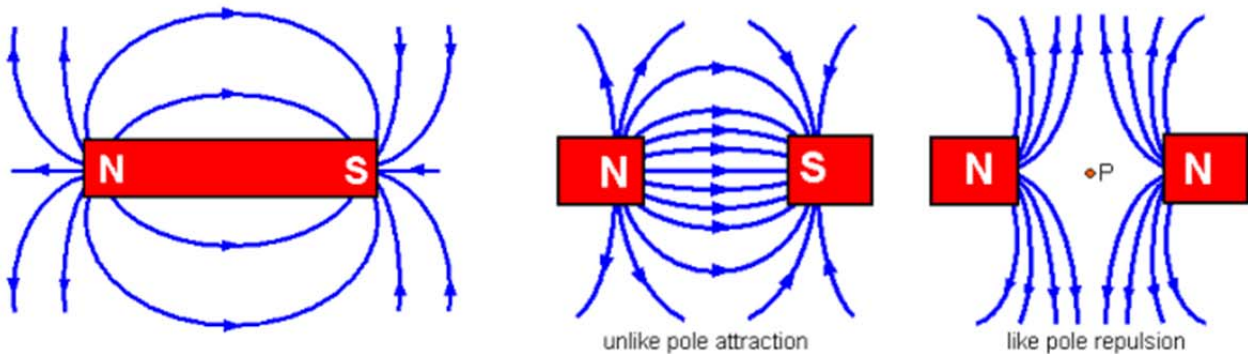


Year 8 Physics - Magnets

Knowledge

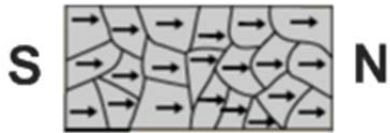
- Iron, nickel and cobalt are the only magnetic elements. Steel is an alloy, and is magnetic because it is mostly made of iron.
- Magnetic materials like iron are attracted to magnets.
- Two magnets can attract or repel each other depending on which poles are brought together.
- Like poles (e.g. N & N) repel, unlike poles (N & S) attract.
- The 'field' of a magnet is the region around the magnet in which a magnetic object experiences a force.
- We can represent the magnetic field using lines:



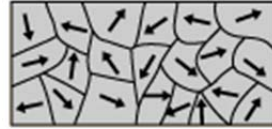
- The closer the field lines are together, the stronger the magnetic field is. The field is strongest near the poles of a magnet.
- The Earth has a magnetic field. If a bar magnet is freely suspended it will turn until it is aligned with the Earth's field. The north pole of the magnet points north. This is how compasses work.
- A current flowing in a coil of wire acts like a magnet – this is called an electromagnet.
- The field pattern of an electromagnet is similar to a bar magnet.
- Electromagnets can be switched on and off. An electromagnet can be made stronger by:
 - increasing the current in the coil
 - increasing the number of turns of wire around the coil
 - winding the coil around a core made from iron
- Iron is a 'soft' magnetic material – it can be magnetised, but loses its magnetism easily.
- Steel is a 'hard' magnetic material – once it is magnetised it retains its magnetism.
- Iron is used as the core for an electromagnet because it loses its magnetism quickly when the electromagnet is switched off. Steel is used to make permanent magnets (like bar magnets) because it retains its magnetism.

Year 8 Physics - Magnets

- A piece of steel is made of lots of small magnetic regions called domains. If the domains are all lined up, the steel is magnetised and acts like a magnet. If the domains are not lined up, the steel is not magnetised.



**domains aligned
steel is magnetised**



**domains not aligned
steel is not magnetised**

- A piece of steel can be magnetised by stroking it with a magnet. This aligns the domains in the steel.
- A steel magnet can be demagnetised by hitting with a hammer. This moves the domains out of alignment.

Understanding & Skills

- use a magnet to test whether another object is a magnet, or is magnetic or non-magnetic
- plot the field around a magnet using a plotting compass
- devise a method to test the strength of a magnet or electromagnet
- explain how devices containing electromagnets work – e.g.
 - an electric bell
 - a relay switch