11
Chapter

Chemical Effects of Electric Current

We'll cover the following key points:

- Liquids Conduct Electricity
- Chemical Effects of Electric Current
- Electroplating

Hi, I'm EeeBee

Do you Remember:

Fundamental concept in previous class.

In class 7th we learnt

- Chemical Change

Still curious? Talk to me by scanning the QR code.

Learning Outcomes

By the end of this chapter, students will:

- Gain an understanding of electric current and its significance in daily life.
- Explore how electrolytes enable the flow of electric current and their key properties.
- Learn about electrolysis, its industrial applications, and the chemical effects of electric current.
- Apply theoretical concepts through experiments to analyze and interpret the chemical effects of electricity.

Guidelines for Teachers

To ensure effective learning, teachers can:

- Simplify Concepts: Clearly explain electric current, electrolytes, and chemical effects.
- Show Practical Relevance: Highlight real-life applications of electrolysis.
- Interactive Learning: Conduct hands-on experiments and activities.
- Stress Safety: Teach precautions for experiments involving current and electrolytes.

NCF Curricular Goals and Competencies

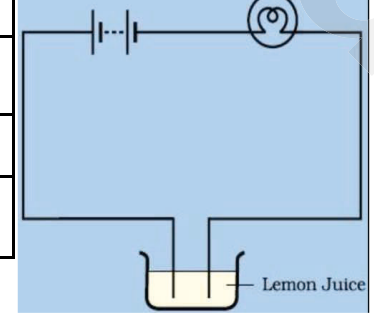
- CG-1 (C 1.2): Examines the properties, composition, and behavior of matter.
- CG-6 (C 6.1): Enhances scientific inquiry and understanding through exploration, experimentation, and critical thinking.

Mind Map

CHEMICAL EFFECTS OF ELECTRIC CURRENT

Liquids Conduct Electricity

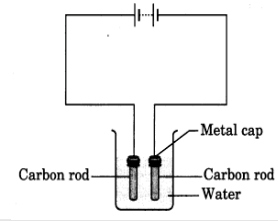
S.no.	Material	Compass Needle Shows Deflection Yes/No	Good Conductor / Poor Conductor
1.	Lemon juice	Yes	Good Conductor
2.	Vinegar	Yes	Good Conductor
3.	Tap water	Yes	Good Conductor
4.	Vegetable oil	No	Poor Conductor
5.	Milk	Yes	Good Conductor
6.	Honey	No	Poor Conductor
7.	Soda	Yes	Good Conductor
8.	Distilled water	No	Poor Conductor
9.	Kerosene oil	No	Poor Conductor
10.	Curd and water	Yes	Good Conductor



Chemical Effects of Electric Current

Electric current in solutions causes chemical reactions, leading to gas bubbles, metal deposits, and color changes, influenced by solution and electrode choice.

NOTE: In 1800, British chemist William Nicholson demonstrated electrolysis of water: Oxygen at the positive electrode, hydrogen at the negative.



Electroplating

The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating.

Uses: Electroplating coats metal objects with a different metal for improved properties, e.g., chromium on car parts, taps, and more.

A simple circuit showing electroplating

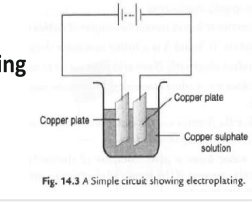
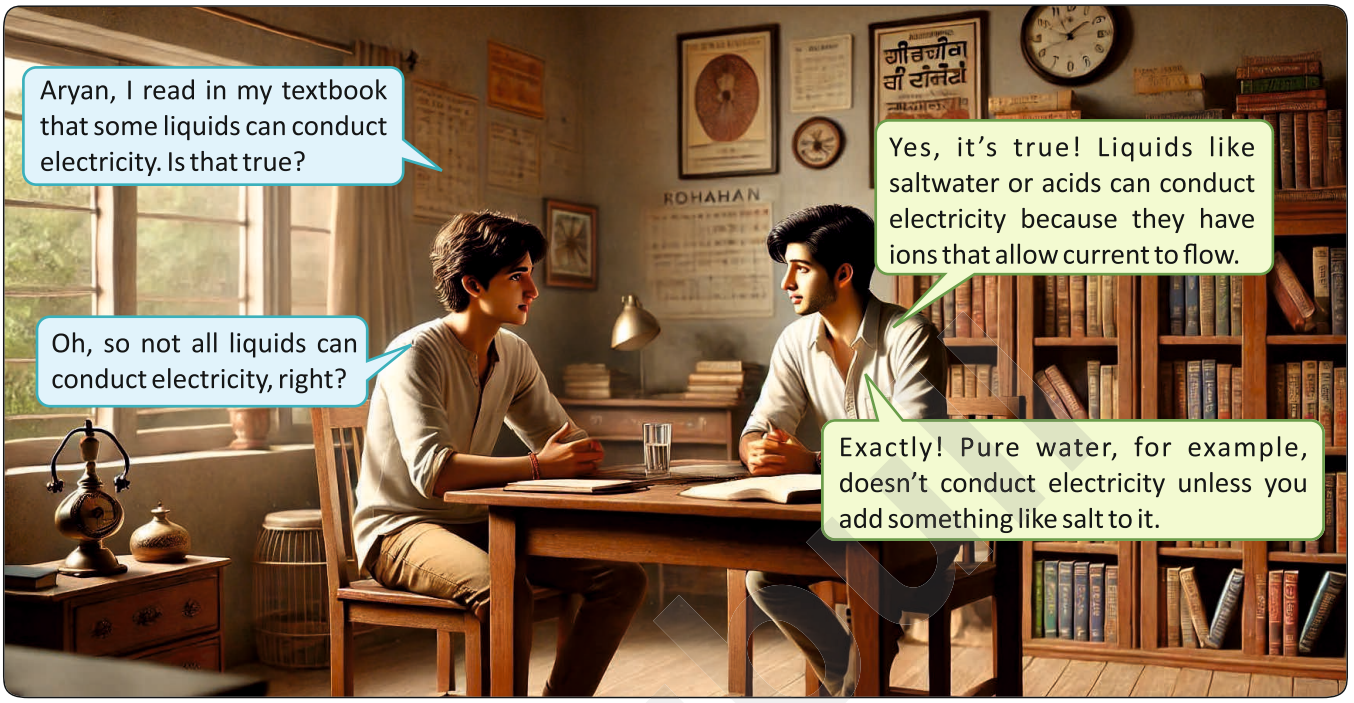


Fig. 14.3 A Simple circuit showing electroplating.

Based on NCERT*

Liquids Conduct Electricity

One evening, Rohan was working on his science homework when his friend, Aryan, stopped by to visit.



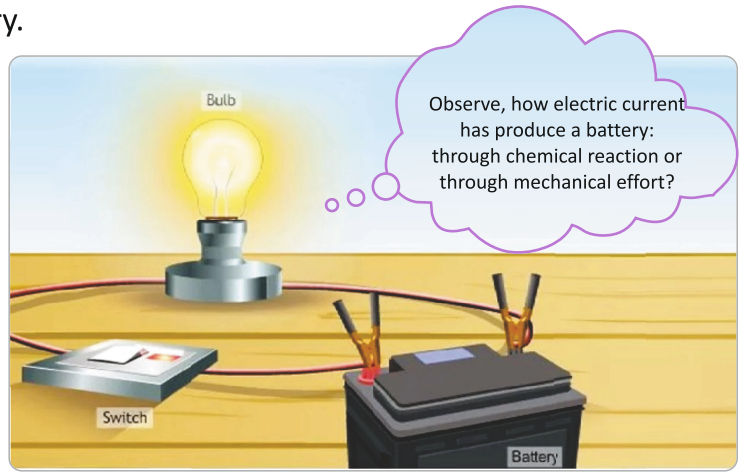
In History...

The discovery of the chemical effects of electric current dates back to 1800, when Italian scientist Alessandro Volta invented the first battery, known as the **Voltaic Pile**. This invention produced a steady electric current and led to the understanding that electricity could cause chemical reactions. In 1834, **Michael Faraday** further explored this phenomenon and discovered the laws of electrolysis, demonstrating how electric current could break down compounds into their elements. Faraday's work laid the foundation for numerous applications, such as electroplating and electrorefining, that we still use today.

In the given picture, a bulb is lit using a battery.

Electric current

Electric current is the flow of electric charge through a material. In the previous classes, we have learned about the heating and magnetic effects of electric current. In this chapter, we will learn about the chemical effects of current.



Conductors and insulators

We have learned about substances that allow the current to flow through them. These substances are called conductors. All metals are considered to be conductors of electricity but some metals such as gold, silver and copper are able to conduct electricity better than the other metals. There are, however, some substances that do not allow electric current better than the other metals. There are, however, some substances that do not allow electric current to flow through them. Such substances are called insulators (or poor conductors). Wood, glass, and plastic are examples of insulators. Both conductors and insulators find uses in our everyday life.

Is there a way to find out whether a substance is a conductor or an insulator? This can be done with the help of an electric tester. The following activity will show you how to create and use an electric tester. If the test sample is a conductor, it will allow current to pass through it and the bulb will glow. It means that the circuit is complete. However, if the test sample is an insulator, it will not allow current to pass through it and the bulb will not glow.

Do you know

Why does an electric wire become hot when an electric current is passed through it?

Activity

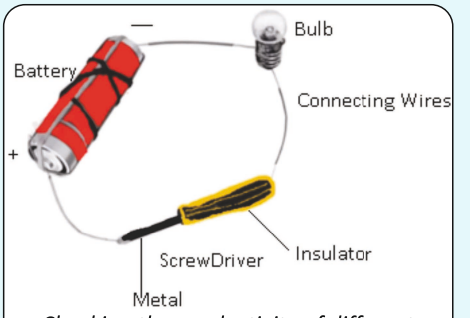
Aim : To make an electric tester (Activity to be performed under adult supervision)

Things required : Cell, torch bulb, connecting wires, iron nail, piece of glass, block of wood, piece of copper wire, rubber band, plastic ruler, a piece of chalk, and a piece of nylon cloth.

Method :

1. Make the connections as shown in the given figure.
2. Connect the samples of the given objects one by one in the circuit between the free ends A and B and note your observation for each object.

   Based on your observations, complete the given table by putting a tick in the correct column.



Checking the conductivity of different objects by using an electric tester

Object	Good Conductor	Poor Conductor
Iron nail	✔	
Piece of glass		
Block of wood		
Piece of copper wire		

Object	Good Conductor	Poor Conductor
Rubber band	✔	
Plastic ruler		
Piece of chalk		
Piece of nylon cloth		

Electricity conduction through liquids

We have seen that some solid substances conduct electricity while others do not. Can we say the same thing about liquid substances? Do liquids also conduct electricity?

Let us perform an activity to test whether a liquid conducts electricity or not.

Activity

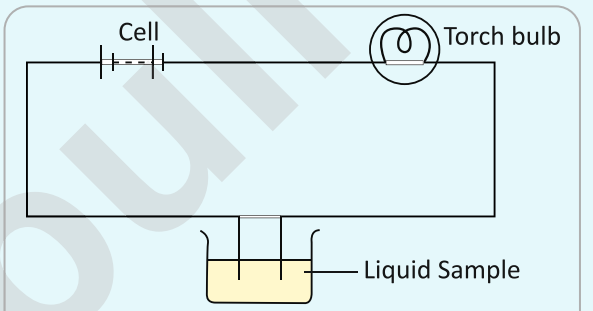
Aim : To test the conduction of electricity by some liquids.

(Activity to be performed under adult supervision)

Things required : Cell with cell holder; torch bulb, connecting wires, beaker, distilled water; solution of common salt in water; water from hand pump, solution of sodium hydroxide in water, dilute hydrochloric acid, vinegar, lemon juice, and kerosene.

Method :

- Insert the cell in the cell holder.
- Make connections as shown in the given figure.
- Take some distilled water in the beaker and dip the free ends of the wire in it for a few seconds.
- Observe if the bulb glows or not.
- Repeat the activity with the other liquid samples and record the observations in each case.



Testing conduction of electricity by liquids

Now, complete the following table and put a tick in the correct column:

Liquid sample	Good conductor	Poor conductor
Distilled water		✓
Salt solution		
Hand pump water		
Distilled water + a few drops of sodium hydroxide		
Dilute hydrocholirc acid		
Vinegar		
Lemon juice		
Kerosene		

(**Remember :** After testing a liquid, dip the free ends of the connecting wires in distilled water and wipe them with a filter paper. Also wash the beaker with distilled water after testing every liquid sample.)

The above activity shows that when the free ends of wire are dipped in certain liquids, the bulb glows. These liquids provide the path for the flow of current through them which completes the circuit of the tester. Such liquids that allow electric current to pass through them are called conducting liquids or electrolytes and the electrical conduction through them is called electrolytic conduction. These are certain liquids, however, that do not allow electric ends of wire are dipped in such liquids, the circuit of the tester does not become complete. Hence, the bulb does not glow. Such liquids are poor conductors of electricity.

In some cases, however the bulb does not glow even if the liquid conducts electricity. In such cases, the current generated in the circuit is very weak. This current is not enough to heat the filament of the bulb. As the filament is not heated, the bulb does not glow. In order to enable the tester to detect even weak current, you can replace the bulb with a light emitting diode (LED).

LEDs

The above activity also shows that distilled water does not conduct electricity. However, on adding salt, it begins to conduct electricity. This shows that distilled water solution is a good conductor of electricity. Distilled water also begins to conduct electricity when a chemical substance such as sulphuric acid or sodium hydroxide is added to it.

Let's recall what we know

Apply Concept in Real-Life Context

Apply

1. Why do you think some liquids can conduct electricity while others cannot?
2. What happens if you immerse electrodes into saltwater and connect them to a battery? Why does this happen?

Skills Covered: Critical and logical thinking, Identification, Application thinking

Further Analysis

Analyse

1. Explain how the presence of ions in a liquid determines its ability to conduct electricity. Provide examples of liquids that conduct and do not conduct electricity.
2. Why does distilled water not conduct electricity, but tap water does?

Skills Covered: Critical analysis, logical reasoning, brainstorming

Self-Assessment Questions

Evaluate

1. What does it mean for a liquid to conduct electricity?
2. Name two examples of liquids that can conduct electricity and explain why.
3. What role do dissolved salts and minerals play in making a liquid conductive?

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Bloom's Taxonomy

Creative Task

Create

Conduct a simple experiment to test the conductivity of liquids:

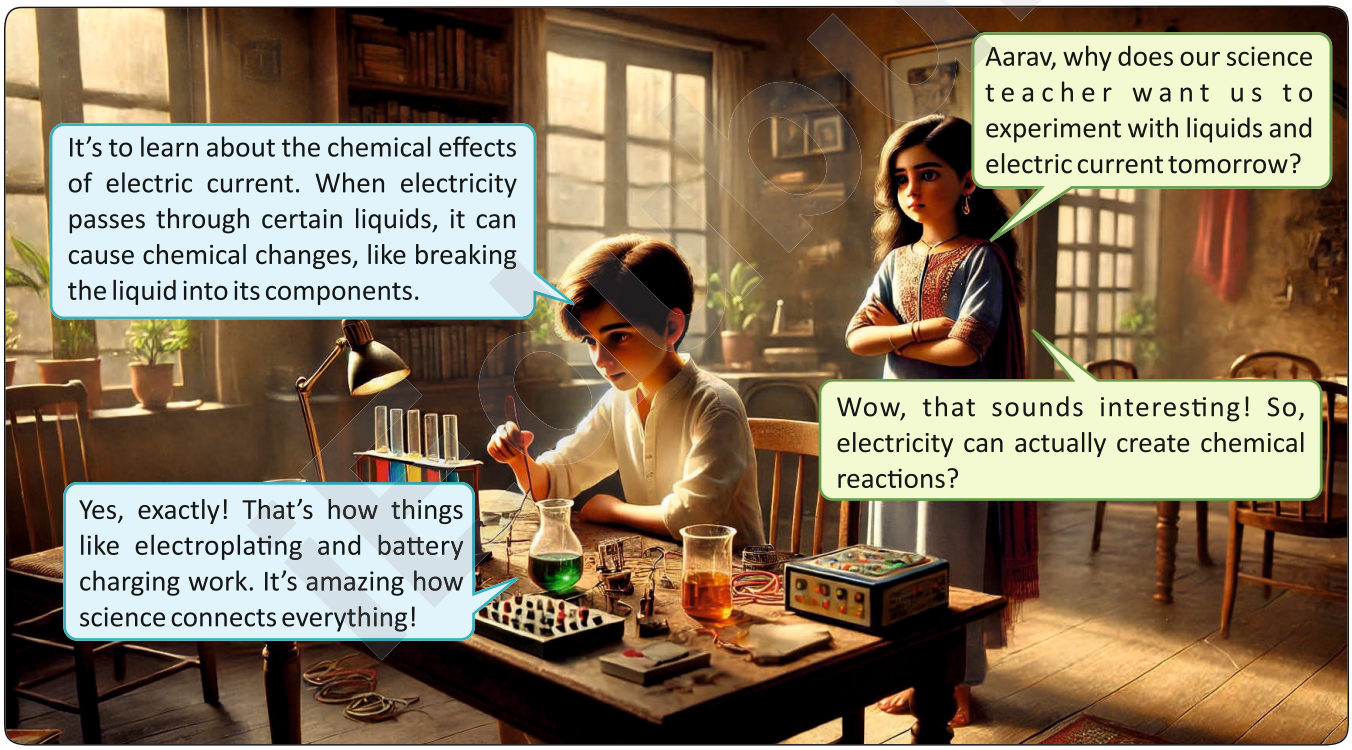
1. Take a glass of distilled water and a glass of saltwater.
2. Use a simple circuit with a battery, wires, and a small bulb.
3. Dip the electrodes into the liquids one by one and observe whether the bulb lights up.

Write down your observations and conclusions in your notebook, explaining which liquid conducts electricity and why.

Skills Covered: Brainstorming, research, digital literacy, creativity

Chemical Effects of Electric Current

Aarav was working on his science project when his friend, Riya, came over to help.



Chemical Effects of Electric Current

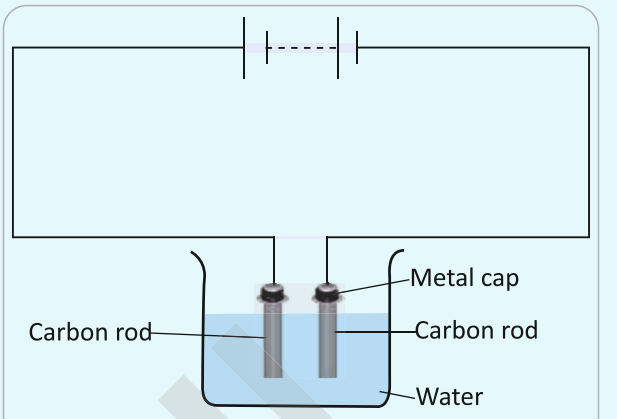
We have already learnt about heating and magnetic effect of electric current. Let us revise that.

The production of heat in a resistor or a conductor when electricity passes through it is called heating effect of electric current and the generation of magnetic field, when an electric current flows through a conductor, is known as magnetic effect of electric current.

What effect does the current produce when it flows through a conducting solution? Let us find out.

Activity

Take out carbon rods carefully from two discarded cells. Clean their metal caps with sand paper. Wrap copper wires around the metal caps of the carbon rods and join them to a battery. We call these two rods as electrodes. Instead of carbon rods, you may take two iron nails about 6 cm long. Pour a cupful of water in a glass/plastic bowl. Add a teaspoonful of salt or a few drops of lemon juice to water to make it more conducting. Now immerse the electrodes in this solution. Make sure that the metal caps of the carbon rods are outside the water. Wait for 3-4 minutes. Observe the electrodes carefully. Do you notice any gas bubbles near the electrodes? Can we call the change taking place in the solution, a chemical change? Recall the definition of a chemical change that you learnt in Class VII.



Passing current through water

The passage of an electric current through a conducting solution causes chemical reactions. As a result,

- Bubbles of a gas may be formed on the electrodes.
- Deposits of metal may be seen on electrodes.
- Colour of solution may change.

The reaction would depend on what solution and electrodes are used. These are some of the chemical effects of the electric current.

Thus, the phenomenon of causing chemical changes by passing electricity through a conducting solution is called chemical effect of electric current.

In History...

In 1800, a British chemist, William Nicholson (1753–1815), had shown that if electrodes were immersed in water, and a current was passed, bubbles of oxygen and hydrogen were produced.

Oxygen bubbles formed on the electrode connected to the positive terminal of the battery and hydrogen bubbles formed on the other electrode.

In fact the chemical effect of electric current involves the use of electric current or the electrical energy to bring about the chemical changes in a conducting solution or liquid. The most suitable example to visualize the chemical effect of electric current is electrolysis.

Electrolysis : It is the process of chemical decomposition of an electrolyte on passing electricity through its molten or dissolved state.

KEYWORDS

Electrodes: Materials that transfer electric current to and from a medium.

Electrolyte: A medium that conducts electricity via ion movement.

Some Common Terms

Conductors and Insulators	The substances which allow the passage of electricity through them are called conductors or good conductors and the substances which do not allow the electricity to pass through them are called insulators or poor conductors or bad conductors of electricity.
Metallic conductors	These are the metallic substances which allow the passage of electricity through them without undergoing any chemical change. Some common examples are copper, silver, aluminium, etc.
Electrolytes or electrolytic conductors	These are the substances which allow the passage of electricity through their molten state or through their aqueous solutions and also undergo chemical decomposition at the same time. Some common examples of electrolytes are acids, bases and salts.
Non-electrolytes	The substances which do not conduct electricity either in their molten state or through their aqueous solutions are called non-electrolytes. Some examples of non-electrolytes are sugar, glucose, alcohols, etc.
Cation and Anion	Electrolytes, in molten states or in their aqueous solutions, break up into positive and negative ions. The positively charged ions and the negatively charged ions produced are called cations and anions respectively.
Electrodes	A metallic wire or rod or plate through which electric current either enters or leaves an electrolytic solution, is called an electrode.
Cathode and Anode	In an electrolytic cell, the electrode at which electricity enters the solution is called anode and the electrode at which current leaves the solution is called cathode. In an electrolytic cell, anode is that electrode which is attached to the negative terminal of the battery and cathode is that electrode which is attached to the positive terminal of the battery.
Electrolytic cell	The device by which the process of electrolysis is carried out is called electrolytic cell.

Let's recall what we know

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Bloom's Taxonomy

Apply Concept in Real-Life Context

Apply

1. Why do you think some liquids conduct electricity while others do not?
2. When an electric current passes through water, bubbles form on the electrodes. Why does this happen?

Skills Covered: Critical and logical thinking, Identification, Application thinking

Further Analysis

Analyse

1. Explain how the chemical effects of electric current are used in electroplating. Provide examples of where this process is applied.
2. Why is it important to use distilled water instead of tap water for certain experiments involving the chemical effects of electric current?

Skills Covered: Critical analysis, logical reasoning, brainstorming

Self-Assessment Questions

Evaluate

1. What are the chemical effects of electric current? List two examples of these effects.
2. What happens when an electric current passes through a solution containing salt, and why?
3. What is electrolysis, and how is it used in industries?
4. Identify and explain two applications of the chemical effects of electric current in everyday life.

Creative Task

Create

Conduct an experiment to demonstrate the chemical effects of electric current:

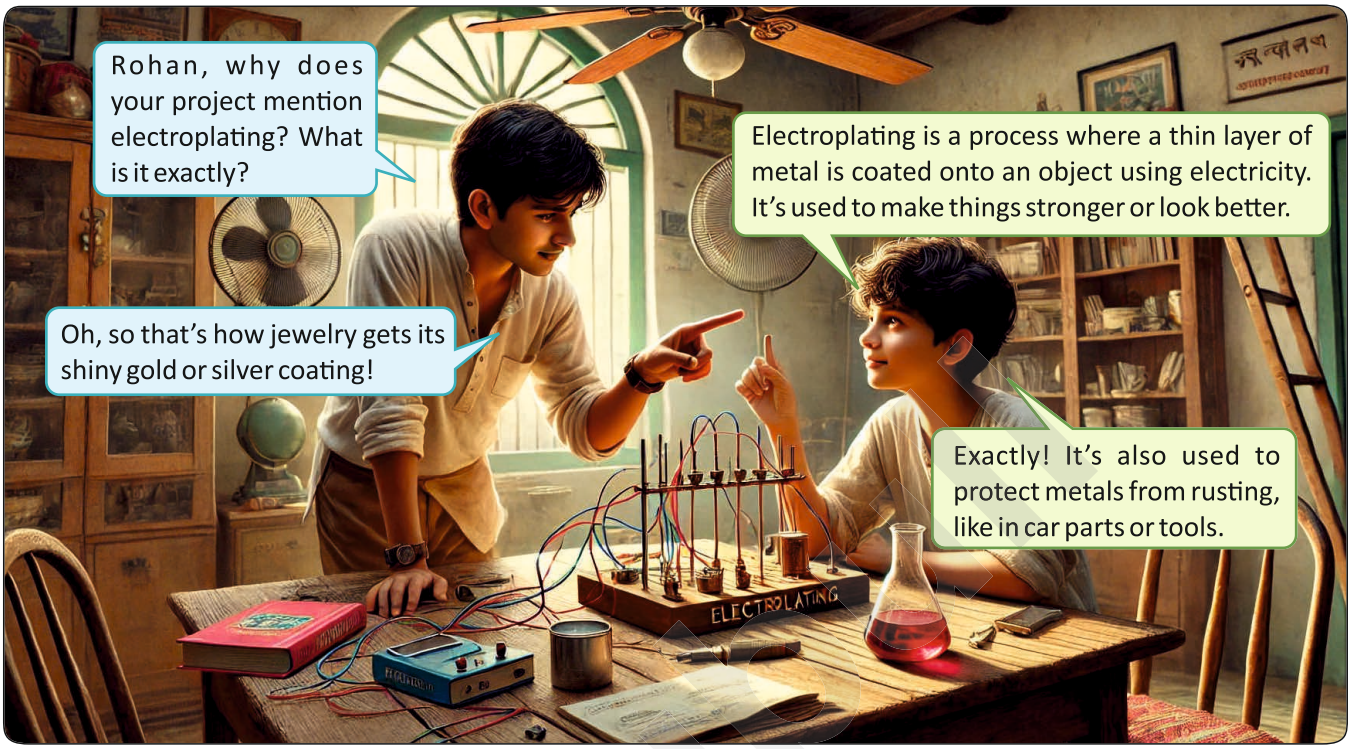
1. Take a simple circuit with a battery, wires, and a bulb.
2. Use two electrodes dipped into a saltwater solution.
3. Observe and note what happens when the circuit is complete (e.g., gas bubbles, change in solution color).

Write your observations and conclusions in your notebook, explaining how electric current causes chemical changes in the solution.

Skills Covered: Brainstorming, research, digital literacy, creativity

Electroplating

Rohan is working on a science project when his friend Aarav stops by to help.



The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating. It is one of the most common applications of chemical effects of electric current.

Electroplating is a very useful process. It is widely used in industries for coating metal objects with a thin layer of a different metal. The layer of metal deposited has some desired property, which the metal of the object lacks. For example, chromium plating is done on many objects such as car parts, bath taps, kitchen gas burners, bicycle handlebars, wheel rims and many others. Chromium has a shiny appearance. It does not corrode. It resists scratches. However, chromium is expensive and it may not be economical to make the whole object out of chromium.

So the object is made from a cheaper metal and only a coating of chromium over it is deposited. Jewellery makers electroplate silver and gold on less expensive metals.

These ornaments have the appearance of silver or gold but are much less expensive.

Some electroplated objects

Tin cans, used for storing food, are made by electroplating tin onto iron. Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoilt.

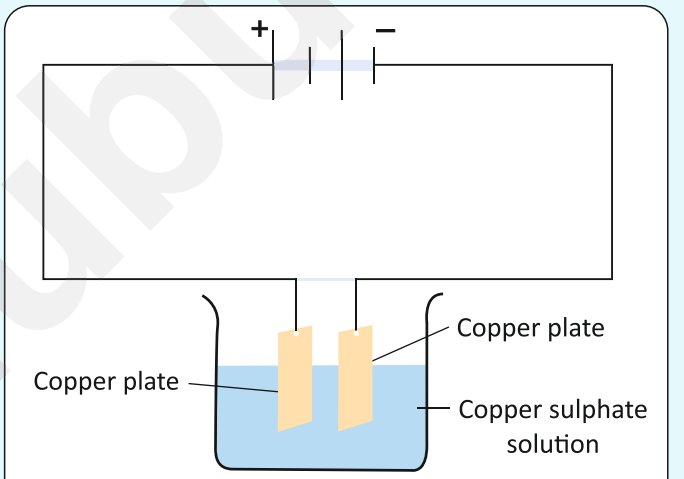
Iron is used in bridges and automobiles to provide strength. However, iron tends to corrode and rust. So, a coating of zinc is deposited on iron to protect it from corrosion and formation of rust.

Activity

We will need copper sulphate and two copper plates of size around 10 cm × 4 cm. Take 250 ml of distilled water in a clean and dry beaker. Dissolve two teaspoonfuls of copper sulphate in it. Add a few drops of dilute sulphuric acid to copper sulphate solution to make it more conducting. Clean copper plates with sand paper. Now, rinse them with water and dry them. Connect the copper plates to the terminals of a battery and immerse them in copper sulphate solution.

Allow the current to pass for about 15 minutes. Now, remove the electrodes from the solution and look at them carefully.

Do you find any difference in any one of them? Do you find a coating over it? What colour is the coating? Note down the terminal of the battery with which this electrode is connected.



A simple circuit showing electroplating

Let us perform the following activity to understand electroplating.

When electric current is passed through the copper sulphate solution, copper sulphate dissociates into copper and sulphate. The free copper gets drawn to the electrode connected to the negative terminal of the battery and gets deposited on it. But what about the loss of copper from the solution?

From the other electrode, a copper plate, an equal amount of copper gets dissolved in the solution. Thus, the loss of copper from the solution is restored and the process keeps going.

This means that copper gets transferred from one electrode to the other.

In the electroplating factories, the disposal of the used conducting solution is a major concern. It is a polluting waste and there are specific disposal guidelines to protect the environment.

Let's recall what we know

Apply Concept in Real-Life Context

Apply

1. Why do you think some metals, like jewelry, are coated with another metal?
2. If a steel spoon is coated with silver, why does it appear shiny and resist corrosion over time?

Skills Covered: Critical and logical thinking, Identification, Application thinking

Further Analysis

Analyse

1. Explain how the process of electroplating improves the durability and appearance of objects. Provide examples.
2. Why is electroplating used in industries to protect materials from rust and wear?

Skills Covered: Critical analysis, logical reasoning, brainstorming

Self-Assessment Questions

Evaluate

1. What is electroplating, and why is it used?
2. Describe the role of an electrolyte and electrodes in the electroplating process.
3. What are the advantages of electroplating in industries?
4. Name two metals commonly used for electroplating and explain why they are chosen.

Creative Task

Create

Conduct a simple experiment to understand electroplating:

1. Take a copper coin, a beaker, and a solution of copper sulfate.
2. Connect the coin to the cathode and a piece of copper to the anode of a power supply.
3. Dip both in the solution and let the process continue for a few minutes.
4. Observe how the coin gets a layer of copper deposited on it.

Write your observations and conclusions in your notebook, explaining the role of electricity in electroplating.

Skills Covered: Brainstorming, research, digital literacy, creativity

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Bloom's Taxonomy

SUMMARY

1. Liquids Conduct Electricity

- **Conducting Liquids:** Some liquids, like saltwater and acid solutions, allow electric current to pass through due to the presence of ions. These are called electrolytes.
- **Non-Conducting Liquids:** Pure water and certain oils do not conduct electricity well, as they lack free ions.
- **Testing Conductivity:** A simple circuit with a bulb can help test whether a liquid conducts electricity; if the bulb glows, the liquid is a conductor.
- **Factors Affecting Conductivity:** The type of liquid, its concentration of ions, and temperature influence how well it conducts electricity.

2. Chemical Effects of Electric Current

- **Decomposition of Compounds:** When electric current passes through certain liquids (electrolytes), chemical changes occur, breaking compounds into simpler substances. This process is called electrolysis.
- **Formation of Gases:** Electrolysis often releases gases, such as hydrogen and oxygen from water.
- Deposition of Substances: Metals or other materials can deposit on electrodes during electrolysis, as ions are attracted to opposite charges.
- **Applications in Everyday Life:** These chemical effects are used in industries for extracting metals, purifying substances, and even in batteries for energy storage.

3. Electroplating

Definition:

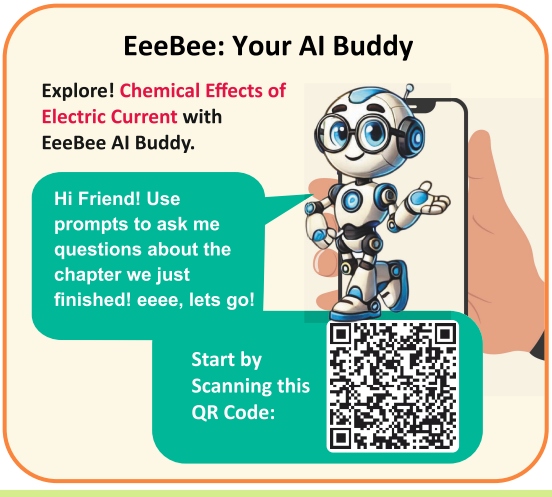
Electroplating is a process that uses the chemical effects of electric current to deposit a thin layer of one metal onto another object for protection, appearance, or special properties.

Common Uses:

- **Corrosion Resistance:** Coating objects with a layer of non-corrosive metal like chromium or zinc to prevent rusting.
- **Decorative Purposes:** Electroplating items with gold or silver to enhance appearance.
- **Improved Functionality:** Adding specific coatings to improve wear resistance or conductivity.

Process:

The object to be plated is connected to the negative electrode, while the metal for plating is connected to the positive electrode in an electrolyte solution.



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EXERCISE

That turn curiosity into confidence—let's begin!

A. Choose the correct answer.

1. Which of the following liquids is a good conductor of electricity?
   (a) Distilled water ☐ (b) Lemon juice ☐
   (c) Cooking oil ☐ (d) Sugar solution ☐
2. Which of the following effects is caused by passing an electric current through a solution?
   (a) Heating effect ☐ (b) Magnetic effect ☐
   (c) Chemical effect ☐ (d) Optical effect ☐
3. Electroplating is used to:
   (a) Reduce the conductivity of a material ☐
   (b) Convert electrical energy into chemical energy ☐
   (c) Protect a metal from corrosion ☐ (d) Generate heat ☐
4. Which of the following solutions is used for electroplating iron with zinc?
   (a) Zinc chloride solution ☐ (b) Copper sulfate solution ☐
   (c) Sodium chloride solution ☐ (d) Distilled water ☐
5. Why is distilled water a poor conductor of electricity?
   (a) It lacks dissolved salts ☐ (b) It contains impurities ☐
   (c) It is an acidic solution ☐ (d) It has free ions ☐

B. Fill in the blanks.

1. The passage of electric current through a conducting liquid causes _____.
2. Electroplating is a process of coating an object with a layer of _____.
3. Substances that allow electricity to pass through them are called _____.
4. When electricity is passed through water, it decomposes into _____ and _____.
5. The process of _____, used in jewellery, protects it from corrosion.

C. Write True or False.

1. Distilled water is a good conductor of electricity. _____
2. Electroplating helps in improving the appearance of objects. _____
3. The bulb glows brightly in all liquids during an electric conductivity test. _____
4. Electrolysis refers to the chemical changes produced by electricity in a liquid. _____

D. Define the following terms.

1. Electroplating
2. Electrolyte
3. Conductor
4. Insulator
5. Chemical effects of electric current

E. Match the columns.

Column A	Column B
1. Electrolysis	(a) Produces hydrogen gas
2. Good conductor	(b) Coating with a thin metal layer
3. Electroplating	(c) Lemon juice solution
4. Poor conductor	(d) Distilled water
5. Hydrogen gas	(e) Decomposition of water

F. Give reasons for the following statements.

1. Lemon juice conducts electricity, but distilled water does not.
2. Electroplating is widely used in industries.
3. The passage of electric current through water produces bubbles.
4. Conducting liquids are used in electrolysis experiments.
5. Metals like copper and zinc are often used for electroplating.

G. Answer in brief.

1. How does distilled water differ from tap water in terms of electrical conductivity?
2. What is the importance of using chemical effects of electric current in industries?
3. Explain why a glowing bulb indicates electrical conductivity of a liquid.
4. How is electroplating beneficial for everyday objects?
5. Why does electrolysis result in the formation of gases or deposition of substances?

H. Answer in detail.

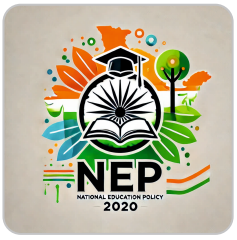
1. Describe how liquids conduct electricity and the factors affecting their conductivity.
2. Explain the process of electrolysis and provide examples of its applications.
3. What is electroplating? Discuss its uses in industries with suitable examples.
4. What are the common methods to test the conductivity of liquids? Explain in detail.
5. Explain the chemical effects of electric current and their significance in daily life.

NEP Corner

Know about NEP 2020

Vocational Training through Digital Platforms

From Class 6, students can learn vocational skills like coding, entrepreneurship, or agriculture through online platforms and simulations.



Skill-based Activity

Activity Time

STEM

Understanding Electrical Conductivity in Liquids

1. Create a table categorizing liquids (e.g., saltwater, distilled water, lemon juice) based on their ability to conduct electricity.
2. Conduct a simple experiment using a battery, bulb, wires, and liquids to check if they conduct electricity.
3. Write an explanation of why some liquids are good conductors while others are not.

Skills Covered: Creativity, Observation, Critical Thinking, Data Analysis, Responsibility, Research

Exploring Chemical Effects of Electric Current

Art

1. Define the chemical effects of electric current and provide examples of where these effects are observed.
2. Research how passing electric current through a liquid can lead to processes like decomposition, gas formation, or changes in color.
3. Compare the chemical effects of electric current in conducting liquids (e.g., saltwater) versus non-conducting liquids (e.g., distilled water).

Skills Covered: Creativity, Imagination, Problem-solving, Environmental Awareness

Chemical Effects of Electric Current in Nature

Group Activity

1. Research how chemical effects of electric current are observed in natural processes like lightning or corrosion of metals.
2. Create a model or presentation to demonstrate a natural phenomenon involving electricity and chemical effects, such as rusting or electrolysis in water.
3. Discuss how these processes impact the environment and human activities.

Skills Covered: Critical thinking, Planning, Collaboration, Communication, Creativity, Teamwork, Responsibility

Electroplating in Everyday Life

Case to Investigate

1. Investigate the process of electroplating and how it is used to coat objects with a thin layer of metal.
2. Write about the importance of electroplating in industries like jewelry making, automobile manufacturing, and corrosion prevention.
3. Create an infographic showing the steps of electroplating and its advantages.
4. Discuss how electroplating contributes to improving the durability, appearance, and value of materials.

Skills Covered: Observation, Critical thinking, Research, Analytical skills, Communication

Chemical Effects of Electric Current in Sustainable Development

Aligning with SDGs

1. Write about how electroplating can help reduce material waste and increase the lifespan of products.
2. Discuss the role of electrolysis in producing clean fuels like hydrogen to support renewable energy initiatives.
3. Create a visual representation or mind map showing how chemical effects of electric current are applied in sustainable technologies.

Aligned with SDGs:

SDG 7: Affordable and Clean Energy – Electrolysis is used in producing hydrogen fuel, a clean energy source., SDG 9: Industry, Innovation, and Infrastructure – Chemical effects of electric current contribute to innovative manufacturing and durable infrastructure., SDG 12: Responsible Consumption and Production – Electroplating and electrolysis promote resource efficiency and waste reduction., SDG 13: Climate Action – Electrolysis and energy-efficient technologies help reduce carbon emissions and support clean energy transitions.

Skills Covered: Research, Brainstorming, Problem-solving, Presentation skills

Applications of Chemical Effects in Technology

Integrated Learning

1. Research how electrolysis is used to produce essential industrial materials like aluminum or hydrogen gas.
2. Identify and explain the role of chemical effects of electric current in battery technology and energy storage.
3. Design a simple model using household items to demonstrate the process of electrolysis (e.g., splitting water into hydrogen and oxygen).
4. Discuss how advancements in understanding chemical effects of electric current have impacted industries like manufacturing and renewable energy.

Integrated Learning: Environmental Science

Skills Covered: Brainstorming, Research, Investigation, Critical Thinking