

ENERGY (POTENTIAL TO KINETIC)

Units 10 & 11 Dr. John P. Cise, Professor of

Physics, Austin Com. College, 1212 Rio Grande St., Austin Tx., 78701 & New York Times June 15, 2016 by Elaine Glusac

Roller Coasters, Class of '16

Each year's class of new roller coasters promises to break speed and height records. This year's models are no exception, but this time around, virtual reality is thrown in for good measure. For maximum thrills, dare to ride the following new rails.



INTRODUCTION: In each case of these three coasters gravitational potential energy(U) (+ could possibly have a bit of kinetic energy at the top of the hills also) is being converted to linear kinetic energy(K) at hill bottoms.

QUESTIONS: In each of the three coasters here confirm the speeds attained at the hill Bottoms? Get answers in ft./s. and then convert to mph? Comment on your results?

Six Flags Magic Mountain , Valencia, Calif.

If whipping around on a coaster with **((a 90-foot-high loop and twists and turns at 55 m.p.h.))**. isn't scary enough, what if that ride took you through a post-apocalyptic world of alien invaders?



SeaWorld Orlando , Orlando, Fla.

HINTS: $U = m g h$, $K = \frac{1}{2} m v^2$, $Work = \Delta K + \Delta U$, where here work is considered 0 due to friction. Thus, $\Delta U = - \Delta K = - (K_{INITIAL} - K_{FINAL}) = K_{FINAL}$
 $g = 32 \text{ ft./s.}^2$, $88 \text{ ft./s.} = 60 \text{ mph}$,

Fittingly, the new roller coaster Mako at the aquatic theme park [SeaWorld Orlando](#) is modeled on a shark. Billed as Orlando's tallest coaster, **Mako, which rises ((200 feet, aims to mimic the movement of a shark. Reaching speeds up to 73 m.p.h.))**, the three-minute thrill is classified as a "hypercoaster,"



Cedar Point , Sandusky, Ohio

ANSWERS: NOTE IN GENERAL WITH MORE HEIGHT MORE SPEED.

VALENCIA: 76 ft./s. or ~ 52 mph

COMMENT: Note computed answer is a bit smaller than 55 Mph in article. Probably due to coaster has some speed at top.

ORLANDO: 113.13 ft./s. or 77 mph

COMMENT: Note computed answer is a bit larger than article quoted speed of 73 mph. Probably frictional work slowed it.

SANDUSKY: 119.5 ft./s. or 81.5 mph

COMMENT: Note computed answer is little bit larger than article speed of 75 mph. Probably frictional work slowed it.

At more than 20 stories tall, Valravn, the 18th roller coaster at [Cedar Point](#), is considered the **highest coaster in the world with the fastest ((dive at 75 m.p.h. Riders who climb the 223-foot))**initial hill are suspended overlooking the drop