
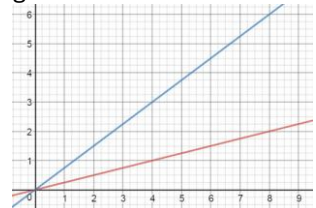
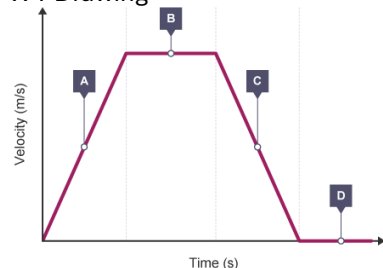
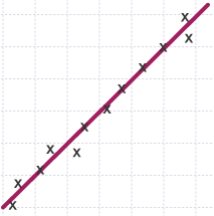
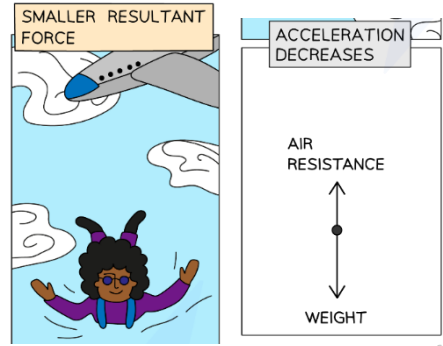


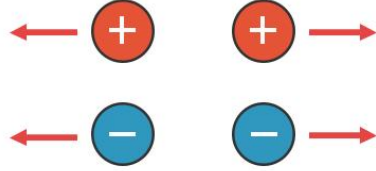

1b Forces Year 9

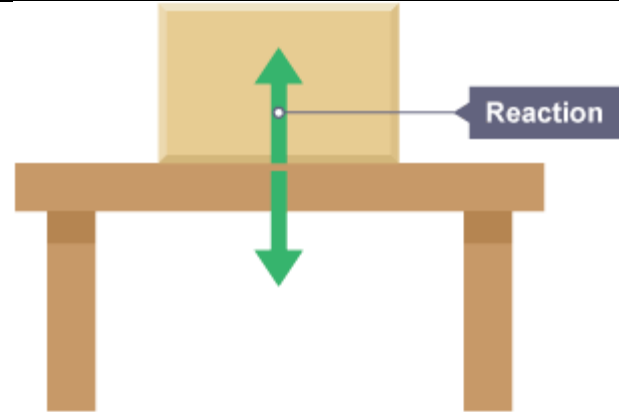
Key word	Simple meaning	GCSE definition	Words in a sentence	Translation
Acceleration	Get faster, slower or even just change direction whilst moving	The rate of change of velocity . $a = \frac{v - u}{t}$	The car accelerates when it goes around a corner because it changes direction .	
Average Speed	Overall speed for a journey e.g. 1.5 metres per second	The total distance divided by the total time . $\text{average speed} = \frac{\text{total distance}}{\text{total time}}$	Police use two cameras on a motorway to measure the average speed . A car travels 100 meters in 10 seconds and then 200 meters in the next 10 seconds. The average speed is $(100 + 200)/20 = 15$ m/s.	
Displacement	How far and where? e.g. 10 metres north	The straight line distance between two points with the direction .	The boat had a displacement 100m East of the flag.	
Direction	Where (e.g. north, south, east, west etc)? 	Measured from the starting point using degrees e.g. 30° or a compass e.g. North, South, East, West.	The vector is pointing in the direction 10° from the North . The wind is blowing from the South-West direction .	
Distance	How far? e.g. 5 metres	The total length of the path travelled, regardless of direction.	The person walked a distance of 2 km between two villages.	
Gradient	The slope. The blue line has a larger gradient than the red line. 	The slope of a line , measured as the ratio of the rise to the run . $\text{gradient} = \frac{y_2 - y_1}{x_2 - x_1}$	The acceleration is the gradient of a velocity-time graph. The gradient can be steep or shallow. A steep gradient on a velocity-time graph represents a large acceleration .	
Graph	X-Y Drawing 	A diagram that shows the relationship between two variables .	The graph showed the car's velocity changed as it was driving. The graph showed that the velocity increased in part A, then stayed constant in part B, then decreased in part C to zero in part D.	

Line of best fit	<p>A line on a graph that shows the trend. e.g. half of the points are above the line and half of the points are below the line.</p> 	A single line best representing the trend.	<p>The line of best fit had a constant gradient and went through the origin.</p> <p>The line of best fit showed that y was directionally proportional to x.</p> <p>There was a small scatter about the line of best fit showing that there was not a lot of random error.</p>	
Plot	To mark points on a graph	To mark points on a graph based on table of data.	One plotted point was not on the line of best fit , this was an outlier due to random error .	
Random error	<p>Something which makes the results of an experiment less accurate.</p> <p>e.g. if the person doing the experiment made a mistake whilst using a stopwatch.</p>	Variation in results due to a lack of control variables .	<p>There was a lot of random error when using the stopwatch due to the reaction time.</p> <p>The student didn't control the starting position of the trolley so there was a lot of random error on the final speeds.</p>	
Speed	<p>How fast?</p> <p>e.g. 5 metres per second</p>	<p>The rate at which an object moves</p> $speed = \frac{distance}{time}$	The car was travelling at a speed of 30m/s .	
Variable	<p>Something that can change</p> <p>e.g. the height above the ground.</p>	<p>A quantity that can change and is usually given as a single letter in equations.</p> <p>e.g. acceleration, a, time, t</p>	<p>The speed is a variable that changes as something falls.</p> <p>Temperature is a variable that can affect the resistance of a wire.</p> <p>The independent variable is the variable that the scientist sets or changes.</p>	
Velocity	<p>Speed in a direction</p> <p>e.g. 12 m/s up, 3 m/s forwards.</p>	<p>The rate of change of displacement</p> $velocity = \frac{displacement}{time}$	Velocity is a vector with both speed and direction .	

1c-1 Forces Year 10

Key word	Simple meaning	GCSE definition	Word in a sentence	Translation
Force	Push or pull	<p>A push or a pull between two objects that can cause an acceleration or a change of shape.</p> <p>Force names: Gravity / Weight Air resistance Friction Normal reaction force Tension Upthrust Electrostatic Magnetic</p>	Weight is a force . When you jump, weight accelerates you down to earth.	
Resultant force	The total force on an object.	The net force on an object.	<p>Weight is pulling the person down and the air resistance is pushing them up, which reduces the resultant force.</p>  <p>E.g. if the person's weight is 700N and the air resistance is 200N, the resultant force downwards is 500N.</p>	
Scalar	A number with no direction. E.g. 10 people.	A quantity with magnitude only , no direction.	Time is a scalar , it doesn't have direction. Speed is a scalar e.g. 10m/s. Velocity is speed in a given direction, so it is a vector, e.g. 10m/s East.	
Unbalanced force	The sum of forces is not zero.	The net force is not zero . This unbalanced force will cause a change of shape or an acceleration.	The skydiver has 700N acting down on them and 200N acting up. The forces are unbalanced and they are accelerating downwards.	

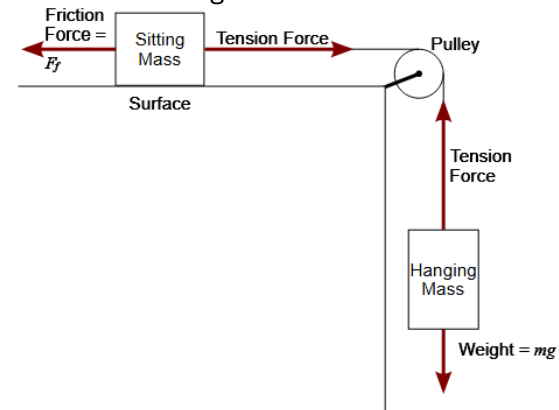
Vector	A number with a direction. E.g 10N downwards.	A quantity with both magnitude and direction .	Acceleration is a vector . If an object changes speed or direction, it is accelerating.	
Air resistance	An object moving through air feels a push backwards.	A resistive force when an object moves through air that goes against the motion.	Air resistance acts in the opposite direction to the object's motion. When the person is running forwards, the air resistance is pushing them backwards.	
Electrostatic force	Push or pull between charges	An attractive or repulsive force between two charges (like charges repel, opposite charges attract).	Two electrons accelerate away from each other as they have the same charge, so the electrostatic force is repulsive. <div style="text-align: center;"> <p>Like charges repel</p>  <p>Opposite charges attract</p>  </div>	
Friction (force)	Rubbing between two objects	A resistive force that goes against the motion when touching another surface.	There was friction between the wheel and the axle. This reduced the resultant force on the car.	
Gravity / Weight (force)	A force pulling between two masses.	An attractive force between two objects with mass.	The force of weight on a person acts towards the centre of the Earth.	
Magnetic	Push or pull between two magnets or iron.	An attractive force between two		
Normal reaction force Normal contact force	A force when you push against an object.	The perpendicular support force exerted by a surface on an object pushing on it, preventing it from going through the surface.	Weight pulls the box down. The box is pushing on the table, so there is a normal reaction force from the table acting up on the box.	



Tension Pull along a rope

A force that acts along a rope or beam. The tension force can be translated over a pulley.

The string has tension on it. The force of weight is pulling the hanging mass down. The force of **tension** in the rope is pulling right on the sitting mass. The force of friction is acting left on the sitting mass.

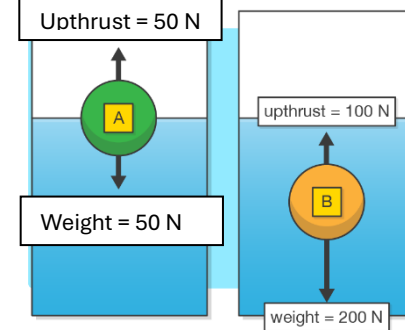


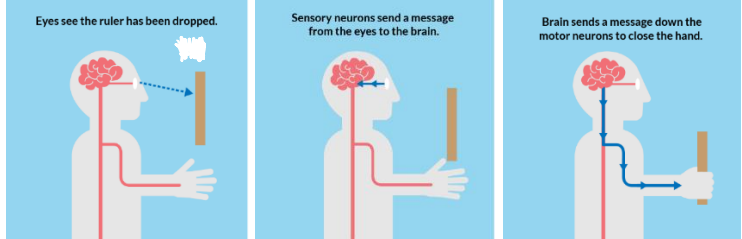
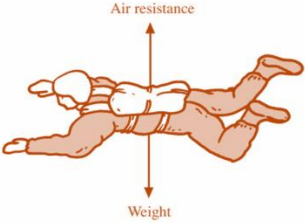
Upthrust Floating in water

Upthrust is a force equal to the weight of water being displaced.

The upthrust on ball A equals the weight of the ball before it is fully under the water, so it floats.

If object A was fully underwater it would accelerate to the surface as the upthrust would be greater than the weight.



			The upthrust on ball B is less than the weight of ball B when it is in the water, so it sinks.	
Braking distance	The distance a car travels whilst the breaks are on.	The distance a car travels after the breaks have been applied. The braking distance is affected by road, tyre and brake conditions.	The braking distance increased when the road was wet because there was less friction between the tyres and the road.	
Reaction time	The time it takes between a person seeing something and responding to it.	The time it takes between a person seeing something and responding to it. The reaction time is affected by distractions, tiredness, drug/alcohol use and age.	The pupils were testing their reaction time by trying to catch a falling ruler. 	
Stopping distance	The total distance travelled to stop a car after seeing something.	Stopping distance = thinking distance + braking distance	The stopping distance of a car travelling on a motor way is 55m. 15m of thinking distance plus 40m of braking distance .	
Terminal velocity	The constant speed an object travels at when falling.	The constant velocity of an object falling through a fluid when the resultant force on the object is zero. The weight is balanced by the air resistance (or water resistance).	A person with a weight of 700N downwards , will accelerate downwards until the air resistance is equal to 700N upwards . At this point there is zero resultant force as the air resistance balances the weight , so they fall at terminal velocity . 	
Thinking distance	The distance a car travels during the driver's reaction time.	The distance a car travels during the driver's reaction time . E.g. the human reaction time is between 0.2 and 0.8 seconds.	A person has a reaction time of 0.5 seconds. Their car is travelling at 30m/s. The car travels 15m before the person applies the brakes after seeing a red light. The thinking distance is therefore 15m.	

1c-2 Forces Year 11 – not yet studied

Key word	Simple meaning	GCSE definition	Word in a sentence
Hooke's Law			
Centre of gravity			
Clockwise / Anticlockwise			
Collision			
Conservation			
Deform			
Elastic			
Extension			
Moment			
Momentum			
Newton's 3 rd law			
Parallel			
Perpendicular			
Pivot			