शिक्षा मंत्रालय
MINISTRY OF EDUCATION

Virtual Lab
as a teaching learning tool for Chemistry

VIRTUAL LABS

Date and Time

10 December, 2024

from 10:00 AM to 11:00 AM, Tuesday

Resource Persons

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Virtual Lab

as a teaching learning

tool for Chemistry

The Laboratory: A Cornerstone of Chemistry Teaching and Learning

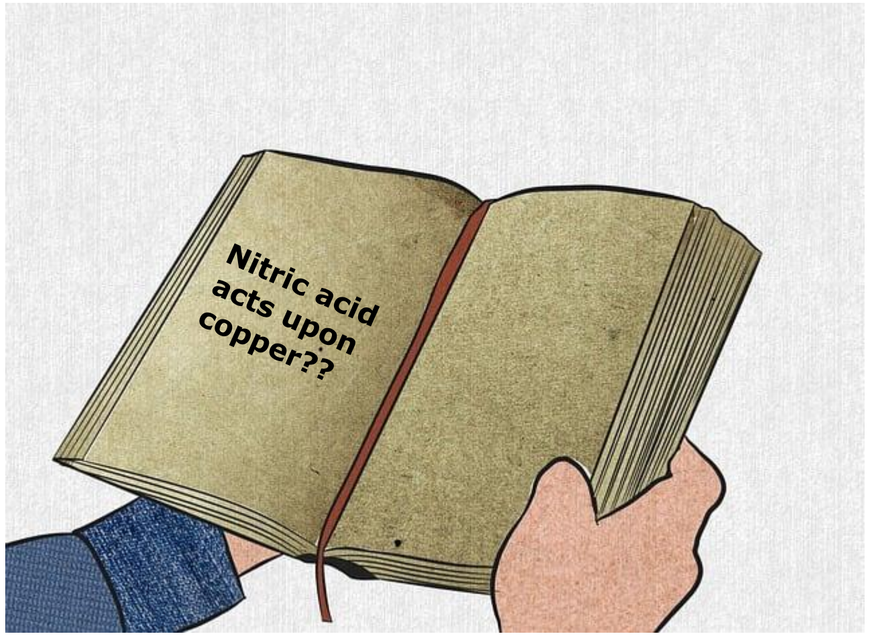
Laboratory experiments are fundamental to teaching chemistry successfully at the middle and high school stages

- **Hands-On Learning and Engagement**
- **Immediate Feedback on Theory**
- **Fostering Inquiry-Based Learning**

Laboratory provides opportunities to **“learn by doing”** to make sense of the world around us.

Nitric acid acts upon copper.....

The only way to learn about it is to see its results, to experiment, to work in the laboratory.



Ira Remsen (1846-1927) ---- He came across the statement, ***"Nitric acid acts upon Copper"*** while reading a chemistry textbook. Intrigued and determined to understand what this meant, he decided to conduct an experiment.

National Eduaction Policy (NEP) 2020

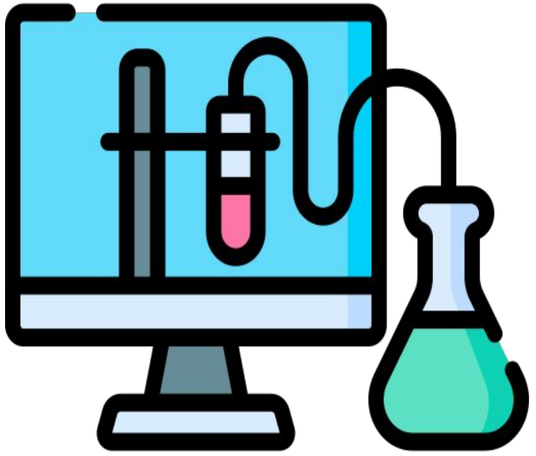
Recommendation of NEP 2020

- Access to quality practical and hands-on experiment-based learning experiences to each student
- Virtual labs enhance actual laboratory experience
- Lab based e-resources help students in visualizing the concepts

Learning by doing require laboaratories.....

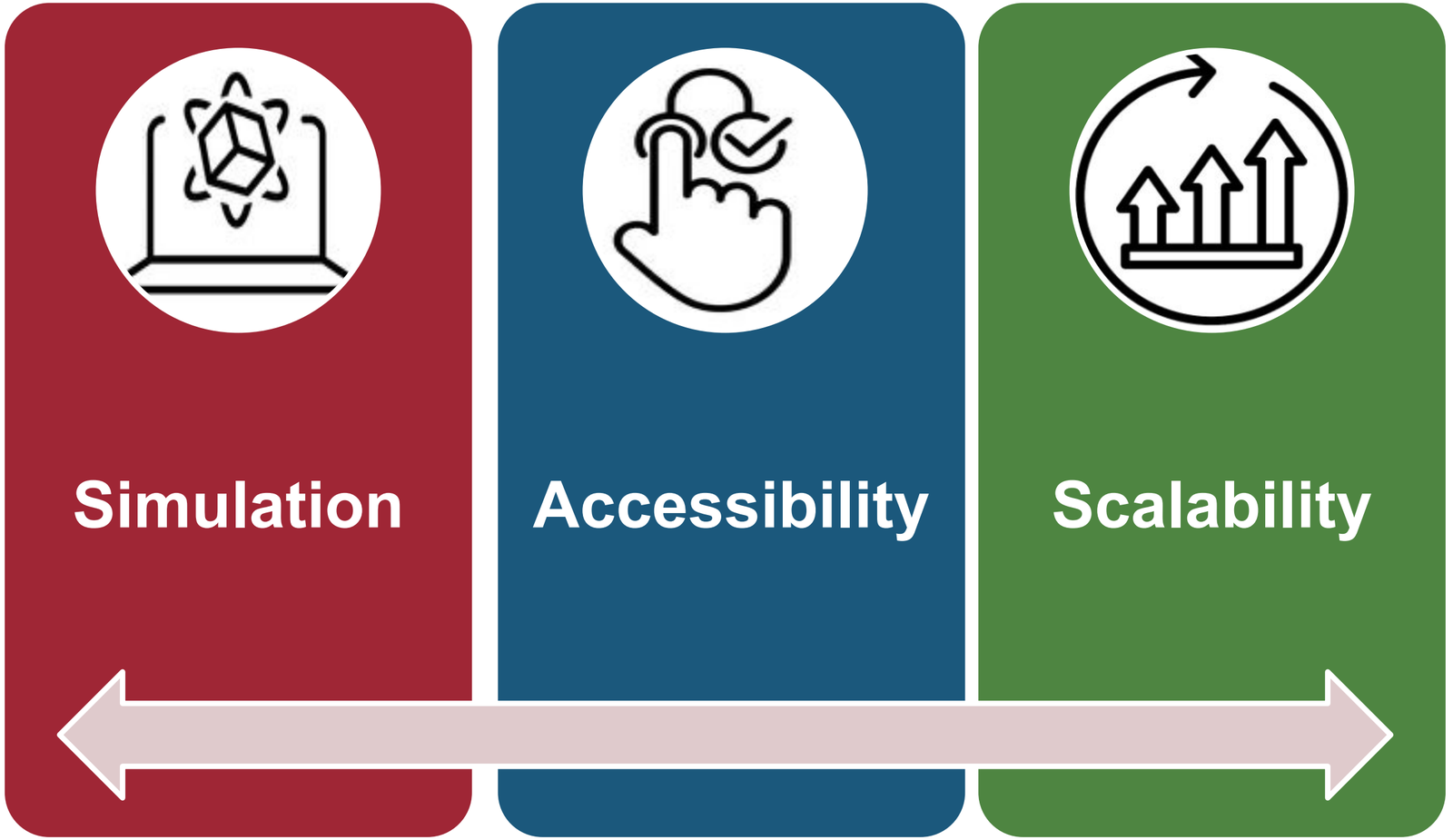
Physical Lab

INTERNET



Virtual Lab

Unlocking Virtual Labs: The Terms that Shape Science Learning

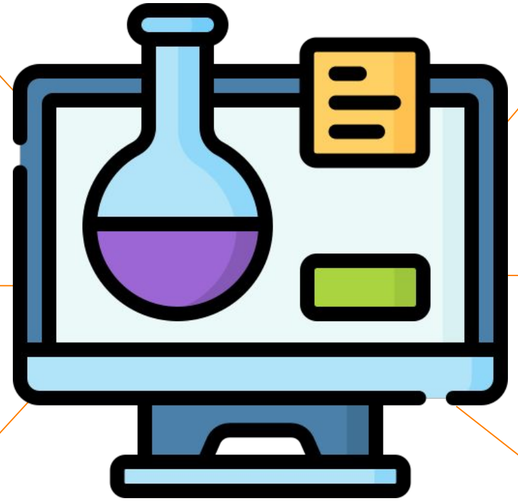


Main features of Virtual Labs

On-demands Labs
(learn and perform at your own pace and time)

Integrated online learning
(content at one place)

Self evaluation
(pre/post lab quiz)



Virtual Laboratory

Demonstarte experiemnt through animation /videos tutorials
(better insights)

Freedom to make mistake
(can experiemnt with experiemnts)

Freedom to repeat experiemnt multiple times
(enhances understanding and mastery of concepts)

Benefits of pedagogical integration of virtual labs

Self-paced learning

Learners can repeat experiments at their own pace

Accessibility

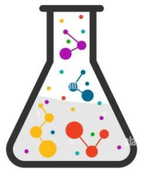
Virtual labs provide access to laboratory experiments for students, enabling anytime, anywhere learning

Interactive learning

Simulations provide hands-on experience and develop a deeper understanding of theoretical concepts

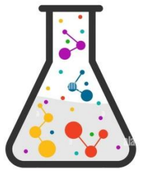
Concept visualization

Visual representations within virtual labs can help learners visualize complex scientific concepts



Data analysis and interpretation

Virtual labs often provide built-in tools for data collection, analysis and drawing conclusions.



How to integrate virtual labs?

Pre-lab activities

Provide learners with information and instructions on the virtual lab experiments before they begin to perform experiments through simulations and animations.

Performance Based

Virtual labs provide consistent, controlled environments for summative assessments, ensuring fairness and reliability.

Post-lab discussions

Encourage classroom discussions where learners can share their observations, analyze data, draw conclusion and compare results from the virtual experiment.

Assessment Techniques in Virtual Labs

Formative

Real-time feedback, Interactivity & Individualized learning

Diagnostic

Identify learning gaps, Personalized Feedback & Data-Driven Intervention

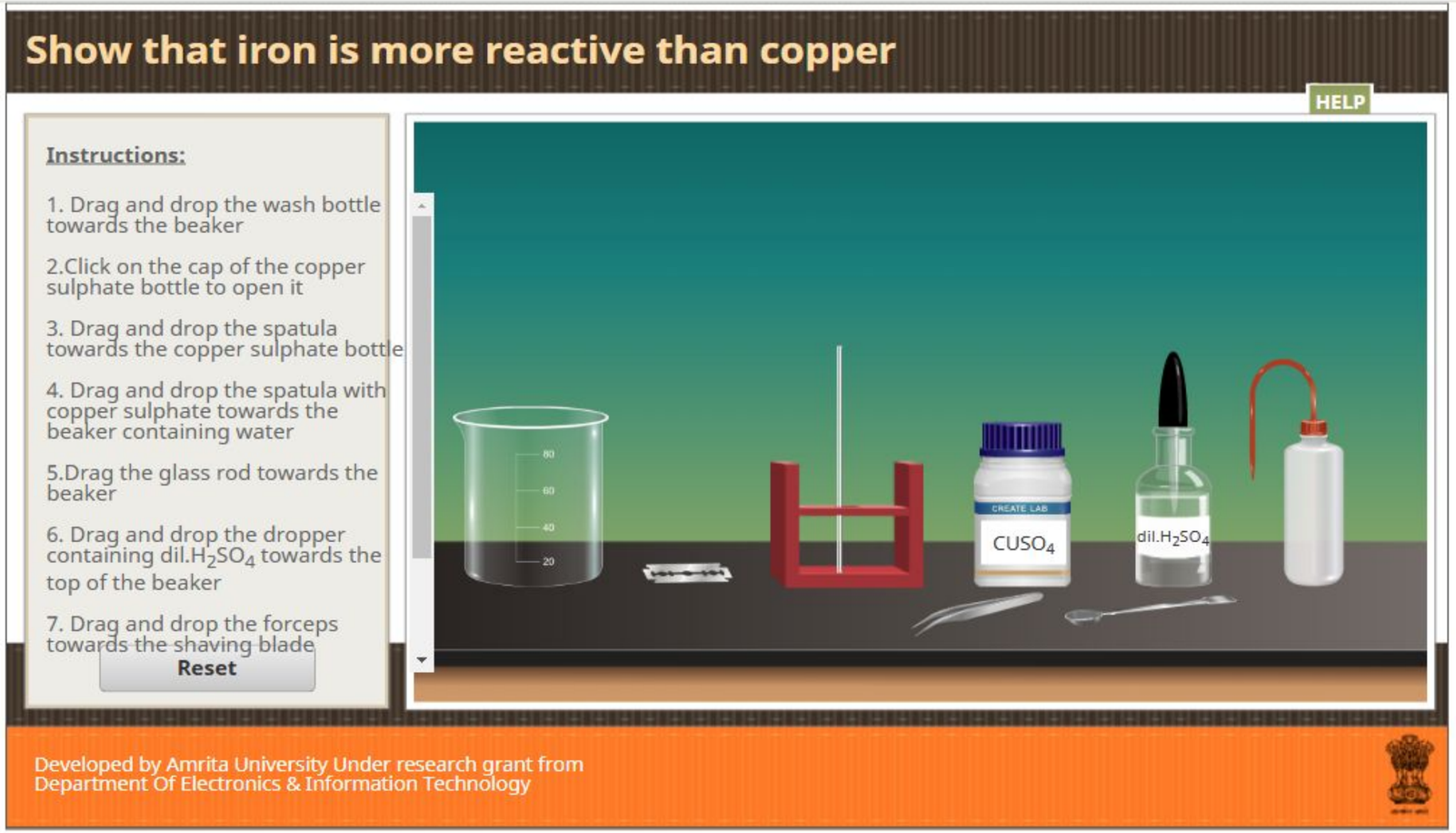
Performance Based

Authentic, Standardized Evaluation & Data Driven Insights

Steps to access the Virtual Lab on the DIKSHA portal

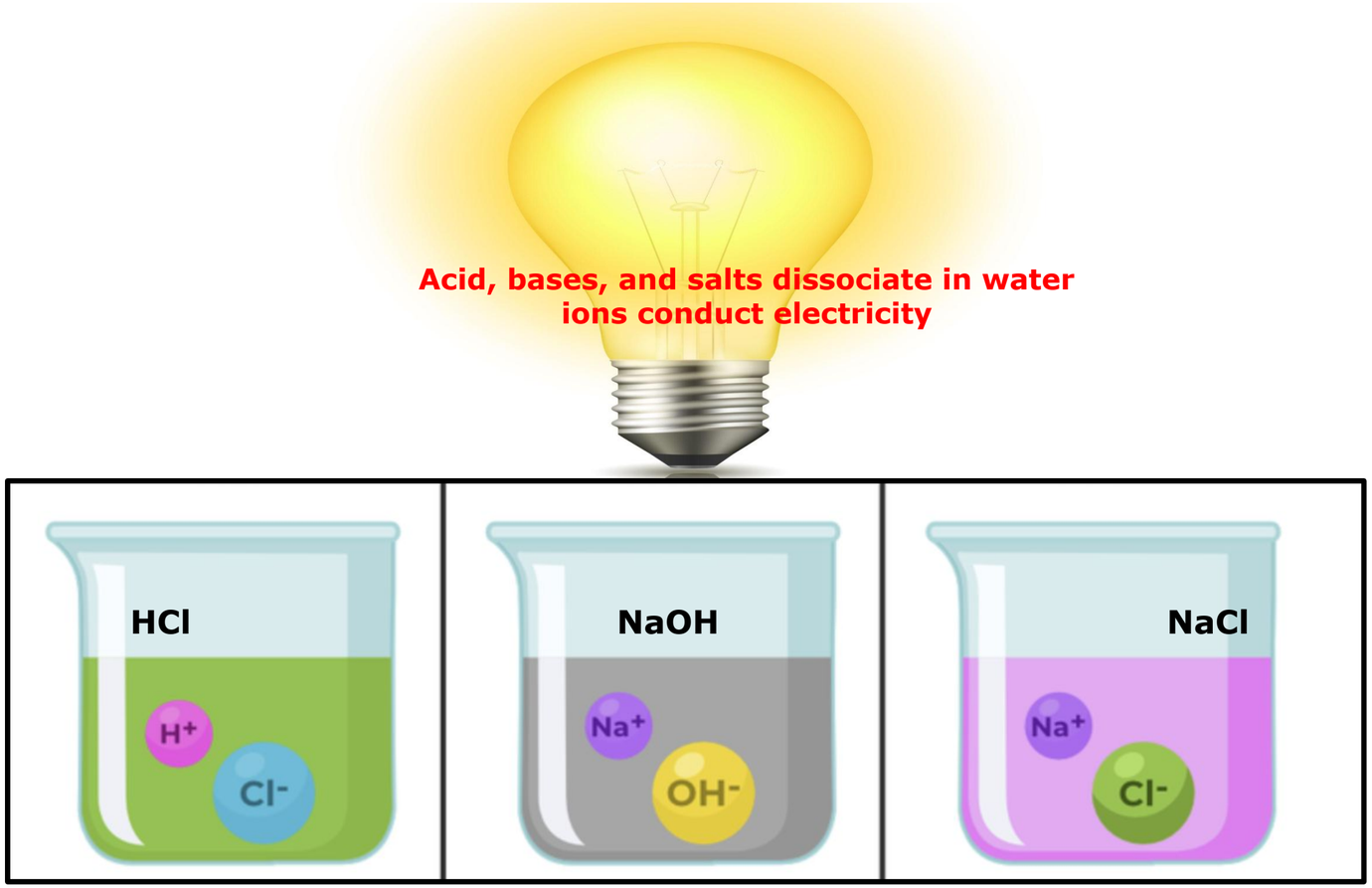
URL: http://diksha.gov.in/

Chemistry Virtual Lab on DIKSHA
Class VIII

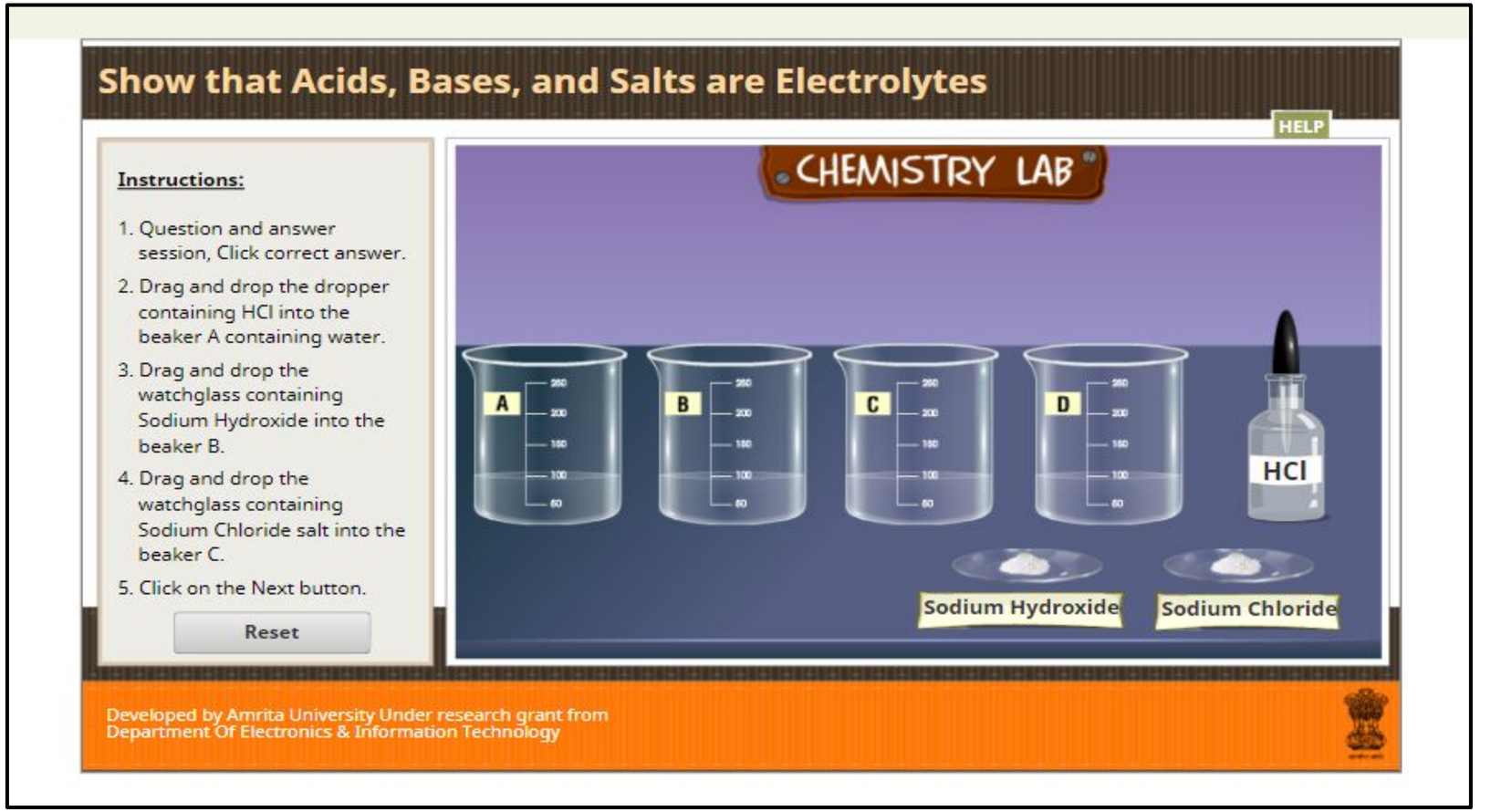


Class X NCERT Lab Manual

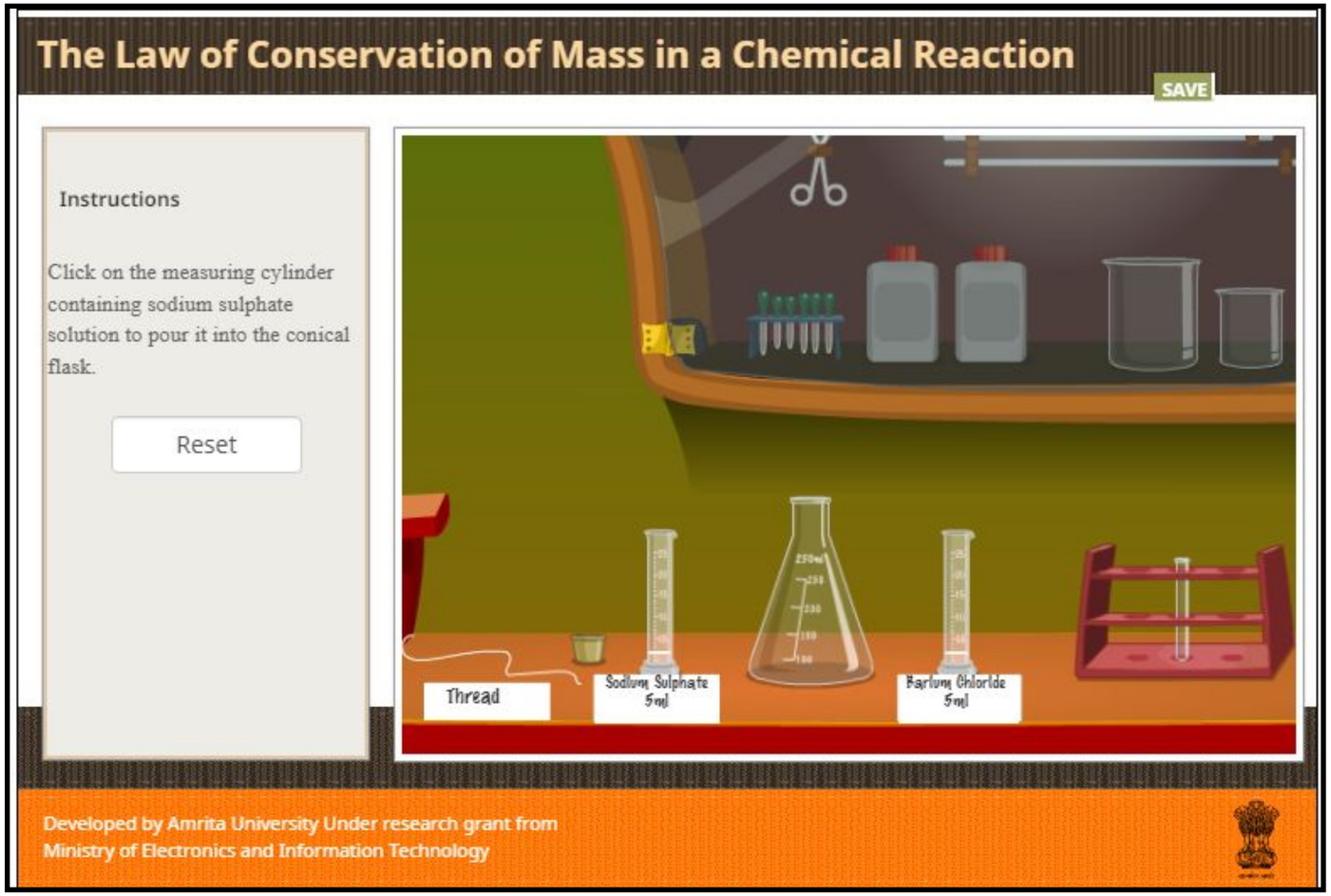
Experiment: To show acids, bases and salts are electrolyte



Chemistry Virtual Lab on DIKSHA
Class X



Chemistry Virtual Lab on DIKSHA
Class IX



Chemistry Virtual Lab on DIKSHA
Class IX