Forces and Magnets

What is a force?

A force is simply a push or a pull that makes something move. Forces act in pairs that oppose each other. Forces cause objects to move, change their speed or change their shape.



push



pull

Contact forces

Contact forces happen when two objects or bodies physically touch each other. Frictional forces are a type of contact force.



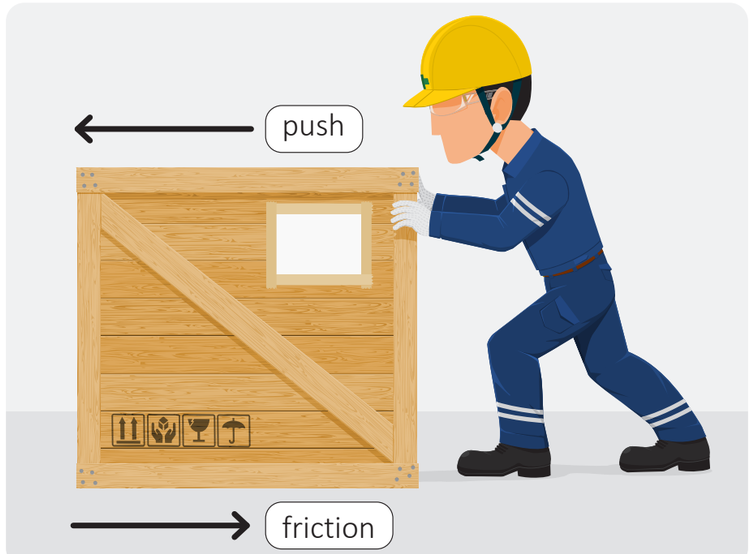
foot pushes ball



hand pulls fishing rod

Frictional forces

Friction is a force between two surfaces as they move across each other. Friction acts in the opposite direction to the movement. Friction always slows down a moving object. It also produces heat.



Sizes of frictional force

The size of a frictional force depends on the materials both surfaces are made from. The rougher the materials, the larger the frictional force. The smoother the materials, the smaller the frictional force.



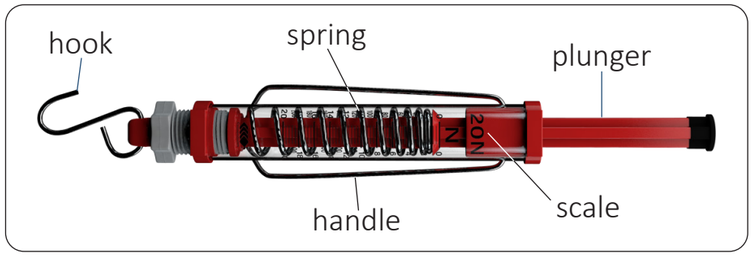
large frictional force



small frictional force

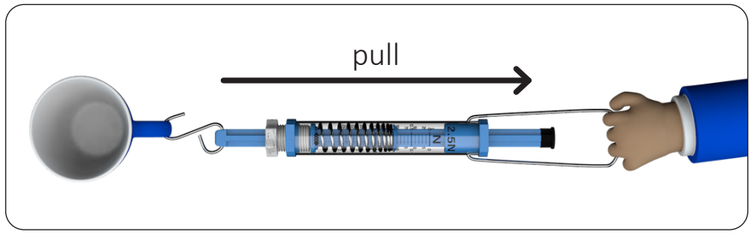
Force meters

A force meter is a piece of scientific equipment that measures force. It can also be called a newton meter or a spring balance. Forces are measured in newtons (N). A force meter has a handle, hook, plunger, spring and scale.



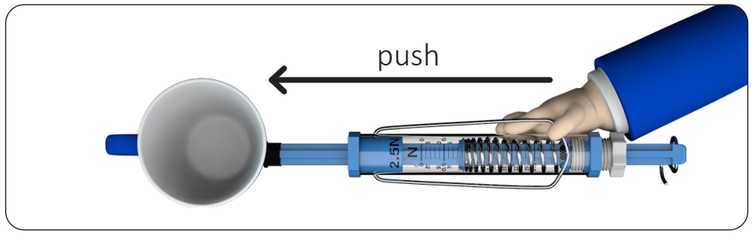
Measuring a pulling force

Attach the object to the force meter's hook. Pull the force meter gently by the handle. When the object starts to move, read the pulling force on the force meter's scale in newtons.



Measuring a pushing force

Place the force meter's plunger on the object. Push the force meter gently against the object until it starts to move. Read the pushing force on the force meter's scale in newtons.



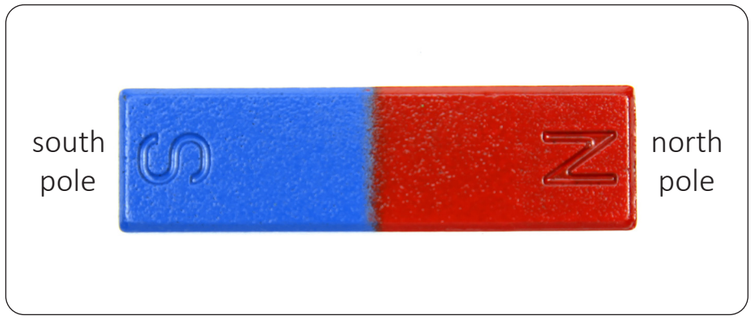
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Non-contact forces

Non-contact forces exert a push or a pull but have no direct contact with the objects they affect. We cannot see non-contact forces, but we can feel them. Magnetic forces are a type of non-contact force.

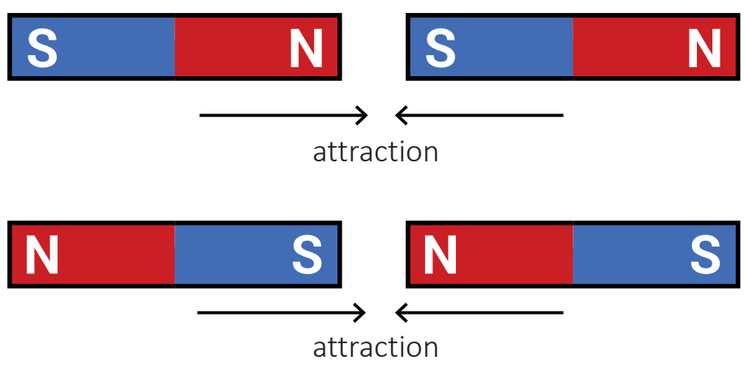
Magnets

Magnets have two ends called poles. The red end is the north pole and the blue end is the south pole.



Magnetic attraction

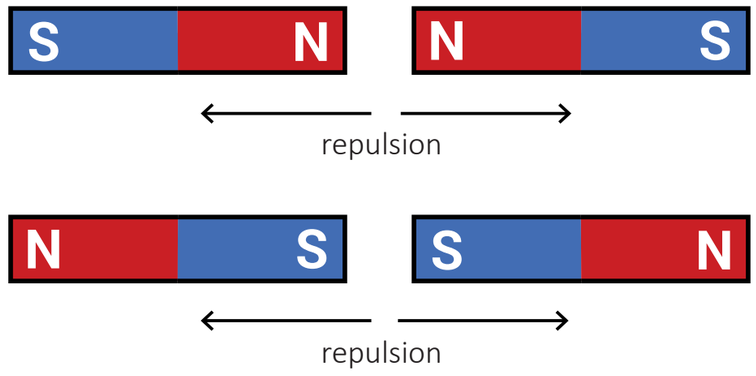
When different, or unlike, poles of two magnets are placed near each other, the magnets pull towards each other. This is called magnetic **attraction**.



Magnets also attract some materials towards them. These materials are known as magnetic. Materials that are not attracted to magnets are called non-magnetic.

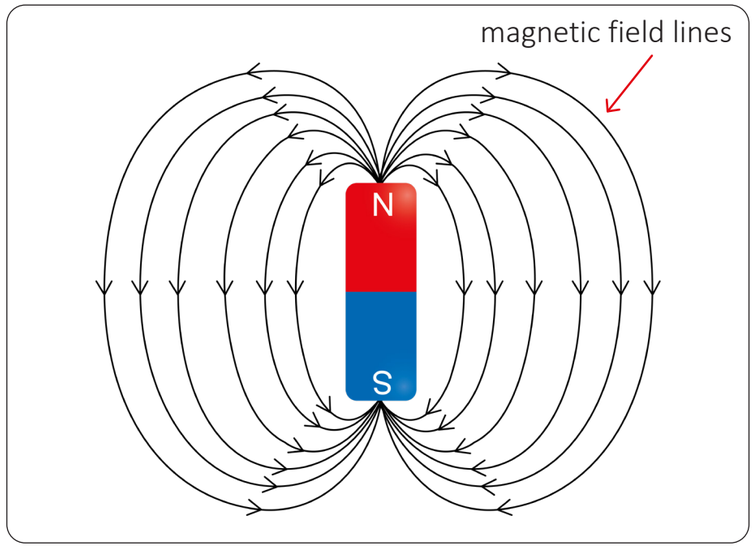
Magnetic repulsion

When the same, or like, poles of two magnets are placed near each other, they push apart. This is called magnetic **repulsion**.



Magnetic fields

The invisible forces we can feel when magnets are close together are caused by their magnetic fields. Magnetic fields are invisible but can be shown as lines on a diagram.



Magnetic Earth

The Earth acts like a huge bar magnet. It is surrounded by an invisible magnetic field called the magnetosphere. Without the magnetosphere, nothing could live on Earth. The magnetosphere is responsible for creating lights in the sky called aurora and also makes navigational compasses work.



aurora

Glossary

attraction	When one object moves towards another object.
aurora	A natural phenomenon characterised by coloured lights in the sky near the North and South Poles.
bar magnet	A rectangular magnet.
magnetic	Attracted to or acting as a magnet.
navigational compass	An instrument used for finding directions.
repulsion	When one object pushes another object away.

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