For more than five decades Busch Gardens® Tampa has delivered some of the world’s most exciting thrills. Rides such as Cheetah Hunt®, SheiKra®, Montu® and Kumba® have set the stage, and the newest edition to the “thrill ride family” is Falcon’s Fury®.

Falcon’s Fury will take guests to new heights, as it is the park’s tallest thrill ride. Like the animal it is named for, the coaster travels straight down at 70 miles per hour. Did you know that cheetahs are the fastest land mammal on Earth? Building on this inspiration, Cheetah Hunt is the park’s longest thrill ride. Rides such as Cheetah Hunt®, SheiKra®, Montu® and Kumba® have set the stage, and the newest edition to the “thrill ride family” is Falcon’s Fury®.

SheiKra will carry you up 200 feet, then plunge you 90 degrees straight down at 70 miles per hour. And that’s just the beginning. SheiKra is the first coaster of its kind to incorporate an element of surprise. Like its bird of prey namesake, riders will pivot 90 degrees in midair to a face-down dive at 60 miles per hour straight down. Located in the newly renovated land, Pantanal, Falcon’s Fury will be visible from any location in the park and even across the Tampa Bay area.

At the ride’s highest point Busch Gardens has added an element of surprise. Like its bird of prey namesake, riders will pivot 90 degrees in midair to a face-down dive position.

Check out these facts about Falcon’s Fury:

• It is taller than the Statue of Liberty.
• Magnets are used to stop the ride vehicle.
• There is a 90-degree “face down” turn at the top.
• There is a 68-ton counterweight in the center of the ride.
• The ride is controlled by magnets, cables, and of course, gravity.
• There are 105 hydraulics for the foundation driven between 75 and 205 feet into the ground.
• A 383-foot-tall crane was used to assemble the final segments of the tower.
• Riders will experience a 5-to-6-second freestyle fall.
• There are more than 6,000 bolts used to build tube segments together.

The twists and turns of rollercoasters

Did you know that cheetahs are the fastest land mammal on Earth? The Cheetah Hunt roller coaster is named after these powerful animals. This triple-launch coaster carries riders high above the park, then races down along the ground through a rocky gargoyle. At a length of 4,400 feet, it is the park’s longest thrill ride. Like the animal it is named for, the coaster travels at 70 miles per hour.

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coasters is tremendous. Since the United States' first roller coaster was unveiled at Coney Island, N.Y., in 1884, the thrill-seeker's desire for daredevil rides has continued to grow. What causes your sense of unease and excitement on a roller coaster? It's all about physics—the science that deals with matter, energy, motion, and force. The principles of kinematics (how we describe motion), dynamics (the effects of forces on the motion of objects), and energy (the capacity to do work) come alive in the study of roller coasters.

The laws of motion
Sir Isaac Newton was a scions in the 1600s. He provided essential theory and ideas about gravity. By 1666, at the age of 23, Newton had written three laws of motion.

Newton's first law: “Every object persists in its state of rest or of uniform motion in a straight line, unless it is compelled to change that state by forces impressed on it,” Newton stated. In other words, an object in motion stays in motion, unless acted upon by another force. If the bicycle you are riding hits a rock, the bicycle will stop. The force is the force that acts on the bicycle. You, the person riding the bicycle, will continue to move (possibly over the handlebars of the bicycle) until a force, such as the resistance, stops you.

Newton's second law: “Force is equal to the change in momentum per unit time. For a constant mass, force equals mass times acceleration,” Newton determined. When net force acts upon an object, the acceleration of the object is equal to the force divided by the mass.

Newton's third law: “For every action, there is an equal and opposite reaction,” Newton concluded. For every force there is a reaction force that is equal in size but opposite in direction. To accelerate the person in the elevator upward, the floor of the elevator must push up on the feet with a force greater than the weight of the person, and the feet push back on the floor with the same force. The person feels heavy.

Imagination, speculation, skepticism, and truth are related to science and scientific methods. Imagination is what you think, speculation is guesses, skepticism is doubting and truth are facts of your conclusion. All four of these ideas work together. The key is to stay in the right mindset and work with the facts. Write down a new story based on your speculations. Speculate about what the outcome of the situation will be. Write down your best guess, and then look the words up in a dictionary. Learning new words is a good way to increase your vocabulary. All four of these ideas work together.

Forceful forces
There are many forces—gravitational, electrical and magnetic—that exist all around us. Research these forces and apply them to everyday life. Look for an article in the Tampa Bay Times. The group that finds the most words wins the game. Here are some words that you might use:

1. Imagination
2. Speculate
3. Skepticism
4. Truth

Write a new story based on your speculations. Speculate about what the outcome of the situation will be. Write down your best guess, and then look the words up in a dictionary.
How does a roller coaster work?

NASCAR® hosts races at approximately two dozen tracks every year. Although no two tracks are the same, one thing all race tracks have in common is banking—the steepness built into the track.

A car traveling 200 miles per hour on a fast course would fall 2 feet in 100 feet if they were not held up by friction forces. This would make the ride too dangerous. An extra bank is built into the track to help support the car. The steeper the bank, the more force needed to pull the car back up to the top of the track.

On a roller coaster, the car is sitting on a starting platform. The banked angle of the track helps pull the car onto the track. As the car accelerates, it travels faster and faster. If the bank was not steep enough, the car would fall off the track. The bank is steep enough to pull the car up to the speed you want to travel at.

When the coaster turns left, you will feel as though you are being thrown to the right. When g forces are high, the turns are so banked that the riders feel weightless. The forces pulling you to the right are equal to the weight of the car. A Newtonian force of gravity is always acting on any part of your body, but you know from experience that it exists. You know that you need this up-side force to keep you from falling down. Up is the same direction as the bank or support force. This also could be the floor coming up on your feet. Your weight is a measure of the strength of the chair force.

Mysterious g forces

Gravitational force is the force of attraction, or pull, between all masses in the universe, especially the attraction of the earth's mass for bodies near its surface. Albert Einstein said, "The more remote the body the less the gravity. The relation between two bodies is proportional to the product of their masses and inversely proportional to the square of the distance between them.

Because of gravity, if you drop something, it falls down, not up. That seems obvious, right? But what is gravity really? Gravity has played a big part in making the universe the way it is. Gravity is what makes pieces of matter clump together into planets, moons and stars. Gravity is what makes the planets orbit the sun—Earth orbits the sun. Gravity is what makes the stars clump together in huge, swirling galaxies.

Gravity holds our universe and ties us together. But even though gravity is a common part of our everyday lives, it is also a mysterious force in the universe. We still don't understand it very well. The best way to experiment with gravity is to put yourself into an experiment, and see what and how bad a pull there is to do that on the riders of roller coasters and experiencing changes is a gravitational g-forces in all directions.

Source: United States Department of Energy

Soaring through the air

One of the most popular activities for children on a playground is swinging. Do you remember flying higher and higher to take flight? The more you pumped your legs, the higher you went into the air.

Pendulum rides are a little like the swing sets you might remember from your early childhood. The swing motion is a parabolic path. Swings give you a feeling of flying in a controlled manner. You pump your legs to provide enough force to increase the height of the swing arc, and enjoy the increased velocity of the downward swing. When you stop pumping, the swing slows gradually and then stops.

At the top of a pendulum ride, such as Phoenix®, you will experience a feeling of near weightlessness. If the ride makes a complete 360-degree circle, you will experience the full effect of complete weightlessness. These sensations are not due to a decrease in forces of gravitation. You cannot feel gravity. What you do feel is the sensation of pushing your body with a force to counteract gravity's downward pull.

Changing acceleration

Deceleration is the process required to make the coaster cars slow down. This is a change in speed, or a change in direction. In both cases, a vertical force is required to cause the deceleration. When the vertical force acting on you is equal to your weight, then you will have no vertical acceleration. This could be the momentum pushing up against the chair you are sitting in. The result is you are experiencing a force factor of 1. If the upward force is greater than your weight, say twice as much, then the force factor is 2. If there is no upward force, then you will feel weightlessness as you free fall. An upward force is required to make the coaster cars change direction. The change of potential energy into kinetic energy is what drives the roller coaster. The total amount of energy is the same at the beginning of the ride, but after that the coaster must complete its travels on its own.

The change of potential energy to kinetic energy is what drives the roller coaster.

For any roller coaster, once the coaster car descends that first hill, different types of wheels help keep the ride steady. Running wheels direct the coaster on the track. Guide wheels control sideways movement. A final set of wheels keeps called up-lift wheels, the coaster on the track even if that coaster is upside-down. When you take a journey comes to an end, compressed air brakes or magnets stop the car at the end of the track.

Learning with the Times

Special theory of relativity

 relativity is based on Albert Einstein's work. This theory makes use of the ideas of Galileo, the Italian physicist. Einstein showed that mass moves and mass is affected by motion. As you move faster, your mass gets bigger. Mass is a way of expressing energy. The more mass an object has, the more energy it contains. It is called energy of motion (kinetic energy).

The energy of motion is what keeps a roller coaster going. It is called potential energy. This energy is stored in the cars. This is the energy that the cars need to travel around the track.

As the cars go off the station, the potential energy is changed into kinetic energy. As the cars go around the track, they gain energy and speed up. The amount of energy remains the same. As they go off the next hill, they slow down because part of the energy has been changed into heat. As the coaster cars move around the track, the cars slow down. The heat energy from the friction is changed to heat production.

If only the force of gravity acts on an object, it is in a state of free fall. Dining off a high diving board or bungee-cord jumping produces this sensation. NASA astronauts are trained to deal with weightlessness by putting them in a plane that flies in a parabolic path.

A roller coaster also can achieve "weightlessness" if the track follows a parabolic path such as a "carnival bump." A steep coaster hill, which has the shape of a half parabola, also produces a near weightless sensation. The carnivals on the Kumba and the gill on the Monorail produce near weightlessness for about 0.3 second. Fast-free fall rides, such as SheiKra, Falcons Fury and Cheetah Hunt, have three parts: the ride to the top, the momentary suspension and the downward plunge. As you go to the top, the force is applied to the car to lift it to the top of the fast-free fall box. Motions apply the force, and there is a built-in safety allowance for differences in body mass and weight.

For a short period, you and your fellow riders hover in the air; the car suddenly drops and begins to accelerate toward the earth. The influence of the earth's gravity. The plunge is dramatic. Just as Galileo and Newton explained, all of the passengers fall to the earth with the attraction of the earth's mass. The plunge is dramatic. Just as Galileo and Newton explained, all of the passengers fall to the earth with the attraction of the earth's mass. The plunge is dramatic. Just as Galileo and Newton explained, all of the passengers fall to the earth with the attraction of the earth's mass. The plunge is dramatic. Just as Galileo and Newton explained, all of the passengers fall to the earth with the attraction of the earth's mass.