

Forces

A force can be a push or a pull. For example, when you push open a door you have to apply a force to the door. You also have to apply a force to pull open a drawer.

You cannot see a force but often you can see what it does. When a force is exerted on an object, it can change the object's:

- speed
- direction of movement
- shape (for example, an elastic band gets longer if you pull it)

Forces can be different sizes and we measure the size of a force in NEWTONS.

Electrostatic force



Gravitational force



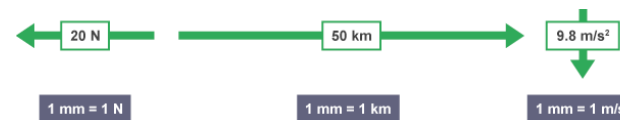
When forces act on objects they can have the following effects:

- The object can speed up or slow down. Think about a race car travelling in a straight line whilst it speeds up and slows down.
- The object can change direction. Think about a satellite orbiting Earth - the gravitational attraction between the satellite and Earth causes the circular motion.
- The shape of the object can change. Think about squeezing a foam ball.

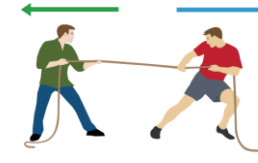
A force meter, also known as a newton meter, can be used to measure the size of a force. Force meters have a spring inside them. The weight of the mass causes the spring to stretch.



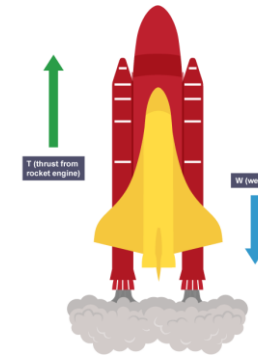
The diagram below shows some examples forces. The arrow shows the direction. The length of the arrow shows the magnitude, e.g. the size of the force in the first arrow.



Balanced forces are responsible for unchanging motion. 'Unchanging motion' is when the body is at rest or is moving with a steady speed in a straight line (it does not change direction)



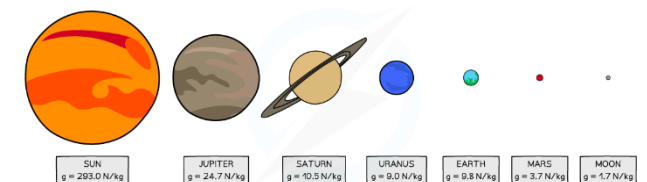
Unbalanced forces are responsible for the body speeding up or slowing down. It also includes motion where the direction in which the body moves is changing, ie the body is moving in a curved path. It is unbalanced forces that cause 'changing motion'.



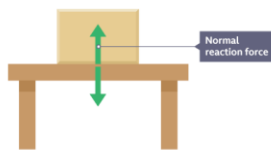
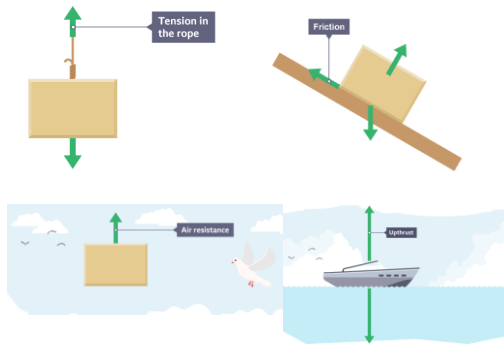
Weight, mass and gravity

The weight of an object is the force on it due to the gravitational pull of gravity at that point. Since it is a force, weight is measured in Newtons (not kilograms).

Gravity is different on different planets, so the weight of an object on different planets (or moons) is different from its weight on Earth. The mass of an object is the amount of matter that makes up the object and is measured in kilograms. The mass of an object remains the same no matter where the object is in the universe.



Contact forces act between two objects that are physically touching.



Non-contact forces act between two objects that are not physically touching

Magnetic force

