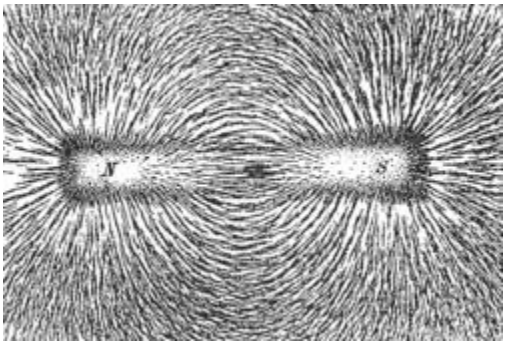
PROPERTIES OF MAGNETIC FIELDS

Changing magnetic fields, according to Faraday's law of induction [[12]], can induce an electric field and thus an electric current; similar currents can be induced by conductors moving in a fixed magnetic field. These phenomena are the basis for many electric generators and electric motors. See also [[13]]

Magnetic field lines



Magnetic field lines emanate primarily from the north pole of a magnet and curve around to the south pole. They can be revealed by scattering iron filings on a piece of paper over a magnet.

Pole labeling confusions

It is necessary to note that the labeling of north and south on a compass is in opposition to the labeling of the north and south pole of the Earth.

If you have two labeled magnets, it is clear that like poles repel, while opposing poles attract. However, this is clearly wrong when using a

compass to find the North Pole of the Earth, because the "north" end of the compass points to the "North" Pole.

By convention, the pole of a magnet is labelled according to the direction it points, hence when we speak of the "north pole" of a magnet, we really mean the "north-seeking pole". Magnetic field lines point from north to south of a magnet, and hence the natural magnetic field lines run from south to north along the Earth's surface. This choice, along with the choice of sign convention in the Biot-Savart law, is equivalent to choosing a sign convention for electric charge.

Rotating magnetic fields

A rotating magnetic field is a magnetic field which rotates in polarity at non-relativistic speeds. This is a key principle to the operation of alternating-current motor. A permanent magnet in such a field will rotate so as to maintain its alignment with the external field. This effect is utilised in alternating current electric motors. A good rotating magnetic field can be constructed using three phase alternating currents (or even with higher order polyphase systems). Synchronous motors and induction motors use a stator's rotating magnetic fields to turnrotors.

Source : http://engineering.wikia.com/wiki/Magnetic_field