Physics Lab

Uniform Horizontal Circular Motion

This Lab will be assessed against all assessment criteria except the hypothesis criteria.

Introduction:

According to Newton's 1st law, an object will travel with uniform velocity in a straight line unless acted on by some net external force. From this we can deduce that a net force *is required* to cause a body to move in uniform *circular* motion. This force is sometimes called the *centripetal force*. This is not a new force, but simply a name given to the net force that causes the change in the direction of the velocity that is required for circular motion. For an object with mass m rotating with radius r and speed v the net force should be $F_{net} = mv^2/r$. An alternative expression in terms of the angular velocity ω is $F_{net} = m\omega^2 r$. Your aim is to design a series of experiments to verify this relationship.

Procedure:

Design at least two experiments that allows you to test one of the above relationships between the centripetal force and the factors that influence it. When investigating a particular variable be careful to keep all other variables constant. Also, consider carefully what you will choose as your independent variable and which variable will be best to leave as a dependent variable. For each variable you investigate plot a suitable graph so that the observed data can be quantitatively analyzed and compared with theory . Finally make an evaluation of your results and your experimental procedure and comment on how successfully you were at predicting the nature of the centripetal force.