



DR. R. N. INTERNATIONAL SCHOOL

**UNDER THE AGIS OF S. S. SITARAMSINGH EDUCATIONAL AND CHARITABLE
TRUST**

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4. Exploring Magnets

Word Meaning

1. Magnet – चुंबक
2. Magnetic – चुंबकीय
3. Non-magnetic – अचुंबकीय
4. Pole – ध्रुव
5. Compass – कुतुबनुमा / दिशा सूचक यंत्र
6. Attraction – आकर्षण
7. Repulsion – प्रतिकर्षण / विकर्षण
8. Lodestone – प्राकृतिक चुंबक पत्थर
9. Shape – आकार
10. Property – गुण
11. Alignment – संरेखण / एक सीध में आना
12. Thread – धागा
13. Suspended – स्वतंत्र रूप से लटका हुआ
14. Deflect – विक्षेपित होना / मुड़ना
15. Force – बल
16. Iron filings – लोहे का बुरादा
17. Hammer – हथौड़ा मारना

- 18. Interaction – परस्पर क्रिया
- 19. Storage – भंडारण / सुरक्षित रखना
- 20. Navigate – दिशा खोजना / मार्गदर्शन करना

Solved Textbook Exercises

A. Choose the correct option.

- 1. What are the two poles of a magnet called?
 - **Answer:** b. North and South
- 2. Which of the following is a magnetic material?
 - **Answer:** c. Iron
- 3. What happens when the North Pole of one magnet is brought closer to the North Pole of another magnet?
 - **Answer:** b. They repel
- 4. Which device helps people find directions using a magnet?
 - **Answer:** c. Compass
- 5. How should magnets be stored to maintain their strength?
 - **Answer:** c. In pairs with unlike poles on the same side

B. Fill in the Blanks.

- 1. A freely suspended magnet always points in the **North and South** direction.
- 2. Materials that are not attracted to magnets are called **non-magnetic** materials.
- 3. The earliest known magnets were natural rocks called **lodestones**.
- 4. Like poles of magnets **repel** each other, while unlike poles attract each other.
- 5. The Earth acts like a giant **magnet**, which is why compasses work.

C. Write T for true and F for false statements.

- 1. The North Pole of a magnet always attracts the North Pole of another magnet. — **False (F)**
- 2. A magnet can only attract metals like iron, nickel, and cobalt. — **True (T)**
- 3. Lodestones are artificial magnets made by humans. — **False (F)**
- 4. Magnetic force is strongest at the poles of a magnet. — **True (T)**
- 5. A compass needle is not a magnet. — **False (F)**

D. Match the following columns.

1. North Pole - **Attracts South Pole**
2. South Pole – **Repels South pole**
3. Lodestone - **Provides energy**
4. Magnetic Compass - **c. Finds directions**

E. Answers the following questions in 20-30 words.

1. What is a magnet?

An object or material that produces a magnetic field and has the ability to attract specific metals like iron, nickel, and cobalt.

2. Name two magnetic materials.

Iron and nickel are two common magnetic materials that are strongly attracted to magnets.

3. What is the purpose of a compass?

The primary purpose of a compass is to find geographic directions (North, South, East, and West), which helps in navigation during travel.

4. How does the Earth act like a magnet?

The Earth behaves like a giant magnet with its own magnetic fields, causing any freely suspended magnet or compass needle to align along its north-south axis.

5. What happens when you bring two South Poles of magnets together?

Since they are like poles, they will experience a repulsive force and push away from each other.

6. Write any five examples of magnetic and non-magnetic materials.

- **Magnetic:** Paper clip (iron), metal spoon, iron nail, nickel coin, cobalt wire.
- **Non-magnetic:** Pencil (wood), eraser (rubber), plastic bottle cap, glass marble, paper.

7. How can you make a simple compass at home?

Magnetize a steel needle by rubbing it with a bar magnet in one direction, then insert it into a floating cork placed inside a bowl of water.

8. Why is it important to store magnets properly?

Proper storage ensures they retain their magnetic strength over time and prevents them from getting demagnetized due to heat, drops, or improper alignment.

9. What is the significance of the North Pole in a magnet?

The North Pole is the end of a freely suspended magnet that seeks or points towards the Earth's geographic North direction.

10. Can magnetic force pass through materials like plastic or glass?

Yes, magnetic forces can easily pass through non-magnetic materials like plastic, glass, cardboard, and wood without being blocked.

F. Answers the following questions in 60-80 words.

1. Explain how a compass works and its importance.

- **Answer:** A magnetic compass contains a small, lightweight needle made of a magnet that is balanced on a pivot so it can rotate freely. When kept on a flat surface, this needle aligns itself with the Earth's magnetic field and always points in the geographic north-south direction. Its importance lies in navigation; it helps travelers, sailors, and pilots find their way accurately across oceans, thick forests, or unfamiliar places.

2. Differentiate between magnetic and non-magnetic materials.

- **Answer:**
 - **Magnetic Materials:** Materials that are strongly attracted to a magnet and can be magnetized are called magnetic materials. Examples include iron, nickel, and cobalt.
 - **Non-magnetic Materials:** Materials that do not show any attraction toward a magnet under normal conditions are called non-magnetic materials. Examples include wood, plastic, rubber, paper, and glass.

3. How do magnets interact when their opposite poles are brought together? What about like poles?

- **Answer:** When opposite poles of two magnets (such as a North pole brought near a South pole) come close, they exert an attractive force on each other and pull together tightly. On the other hand, when like poles (such as North near North, or South near South) are brought close together, they experience a repulsive force, meaning they push away from one another.

4. Why does a magnet always point in the north-south direction when suspended freely?

- **Answer:** A freely suspended magnet always rests in the north-south direction because the Earth behaves like a giant magnet with its own magnetic poles. The Earth's invisible magnetic field exerts a continuous rotational force on the suspended magnet, turning it until its North pole faces the Earth's magnetic North and its South pole faces the magnetic South.

5. How can you test whether a material is magnetic or not using a magnet?

- **Answer:** To test the material, take a bar magnet and bring it close to the given object. Observe the behavior: if the object gets pulled toward the magnet or sticks to it, it is confirmed to be a magnetic material (like iron). If the object shows no movement

and remains completely unaffected, it is categorized as a non-magnetic material (like plastic or wood).

6. Discuss the uses of magnets in everyday life.

- **Answer:** Magnets have various essential applications in our daily lives:
 - They are primary components in compasses used for finding geographic directions.
 - They keep pencil boxes, refrigerator doors, and handbags securely closed.
 - They are used inside speakers, microphones, and hard drives to store digital data.
 - In medicine, powerful electromagnets are vital for running MRI machines to take inner body scans.

7. What happens when a magnet is cut into smaller pieces?

- **Answer:** When a magnet is broken or cut into smaller pieces, each individual piece automatically becomes a complete, functional magnet on its own. A new North pole and South pole instantly develop at the broken ends of each fragment. In physics, it is scientifically impossible to isolate a single magnetic pole (monopole); magnets always exist in pairs.

8. How does the Earth's magnetic field influence a compass?

- **Answer:** The Earth's magnetic field acts as a global guiding force. Because a compass needle is actually a miniature magnet itself, it reacts dynamically to this planetary magnetic field. The field exerts magnetic forces that pull and twist the needle until it perfectly aligns parallel to the Earth's field lines, thus continuously pointing out the north-south direction.

G. Assertion/Reason Questions

1. Assertion: A freely suspended magnet always points in north-south.

Reason: The Earth acts like a giant magnet, aligning the suspended magnet.

- **Correct Option: a.** Both A and R are true, and R explains A.

2. Assertion: A magnetic compass is used to find directions.

Reason: The compass needle is not affected by other magnetic fields.

- **Correct Option: c.** A is true, but R is false.

3. Assertion: Like poles of two magnets repel each other.

Reason: Like poles create a stronger magnetic force when brought close together.

- **Correct Option: c.** A is true, but R is false.

H. Higher-Order Thinking Questions (HOTS)

1. If a compass always points north, how might this affect its use near the Earth's magnetic poles?

- **Answer:** At or near the Earth's magnetic poles, the magnetic field lines point vertically straight down into the ground rather than horizontally. Because the compass needle is designed to rotate horizontally, it will lose its direction-finding capability, become erratic, point downward, or spin randomly, making it useless for navigation there.

2. What would happen if a magnet were taken into space where the Earth's magnetic field is weak?

- **Answer:** In deep space where the Earth's magnetic field is weak or negligible, there is no significant external magnetic alignment force acting on it. A freely suspended magnet or compass needle will not orient itself in any specific direction; it will float or spin aimlessly depending on any initial force applied to it.