

## Properties of a Magnet

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A Greek Philosopher, **Thales** of Melitus had observed as long back as 600 BC that a naturally occurring ore of iron attracted small pieces of iron toward it. This ore was found in the district of Magnesia in Asia Minor in Greece. Hence, the ore was named magnetite. The phenomenon of attraction of small bits of iron, steel, cobalt, nickel, etc. toward the ore was called **magnetism**. The iron ore showing this effect was called a **natural magnet**.

### Basic Properties of Magnet

1. A magnet attracts magnetic substances like iron, steel, cobalt, nickel toward it. When a magnet is put in a heap of iron fillings, they cling to the magnet. The attraction appears to be maximum at the ends of the magnet.
2. When a magnet is suspended freely with the help of a unspun thread, it comes to rest along the North-South direction. If it is turned from this direction and left, it again returns to this direction. The pole which points toward the geographic north is called North-pole and the pole which points toward geographic south is called South-pole.
3. Like poles repel each other and unlike poles attract each other. To show this, we suspend a bar magnet with the help of a thread. When we bring N pole of another magnet near the N pole of suspended magnet, we observe repulsion. Similarly, South-pole of one magnet repels South-pole of the other.
4. The force of attraction or repulsion  $F$  between two magnetic poles of strengths  $m_1$  and  $m_2$  separated by a distance  $r$  is directly proportional to the product of pole strengths and inversely proportional to the square of the distance between their centres.
5. The magnetic poles always exist in pairs, i.e. magnetic monopoles do not exist. In an attempt to separate the magnetic poles, if we break a magnet, we find new poles formed at the broken ends. If the two pieces are broken again, we find the broken ends contain new poles. Thus each piece, however small, is a complete magnet in itself. Even if a magnet is broken into molecules, each molecule shall be a complete magnet.