Centripetal force of a rubber bung

Aim :

To get any object to move in a circle you have to apply a force to it.

Methods :

With your experiment you don't mention anything about controlling or measuring the force. All you have measured is the (average) period of the object moving in a circle. From this you can calculate the average speed and acceleration.

To turn this into an investigation you would need to measure the force pulling the bung into the circular path. i.e. the tension in the string.

At the moment, if you put more effort in the bung will go faster, even if you don't change the radius of the circle, or the mass of the bung.

One way to do this would be to include a spring of suitable strength into the string and you could possible measure the extension of the spring as you twirl it around to estimate the force.

Another method I've seen used is to have the string pass through a tube. On the bottom end of the string you attach a weight. You twirl the bung around above your head whilst holding the tube until the forces are balanced. If you spin it too slowly the weight drops down, if you go too fast it rises up. You need to adjust the speed of spinning until the weight balances at the correct point.

Results:

There is a fairly simple formula for cicular motion.

$F = (m \times v2) / r$

F = force (Newton)
m = mass of bung (kg)
v = speed of bung (m/s)
r = radius of circle (m)

You must make sure you use the correct units (m not cm, kg not g) to get the formula to work correctly.

The Force is constant: 90 gram = 0.9 Newton approximately.

The mass of the bung is also constant.

You can work out the speed using the formula:
speed = distance / time

distance = circumference of circle X 10
time = time for 10 complete revolutions.

Analysis:

Circumference of circle = 2 X pi X r

If you rearrange the circular motion formula you get:

v2 = (F/m) X r

F/m is a constant.

Conclusions :

So a graph of V2 (on the y axis) plotted against r (x axis) should give you a straight line. The gradient is equal to (F/m).

it is a straight line which means the graph and the results are correct and they are ok and you will be able to use these for a future reference when explaining the stuff in the anlysis.
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