

## Centripetal Net Force Model Worksheet 1: Radial Net Forces and Circular Motion

1. A bowling ball rolls down the hallway.
  - a. To curve the ball turn in a smooth circular turn to the right, draw a picture to indicate how you would push on the ball to make it turn.
  - b. While you are curving the ball's path, are the forces on the ball balanced? Draw a force diagram for the ball.
  - c. Is the ball accelerating? If so, what is changing about the velocity?
2. An airplane banks and makes a wide circle.
  - a. Draw a force diagram for a head-on view of the banking plane.
  - b. Name the force that allows the plane to travel in a circle.

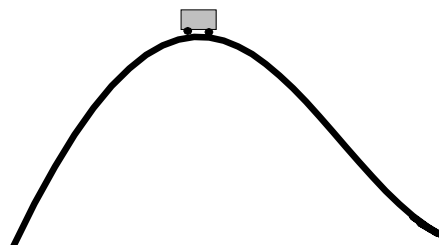


3. A car enters a circular turn.
- Name the force (the interaction between objects) that allows the car to travel in a circle. In what direction does this force push on the car? Draw a force diagram for the car as it approaches head-on.
  - Describe the motion of the car if the force you described in part "a" suddenly vanished.
  - If the 35 meter radius turn is level, the car has a mass of 1200 kg, and the coefficient of friction between the tires and the road is .85, what is the maximum speed that a car can travel through the turn?
4. The international space station orbits earth once every 90 minutes.
- Name the force that allows the ISS to orbit the Earth.
  - Explain why the space station doesn't crash to the Earth due to the force on it.

5. a. Draw a force diagram (side view) for a rollercoaster on level track. Should the forces perpendicular to the track be balanced? If the forces are unbalanced, explain why there is a net force and the direction of the net force.



- b. Draw a force diagram (side view) for a rollercoaster traveling over the top of a hill. Should the forces perpendicular to the track be balanced? If the forces are unbalanced, explain why there is a net force and the direction of the net force.



- c. Draw a force diagram (side view) for a rollercoaster traveling through a valley. Should the forces perpendicular to the track be balanced? If the forces are unbalanced, explain why there is a net force and the direction of the net force.

