



Dr. Bbosa Science

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The Science Foundation College Kiwanga- Namanve
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Magnetism

A **magnet** is a piece of metal which has ability to attract other metals.

Magnetic substances are those substances which can be attracted by a magnet, for example iron, steel, cobalt and nickel

The substances that cannot be attracted by a magnet are described as **nonmagnetic substances**, for example sand, wood, pen and so on.

The ends of a magnet are called **poles**, one being **North Pole (N)** and the other **South pole (S)**

Types of magnets

There are two types of magnets, these are

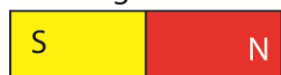
- Natural magnets e.g. **lodestone or magnetite** and **earth**. All natural magnets are permanent magnets
- Artificial magnets, these may be permanent or not.

Shapes of magnets

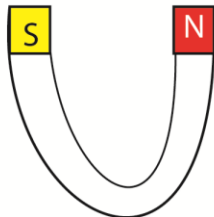
The common shapes of magnets are shown below

Common shapes of magnet

Bar magnet



Horse shoe magnet



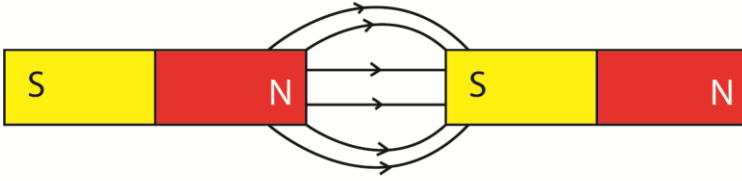
Needle magnet



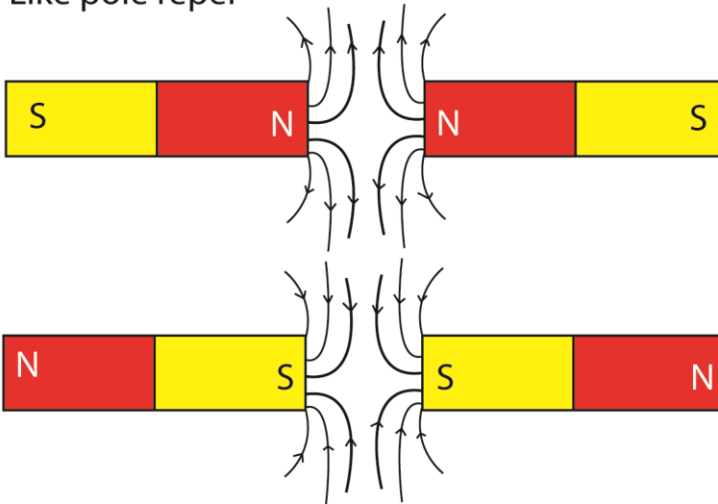
Properties of magnets

1. Unlike poles attract while like pole repel.

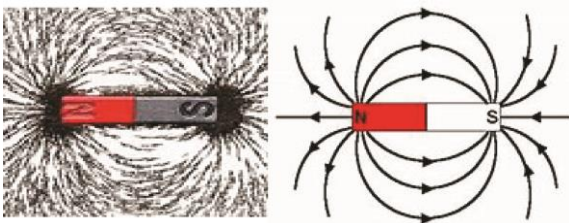
Unlike pole attract



Like pole repel



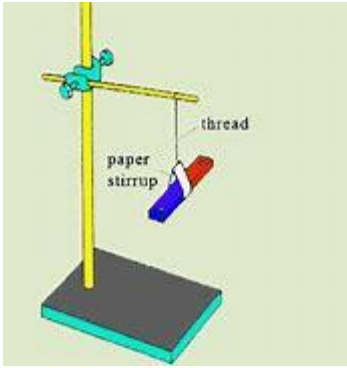
2. A magnet has a magnetic field lines which is covered with magnetic field lines running from the North to the South Pole.



Magnetic field

Magnetic field is an area around a magnet in which its magnetic field. This means that a magnet cannot attract magnetic objects outside the magnetic field.

3. Freely suspended magnet points in the N-S direction



4. The strength of a magnet (magnetism) is greatest at the pole
5. Magnetism can pass through nonmagnetic objects

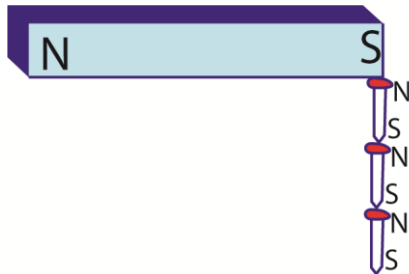
Magnetization

It is a process of making metals acquire the force of magnet (magnetism)

Methods of magnetization

1. Induction

It is when a magnetic bar or nail is put on a magnet and is able to attract other magnetic substances, if a magnet is removed the nail also loses its magnetism



2. Electric method

It is when electricity is used to magnetize a magnetic bar. The more volts used the stronger the magnet. The more coil wound around a bar, the stronger the magnet. The nail or iron bar acquires magnetism only when the circuit is complete. The magnet formed by electric method is called electromagnet.

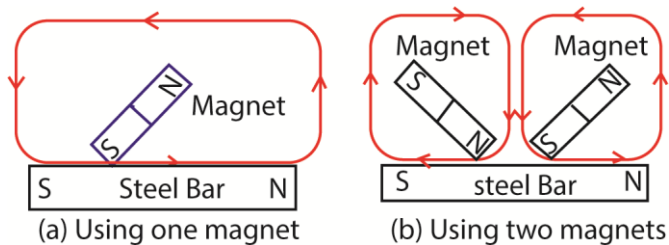


3. Single Touch method

It is when a single (one) magnet is used to magnetize a metallic bar by stroking. The more times you stroke the iron bar, the more powerful magnet it will become. The pole at the magnet being used to stroke the Iron bar

4. Double touch

In this method two magnets are used to magnetize, each one has a different pole exposed to stroke. Both bar magnets are brought into contact at the center of the bar at the same time and drawn apart maintain the poles of contact with the bar. the bar will be magnetized but the pole will be opposite of the ones that were used to magnetize that end of the bar.



Demagnetization

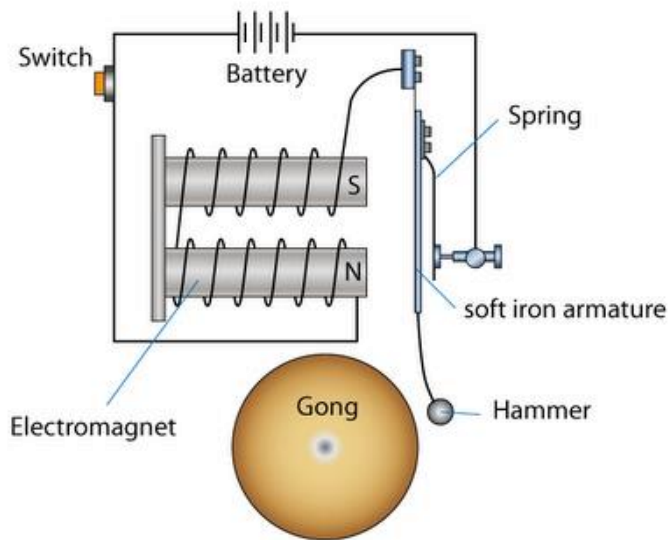
This the method of making a magnetic object lose its magnetism

- (i) Heating a magnet to red hot
- (ii) Hitting a magnet on a hard surface repeatedly
- (iii) Keeping like poles of magnets facing each for a long time
- (iv) Passing a magnet through a coil of alternating current for a long time
- (v) Keeping a magnet facing in East-West direction for a long time

Uses of magnet

For manufacturing compasses, generators, microphones, refrigerators, electric bell.

Electric bell



How does electric magnet work?

- The switch is pressed and current flows through the circuit.
- The electromagnet is powered and generates a magnetic field that attracts the iron strip towards it.
- The hammer strikes the gong (bell).
- When the striking arm strikes the gong, the contact is broken and current stops flowing through the circuit. The spring pulls back the hammer.

Revision questions and answers

1. (a) What is a magnet?

An object that has ability to attract other magnetic metals

- (b) Give one example of how a doctor in a hospital can use a magnet.

To keep razor blades, dissection knives

To remove metallic substance from the eyes

- (c) Give two items found in homes which make use of magnets.

Loud speakers

Electric bell

Television

2. In the diagram below, when the nail was brought nearer to the magnet it was attracted as shown Use the diagram to answer questions (a) to (d) below.



- (a) How does the nail get magnetized?

By induction

- (b) Name the pole marked L.

North Pole

- (c) Which other method can be used to magnetize the nail without using a magnet?

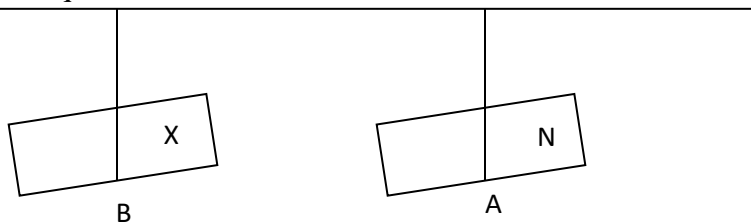
Electrical method

- (d) Name the type of a magnet in (c)

Electromagnet

Two magnets A and B were suspended as shown in the diagram below

Use it to answer question 3.



3. If the pole marked N magnet A is the North Pole, what is the pole marked X on magnet B?

North Pole

4. (a) Give any one reason why a magnet cannot attract pieces of wood.

Wood has no magnetic properties

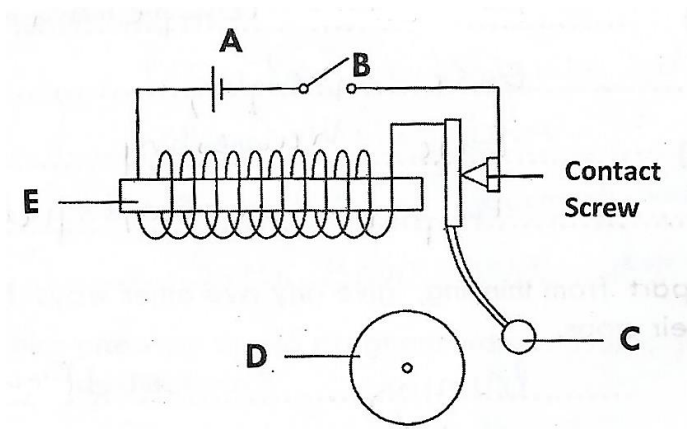
(b) Give any three practices that can lead to the destruction of a magnet

- (i) **Heating**
- (ii) **hammering**
- (iii) **Storing east -west direction**

5. State the compass direction in which a freely suspended magnet will rest.

North-south direction

Study the diagram of an electric bell below and use it to answer question 6.



6. 55(a) Name the part marked A and C

- (i) **A Dry cell**
- (ii) **C hammer**

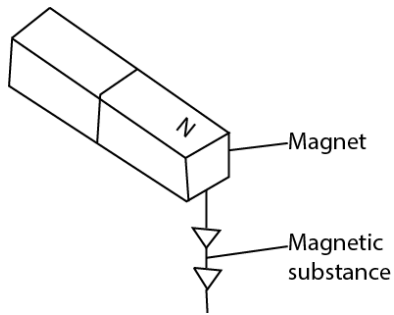
(b) What will happen to E when B is closed?

Become magnetized

(c) How useful is part D on the electric bell?

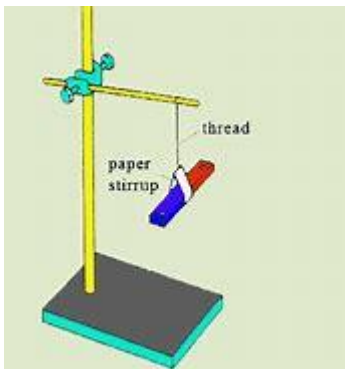
Produce sound

7. Name the method of making a magnet shown in the diagram below



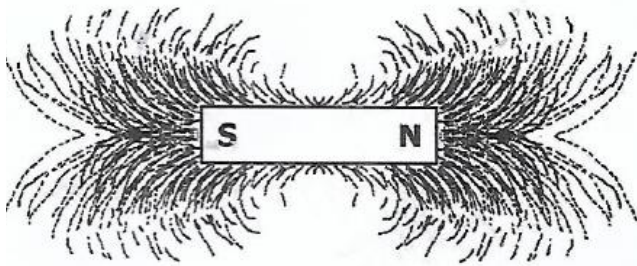
Induction

8. Which property of a magnet enables a magnet compass to work?



A freely suspended magnet rests in north-south direction

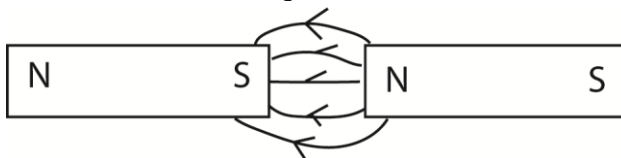
9. The diagram below shows a bar magnet with iron fillings around. Study and use it to answer the question that follows



Which property of magnets is shown in the diagram?

A magnet has a magnetic field lines

10. The diagram below shows two bar magnets placed close to each other. Use it to answer the question that follows



Use arrows to show what happens to the two bar magnet