

Topic 6 – Guidance for Practical 1

Relationship between centripetal force and period in circular motion

Safety

Although great care has been taken in checking the accuracy of the information provided in this guidance, Cambridge University Press shall not be responsible for any errors, omissions or inaccuracies.

Teachers and technicians should always follow their school and departmental safety policies. You must ensure that you consult your employer's model risk assessments and modify them as appropriate to meet local circumstances before starting any practical work. Risk assessments will depend on your own skills and experience, the skills and experience of your students, and the facilities available to you. Everyone has a responsibility for his or her own safety and for the safety of others. The notes below should not be regarded as a risk assessment.

You should carry out the practical yourself before presenting it to students. Make sure you are comfortable with the procedures, and can anticipate any difficulties your students may encounter.

Guidance

Students will practice recording measurements in appropriate tables, calculating the gradient of a linear graph and its uncertainty and using graphical methods to determine experimental values.

Students do not keep the string horizontal, leading to errors in their calculations.

A common misconception is centrifugal force. You can use this practical to discuss this misconception and point out that what is usually thought as centrifugal force is the absence of centripetal force.

Apparatus and materials

Each group will need:

- rubber stopper, 2 cm diameter, with a hole in the centre
- nylon string, 1.5 m long, with a small loop at each end
- glass or plastic tube, 20 cm long, polished rims
- mass hanger, 20 g
- slot masses, 20 g
- stopwatch
- crocodile clip
- top-pan balance
- ruler

Setting up the practical

This setup can be also used to investigate other relationships of circular motion; students can change the radius of the circle or the mass of the stopper while keeping either the period or the weight constant.

Supporting the practical

Make sure students are well separated, to avoid injuries.



Answers to questions

- 1 Strings always transfer attractive forces.
- 2 Constant speed on a straight line, i.e. constant velocity because the resultant force is zero.
- 3 Centrifugal force does not exist; it is a lack of centripetal force.