A.2

Conservation of Momentum

IB PHYSICS - MOTION

What is Momentum??

A.2

"Inertia in Motion"

Which has more Momentum??

A.2

20000 kg

10 m/s

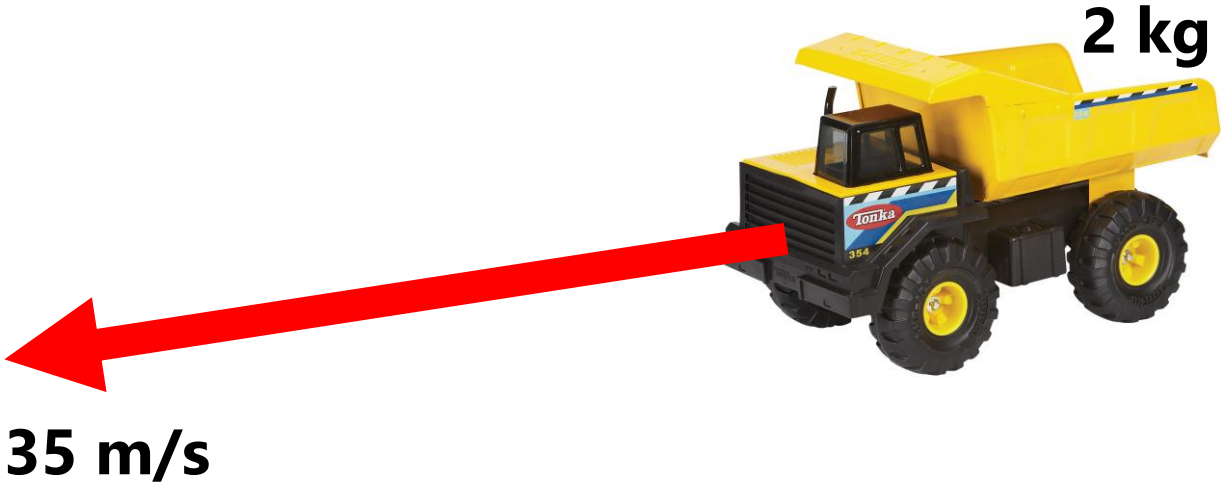
2 kg

10 m/s

Why?

Which has more Momentum??

A.2



Why?

Momentum Equation

A.2

Momentum = mass × velocity

Symbols		=	×
Units		=	×

IB Physics Data Booklet

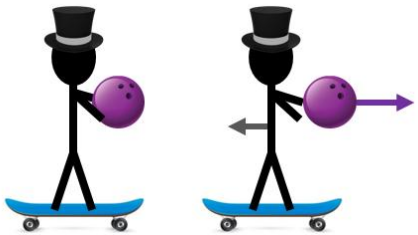
A.2

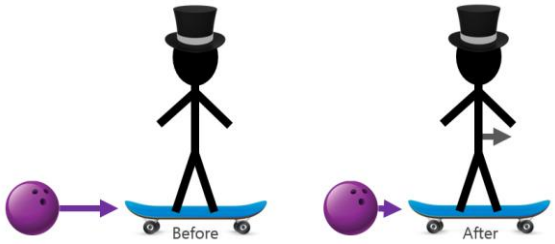
A.2 Forces and momentum	
	$F_f \leq \mu_s F_N$
	$F_f = \mu_d F_N$
	$F_H = -kx$
	$F_d = 6\pi\eta rv$
	$F_b = \rho Vg$
	$F_g = mg$
	$p = mv$
	$J = F\Delta t$
	$F = ma = \frac{\Delta p}{\Delta t}$
	$a = \frac{v^2}{r} = \omega^2 r = \frac{4\pi^2 r}{T^2}$
	$v = \frac{2\pi r}{T} = \omega r$

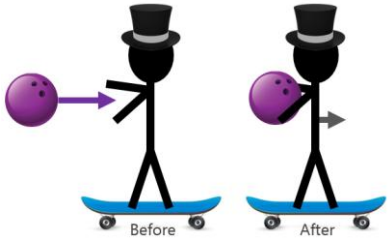
Conservation of Momentum

A.2

The total momentum of a system is constant



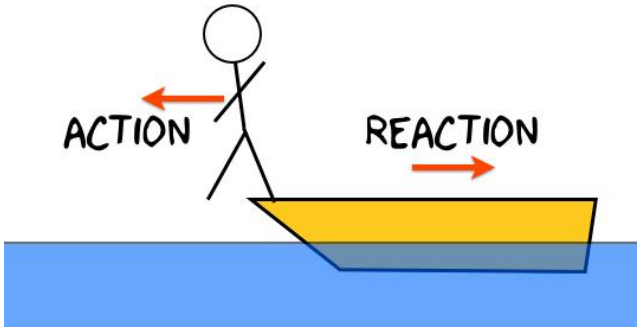


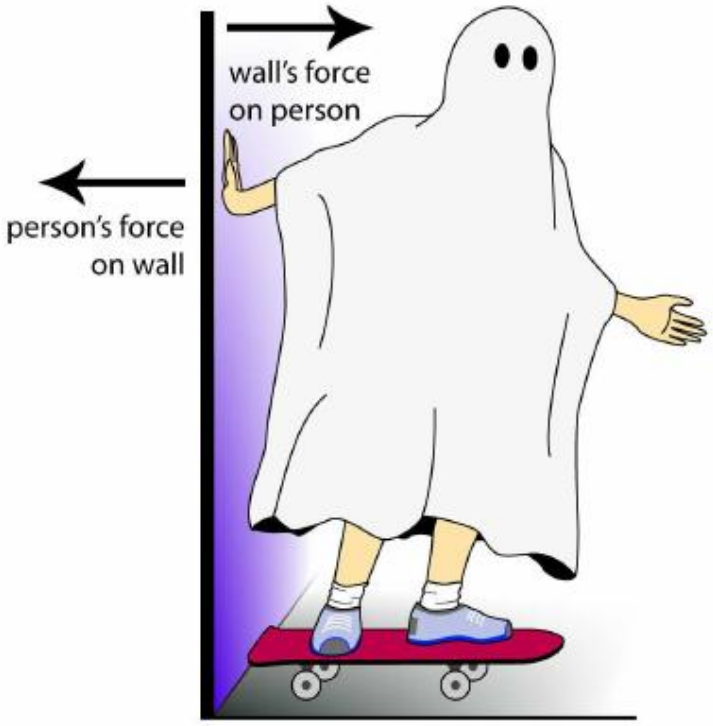


Newton's Third Law

A.2

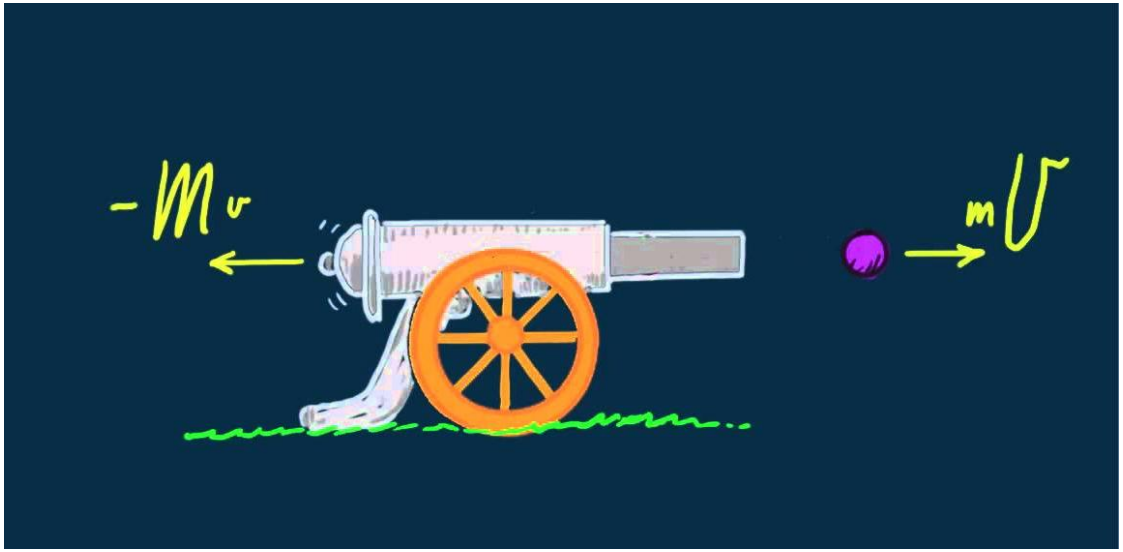
For every action, there is an equal and opposite reaction





Conservation of Momentum

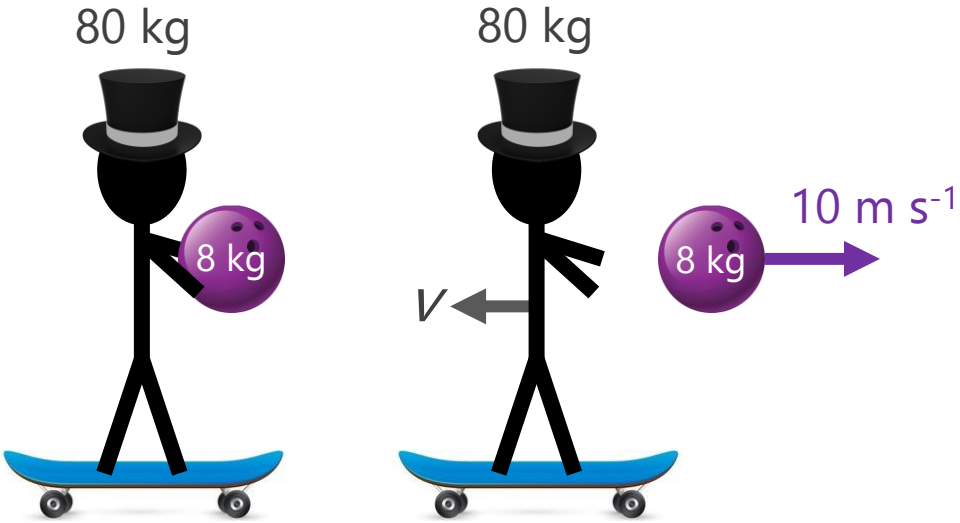
A.2



When a cannonball is fired out of a cannon, there is a recoil…

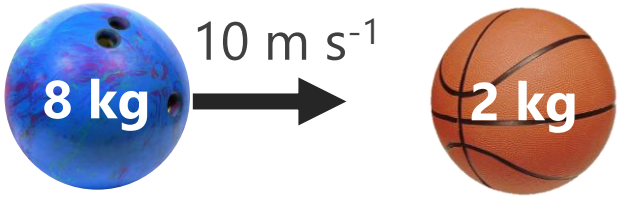
Explosion

A.2



Hit and Bounce #1

A.2

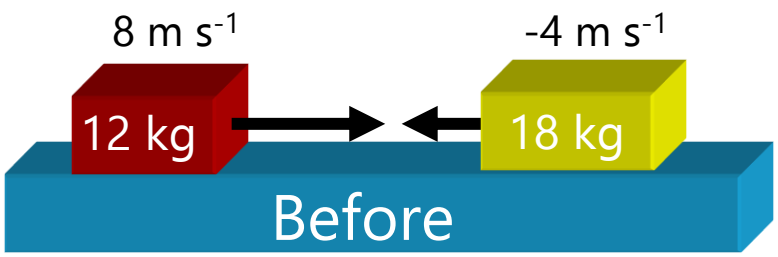


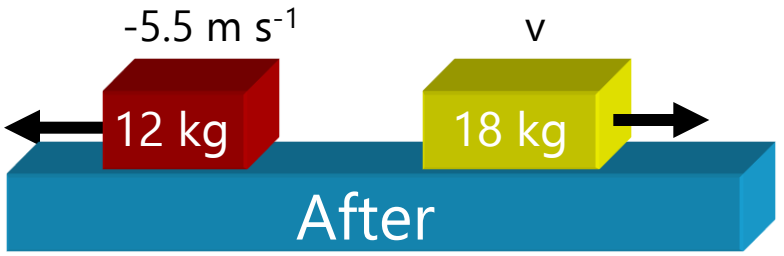
Hit and Bounce #2

A.2

Before

After



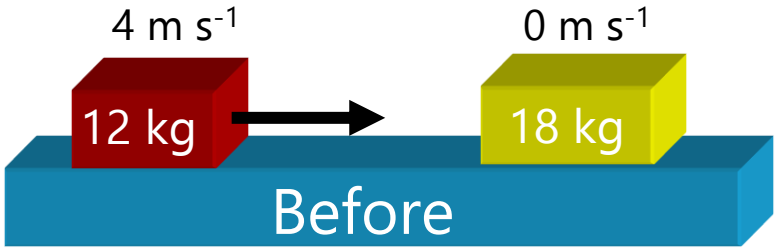


Hit and Stick

A.2

Before

After



Lesson Takeaways

A.2

- ❑ I can define and calculate momentum
- ❑ I can calculate “before” and “after” momentums for multiple objects
- ❑ I can use the conservation of momentum to solve for missing variables in linear collisions
- ❑ I can describe the process required for explosion, hit and bounce, and hit and stick scenarios