Science in the amusement park

Here are some questions to ponder when visiting an amusement park and trying rides such as the Waveswinger, pictured above. Some of the answers may be found in articles in this issue; for the others, consult a physics teacher!

1 You love feeling heavy at the bottom of a rollercoaster valley. Which part of the train lets you experience maximum *g*-force?

a The front row
x Close to the middle
b It doesn't matter, since all parts of the rollercoaster train move with the same speed at any given time

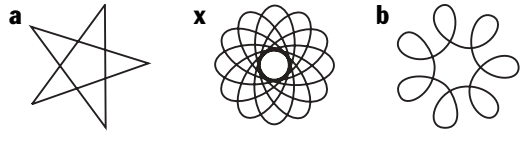
2 For the Waveswinger ride, you have been allowed to take along a soft mug containing half an inch of water. You hold the mug parallel to the seat throughout the ride. What happens to the water level as the ride starts and the swings start to hang out?

a The water level remains horizontal
x The water level remains parallel to the seat
b The water level moves away from the centre, more than the seat

3 You watch the Waveswinger start, and note that a few of the swings are empty. The empty swings will make an angle

a that is smaller than the angle for the loaded swings
x that is larger than the angle for the loaded swings
b that is the same as the angle for the loaded swings

4 In the classic Teacup ride, the floor moves clockwise whereas the 'trays' with the cups on move counterclockwise, with a somewhat larger angular velocity. Which of the figures resembles most the motion of a rider?



5 Find a coaster with a loop. Note how the radius of curvature increases as you get closer to the ground. (Why?) Let R denote the radius of curvature at the top. The experience of the body as you ride through the loop depends on the speed. To experience weightlessness at the top, the coaster train must start

a somewhat higher than the top of the loop
x slightly more than $R/2$ over the highest point of the loop
b about $2R$ above the highest point of the loop

6 As you exit a water ride you step onto a slowly rotating platform but may have the impression that the platform is stationary whereas the ground rotates. If you couldn't see the world outside, could you distinguish if the platform was stationary or rotating?

a No, it is impossible
x Yes, if you brought along a little spring scale
b Yes, by letting a toy on a string swing as a pendulum

Ann-Marie Pendrill