

IMPORTANT TERMS:

- Axis
- Centrifugal force
- Centripetal force
- Linear speed
- Revolution
- Rotation
- Rotational speed
- Tangential speed

EQUATIONS:

$$F_{net} = ma_c$$

$$a_c = \frac{v^2}{r}$$

$$F = \frac{mv^2}{r}$$

UNIT I: MECHANICS

Chapter 10: Circular Motion

I. Rotation and Revolution (10.1)

A. **Rotation**– when object turns about an _____ axis

1. _____ – straight line around which rotation takes place

2. **Revolution**– when object turns about an _____ axis

3. Earth– undergoes both types of rotational motion

a. revolves around sun every 365 1/4 days.

b. revolves around an axis passing through its geographical poles once every 24 hours.

II. Rotational Speed (10.2)

A. **Linear speed**– _____ moved per unit _____

B. **Tangential speed**– the speed of something moving along a _____ path

1. direction of motion is always _____ to the circle

2. For circular motion can use terms _____ and _____ speed interchangeably

C. **Rotational speed**– sometimes called _____ speed

1. Equals the number of _____ per unit _____

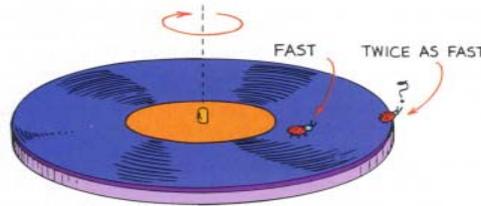
2. Expressed in _____ **(RPM)**

D. Tangential and Rotational speed are related

1. Tangential speed is directly _____ to rotational speed and the radial distance from the axis of rotation.

In summary– in any rigidly rotation system, all parts have the same _____ speed. However, linear or tangential speed

varies. Tangential speed depends on _____ speed and _____ from axis of rotation



III. Centripetal

Force (10.3)

A. **Centripetal Force**— any _____ that causes an object to follow a _____ path

1. Centripetal means “_____ seeking” or “toward the center”.

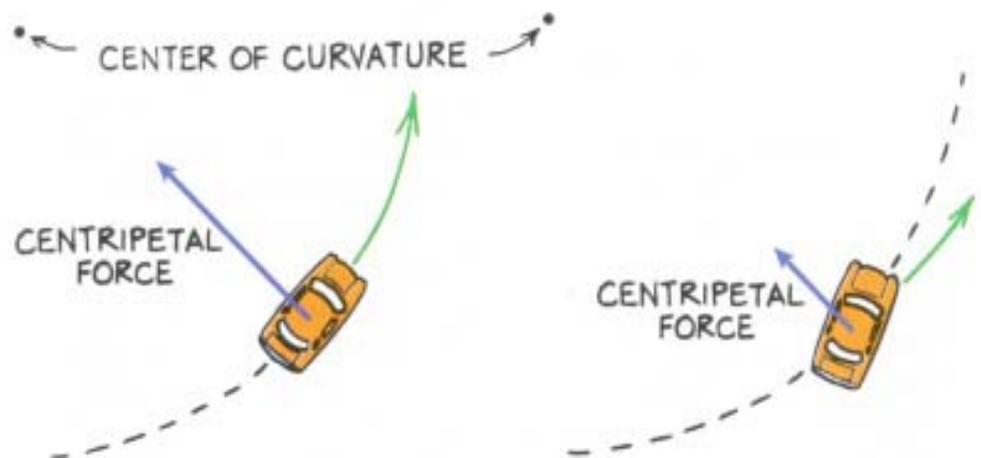
B. Centripetal force is the name given to any force that is directed at a right angle to the path of a moving object that tends to produce circular motion

1. _____ forces directed towards the center of the Earth holds the moon in an almost circular orbit around the Earth

2. _____ forces hold electrons and cause them to rotate around the nucleus of the atom

3. A car rounding a corner has sideways-acting _____ forces between tires and road that provides centripetal force that holds car on curved path

C. Equation for centripetal force



1. Equation for centripetal acceleration (a_c)

2.

tripetal acceleration in Newton's equation for centripetal force

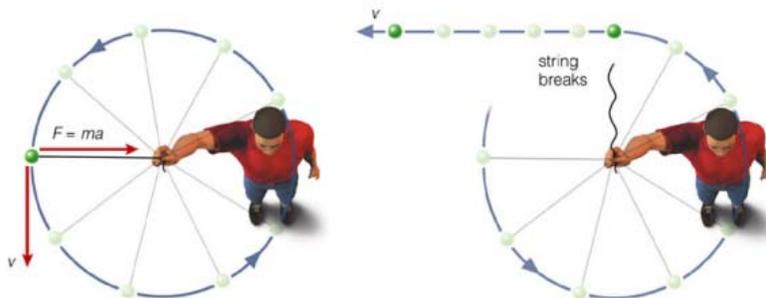
Substitute centripetal acceleration in Newton's second law to get

IV. Centripetal and Centrifugal Forces (10.4)

A. **centrifugal force**– means “_____ fleeing”, or away from the center”.

1. common misconception to state that a centrifugal force pulls outward

2. Example: if string breaks holding a whirling can– the can would go off in a tangential path because there is no _____ acting on it



B. The “centrifugal-force effect” is attributed not to any real force but to _____ (the tendency of the moving body to follow a _____-line path.

V. Centrifugal Force in a Rotating Reference Frame (10.5)

A. Centrifugal force is an effect of rotation. It is not part of an interaction and therefore it cannot be a true force.

B. Physicists refer to **centrifugal force** as a _____
force

C. To observers who are in a rotating system, centrifugal force seems very real