

Applications of Newton's Laws

Key Terms

The following are the terms you should be familiar with in order to properly complete this unit. You are expected to be able to define each as well as apply these terms in any situation during this and subsequent units of study.

mass - the amount of matter in an object or the measurement of its inertia; a scalar quantity; measured in kilograms.

force - described as a push or a pull; a vector quantity; measured in the units of kg m/s^2 (Newton)

gravity - It is the attractive force exerted on every object by another object and is due to the objects' masses and the distance between the objects.

weight - the force that results due the effect of gravity on an object's mass.

static equilibrium - Describes the state of motion of an object when the net force on the object is zero and it is not moving.

friction - type of force that acts to oppose the motion of objects or materials that are in contact with each other.

dynamic equilibrium - The state of motion of an object when the net force on the object is zero, it is not accelerating, but is moving at a constant velocity.

weightlessness - Condition of freefall toward or around the earth, in which an object experiences no support force (and exerts no force on a scale) due to the frame of reference and the object having the same acceleration.

air resistance - A frictional force that opposes something moving through air.

terminal velocity - the maximum velocity an object attains while falling through the air; air resistance prevents a greater velocity.

fluid - A substance such as a gas or a liquid which can flow around/through another material

centripetal force - A center-directed force that causes an object to follow a curved or circular path.

centrifugal force - the name given to your perception of being pushed outward while in a circular motion

normal force – for an object resting on a surface, the upward force that is perpendicular to the surface. For a horizontal surface it is the support force that balances the weight of the object.

sliding friction – the friction between two objects that are sliding past each other. For example, the friction that results when a box slides across the floor.

static friction – the friction between two objects in contact that prevents the objects from moving relative to each other. For example, the friction that keeps a parked car from sliding down a hill.

gravitational field – a force field that exists in the space around every mass. Results in the attraction between all masses within the field.

pressure – force per unit of surface area; measured in pascals (Pa).

linear (tangential) speed – speed of an object moving along a circular path. Determined by the circumference of the circle divided by the time it takes the object to travel that distance.

rotational speed – the number of rotations, revolutions, or any other repetition of motion per unit of time; often measured in RPM (rotations per minute)