Chapter 15: Fun with Magnets

EXERCISE [PAGE 111]

Exercise | Q 1.1 | Page 111
How will you do this?
Determine whether a material is magnetic or non-magnetic.

SOLUTION

If a material sticks to a magnet, then it is a magnetic material otherwise it is a non-magnetic material.

Exercise | Q 1.2 | Page 111
How will you do this?
Explain that a magnet has a certain magnetic field.

SOLUTION

A magnet has a certain magnetic field which can be demonstrated using the below activity.

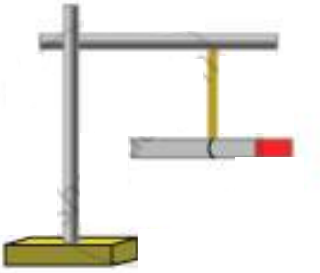
Take a drawing cardboard and sprinkle some iron filings on it. Notice the position of the iron filings as a whole. Now, take a bar magnet and slowly bring it below the cardboard. You will observe that the iron filings tend to attract towards the magnet and align themselves as shown.

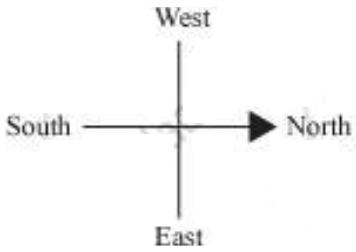
It represents that the magnet exerts a force around its body with a stronger force near the two poles. Also, this regular pattern of the iron filings on the board represents the lines of magnetic field. Thus, a magnet has a certain magnetic field which can be represented by curved lines around a magnet.

Exercise | Q 1.3 | Page 111
How will you do this?
Find the north pole of a magnet.

SOLUTION

Tie a thread to the centre of a magnet and hang it from a stand as shown. Wait till the magnet settles itself.





Exercise | Q 2.1 | Page 111
Which magnet will you use?
Iron is to be separated from trash.

SOLUTION

Electromagnet can be used to separate iron from trash.

Exercise | Q 2.2 | Page 111
Which magnet will you use?
You are lost in a forest.

SOLUTION

Bar magnet or loadstone can be used to find the direction in the forest. This is because a bar magnet, when suspended freely, always rests in north-south direction.

Exercise | Q 2.3 | Page 111
Which magnet will you use?
A window shutter opens and shuts continuously in the wind.

SOLUTION

Permanent magnet can be used to stop the continuous shuttering of the window in the wind.

Exercise | Q 3.1 | Page 111
Select the appropriate word and answer the question:

If a bar magnet is hung by a thread tied at its center, its north pole becomes steady in the direction of the _____ Pole of the earth.
(South, north, east, west)

SOLUTION

If a bar magnet is hung by a thread tied at its center, its north pole becomes steady in the direction of the **north** pole of the earth.

Exercise | Q 3.2 | Page 111

Select the appropriate word and answer the question:

If a bar magnet is cut into equal pieces by cutting it at right angles to its axis at two places, _____ bar magnets are formed, and a total of _____ poles are formed.
(6,3,2)

SOLUTION

If a bar magnet is cut into equal pieces by cutting it at right angles to its axis at two places, **3** bar magnets are formed, and a total of **6** poles are formed.

Exercise | Q 3.3 | Page 111

Fill in the blanks with the appropriate word.

There is repulsion between the _____ poles of a magnet, and attraction between its _____ poles.
(opposite, like.)

SOLUTION

There is repulsion between the **like** poles of a magnet, and attraction between its **opposite** poles.

Exercise | Q 3.4 | Page 111

Fill in the blanks with the appropriate word.

When magnetic material is taken close to a magnet, the material acquires _____.
(permanent magnetism, induced magnetism)

SOLUTION

When magnetic material is taken close to a magnet, the material acquires **induced magnetism**.

Exercise | Q 3.5 | Page 111

Fill in the blank with the appropriate word.

If a magnet attracts a piece of metal, that piece must be made of _____.
(any other metal but iron, magnetic material or iron, non-magnetic material)

SOLUTION

If a magnet attracts a piece of metal, that piece must be made of **magnetic material or iron.**

Exercise | Q 3.6 | Page 111

Fill in the blank with the appropriate word.

A magnet remains steady in a _____ direction.
(east-west, north-south)

SOLUTION

A magnet remains steady in a **north-south** direction.

Exercise | Q 4.1 | Page 111

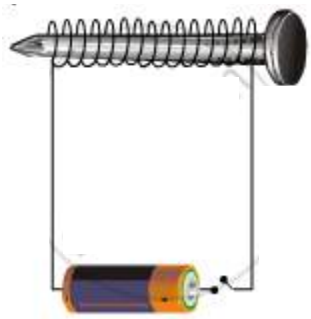
Write the answer in your word.

How is an electromagnet made?

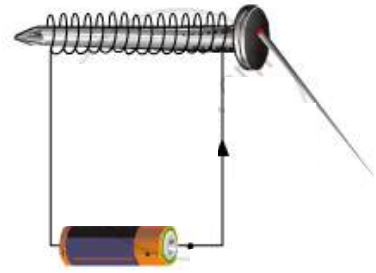
SOLUTION

For the construction of an electromagnet, we require an iron nail, a long insulated copper wire, a battery and a switch.
The long insulated copper wire is first wound on the iron nail. Then the two free ends of the wire is connected to the battery and the switch as shown. Now, when the switch is turned on, current flows through the circuit. Due to this flow of current, the insulated copper wire and iron nail acts as an electromagnet. Now, if iron pins are brought close to this set-up, they stick to the iron nail.
As soon as the current stops flowing in the circuit, the iron nail loses magnetism and the pins fall off.

Case: Switch open



Case: Switch close



Exercise | Q 4.2 | Page 111

Write the answer in your word.

Write the properties of a magnet.

SOLUTION

Properties of a magnet are following:

- A magnet has two poles known as North-Pole and South-Pole.
- A magnet, when suspended freely, always rests in north-south direction.
- A magnet has an attractive properties i.e. it always attracts magnetic materials towards it.
- Like poles of magnets repel each other whereas unlike poles attract each other.
- The two poles of a magnet are inseparable. It means that when a magnet is cut into two parts, two independent magnets are formed.
- Magnetic force of a magnet is concentrated at its two poles.

Exercise | Q 4.3 | Page 111

Write the answer in your word
What are the practical uses of a magnet?

SOLUTION

Magnets have very wide range of uses:

- **Magnetic compass:** With the help of a magnetic compass, you can know the directions at a particular place. The red end of the needle indicates the North direction.

A simple magnetic compass

- **Magnets in daily life:** Magnets are used in refrigerator doors, as pin holders, in screwdrivers, etc.
- **Magnet in junkyard:** In the junkyard, you will see that a large magnet is attached at the bottom of the arm of a crane. The arm moves over a heap of junk and the magnet collects objects made of iron. The magnet used in a junkyard crane is not a natural or a permanent magnet. It is a temporary magnet, which is called an electromagnet.

- **Magnet in electrical appliances:** Magnets are also used in many electrical appliances such as electric bells, telephone, telegraph, radio, loudspeaker, fans, electrical motors, electric generator, etc.

- **Magnet for security:** While going to some important places like temples, buildings, airport etc. you will see equipments for inspection of people entering these places. These equipments uses magnets and are known as Metal detectors. These metal detectors are also used in food-processing industry to detect any unwanted iron/steel objects mixed unknowingly in food stuff.