MATHEMATICAL MOMENTS

Going Over the Top

You might not get many riders to line up for the "Potential Energy-Kinetic Energy Exchanger," but that gives a pretty accurate description of a roller coaster. Potential energy is high at the peaks and is converted to kinetic energy as the cars plunge down the track. At the low points, the kinetic energy is high, which propels the car back up the track. Basic mathematical subjects such as calculus help determine the height needed to allow the car to get up the next hill, the maximum speed, and the angles of ascent and descent. These calculations also help make sure that the roller coaster is safe. No doubt about it—math keeps you on track.

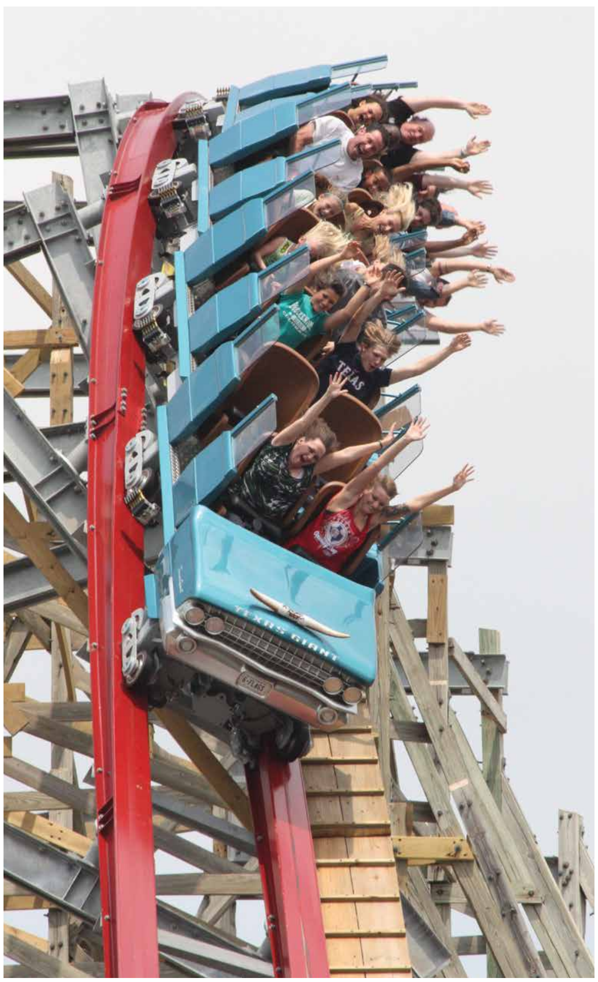

Image courtesy of *Amusement Today*.

Roller coaster rides are designed to look and feel more dangerous than they are, so that riders still get the thrills without significant risk. For example, a teardrop-shaped loop appears more perilous than a simple circle. Yet it involves less g-force on the riders upon entrance to the loop than a circle would while still guaranteeing the acceleration necessary to get through the top of the loop. Areas of mathematics such as numerical analysis and differential equations help solve the physics and engineering problems that arise as roller coaster designers, like riders, seek new records in speed, height, and steepness.

For More Information: "How Roller Coasters Work," Tom Harris http://science.howstuffworks.com/engineering/structural/roller-coaster.htm.

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