	PHYSICS 1 (3rd Quarter)			
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	Module Title	uniform Circular Motion	**Section:**	9 – Lithium
	Lesson #	10.2	**Date:**	January 28, 2021
	Lesson Title	ACTIVITY: UNIFORM CIRCULAR MOTION		

B. Determination of the relationship between the radius and the tangential speed

Repeat procedure A but this time, keep the weight in the paper cup constant at about 4 - 8 coins on top of the initial counterbalance. Vary the radius by 10 cm until you complete Table 2.

Table 1. Relationship between the Centripetal Force and the Tangential Speed

Mass of the counterbalance (g)	Centripetal force (N)	Number of revs in 5.0 s	Angular speed (rev/s)	Radius (cm)	Tangential speed (cm/s)
60g	0.588 N	5.2	1.04 rev/s	35cm	228.7 cm/s
72g	0.7056	5.5	1.1 rev/s	35cm	241.9 cm/s
84g	0.8232 N	5.6	1.12 rev/s	35cm	246.3 cm/s
96g	0.9408 N	6	1.2 rev/s	35cm	263.9 cm/s

Questions and Calculations:

1. What happens to the tangential speed as the centripetal force is increased? Account for the result using appropriate formula.

The tangential speed increases as the centripetal force increases. Since the formula is $F_c = \frac{mv^2}{r}$, and mass and radius remain constant, the tangential velocity has to increase in coordination to the centripetal force increasing.

2. From your data, is it possible to compute the mass of the object being whirled? Explain why or why not.

Yes, it is possible. The only unknown is mass. All the other values needed to compute the mass are given.

3. Using your first set (row) of data in Table 1, show sample computation for centripetal force Fc , angular speed ω (rev/s), and tangential speed v (cm/s):

Centripetal force = mg = 0.006kg * 9.8m/s^2 = 0.0588 kgm/s^2 = 0.0588 N
Angular speed = rev/s = 5.2 rev/ 5s = 1.04 rev/s
Tangential speed = 2*pi*35cm*1.04 = 228.7 cm/s

Table 2. Relationship between the Radius and the Tangential Speed

Radius (cm)	Centripetal force (N)	Number of revs in 5.0 s	Angular speed (rev/s)	Tangential speed (cm/s)
35	0.9408 N	6	1.2	263.9 cm/s
25		8	1.6	251.3
15		11	2.2	207.3 cm/s
5		16	3.2	100.5 cm/s

4. What happens to the tangential speed as the radius i is increased? Account for the result using appropriate formula.

The tangential speed decreases as the radius is increased. Since the formula is $F_c = \frac{mv^2}{r}$, and centripetal force and mass remain the same, tangential speed has to decrease in coordination to radius in order for the formula to be valid.

GENERALIZATION

Given the activity's objectives, write your generalizations based on your results.

From Table 1, we can infer that, when mass and radius are constant, that tangential velocity is directly proportional to centripetal force.

From Table 2, we can infer that, when centripetal force and mass remain the same, that tangential velocity is directly proportional to the radius.