

QUALITATIVE QUESTIONS

1. As riders sit in the stationary Highland Fling how are the rider's bodies oriented relative to the spokes of the ride?



2. Observe the Highland Fling as it reaches full speed while still oriented horizontally. How are the rider's bodies oriented relative to the spokes of the ride?

3. Why do the cars change their positions as the ride speeds up?

4. Continue to watch the ride as it tilts from horizontal to vertical. Now how are the rider's bodies oriented relative to the spokes of the ride?

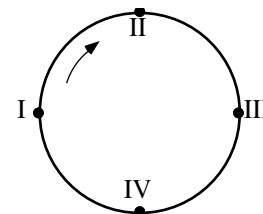
5. Compare the tangential speed of a car to the tangential speed of the middle of a spoke. Explain!

6. Compare the angular speed of a car to the angular speed of the middle of a spoke. Explain!

QUALITATIVE QUESTIONS (continued)

7. Consider the diagram to the right. When the ride is spinning vertically, at what point:

- a. are you going fastest? _____
- b. are you going slowest? _____
- c. do you feel heaviest? _____
- d. do you feel lightest? _____



8. When the ride is spinning horizontally, predict whether or not the readings from your Force Factor meter will differ significantly between positions I, II, III, and IV.

9. When the ride is spinning vertically, predict which of the positions I, II, III, or IV will have a Force Factor meter reading that is a:

- a. maximum: _____
- b. minimum: _____
- c. halfway between the maximum and the minimum: _____

10. Take head to toe Force Factor meter readings at positions I, II, III, and IV when the ride is vertical and when it is horizontal.

| Ride orientation | Force Factor At position I | Force Factor At position II | Force Factor At position III | Force Factor At position IV |
|-------------------|-------------------------------|--------------------------------|---------------------------------|--------------------------------|
| Horizontal | | | | |
| Vertical | | | | |

11. Are your answers for #8 and #9 consistent with your Force Factor readings? Explain.

Name:

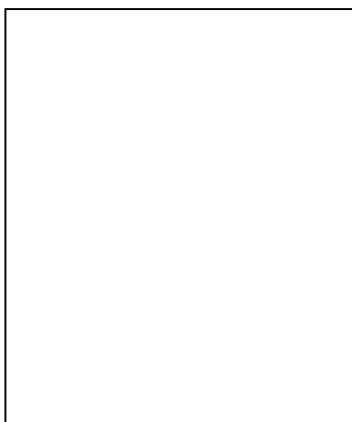
Partner:

Teacher:

Highland Fling

QUANTITATIVE QUESTIONS:

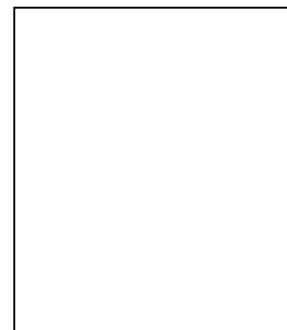
1. Draw and label a quantitative force diagram for a 60.0 kg rider when the ride is at rest.



QUANTITATIVE QUESTIONS:

WHEN THE RIDE IS AT FULL SPEED HORIZONTALLY

2. Draw a force diagram for a rider.

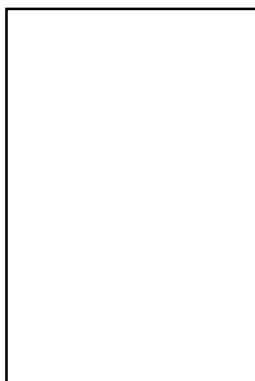
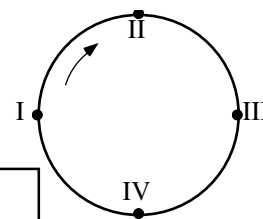


3. What happens to the Force Factor meter readings from points I to II to III to IV in this situation? Explain!

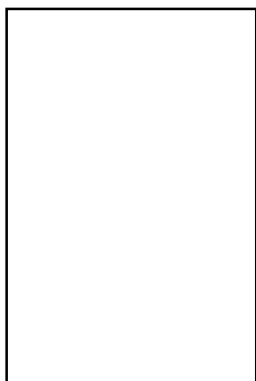
QUANTITATIVE QUESTIONS:

WHEN THE RIDE IS AT FULL SPEED VERTICALLY

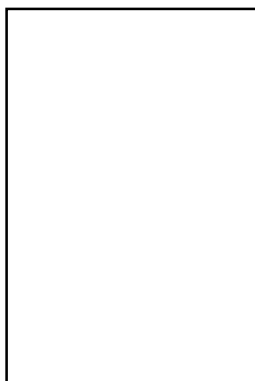
4. Draw a force diagram for a rider at each of points I, II, III, and IV, when the ride is at full speed, but at its maximum vertical orientation.



I.



II.



III.



IV.

5. Compare the magnitude and direction of the Force Factor at positions I and III when the ride was moving vertically to the magnitude and direction of the Force Factor at any point when the ride was moving horizontally. Explain the relationship!

