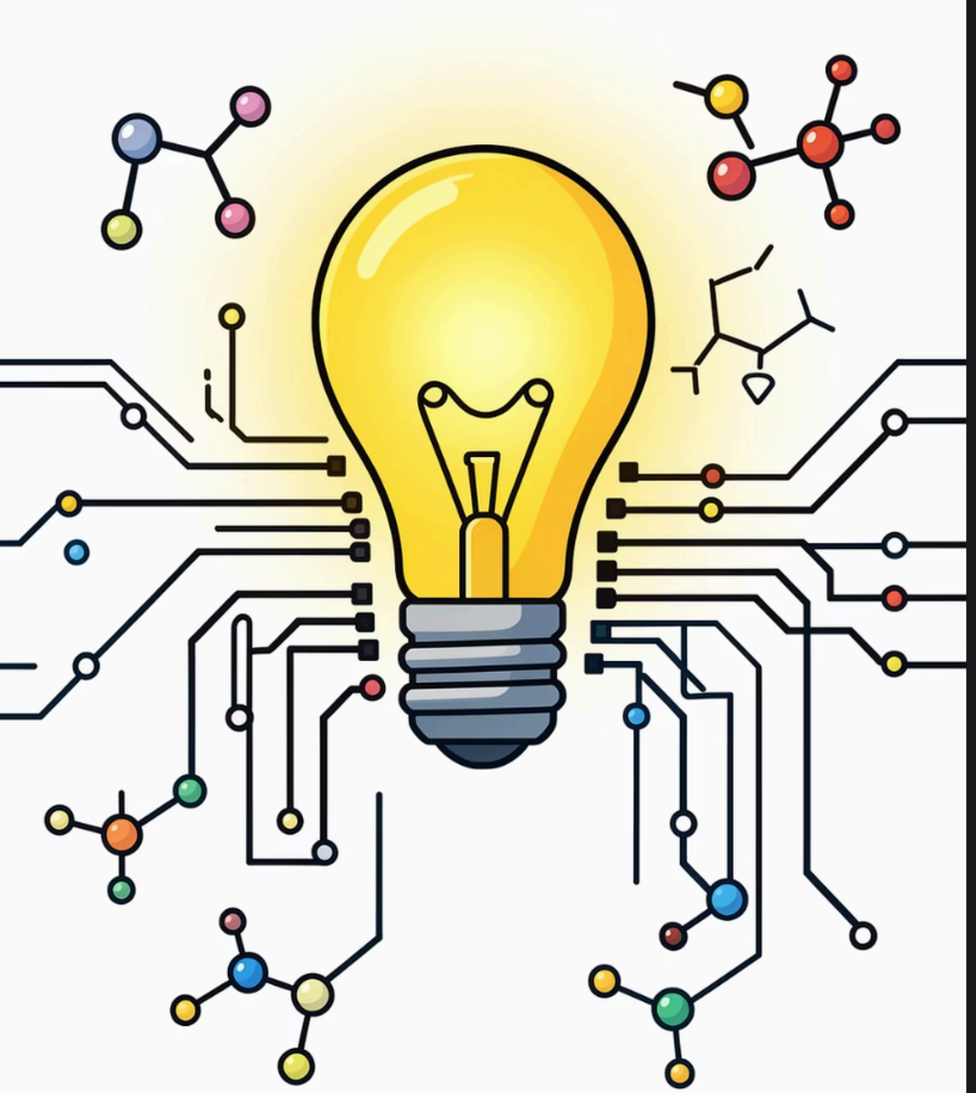


Chemical Effects of Electric Current

Discover how electricity transforms liquids and materials in this exciting chapter on Class 8 Science.

- Liquid Conductivity
- Chemical Reactions
- Electroplating

Do Liquids Conduct Electricity?

Let's explore how we can test different liquids to understand their electrical conductivity.

A simple tester helps us check if a liquid allows electric current to pass through it.

- If the liquid conducts, the circuit completes, and the bulb glows brightly.
- If it's a poor conductor, the bulb remains unlit.

> Remember, some liquids might conduct, but the current can be too weak to light a standard bulb filament.

Understanding Liquid Conductivity

The ability of a liquid to conduct electricity depends on the presence of free ions. These charged particles carry the electric current through the liquid. Liquids containing dissolved salts, acids, or bases are typically good conductors because they dissociate into ions.

Types of Liquids and Their Conductivity:

- **Good Conductors:** Solutions like lemon juice, vinegar, salt water, and tap water contain dissolved salts and acids, providing plenty of ions. Soap solutions also conduct due to dissolved bases.
- **Poor Conductors/Insulators:** Distilled water, being pure H_2O, has very few ions and is a poor conductor. Sugar solutions and oils are also insulators as they do not produce ions when dissolved or present.

Safely Performing the Test

When testing liquids, safety is paramount. Always use a low-voltage power source, such as a battery (e.g., 9V or 1.5V cells), to minimize risks. Ensure the testing apparatus is clean and dry before each new test to prevent contamination. Never touch the liquid or exposed wires when the circuit is live.

Observations and Explanations

When you place the tester's electrodes into a liquid, observe the following:

- **Bulb Brightness:** A brightly glowing bulb indicates a strong conductor with many free ions. A dim bulb suggests a weak conductor with fewer ions. No glow means it's an insulator.
- **Bubbles at Electrodes:** If bubbles form around the electrodes, it indicates a chemical change (electrolysis) is occurring, which is a key sign of electrical conduction in liquids. These bubbles are usually hydrogen or oxygen gases.

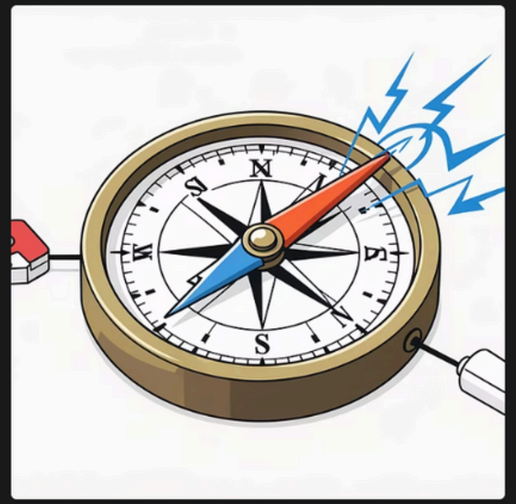
The variation in conductivity levels stems from the nature of the dissolved substance. Strong electrolytes (like strong acids and salts) produce a large number of ions in solution, leading to high conductivity. Weak electrolytes (like some organic acids) produce fewer ions, resulting in lower conductivity. Non-electrolytes (like sugar or distilled water) do not produce ions and therefore do not conduct electricity.

Detecting Weak Currents

Sometimes, currents are too weak for a bulb. That's when we need more sensitive testers!

LED (Light Emitting Diode)

An LED can glow even with very weak electric currents. Make sure the longer lead connects to the positive terminal and the shorter one to the negative.



Magnetic Tester

This tester uses a compass needle inside a wire coil. Even a tiny current causes the needle to deflect, indicating current flow.

Good vs. Poor Conductors

Not all liquids behave the same way when it comes to electricity.

Good Conductors

- Solutions of acids, bases, and salts (e.g., lemon juice, salt water).
- Tap water conducts well due to dissolved mineral salts.

Poor Conductors

- Distilled water, rubber, plastic, and oil.
- Adding salt to distilled water makes it a good conductor.

Chemical Effects of Electric Current

Electricity isn't just about light and heat; it can also cause fascinating chemical changes!

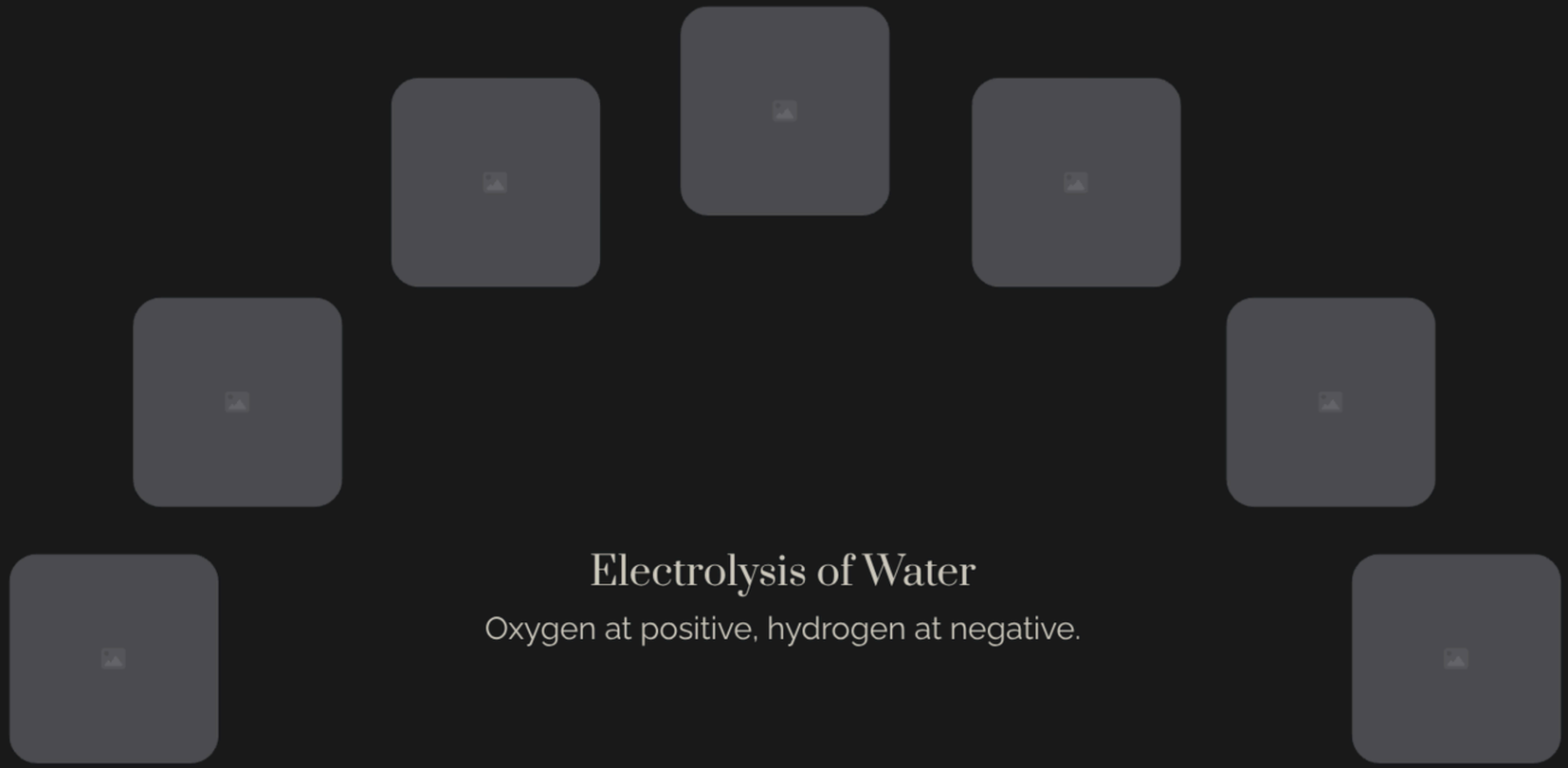
When electric current passes through a conducting solution, it triggers chemical reactions.

Evidence of Chemical Change:

- Formation of gas bubbles on the electrodes.
- Deposits of metal on the electrodes.
- Noticeable changes in the solution's colour.

Electrolysis of Water

Witness how electricity can break down water into its basic components!



Electrolysis of Water

Oxygen at positive, hydrogen at negative.

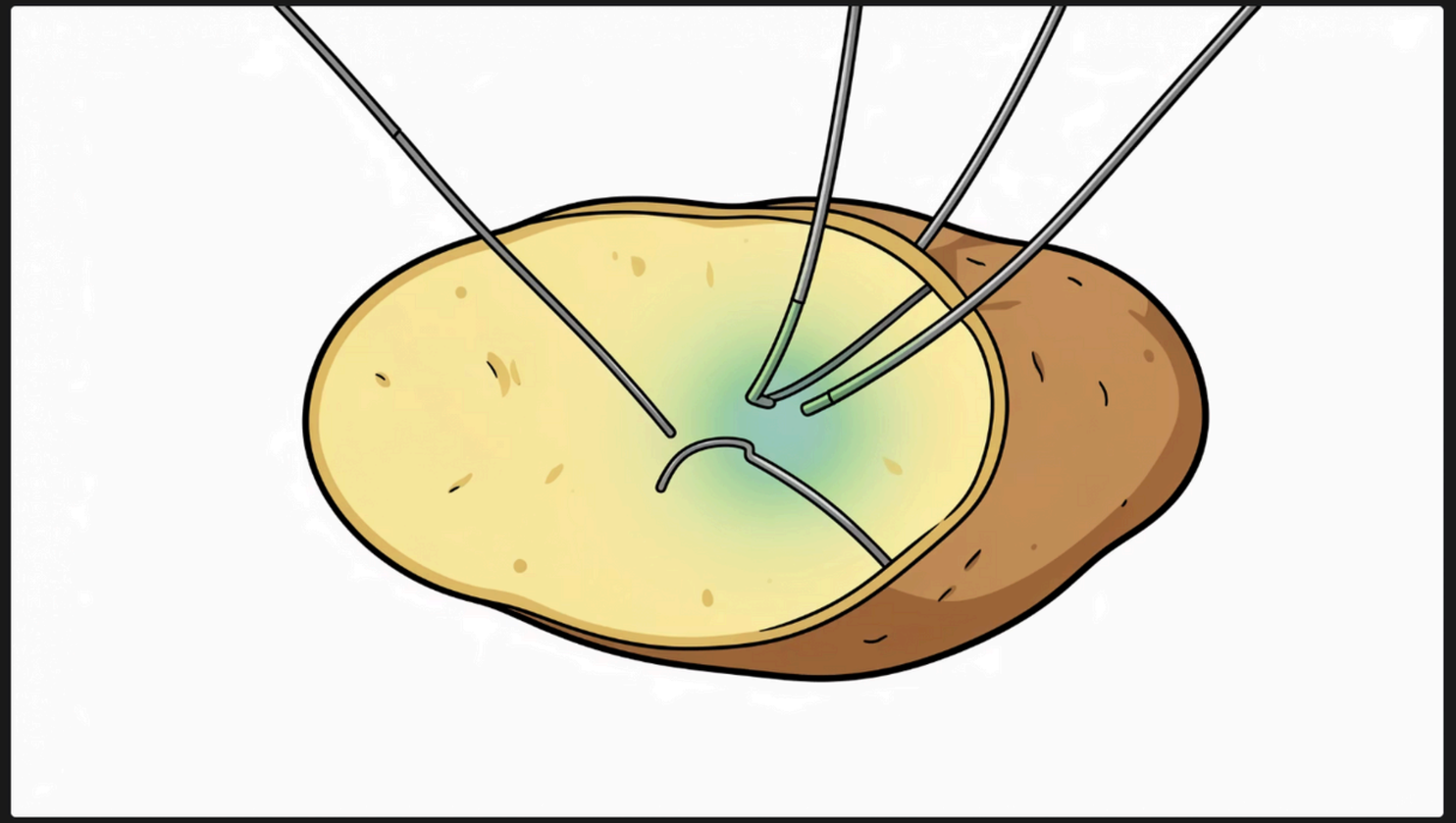
Discovered by William Nicholson in 1800, this process shows that when current passes through water, oxygen bubbles form on the positive electrode, and hydrogen bubbles appear on the negative electrode.

The Potato Experiment

A surprising way to see the chemical effects of current, right in your kitchen!

Current produces a chemical effect even in vegetables like potatoes.

- Observe a greenish-blue spot forming around only one wire.
- This spot always appears around the wire connected to the positive terminal.
- This trick helps identify the positive terminal of a hidden battery!



Electroplating: The Process

Let's look at how electroplating works using a simple copper sulphate setup.

- **Setup:** Two copper plates immersed in a copper sulphate solution.
- **Action:** Electric current causes copper sulphate to separate into copper and sulphate ions.
- **Result:** Free copper deposits onto the electrode connected to the negative terminal.
- **Replenishment:** Copper from the positive electrode dissolves into the solution to keep the process going.

Understanding Electroplating

This ingenious technique applies a thin layer of metal using the power of electricity.

Definition

Electroplating is the process of depositing a desired metal layer onto another material using electricity.

Mechanism

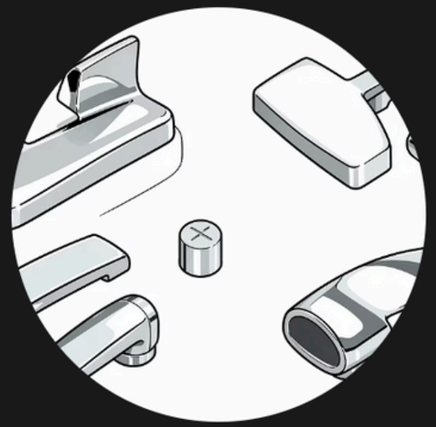
Metal is transferred from one electrode to another. The object to be coated is always connected to the negative terminal.

Application

It's a widely used and very important application of the chemical effect of electric current.

Applications: Appearance & Value

Electroplating makes things look good and last longer!



Chromium Plating

Used on car parts, water taps, and cycle rims. Chromium is shiny, doesn't corrode, and resists scratches, giving a polished finish.

Jewellery

Precious metals like silver and gold are plated onto cheaper metals. This gives the look of expensive jewellery at a much lower cost.