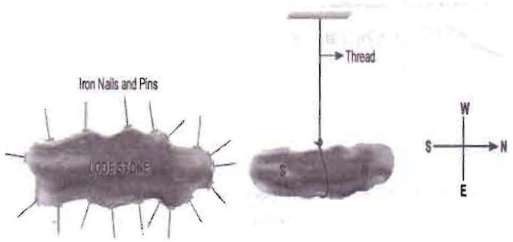
FUN WITH MAGNET

MAGNET

A mineral was discovered in the town of magnesia which was found to have a wondrous property. It could attract pieces of iron towards it. This mineral is called magnetite. Further it was found that thin strips of magnetite always align themselves in a particular direction when suspended freely In air. It was found that magnetite is mainly composed of oxides of iron (Fe30 4). Magnetite (Fe30.) is the world's first magnet. It is also called natural magnet.



(a) Types of Magnet :

(i) Natural magnet :

A magnet which occurs naturally and is not made by any artificial means is called a natural magnet.

Eg : Magnetite, Which is an ore of iron [Fe_3O_4].

(ii) Artificial magnet :

A substance to which properties of the natural magnet are imparted by artificial means is called artificial magnet.

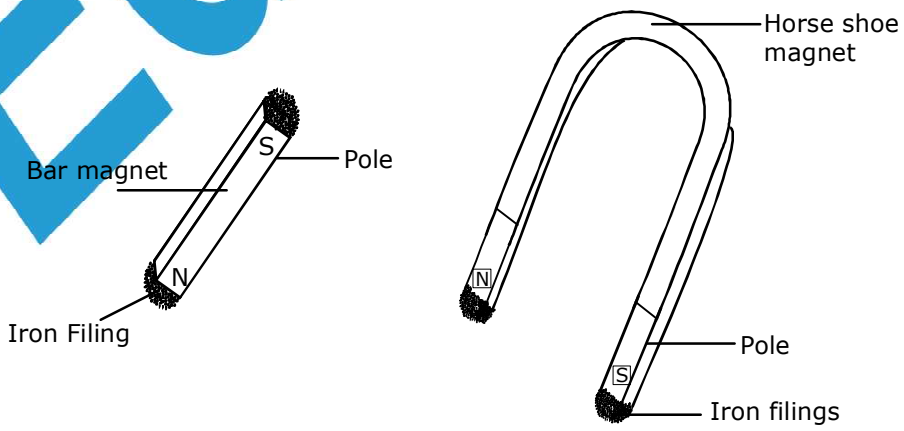
Eg : The magnets made from iron, steel, cobalt and nickel.

(b) Properties of a Bar Magnet :

(i) It attracts small pieces of iron towards itself.

Example :

Spread out some iron fillings over a sheet of paper. Now, move a bar magnet in the fillings taking care that all parts of the magnet moves through iron fillings and observe how the iron fillings are distributed all over the magnet. We will notice that most of the iron fillings cling near the ends of the magnet while there are a few iron fillings near the middle.



Repeat the experiment with a horseshoe magnet. This experiment explains the attractive property of magnets.

(ii) The magnetic pull seems to come from two points near the ends. These preferred regions of attraction are called the magnetic poles. We will find that all magnets have maximum attractive power at their poles. Poles of a magnet remain slightly inside from the end points. .

(iii) A freely suspended magnet always align itself along the north-south direction.
The end of the magnet that points towards the north is called the north pole (N-pole) and the other end of the magnet pointing towards the south is called the south-pole (S-pole).

(iv) Like poles of the magnets repel each other while unlike poles attract each other.

(v) Magnetic poles always exist in pair . .

(vi) Repulsion is the surest test of magnetism. Since a magnet can attract magnetic substances and magnet also but it will always repel the magnet only.

TEMPORARY AND PERMANENT MAGNETS

(a) Temporary Magnets :

The magnets which cannot retain their magnetism for a long time are called temporary magnets. The temporary magnets are made from the 80ft Iron.

Eg : Electromagnet

(b) Permanent Magnets :

The magnets which retain their magnetism for a very long time are called permanent magnets. The permanent magnets are generally made from steel. More powerful permanent magnets are made from ALNICO, an alloy of aluminium, nickel and cobalt or from ferrite. The ferrite made permanent magnets are quite strong.

TYPES OF SUBSTANCE

(a) Magnetic Substances :

Those substances that are attracted by magnets are called magnetic substances.

Eg. : Iron, Cobalt, nickel, steel etc.

(b) Non - Magnetic Substances :

Those substances that are not attracted by magnets are called non - magnetic substances.

MAKING A MAGNET

The methods by which an ordinary piece of any magnetic material, like iron or steel, can be made a magnet are single touch method, double touch method and electrical method. Let us study each method separately.

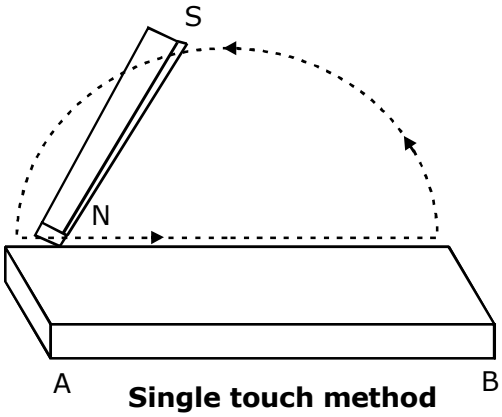
(a) Single touch method :

A piece of any magnetic material, like iron or steel (nail, knitting needle, bolt, etc.), is taken and placed on a bench or tale. A bar magnet is brought close to the magnetic material (say an iron piece AB). One end of the bar magnet is stroked against it, moving from end A to end B of the iron piece.

When the bar magnet reaches and B, It is lifted and the stroke repeated from end A to end B, it is lifted and the stroke repeated from end A to B. This procedure is repeated several times, keeping two things in mind.

(i) the same pole of the bar magnet should be used every time.

(ii) Strokes should be in the same direction.

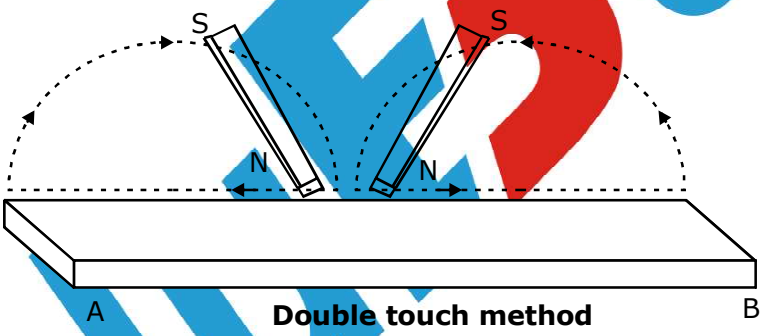


Single touch method

By Stroking the iron piece with the north pole of the bar magnet, end A becomes the north pole and end B the south pole.

(b) Double Touch Method :

The iron piece to be magnetised, say AB, is placed on a bench and two bar magnets of equal strength are taken. Here, the opposite poles of both the magnets are stroked, at the same time from the centre to the opposite ends of the iron piece being magnetized. This step is repeated may times.



Double touch method

Then, the end A of the iron piece becomes the north pole and end B becomes the south pole.