

Year 12 Practical Investigation

Uniform Circular Motion

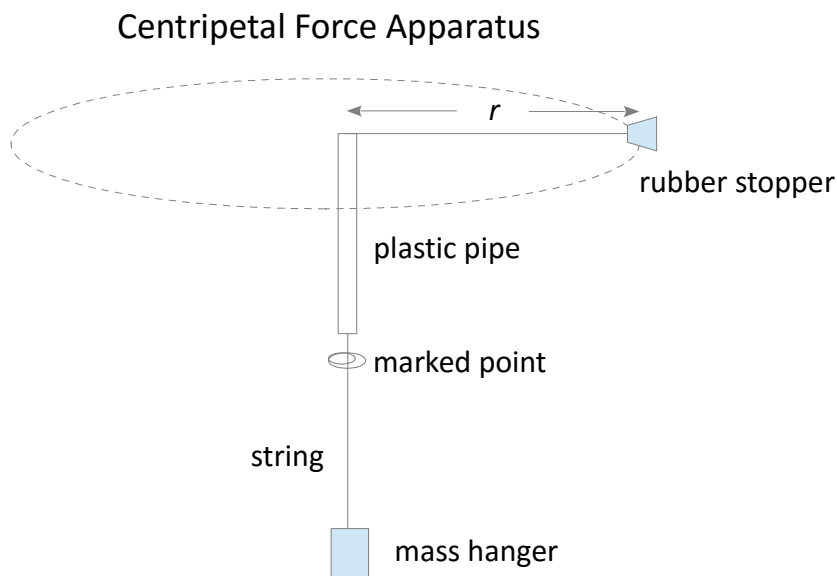
NAME _____

Aim: To investigate the relationship between the centripetal force on an object in uniform circular motion and the object's speed.

The practical:

Equipment:

- Rubber stopper (with hole)
- Plastic pipe
- Mass hanger and masses
- Measuring tape
- Paperclip or permanent marker
- Stopwatch
- Electronic balance
- 1.5 m of string



In pairs, follow the procedure below:

1. Measure and record the mass of the rubber stopper.
2. Tie the rubber stopper to one end of the string.
3. Thread the other end of the string through the plastic pipe and tie it to the mass hanger.
4. Mark a point on the string between the pipe and the mass hanger using the permanent marker and/or the paperclip. This point should be kept a constant distance from the pipe throughout the investigation.
5. Measure and record the distance between the top of the pipe and the centre of the rubber stopper.
6. Ensure all extra masses are removed from the mass hanger, and record its mass (50g).
7. By holding and moving the plastic pipe, spin the rubber stopper steadily. It may take a few tries to get the appropriate speed to maintain the distance between the pipe and the marked point.
8. Measure the time it takes the stopper to perform 10 full revolutions. Divide this by 10 and hence record the period of the stopper.
9. Repeat steps 7 and 8 at least five times, each time adding an additional 50g mass to the hanger.

The report:

- Hypothesis
 - Predict the relationship between the speed of the object and the centripetal force (tension) causing the circular motion.
- Manipulation and Collaboration
 - Include discussion of cooperation and safety considerations.
- Results and Calculations
 - Represent your results using a table and at least one graph, including a line of best fit. Calculate an equation for the line of best fit.
- Discussion
 - Discuss the results, including analysis and evaluation of precision and accuracy, possible sources of error, and a comparison with expected results.
- Evaluation and Conclusion
 - Evaluate the procedure, including suggestions for improvement, and write a conclusion for the investigation.