Physics 11 - Unit 5
Momentum
5.2 - Impulse

Review

SI [Système International] Units

length	metre	m
mass	gram/kilogram	g/kg
volume	litre	L
time	second	s

Common Prefixes

0.000001	$= 10^{-6}$	micro (μ)	10^{0}	$= 1$	
0.00001	$= 10^{-5}$		10^{1}	$= 10$	deca (da)
0.0001	$= 10^{-4}$		10^{2}	$= 100$	hecto (h)
0.001	$= 10^{-3}$	milli (m)	10^{3}	$= 1000$	kilo (k)
0.01	$= 10^{-2}$	centi (c)	10^{4}	$= 10000$	
0.1	$= 10^{-1}$	deci (d)	10^{5}	$= 100\,000$	
1	$= 10^{0}$		10^{6}	$= 1\,000\,000$	mega (M)

New

Newton's 2nd Law, in its original form:

$$\vec{F} = \frac{m\vec{v}}{t} \rightarrow \Delta\vec{p} = \vec{F}\Delta t = m\Delta\vec{v} = \text{impulse}$$

The product of ↑ force and ↑ time interval in which it acts is called ↑

Impulse ($\vec{J}$)

Newton's 2nd Law

cause → impulse → $\vec{J}$ → $N \cdot s$ = effect → Δ in momentum → $\Delta\vec{p}$ → $kg \cdot m/s$

$\vec{J} = \vec{F}\Delta t = \Delta\vec{p}$: applying a force over a period of time will Δ momentum

: it is a cause/effect relationship

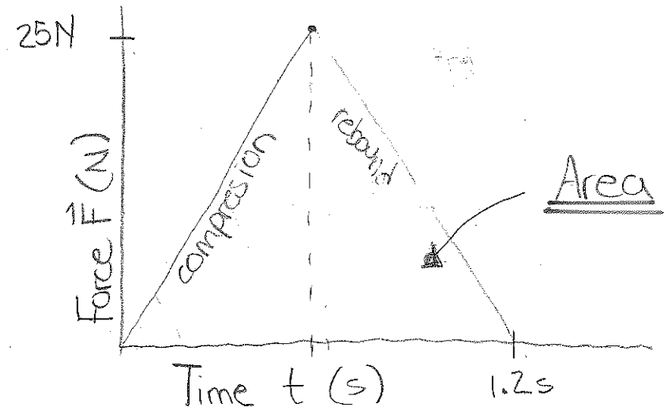
→ Goalie catching a puck; why use a leather glove?

If $\Delta\vec{p}$ remains the same (unchanged) then u can ↓ the F_{puck} by ↑ time the puck is in contact w/ the glove.

If glove was wooden the time of contact ↓ and the F_{puck} ↑

$\vec{F}\Delta t = \Delta\vec{p}$	
4.3	12
2.6	12

Impulse from a $\vec{F}$·t graph



Area under the graph = $\vec{J}$ = impulse

Graph of a ball being kicked. During the 1st 0.6s the ball was compressed & the $F_{compression}$ ↑ 0 to 25 N. After the ball reached maximum compression it rebounded for 0.6s and the Force ↓ 25 N to 0.

The area under the Fat graph is $\left[A_\Delta = \frac{1}{2} b \cdot h\right]$

$\frac{1}{2}(1.2s)(25N) = \boxed{15\ N \cdot s}$

From Newton's 1st Law:

Applied Force (over a period of time) → creates an impulse → causes $\Delta\vec{v}$ → causes $\Delta\vec{p}$