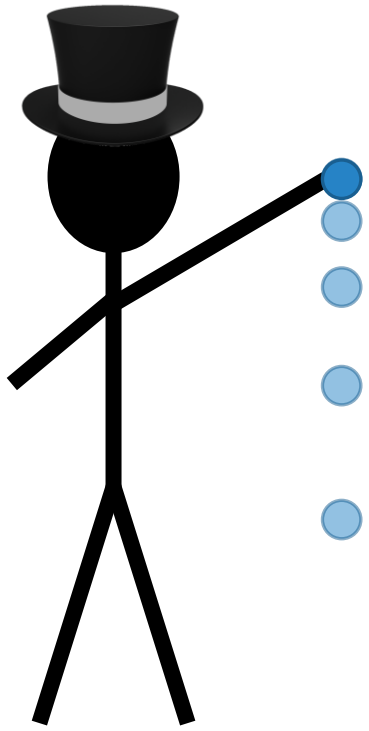
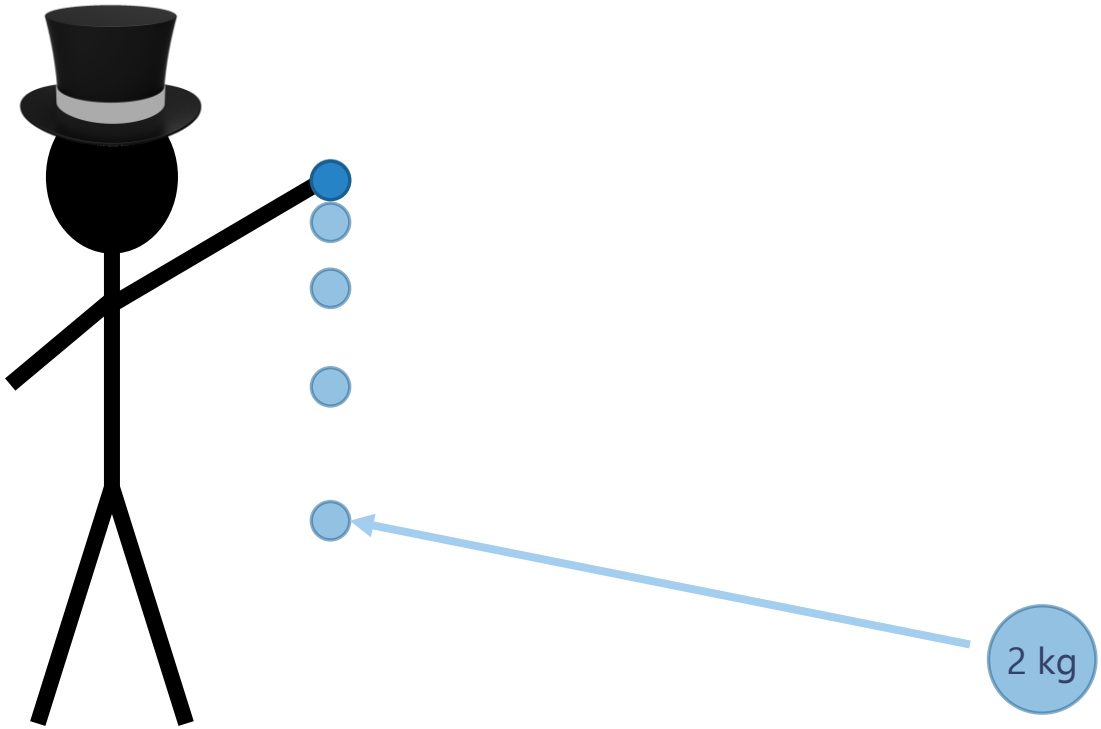
Free Fall



IB PHYSICS - MOTION

What is Free Fall?

A.2



Acceleration due to Gravity

A.2

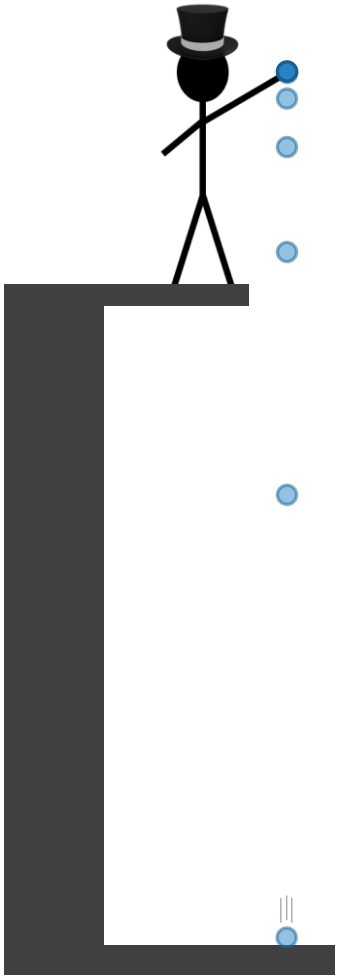
$F_g = (2)(9.8) = 19.6$ N

$F_g = (5)(9.8) = 49$ N

$$F = ma = \frac{\Delta p}{\Delta t}$$

What If You Drop Something?

A.1



What do you know?

s	
u	
v	
a	
t	

What If You Throw Something Up?

A.1

What do you know?

1st Half

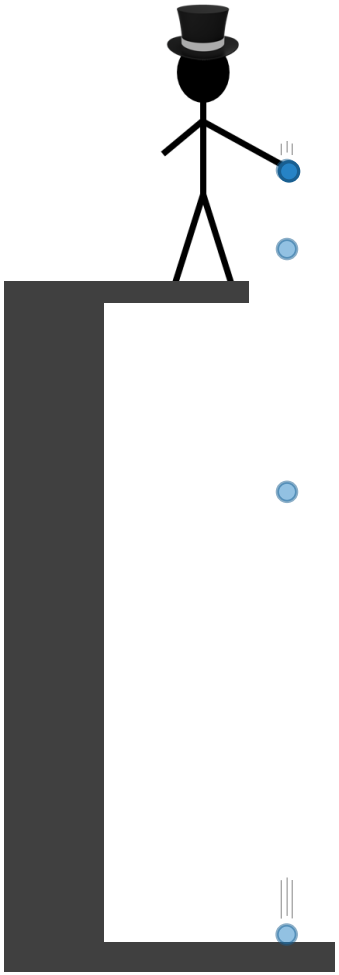
s	
u	
v	
a	
t	

2nd Half

s	
u	
v	
a	
t	

What If You Throw Something Down?

A.1



What do you know?

s	
u	
v	
a	
t	

Reminder of Our Equations

A.1

Units	m	$m\ s^{-1}$	$m\ s^{-1}$	$m\ s^{-2}$	s
$s = \frac{u+v}{2}t$	s	u	v		t
$v = u + at$		u	v	a	t
$s = ut + \frac{1}{2}at^2$	s	u		a	t
$v^2 = u^2 + 2as$	s	u	v	a	

Dropping a Marble

A.1

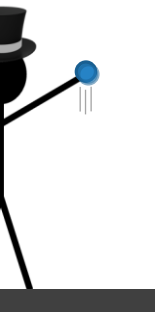
If you drop a marble off the Empire State Building (~380 m), how fast will it be going once it reaches the ground?

s	
u	
v	
a	
t	

Shooting a Basket

A.1

What is the vertical velocity of a basketball required to reach the rim of the basketball hoop? (~3.0 m high)



s	
u	
v	
a	
t	

Flipping a Coin

A.1

You flip a coin and catch it. It is in the air for a total of 0.6 seconds. How high did it go?

s	
u	
v	
a	
t	

Lesson Takeaways

- ❑ I can identify the constant acceleration due to gravity neglecting air resistance.
- ❑ I can interpret a free fall problem to identify hidden values and understand when to look at only half of the problem.
- ❑ I can use the kinematic equations to solve a free fall problem.