

Year 5: FORCES

WHAT IS A FORCE?



A force is a push or a pull on an object in a particular direction.

The pull of a force is measured in Newtons and can be measured using a device called a force meter (seen in the image on the left).

Forces can be either balanced or unbalanced.

If they are balanced the object will be stationary or moving at the same speed.

If they are unbalanced then the object will be moving, either accelerating or slowing down, or changing direction.

A gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that one gear turns in the different direction.

Gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger force over a small distance at the other end.

LEVERS & PULLIES

A lever is a rigid length pivoting on a fulcrum

The object you lift is called the load, and the force applied through the arm to make the load move is called the effort

The lever is the name of the structure that connects these parts

Everyday levers help us to move, break, squeeze objects and cut things

A pulley is a wheel with a fulcrum that supports a moving cable or belt.

The pulley changes the direction of or the amount of forced that is needed to lift the object

Pulley systems include lifts, cranes and cable cars

FORCES ACTING ON OBJECTS:

Gravity

Gravity is a force that acts between all objects in the universe.

Everything is pulled to the Earth by gravity.

Unsupported objects fall because gravity pulls them towards the Earth

The amount of matter which makes up an object determines its mass.

Gravity is a force that acts between all objects in the universe, but acts more strongly between objects which have a greater mass

Because some planets have a greater mass, the gravity on those planets is greater

Resistance

Air resistance is a force felt by an object as it moves through air

It is caused by the object bumping into the gas particles that make up air.

The more gas particles it bumps into the more air resistance it experiences.

Falling objects will accelerate until the air resistance matches the gravitational force where it will stop accelerating and fall at a steady speed.

This speed is called terminal velocity.

A parachutes shape increases the air resistance experienced giving it a much slower terminal velocity.

Water resistance is the force felt by an object as it moves through water. It is caused by the object bumping into water particles.

The shape of an object determines how much resistance it experiences. Shapes of objects which experience little resistance are called streamlined.

WHO:



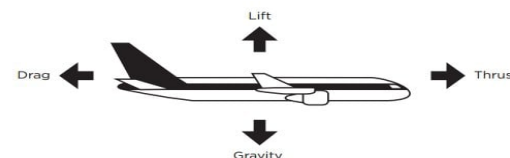
Sir Isaac Newton

1643 - 1727

A force is measured in a unit called Newtons, named after a British scientist, called Sir Isaac Newton who discovered lots about gravity and how planets in the Solar System move.

FORCES DIAGRAM:

A force diagram with arrows showing the different forces acting upon the object.



KEY VOCABULARY:



AIR RESISTANCE: a type of force that uses friction to slow things down through the air



FULCRUM: the point at which a lever is placed to get purchase or the point it is supported.



MASS: how heavy an object is



NEWTON: a unit of measure used when measuring the power of forces



UNSUPPORTED: not held in place



FRICTION: the resistance of motion when there is no contact between two surfaces



GRAVITY: the force which causes things to drop to the ground



NEWTON METER: an instrument used to measure the power of forces



PIVOT: the central point, pin, or shaft on which a mechanism turns



WATER RESISTANCE: a type of force that uses friction to slow things down through water