Roller Coaster

Design Your Own Coaster Instructions

1. Use two connected pieces of paper.  (Optional: print out and use two pieces of coaster grid.)

2. Set a scale along the side, just like in the worksheet. If you don't use the coaster grid paper, just do your best to estimate heights on your track.

3. Draw a coaster track. Start with the first hill. Which hill should be the highest? (Unless you do DU #4 below.)

4. Calculate the total energy on the first hill. (Unless you do DU #4 below.)

5. Use the total energy to determine the GPE and KE at three other spots, and calculate the speed at each spot (just as we did on the worksheet.) The three spots:
   - The fastest spot on your coaster.
   - The slowest spot on your coaster after the first hill.
   - One other spot with a height different from the other two - your choice.

6. Show all calculations.

7. Make sure all energies and speeds have proper units.

DU: Choose any TWO of the following:

1. Make sure one of the three spots where you calculate the speed is on a curve. Estimate the radius of the curve and calculate the g's the riders experience.

2. Put an angled jump in your coaster, launching and landing at the same height. Make the launch location one of the three spots where you calculate the speed. Estimate the launch angle. Use the speed and launch angle to calculate the range to the landing spot.

3. Draw a stopping area at the end. Choose a coefficient of friction and calculate the stopping distance.

4. Start your coaster with zero height and a start velocity that will ensure that your coaster makes it over all the hills. When you calculate your total energy, it will be a KE calculation at the start, instead of on the first hill.