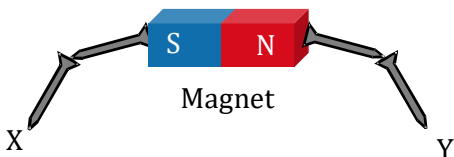
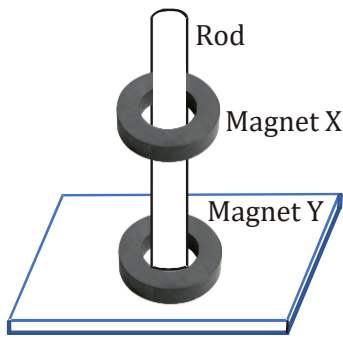


EXERCISE-01

Multiple choice questions

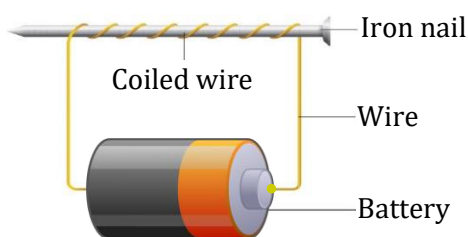
- Earth can be thought of as a giant magnet because it
 - (1) orbits around the Sun.
 - (2) has a magnetic field.
 - (3) rotates on its axis.
 - (4) has a moon.
- Which of the following is not true about permanent magnets?
 - (1) They have two poles.
 - (2) They are surrounded by magnetic fields.
 - (3) They have magnetic force.
 - (4) They can be turned on and off.
- What is the shape of Earth's magnetic field similar to?
 - (1) That of a horseshoe magnet
 - (2) That of a bar magnet
 - (3) That of a ball ended magnet
 - (4) None of these
- Magnetism in materials is due to
 - (1) electrons at rest
 - (2) motion of electrons around the nucleus
 - (3) protons at rest
 - (4) neutrons at rest
- What happens when a magnet is brought near an iron nail?
 - (1) The magnet repels the nail.
 - (2) The nail repels the magnet.
 - (3) The nail becomes magnetic.
 - (4) Nothing will happen.
- Iron attracts
 - (1) only the north pole of a magnet.
 - (2) only the south pole of a magnet.
 - (3) both north and south poles of a magnet.
 - (4) the north pole but repels the south pole.
- In which part of a bar magnet the magnetisation is minimum?
 - (1) At the centre
 - (2) At both poles
 - (3) At south pole
 - (4) At north pole
- Iron filings were sprinkled around a magnet and acquired the pattern shown below.

 Where is the magnetic force strongest?
 - (1) 1
 - (2) 2
 - (3) 3
 - (4) 4
- An iron bar is considered as a magnet if the south pole of any other magnet
 - (1) repels its both the ends.
 - (2) attracts its both the ends.
 - (3) neither attracts nor repels any of its ends.
 - (4) attracts its one end and repels its other end.
- A bar is confirmed to be a magnet when it
 - (1) attracts all metal.
 - (2) attracts another magnet.
 - (3) attracts an unmagnetised piece of iron.
 - (4) repels a magnet.

- 11.** You are given two similar unmarked bars. One of them is a magnet while the other is a magnetic material. Without any other aid, how would you deduce which one of them is a magnet.
- By placing the two bars parallel to each other.
 - By placing the tip of one of the bars near the middle point of the other bar.
 - By placing the tip of one of the bars near that other bar such that they are parallel to each other.
 - By placing the tip of one of the bars near that of other such that they are perpendicular to each other.
- 12.** Freely suspended magnet stays in direction of
- east-west
 - northeast- southwest
 - north-south
 - northwest-southeast
- 13.** When any magnet is cut into two equal parts and then they are again joined by quick fix then new magnet will behave as
- four bar magnets.
 - four ordinary rods.
 - one ordinary bar magnet.
 - one ordinary iron rod.
- 14.** Observe the figure given below. The polarity of ends X and Y are respectively
- 
- Magnet
- North pole and north pole
 - South pole and south pole
 - South pole and north pole
 - North pole and south pole
- 15.** Magnetic force becomes stronger when magnets are
- both metal.
 - farther apart.
 - different sizes.
 - closer together.
- 16.** Where is the magnetic force exerted by a magnet strongest?
- at both poles
 - at north pole
 - at south pole
 - at centre
- 17.** What happens to the magnetic force as the distance between two magnetic poles decreases?
- Remains constant
 - Increases
 - Decreases
 - Becomes zero
- 18.** Two ring magnets, X and Y are connected through a rod as shown below. Magnet X floats above magnet Y because
- 
- Rod
Magnet X
Magnet Y
- Magnet X is lighter than magnet Y.
 - Magnet Y is more powerful than magnet X.
 - The like poles of both magnets are facing each other.
 - The unlike poles of both magnets are facing each other.

19. When two pieces of solid materials each of same shape and size repel each other then
- (1) one of them must be a magnet.
 - (2) both of them must be magnets.
 - (3) one of them must be a non-magnetic substance.
 - (4) both of them must be non-magnetic substances.
20. A compass points north because
- (1) Earth's gravity is strongest at the north pole.
 - (2) Earth's magnetic field has poles that are exactly at geographic poles.
 - (3) Earth's magnetic field has poles that are near the geographic poles.
 - (4) Earth's magnetic field has poles that are in east-west direction.
21. A loudspeaker uses electromagnet to
- (1) turn electrical energy into sound.
 - (2) turn electrical energy into light.
 - (3) turn motion into electrical energy.
 - (4) turn sound into electrical energy.

22. Look at the simple electromagnet below.



How can you make the electromagnet's magnetic field stronger?

- (1) Remove the iron nail.
- (2) Use a wooden nail instead of an iron nail.
- (3) Wrap more coils of wire around the nail.
- (4) Wrap fewer coils of wire around the nail.

23. Which of the following would not change the strength of an electromagnet?
- (1) Increasing the amount of current.
 - (2) Changing the current's direction.
 - (3) Inserting an iron core inside the coil.
 - (4) Increasing the number of loops.
24. How is an electromagnet different from a permanent magnet?
- (1) It has north and south poles.
 - (2) It attracts magnetic substances.
 - (3) Its magnetic field can be turned off.
 - (4) Its poles cannot be reversed.
25. The most suitable material to be used as the core of an electromagnet is
- | | |
|---------------|----------|
| (1) Aluminium | (2) Iron |
| (3) Copper | (4) Zinc |

True or false

1. Artificial magnets were discovered in Greece.
2. Rubber is a magnetic material.
3. A cylindrical magnet has only one pole.
4. Maximum iron filings stick in the middle of a bar magnet when it is brought near them.
5. Attraction of material with a magnet is a clear proof that 'it is a magnet'.
6. Bar magnets always point towards North-South direction.
7. Similar poles of a magnet repel each other.

8. A compass can be used to find East-West direction at any place.
9. An electric bell uses a bar magnet.
10. Magnetic properties of a magnet reduces by repeatedly hammering it.

1. **Match the column**

Column-I		Column-II	
(1)	A magnet is dropped from a height on a hard rock.	(a)	Magnetism is induced in the iron bar.
(2)	An electric current is passed through a coil of copper wire wound around an iron bar.	(b)	Magnetism is lost.
(3)	An iron bar is placed in line with a magnet.	(c)	Iron bar is a magnet.
(4)	A magnet repels an iron bar placed near it.	(d)	Electro-magnet

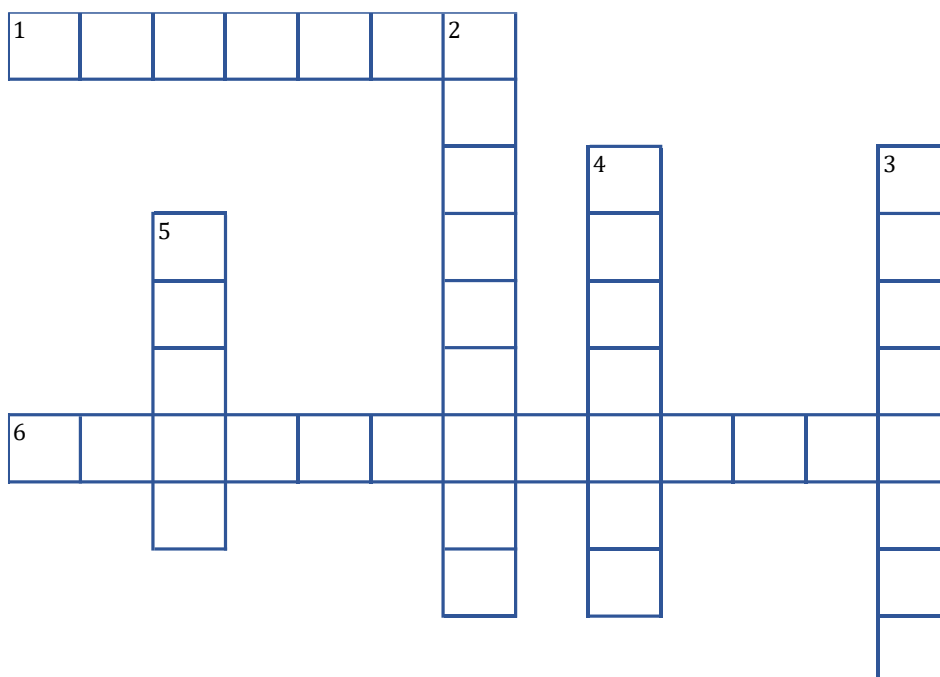
2. **Match the column**

Column-I		Column-II	
(1)	Natural magnet	(a)	Electromagnet
(2)	Temporary magnetism	(b)	Lodestone
(3)	North pole of a magnet	(c)	Magnetic keeper
(4)	Protection of magnet	(d)	Points towards north when suspended freely

Fill in the blanks

1. Any object that has magnetic force is called a _____.
2. A material that maintains its magnetic properties even when it is not close to another magnet is called a _____.
3. Materials similar to iron that have strong magnetic properties are called _____.
4. Every magnet has a north and a south _____.
5. The region of magnetic force around a magnet is called its _____.
6. The influence created by a magnet that exerts forces on other magnetic objects is known as a _____.
7. Two magnetic north poles _____ each other.
8. A north pole and a south pole _____ each other.
9. Earth's magnetic field causes a _____ to point north.
10. Electric current produces a magnetic field in an _____.

Crossword



Across

1. _____ magnets have irregular shape and weak attracting power.
6. An _____ is a coil of wire wrapped around an iron core.

Down

2. Magnetite contains iron and it is also called _____.
3. _____ is the ability of an object to push or pull an another object that has the magnetic property.
4. Magnetic _____ is an instrument that uses Earth's magnetic field to help people to find out directions.
5. The region in a bar magnet where the attracting power is maximum are called _____.

ANSWER KEY

Multiple choice questions

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sol.	2	4	2	2	3	3	1	1	4	4	2	3	3	3	4
Que.	16	17	18	19	20	21	22	23	24	25					
Sol.	1	2	3	2	3	1	3	2	3	2					

True or false

1. False 2. False 3. False 4. False
 5. False 6. True 7. True 8. True
 9. False 10. True

Match the column

1. (1) → b ; (2) → d ; (3) → a ; (4) → c
 2. (1) → b ; (2) → a ; (3) → d ; (4) → c

Fill in the blanks

1. Magnet 2. Permanent magnet 3. Magnetic materials
 4. Pole 5. Magnetic field 6. Magnetic field
 7. Repel 8. Attract
 9. Magnetic compass needle or freely suspended bar magnet
 10. Electromagnet

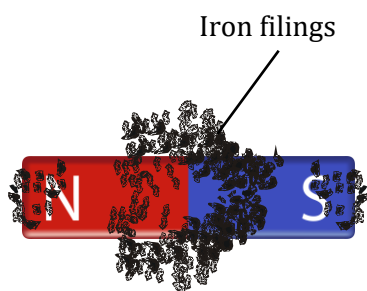
Crossword

¹ N	A	T	U	R	A	² L											
						O											
						D											
						E			⁴ C							³ M	
						S			O							A	
						T			M							G	
						P										E	
⁶ E	L	E	C	T	R	O	M	A	G	N	E	T					
		S				N		S				I					
						E		S				S					
												M					

EXERCISE-02

Very short answer type questions

1. What is a magnet?
2. Name two materials which are magnetic and two that are non-magnetic.
3. Which magnetic pole is attracted to a south magnetic pole?
4. A bar magnet is rolled in the iron filings and then lifted up. What is wrong in figure of that magnet shown below?



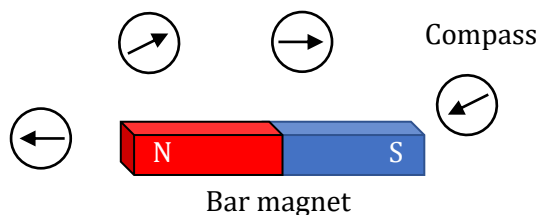
5. Why the north end of a compass always points to the northern part of the Earth?
6. What do you think, the following magnets will repel or will attract each other?



7. What happens when like magnetic poles are brought close together?
8. Describe, what is meant by the term magnetic field.
9. What happens if a magnet is heated?
10. What are magnetic keepers?

Short answer type questions

1. Why does a magnet attract unmagnetized piece of iron? Write the name of phenomenon involved in it.
2. What do you call the type of material that is attracted to a magnet or can be magnetised? Give any two examples of this type of material.
3. A scientist says, "Magnetic poles of magnets and electric charges on bodies apply forces in similar ways." Explain what is meant by this statement?
4. What happens to the poles of a magnet if it is cut into pieces?
5. Suppose astronauts land on Planet Z. Planet Z does not have a magnetic field. Will the astronauts be able to use a compass to find direction? Give reason.
6. Use the figure below to answer questions.



- (i) Explain why the compass needles are pointed in different directions?
- (ii) What will happen to the compass needles when the bar magnet is removed?

- | | |
|---|---|
| <p>7. Why does a compass change direction when it is kept near a magnet?</p> <p>8. How is a compass used to find directions?</p> <p>10. Large electromagnetic cranes are used in junk yards for moving scrap metal from one location to another. Why would an electromagnet be more useful in this application than a permanent magnet?</p> <p>Long answer type questions</p> <p>1. You are given an iron strip. How will you turn it into a magnet? Make figure.</p> <p>2. Write any four properties of a magnet. Make figures.</p> | <p>9. What is the difference between a permanent magnet and an electromagnet?</p> <p>3. (i) Where are the poles of a bar magnet located?
(ii) A bar magnet has no markings to indicate its poles. How would you find out near which end is its north pole located? Make figure.</p> <p>4. (i) What is an electromagnet? How it works? Make figure of an electromagnet.
(ii) How an electromagnet is better than a permanent magnet?</p> <p>5. Write some safety measures for magnets.</p> |
|---|---|

EXERCISE-01 SOLUTIONS

Multiple choice questions

1. **Option (2)**

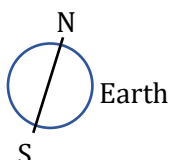
Earth has its own magnetism so, the Earth can be thought of as a giant magnet.

2. **Option (4)**

Permanent magnets → have two poles.
→ They have their own magnetism.
→ They have magnetic force.
But they can not be turned on and off as they are permanent magnets.

3. **Option (2)**

That of a bar magnet.



4. **Option (2)**

Motion of electrons around the nucleus.

5. **Option (3)**

The nail becomes magnetic

Reason :- When we bring a magnet near a magnetic material it gains magnetic properties. So the nail becomes magnetic.

6. **Option (3)**

Both north and south poles of a magnet.

Reason :- Iron is a magnetic material not a magnet so it has no poles, so it will attract both poles of a magnet.

7. **Option (1)**

At the centre

Reason :- In a bar magnet, maximum attracting power is at the poles and minimum attracting power is in the centre.

8. **Option (1)**

Reason : Magnetic force, is strongest at the poles.

9. **Option (4)**

Attracts its one end and repels its other end.

Reason :- The iron bar will be considered as a magnet if other magnet's south pole attracts one of its end which will be north pole and repels the other end which will be south pole because like poles repel and unlike pole attract.

10. **Option (4)**

Repels a magnet

Reason :- A bar will be only confirmed to be a magnet when it repels a magnet as an iron bar will also attract the magnet but only a magnet will repel a magnet.

11. **Option (2)**

By placing the tip of one of the bars near the middle point of the other bar

Reason :- It is because if you have a magnet in your hand, when you will place its tip near the middle of the iron bar it will attract with a good attracting power.

If you have the iron bar in your hand and when you bring it near the middle of the magnet, the attracting power will be less because attracting power of a magnet is minimum at the center and maximum at the poles.

12. **Option (3)**

North-south

Reason :- Earth also has a north and south pole because it also has a magnetic field. So, a freely suspended magnet's north pole is attracted toward south pole of the Earth's which is its geographical north pole.

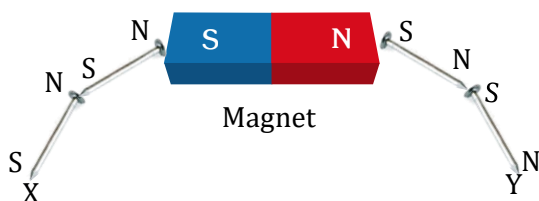
Magnets south pole gets attracted toward earth actual north pole which is its geographical south pole.

13. Option (3)

Reason :- When the bar magnet was cut into two equal parts we got two different magnets each with two poles but when we join them back one pole of each piece of magnet is joined with each other and we again got a single magnet with two poles north and south poles.

14. Option (3)

South pole and north pole

**15. Option (4)**

Reason :- When two magnets are kept close together the magnetic force becomes stronger between them.

16. Option (1)

Reason :- Maximum force of attraction or repulsion is at the poles but both poles have equal attracting or repulsive power.

17. Option (2)

Reason :- When the distance between two magnets will decrease the magnetic force will increase. As distance is becoming shorter and both of the magnets are entering the magnetic field of the magnets.

18. Option (3)

The like poles of both magnets are facing each other.

Reason :- Both the ring magnets are connected with the rod and we know that like poles repel each other so the magnet X is floating and not setting close or lying away from magnet Y.

19. Option (2)

Reason :- Only like poles repel each other and only materials with magnetic properties like magnet have poles. So, both of them must be magnets.

20. Option (3)

Earth's magnetic field has poles that are near the geographic poles.

Reason :- It is because the compass has the needle which is also a magnet and has north and south poles so, it points to the geographical north pole, but the geographical poles are also not exactly on the Earth poles.

21. Option (1)

By creating magnetic field which creates sound vibrations when hit by electric signals.

22. Option (3)

Electromagnets magnetic field becomes stronger when more number of turns are wrapped.

23. Option (2)

Strength of electromagnet depends on magnitude of current not the direction.

24. Option (3)

When electric current is turned off, the electromagnet loses its magnetism.

25. Option (2)

Iron becomes magnetised and demagnetised easily, so it is the most suitable material among these.

True or false

1. **False**
Natural magnet were discovered in Greece, not artificial.
2. **False**
Rubber is not a magnetic material.
3. **False**
Every magnet has two poles north and south pole.
4. **False**
Maximum iron fillings can't stick the middle of the bar magnet as minimum magnetic force is in the middle and maximum magnetic force is at the poles.
5. **False**
It is because an unmagnetised iron bar will also attract a magnet. Only a magnet can repel a magnet.
6. **True**
When suspended freely, bar magnet align north south.
7. **True**
Like poles repel while, unlike poles attract each other.

8. **True**
As it shows north south so east west can be determined accordingly.

9. **False**
An electric bell uses an electromagnet.

10. **True**
Magnet loses its magnetism by hammering it.

Match the Column

1. (1 → b); (2 → d); (3 → a); (4 → c)
2. (1 → b); (2 → a); (3 → d); (4 → c)

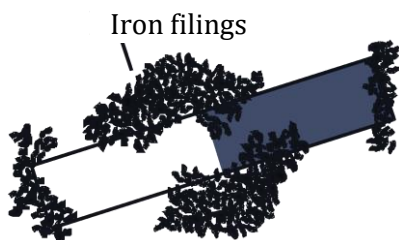
Fill in the blanks


1. Magnet
2. Permanent Magnet
3. Magnetic Materials
4. Pole
5. Magnetic field
6. Magnetic field
7. Repel
8. Attract
9. A magnetic compass needle or A freely suspended magnet.
10. Electromagnet.

EXERCISE – 02 SOLUTIONS

Very short answer type questions

1. A material having the property of attracting magnetic materials like iron are known as magnets.
2. Magnetic → Cobalt, Nickel
Non - Magnetic → Plastic, Copper
3. North magnetic pole is attracted to a south magnetic pole.
4. Iron filling can't stick more at the middle than at the poles because magnet's attracting power is minimum at its centre. This is what is wrong in this figure.

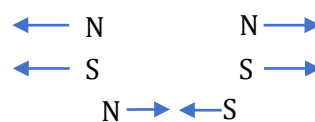


5. As we know Earth also acts as a giant magnet and has a south and a north pole, and a compass has a magnetic needle. So, the north pole of the needle points towards the south pole of the Earth which is its geographical north pole. This is why the compass always point towards the north of the Earth.
6. 
Both the magnets will repel each other as both have their north pole towards them. As like poles repel each other and unlike poles attract each other.
7. If like magnetic poles are brought close together they will repel each other.

8. Area around the magnet where magnetism is felt is called magnetic field.
9. If a magnet is heated, it loses its magnetism.
10. To avoid self demagnetisation, bar magnets are kept in pairs separated by a piece of wood, unlike poles on the same side. Pieces of iron which are called magnetic keepers or keepers, are placed across both end.
A horse shoe magnet needs only one keeper across its poles.

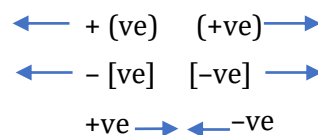
Short answer type questions

1. Iron is magnetic material and when we place a magnetic material near a magnet, it gets attracted towards it because of attractive property of magnet. The phenomenon involved in it is called 'magnetic induction'.
2. Materials that are attracted by magnets or can be magnetised are known as magnetic materials.
Eg :- Iron, Nickel, Cobalt
3. This statement means that as the like poles of a magnets repel each other and unlike poles attract each other.



In the same way →

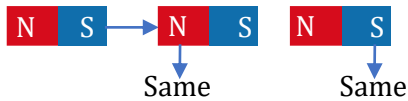
The like electric charges on bodies repel each other and unlike charges attract each other.



4. If a bar magnet is taken it has two poles



But when it is cut into pieces, it has four poles as we get two different magnets.



5. If the astronauts land on planet Z which has no magnetism, they would not be able to use a compass to find the direction because a compass also has a magnetic needle inside it, and a magnet can only show direction when it is in the magnetism of the planet.
6. (i) The compass needle is pointing in different directions because it also has a magnetic needle inside it which has a north and south pole and when it is kept near a bar magnet like poles are repelling and unlike poles are attracting each other.
- (ii) If the bar magnet is removed, then the needle of the compass will show the direction of earth's magnetism. No other magnet's (other than Earth) magnetic field is affecting the compass now.
7. A compass needle changes its direction when kept near a magnet because the compass needle is also a magnet and when two magnets are closer to each other their like poles repel and unlike poles attract each other. Same thing also appears with the compass needle when kept near a magnet.

8. The needle of the magnetic compass points in the north direction of Earth's magnetic field. Since the compass needle points north, it can be used to tell all the directions → North, South, East and West.

9. Natural magnets are permanent magnets. Natural occurring minerals or ores having magnetic properties are called 'natural magnets'. Due to their irregular shapes and weak attracting power, natural magnets are rarely used now a days.

Electromagnets

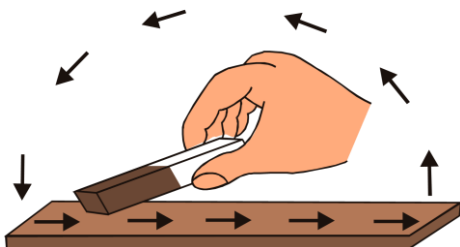
An electromagnet is a coil of wire wrapped around an iron core which produces strong temporary magnetism when electric current is passed through it. As the current stops, the electromagnet becomes demagnetized.

10. Electromagnets are more useful than permanent magnets in this application because to collect junk we can turn on the electromagnet while to drop the junk, we can turn off the electromagnet while a permanent magnet can only collect the junk which does not fulfil the application required at the junk yards.

Long answer type questions

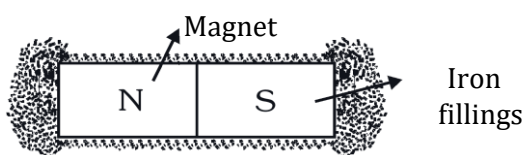
1. Take the iron strip and place it on the table. Now take a bar magnet and place one of its poles near one edge of the iron strip without lifting the bar magnet, move it along the length of the iron strip till you reach the other end. Now, lift the magnet and bring the pole (the same pole you started with) to the same point of the iron strip from which you began. Move the magnet again along the iron strip in the same direction as you did before.

Repeat this process for about 50 - 60 times. Now bring awl pin near the iron bar. If it attracts the pin, it means it has become a magnet.



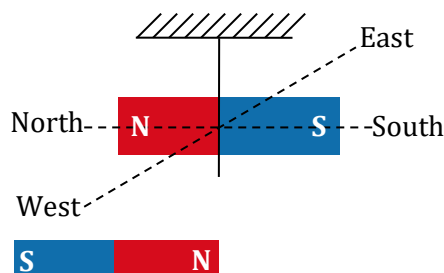
2. (1) Attractive nature :-

When iron filings are put near a bar magnet, the magnet attracts iron filings towards it. The attracting power is maximum (see figure) near the ends (poles) and minimum at the middle (neutral region).



(2) Directive property :-

When a magnet is suspended freely, it aligns itself to north-south direction. The pole of the bar magnet pointing towards north direction when suspended freely is called '**north pole** (or north seeking pole)'. The pole of the bar magnet pointing towards south direction when suspended freely is called '**south pole** (or south seeking pole)'.



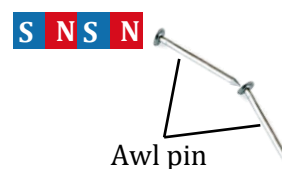
(3) Poles exist in pairs :-

In a bar magnet there are always two poles which are equal in strength and opposite in nature. In other words, 'a magnet is always a dipole'.



(4) Inductive nature :-

When certain substances like iron, steel, cobalt, nickel are placed near a bar magnet, they acquire magnetisation called 'induced magnetisation'. The phenomenon is called '**magnetic induction**'. It involves inducing opposite pole in a magnetic material like iron on the side facing the magnetic pole (see figure).

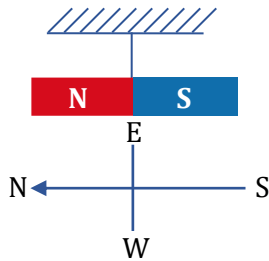


3. (i) The poles of a bar magnet are located on two ends of the bar magnets.

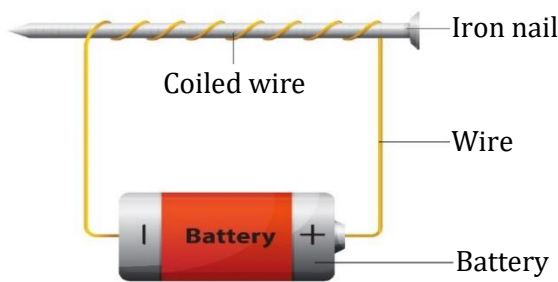


(ii) To find the north pole of the bar magnet it is hanged freely with the help of a thread. The end pointing to the north is the north pole of the magnet. This happens because when a bar magnet is suspended freely, it aligns itself to the North - South direction.

It happens because the bar magnet aligns in the direction of the Earth's magnetic field.



4. (i) An electromagnet is a coil of wire wrapped around an iron core which produce temporary but strong magnetic field when electric current is passed through it.



- (ii) An electromagnet is better than a permanent magnet as permanent magnet does not produce strong magnetic field as of an electromagnet. Also, strength of the electromagnet can be changed easily by changing the current or number of turns in the coil. Polarity of an electromagnet can be changed by reversing the direction of current which is not possible in case of a permanent magnet. When current is stopped, the iron core is no longer magnetised i.e. it becomes demagnetised easily.

5. Magnets should not be heated at high temperatures, repeatedly hammered or dropped from some height, because they loose their magnetism.

Magnets tend to become weaker after some time if their poles are left free. This is called self demagnetisation. To avoid this, bar magnets are kept in magnetic keepers.

To avoid self demagnetisation, bar magnets are kept in pairs separated by a piece of wood, unlike poles on the same side. Pieces of iron which are called magnetic keepers or keepers, are placed across both end.

A horse shoe magnet needs only on keeper across its poles.

