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**Purpose:**

The purpose of this lab is to further our understanding of circular motion using an airplane flying on a string hung from the ceiling.

**Equipment:**

One electric airplane complete with a string of a certain length. A measuring stick to record radius of flight path, A video recorder to record the time per revolution and the radius more accurately.

**Procedure:**

1. Measure equipment (weight of plane, length of string.)
2. Hang String with airplane attached to one end from the ceiling.
3. Place board with markings of every centimeter on the ceiling right along the side of the origin of the string hanging from the ceiling.
4. Make the plane fly in a circle and, after waiting a minute for the plane to stabilize, record the motion from underneath so you can see the radius and time it takes the plane to complete each revolution.

**Data:**

String length: 90 cm

Plane Mass: 130 g

Radius of circle: 68 cm

Revolutions Per Minute: ≈50

**Analysis:**

Method 1:

Fc = mv^2/r

V=2\*pi\*r / period

50 RPM =1.2 second period

V=2\*pi\*.68/1.2

V=3.5605

Fc = mv^2/r

Fc=(.13\*3.5605^2)/.68

Fc= 2.4245362 N

Method 2:

ΣFy=Tcos(θ)-mg=0

T=mg/cos(θ)

θ= sin^-1(r/L)

θ=49.074

T=.13\*9.81/cos(49.074)

T= 1.94677

Tcos(49.074)-.13\*9.81= 0

ΣFx=Tsin(θ)=Fc

1.94677\*sin(49.074)=1.471

Fc = 1.471 Newtons

**Conclusion:**

Our data may have been inaccurate from many different sources. The camera footage was blurry and the exact radius was hard to determine because we may not have been directly underneath the plane at the time of crossing the measuring board which, when viewing it from an angle, could cause a different measurement for the radius. Also the airplane was missing a rear flap which caused it to fly abnormally and may have changed its flight path. Overall the lab was a success since we were able to find the centripetal force.