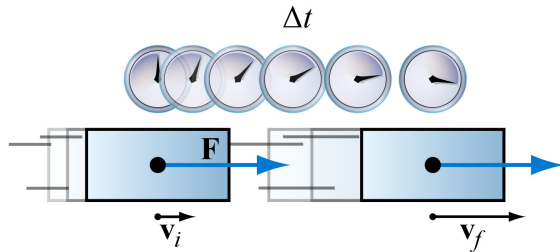
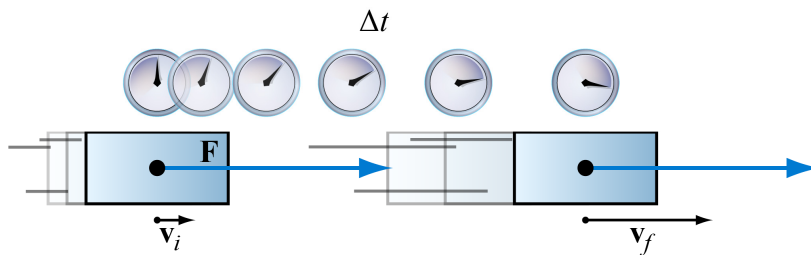


A force can deliver an impulse that contributes to a change in $m\vec{v}$

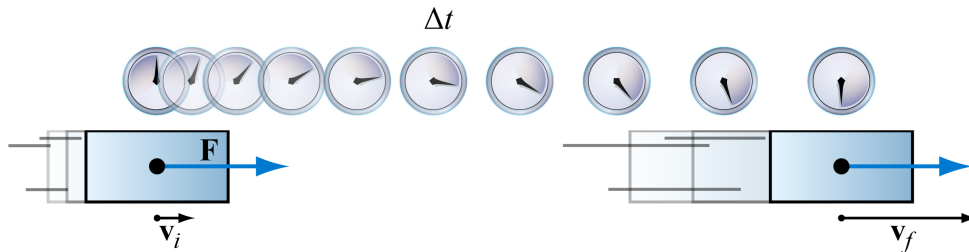
How much can I change the $m\vec{v}$ of an object by applying a constant force during some interval of time?



change in $m\vec{v}$



$\uparrow F \Rightarrow \uparrow$ change in $m\vec{v}$



$\uparrow \Delta t \Rightarrow \uparrow$ change in $m\vec{v}$

$$\text{Momentum} = \vec{p} := m\vec{v}$$

Impulse delivered = (forcefulness)(duration of contact) = change in momentum

$$\text{Impulse delivered by a force} = \Delta\vec{J}_F := \vec{F}\Delta t = \Delta\vec{p}$$

A force can deliver an impulse that contributes to a change in $m\vec{v}$

Impulse delivered by a varying force

Consider the impulse delivered by a one-dimensional force of varying strength. Allow increments of time to be short enough so that, for each increment, the force is roughly constant.

$$\Delta J_{F,i} \approx F_i \Delta t$$

The total impulse delivered during a finite interval of time

$$\Delta J_F \approx \sum_i F_i \Delta t$$

is the signed area “under” the plot of F vs. t .

