

Circles

Overview of what types are circles we'll be doing:

Conic circles: Spinning a yo-yo around and around...

Horizontal circles: Car around a corner

Vertical circles: ...roller coaster loop.

Planet circles: orbits

We need some definitions to progress:

Period: The time required for one complete cycle of a repeated event. Unit - second = s.

$$Period = T = \frac{seconds}{cycle}$$

Frequency: The number of complete cycles of a repeated event per second. Unit - Hertz = Hz.

$$frequency = f = \frac{1}{T} = \frac{1}{\frac{seconds}{cycle}} = \frac{cycles}{second}$$

A dismembered zombie head bobs up and down 17 times in 68 seconds. Find its period (T) and frequency (f).

RPM: revolutions per minute. We would (probably) want this number in Hz.

$$1,800rpm = \frac{1,800 \text{ revolutions}}{60 \text{ seconds}} = 30Hz.$$

Important uniform circular motion equations:

$$v = \frac{d}{t}$$

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

There is a net force directed toward the center of a circle, centripetal force (F_c).

There is an acceleration in the direction of F_{net} called the centripetal acceleration (a_c).

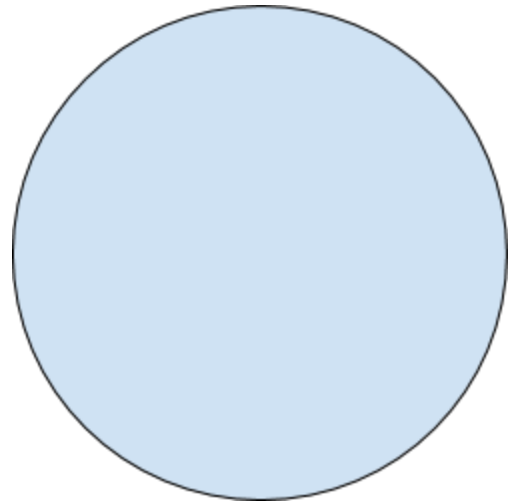
$$F_{net} = ma \quad \therefore \quad F_c = ma_c$$

The velocity is tangential to the circle.

a_c and F_c are directed radially.

Velocity can be found using

$$v = \frac{\Delta d}{\Delta t}$$



Let's do some physics!

A pug of mass 5.0kg is swung on a 2.0m long leash in a radius of 1.0m. Determine the velocity of frequency of the rotation.

A pug of mass 5.0kg is swung on a 1.2m long leash through a fire in radius .60m. Determine the F_g , θ , F_T , F_c , a_c , and f .