

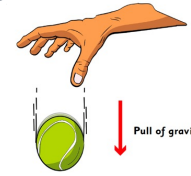
What are Forces?

Forces are **pushes** or **pulls** that act upon an object. There are different types of forces, such as **gravity**, **air resistance**, **friction** and **water resistance**. We push and pull objects to do many different things. When we push or pull objects we can move the object, change the shape of the object or make the object change direction.



Gravity

Gravity is the force that means that objects are pulled towards the centre of the Earth. All objects exert a gravitational pull. However, the strength of an object's gravitational pull depends on its mass. The Earth is a huge object with an extremely high mass, so its gravitational pull is very strong. The force of gravity keeps us on the ground. Gravity also causes objects to fall down if they are dropped. Sir Isaac Newton was a scientist who developed the first description of the force of gravity. Newton said that he started thinking about gravity after watching an apple fall from a tree, but it did not actually hit him on the head, as it is often claimed!



Key Vocabulary



AIR RESISTANCE: The force that acts in the opposite direction to gravity, slowing down objects moving through the air.



FORCE: A push or a pull that acts upon an object.



FRICTION: The force made when two surfaces rub together, slowing things down.



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



MECHANISM: A device which takes an input motion or force, and outputs a different motion or force.



RESISTANCE: An opposing or slowing force.



STREAMLINED: Designing an object in a particular way so that the amount of air/water resistance is reduced. Streamlined shapes push air or water around them, so they can travel faster.



WATER RESISTANCE: The force that makes it difficult to move through water.

Friction

Friction is a force created between two surfaces when they rub together. Friction creates heat and always slows down an object. Rough surfaces create more friction than smooth surfaces.

Friction is very useful. We need friction to create a good grip between the soles of our shoes and the ground, or between our car tyres and the road. At other times, friction can be something we want to reduce. Oil or lubricants are added to door hinges or the gears of our bicycles to reduce friction and make them move more easily.

Mechanisms

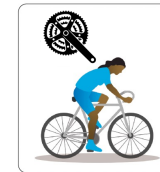
A mechanism is a device which takes an input motion or force, and outputs a different motion or force. The point of a mechanism is to make the job easier to do, they do this by allowing a smaller force to have a greater effect.



pulley



lever



gear

Air Resistance

Air resistance is a force that acts in the opposite direction to gravity. It acts between a moving object and the air molecules around it, slowing the object down.

Air resistance is a type of friction. Parachutes are used to increase air resistance and slow down the parachutist, so they can land safely. Modern cars and planes are streamlined in design to reduce air resistance, allowing them to move faster.

Water Resistance

Water resistance is also the force responsible for making it difficult for us to move through the water. It acts between a moving object and the water molecules around it, slowing the object down. Water resistance is a type of friction. Boats are streamlined in design to reduce water resistance, allowing them to move through the water faster. When we jump into a swimming pool, it is water resistance that prevents us from hitting the bottom. If we spread our body out as we jump into the water it will hit more water molecules than if we dive neatly into the water so cause more resistance, which is why divers make a streamlined shape.