

Title: Gettin' Dizzy on Centripetal Force

Name:

Location: Outside

*SAFETY is the #1 priority of this lab. Do not spin at unsafe speeds. The person spinning should be 50 feet away from any other person.

Purpose: Compare theoretical and observed values of centripetal force.

Materials: masses, string, masking tape, spring scale, stop watch, meterstick

A person will spin in a circular with the spring scale and mass apparatus. The person spinning should keep a constant rotational speed and read the force on the spring scale. Other people in the lab group should count the number of revolutions the spinning completes in 10 seconds. Frequency can be calculated by taking the number of revolutions divided by the 10 second unit of time. Period is the reciprocal of the frequency.

1. Measure the following: centripetal force (read it from the spring scale as you spin), swinging mass in kg, radius in meters (length between your center and the mass), and period in seconds.

Mass: _____ Radius: _____ Frequency: _____ Period (T): _____

Observed centripetal force from spring scale: _____

2. Calculate the tangential velocity of the mass using $v = (2\pi r) / T$

Velocity in m/s: _____

3. Calculate the theoretical centripetal force using $F = (m \cdot v^2) / r$
4. Find the percent error between observed and theoretical centripetal force.

Percent error = $((\text{observed} - \text{theoretical}) / \text{observed}) \cdot 100 =$ _____

5. What are potential sources of error in this lab? Write a five sentence paragraph and include at least two sources of error.

6. What did you learn from this lab?