PHYSICS
FORM 5
MAGNETISM

The Magnetic Force

A ferromagnetic substance is any substance that can become magnetised, that is, possesses magnetic properties. A ferromagnetic substance can be divided into domains. The direction of the magnetic force within each domain may be different such that the overall magnetic force is zero. (The magnetic forces of the domain will cancel each other.)

In a magnet the direction of the magnetic force is the same in each domain, that is, the magnetic force do not cancel off each other.

PHYSICS
FORM 5
MAGNETISM

Rules of Magnetism

1. Like poles repel each other
2. Unlike poles attract each other

Direction of a Magnetic Field In or Around A Magnet

The magnetic force around the magnet is represented by lines called magnetic field lines.

The direction of a magnet field line is defined as the direction of the force exerted on a freely moving north pole.

Magnetic Field

This is defined as the region around a magnet in which a magnetic force is exerted.

Neutral Point

This is a specific area within a magnetic field in which no magnetic force is exerted.

PHYSICS
FORM 5
MAGNETISM

Permanent Magnet

This is defined as a magnet which retains its magnetic properties for exceedingly long periods of time.

Temporary Magnet

These are magnets which lose their magnetic properties readily.

Temporary magnets are readily magnetised but permanent magnets are initially difficult to magnetise.

Magnetic Attraction

When a ferromagnetic substance is placed near to a magnet. All the magnetic forced within the domains line up in a direction that is similar to the magnetic field lines around the magnet.

Therefore from the above diagram it can be seen that the end of the metal block that is closest to the north pole of the magnet becomes the south pole.

Unlike poles attract each other and the metal block becomes attracted to the magnet.

PHYSICS
FORM 5
MAGNETISM

Mapping of the Magnetic Field

Experiment 1

Method:

1. The experiment was set up as shown above. (Note the paper is not in contact with the magnet)
2. Iron filings was sprinkled evenly on top of the paper.
3. The paper was then tapped gently to allow the iron filings to align themselves with the field lines.

PHYSICS
FORM 5
MAGNETISM

Experiment 2

Method:

1. The outline of the magnet was traced on a sheet of paper.
2. A north pole compass was brought near to the magnet and the position of arrow head and arrow tail was marked initially.
3. The compass is then moved such that the arrow tail is located at the previous position of the arrow head.
4. The new position of the arrow head is then marked.
5. This process is continued until the arrowhead of the north pole compass returns to the magnet.
6. A line is then drawn connecting all the points.
7. This process is repeated for several starting points around the magnet.

Magnetic Field Patterns