

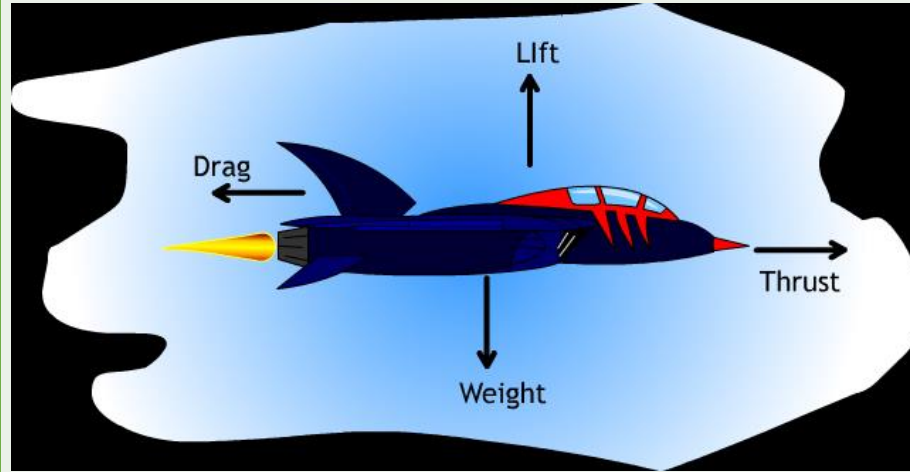
# Forces - Gravity

## Key words

<b>Weight</b>	The force of gravity on an object (N)
<b>Non-contact force</b>	One that acts without direct contact
<b>Mass</b>	The amount of stuff in an object (kg)
<b>Gravitational field strength, g</b>	The force from gravity on 1 kg (N/kg)
<b>Field</b>	The area where other objects feel a gravitational force

## Key diagram – Free body diagram

Free body diagrams show the direction and size of forces acting on an object.



## Key knowledge

$g$  on Earth = 10 N/kg. On the Moon it is 1.6 N/kg

Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength.

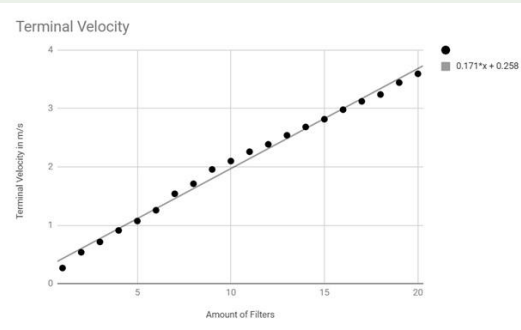
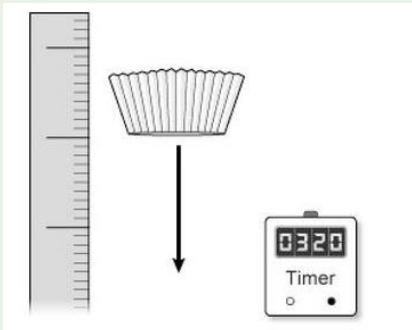
Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance.

Gravity holds planets and moons in orbit around larger bodies.

When an object falls, it will accelerate until it reaches its maximum speed or terminal velocity.

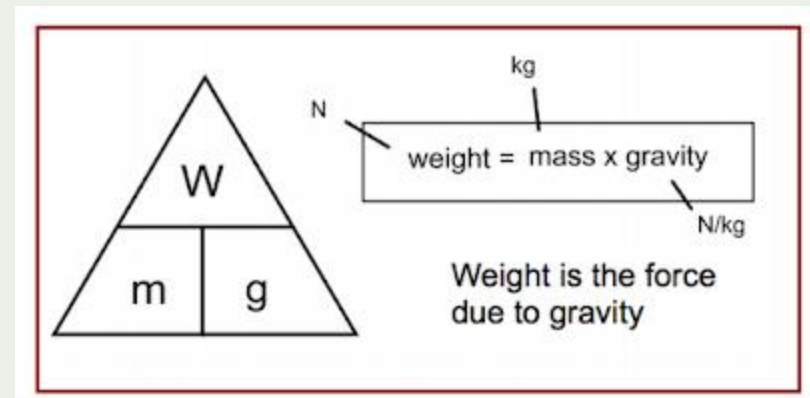
## Required practical – Terminal velocity

You can investigate the effect of mass on terminal velocity by dropping cupcake cases. You can change the mass by adding more cupcake cases. Drop from a fixed height and measure the time to fall. Calculate the speed using speed = distance / time. The speed increases as the mass increases because the weight is increasing.



## Key process – Calculating mass, weight and gravity

You can calculate the weight of an object if you know its mass (m) and the strength of the gravitational field that it is in (g)



# Knowledge Assessment

State the equation linking mass, weight and gravitational field strength.

Define the term 'weight', giving the unit.

Define the term 'non-contact force'

Define the term 'mass', giving the unit.

Define the term 'gravitational field strength', giving the unit.

Define the term 'field'

Gravitational force increases with mass, true or false?

Gravitational force increases with distance, true or false?

State the gravitational field strength on Earth.

State the gravitational field strength on the Moon.

# Knowledge Assessment ANSWERS

State the equation linking mass, weight and gravitational field strength.	Weight = mass x gravitational field strength
Define the term 'weight', giving the unit.	The force of gravity on an object (N).
Define the term 'non-contact force'	One that acts without direct contact.
Define the term 'mass', giving the unit.	The amount of matter in an object (kg).
Define the term 'gravitational field strength', giving the unit.	The force due to gravity on 1 kg (N/kg).
Define the term 'field'	The area where other objects feel a gravitational force.
Gravitational force increases with mass, true or false?	True
Gravitational force increases with distance, true or false?	False
State the gravitational field strength on Earth.	10N/kg (accept 9.8N/kg)
State the gravitational field strength on the Moon.	1.6N/kg