# 1 Acceleration

> **Definition 1.0.1**
> **Acceleration**, $\vec{a}_{av}$, refers to the rate of change of velocity, or in other words the ratio of the change of velocity to the time elapsed.
>
> $$\vec{a}_{av} = \frac{\Delta \vec{v}}{\Delta t}$$

First we note that acceleration is a vector quantity because $\Delta \vec{v}$ is a vector quantity. Acceleration is experienced any time an object is increasing or decreasing its velocity, *any* change in velocity results in acceleration. For example, you must initially accelerate your vehicle in order for it to reach the desired velocity, similarly you must first *accelerate* your vehicle in order to come to a stop and change your velocity to $(+0\,\mathrm{m/s})$.

**Remark :** It is common to hear the term *de-accelerate*, however this term is rather redundant because the term acceleration refers to any change in velocity, regardless of weather you would like to increase your velocity or bring yourself to a holt $(\vec{v} = +0\,\mathrm{m/s})$.

## 1.1 Average Speed