

**KNOWLEDGE ORGANISER**  
**BIG IDEA: FORCES**  
**TOPIC: FORCES INTRO**

Key Word	Definition
<b>force</b>	A force is a push or pull between objects that cause change in speed, direction and/or shape
<b>contact force</b>	Contact forces act between two objects that are physically touching.
<b>non-contact force</b>	Non-contact forces act between two objects that are <b>NOT</b> physically touching.
<b>Newton</b>	Unit for measuring forces (N).
<b>magnitude</b>	The size or amount of a quantity
<b>resultant force</b>	Single force which can replace all the forces acting on an object and have the same effect.
<b>equilibrium</b>	State of an object when opposing forces are balanced.
<b>stationary</b>	State of motion where the object is not moving
<b>Newton meter</b>	Instrument used to measure the magnitude of a force
<b>accelerate</b>	Increasing speed
<b>decelerate</b>	Decreasing speed

Type of force	Definition	Contact / non-contact
<b>tension</b>	a pulling force exerted on an object by a string, rope or rod.	contact
<b>friction</b>	a force that acts between two touching surfaces and prevents or resists them moving against each other	contact
<b>upthrust</b>	an upwards force that acts on an object when it is in a fluid (a liquid or gas).	contact
<b>thrust</b>	a driving force exerted by an engine to make an object move	contact
<b>weight</b>	experienced by a mass when it is sufficiently close to another mass it always pulls two objects towards each other. It never pushes them apart.	non-contact
<b>air resistance</b>	An object experiences this force as it moves through air. It acts in the opposite direction to movement and increases the faster the object moves	contact
<b>magnetic</b>	experienced by a magnet or a magnetic material, eg iron, when placed in a magnetic field. This force can pull the two objects together or push them apart.	non-contact
<b>normal contact</b>	When an object pushes on a surface like a table, wall or the ground, the surface pushes back on the object with a balancing force.	contact
<b>electrostatic</b>	experienced by a charged particle in an electric field. This force can be either <b>attractive</b> or <b>repulsive</b> .	non-contact

moving right

- Resultant = 5 N right
- Object accelerates

moving right

- Resultant = 5 N left
- Object decelerates

moving right

- Resultant = 0 N
- Constant speed

Stationary

- Resultant = 0 N
- stationary

**Resultant Force**

**Free Body Force Diagrams**

- We use arrows to represent force:
  - The direction of the arrow represent the direction of the force
  - The size of the arrow represent the magnitude of the force
- We simplify scenarios by focusing on one object at a time

becomes
→

Ball

Normal contact  
 weight

- Force arrows must be drawn from the centre pointing away from the object

### Knowledge organiser

Big idea:



**Y7 topic:** Forces intro

### I have already learned:

#### In KS2:

Y3 – Compare how things move on different surfaces, some forces need contact between 2 objects

Y5 – Objects fall to the Earth due to gravity, identify the effects of friction

#### This topic links to:

Y8 Forces and Motion

KS4; P1 Energy, P5 forces, P7 Magnets and Electromagnets, P8 Space

KS5; Forces and Motion, Newtonian world and astrophysics, particles and medical physics

### It is important to study about forces because...

Forces cause change. Forces are encountered every day — from walking, placing an object on a surface, throwing an object in the air, and even the regular variation of ocean tides. What is force? A force is a push or a pull and a product of the interaction between two or more objects. Studying forces enables humans to understand the behaviour of objects, specifically, how it changes an object's speed, direction, size, or shape. It also sheds light on how an object behaves when interacting with another object.

### Possible careers involving force are...

Engineer

Race car driver

Gymnast

Game developer

Architect

Astronaut

Construction

Pilot

Sports player

Astrophysicist

Nuclear physicist

Physio

Armed forces

Tree surgeon

Geophysicist

...and many more