Year 3 – Spring 1 - Forces and Magnets

Science

By the end of this unit, you will have a better understanding of how force can affect a moving object. You will understand that some forces need contact between objects, but magnetic force works from a distance. You will be able to identify how a magnet attracts some objects and repels others. You will be able to identify the two poles of the magnet and how they interact. You will also be able to identify some magnetic materials and describe how magnets can be useful in everyday life.

Key Questions

What is a force?

What are magnetic materials?

How do two magnets interact with each other?

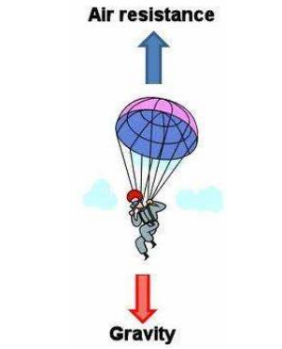
How can I identify the different poles of a magnet?

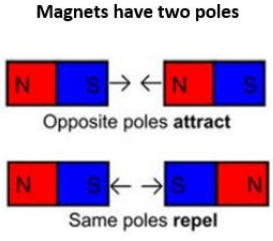
What affects the strength of different magnets?

How does a compass work?

Significant scientists	
Michael Faraday ***(1791-1867)*** 	Michael Faraday was an English scientist. In 1831, he discovered electromagnetic induction. This was a very important discovery for the future of science and technology.
Hans Christian Oersted ***(1771-1851)*** 	A Danish scientist who accidentally discovered that electricity and magnetism are connected when he brought a compass near a wire which had electricity running through it.

Key Vocabulary	
Force	A force is a push or a pull (or a combination of both e.g. a twist.) Forces may need **contact** to act or may act at a distance like magnetic force. (a **non-contact** force)
Water Resistance	A friction force that acts on a moving object as it travels through water, slowing the object down.
Air Resistance	A friction force that acts between a moving object and the air molecules around it, slowing the object down. Parachutes create lots of air resistance, slowing down the parachutist as they fall through the air.
Friction	Friction is a force created between two surfaces when they rub together. Friction created heat and always slows down an object. Rough surfaces create more friction than smooth surfaces.
Surface	The top layer of something.
Magnet	Magnets attract magnetic materials. Iron, nickel, cobalt and materials that contain these (e.g. stainless steel) are magnetic.
Magnetic Force	An invisible force that attracts magnetic materials.
Attract / Repel	To pull towards/ To push away.
Poles	Magnets have two poles: a north pole and a south pole.





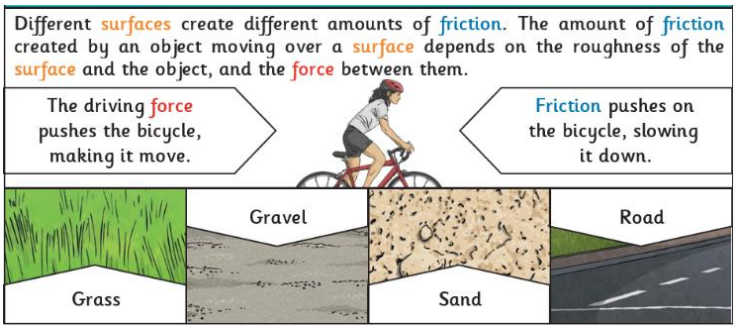
Objects moving on surfaces:

Ice skates have a sharp blade. This helps them move better on ice.

It is much harder to walk on ice in trainers.

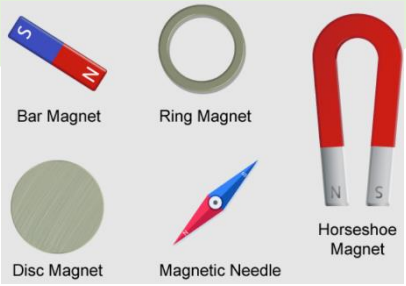
A bowling green is closely mown so the grass is short, so the balls roll easily.

Different surfaces create different amounts of friction. The amount of friction created by an object moving over a surface depends on the roughness of the surface and the object, and the force between them.



Different Magnets

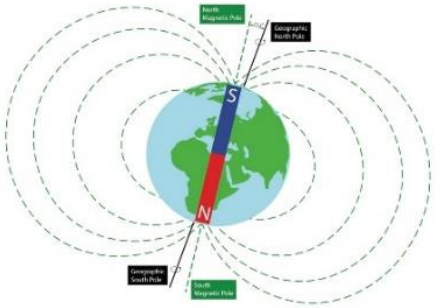
The three main types of magnets are temporary, permanent and electromagnets. Temporary magnets become magnetised in the presence of a magnetic field. They lose their magnetism gradually when the magnetic field is removed.



Magnetic Materials

We can sort objects into those that are magnetic and those that are not. All magnetic materials are made of metal **but** not all metals are magnetic.

The Earth's Magnetic Field



The core of the Earth is mostly made up of iron and nickel
which are magnetic materials.

The Earth has a magnetic field which extends thousands or miles into space. It helps to protect the Earth from solar winds. This interaction creates the Aurora Borealis and Aurora (the northern and southern lights).

Magnetic compasses use the Earth's magnetic field and point towards magnetic north.

Suggested Home Learning Ideas.

Find different examples of pushes and pulls that are used in everyday life. Present your findings in a creative way. You could label the direction of the force and whether the force starts an object moving or stops it moving.

Can you create a game that can be played using magnets or invent a new use for a magnet?

Which objects in your house are magnetic? Why?

Research how magnetic compasses work.