fall, you experience weightlessness. Your stomach feels weird. Scientists think the fast downward rush makes some of your organs move a little. They float up as you fall down.

Pendulum Power

Next up is the **pendulum** ride, and it's a real rush. The part of the ride you sit in is attached to a long arm. The arm slowly starts swinging from one side to the other. You go higher and higher. Then you loop all the way around before speeding back down.

What's behind this excitement? Pendulum rides build up potential energy as they rise. Then gravity pulls the ride down. Just like on a roller coaster, the potential energy changes to kinetic energy. The ride swings at its **axis** from side to side. Its energy switches back and forth from potential to kinetic as it rises higher and falls back down. When the ride is at its highest, it has the most potential energy. When it is moving fastest, it has the most kinetic energy. This kinetic energy powers the ride into a full loop.

axis—a real or imaginary line through the center of an object, around which the object turns

pendulum—a weight that hangs from a fixed point and swings back and forth freely using the force of gravity

At its highest points, a pendulum ride has the most potential energy.

FACT

Pendulums often keep time in clocks. Dutch scientist Christiaan Huygens invented the first pendulum clock in 1656.

Slingshot Up!

If you think the pendulum ride didn't get you high enough into the sky, try the slingshot ride! The seats are connected to two cables. The cables go to the top of two tall towers and over **pulleys**. The cables go back down to the ground inside the towers. The other ends of the cables attach to stretchy springs inside a small spring tower near the two taller towers. When the seats are released, you rocket up. You fly past the tops of the towers. You're so high that people below look like ants on the ground!

Hundreds of stretchy springs fling this ride upward. Inside the spring tower, a metal plate is at the top and bottom of the springs. A **hydraulic** system pulls the plates apart. This stretches the springs, giving them potential energy called elastic energy. When the seats are released, the potential energy in the springs becomes kinetic energy. The bottom plate flies up in the spring tower. This pulls on the cables. It makes the seats fly up into the air. The springs and seats bounce up and down. Finally they slow down, and it's time to get off. Whew! You made it!