**Circular Motion Model Review**

1. Two objects, A and B, travel around the same curve. The mass of object B is twice that of object A.
   1. In order to produce the same centripetal acceleration, how will the velocity of B compare to the velocity of A? (Vb/Va)
   2. In order to produce the same centripetal force, how will the velocity of B compare to the velocity of A? (Vb/Va)
2. A 1400 kg car takes a curve with a radius of 20 m at a speed of 12 m/s. The car has a centripetal force of 8,000 N. At this speed can the car safely make it around the curve? Justify your answer.
3. At the bottom of a vertical loop on a rollercoaster an 80 kg person feels 3 times heavier than usual.
   1. Explain why they feel heavier than usual.
   2. Draw a quantitative force diagram for the person at the bottom of the loop. You may neglect any resistance.
   3. Find the centripetal force acting on the person.
   4. If the person is traveling at 24.2 m/s at the bottom of the loop, what is the radius of the loop?
   5. What is the person’s centripetal acceleration?
4. Explain why people experience a sensation of ‘weightlessness’.
5. Determine the force of gravitational attraction between the earth (m = 5.98 x 1024 kg) and a 70-kg physics student if the student is standing at sea level, a distance of 6.38 x 106 m from earth's center.
6. Suppose that two objects attract each other with a gravitational force of 16 units. If the distance between the two objects is doubled, what is the new force of attraction between the two objects?
7. Suppose that two objects attract each other with a gravitational force of 16 units. If the mass of both objects was tripled, and if the distance between the objects was doubled, then what would be the new force of attraction between the two objects?

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