

<http://0-search.proquest.com.millennium.itesm.mx/docview/268835920/141DD35F5BB22FBF831/1?accountid=11643>

Título

The science of fun ; Roller coasters combine physics with fear:

BOSTON -- You're on a roller coaster approaching the first drop. The coaster hangs just long enough for you to look out over trees swaying in the breeze, your bright red SUV a mere speck in the distance. You think, "Oh, my God," as the coaster starts its plunge. You're overwhelmed by the sensation that you're suspended in midair.

You scream. And you feel, well, more than a little queasy as you whip into a loop, a couple of spirals, up again and then into another drop.

Once your feet are back on the ground, you know it was exciting. But you wonder, what gave you the sense that your stomach was in your throat? And how did the roller coaster go so fast, anyway?

A temporary interactive exhibit, aptly titled "Scream Machines: The Science of Roller Coasters," is now open at the Museum of Science, where it will remain until Sept. 2. The display explains the physics, physiology and psychology behind the roller coaster, the centerpiece of North American amusement parks for more than a century.

The exhibit offers a chance to experience the physical effects of riding a coaster without stepping on a real one. On a recent day, scores of youngsters from Boston area schools got dizzy defying gravity and lost their balance exploring motion simulators. They discovered that while gravity remains one of the most important elements in thrill rides, other tricks and illusions are used to heighten the sense of danger.

Boys and girls waited in line to experience the illusion of riding the world's most terrifying and famous roller coasters at the "Ride the Great Ones" simulator. By the sounds of things, they might as well have been at Canobie Lake Park in New Hampshire riding "The Yankee Cannonball," which is rated one of the nation's 10 best wooden coasters by American Coaster Enthusiasts.

Canobie Lake Park, founded in 1902 and boasting four coasters, sponsored "Scream Machines." Wayne Ulaky, the park's vice president, said the exhibit is intended to provide fun and a "science learning experience."

"There is a tremendous amount of science involved in building and operating an amusement park safely and successfully that includes elements such as electricity, hydrodynamics, gravity, centripetal force and physics of all kinds," Mr. Ulaky said.

The exhibit's main attraction, an 18-foot-high loop called "G- Force," helps explain all that screaming. Teen-agers took turns on a gravity-defying bicycle that is set inside the loop. It allows the rider to pedal upside down and experience astronaut G-force levels and "free falling."

A sign nearby explains that 1-g is like everyday life; 2-g is experienced as the bike gets moving and you feel thrown to the outside of the loop and two times your normal weight; 3-, 4-, 5-g, three times normal weight; .5-g, half normal weight; 0-g, free fall; -1-g, you're upside down, so from your point of view, gravity is pulling the wrong way.

Not far from "G-Force" is an explanation of what happens in the human body that makes it difficult for some people to stomach rides and produces the urge to purge. It starts with a reaction in the ear's fluid-filled canals that causes a reaction in the medulla that, in turn, sends a message to the throat and stomach muscles.

A model of the innards of a male demonstrates the entire process of vomiting -- "a coordinated dance between your brain and gut." It ends with some loud and realistic sounding retching that seems to send every child fleeing in disgust.

Several of the exhibit's components show how roller coasters operate through the simple laws of physics. Gravity and momentum turn potential energy into kinetic energy. Clusters of young people examined the science of motion by sending balls down different tracks to see how fast they moved. Others pieced together coasters and tested them with toy race cars.

Designers want to minimize energy loss and maximize thrills, the exhibit explains. Because the first lift hill is usually the coaster's only source of energy, it has to be the highest point on the ride. After that, each hill or loop is smaller than the one before, as the coaster slows down.

To make what feels like a big finish, coaster designers often create the illusion of increasing speed by placing bushes and towers closer to the track or by ending in a tunnel.

Nowadays, many of the physical sensations of a coaster ride can be had through virtual reality. Components of the exhibit demonstrate how this is done through motion and light.

In "The Tumbling Room," you sit completely motionless while all the virtual visual cues in the room -- furniture, teacups -- turn upside down, instilling an overwhelming sensation that you have moved with the objects.

To complement "Scream Machines," a film titled "The Fun of Fear" is being shown twice a day on the domed screen of the museum's Mugar Omni Theater. The film explains how a motion simulator of the type used to train pilots and astronauts, combined with computerized special effects, tricks the mind and creates the same sensations as the real thing.

Using these techniques, Hollywood has created the "ride" film, in which the spectator has the sensation of being part of the action. One of the best examples is the movie "Back to the Future."

The film's narrator points out that, "Ride films can take us anywhere, to the future or the supernatural, or back to the age of the dinosaur. Ride films are limited only by imagination."

Admission to the exhibit hall is \$11 for adults, \$8 for children, ages 3 to 11, and seniors, 65 and up. Combination tickets for the Omni Theater and the Exhibit Halls are \$16 for adults, \$12 for children and seniors. The museum is open daily from 9 a.m. to 5 p.m.; Fridays until 9 p.m. For more information and showtimes at the Omni Theater call (617) 723-2500 or visit the Web site at www.mos.org.

New England Roller Coasters

Six Flags New England, Agawam

Eight roller coasters: Cyclone; Flashback; Mind Eraser; Superman Ride of Steel; Poison Ivy's Twisted Train; Thunderbolt; Riverside Cyclone; Batman-The Dark Knight.

For more information: toll free (877) 4-SIXFLAGS or (413) 786- 9300; Web site, www.sixflags.com.

Canobie Lake Park, Salem, N.H.

Four roller coasters: The Yankee Cannonball; Corkscrew Coaster; Rockin' Rider (formerly Galaxi Coaster); Kiddie Dragon.

For more information: (603) 893-3506; Web site, www.canobie.com

Lake Compounce, Bristol, Conn.

One roller coaster: The Boulder Dash, voted the No. 1 wooden coaster in the world in 2001 by the National Amusement Park Historical Association.

For more information: (860) 583-3631; Web site, www.lakecompounce.com.

Illustration

PHOTOS; T&G Staff/CHRIS CHRISTO; (1) People take a ride on the Batman-The Dark Knight floorless roller coaster at SixFlags New England in Agawam. (3) Museum of Science visitors can climb aboard the G-Force to discover what "Gs"

feel like. (3) "Thrill Ride: The Science of Fun," a film at the Museum of Science, features white- knuckle point-of-view footage of roller coasters.

Número de palabras: 1162

Copyright Telegram & Gazette Corporation Jul 2, 2002