Be REFLECTIVE: Review your learning

KNOWLEDGE ORGANISER

PHYSICS: FORCES Speed and gravity

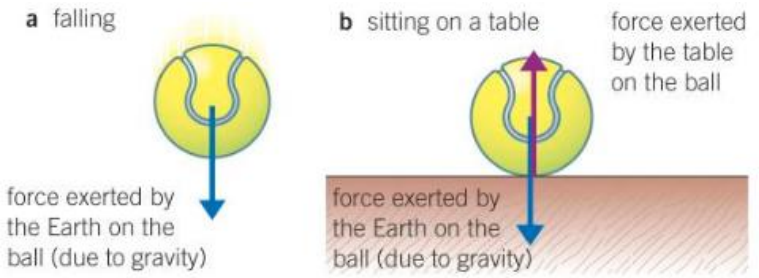
Name:

Keyword	Definition
Force	Forces can make things speed up, slow down, change direction or change shape.
Contact force	These forces only act when two things are touching.
Non-contact force	These forces can act when things are not touching
Newtons	The units for measuring forces (N)
Gravity	The force that earth uses to pull things towards it
Air resistance	The force that slows something down because air particles hit it.
Friction	The forces that slows things down when they move on a surface e.g. a car on a road.
Upthrust	The force on an object in liquid or gas that pushes them up
Interaction pairs	When two objects interact there is a force on each one that is the same size but in opposing directions.
Speed	A measure of how far something travels in a particular time, measured in meters per second (m/s)
Average speed	The overall distance travelled by overall time for a journey
Acceleration	How quickly speed increases or decreases
Mass	The amount of matter something is made of
Weight	The force that acts on a mass because of gravity
Equilibrium	When all of the forces on something are balanced and cancel out.

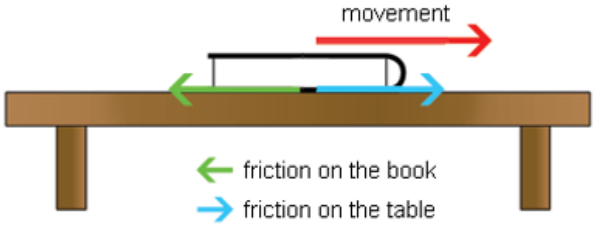
Introduction to forces

A force can be a push or a pull. Forces explain why objects move in the way that they do or why they don't move at all. Forces can change the direction that objects are moving in and change their shape.

Force arrows



▲ These force arrows show the forces acting on a tennis ball.

Contact forces	Are forces that act when you are touching something. friction, and air resistance are contact forces. Support forces like upthrust are also contact forces.
Non-contact forces	The force of gravity acts on a tennis ball when travels through the air. The Earth pulls the ball down even though it isn't touching it. Gravity is a non-contact force. The force between magnets is another example.
Interaction pairs	When two objects interact there is a force on each one that is the same size but in opposing directions. 

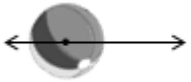
Be REFLECTIVE: Review your learning

KNOWLEDGE ORGANISER
PHYSICS: FORCES Speed and gravity

Name:

Balanced and unbalanced

When the forces acting on an object are the same size but act in opposite directions we say that the resultant force is zero, the forces are **balanced** and the object is in **equilibrium**.

Balanced forces	Unbalanced forces
An object can either: • Stop • Move at a steady (constant) speed 	An object can either: • Speed up • Slow down • Change direction • Change shape 
Resultant forces  20N 40N Resultant = 20N →	• Single force that can replace all the forces acting on an object and have the same effect

Gravity

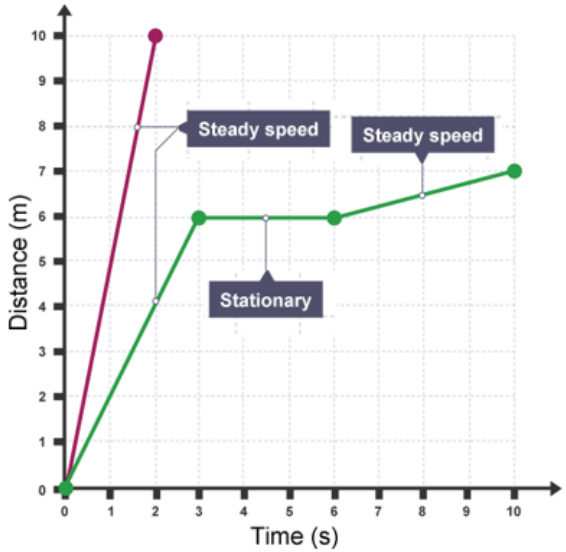
Gravity (or gravitational force) is a **non-contact force** which acts between two masses. It depends on the mass of each object and how far they are apart.
On Earth the Gravitational field strength on Earth is 10 N/kg. Gravitational filed strength is different on other planets.
Gravity keeps things in orbit because the Earth exerts a force on the Moon. The force of gravity acts on the Moon keeping it in orbit around the Earth.

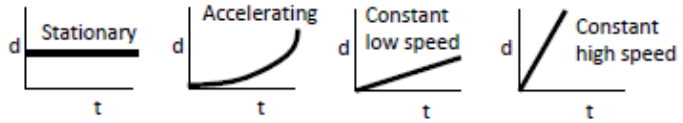
Difference between weight and mass

Weight	Is the effect of gravity on an object. Measured in newtons (N). Its value differs on different planets.
Mass	Amount of matter in an object measured in Kg. Same value on different planets.

Distance-time graphs

A distance-time graph is a useful way to represent the motion of an object. It shows how the distance moved from a starting point changes over time.





The slope of a distance-time graph tells you the speed. If the line is steep, the object is moving fast, if its not very steep then the object is moving more slowly.

Equations to learn

Distance = speed x time s = v x t	Distance – metres (m) Speed – meters per second (m/s) Time – seconds (s)
Weight (**N**) = mass (**kg**) × gravitational field strength (N/kg)	