

What is a force?

Forces

A force is a push or pull. Forces cannot be seen, but it is possible to see what forces do. When a force is applied to an object, it can change the object's speed, direction of movement or shape. Some forces are contact forces. This is where objects must be touching each other to apply a force. Non-contact forces, such as gravity and magnetism, act between two objects that are not touching each other. Some forces can be measured in newtons (N) using a force meter.

Friction

Friction is the force between two surfaces moving across each other. It acts in the opposite direction to movement and always slows down a moving object. Friction is in all places where two surfaces meet, but its force depends on their materials. Normally, smooth surfaces have less friction than rough surfaces. Friction can be a useful force. It keeps our shoes from slipping and stops car tyres from skidding. However, friction produces heat that can cause damage to materials that move across each other.

Gravity

Gravity is a non-contact force. It pulls objects towards each other. Anything with a mass can pull on another object. The bigger the object's mass, the bigger the gravitational pull. On Earth, gravity pulls everything downwards towards its centre because the Earth has such a large mass. This is why objects on Earth fall to the ground when dropped. The Sun is much larger than Earth, so its gravity causes Earth and the other planets in our Solar System to stay in orbit around it.

Mighty Metals Knowledge

Big Idea: Can I make an Iron Man with magnetic parts?

How do I know if a material is magnetic?

Magnetism

A magnet is a material or object that produces an invisible magnetic field. A magnetic field causes the force of magnetism that pulls on magnetic materials and attracts or repels other magnets. The two ends of the magnet are where the force is strongest. These are called the north and south poles. Two poles of the same type push each other away, which is called magnetic repulsion. Two opposite poles pull towards one another, which is called magnetic attraction. Earth has a molten metal core made from iron, which produces a magnetic field around the planet and magnetic poles in the north and south.

Glossary

air resistance	A force that slows an object down as it moves through the air.
attract	To pull or draw things together.
force meter	An instrument that is used to measure the strength of forces, in newtons.
friction	A force that is created when two surfaces rub against each other. It makes things
pull	A force that moves something towards a person, animal or object.
push	A force that moves something away from a person, animal or object.

Which materials are magnetic?

Metals

A metal is a solid material, found in rocks. Each metal has different properties but many are strong, tough and hard. Metals can be melted and shaped into different forms, such as screws and cars. They can also be used to conduct electricity and heat. This means they can be used in the home for pans or electric wiring. Some metals, such as iron and nickel, are magnetic. This property makes them useful for motors, computers and headphones. Metals can be mixed to make new materials with different properties. These are called alloys.

Iron is magnetic, so any metal with iron in it will be attracted to a magnet. Steel contains iron, so a steel paperclip will be attracted to a magnet too. Most other metals, for example aluminium, copper and gold, are NOT magnetic.



