GIANT GONDOLA WHEEL

1. Spin Rate _____ rpm

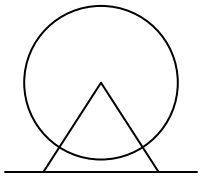
   Diameter _____ m

   Capacity _____ adults

   The center axle is elevated _____ m

   What is the duty cycle? _____ min

2. Label the point on the diagram where you feel the most "peculiar" sensation. Explain why you feel so peculiar at this point.



3. How many light bulbs are on this ride?

4. Do the gondola cars travel in a circle?

5. Is the motion of the gondola cars about the center axle of Giant Wheel? Why or why not?

6. What is the angular velocity?

7. What is your potential energy when stopped at the top?

8. Relate what your vertical accelerometer shows you.

9. Relate what your horizontal accelerometer shows you.

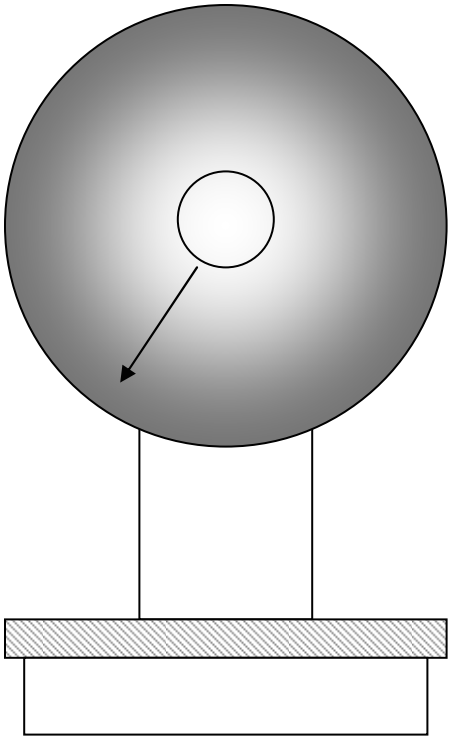
THE SCALE

1. Accuracy in lb/degree.

2. Diameter of the scale.

3. Total linear distance the pointer moves for a 186 lb person.

1. Is the scale reading differently at different positions on the platform? Explain.



LOGGER'S RUN

1. Time for one ride.

2. Distance around the ride.

3. Length of one car.

4. Time down the largest hill.

5. Average velocity down this hill.

6. Average velocity around the entire loop in both ft/sec and mph.

7. Average time for a log to pass a point when above the hill (in seconds).

8. Average time for a log to pass a point when below the hill (in seconds).

9. Why is there such a difference?

10. Determine the velocity of the log both above and below the hill.

    Above _____ ft/sec Below _____ ft/sec

CAROUSEL

Diameter of inner ring = 15'
Diameter of outer ring = 48'

1. Circumference of inner ring of animals in feet.

2. Circumference of outer ring of animals in feet.

3. Period in seconds/revolution.

<u>SHOW ALL YOUR WORK</u>

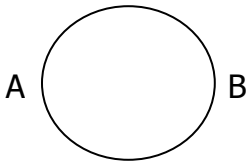
4. Which horse has the greatest speed (inner, outer, same)?

5. Which horse has the greatest angular velocity?

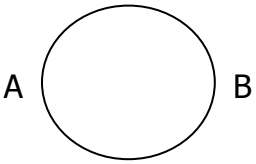
6. Calculate the speed of the inner and outer horses.

7. Calculate the angular velocity of the inner and outer horses.

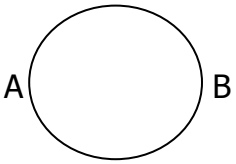
8. If you were to throw a ball from position A to someone at position B while the ride was turning, where would you aim the ball?



9. Draw the path of the ball as seen by someone standing:



On the ground



On the ride at point B

10. What is the frequency of the up and down motion of the horses?

11. How many people can ride the Carousel per trip?

SCRAMBLER

1. Estimate the radius of the primary axis (center of ride to center of a cluster).

2. Estimate the radius of the secondary axis (center of a cluster to rider).

3. Concentrate your attention on a single rider and follow their path of motion for at least one full rotation of the ride around the primary axis. Draw the path of the rider for one full rotation. Draw the sketch as if you were looking down on the ride from directly above.

4. Describe the sensations you feel during the ride.

5. Describe the direction of both the primary and secondary rotation. Are they in the same or different directions?

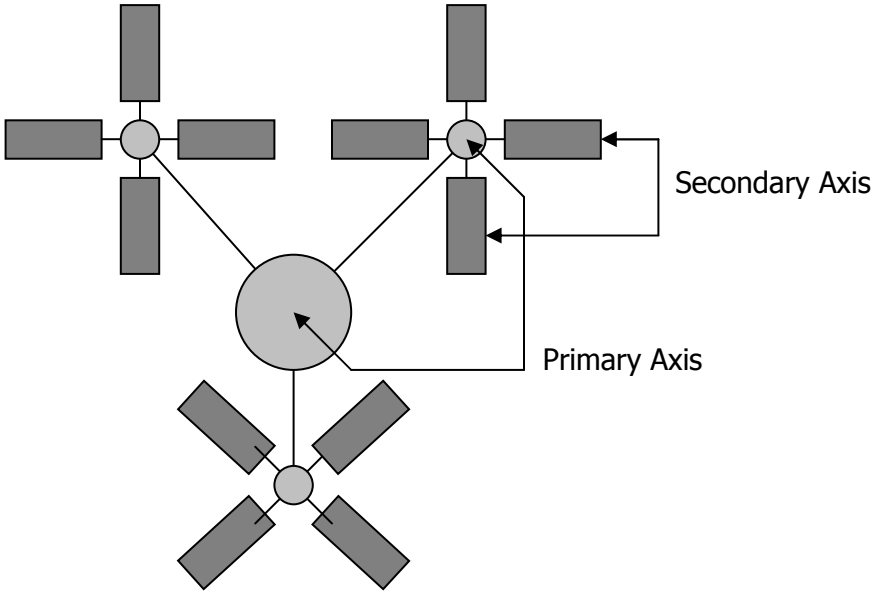
6. What is the period of the ride (show method)?

7. Where was your speed the greatest?

8. Where was your speed the least?

9. Where was your acceleration the greatest?

10. Where was your acceleration the least?



SEA DRAGON

1. Time for one full swing (in seconds).

2. Estimated radius of the ship's path (in meters).

3. In each arc, where did you feel:

   A. The strongest push against your back?

   B. The most pressure against your seat?

   C. The least pressure against your seat?

4. When did you feel you were going the fastest?

5. If you have a vertical accelerometer, hold it in front of you during the ride. Observe the motion of the suspended mass.

   A. In what part of the ride was the mass pulled the farthest down the tube?

   B. In general, describe the motion of the suspended mass during an arc.

6. How fast is the Sea Dragon traveling at the bottom of the swing?

7. How much kinetic energy does the Sea Dragon have at the bottom of the swing?

   Min Max ½Min ½Max (circle one)

8. How long does it take the Sea Dragon to go from the bottom of the arc to its maximum height?

9. How high does the Sea Dragon rise?

10. Calculate the maximum centripetal acceleration for the Sea Dragon.

CORKSCREW

1. Measurements while standing in line:

   Time for one ride _____ s Length of train _____ m

2. Measurements while on the ride (using accelerometer):

   Max g _____ g's at _____ (location)

   Min g _____ g's at _____ (location)

3. Distance from hill to observation area: _____ m

   Angle: _____ degrees

   Calculated height of hill: _____m

4. Time for train to go from bottom to top of 1st hill _____ s

5. Time for train to pass point at top of hill _____ s

6. Time for train to pass point at bottom of hill _____ s

7. Time for train to go from top of hill to bottom _____ s

8. Where on the ride did you feel you were going the fastest? Why?

9. Where on the ride did you feel like you were lifted off your seat? How did the ride cause this feeling?

10. How accurate were you accelerometer measurements? Explain.

11. Average speed of train for total ride _____ m/s _____ km/h

12. Speed at top of first hill (show work) _____ m/s _____ km/h

13. Speed at bottom of first hill (show work) _____ m/s _____ km/h

14. Calculate the acceleration of the train during the trip down the first hill._____ m/s^2

FALLING STAR

1. Frequency of ride in rev/min

2. Observe the ride from the area in front of the ride and sketch the shape of the path followed by a person sitting where you sat. Note it is not always a perfect circle.

3. Did you travel in a perfect circle?

4. What is the height of the ride?

5. Determine the velocity when at full speed.

6. Determine the angular velocity when at full speed.

7. Briefly describe the sensations felt at the following points on the ride while at full speed.

12:00

3:00

6:00

9:00

FLYING TRAPEZE

1. Determine the diameter of the ride when not moving.

2. Determine the diameter of the swings when at full speed.

3. Estimate the length of the swing chains.

4. At what angle from vertical do the swings move when at full velocity?

5. Using your body weight (_____), what is your increase in potential energy and kinetic energy when rotating?

6. Potential _____ Kinetic _____

7. What is the average velocity when at maximum speed.

8. How many light bulbs are on this ride?

THUNDERBOLT

Diameter of ride = 42 ft.

1. How many people can ride this ride at one time?

2. What is the distance traveled for one revolution?

3. What is the period of rotation of the Thunderbolt at its maximum velocity?

4. Calculate the maximum centripetal acceleration.

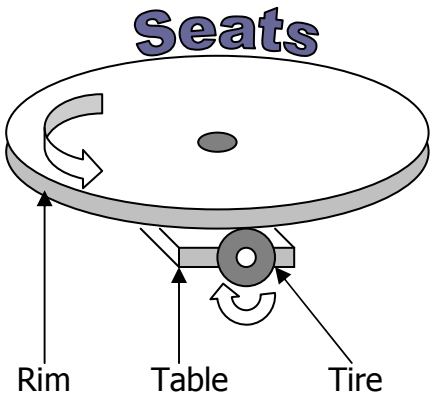
5. Calculate the maximum angular velocity.

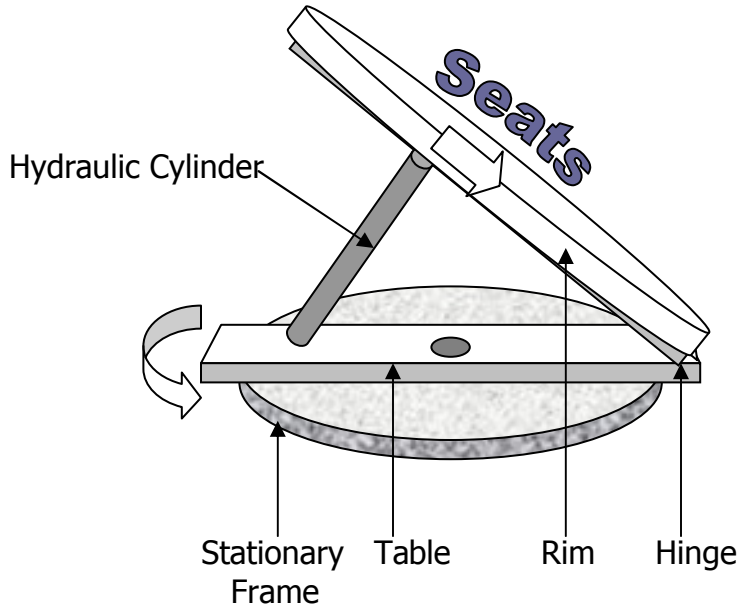
6. Using a spring scale and mass, ride the thunderbolt and notice what happens to the mass as the ride undergoes different accelerations. Explain the action of the mass in terms of the different types of acceleration the ride is undergoing.

7. What is the angle of swing from vertical of a car?

8. When does this occur and why?

TRABANT





The Trabant uses two different drive mechanisms. The seats are mounted on a "rim" which is rotated by a tire underneath (the rim drive). The tire is mounted on a rotating "table"(the table drive). The radius of the rim from the center of the ride to the center of the seat is 4.1 meters.

1. Calculate the period of revolution for the rim drive.

2. Calculate the period of revolution for the table drive.

3. Calculate the centripetal acceleration produced by the rim drive alone.

4. Determine the centripetal acceleration of the Trabant using an accelerometer. Compare the result to the one obtained in #3. Are they the same or different?

5. If you were riding the Trabant with a small child would you have them sit on the inside (toward the center of the ride) or the outside? Why?

6. Ride the ride. Describe the different sensations you feel when the Trabant is spinning with the rim drive horizontal, and with the rim drive lifting your seat into the air. What physics might be involved in providing these different sensations? Are there non-physics reasons for some of these phenomenon?

WOLVERINE WILDCAT ROLLER COASTER

1. Measurements while standing in line:

   Time for one ride _____ s Length of train _____ m

2. Measurements while on the ride (using accelerometer):

   Max g _____ g's at _____ (location)

   Min g _____ g's at _____ (location)

3. Distance from hill to observation area: _____ m

   Angle: _____ degrees

   Calculated height of hill: _____m

4. Time for train to go from bottom to top of 1st hill _____ s

5. Time for train to pass point at top of hill _____ s

6. Time for train to pass point at bottom of hill _____ s

7. Time for train to go from top of hill to bottom _____ s

8. Where on the ride did you feel you were going the fastest? Why?

9. Where on the ride did you feel like you were lifted off your seat? How did the ride cause this feeling?

10. How accurate were you accelerometer measurements? Explain.

11. Average speed of train for total ride _____ m/s _____ km/h

12. Speed at top of first hill (show work) _____ m/s _____ km/h

13. Speed at bottom of first hill (show work) _____ m/s _____ km/h

14. Calculate the acceleration of the train during the trip down the first hill._____ m/s^2

SHIVERING TIMBERS ROLLER COASTER

1. Measurements while standing in line:

   Time for one ride _____ s Length of train _____ m

2. Measurements while on the ride (using accelerometer):

   Max g _____ g's at _____ (location)

   Min g _____ g's at _____ (location)

3. Distance from hill to observation area: _____ m

   Angle: _____ degrees

   Calculated height of hill: _____m

4. Time for train to go from bottom to top of 1st hill _____ s

5. Time for train to pass point at top of hill _____ s

6. Time for train to pass point at bottom of hill _____ s

7. Time for train to go from top of hill to bottom _____ s

8. Where on the ride did you feel you were going the fastest? Why?

9. Where on the ride did you feel like you were lifted off your seat? How did the ride cause this feeling?

10. How accurate were you accelerometer measurements? Explain.

11. Average speed of train for total ride _____ m/s _____ km/h

12. Speed at top of first hill (show work) _____ m/s _____ km/h

13. Speed at bottom of first hill (show work) _____ m/s _____ km/h

14. Calculate the acceleration of the train during the trip down the first hill._____ m/s^2