Worksheet Uniform Circular Motion

1. Zach drives his car around a circular section of a road having a radius of 50 meters at a constant speed of 20 m/s. What is the centripetal acceleration of Zach's car?

2. Eva Destruction twirls a stone attached to a string 2.0 meters long in a horizontal circle. At what speed must the stone move for its centripetal acceleration to be equal to the acceleration due to gravity (g)?

3. A toy electric train moving at constant speed on a circular track that has a radius of 1.0 meters goes around the track every 10 seconds. What is the centripetal acceleration of the train?

4. Noah Formula is in an airplane which is flying at constant speed in a circular course of radius 5000 meters, circling O'Hare Airport prior to landing. Noah observes that the plane completes each round trip in 400 seconds. (a) What is the speed of the airplane? (b) What is its centripetal acceleration?

5. An electron moves in a circular path with a radius of 0.10 m at a constant speed of 2.0 $X10^6$ m/s. (a) What is the period of its motion? (b) What is the centripetal acceleration of the electron?

6. What centripetal force is needed to keep a 2 kg sack of flour moving at a constant speed of 4 m/s in a circle having a radius of (a) 4 meters (b) 8 meters?

7. Curious George is whirling a 2.0 kg bunch of bananas on a smooth floor in a circular path having a radius of 0.50 m. What force must he apply to keep the motion constant so that the bananas complete one revolution every 4.0 seconds?

8. Tommy, who has a mass of 30 kg, sits 4.0 meters from the center of a merry-go-round that is rotating with a period of 10 seconds. What is the centripetal force acting on Tommy?

9. Lulu wants to swing a 0.10-kg Twinkie tied to one end of a cord in a horizontal circle of radius 0.50 m with a tangential speed of 0.20 m/s. What centripetal force must she exert on the mass through the cord?

10. Brewster applies a force of 10 N to one end of a cord to keep a bag of rubber frogs tied to the other end moving at a speed of 2.0 m/s in a horizontal circle of radius 3.0 m. What is the mass of the bag of frogs?

11. Heather drives her Super-Beetle around a turn on a banked circular track which has a radius of 200 m. The Super-Beetle has a mass of 1500 kg and Heather maintains a speed of 20 m/s around the turn. What centripetal force does the track exert on the Super-Beetle?