How to Use the Virtual Lab?

A complete user guide for Teachers & Students - explore interactive 2D/3D simulations, conduct safe experiments, and master concepts through experiential learning.

What is the Virtual Lab?

The Virtual Lab is a digital platform that lets you perform experiments in a safe, 2D/3D-simulated environment.
Whether you are exploring Physics, Chemistry, Biology, or Math, this guide will help you navigate the platform effectively.

Subjects	• Mathematics • Science • Physics, Chemistry, Biology
Grades	• Classes 6 - 12 • Topics aligned to NCERT books
Platform	• Runs entirely in your web browser • Works on desktops, laptops, tablets, and Smart Boards
Access URL	• https://vr.icm-hp.com/

Section 1: Before You Begin

1. System Requirements

The Virtual Lab runs in your browser — no software to install. Check the specifications below to ensure smooth 3D performance.

Supported Devices	• Desktop Computers (Windows / macOS / Linux) • Laptops (Windows / macOS / Linux) • Tablets (Android / iPad) • Interactive Smart Boards (modern browser support)
Minimum Hardware	• CPU: Basic dual-core processor • GPU: Integrated graphics with WebGL support • RAM: 2–4 GB (close extra tabs before use)

Recommended Hardware	• CPU: Intel i3 / AMD Ryzen 3 or better • GPU: Dedicated GPU or modern integrated graphics • RAM: 8 GB or more
Browser	• Google Chrome — Recommended (latest version) • Microsoft Edge (latest version) • Safari (latest version) • Mozilla Firefox (latest version)
Internet Speed	• Minimum: 5 Mbps • Recommended: 10 Mbps or higher • Stable broadband connection preferred

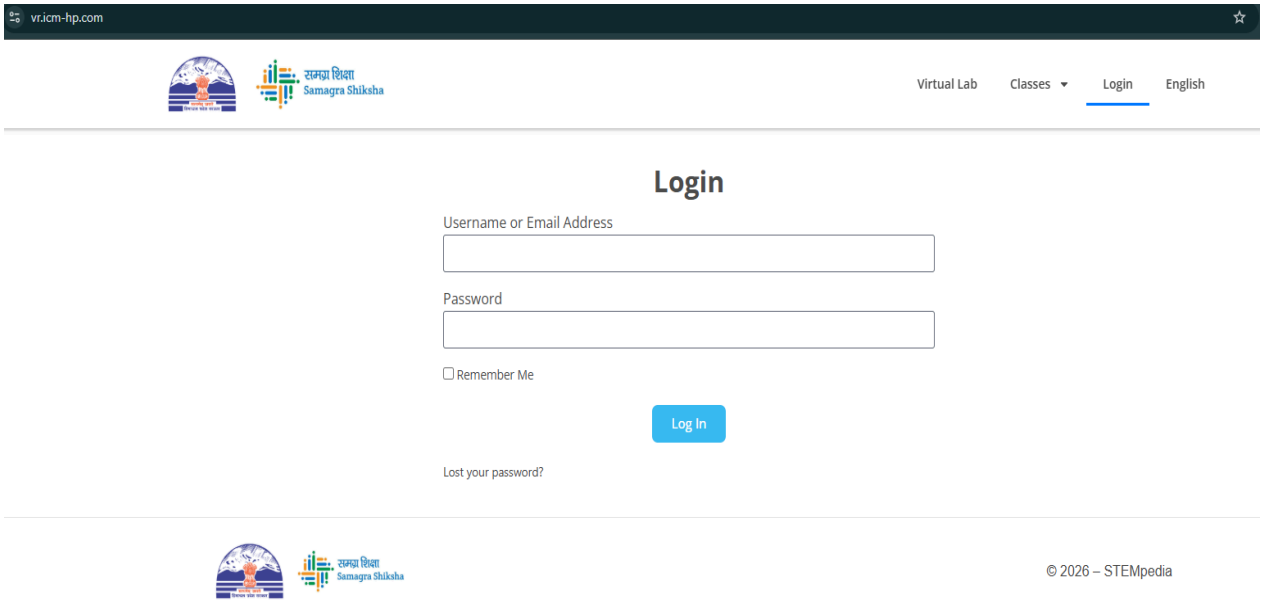
💡 Tip: Always update your browser to the latest version for the best 3D/WebGL performance. Close unused tabs to free up RAM before starting a simulation.

Section 2: Getting Started

2. How to Access the Lab?

Follow these steps to enter the virtual lab. Your school administrator will provide your login credentials.

1	Open the Portal Launch any supported browser and go to: https://vr.icm-hp.com
2	Click Login Locate the Login button in the top-right corner of the homepage and click it.
3	Enter Your Credentials Use the Username and Password provided by your school administrator/teachers. **Note: Don't have credentials? Contact your respective teacher or school admin.**
4	Select & Explore From your dashboard, select your Grade → Subject → Topic and click "Virtual Lab" to launch the simulation. Your dashboard shows: Discipline/Subject selection, Simulation Type selection, and the class selection.



Section 3: Navigation

3. How to Navigate?

Once logged in, follow these quick steps to reach any simulation:

1. Select Subject : Pick Science, Mathematics, Physics, Chemistry, or Biology.
2. Select Class: Choose your grade (6-12).
3. Select Topic: Choose the specific chapter you are teaching or studying.
4. Search: Type the topic name.
5. Click the respective topic for the content.
6. Click “Virtual Lab”: This launches the simulation interface.
7. Navigate through different tabs for the learning experience of the topic.
8. Refer to the learning flow for students and teachers specified below.

SECTION 4A — FOR STUDENTS

4. The Learning Sequence: Students

Follow this four-step sequence for every topic to get the most out of each session.

STEP 1 Theory & Vocabulary Understand the 'why' and learn the key scientific terms before you begin.	STEP 2 Procedure Read the step-by-step experiment roadmap to understand how the simulation is structured.	STEP 3 Virtual Lab (Simulation) Perform the experiment, manipulate variables, and observe real-time 2D/3D results.	STEP 4 Self-Evaluation Take the 10-question Bloom's Taxonomy quiz to test your understanding.

SECTION 4B — FOR EDUCATORS

4. The Teaching Sequence: Educators

Teachers follow a richer six-step sequence that includes lesson planning, visual presentation, and class-wide assessment.

STEP 1 Lesson Plan Review learning objectives and teacher delivery structure and flow.	STEP 2 Theory & Vocabulary Master key terms and fundamental concepts.	STEP 3 PowerPoint (PPT) Project the structured visual topic summary.	STEP 4 Procedure Walk students through the experiment roadmap.	STEP 5 Virtual Lab Run the 2D/3D simulation live for the class.	STEP 6 MCQ Evaluation Auto-graded quiz for instant class-wide feedback.

SECTION 5 —THE INTERFACE

5. Using the Simulation Interface

Once the Virtual Lab opens, you will see four main areas:

Viewer Panel	• The main 3D canvas • Rotate, zoom, and pan to explore models from every angle

Control Panel	• Sliders to change variables (temperature, pressure, weight) • Drag-and-drop tools to interact with equipment
Observation Section	• Real-time data updates as you change inputs • Functions like a live lab notebook
Navigation Menu	• Jump between Theory, Procedure, Simulation, and Quiz • Move between sub-topics without leaving the page

Interaction Types

The simulation supports five ways to interact:

- Click / Tap — Explore by clicking on 3D elements
- Drag & Drop — Move and place equipment in the scene
- Sliders — Manipulate numerical variables in real time
- Keyboard Input — Navigate and respond to prompts
- User Input Fields — Reflect on and engage with the learning process

SECTION 6A — BEST PRACTICES FOR STUDENTS

6. Best Practices for Students

- One Variable at a Time
- When using interactive sliders, change only one variable at a time. This helps you clearly see cause and effect — the foundation of good science.
- Repeat as Many Times as You Like
- Unlike a physical lab, you have unlimited virtual chemicals and equipment. Redo the experiment until you feel fully confident.
- Take Notes Just Like a Real Lab
- Record your observations in your notebook as you go. Writing things down helps cement learning and prepares you for exams.
- Always Complete the Quiz
- The built-in MCQ is auto-graded and gives you instant feedback. It is the best way to know whether you have truly understood the concept before moving on.

SECTION 6B — CLASSROOM DELIVERY GUIDE FOR EDUCATORS

7. Teacher's Integration Checklist

A step-by-step strategy for seamless classroom delivery. Follow the phases in order for maximum impact.

Phase 1 — Pre-Class Preparation

- Topic Alignment: Confirm the selected Virtual Lab topic maps to your current NCERT chapter.
- Tech Check: Open the simulation on your Smart Board or laptop before students arrive so 3D assets are fully cached — eliminates loading delays mid-class.
- Lesson Plan Review: Skim the "Lesson Plan" tab to confirm the day's key learning objectives and delivery flow.

💡Pro tip: Opening the simulation 5 minutes before class ensures all 3D assets are cached and prevents lag during delivery. Use a projector/ interactive smartpanel or share your screen online to navigate the platform effectively to use it as an interactive teaching tool.

Phase 2 — Introduction: Theory & PPT

- Set the Stage: Use the Theory & Vocabulary section to define key terms students will encounter in the simulation.
- Visual Walkthrough: Project the built-in PowerPoint from the portal. It provides the structural framework of the concept before students touch any virtual equipment.
- Define the Goal: State the observation objective clearly — e.g., "Watch how pressure increases as we decrease volume." Students perform better when they know what to look for.

Phase 3 — Demonstration: Live Simulation

- Model the Experiment: Launch the Virtual Lab on the main screen and walk through the simulation step-by-step.
- Interactive Inquiry: Ask "What if?" questions as you go — "What happens if I move this slider to its maximum value?" Encourages prediction and critical thinking.
- 2D/3D Exploration: Rotate the model if applicable, zoom into components, and use built-in annotations to draw attention to key structures.

Phase 4 — Student Activity: Experiential Learning

- Guided Practice (Devices available): Have students follow the demo of the Procedure tab step-by-step on the Smartpanel/respective computers.
- Variable Control Task: Change one variable at a time and ask students to record results in their notebooks — reinforcing the scientific method.
- Collaborative Learning (One screen): Invite students to the Smart Board to perform a step of the experiment. Rotate volunteers to keep everyone engaged.

Phase 5 — Assessment: Self-Evaluation (MCQ)

- Instant Feedback: Launch the Self-Evaluation (MCQ) at the end of the period — it is auto-graded and results are immediate.
- Identify Gaps: Review which questions most students answered incorrectly to find concepts needing further attention.
- Practice Assignment: Assign the simulation as homework — students can repeat it unlimited times to reinforce the day's lesson.

Flipped Classroom Tip: Ask students to read the 'Theory and Vocabulary' section at home the night before class. Use the entire period for hands-on simulation and discussion — where deep learning happens.

SECTION 7 — TROUBLESHOOTING

8. Troubleshooting Quick Fixes

Most issues can be resolved in under a minute. Use the table below:

Issue	Quick Fix
Simulation Not Loading?	• Refresh the page (Ctrl+R / Cmd+R) • Check internet connection • Close other browser tabs to free up RAM
Black Screen?	• Update your browser to the latest version • Verify WebGL is enabled — visit webglreport.com to check • Switch to Google Chrome if using another browser
Stuck / Frozen?	• Clear browser cache: Settings → Privacy → Clear Browsing Data • Restart the browser completely • Reload the simulation from the portal dashboard

Login Issues	• Credentials are case-sensitive — check Caps Lock • Clear cookies and try logging in again • Use the 'Lost your password' link on the login page • Contact your school admin for a credential reset
Still Need Help?	• Contact your School Coordinator • Email the STEMpedia support team

SECTION 8 — REFERENCE LINKS

9. Important Links

Virtual Lab Portal	https://vr.icm-hp.com
Contact us	support@icm-hp.com