

NOTES

CLASS 6

SCIENCE

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FUN WITH MAGNET

What is Magnet?

Objects, which attract magnetic materials like cobalt, nickel and iron are called as a magnet.

Magnetic Materials: Cobalt, nickel and iron are some examples of Magnetic Materials. These materials easily attract a magnet.

Non-magnetic Materials: Aluminium, zinc, wood, and rubber are called the Non-magnetic Materials, as these materials are not attracted towards the magnet even when they are brought closer to the magnets.



Types of Magnets

There are different types of magnets and are classified based on their shapes. The different types of magnets include – bar magnet, dumb-bell shaped magnet, horseshoe magnet, cylindrical magnet, etc.

Magnetic compass

The magnetic compass is a simple device, which has been used from the ancient times by the sailors and other travellers to find directions. A magnetic compass is composed of a small box with a glass top and a magnetic needle, which moves and indicates the directions.

Introduction Magnet and magnetite

- Substances that attract materials like iron, nickel etc.
- Magnets occur naturally as a particular type of rock.
- This rock is called magnetite.

Discovery of Magnets

Greeks used the term magnet in six hundred B.C. for the mysterious stone that seemed to attract iron and other materials. It was first discovered by a Greek shepherd named Magnes (hence the terminology), when his stick that had an iron end got stuck to a rock.

Magnetic and non-magnetic materials

- Materials that get attracted towards a magnet are called magnetic materials. E.g. iron, cobalt or nickel.
- Materials that do not get attracted by a magnet are nonmagnetic materials. E.g. wood, plastic etc.

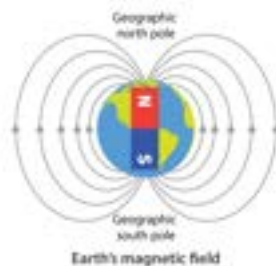
Poles of a Magnet

Every magnet is bipolar, i.e. they have 2 poles at the extremities. This can be seen by spreading iron filings around a magnet. These filings arrange themselves in a pattern which is mostly dense towards the two ends of a magnet. These poles are called North and South poles of a magnet.



Magnetic poles of the Earth

- Earth has 2 geographic poles, north and south poles.
- They are the Arctic (South pole of the earth's magnet) and Antarctica (North Pole of the earth's magnet).
- Earth's magnetic poles are near but not exactly in the same place as the geographic poles.
- A magnetic compass aligns itself towards the magnetic north pole of the earth.



Using magnets to find directions

- When a bar magnet is suspended freely by a thread, it aligns itself to the direction of North.
- Travellers have used this property of magnets for ages to find directions.
- A compass is a device with a magnetized needle pivoted inside a box covered by glass, which points to the direction of north and is a useful tool for finding directions.



Making a magnet

- The magnetic material can be made into a magnet by rubbing a magnet on the surface of the magnetic material.
- This creates an influence, where the particles inside the material align themselves like the poles of a magnet.

Microscopic cause of magnetism

- Each particle in a magnetic material behaves somewhat like a bar magnet.
- They are normally aligned randomly within the material.
- But under the influence of a stronger magnet, they realign themselves according to the stronger magnet's field.

Loss of magnetic property

The magnetic property of a magnet is lost on:

- Heating
- Hammering or hitting
- Dropping

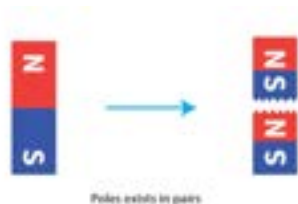
Attraction and Repulsion between Magnets

Like poles repel each other, while unlike poles attract each other.



Inseparable Poles

- Magnetic poles always exist in pairs.
- If you cut a bar magnet in half, it forms 4 poles, each half having a north and a south pole.



SOME IMPORTANT QUESTIONS

Question 1: Fill in the blanks in the following



(i) Artificial magnets are made in different shapes such as _____, _____ and _____.

(ii) The materials which are attracted towards a magnet are called _____.

(iii) In olden days sailors used _____ to find direction by suspending a

(iv) A magnet always has _____ poles.

(v) Paper is not a _____ material.

Answer 1:

(i) bar magnets, horseshoes and cylindrical magnets. (ii) called magnetic. (iii) to suspend a piece of magnet. (iv) two poles. (v) magnetic material.

Question 2: North pole of a magnet can be determined by

(a) Another magnet has its poles marked as the North pole and South pole.

(b) Using iron filings.

(c) Another magnet, no matter whether the poles are marked or not.

(d) Using an iron bar.

Answer 2: (a) Another magnet has its poles marked as the north and south poles.

If another magnet with marked poles with the north pole repelling the pole of the unmarked magnet repels, then the pole is north.

Question 3: A bar magnet is immersed in a heap of iron filings and pulled out. The amount of iron filling clinging to the magnets

(a) The North Pole is almost equal to the South Pole.

(b) the North Pole is much more than the South Pole.

(c) The North Pole is much less than the South Pole.

(d) Magnet will be the same all along its length.

Answer 3: (a) the North Pole is almost equal to the South Pole.

A magnet has equal strength on both poles.

Question 4: Write any two properties of a magnet.

Answer 4: Two properties of magnets are:

1. The magnet attracts metals, for example, nickel, cobalt, iron etc.
2. There are two poles of a magnet where, like poles of a magnet, repel each other, and unlike poles, attracts each other.

Question 5: Fill in the given blanks

(i) When a bar magnet is broken then each of the broken parts will have poles.

(ii) In a bar magnet, magnetic attraction is near its ends.

Answer 5:

(i) two poles. (ii) In a bar magnet, magnetic attraction is the maximum near its ends.

Question 6: Choose the correct option in the following questions:

(i) Which is an example of a magnetic substance?

(a) Iron (b) Cobalt (c) Nickel (d) All of these

Answer: (d) All of these (All of these are attracted towards a magnet as all of them are metals.)



(ii) Magnets have a shape

(a) cylindrical (b) horseshoe (c) ball ended (d) all of these

Answer: (d) all of these (Magnets come in various shapes, including bar magnets.)

(iii) When a bar magnet is brought near iron dust, most of the dust sticks

(a) at the middle and ends (b) equally everywhere (c) near two ends (d) near the middle

Answer: (c) near two ends (Magnetic field intensity is maximum at the poles of a bar magnet; hence most of the iron dust sticks to the poles.)

(iv) A freely suspended bar magnet rests in

(a) East-west directions (b) North-south directions (c) Any direction by chance (d) Upside down

Answer: (b) north-south directions

A bar magnet will always rest in the N-S direction when it's suspended freely.

(v) Attraction is observed between the poles of two bar magnets in the case of :

(a) S-pole of one magnet with S-pole of other

(b) N-pole of one magnet with S-pole of other

(c) N-pole of one magnet with N-pole of other

(d) All of these cases will show attraction

Answer: (b) N-pole of one magnet with S-pole of other

In a magnet, unlike poles attract and like poles repel each other.

(vi) Which is a natural magnet?

(a) Magnetite (b) Hematite (c) Bakelite (d) Copper

Answer: (a) Magnetite (Magnetite is a natural magnet discovered around 800 B.C.)

(vii) Choose the wrong statement

(a) Heat can destroy the magnetic properties of magnets.

(b) Different magnets are made up of different materials and come in different shapes.

(c) There is a maximum attraction in the middle area of a magnet.

(d) Magnetite does not show any magnetic properties.

Answer: (d) Magnetite does not show magnetic properties. (Magnetite does not show magnetic properties.)

(viii) The magnetic properties of a magnet cannot be destroyed by

(a) heating (b) dropping on a hard surface (c) hammering (d) boiling

Answer: (d) boiling (Magnetic properties cannot be destroyed by boiling because magnetic properties are destroyed by hammering, dropping on a hard surface and heating.)

(ix) Which ends of a magnet are called magnetic poles?

(a) only North pole (b) North and south pole (c) South pole (d) Self demagnetization

Answer: (b) North and south pole (Magnetic poles are called the North pole and the South pole.)

(x) Magnets attract

(a) plastic (b) wood (c) paper (d) iron

Answer: (d) iron (Iron is attracted by a magnet.)

Question 7: How is a compass used to find directions?



Answer 7: A compass always points in the north-south direction. The compass has a red arrow present in the compass, indicating the north direction. If we get to know the north direction, then we can easily find out the other direction.

Question 8: Which arrangement is beneficial to store a U-shaped magnet? How is this different from storing a pair of bar magnets?

Answer 8: For storing a U-shaped magnet, a soft iron bar is placed on the tip of a U-magnet. To divide the bar magnets, which are placed in the same direction, a wooden block is placed between them. It is then stored in a wooden box. By following this method, the magnetic properties and strength of the magnet can be prolonged for a longer time.

Question 9: What do you mean by magnetization?

Answer 9: Magnetisation is defined as the process of creating an artificial magnet with the help of a magnet. To transform a non-magnetic material into a magnet, firstly, we must place the non-magnetic material, for example, an iron nail, on a table. Then move a strong magnet along the lengths of the iron nail without any disruptions. We must move the magnet in the same direction around 40-50 times until the iron nail becomes magnetised.

Question 10: What are the precautions to be taken care of while handling magnets?

Answer 10: Precautions to be taken while handling magnets for ensuring their magnetic strength for a longer time duration are:

1. Magnets are advised to be always stored in pairs with opposite poles facing each other.
2. Magnets must never be fired, hammered or thrown from a great height. This will cause the magnetic property to weaken.
3. A piece of the magnet must be kept across from horseshoe magnets to avoid weakening of its magnetism.
4. Magnets must be kept away from television, mobiles, CDs, laptops etc.

Question 11: State whether true or false. If false, correct the statement.

1. **Magnet can be used to magnetise a non-magnetic material.**

Answer: False.

A magnet can be used to magnetise other magnetic materials.

2. **Unlike poles of a magnet, they always repel each other.**

Answer: False.

Unlike the poles of a magnet, they always attract each other.

3. **Like poles of a magnet always repel each other.**

Answer: True

4. **A bar magnet has equal magnetism all around its surface.**

Answer: False.

A bar magnet has maximum magnetism at the poles and least on the centre of the body.

5. **Magnetite is a rock with magnetic properties.**

Answer: True

Question 12: Boojho dipped a bar magnet in a heap of iron filings and pulled it out. He found that iron filings got stuck to the magnet.





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