

Unit 4: Newton's Laws

Newton's 1st Law

Newton's 1st Law:

An object in motion will...*stay in motion*
and an object at rest will...*stay at rest*
unless...*acted upon by an external net force.*

This is also referred to as the **Law of Inertia**.

Inertia: *how difficult it is to change an object's motion.*
≈ mass

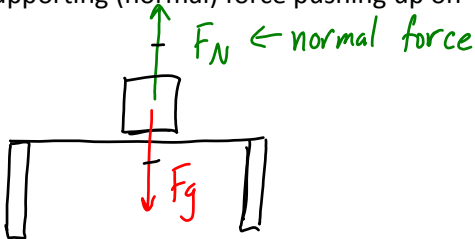
Imagine that you are racing around a track on a go-kart. List *three* times when you notice your *inertia*.

- 1) *Stopping*
- 2) *Turning*
- 3) *Starting*

Another way of thinking of Newton's 1st Law is that if there is no net force on an object then it will stay at a constant velocity.

If it is not moving then it has a constant velocity of zero!!!

Ex. Imagine a book sitting on a table. There is a force of gravity pulling down on the book, but there is also a supporting (normal) force pushing up on the book.



Ex. If I drop the book from 2 m, there is only a downwards, gravitational force acting on it. Now that the forces on it are **unbalanced**, what does the book do?



Accelerates

Examples:

- 1) While riding a skateboard (or chuckwagon or unicycle, whatever), you fly forward off the board when hitting a curb or rock or other object which abruptly halts the motion of the skateboard.
- 2) The head of a hammer can be tightened onto the wooden handle by banging the **bottom** of the handle against a hard surface.
- 3) While you are sitting in the back seat of the car, it makes a hard right turn. You squish your sister against the side door (CORNERS!!!).
- 4) Headrests are placed in cars to prevent whiplash injuries during rear-end collisions.