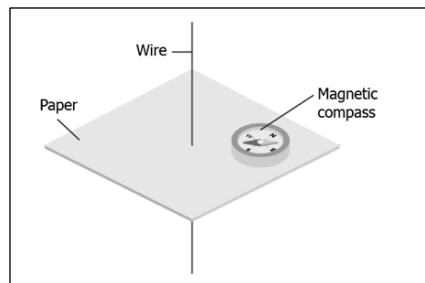


	INDIAN SCHOOL AL WADI AL KABIR		
CLASS: VIII	DEPARTMENT: SCIENCE 2026-2027	DATE: 07/05/2026	
WORKSHEET NO:3 WITH ANSWERS	TOPIC: ELECTRICITY: MAGNETIC AND HEATING EFFECTS	NOTE: A4 FILE FORMAT	
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.	

- Why do household circuits have safety devices in place?
 - To increase the magnetic field.
 - To minimise the heating effect of electric current.
 - To make the circuit more decorative.
 - To make the circuit reusable.
- An electric room heater uses a long coil of wire called the heating element. What special property does this wire material have to make the heater effective?
 - It must have very low resistance.
 - It must be a poor conductor of electricity.
 - It must be made of pure copper.
 - It must offer high resistance to the flow of current.
- A repair person opens a broken electric bell and finds a coil of wire wrapped around an iron piece. What is the function of this specific component within the electric bell?
 - It converts electrical energy directly into sound energy.
 - It acts as a temporary magnet only when current passes.
 - It is a permanent resistor used to limit the current flow.
 - It converts mechanical energy into electrical energy.

4. A student performed an experiment where he placed a magnetic compass near a current-carrying wire. She notices some deflection in the compass needle. What causes the deflection of the needle in the compass?

- (a) Magnetic effect of the electric current
- (b) Electric effect of the magnetic compass
- (c) Magnetic effect of the compass on paper
- (d) Electric effect of the paper on the compass



5. The discovery that electricity and magnetism are linked was made by which scientist?

- (a) Alessandro Volta
- (b) Luigi Galvani
- (c) Hans Christian Oersted
- (d) Thomas Edison

6. Which of the following would make an electromagnet with the greatest strength?

- (a) A coil with a few turns and a single cell.
- (b) A coil with a large number of turns and a battery of 2 cells.
- (c) A coil with a few turns and a battery of 2 cells.
- (d) A coil with a large number of turns and a single cell.

7. Which of the following describes the key principle behind the working of a Voltaic cell?

- (a) Magnetic effect of electric current
- (b) Heating effect of electric current
- (c) Chemical reactions between electrodes and electrolyte
- (d) The use of a dry paste instead of a liquid

For question numbers 8-10, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (A), (B), (C), and (D) as given below -

- (A) Both A and R are true, and R is the correct explanation of the assertion.**
- (B) Both A and R are true, but R is not the correct explanation of the assertion.**
- (C) A is true, but R is false.**
- (D) A is false, but R is true.**

8. **Assertion (A):** The polarity (North and South poles) of an electromagnet can be reversed.

Reason (R): The direction of current in the coil can be reversed, which changes the

polarity of the electromagnet.

9. **Assertion (A):** The Earth behaves like a giant magnet.

Reason (R): The movement of liquid iron in the crust creates electric currents, which generate a magnetic field.

10. **Assertion (A):** In a dry cell, the central carbon rod acts as the negative terminal, and the zinc container acts as the positive terminal.

Reason (R): The chemical reactions within a cell convert chemical energy into electrical energy.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. Discuss the advantages of using rechargeable batteries over dry cells. (WB.Q.B.4)

[Hint: The dry cell is a single-use cell; once it is used up, it has to be disposed of, whereas rechargeable batteries can be recharged and reused multiple times.]

2. Mention some of the problems that can arise due to the heating effect of electric current.

[Hint: The heating effect of electric current can cause problems like energy loss in wires during transmission. Overheating in appliances may cause damage to plugs and sockets, where plastic parts may melt, or even lead to fires.]

3. Why does the compass needle get deflected when placed near a current-carrying wire?

[Hint: The compass needle gets deflected because the current in the wire produces a magnetic field, which exerts a force on the needle, causing it to change direction.]

4. State two uses of lifting electromagnets.

[Hint: Lifting electromagnets are widely used in factories and scrap yards to move, lift, and sort heavy metal items efficiently.]

5. How is an electromagnet different from a permanent magnet? (WB A.2)

[Hint: An electromagnet is a current-carrying coil that behaves like a magnet.

An electromagnet works only when electric current flows; its magnetism disappears when the current stops. But a permanent magnet is always magnetic, even without current.]

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. Differentiate between a Voltaic cell and a Dry cell based on the state and material of their internal components.

Hint:

Feature	Voltaic Cell	Dry Cell
State of electrolyte	Contains a liquid electrolyte (usually a weak acid or salt solution)	Contains a paste-like electrolyte (thick, moist paste)
Material of container/electrodes	It contains two metal plates made of different materials and an electrolyte, placed in a glass or plastic container.	The zinc container acts as the negative terminal, and a carbon rod with a metal cap acts as the positive terminal.

2. State the ways by which the strength of an electromagnet can be changed.

[Hint: The strength of an electromagnet can be changed in the following ways:

- **Changing the current: Increasing the current in the coil increases the magnetic field, making the electromagnet stronger. Decreasing the current weakens it.**
- **Changing the number of turns in the coil: More turns of wire in the coil produce a stronger magnetic field. Fewer turns make it weaker.**
- **Using a different core material: Using a highly magnetic material like soft iron as the core strengthens the electromagnet. A less magnetic material weakens it.]**

3. What is meant by the heating effect of electric current? Mention its industrial applications.

[Hint: When electric current passes through a conductor, it gets heated. This warming is known as the heating effect of electric current. The heating effect of electric current is used in steel manufacturing industries, where a specially designed high-temperature electric furnace melts and recycles scrap steel to produce usable steel.]

4. (i) How does the heating of a nichrome wire change when you use 2 cells instead of 1? Explain.

[Hint: Observation: The wire heats up more quickly and becomes hotter with 2 cells compared to 1 cell.

Reason: The heat generated in a wire depends on the magnitude of the electric current. Using 2 cells increases the current, so more heat is produced in the same duration.]

(ii) How does the thickness of the Nichrome wire affect the heat produced?

[Hint: Thinner wire produces more heat; thicker wire produces less heat.]

5. (i) How can you make a simple electromagnet?



[Hint: Wrap a flexible insulated wire tightly around an iron nail, connect the ends of the wire to a cell, and an electric current passing through the wire will make the nail act as a magnet.]

(ii) What happens when like and unlike poles of two electromagnets are brought together?
(WB.Q.B.2)

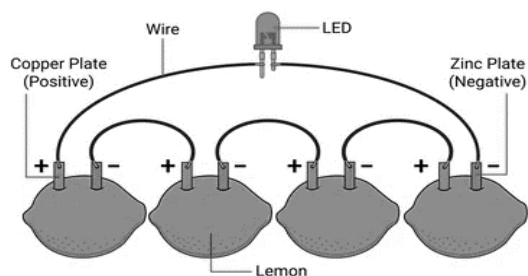
[Hint: Just like a magnet, an electromagnet also has two poles — North and South. When two electromagnets are brought close to each other, their unlike poles (North–South) attract and like poles (North–North/ South–South) repel each other.]

IV. LONG ANSWER TYPE QUESTIONS (5M):

1. Describe an activity to construct a simple electric cell using a lemon. Explain the materials required, the electrodes, the electrolyte and the procedure involved. (WB.Q.B.1)

[Hint: Materials required- Few juicy lemons, copper wires/ strips, iron nails, one LED and some connecting wires. The metal electrodes are the copper wires and iron nails; the electrolyte is the lemon juice.]

Procedure: Insert the copper wire and the iron nail in one of the lemons, keeping them apart by a small distance. Repeat the above step for all the remaining lemons. Join the copper wires and nails. Connect the LED between the copper wire of the first lemon and the iron nail of the last lemon, using connecting wires. The LED glows when the positive terminal (longer wire) of the LED is connected to the positive terminal of the battery, and the negative terminal (shorter wire) of the LED is connected to the negative terminal of the battery.]



2. Explain how the flow of electric current produces heat in a conductor? Describe an activity to demonstrate it. (WB.Q.B.3)

[Hint: When electric current flows through any conductor, it faces some opposition or resistance to its flow. Different conductors offer different levels of resistance to the flow of current. This resistance causes some of the electrical energy to be converted into heat energy.]



Fig. 4.5: Heating effect in a wire

Activity: Take a cardboard piece, two nails, a nichrome wire, an electric cell, a cell holder, a switch, and connecting wires. Mount the nails on the cardboard about 5 cm apart. Tie the nichrome wire between these nails and make the connections. Touch the nichrome wire. The nichrome wire feels warm when current is passed through it.]

V. CASE STUDY- BASED QUESTIONS/PASSAGE-BASED QUESTIONS:

In a bustling recycling plant, a large crane operator, named Arjun, controls a powerful lifting electromagnet to sort and move heavy metal waste. He uses a switch in his control cabin to turn the magnet on and off. When he turns the switch ON, the electromagnet attracts and lifts huge pieces of scrap metal. As he moves the crane over the collection bin, he turns the switch OFF, and the metal pieces fall cleanly into place. This process is highly efficient and safe, allowing the recycling plant to handle large quantities of metal waste quickly and effectively.

(i) Can the lifting electromagnet lift a heavy piece of plastic? Justify your answer.

[Hint: No, plastic is not a magnetic material and hence it is not attracted by the electromagnet.]

(ii) Why do the metal pieces fall when Arjun turns the switch OFF?

[Hint: When the current is switched OFF, the magnetic field disappears and the metal pieces are released.]

(iii) Why is an iron core used in lifting electromagnets?

[Hint: Most electromagnets used in practical applications, such as lifting electromagnets, have an iron core because it makes the electromagnet much stronger.]

ANSWERS FOR QUESTIONS 1 TO 10

1. (b) To minimise the heating effect of electric current.
2. (d) It must offer high resistance to the flow of current.
3. (b) It acts as a temporary magnet only when current passes.
4. (a) Magnetic effect of the electric current
5. (c) Hans Christian Oersted
6. (b) A coil with a large number of turns and a battery of 2 cells.
7. (c) Chemical reactions between electrodes and electrolyte
8. (A) Both A and R are true, and R is the correct explanation of the assertion
9. (C) A is true, but R is false
10. (D) A is false, but R is true

<i>Prepared by:</i> <i>Ms Neena Alex</i>	<i>Checked by:</i> <i>HOD Science</i>
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