Magnetism

Fun With Magnets

IN TEXT QUESTIONS

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Q.1. Name the materials placed on the ground which are picked up by Magnes stick.

Ans. Magnetic materials like iron, nickel, cobalt, etc are attracted (or picked up) by Magnes stick.

Q.2. What about objects in the classroom?

Ans. The objects in the classroom are magnetic materials as well as non-magnetic materials. Materials like iron, nickel, cobalt, etc are magnetic materials. The materials like cloth, plastic, wood, aluminium, glass, etc are non-magnetic materials.

Q.3. Is there any material common in all the objects that were attracted by the magnet? Name it.

Ans. Yes, iron

Q.4. Some materials are given as cloth, plastic, aluminium, wood, glass, iron. Collect the non-magnetic materials.

Ans. Cloth, plastic, wood, glass, etc.

Q.5. Is the soil a magnetic or a non-magnetic material?

Ans. The soil is generally non-magnetic material. But some iron filings are available in the soil which can stick to magnet. Fun with Magnets

Q.6. A tailor was stitching buttons on his shirt. The needle has slipped from his hand onto the floor. How can you help the tailor to find the needle?

Ans. With the help of a bar magnet, we can find the needle.

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Q.7. Does the magnet with iron filings sticking to it look like a bar magnet?

Ans. Yes

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Q.8. Do the materials other than magnet also come to rest in the same direction in the statue of Emperor's chariot?

Ans. No, the materials like iron bar, plastic or wooden scale inside the statue will not come in the same direction.

Q.9. How can you find the direction of your classroom from the main gate of your school?

Ans. With the help of a bar magnet, we can find the direction of the classroom from the main gate of school.

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Q.10. Insert a magnetized needle through a paper cork. Let the cork float in the water placed in a tub in such a way that the cork does not touch the water. Does the needle always point in the same direction when the cork stops rotating?

Ans. Yes, the needle always point in the same direction when the cork stops rotating.

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Q.11. Do the two similar poles attract or repel each other?

Ans. Yes, the two similar poles repel each other.

Q.12. Do the opposite poles attract or repel each other?

Ans. Yes, the two opposite poles attract each other.

Q.13. What will happen if a magnet is brought near a compass?

Ans. When the North pole of a magnet is brought near a compass the South pole of compass is attracted towards it. Similarly, for South pole of magnet, the North pole of needle is attracted towards it.

NCERT Exercises (Questions-Solutions)

EXERCISES

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Q.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) Paper is not a ... material.
(iv) In older days, sailors used to find direction by suspending a piece of....
(v) A magnet always has ... poles.

Ans. (i) Artificial magnets are made in different shapes such as **bar magnet, horse-shoe magnet and cylindrical magnet.**
(ii) The materials which are attracted towards a magnet are called **magnetic materials.**
(iii) Paper is not a **magnetic** material.
(iv) In older days, sailors used to find direction by suspending a piece of **bar magnet.**
(v) A magnet always has **two** poles.

Q.2. State whether the following statements are true or false:
(i) A cylindrical magnet has only one pole.
(ii) Artificial magnets were discovered in Greece.
(iii) Similar poles of a magnet repel each other.
(iv) Maximum iron filings stick in the middle of a bar magnet, when it is brought near them.
(v) Bar magnets always point towards North-South direction.
(vi) A compass can be used to find East-West direction at any place.
(vii) Rubber is a magnetic material.

Ans. (i) False, as each magnet has two poles, i.e. North and South.
(ii) True, it is considered that first magnet was discovered by a shepherd named Magnes, who lived in Greece.
(iii) True
(iv) False, maximum iron filing get stick up at the two ends of the magnet.
(v) True
(vi) True,
(vii) False, as rubber does not attract towards a magnet.

Q.3. It was observed that a pencil sharpener gets attracted by both the poles of a magnet although, its body is made up of plastic. Name a material that might have been used to make some part of it.

Ans. Since a pencil sharpener contains a blade which is made up of iron. Hence, it gets attracted by both the poles of a magnet.

Q.4. Column I shows different position in which one pole of a magnet is placed near that of the other. Column II indicates the resulting action between them for each situation. Fill in the blanks.

Column I	Column II

N-N	……
N-...	Attraction
S-N	……..
...-S	Repulsion

Ans. As we know that like poles of a magnet repel each other and unlike poles attract each other.
Thus, the complete table is shown as below:

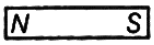
Column I	**Column II**
N-N	Repulsion
N-S	Attraction
S-N	Attraction
S-S	Repulsion

Q.5. Write any two properties of a magnet

Ans. The two properties of a magnet are as follows
(i) A magnet has two poles: North and South always.
(ii) It attracts magnetic materials like iron, nickel or cobalt.

Q.6. Where are poles of a bar magnet located?

Ans. The poles of a bar magnet are located at the two ends of a bar magnet as shown below:



Magnet

These two poles are North pole (N) and South pole (S).

Q.7. A bar magnet has no markings to indicate its poles How would you find out' near which end is its North pole located?

Ans. We can find out a direction by freely suspending a bar magnet. We will find that freely suspended bar magnet always comes to reset in a North- South direction. The end of the magnet that points towards North is called North pole. The other end that points towards South is called South pole.

Q.8. You are given and iron strip. How will you make it into a magnet?

Ans. We can convert an iron strip into a bar magnet by the following method:
(i) Take an iron strip.
(ii) Place it on the table.
(iii) Now, take a bar magnet and place one of its poles near one edge or the bar of iron.
(iv) Without lifting the bar magnet, move it along the length of iron strip till we reach the other end.
(v) Now, lift the magnet and bring the pole (the same pole we started with) to the same point of the iron strip from which we began.
(vi) Now, move the magnet again along the iron bar in the same direction as we did before.
(vii) Repeat this process about 30-40times.
(viii) Bring a pin or some iron fillings near the iron strip to check whether it has become a magnet.
If not, continue the process for some more time
Note The pole of the magnet and direction of its movement should not change in this process

Q.9. How is compass used to find directions?

Ans. Compass is a device that was developed based on the property of magnet.
Construction A compass is usually a small box with a glass cover on it. A magnetised needle is pivoted inside the box which can rotate freely. The compass also has a dial with direction marked on it.

Working The compass is kept at the place, where we wish to know the direction. Its needle indicates the North-South direction, when it comes to the rest. The compass is then rotated until the North and South marked on the dial are at the two ends of the needle.
To identify the North pole of the magnetic needle, it is generally painted in a different colours.

Q.10. A magnet was brought from different directions towards a toy boat that has been floating in water in a tub. Affect observed in each case is stated in Column I. Possible reasons for the observed affects are mentioned in Column II. Match the statements given in Column I with those in Column II.

	Column I		Column II
(i)	Boat gets attracted towards the magnet	(a)	Boat is fitted with a magnet with North pole towards its head
(ii)	Boat is not affected by the magnet	(b)	Boat is fitted with a magnet with South pole towards its head
(iii)	Boat moves towards the magnet, if North pole of the magnet is brought near its head	(c)	Boat has a small magnet fixed along its length
(iv)	Boat moves away from the magnet when North pole is brought near its head	(d)	Boat is made of magnetic material
(V)	Boat floats without changing its direction	(e)	Boat is made up of a non-magnetic material

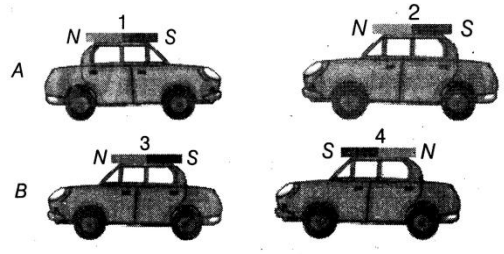
Ans.

	Column I		Column II
(i)	Boat gets attracted towards the magnet	(d)	Boat is made of magnetic material
(ii)	Boat is not affected by the magnet	(e)	Boat is made up of non-magnetic material
(iii)	Boat moves towards the magnet, if North pole of the magnet is brought near its head	(b)	Boat is fitted with a magnet with South pole towards its head
(iv)	Boat moves away from the magnet when North pole is brought near its head	(a)	Boat is fitted with a magnet with North pole towards its head
(v)	Boat floats without changing its direction	(c)	Boat has a small magnet fixed along its length

NCERT Exemplar (Problems-Solutions)

MULTIPLE CHOICE QUESTIONS

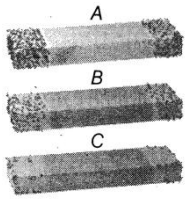
Q 1. Observe the pictures A and B given in figure carefully.



Which of the following statements is correct for the above given pictures?
(a) In A, cars 1 and 2 will come closer and in B, cars 3 and 4 will come closer.
(b) In A, cars 1 and 2 will move away from each other and in B, cars 3 and 4 will move away.
(c) In A, cars 1 and 2 will move away and in B, 3 and 4 will come closer to each other.
(d) In A, cars 1 and 2 will come closer to each other and in B, 3 and 4 will move away from each other.

Ans. (d) In A, cars 1 and 2 will come closer to each other because North and South poles attract each other, while in B, car 3 and 4 will move away from each other because North and South poles repel each other.

Q 2. Three magnets A, B and C were dipped one by one in a heap of iron filings. Figure shows the amount of the iron filings sticking to them.



The strength of these magnets will be

Ans. (a) As we can see from the diagram that amount of iron filings in A is greater than B and C and in B, it is greater than C. So, the strength of magnets will be according to the amount of iron filing only.

Q 3. North pole of a magnet can be identified by
(a) another magnet having its poles marked as North pole and South pole
(b) another magnet no matter whether the poles are marked or not
(c) using an iron bar
(d) using iron filings

Ans. (a) North or South pole can be identified only if we have another magnet having its poles marked as North pole and South pole because only then we can see the attraction and repulsion between N-S and N-N respectively.

Q 4. A bar magnet is immersed in a heap of iron filling and pulled out. The amount of iron filing clinging to the
(a) North pole is almost equal to the South pole

(b) North pole is much more than the South pole
(c) North pole is much less than the South pole
(d) magnet will be same all along its length

Ans. (a) A bar magnet is immersed in a heap of iron filing and pulled out. The amount of iron filing clinging to the North pole is almost equal to the South pole because in a magnet, the strength of both poles is same.

VERY SHORT ANSWER TYPE QUESTIONS

Q 5. Fill in the blanks:
(i) When a bar magnet is broken, each of the broken part will have ..... pole/poles.
(ii) In a bar magnet, magnetic attraction or ..... is near its ends.

Ans. (i) Two (ii) repulsion

Q 6. Paheli and her friends were decorating the class bulletin board. She dropped the box of stainless steel pins by mistake. She tried to collect the pins using a magnet. She could not succeed. What could be the reason for this?

Ans. She could not succeed because the stainless steel pins are not made of iron, so they are not attracted towards magnet.

Q 7. How will you test that the 'tea dust' is not adulterated with iron powder?

Ans. We can do simple experiment for this:
(i) Take tea dust on a paper.
(ii) Take a bar magnet in your hand.
(iii) Shake the bar magnet over this dust.
(iv) If some particles are attracted strongly towards this magnet, then definitely tea dust will have iron powder.

Q 8. 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 as shown in figure alongside:

(i) Which regions of the magnet have more iron filings sticking to it?
(ii) What are these regions called?

Ans. (i) Pole regions of the magnet have more iron filings sticking to it.
(ii) These are called North pole and South pole respectively.

Q 9. Four identical iron bars were dipped in a heap of iron filings one by one. Figure shows the amount of iron filings sticking to each of them.

(a) **(b)**

(c) **(d)**

(a) Which of the iron bar is likely to be the strongest magnet?
(b) Which of the iron bar is not a magnet? Justify your answer.

Ans. (a) Iron bar (a) seems to be the strongest magnet because it has maximum amount of iron filings attracted.
(b) Iron bar (b) is not a magnet because no iron filings have been attracted by it.

Q 10. A toy car has a bar magnet laid hidden inside its body along its length. Using another magnet how will you find out which pole of the magnet is facing the front of the car?

Ans. If we face North pole towards the front side of the car and the car is attracted, it means its front side pole is South pole and if it is going away, it means its front side is North pole.

Q 11. Match Column I with Column II (One option of I can match with more than one option of II)

Column I	Column II
(a) Magnet attracts	(i) rests along a particular direction
(b) Magnet can be repelled	(ii) iron
(c) Magnet if suspended freely	(iii) by another magnet
(d) Poles of the magnet can be identified by	(iv) iron filings

Ans.

Column I	Column II
(a) Magnet attracts	(i) iron filings
(b) Magnet can be repelled	(ii) by another magnet
(c) Magnet if suspended freely	(iii) rests along a particular direction
(d) Poles of the magnet can be identified by	(iv) iron

Q 12. You are provided with two identical metal bars. One out of the two is a magnet. Suggest two ways to identify the magnet.

Ans. **Ist way** Hang the metal bars with a thread and having its level horizontal one by one and let it stop in any direction. Now, if we move it by pushing it slowly and it returns to the same direction, it means it is a magnet otherwise it is an iron bar simply.

Ist way Take some iron filings and move the iron bars over these iron filings one by one. If iron filings are attracted very strongly at poles, then it is magnet and if it is not attracted, then it is simply an iron bar.

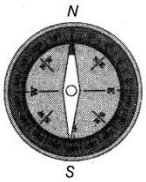
LONG ANSWER TYPE QUESTIONS

Q 13. Three identical bars are kept on a table. Two out of three bars are magnets. In one of the magnet the North-South poles are marked. How will you find out which of the other two bars is a magnet? Identify the poles of this magnet.

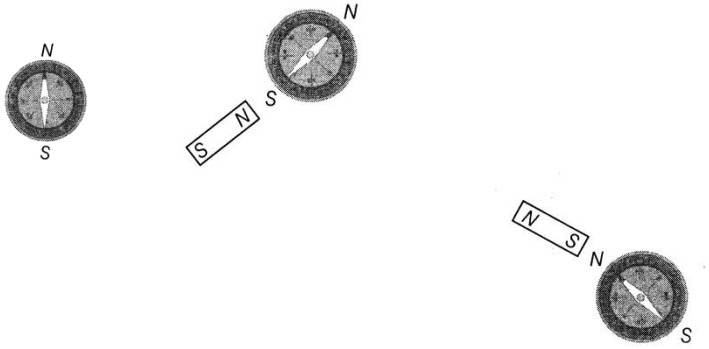
Ans. To find out the magnet:
(i) Take the bar magnet A in your hand.
(ii) Take the bar magnet B in other hand.
(iii) Bring one side of B towards South pole and note down it is attracted or repelled.
(iv) Bring other side of B towards South pole and again note down the same thing.
(v) If there is attraction in both cases (iii) and (iv), then it is definitely a iron bar.
(vi) If there is attraction in one case and repulsion in other case, then it is a bar magnet.

(vii) Do the same for the iron bar C.
To find out the poles:
If in case (iii), the bar is attracted, then it is North pole of the identified bar magnet. If bar is repelled, then it is obviously a South pole of the identified bar magnet.

Q 14. Given figure shows a magnetic campass. What will happen to the position of its needle if you bring a bar magnet near it? Draw a diagram to show the effect on the needle on bringing the bar magnet near it. Also draw the diagram to show the effect when the other end of the bar magnet is brought near it.



Ans.



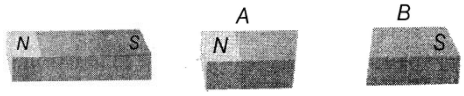
As shown in figures. North pole will be far apart as we bring more near to the compass needle and it will be closer to it when we bring the South pole towards it.

Q 15. Boojho kept a magnet close to an ordinary iron bar. He observed that the iron bar attracts a pin as shown in figure.

What inference could he draw from this observation? Explain.

Ans. When we place any iron bar near a bar magnet, it becomes a magnet temporary and small objects like pin, iron filings can be attracted by it. But when we remove this bar from magnet, it again becomes an iron bar and does not attract the small irony objects.

Q 16. A bar magnet is cut into two pieces A and B, from the middle as shown in figure.



Will the two pieces act as individual magnets? Mark the poles of these two pieces. Suggest an activity to verify your answer.

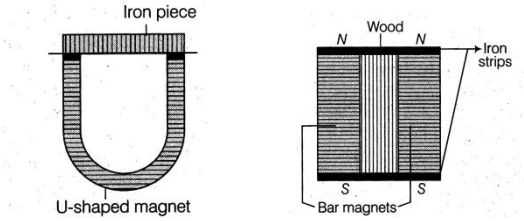
Ans.

Yes, two piece will work as an individual magnets because a monopole (single pole) of magnet never exists.
Activity
(a) Place the magnet, so formed (A and B) on the table.

(b) Bring the North pole of both magnets towards each other, they will be repelled.
(c) Bring the North and South poles of both magnets towards each other, they will be attracted.

Q 17. Suggest an arrangement to store a U-shaped magnet. How is this different from storing a pair of bar magnets?

Ans. It is suggested way shown in figure below:



U-shaped magnet is kept along with an iron piece, while bar magnets are kept along with iron strips and magnets separated by wood along their length.