



Master Lesson Plan

For

Fun with Magnets

Board	Standard	Subject	Chapter	Language	Reference Link	Creation
CBSE	STD VI	Science	Fun with Magnets	English	Fun with Magnets	2020-10

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Fun with Magnets

1. MS_Objectives_Fun with magnets

Notes to the teacher: This asset lays down the proposed plan for transacting this chapter. It states the asset objectives of the MLP. This asset is for teacher's reference and need not be taught to the students:

Students will be able to....

- analyse the attraction property of magnets
- appreciate the discovery of magnets
- identify the different types of magnets
- sort magnetic materials by hand and a magnet
- distinguish between magnetic and non-magnetic materials
- explain the properties of a magnet
- take delight on the information on non magnetic watches
- compare the attraction and repulsion of a magnet
- notice the attraction and repulsion of magnet
- recognise the uses of magnets in daily life
- make a magnet
- infer the questions on magnets
- determine the strength of attraction at the poles of a magnet
- take delight in knowing about magnetic levitation and other interesting facts on magnets
- summarise the earth as a magnet
- realise the importance of responsible decision making in choosing good company
- describe about magnetic compass
- relate how mariner's compass got its name
- enjoy the beauty of Aurora Borealis and Aurora Australis
- discuss the ways of storing magnets
- imagine the magnetic hill
- assess themselves on the various concepts of the topic 'Fun with magnets'

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Main Script	Magnetism	Taking care of magnets, Pro magnets, Poles of a magnet magnets, Magnetic compass non-magnetic material, Law poles, Finding directions wi Discovery of magnets, Taking care of magnets, Properties of magnet, Making artificial ma compass, Magnetic and non material, Law of magnetic p directions with a magnet, Di magnets

2. IQ_ Magnetic Attraction

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1. What is an easy way to collect nails scattered on the floor?

Ans. Move a magnet on the place where the nails have scattered. The nails get stuck to the magnet.

2. Have you ever wondered how some stickers remain attached to the door of the fridge? Several cupboards and pencil boxes close with a click . How does this happen?



Suggested Answer: It is because these stickers have magnets.

3. Why don't such stickers with magnets in the above picture stick on a wooden cabinet or door?

Suggested Answer: Magnets attract metals such as iron, etc. Wood does not have magnetic material in it, so magnets do not attract it.

4. You would have seen a compass. How does a compass needle show the North- South direction?

Suggested Answer:: A Compass has a suspended free moving magnetic pin pointing at North-South direction.

<https://www.flickr.com/photos/oskay/254588221> (Attribution – Windell Oskay)

Time to teach	Asset Type	Theme	SubTheme
2 Minutes	Inquisitive Questions	Magnetism	Magnetic and non-magnetic Magnetic and non-magnetic

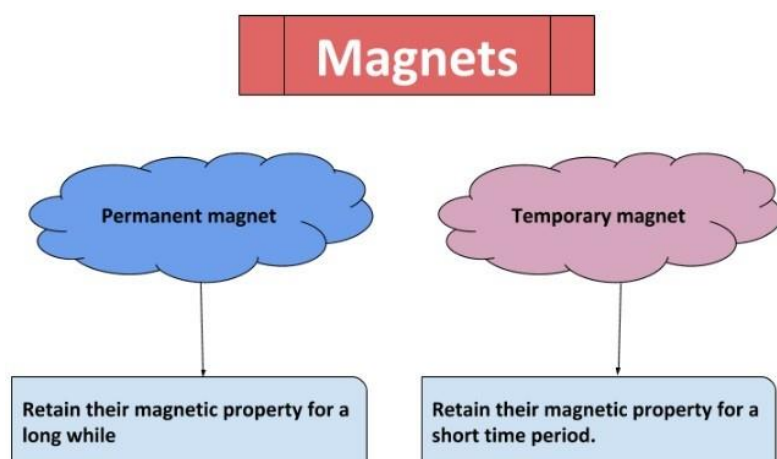
3. IA_Discovery of Magnets

There is a popular legend that is 4000 years old.

There lived an elderly shepherd Magnus in Northern Greece called Magnesia. One day, while following his herd over a hill, he found that the nails of his shoe and the base of his staff were firmly stuck to a large, black rock over which he was standing. Curious to find out the source of attraction, Magnus dug up the earth to find what we call today as the lodestone. Lodestone contains the ore magnetite. The name magnetite subsequently may have come from either Magnesia or from the name of the shepherd, Magnus. Magnetite (Fe_3O_4) is a naturally occurring magnetic material.

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Interesting Aside	Magnetism	Discovery of Magnets

4. MS_Types of Magnets



Temporary magnets	Permanent magnets
They are made of iron, cobalt or nickel.	They are made from mixtures of iron, cobalt, nickel with some other materials.
They show their magnetic property only when they are close to a very strong magnet.	They are strong magnets and retain their magnetic property for a long time.
As soon as the strong magnet is removed, they quickly lose their magnetic property.	Always remains a magnet.

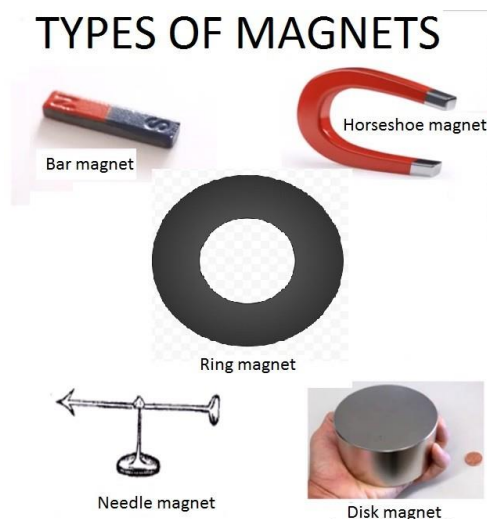
Natural magnets	Artificial magnets
1. Weak magnets	1. Strong magnets
2. It occurs in nature and is made from lodestone	2. It is manmade
3. Irregular in shape	3. Has definite shape

Where do these magnets come from?

The naturally occurring magnet, lodestone, is found in nature. This magnetite mineral is found in Igneous and Metamorphic rocks across the world. Lodestone has an irregular shape. It also has weak magnetism.

Artificial magnets are man made and are of different shapes and strengths. These magnets are made according to the requirements.

Shapes of different magnets



Bar magnet: A magnet in the form of a bar is called a bar magnet. In bar magnets, the magnetic poles are located at both the ends.

Horseshoe magnet: A horseshoe magnet is a magnet made in the shape of a horse shoe. The ends of a horseshoe magnet have two magnetic poles. As both the magnetic poles are close together a strong magnetic field is present between these poles.

Disc magnet: Disc magnets look like a disc. They have flat and broad surfaces. This gives them a larger pole area which makes them strong magnets.

Needle magnets: A thin magnetised steel which is suspended on a low -friction mounting is called a needle magnet. It is used in magnetic compasses. It shows the direction of the earth's magnetic poles.

Ring magnet: It is a thin flat circular magnet which has a hole through the centre. The magnetic poles are found on the top and bottom surfaces of the ring magnet.

Image source: <https://www.youtube.com/watch?v=gVHxXPmT4go> (Attribution – OLI – NSS, IITB)

Ring magnet: OC: puttyrevankar@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Magnetism	Properties of magnets, Pole Properties of magnets, Pole

5. SA_Separating magnetic materials

Aim: To compare the separation of ball bearings by hand and by using a magnet.

Materials required: Troughs filled with a mixture of sand and ball bearings, magnets (any artificial magnet can be used)

Different groups are provided with the required materials.

Procedure

Take a basin. Fill it with sand and mix some iron rings in it.

Exercise—A Use your bare hand to remove the rings from the basin of sand. Note down time taken.

Now put back the iron rings into the basin of sand.

Exercise-B Use a magnet to separate the rings from sand. Note down time taken.

Observation: The time taken to separate the rings by hand is more than with the help of a magnet.

Conclusion: The magnets attract the magnetic materials quickly.

Ask the following questions:

1. Which exercise (A/B) took shorter duration to perform? Give reason(s) in support of your answer.

Suggested Answer: Exercise B took shorter time, as the magnet attracted the rings quickly.

2. Was it easier to remove the rings by hand or by using a magnet? Give reason(s) in support of your answer.

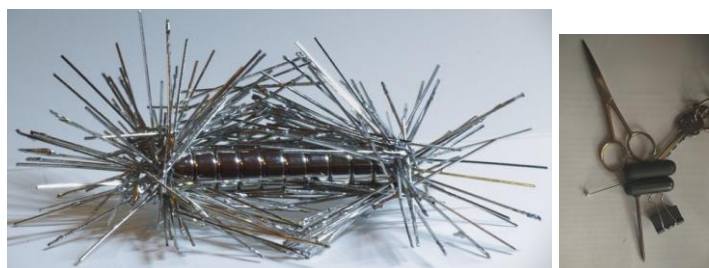
Suggested Answer: The rings were easily removed using a magnet than our hand. The magnet attracts the ring faster than the hand.

Precautions- The ball bearings have to be rust free.

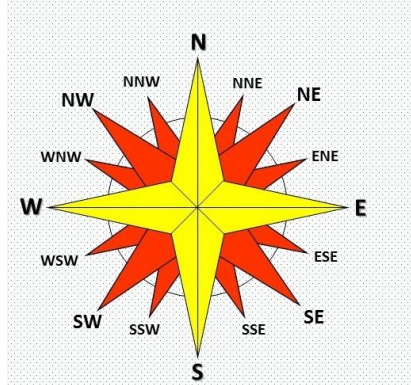
Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Suggested Activity	Magnetism	Magnetic and non-magnetic Magnetic and non-magnetic

6. MS_Properties of magnets

1. Magnets attract magnetic substances such as iron, nickel, and cobalt.



2. A freely suspended magnet always sets itself along the north-south direction. When a bar magnet is suspended by a thread freely in horizontal position, its north pole will move towards the North Pole of the earth and its south pole will move towards the South Pole of the earth. This is because the earth is a giant magnet, and its geographical north pole is its magnetic south pole, and vice versa.



3. All magnets have two poles; north pole and south pole, where its magnetic strength is maximum. There are no magnets containing only one pole.

4. The two poles of a magnet cannot be separated. The stronger the magnets and the closer two magnets are to each other, the greater is the magnetic force exerted on each other.

5. Unlike poles attract each other and like poles of a magnet repel each other.

6. A magnet can induce magnetism on other magnetic materials such as iron. An iron nail when brought near, attracts other smaller nails or pins.

7. There are two types of magnets:

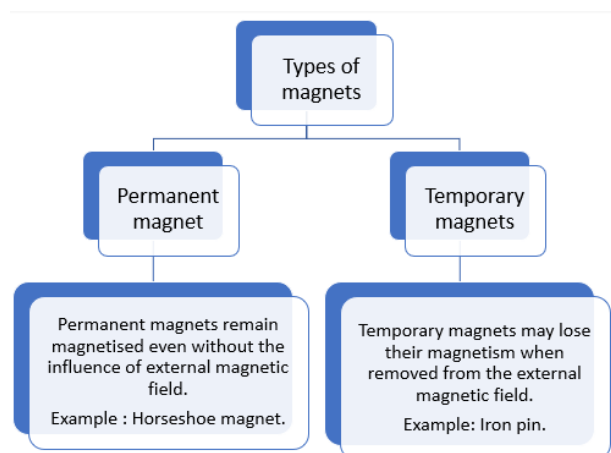


Image source

Magnets: https://www.flickr.com/photos/ben_on_the_move/6258216472 (Attribution – ben_osteen)

Magnetic substances: SSSVV Gallery

Cardinal points: SSSVV Gallery

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Main Script	Magnetism	Properties of magnets

7. SA_Fun with shepherd's stick

Aim: To find the objects attracted by magnet using shepherd's stick.

Materials Required :

- Plastic ball
- Tooth Brush
- Nails
- Bell pins
- Coin
- A pair of scissors
- Doll
- Clips
- Bottle

Making of a Shepherd's Stick:

Take a long wooden rod and stick a magnet at the end of the stick using a cello tape.

Procedure :

- Touch the objects with the shepherd's stick and now record your observations in the given tabular column.

Observation:

S.No	Name of the object	Material what the object is made of	Attracted by the stick	Magnetic or non magnetic substances
1.	Nails	Iron	Yes	Magnetic
2.	Doll			
3.	Pencil			
4.	Eraser			
5.	Bell pins			
6.	Coin			
7.	Clips			

Conclusion: Students will be able to differentiate between magnetic and non-magnetic materials.

Post discussion questions:

1. How is a doll different from iron nail?

Suggested Answer: Doll is made up of a cloth/plastic. These are non-magnetic materials. They do not attract to a magnet.

2. All metals attract a magnet? Justify your answer.

Suggested Answer: No, not all the metals attract magnets. There are certain metals like gold, which do not attract magnet.

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Suggested Activity	Magnetism	Making artificial magnets, Making a Magnetic and non-magnetic

8. IA_Non magnetic watch

People working near large electrical or electronic machines use non-magnetic watches. This is because in such industries people are exposed to strong magnetic fields and magnetic lines of forces.

These forces affect the springs of the normal watch and do not show time. But non-magnetic watches are not affected by magnetism. In non-magnetic watches, the working parts of the watch are enclosed in a case made of material that is a very good magnetic absorber.

The case absorbs all the forces of magnetism and does not allow them to reach the spring of the watch.

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Interesting Asides	Magnetism	Magnetic and non-magnetic Magnetic and non-magnetic

9. MS_Poles of a Magnet- Attraction and Repulsion

The ends of a magnet are called its poles. Every magnet has two poles- north pole and south pole where most of the magnetic strength is concentrated.

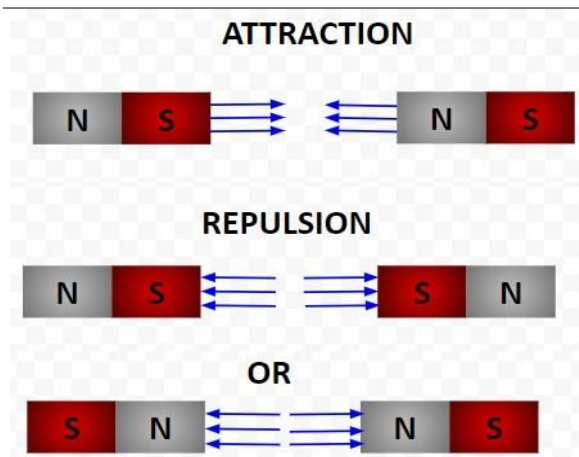
When a magnet is suspended freely it always aligns itself in the north-south direction.

North Pole

The end of the freely suspended magnet, which points towards the geographic north is the north pole of the magnet.

South Pole

The end of a freely suspended magnet, which points towards the geographic south is the south pole of the magnet.



Attraction and Repulsion

When the north pole of a bar magnet is brought near the north pole of a freely suspended magnetic needle, the north end of the magnetic needle gets repelled. Similarly when the south pole of the magnet is brought near the south pole of the freely suspended magnetic needle the south end of the magnetic needle gets repelled.

Pole of magnet 1	Pole of magnet 2	Behaviour of magnet
North	North	Repel
North	South	Attract
South	North	Attract
South	South	Repel

OC: puttyrevankar@gmail.com

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Magnetism	Poles of a magnet, Poles of a magnet,

10. SA_ Explore the direction of magnet

Aim: To find the direction of a freely suspended magnet.

Materials Required: Clamp stand, string of length 30 cms, a bar-magnet.

Procedure:

Ask students to come to the playground. (This can also be done in the classroom)

1. Note down the north, south, east, and west directions.
2. Take the magnet and tie it securely to one end of the string.
3. Clamp the string to the clamp stand. Else, hold the string in such a way that the magnet is suspended freely.
(*PRECAUTION- Hand should not move as it would disturb the magnet from coming to rest position.)
4. Gently tap the magnet at one end and wait for it to come to rest
5. Observe the direction in which the magnet comes to rest.
6. Note down your observation.

7. Repeat the experiment.

Ask students to complete the table.

Observation:

Trial	Pole of magnet 1	Pole of magnet 2	behaviour of magnet
1	North	North	
2	North	South	
3	South	North	
4	South	South	

Ask the following question:

1. Why are the poles of the magnet called as North Pole and South Pole?

Suggested Answer: A freely suspended magnet comes to rest in the North-South direction therefore, the end pointing towards the earth's geographic North is called the North pole and the end pointing towards the earth's geographic South is called as the South Pole.

Conclusion:

A freely suspended magnet comes to rest in the North-South direction. This is a property of direction of magnets.

Time to teach	Asset Type	Theme	SubTheme
20 Minutes	Suggested Activity	Magnetism	Poles of a magnet, Poles of a magnet,

11. DD_Uses of magnets in daily life

- Magnetic latches or catches are used in windows and cupboard doors.
- Magnet in a magnetic compass is useful to find the direction.
- It is used to make magnetic toys, decorative pieces.
- Electric motors, dynamo of cycles, door of the refrigerator, speakers, use magnets
- Magnetic tapes are used in audio and video tapes to store information
- They are also used in computers, mobile phones to store information
- Credit and debit cards have a magnetic strip on the reverse to store information
- Magnets are used to pick up iron scraps from the scrap-yard. An electromagnet in the hook of a crane will pick up and lift a large load of iron scrap.
- Magnetic levitation transport, or maglev, is a form of transportation that suspends, guides and propels

vehicles (especially trains) through electromagnetic force. The maximum recorded speed of a maglev train is 581 kmph.

- In the field of medicine, magnets are used for MRI or Magnetic Resonance Imaging. In hospitals, strong magnets are used to remove iron or steel splinters from a patient's eyes or other parts of the body.
- Magnets are used to separate magnetic ores from non magnetic rocks. Loud
- speakers, electric bells, and telephones contain electro magnets.
- Data, sound and images, audio visual signals are stored on special surfaces coated with magnetic material in computer hard disc, floppies, and audio, video tapes.

Magnets in banks

(i) Magnetic ink is used by banks to print serial numbers and bar codes on cheques. Magnetic ink is made by mixing very small particles of a magnetic substance with a liquid.

(ii) Information is also stored on the magnetic stripe on credit cards, ATM cards used in banks

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Day-to-day Relevance	Magnetism	

12. SA_Making a Magnet

Aim: To make a magnet

Materials Required: A (steel/iron) needle, a magnetic compass, a bar magnet, a magnetic compass, small pins made of iron

Procedure:

1. Place the needle on the table or any flat surface.
2. Rub the magnet along the length of the needle, end to end.
3. The rubbing should be uni-directional.
4. Repeat the process several times (30-35 times).
5. Keep the bar magnet away from the needle.
6. Take the magnetic compass and bring it near the needle.

What do you think will happen to the magnetic compass? Give reason.

The magnetic compass will deflect as there is presence of magnetic field around the needle which has been magnetised.

7. If the magnetic compass does not deflect, repeat step 2.

8. Bring the needle close to some iron pins.

Observation: The iron nails will get attracted to the needle as the needle has been magnetised.

Conclusion: A magnetised needle is obtained.

Discussion Question-

1. How can you identify the North and South poles of temporary magnets?

Answer: An easy way is to bring a magnet close to the created one. If the North pole of the Magnet attracts the unmarked end of the created magnet then it is South pole and vice versa.

Precautions:

1. Use sand paper to clear off the dirt from the iron piece or nail.
2. Do not use a rusted iron piece or nail.
3. Rub the magnet over the needle in a single direction.

Time to teach	Asset Type	Theme	SubTheme
20 Minutes	Suggested Activity	Magnetism	Making artificial magnets, Making artificial magnets

13. IQ_Magnets - A thought!

[Notes to the teacher - Teacher may enable the students to think and come out with as many answers as possible before giving out the right answer/ answers]

1. Why does Earth act as a huge magnet?

Answer: Earth contains iron, nickel and cobalt in its core – magnetic materials at 6000 Celsius. Hence earth acts as a huge magnet.

2. How does a magnetic pencil box which you see close automatically?

Answer:- By the force of attraction between the magnet and the iron piece.

3. Mention whether CD player or a loudspeaker work with the help of magnets?

Answer: - Yes. It works with the help of magnets only. Permanent and Electromagnets are present in these gadgets.

4. If iron pins or iron needles are thrown in the sand or ground, what is the easiest method to pick it up?

Give reason for your answer.

Answer:-The easiest method to pick it up is by using a magnet attached to one end of a stick because it is a time and energy saving method.

5. Is earth a magnetic or non magnetic material? How is earth like a magnet?

Answer: - A magnet always comes to rest in N-S direction if it is suspended freely as the earth behaves as a magnet. The magnet's south pole lies in the geographical north pole of the earth and the magnet's north pole lies in the geographical south pole of the Earth.

6. Why does a magnet have only N and S poles, and not West and East Poles?

Answer: - Because a magnet always comes to rest in N-S direction if it is suspended freely.

7. Does an electromagnetic train have wheels? If not, why?

Answer: - No, it does not have wheels because it works on the principle of magnetic levitation i.e. it is lifted in air with the help of magnetic unlike poles. So, it is also called as 'flying train'.

8. Why repulsion is a sure test for a magnet?

Answer: A magnetised substance would be attracted to both ends of a magnet, but only a magnet would be attracted to one end of a magnet and repelled by the other end. Like poles repel and unlike poles attract.

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Inquisitive Questions	Magnetism	Taking care of magnets, Properties of magnets, Poles of a magnet, Magnetic compass, non-magnetic material, Law of magnetic poles, Finding directions with a magnet, Discovery of magnets, Making artificial magnets, Properties of magnetic material, Making artificial magnetic compass, Magnetic and non-magnetic material, Law of magnetic poles, Finding directions with a magnet, Discovery of magnets

14. SA_Comparison of strength of attraction

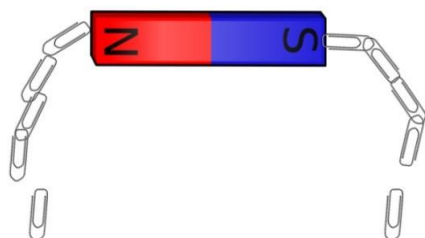
Aim: To determine the strength of attraction at the poles of a magnet.

Material Required: magnet, paper clips

Procedure:

1. Distribute paper clips and magnet to the groups.
2. Hold the magnet at its centre.

3. Bring one paper clip to the other pole of the magnet. It gets attracted.
4. Next, bring another paper clip towards the first paper clip at one pole.
5. Similarly, bring another paper clip to the paper clip at the other pole.
6. Carry on steps 4 & 5 till no more paper clips get attracted.
7. Count the number of paper clips attracted to both the poles of the magnet.



Observation: It is observed that paper clips do not get attracted beyond the magnetic field.

Conclusion: The number of paper clips attracted to both the poles of the magnet is the same.

Instruction to the teacher :

Explain to the students that the strength of attraction is the same at both the poles of the magnet.

Also explain that the paper clips are attracted as long as there is presence of magnetic field. There is no attraction to the magnet beyond the magnetic field.

This is a property of magnets.

Precautions: NA

Ask the following questions:

1. Why is the second pin getting attracted to the first paper clip?

Answer: This is because of the magnetic field present around the magnet which also passes through the pole of the magnet to the paper clip.

Force of attraction from the pole of the magnet passes on to the paper clip.

2. What will happen if a magnet is broken into two pieces?

Suggested Answer: If a magnet is broken into two pieces, then each part will behave as a complete magnet with North and South pole.

3. Do you think it will retain its property of attraction to magnetic substances?

Suggested Answer: Yes, the magnet will attract other magnetic substances.

4. Will its ends still behave like the north and south poles?

Suggested Answer: If you cut one in half, the newly cut pieces faces will become the new north or south poles of the smaller pieces and will still behave as north and south poles.

<https://pixabay.com/vectors/paperclip-paper-clip-office-clip-34594/>

<https://pixabay.com/vectors/bar-magnet-magnetic-physics-poles-35424/>

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Suggested Activity	Magnetism	Law of magnetic poles, Law poles

15. IA_Interesting facts on magnets**1. MAGLEV TRAINS**

Maglev means 'Magnetic Levitation'. Magnetic Levitation means objects float with the help of magnetic fields.

Maglev works on the principle of magnetic repulsion. This principle is used in maglev trains which float on a guided rail without touching the rails.

These trains run at very high speed and even do not cause noise pollution because the friction is less. These trains are smooth, quiet and faster.

Several countries including Japan, Germany and the United States have such trains which can run faster than 400 kmph.

This technology is also being used by NASA to launch space vehicles. Using this technology, the launch space vehicle would go at a speed of 965km/h which will help them to break the earth's gravity.

2. MAGNETS AND ELECTRONIC DEVICES

Be very careful not to take magnets near computers, CD's, audio/video cassettes, television, floppy discs, credit cards (ATM), pacemakers fitted in the heart, other electronic equipment.

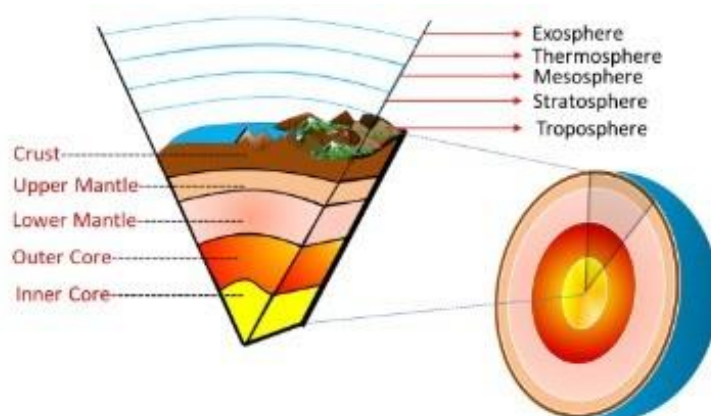
Magnets can cause damage to this type of equipment.

<https://pixabay.com/photos/magnetic-levitation-train-499779/>

Time to teach	Asset Type	Theme	SubTheme
4 Minutes	Interesting Asides	Magnetism	Taking care of magnets, Properties of magnets, Poles of a magnet, Magnetic material, Law of poles, Finding directions with a magnet, Discovery of magnets, Making artificial magnets, Properties of a magnet, Making artificial magnets, Magnetic and non-magnetic material, Law of magnetic poles, Finding directions with a magnet, Direction of magnetic field lines

16. MS_Earth as a magnet

- The earth is a huge magnet. It has a magnetic field around it, as if a powerful bar magnet is kept at the centre.
- It is said that earth possesses this magnetic field because of the materials present in its core.
- The core of earth is made up of iron and nickel. These materials are very hot because of tremendous pressure.
- The inner core is probably solid and the outer core is possibly liquid.
- The movements of both the inner and outer core produce the main magnetic field.



- Another weaker, magnetic field is generated by the earth's ionosphere, a layer of air about 60 -100 miles above the surface of earth.
- The ionosphere is made up of electrically charged particles.
- As these particles move with high speed they create magnetic fields.
- Earth 's magnetic field is also called a geomagnetic field.

When we suspend a bar magnet freely, it is observed that it points towards geographical north with its north pole and geographic south with its south pole as it comes to rest.

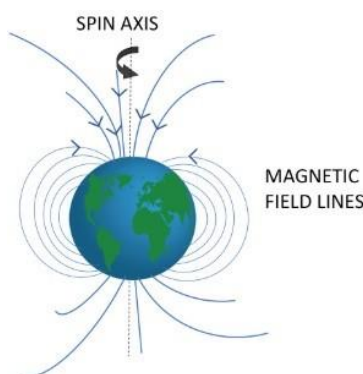


Image Source:

Magnetic field: SSSVV Gallery

Layers of earth: SSSVV Gallery

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Magnetism	Law of magnetic poles, Law poles

17. VC_Good company

Introduction:

“Tell me your company, and I shall tell you what you are” says a well-known proverb. The way iron imbibes the quality of a magnet when it is kept near a magnet, we too imbibe good qualities when we are in the company of good people. For example a newspaper does not have any fragrance of its own, but when it is used to wrap a beautiful jasmine garland, it acquires the fragrance of the flowers. So, we should be responsible enough to take a decision to be in the company of people with good qualities and must make efforts to stay in good company. Wrong company can sow the seed for negative qualities in us.

The Lion and the Advisers

There once lived a mighty lion in a jungle who had a swan and a parrot as his advisers. The lion was just and noble as his advisers always gave him good advice and kept him in the path of righteousness. He tried to ensure that all the animals in the jungle lived in peace. Most of the animals were happy and enjoyed the

peaceful nature. However, there were some animals who did not like it and always created problems for the lion which worried him.

One day the swan saw a holy man passing through the jungle. The parrot and the swan advised the lion to seek the blessings of the holy man. The lion went to seek the blessings of the holy man and invited him to stay in the forest. The holy man was pleased and blessed the Lion King for his hospitality.

As time went by, because of the holy man's blessings all the enemies of the lion were vanquished, and the king of the jungle was happy. The advisers, the swan and the parrot felt that they had no more work as the jungle was peaceful and the Lion was ruling with justice. They approached the lion and asked his permission to retire and visit holy places to which the lion agreed.

A crow and a jackal were waiting for just this moment. They volunteered to become his advisers. As the lion had no one to talk to after the swan and parrot had left, he yielded. Unlike the swan and the parrot they were vile and crafty. By showering empty praises on the lion they won his confidence. The lion was happy to hear the praises of the crow and the jackal. One day they approached the lion and told him that he should not be sitting in a shabby cave, but instead should be served by his subjects. As the lion started to act on the advice of his cunning advisers he soon became a terror to other creatures. Justice and peace left the jungle.

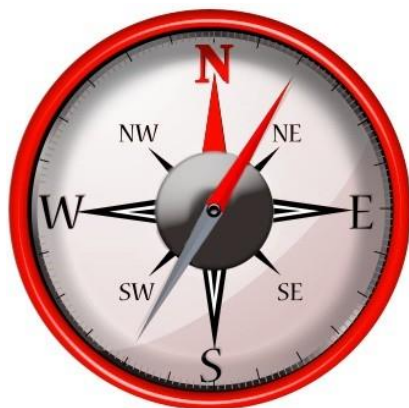
One day the holy man who had visited the jungle earlier, was returning back after visiting all the holy places. The holy man remembered the noble lion for his kindness and hospitality and decided to see him. On seeing the holy man the crow and jackal told the lion that the holy man was a spy and advised that he should be killed. As the lion was about to kill the holy man, he recognised the holy man and a sense of shame engulfed him. He apologised to the holy man saying that all good sense had left him after the swan and parrot had left and that he had also become evil like the company he was with - the crow and the jackal. He banished the crow and the jackal from the jungle. Peace once again returned to the jungle.

Children! The word company does not refer to friends alone, it covers anything and everything that you interact with, in your day-to-day life.

Time to teach	Value Type	Value Sub Type	Value Attribute
10 Minutes	Love	Friendship	Stories

18. MS_Magnetic compass

A magnetic compass is an instrument used by the pilots and navigators to know the direction in which their plane or ship is moving. It is made up of a flat circular aluminium box.



At the base of the magnetic compass, we see marked directions such as north, south, east, west, north-east, north-west, etc. In the middle of the compass we find a sharp needle. This is the magnetic needle.

This compass needle is a thin magnet which is balanced on a pivot so that it allows the magnet to turn easily. The earth's north magnetic pole attracts one end of the compass needle, so that it always points north. This could be because the earliest use of a magnet as a compass took place in the northern hemisphere, we talk about a compass needle always pointing in the north.

The aluminum box is fixed with a circular glass plate. By looking at the north pole of the magnetic needle we can find the direction.

Image Source:

Magnetic compass: SSSVV Gallery

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Magnetism	Magnetic compass, Magnetic compass

19. DD_Mariner's compass



- A compass is a navigational instrument that is used by navigators to determine the direction.
- It has a magnetic pointer that aligns to the magnetic field of the earth. The magnetic pointer is marked on the north end.
- The compass has helped the mariners during their travel in deep oceans. It has improved the safety and the efficiency of travel.
- So it is called as mariner's compass.

Image source:

Compass: SSSVV Gallery

Magnetic compass: SSSVV Gallery

Time to teach	Asset Type	Theme	SubTheme
2 Minutes	Day-to-day Relevance	Magnetism	Properties of magnets, Pole Magnetic compass, Law of Finding directions with a ma of magnets, Poles of a mag compass, Law of magnetic directions with a magnet

20. IA_Aurora

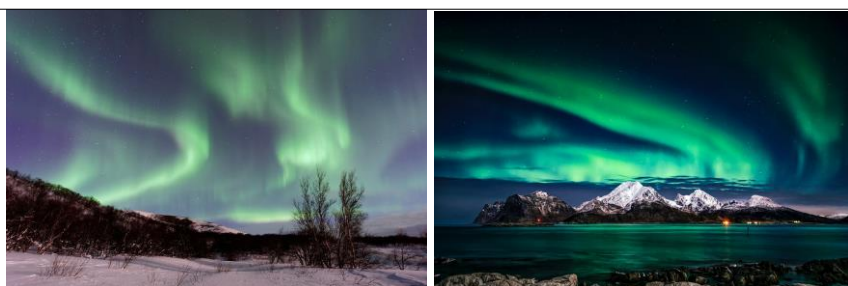


An aurora is a natural phenomena that is seen in the polar sky. It is a display of light in the sky which is caused when charged particles collide directed by the magnetic field of the earth.

People living in the northern parts of the United states or in Canada or in the southern part of the southern hemisphere, are able to see great curtains or streamers of light sweeping through the sky at night, especially during the early spring and autumn season. These lights are called aurora borealis or northern lights, named after the Roman goddess of dawn Aurora, and the Greek name for the north wind, Boreas. In the southern hemisphere these lights are called aurora australis or southern lights.

The sun is continuously sending out streams of electrically charged particles. When these particles reach the earth's magnetic field, they spiral towards the surface of the earth along the lines of magnetic force. Many of these particles collide with air molecules causing the molecules to vibrate and give off the white, red, blue, and green lights that make up the awesome displays of the auroras. These auroras are only seen in the higher latitudes because the earth's magnetic field is strongest at the north and south magnetic poles.

Aurora Australis



<https://www.needpix.com/photo/667601/northern-lights-mountains-aurora-borealis-aurora-australis-solar-wind-aurora-light-phenomenon-light-starry-sky>

<https://pixabay.com/photos/astronomy-aurora-aurora-australis-1866786/>

<https://www.pexels.com/photo/aurora-borealis-1933239/>

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Interesting Asides	Magnetism	Taking care of magnets, Properties of magnets, Poles of a magnet, Types of magnets, Magnetic materials, Non-magnetic materials, Law of attraction and repulsion, Finding directions with a magnet, Discovery of magnets, Making artificial magnets, Properties of magnets, Making artificial magnets, Law of attraction and repulsion, Finding directions with a magnet, Discovery of magnets, Making artificial magnets

21. MS_Ways of storing and handling magnets

Handling and storing magnets:

All the magnets are stored in pairs. They are kept side by side, the north pole is kept next to south pole

Look at the below picture, you will see that magnets are stored with iron or steel pieces that connect the poles. These pieces are called “Keepers”.

When a magnet is hammered or thrown from a height the magnets get demagnetised.

Magnets are kept in closed containers so that they do not attract objects made of magnetic materials.



A horseshoe magnet needs only one keeper

Different ways of taking care of magnets are:

- Magnets should not be dropped or heated.
- While storing magnets they must be kept in pairs with opposite poles lying side by side.
- A piece of wood should be kept between the two magnets.
- Two pieces of soft iron known as keepers must be placed at the poles of the pairs of magnets.
- A single keeper is required for a horse-shoe magnet.

OC: Bar magnet: puttyrevankar@gmail.com

Horseshoe magnet: <https://pixabay.com/vectors/magnet-magnetic-poles-magnetism-297698/>

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Magnetism	Taking care of magnets, Taking care of magnets

22. IA_Magnetic hill



Gravity hill also called as magnetic hill is located in Leh, Ladakh, India. The so-called magnetic hill has become a popular stop for domestic tourists on car journeys. The most interesting fact of this magnetic hill is that the magnetic properties of this hill is so strong that it pulls the cars uphill. If an aircraft passes over this hill, it forces the moving aircraft to increase its altitude.

It is believed that the effect is just an optical illusion. People say that there is no magnetic disturbance in the area at all. The setup and layout around this area and the surrounding slopes creates an optical illusion. The downhill road looks like an uphill road. Thus, a car left out of gear will appear to be rolling uphill against gravity.

The most important factor contributing to the illusion is mostly the horizon. If there is no horizon, judging the slope of a surface is difficult because a reliable reference is not present. Objects that look more or less perpendicular to the ground (such as trees) may actually be leaning, offsetting the visual reference.

<https://www.flickr.com/photos/rohitganda/7573373650> (Attribution - Rohit Ganda)

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Interesting Asides	Magnetism	Taking care of magnets, Properties of magnets, Poles of a magnet, Magnetic compass, non-magnetic material, Law of magnetic poles, Finding directions with magnets, Discovery of magnets, Making artificial magnet, Making artificial magnetic compass, Magnetic and non-magnetic material, Law of magnetic poles, Directions with a magnet, Directions with magnets

23. QA_Fun with magnets - A recap

I. Answer the following in brief.

1. Describe ways in which bar magnets and horse-shoe magnets can be stored.

Answer: Bar magnets are stored in pairs with unlike poles opposite and pieces of soft iron - keepers across the ends.

Horse shoe magnets are stored using a single keeper.

2. List any four uses of magnets.

Answer:

- In compass
- In maglev -trains
- electric motors
- welding
- holding things

3. Define poles of a magnet.

Answer: The magnetic pole is the region at each end of a magnet where the external magnetic field is the strongest.

4. Differentiate between natural and artificial magnets.

Answer:

Natural Magnet	Artificial Magnet
It occurs in nature and is made from lodestone	It is man-made
Irregular in shape	Has definite shape
Weak magnets	Strong magnets

5. What is a magnet?

Answer: A magnet is any material capable of attracting iron and producing a magnetic field outside and around it.

6. Why does a freely suspended magnet point in the north-south direction?

Answer: Earth itself behaves as a magnet which causes a freely suspended magnet (or magnetic needle) to point always in a particular direction.

7.State the properties of magnets.

Answer:

- Magnets attract magnetic materials. Magnetic
- poles that are alike repel each other
- Magnetic poles that are unlike attract each other
- The magnetic effect is strongest at the poles

8.What is a compass?

Answer: A compass is a tool used to show directions. It has a needle that spins and always points north.

II. Answer in a word

1. An example for magnetic substance. _____
2. An example for non-magnetic substance. _____
3. An example for natural magnet. _____
4. An example for strong magnet. _____
5. An instrument with a magnet used to find directions. _____

Suggested Answer: 1. Iron 2. wood 3. lodestone 4. neodymium (Nd) magnets 5. compass

III. Magnetism word search

E	N	E	R	T	H	G	Y	S	T	R	E	P	E	L	T
G	E	L	E	C	T	R	O	M	A	G	N	E	T	S	D
M	A	N	G	C	O	B	A	L	T	N	O	R	E	S	I
F	O	I	R	O	N	E	A	R	T	H	T	M	M	N	R
E	L	C	R	M	F	E	N	E	R	G	Y	A	P	O	E
M	F	K	E	P	O	L	E	S	A	M	A	N	O	R	C
S	O	E	M	A	G	N	E	T	C	E	L	E	R	T	T
E	R	L	T	S	O	U	T	H	T	S	T	N	A	H	I
P	C	E	N	S	T	E	E	L	P	E	R	T	R	T	O
R	E	S	E	N	E	L	E	C	T	E	M	O	Y	S	N

Clue: ATTRACT; COBALT; COMPASS; EARTH; ELECTROMAGNET; ENERGY; FORCE; IRON; MAGNET; NICKEL; NORTH; PERMANENT; POLES; REPEL; SOUTH; STEEL; TEMPORARY

IV. Correct the statements:

1. **Plastic is a material that attracts iron, cobalt and nickel.**

Answer: Magnet is a material that attracts iron, cobalt and nickel.

2. **Natural magnets are made artificially.**

Answer: A natural magnet is a magnet that occurs naturally in nature.

3. **A magnet has many poles.**

Answer: A magnet has two poles.

4. **Like poles attract each other.**

Answer: Like poles repel each other

5. **A freely suspended magnet always points towards the east west direction.**

Answer: A freely suspended magnet always points towards the north south direction.

6. **Attraction is the sure test of magnetism.**

Answer: Repulsion is the sure test of magnetism.

7. **A magnetic compass is a device used to find time.**

Answer: A magnetic compass is a device used to find directions.

8. **A wooden rod is a natural magnet.**

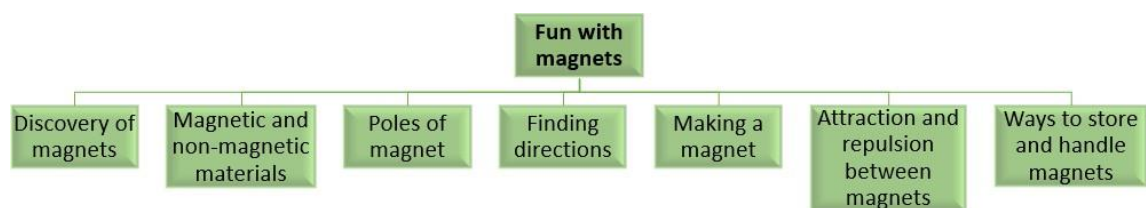
Answer: A lodestone is a natural magnet.

9. **When electricity is passed through the wire wound around the magnet, it is called a light magnet.**

Answer: When electricity is passed through the wire wound around the magnet, it is called an electromagnet.

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Assessments	Magnetism	Taking care of magnets, Properties of magnets, Poles of a magnet, Magnetic compass, non-magnetic material, Law of poles, Finding directions with magnets, Discovery of magnets, Making artificial magnet, Properties of magnetic material, Making a compass, Magnetic and non-magnetic material, Law of magnetic poles, Finding directions with a magnet, Direction of magnetic field lines

24. MS_Summary_Fun with magnets



Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Magnetism	Taking care of magnets, Pro magnets, Poles of a magnet magnets, Magnetic compas non-magnetic material, Law poles, Finding directions wi Discovery of magnets, Taki magnets, Properties of mag magnet, Making artificial ma compass, Magnetic and non material, Law of magnetic p directions with a magnet, Di magnets