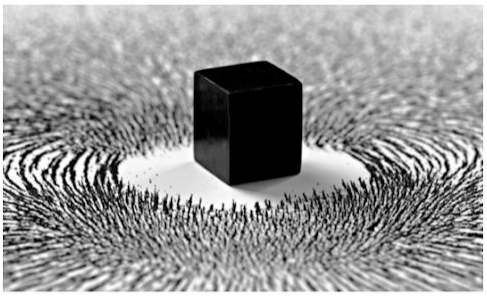
Magnetism

Magnets are generally of two types: **natural** magnets and **artificial** magnets. Natural magnets are naturally occurring magnets. Loadstone is an example of a natural magnet. Artificial magnets are the man-made magnets. Horseshoe shaped magnet and Bar magnet are the example of artificial magnets.



Properties of magnets

- A magnet has the ability to attract magnetic properties.
- A freely suspended magnet points North-South direction.
- Like poles repel and unlike poles attract.
- The magnetic poles cannot be separated by breaking the magnet.

Molecular theory of magnetism

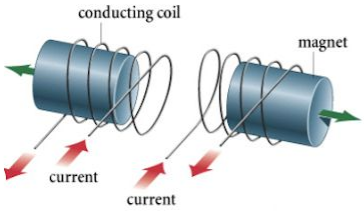
Molecular theory of magnetism states, "If molecular magnets align in a row, then the substance exhibits magnetic property. If they are kept haphazardly, they do not exhibit magnetic property." This is the molecular theory of magnetism.

If molecular magnets align in a row, then the substance exhibits magnetic property. If they are kept haphazardly, they do not exhibit magnetic property. This is the molecular theory of magnetism. The poles of a magnet cannot be separated even by breaking into pieces because they exist in a pair and every molecule of a magnet has poles in the pair.

Evidence of molecular theory of magnetism

1. The poles of a magnet cannot be separated.
2. A magnet has more force at its ends than in the middle.
   Reason: The molecular magnets are arranged in an open chain so that the north pole or the south pole of molecular magnets lie in the same direction which gives strong force at the poles whereas two opposite poles are arranged at the middle and the force cancel each other. So, poles have more force than the middle portion.
3. Only magnetic bodies can be magnetised.
4. A magnet gets demagnetized by
   - Dropping regularly from a certain height
   - Hammering a magnet
   - By heating a magnet
   - Rubbing the same pole, etc

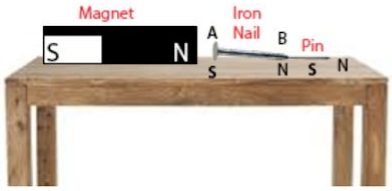
Magnetic Induction and Demagnetization



Magnetic Induction

Magnetic induction is the process by which substances like iron are magnetised by the magnetic field. The magnet causes the individual particles of the iron, which act like tiny magnets, to line up so that the sample as a whole becomes magnetised. Most of this induced magnetism is lost when the cause of magnetism is taken away.

Activity 1



1. Place an iron nail on the table.
2. Place small pin near the iron nail.
3. Now, put a bar magnet above the iron nail and see what happens.

You can see the iron nail gets magnetise and attract the pin towards it.

Demagnetization

Demagnetization means decreasing magnetic property or losing it completely. In the following conditions, magnet loses its property.

1. Dropping regularly from the table or height.
2. Rubbing against diamagnetic substances.
3. Bringing similar poles closer by applying an external force.
4. Using the magnet for making other magnets.
5. By heating the magnet.
6. By passing the magnet in a copper coil of alternating current (AC) and pulling it against the direction of the current.

Ways to prevent magnet from demagnetization:

1. Do not heat magnet or keep it near the hot object.
2. Do not drop the magnet.
3. Do not hit or rub magnet.
4. Do not let magnet rust.
5. Do not keep similar poles of magnet closer to each other.