Principles of Physics: A Real Scream!
(Amusement Park Alternate Assignment)

Submit all answers either on paper or electronically by **May 26.**

1. Read the article "Game Theory: Playing Big Brother at the Amusement Park" and answer the following questions.

   (a) What does Roller Coaster Tycoon allow you to create other than roller coasters?

   (b) What economics would one need to understand to create a successful park on this computer program? Think about the products sold, their placement in the park, and the consumer information that is available about each park visitor.

   (c) What engineering know-how does one need to create a safe, fun roller coaster?

   (d) What physics principles apply to the function of roller coasters, and how?

   (e) All amusement park rides involve physics. Select another amusement park ride and describe the physics behind this ride.

2. A roller coaster has the following specifications:

Mass of train = 19000 kg Height of first hill = 93.27 m Full train holds 32 people Average mass of a person = 60 kg It takes 45 s to pull the train to the top of the first hill.

   Calculate

   (a) The gravitational potential energy at the top of the first hill.

   (b) The train has a speed of 1.0 ms-1 at the top of the hill. Calculate the kinetic energy at the bottom of the first hill ignoring friction.

   (c) How would friction affect the train's speed at the bottom of the first hill?

   (d) How much work is done in getting a train filled with passengers to the top of the first hill?

   (e) How much power does the chain motor have to put out to lift the train (with passengers) to the top of the first hill?