

## Centripetal Acceleration Lab

Centripetal acceleration force is a large force  $a = r\omega^2$ .  $\omega$  is the angular speed, in radians per second, and  $r$  is the radius. There are  $2\pi$  radians per rotation.

Compare it to the gravitational force. How fast would I have to be turning a 25g mass on a 0.3m string to create as much force as the force of gravity on 100g of washers? How fast would I have to be turning a 50g mass if the radius is only 0.2m to lift the washers? Remember, the forces will be equal, and  $F = ma$ . Setting the two forces equal, you can solve for  $\omega$ , then divide by  $2\pi$  to get expected rotations per second.

Test your calculations, with a string and slick glass tube that I can provide. You can try to match the masses exactly, or use what you have, and re-calculate. You can time 10 rotations and then divide the 10 rotations by the time required for 10 rotations to get rotations per second.

### Lab write up headings

1. Recommendation
2. Conclusion
3. Procedures
4. Equations (centripetal acceleration)
5. Data.