

Bringing Electricity to Life

Integrating Free, Offline Digital Tools in UP Science Classrooms



• Freeplane • PhET Circuit Construction Kit • Vokoscreen •



The Invisible Challenge

$$V=IR$$
$$I=Q/t$$
$$P=IV$$

Students are asked to picture what they cannot see. Current, charge, and voltage remain abstract. Sticky misconceptions survive right through board exams (e.g., "Current gets used up" or "Thicker wire = more heat").



The Classroom Reality



Physical lab access is limited—there simply aren't enough circuit kits, batteries, or resistors for a 1:1 experience. Furthermore, rural classrooms cannot rely on live internet during a lesson.

Traditional

Digital Integration

Lab Access

1 physical kit per 40 students (Watch & Wait).

1 virtual kit per student (Active Experimentation).

Concept Visibility

Abstract textbook formulas and static diagrams.

Animated particle flow and **live** needle reactions.

Language & Accessibility

English-heavy external resources.

The **teacher's own voice**, recording **explanations** in native Hindi.

Handling Misconceptions

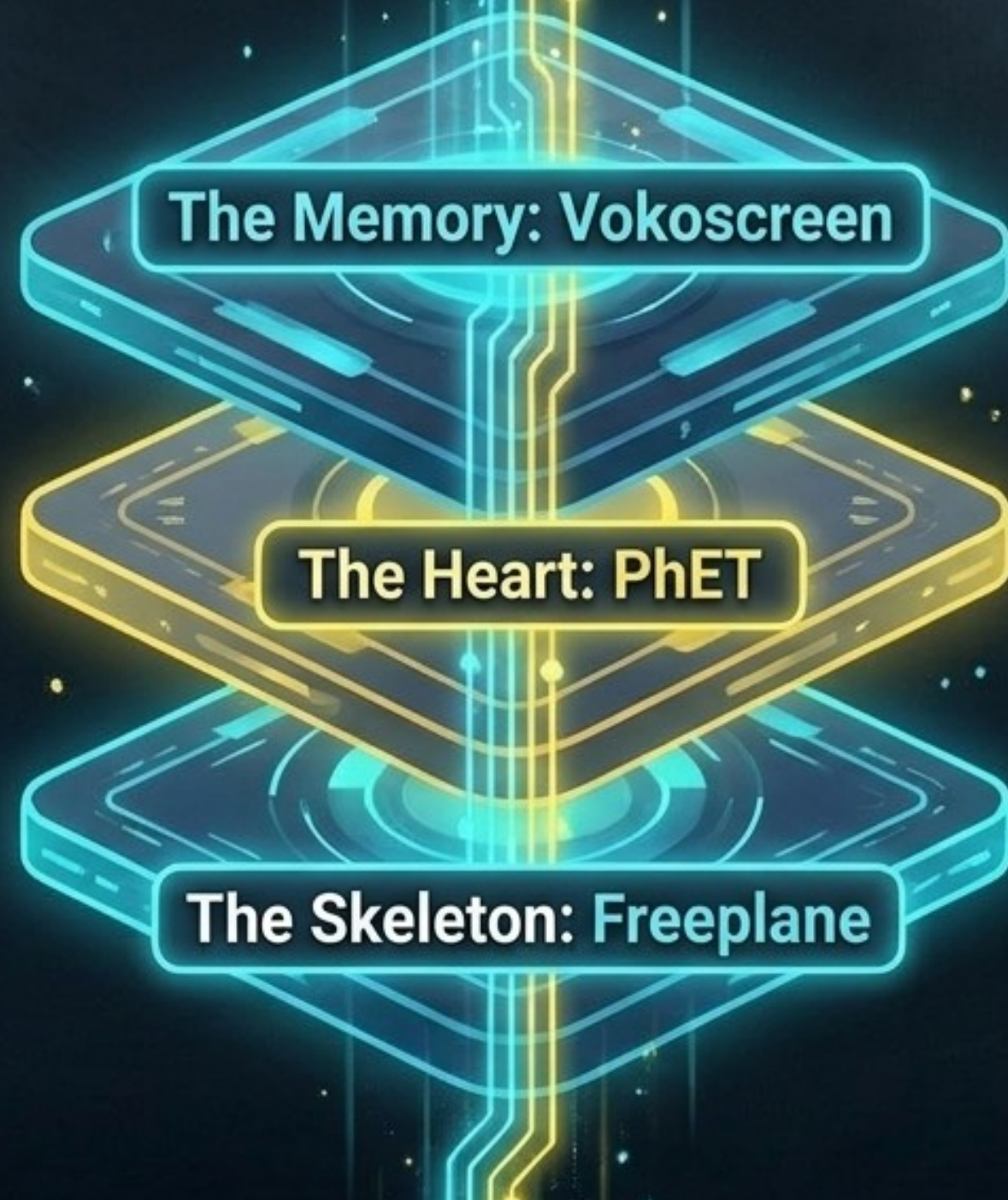
Hidden cognitive traps that survive until board exams.

Visualized, short-circuited, and corrected live on screen.

Built for Your Classroom Constraints

	Freeplane	PhET Simulation	Vokoscreen
₹	Completely free & open source. No budget approval needed.		
💻	Runs smoothly on older, low-spec Linux/Ubuntu lab computers.		
📶	100% offline-capable during class time.		
A/文	Fully adaptable to Hindi teaching environments.		

One Unified Methodology



The capture mechanism. It records the live simulation alongside your Hindi narration to create an everlasting resource.

The beating pulse of the lesson. A live, interactive environment where invisible current becomes a visible flow.

Organizes the pedagogical structure. It maps out the concepts (Ohm's Law, Resistance) and flags where students go wrong.

Freeplane: Organising Thinking, Not Just Notes

The Misconception Trapdoor

Current

Misconception 

Current gets used up
in the bulb.



Correction: Uniform
ammeter readings
across a series circuit.

Map branches can be collapsed to prevent overwhelm, and expanded only when the class is ready.

Every idea (Heating Effect, Power, Ohm's Law) connects in one visible chain.

PhET: Making the Invisible Visible

The Build

Build The Connected Circuit



Drag and drop components to build real, working circuits side-by-side (series vs. parallel) to compare brightness directly.

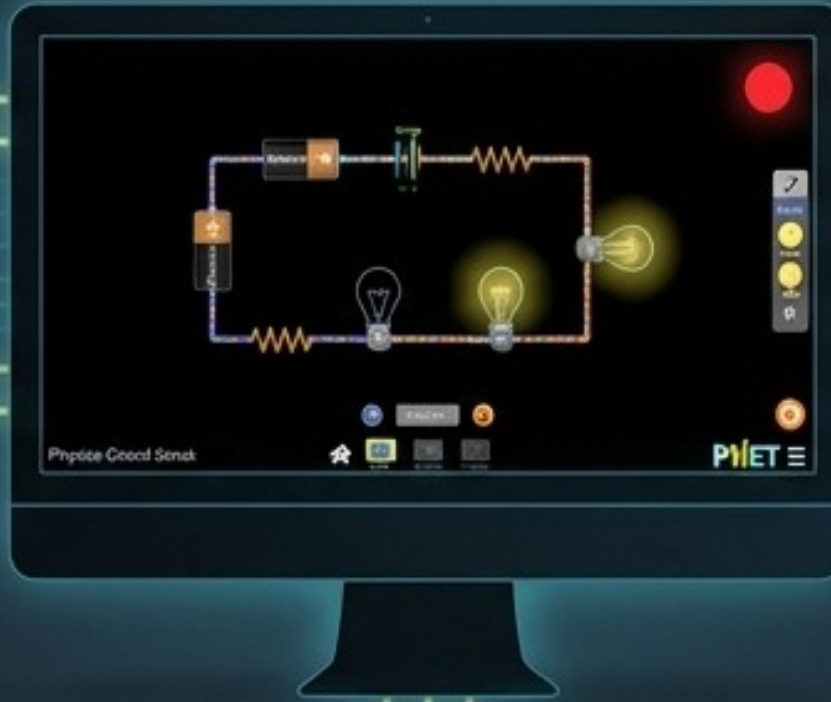
The Breakthrough

Engage The Connected Circuit



Students don't just write Ohm's Law; they observe it. They see the exact moment the current flow speed changes instantly as resistance is adjusted. Predict, then verify.

Vokoscreen: Lessons That Outlast the Period



Your Voice, Their Language

Capture your exact Hindi explanation alongside the visual proof.

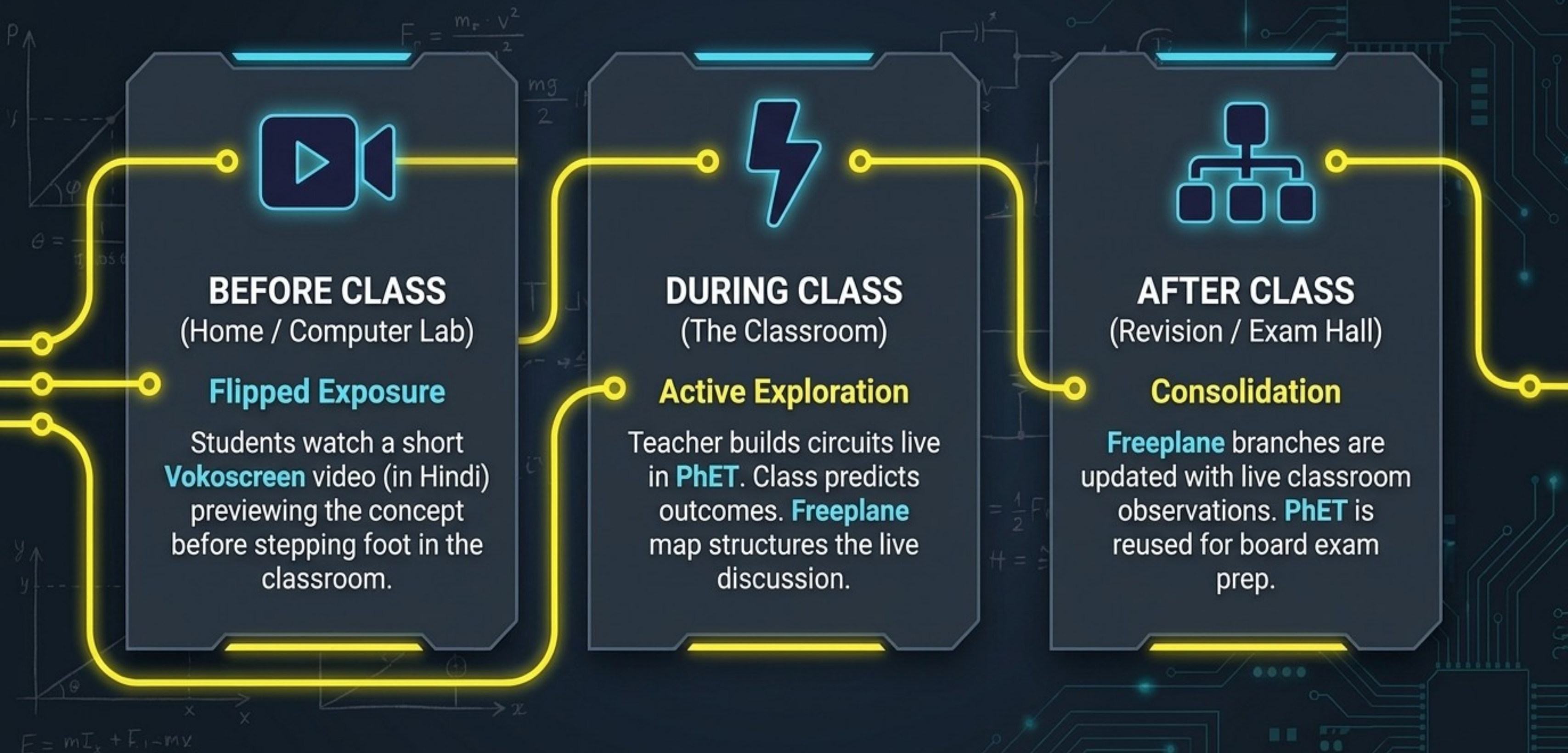
Zero Editing Required

Record in one take. Saves as an MP4 directly to the desktop.

Infinite ROI

A 4-minute concept video recorded once can be reused for absent students, pre-exam revision, or flipped homework for years.

The Pedagogical Flow: A Continuous Loop



One 40-Minute Lesson, Three Tools

5 Min Before Class

Vokoscreen video consumed as homework.

The Lesson Blueprint

10 Min: Recap & Setup

Teacher opens Freeplane, revisits the map, and sets up today's core question.

10 Min: Consolidate

Freeplane misconception branches are updated live based on what the students just observed.

20 Min: Explore & Predict

The heart of the class. Building and testing circuits in PhET. The room votes on outcomes before the switch is flipped.

Overcoming the “Yes, but...”



I don't have great computers.

All three tools run smoothly on old, low-spec Linux systems. Once downloaded, PhET is fully offline.



My English isn't strong.

That's the advantage. You record everything in Vokoscreen in your own voice, in local Hindi phrasing. No English dependence.



I don't have extra time.

You record it once, and reuse it every year. Updating a Freeplane map takes minutes, not hours.



I'm not very tech-savvy.

There is no coding or complex editing. Each tool takes under 15 minutes to learn, and we will practice together today.

