QUALITATIVE QUESTIONS

1. Your weight doesn't change while riding The Joker, but your *sensation* of weight does change while on the ride. What force is responsible for your *sensation* of weight?

2. Describe your sensation of weight for each position:
   a. at rest
   b. moving through the lowest point
   c. at the highest point

3. At what points on the ride is the force on your back equal during the forward and backward swings? At what points on the ride is it different?

QUALITATIVE QUESTIONS (continued)

4. To feel the lightest, you should sit (closer to) (farther from) the center of the gondola. Explain your response.

5. Determine the period of the ride by timing one back and forth swing:
   a. for a small initial oscillation T = _____ seconds.
   b. for a large maximum oscillation T = _____ seconds.
   c. Was the period affected by the size of the oscillations? Explain.

6. At what point during the swing of the ride is greatest gravitational potential energy the largest and at what point of the swing is the kinetic energy the largest?

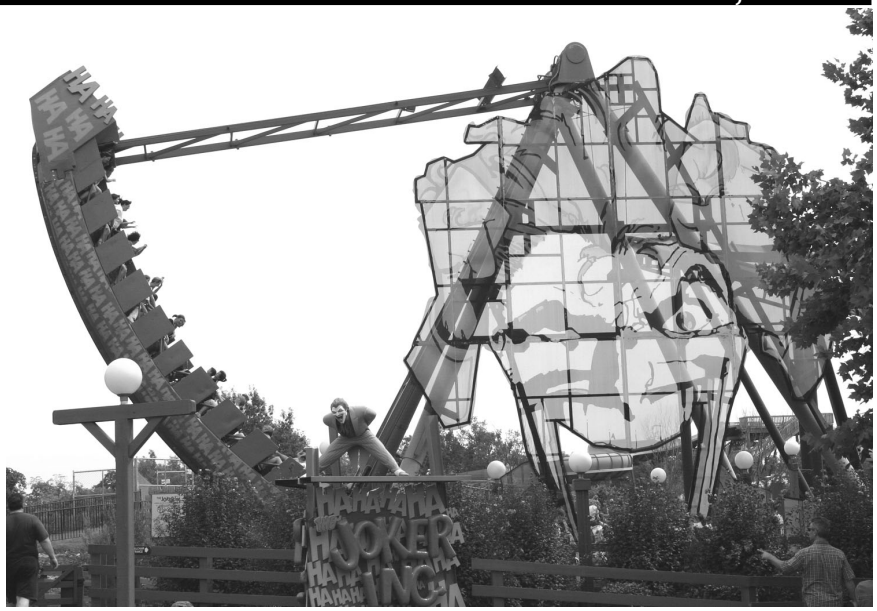
7. How do the points of greatest gravitational potential energy compare to: (the same) or (different than)
   a. points of lowest accelerometer readings _____
   b. points of maximum accelerometer readings _____
   c. points of minimum velocity _____
   d. points of maximum velocity _____

8. How do the points of greatest kinetic energy compare to: (the same) or (different than)
   a. points of lowest accelerometer readings _____
   b. points of maximum accelerometer readings _____
   c. points of minimum velocity _____
   d. points of maximum velocity _____

9. What two forces are acting on you during the ride?
   a. _____ b._____

10. Does the number of people on the ride alter any results or conclusions? Explain!

QUANTITATIVE QUESTIONS



1. Use the triangulation technique to determine the radius of the ride.

2. Determine the period of the ride by timing one back-and-forth swing.

3. a. Based on the radius of the ride, use the simple pendulum equation to predict the period of a Joker-sized pendulum.

   b. Is the calculated period for a simple pendulum the same as the period measured for the Joker? Explain.

4. Align your Force Factor meter **head-to-toe** and record the maximum swing readings:
   a. moving forward through the lowest point _____
   b. at the highest point _____
5. Align your Force Factor meter **front-to-back** and record the maximum swing readings:
   a. moving forward through the lowest point _____
   b. at the highest point _____

6. Where did the maximum Force Factor occur? Is this point the same for every seat? Explain!

7. Are the maximum and minimum Force Factor readings the same for every seat? Explain!

QUANTITATIVE QUESTIONS (continued)

8. Use your Force Factor measurements to make quantitative free body diagrams for a 60 kg rider:

a. at rest	b. moving forward through the lowest point	c. at the highest point

9. Use your free body diagram to determine the centripetal force at the lowest point.

10. From the centripetal force, predict the 60 kg rider's velocity at the lowest point.

11. Use the triangulation method to determine the height the center seat reaches, which is also the height of the center of mass of the ride.

12. Use conservation of energy to determine the gravitational potential energy and kinetic energy of a 60.0 kg rider seated at the center of mass of the ride when:

    a. at the highest point

    b. moving forward through the lowest point

13. From your energy calculations, determine the rider's velocity when moving through the lowest point.