WJEC Wales Physics GCSE

2.2 - Newton's Laws

Flashcards

What is a force?

What is a force?

A push or pull acting on an object due to an interaction with another object.

Define resultant force.

Define resultant force.

The sum of all the individual forces acting on an object (taking directions into account).

How is resultant force calculated?

How is resultant force calculated?

Adding together the vector arrows of all the individual forces.

State Newton's first law for a stationary object.

State Newton's first law for a stationary object.

If the resultant force on a stationary object is zero, the object will remain at rest.

State Newton's first law for a moving object.

State Newton's first law for a moving object.

If the resultant force on a moving object is zero, the object will remain at constant velocity (same speed in same direction).

If an object changes direction but remains at a constant speed, is there a resultant force?

If an object changes direction but remains at a constant speed, is there a resultant force?

Yes; since there is a change in direction, there is a change in velocity and so there must be a resultant force.

What happens if there is zero resultant force?

What happens if there is zero resultant force?

The object will remain stationary or continue to move with constant speed and direction.

What is inertia?

What is inertia?

The tendency of an object to continue in its state of rest or uniform motion.

State the defining equation for Newton's Second Law.

State the defining equation for Newton's Second Law.

Resultant force = Mass x Acceleration

$$F = ma$$

State Newton's Second Law in words.

State Newton's Second Law in words.

An object's acceleration is directly proportional to the resultant force acting on it and inversely proportional to its mass.

What is inertial mass?

What is inertial mass?

- A measure of how difficult it is to change a given object's velocity
- The ratio of force over acceleration
- m = F/a (derived from F=ma)

State Newton's Third Law.

State Newton's Third Law.

Whenever two objects interact, the forces that they exert on each other are always equal and opposite.

What is weight?

What is weight?

The force that acts on an object due to gravity and the object's mass.

What quantities does weight depend on?

What quantities does weight depend on?

Weight = mass x gravitational field strength

- The object's mass
- The gravitational field strength at the given position in the field

What is the unit used for weight?

What is the unit used for weight?

The Newton (N).

What is the gravitational field strength on the surface of Earth?

What is the gravitational field strength on the surface of Earth?

10 N/kg

What is the approximate weight of a 1kg object on the surface of Earth?

What is the approximate weight of a 1kg object on the surface of Earth?

10 Newtons

When does a falling object reach terminal velocity?

When does a falling object reach terminal velocity?

- When the upwards forces (air resistance) and the downwards forces (weight) are equal to each other.
- No resultant force, so constant speed.

What happens to the magnitude of air resistance on a falling object when the velocity increases?

What happens to the magnitude of air resistance on a falling object when the velocity increases?

As velocity increases, the force of air resistance on the object will also increase.