

on the educational grapewine



The thrills of physics

—by Nelson Hernandez

“I love standing firmly on Earth!”

How much is an amped-up teenager really going to learn about physics by riding the Mind Eraser roller coaster? Not a whole lot. But Isaac Newton would have been sooo jealous.

More than 4,000 students from across the Washington, D.C. region poured through the main gates of Six Flags America in Largo, Maryland, for Physics Day on April 26, passing onto the park’s faux-Colonial “Main Street 1776” the day before the park officially opened for the season. Janet Jackson and the pop song “Live and Let Die”—apparently the preferred music of the Founding Fathers—blared in the background, and the students vibrated like atomic particles. Some wore their physics team T-shirts and brought in accelerometers and stopwatches; others were just along for the rides.

Barnabas Adekanye, Irving Delco, Frailen Ramirez, Ludwin Romero, and Johnny Wilks, all sophomores at Northwestern High School in Hyattsville, Maryland, who study engineering, brought a 28-page workbook of problems to solve. It was complicated stuff with a lot of formulas.

“Compare the change in potential energy to the gain in kinetic energy,” went one question about the Mind Eraser. “Within experimental error, was energy conserved?” Johnny, 15, translated in normal teen-speak, “It’s like how the gravity and force relates with the loops and stuff.”

Clear on what to do, the budding physicists trotted off to the Mind Eraser and strapped themselves in. Seated, they looked expectantly to the ride, but not without some trepidation—after all, going at a top speed of 60 mph through loops and corkscrews and a 91-foot drop is not without a risk.

Their next destination was a ride called Roar. Frailen, 15, timed the coaster using his iPhone, and his buddies wrote down the coaster’s specifications. They had all decided to do the problems on the bus ride home. “It’s wood,” Irving observed. “It could collapse at any moment,” Johnny said. “This was, like, slower, I guess,” Ludwin, 16, added. (He was right: The top speed of Roar is 50 mph, though it puts the rider through 3.5 times the force of gravity.)

On the Batman-themed ride, the Joker’s Jinx, the coaster is propelled to 60 mph in three seconds by a series of magnets. The technology is similar to what physicists use in particle accelerators, but these thoughts were far from the minds of the youngsters.



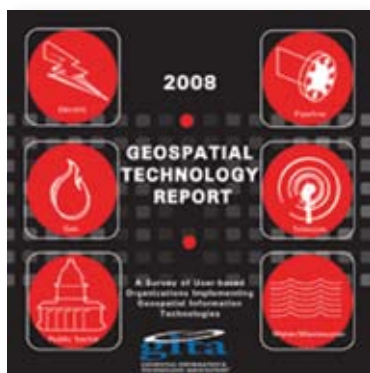
Irving screamed repeatedly— words he probably wouldn't want his family to hear—as the ride twisted and turned. Afterward, he explained: "The forces are gravitational force, centripetal force and magnetism working together to create a fun ride. You can't see it, but you know it's happening."

After lunch, the boys headed out for their final and most intense experiment: Superman: Ride of Steel. By now, physics had been mostly forgotten. There was a deeper lesson being learned at the theme park: overcoming primal fear.

While they waited, a girl who had just finished the ride walked by with a boy, flopping her hands and crying. "I can't feel my hands!" she wailed.

"The ride is going to do that?" Frailen said with alarm. Irving crossed himself. Ludwin tried to duck out on the lame excuse that he had just eaten, but the power of peer pressure found him and everyone else strapping on the orange seat belts and lowering the safety bars over their laps.

The coaster lurched to a start and climbed up. Way up. One hundred and ninety-seven feet up. As it crested the hill to a 205-foot drop that would hit a top speed of 73 mph, the boys started screaming. Barnabas, a 16-year-old from Nigeria who had never before been on a roller coaster, gasped with horror. And after the drop, the ride took them into a series of twists and humps that had everyone grabbing the safety bar for dear life even while they boisterously proclaimed— "I love physics! I love science! I love engineering!" And then, the perfect counterpoint: "I love standing firmly on Earth!"



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