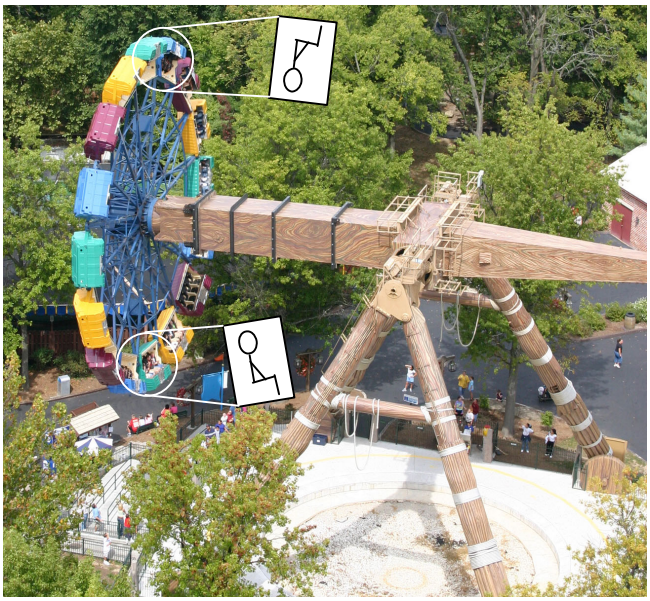
Name:	Partner:	Teacher:	**Xcalibur**

QUALITATIVE QUESTIONS:

1. Watch the ride to see how the orientation of the riders changes. Use the pictures on this page to help you name and describe the positions of riders oriented in the following ways:
   a. Where are the riders' torsos nearly vertical with heads up?

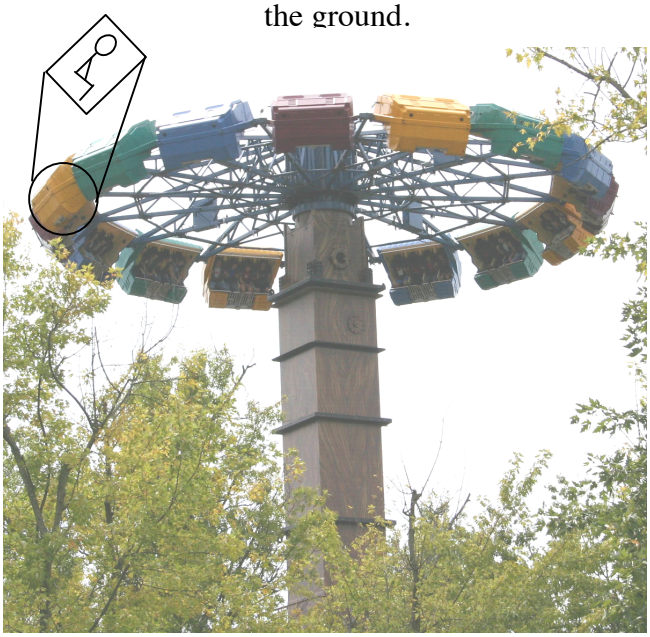
   b. Where are the riders' torsos nearly vertical with heads down?

   c. Where are the riders' torsos nearly horizontal relative to the ground?



Side position – note that riders at different points on the circle are oriented differently relative to the ground.

Bottom position – ride at full speed. All riders are oriented the same relative to the ground.



Top position – all riders are oriented the same relative to the ground.

QUALITATIVE QUESTIONS (continued)

d. Describe how the riders' torsos are generally oriented relative to the wheel's spokes and the giant arm throughout the ride.

2. The graphs on the following page show an altitude vs. time graph, the Force Factor vs. time for the head to toe axis and the Force Factor vs. time for the front to back axis. Label the graphs with letters corresponding to the following ride positions:
   A. Bottom position once the ride reaches full speed.
   B. Ascending side position
   C. Top position
   D. Descending side position
   E. Bottom position before the ride begins to slow down.

3. Explain why the Force Factor values gradually increase in magnitude as the ride begins.

4. Explain why the Force Factor values oscillate as the ride tips to the side position.

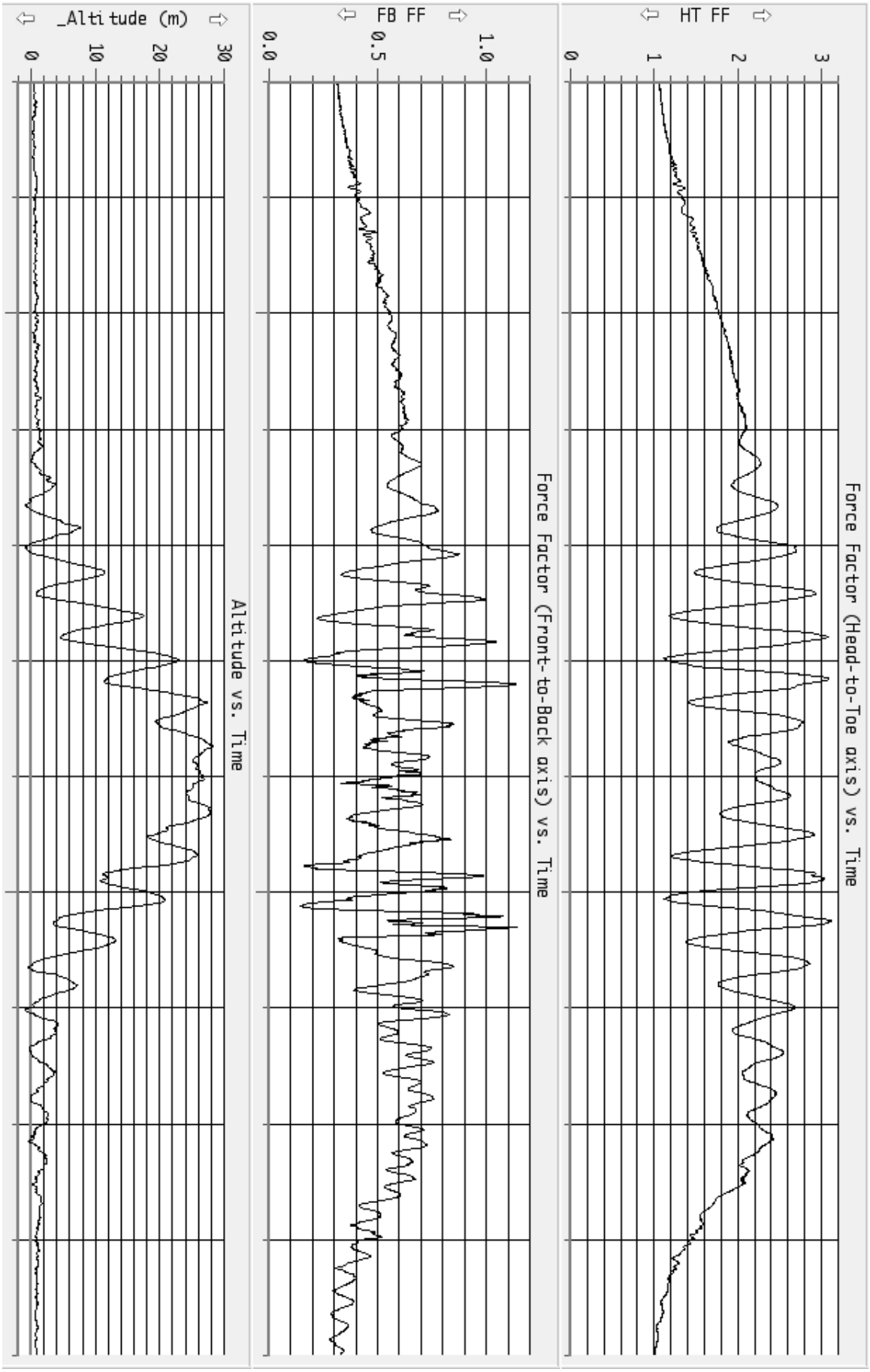
5. Explain why the Force Factor values reach a fairly constant value at the top position.

6. Does the restraining bar in front of the passenger ever push the passenger back into his or her seat? Justify your answer based on the graphs.

7. Why don't the riders fall out of the top of the side position where they are upside down?

8. Is the rider's torso ever truly vertical during the ride? Justify your answer based on the graphs.

Name:	Partner:	Teacher:
		Xcalibur



QUANTITATIVE QUESTIONS:

1. Once the ride is spinning at full speed, determine the period of the ride.

2. Determine the circumference of the circle of seats by counting paces while walking around the ride before getting on the ride.

   Number of paces: _____
   Circumference:

3. From the circumference, determine the radius of the circle of seats.

4. Determine the radius of the circle made by the arm of the ride from the altitude vs. time graph on the previous page.

5. Calculate the tangential velocity of the riders from your measured values.

6. Calculate the centripetal acceleration of the ride from your measured values.