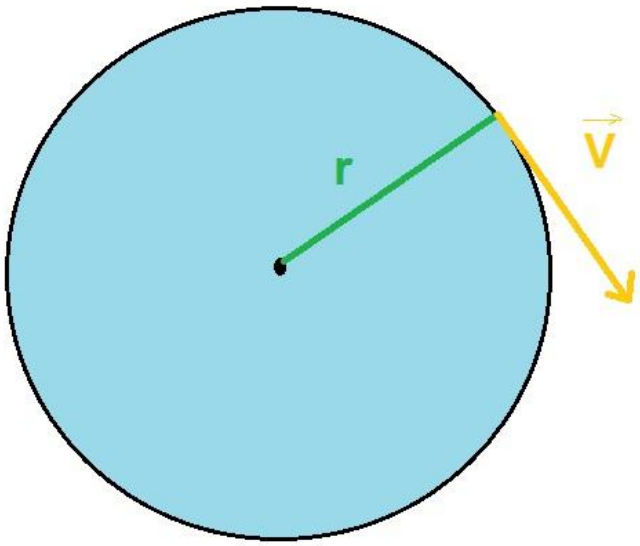
Lettergram.Net – Uniform Circular Motion

*To understand the topic of Circular Motion one must first understand Vectors, Motion in one Direction, Newton's Laws, and what a force is.

To understand what happens when an object is in circular, the simplest and often the first example is that of a particle in uniform circular motion. That is to say as a particle (or another object which can be treated as such, say a car) moves around on a track at a constant speed, with the same distance each time around the track, there is uniform motion.

Example 1: Particle on track.



In this example we just have a particle going around on a track with a specific circumference, radius, and velocity. The velocity is unchanging (or at least is constant tangent to the circle). In order to understand how circular motion works, I'll pose the question, "What does Newton's first law have to do with circular motion?"

The answer is that in order for there to be a change in the path the particle is taking, there must be a force acting on the particle, which in turn means there must be an acceleration inwards (towards which the object is rotating around). This is because F = ma, and since we know a force must act on an object in order to change the direction of its motion because of Newton's first law, there must be an acceleration.

This acceleration is called the centripetal acceleration (or center-seeking acceleration), it is caused by things such as tension (picture a yo-yo being spun around and how the force of tension keeps the yo-yo on a particular path). In order to calculate this we can simply use the formula

$a_c = v^2/r$

r – radius

v – velocity

This is all I shall cover in this guide, all I would like to add is:

$T = 2\pi r / v$

That is to say that the period (T) can be calculated by taking the circumference ($2\pi r$) and dividing it by the speed at which the particle is rotating. Simple enough.

Recommendations:

Because I do not know the specific knowledge each individual has using this guide, I would recommend that if there is something I mention that you do not fully understand you either use YouTube to find a video; Tweet me via Twitter *(though I may be a while getting back); Comment on the related post on Lettergram.net or simply ask your teacher.