Glossary: Motion

acceleration: the rate at which an object's velocity changes over a period of time

acceleration due to gravity: acceleration of an object as a result of gravity

average acceleration: the change in velocity divided by the time over which it changes

average speed: distance traveled divided by time during which motion occurs

average velocity: displacement divided by time over which displacement occurs

carrier particle: a fundamental particle of nature that is surrounded by a characteristic force field; photons are carrier particles of the electromagnetic force

deceleration: acceleration in the direction opposite to velocity; acceleration that results in a decrease in velocity

dependent variable: the variable that is being measured; usually plotted along the -axis

displacement: the change in position of an object

distance: the magnitude of displacement between two positions

distance traveled: the total length of the path traveled between two positions

dynamics: the study of how forces affect the motion of objects and systems

elapsed time: the difference between the ending time and beginning time

external force: a force acting on an object or system that originates outside of the object or system

force: a push or pull on an object with a specific magnitude and direction; can be represented by vectors; can be expressed as a multiple of a standard force

force field: a region in which a test particle will experience a force

free-body diagram: a sketch showing all of the external forces acting on an object or system; the system is represented by a dot, and the forces are represented by vectors extending outward from the dot

free-fall: the state of movement that results from gravitational force only

friction: a force past each other of objects that are touching; examples include rough surfaces and air resistance

independent variable: the variable that the dependent variable is measured with respect to; usually plotted along the x-axis

inertia: the tendency of an object to remain at rest or remain in motion

inertial frame of reference: a coordinate system that is not accelerating; all forces acting in an inertial frame of reference are real forces, as opposed to fictitious forces that are observed due to an accelerating frame of reference

instantaneous acceleration: acceleration at a specific point in time

instantaneous speed: magnitude of the instantaneous velocity

instantaneous velocity: velocity at a specific instant, or the average velocity over an infinitesimal time interval

kinematics: the study of motion without considering its causes

law of inertia: see Newton's first law of motion

mass: the quantity of matter in a substance; measured in kilograms

model: simplified description that contains only those elements necessary to describe the physics of a physical situation

net external force: the vector sum of all external forces acting on an object or system; causes a mass to accelerate

Newton's first law of motion: a body at rest remains at rest, or, if in motion, remains in motion at a constant velocity unless acted on by a net external force; also known as the law of inertia

Newton's second law of motion: the net external force on an object with mass

proportional to and in the same direction as the acceleration of the object, and inversely proportional to the mass

Newton's third law of motion: whenever one body exerts a force on a second body, the first body experiences a force that is equal in magnitude and opposite in direction to the force that the first body exerts

normal force: the force that a surface applies to an object to support the weight of the object; acts perpendicular to the surface on which the object rests

position: the location of an object at a particular time

scalar: a quantity that is described by magnitude, but not direction

slope: the difference in -value (the rise) divided by the difference in -value (the run) of two points on a straight line

system: defined by the boundaries of an object or collection of objects being observed; all forces originating from outside of the system are considered external forces

tension: the pulling force that acts along a medium, especially a stretched flexible connector, such as a rope or cable; when a rope supports the weight of an object, the force on the object due to the rope is called a tension force

thrust: a reaction force that pushes a body forward in response to a backward force; rockets, airplanes, and cars are pushed forward by a thrust reaction force

time: change, or the interval over which change occurs

vector: a quantity that is described by both magnitude and direction

weight: 'the force mathematically as: w = mg where g is the magnitude and direction of the acceleration due to gravity

y-intercept: the -value when x = 0, or when the graph crosses the y-axis

Source: OpenStax College Physics (Accessed: 2023-05-08)