

# MAGNETS AND MAGNETIC FIELD

## WHAT ARE MAGNETS?

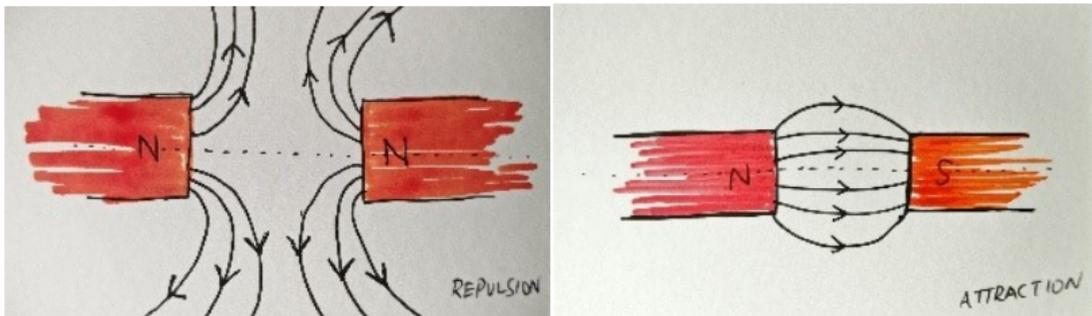
1. Magnet is a piece of iron or other material which exhibits properties of magnetism, such as attracting other iron-containing objects or aligning itself in an external magnetic field.
2. **Magnets have magnetic field around them.** Study of magnetic field help us explain the properties of magnets.
3. With the use of electricity, we can create artificial magnet called **electromagnet**, which have a variety of use. Magnets are used in many **gadgets**; the earphone is just one of them. Here, we take up magnets, magnetic field, properties of magnetic field and electric motor
4. A **bar magnet** is a rectangular piece of iron, steel or magnetic material, that shows permanent magnetic properties.
5. A compass needle is a small **bar magnet**. The end pointing towards north is called north seeking or north pole. The other end that points towards south is called south seeking or south pole.

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## PROPERTIES OF MAGNETS

6. Magnets show the following two properties:

(i) **like poles repel** (north pole repels north pole and south pole repels south pole), while



(ii) **unlike poles of magnets attract each other** (north pole attracts south pole and vice versa)

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## WHAT ARE MAGNETIC FIELD

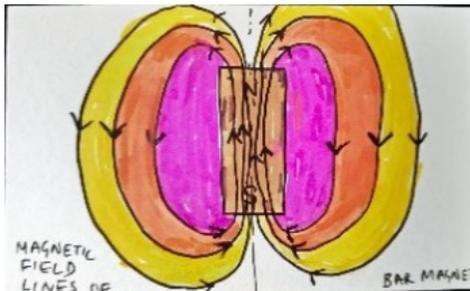
7. The region surrounding a magnet, in which the force of the magnet can be detected, is said to its **magnetic field**. The iron filings when sprinkled around a bar magnet arrange themselves in a pattern. The iron filings experience a force. The force thus exerted makes iron filings to arrange in a pattern.
8. The lines along which the iron filings align themselves in a magnetic field represent **magnetic field lines**. **Magnetic field lines** are pictorial representation of magnetic field around a magnet. You can also draw the field lines of a bar magnet using a small compass.
9. **Magnetic field** is a quantity that has both **direction** and **magnitude (ie Vector quantity)**.

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## PROPERTIES OF MAGNETIC FIELD

### 10. **Magnetic field lines have the following properties:** -

- (i) By convention the **magnetic field lines** emerge from north pole and merge at the south pole (*look at the figure*). Inside the magnet, the direction of field lines is from its south pole to its north pole. Thus, the magnetic field lines are closed curves.



- (ii) The **relative strength** of the magnetic field is shown by the **degree of closeness of the field lines**. The field is stronger where the field lines are crowded (more

field line per square unit/magnetic field lines are closer to each other).

- (iii) **No** two field-lines cross each other. (*If they did, it would mean that at the point of intersection, the compass needle would point towards two directions, which is not possible.*)

