Looping Roller Coasters

Featured Rides: **Demon, Vortex and Flight Deck**

Materials Needed: Protractor, stopwatch, horizontal and vertical accelerometers, calculator

Hints:

According to the Law of Conservation of Energy, the potential energy of the train at the top of the lift hill should be equal to the kinetic energy of the train as it reaches the bottom of the first downhill track section.

Questions to Be Answered:

Intermediate:

1) What is the potential energy of the train at the top of the lift hill?
2) What is the kinetic energy of the train at the bottom of the first downhill?
3) What is the potential energy of the train at the top of the loop? (Use the first loop on Shockwave.)
4) What is the kinetic energy of the train at the bottom of the loop, as it is leaving the loop?

Advanced:

1) What is the acceleration of the train at the bottom of the loop, as it enters the loop? How many g's?
2) What is the acceleration of the train at the top of the loop? How many g's?

Investigative Steps: Describe your procedure here.

Data and Observations: Record and organize your results here.

Calculations and Conclusions: Explain your answers to the questions here.

Going Further:

1) Compare the forces recorded on the accelerometer with those calculated. Calculate the percent difference between the measured and calculated values.
2) Six Flags reports that the maximum G-force experienced by a rider on the Shockwave is 5.9 g's. Design and conduct an experiment to validate or disprove their claim.

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