

Forces in Circular Motion

- Two children are on a merry-go-round that is rotating at 5 revolutions each minute. One is standing 1 m from the center, while the other is 1.5 meters from the center.
 - What is the linear speed of each child?
 - What is the centripetal acceleration for each child?
 - Draw a free body diagram for one of the children.
 - If the child on the outer edge falls off. Draw a diagram to show where he would land.

- A 25 gram stopper is twirled on the end of a 0.75 m string in a vertical circle. At the top, the stopper is traveling 5.0 m/s.
 - Draw a free body diagram for the stopper at the top of the motion.
 - What is the centripetal acceleration of the stopper?
 - What is the force of the rope on the stopper at the top of the motion?

- The same stopper and string are used to again produce a vertical circle. This time, the stopper is traveling 5.0 m/s at the bottom.
 - Draw a free body diagram for the stopper at the bottom of the motion.
 - What is the centripetal acceleration of the stopper?
 - What is the force of the rope on the stopper at the bottom of the motion?

- A car is traveling 20 m/s when it reaches the top of a hill that has an approximate radius of 75 m. The driver has a mass of 80 kg.
 - Draw a free body diagram for the driver of the car.
 - What is the centripetal acceleration for the driver of the car?
 - What is the apparent weight of the driver?

- A car is traveling 20 m/s when it reaches the bottom of a hill that has an approximate radius of 75 m. The driver has a mass of 80 kg.
 - Draw a free body diagram for the driver of the car.
 - What is the centripetal acceleration for the driver of the car?
 - What is the apparent weight of the driver?

- A car is making a horizontal turn with a radius of 25 meters at 20 m/s. The road is banked so the car doesn't need friction to make the turn.
 - Draw a free body diagram for the car.
 - What is the centripetal acceleration for the car?
 - What force causes this acceleration?