

Virtual Lab as a teaching learning tool for Chemistry



Date and Time

10 December, 2024

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



Resource Persons



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Watch it Live on NCERT Official YouTube Channel
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You can
watch at:



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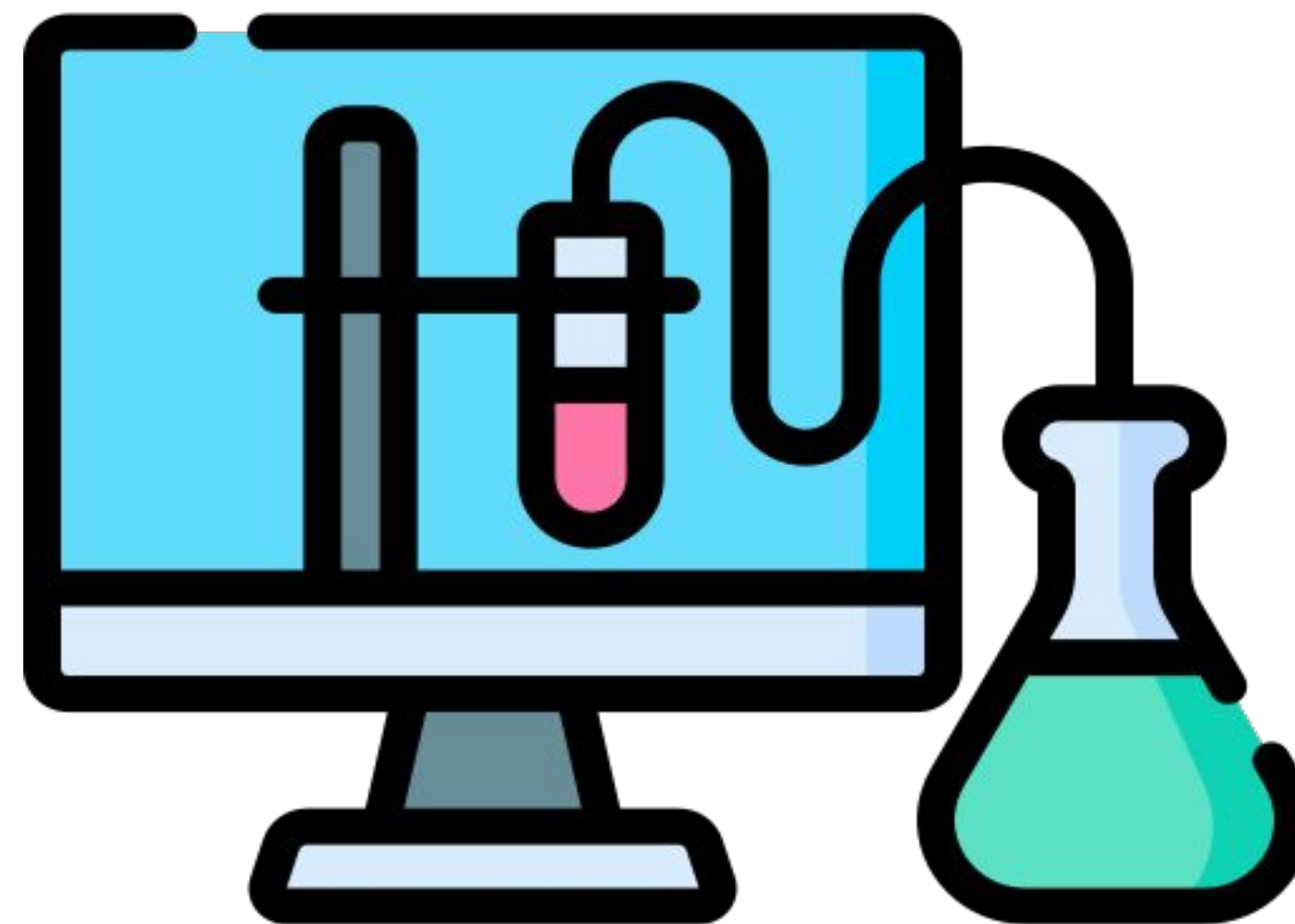


PM eVidya Channel #6-12



For any further queries, mail to : diksha.training@ciet.nic.in Or Call : 8800440559

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

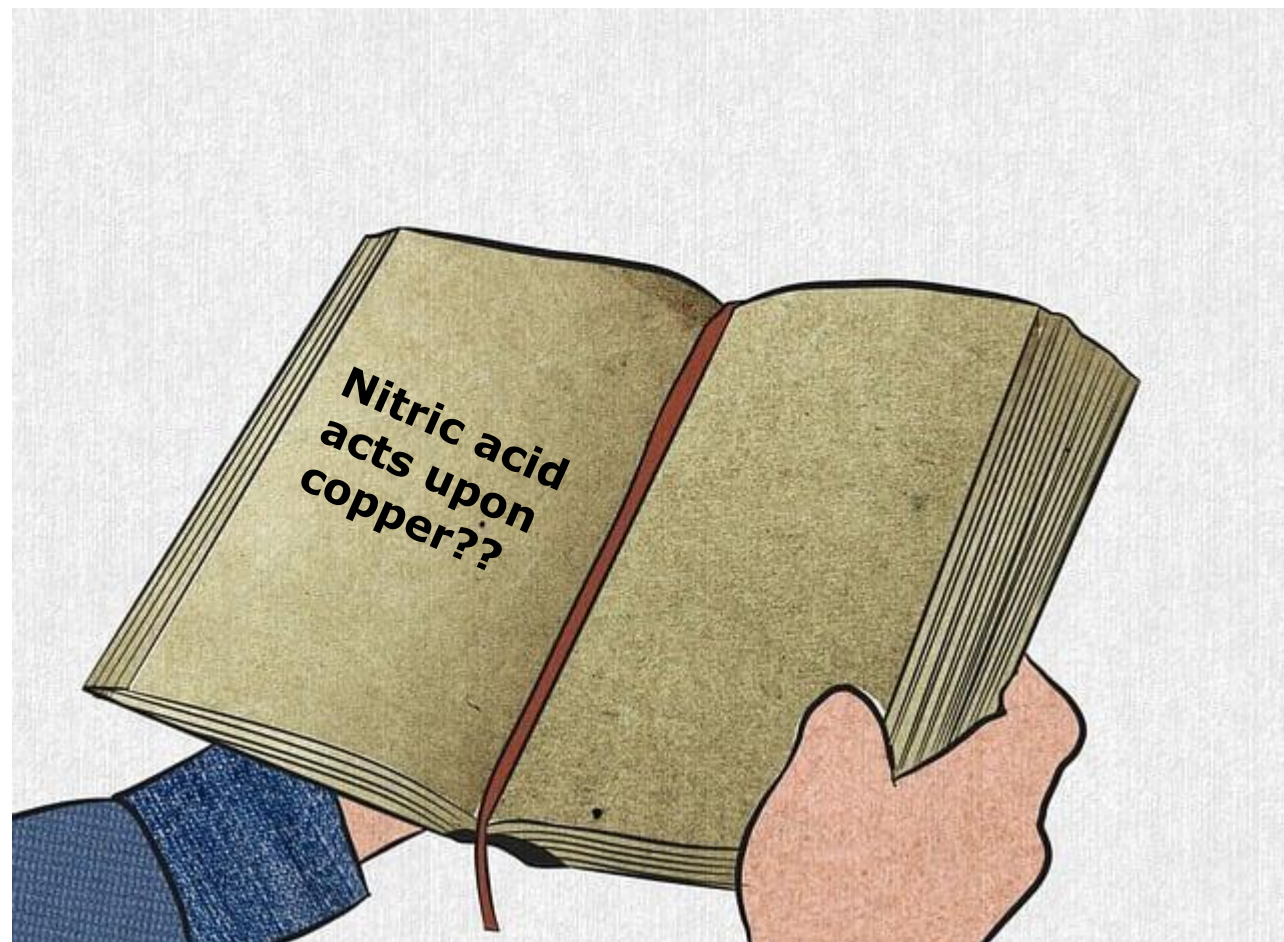


**ACTIVE
LEARNING**

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.



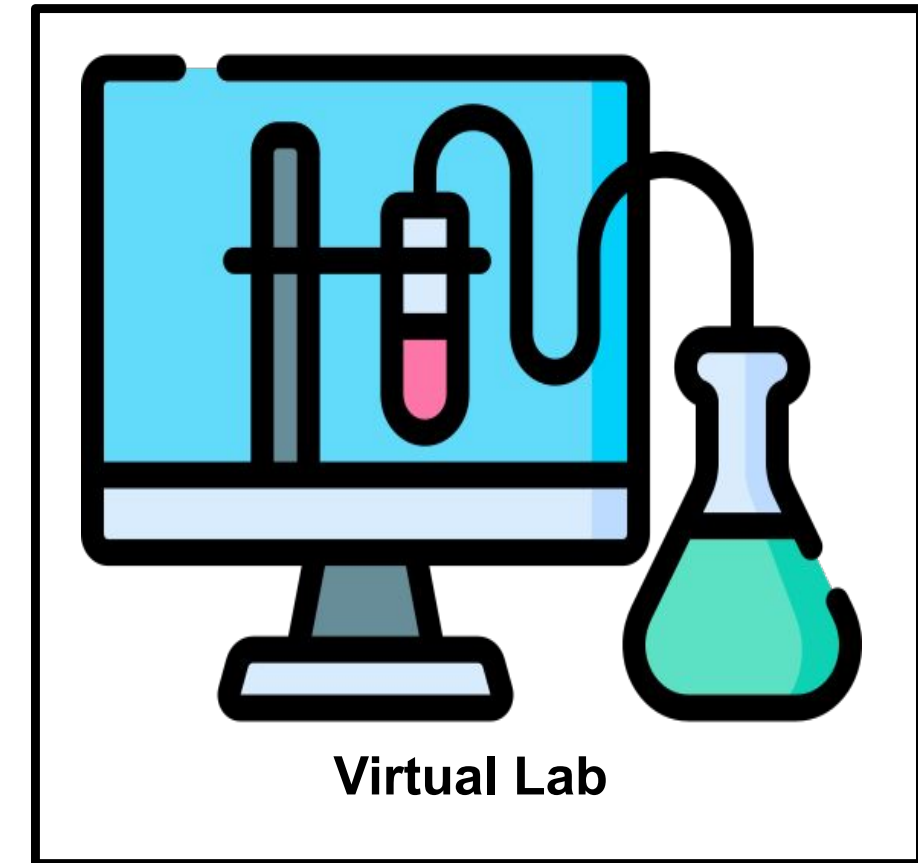
National Education Policy (NEP) 2020



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.....



Unlocking Virtual Labs: The Terms that Shape Science Learning



Simulation



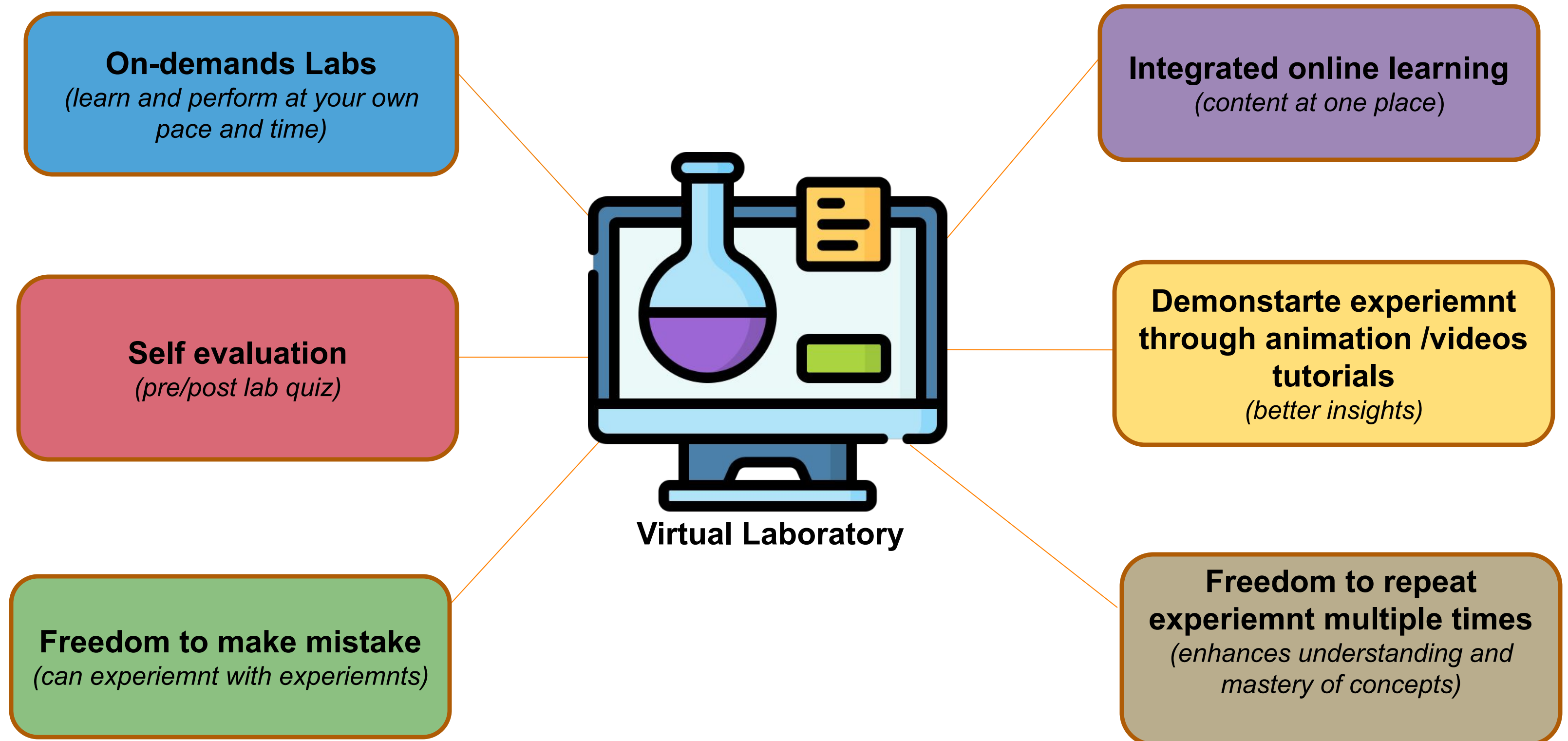
Accessibility



Scalability



Main features of Virtual Labs



Benefits of pedagogical integration of virtual labs

Self-paced learning

Learners can repeat experiments at their own pace

Accessibility

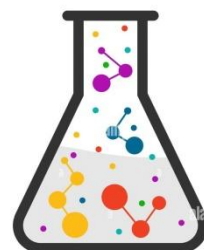
Virtual labs provide access to laboratory experiments for students, enabling anytime, anywhere learning

Interactive learning

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

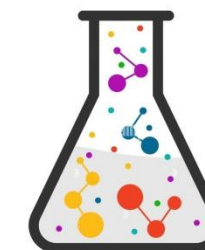
Concept visualization

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

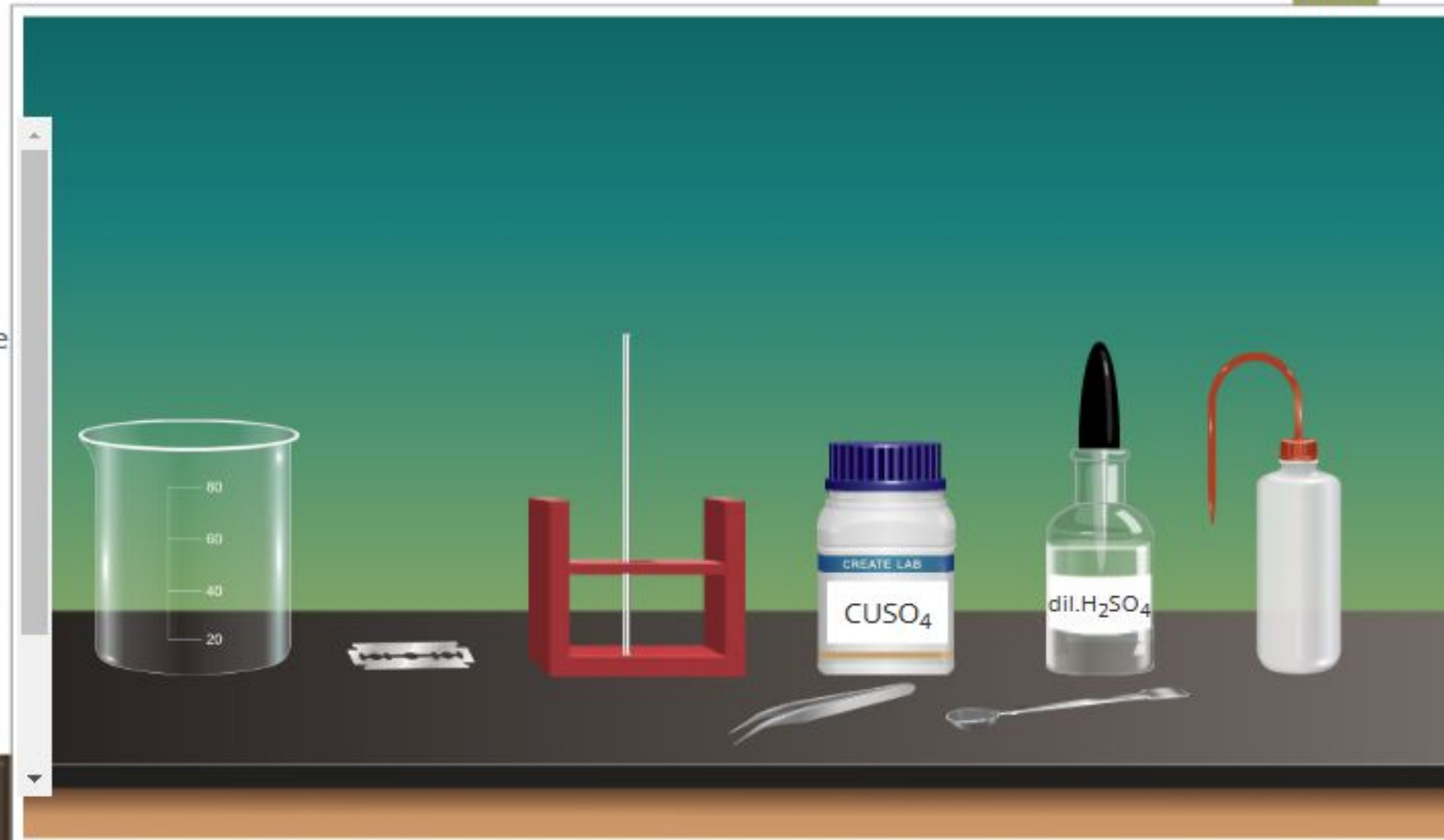
Show that iron is more reactive than copper

HELP

Instructions:

1. Drag and drop the wash bottle towards the beaker
2. Click on the cap of the copper sulphate bottle to open it
3. Drag and drop the spatula towards the copper sulphate bottle
4. Drag and drop the spatula with copper sulphate towards the beaker containing water
5. Drag the glass rod towards the beaker
6. Drag and drop the dropper containing $\text{dil.H}_2\text{SO}_4$ towards the top of the beaker
7. Drag and drop the forceps towards the shaving blade

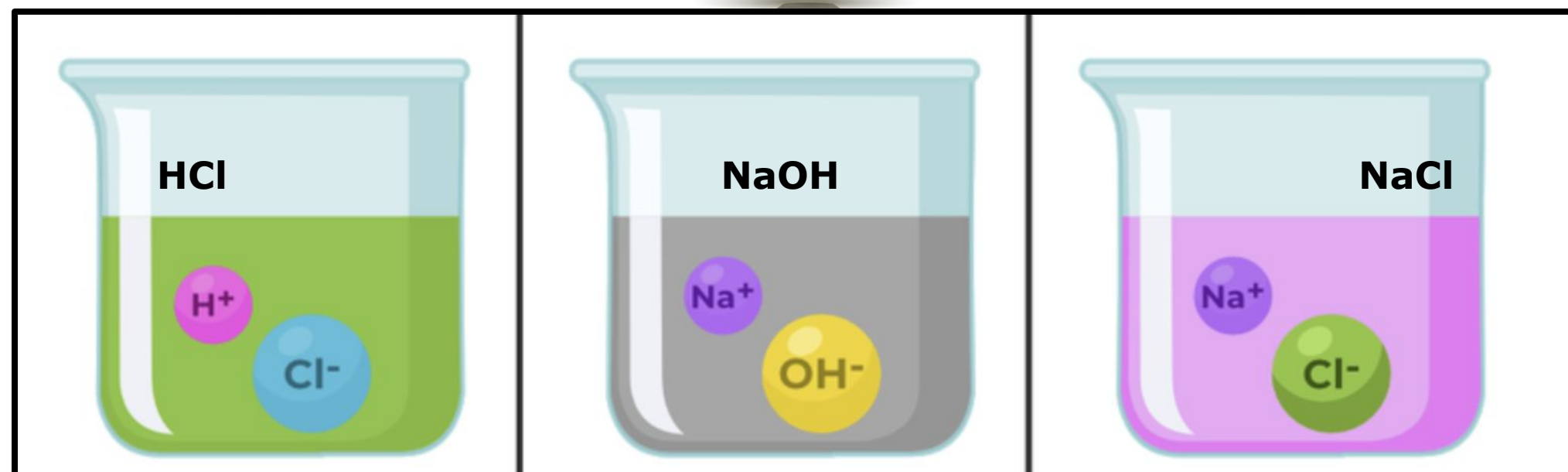
Reset



Class X NCERT Lab Manual

Experiment: To show acids, bases and salts are electrolyte

**Acid, bases, and salts dissociate in water
ions conduct electricity**



Chemistry Virtual Lab on DIKSHA Class X

Show that Acids, Bases, and Salts are Electrolytes

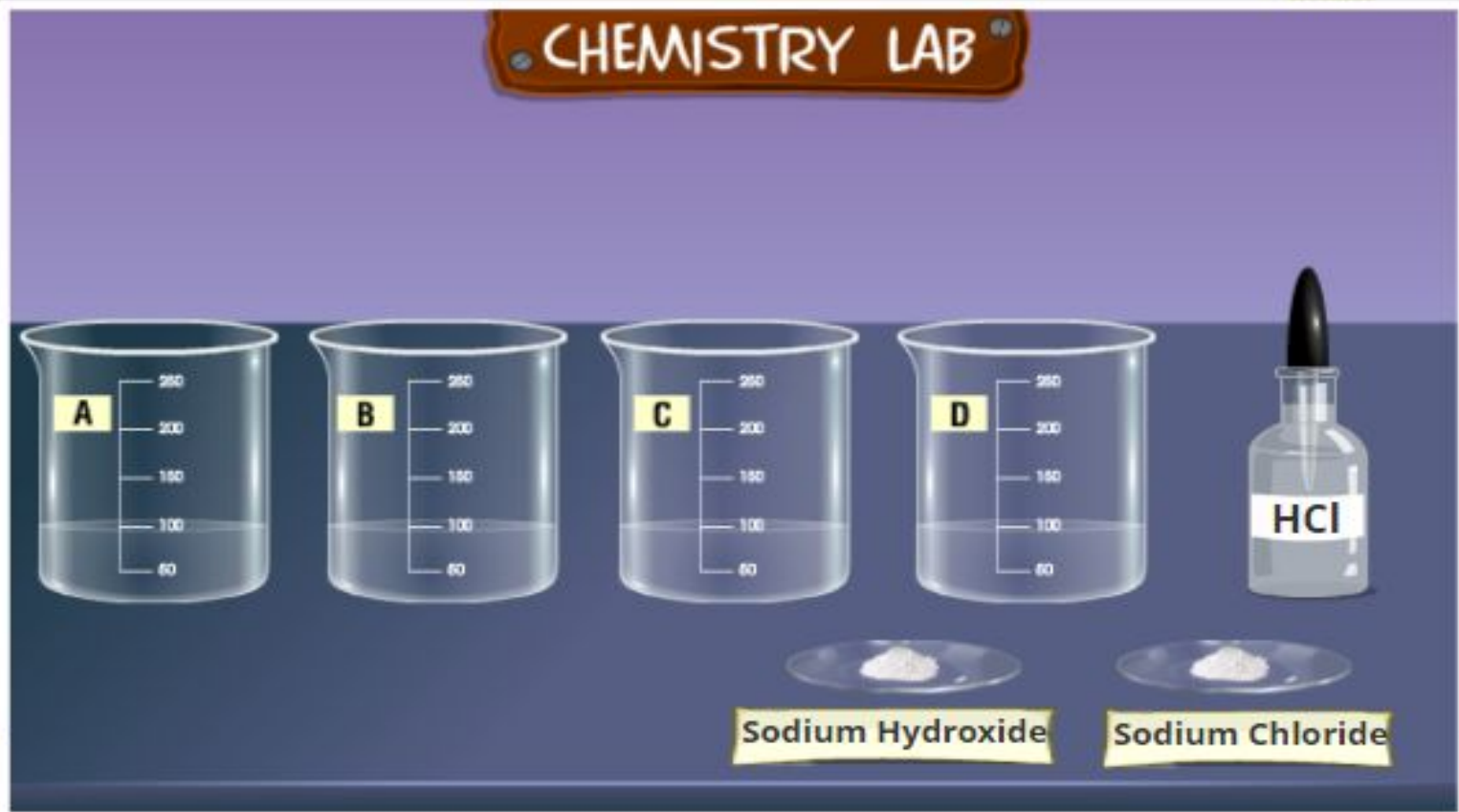
HELP

CHEMISTRY LAB

Instructions:

1. Question and answer session, Click correct answer.
2. Drag and drop the dropper containing HCl into the beaker A containing water.
3. Drag and drop the watchglass containing Sodium Hydroxide into the beaker B.
4. Drag and drop the watchglass containing Sodium Chloride salt into the beaker C.
5. Click on the Next button.

Reset



The virtual lab interface features a purple background with a 'CHEMISTRY LAB' banner. On the left, four beakers labeled A, B, C, and D are arranged horizontally. Beaker A contains a small amount of liquid. To the right of the beakers is a glass dropper with a black stopper and a label 'HCl'. Below the beakers are two white watchglasses on a dark surface. The first watchglass is labeled 'Sodium Hydroxide' and contains a white powder. The second watchglass is labeled 'Sodium Chloride' and also contains a white powder. The beakers have volume markings at 60, 100, 150, 200, and 250. The dropper has a label 'HCl'. The watchglasses are labeled 'Sodium Hydroxide' and 'Sodium Chloride'. The interface includes a 'HELP' button in the top right corner and a 'Reset' button below the instructions.

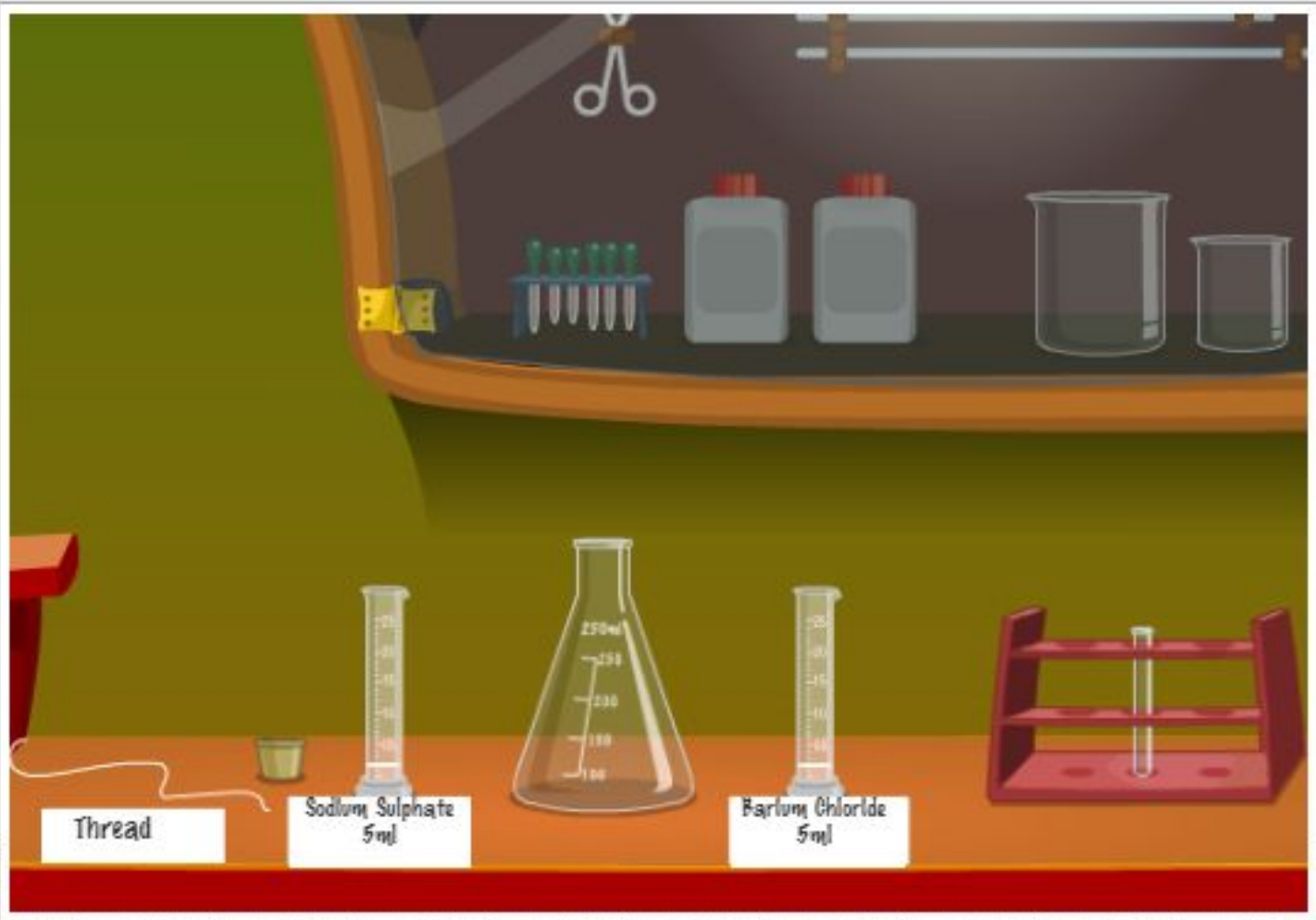


Chemistry Virtual Lab on DIKSHA Class IX

The Law of Conservation of Mass in a Chemical Reaction SAVE


Instructions

Click on the measuring cylinder containing sodium sulphate solution to pour it into the conical flask.



Thread Sodium Sulphate 5ml 250ml Barium Chloride 5ml

Developed by Amrita University Under research grant from
Ministry of Electronics and Information Technology



Chemistry Virtual Lab on DIKSHA Class IX

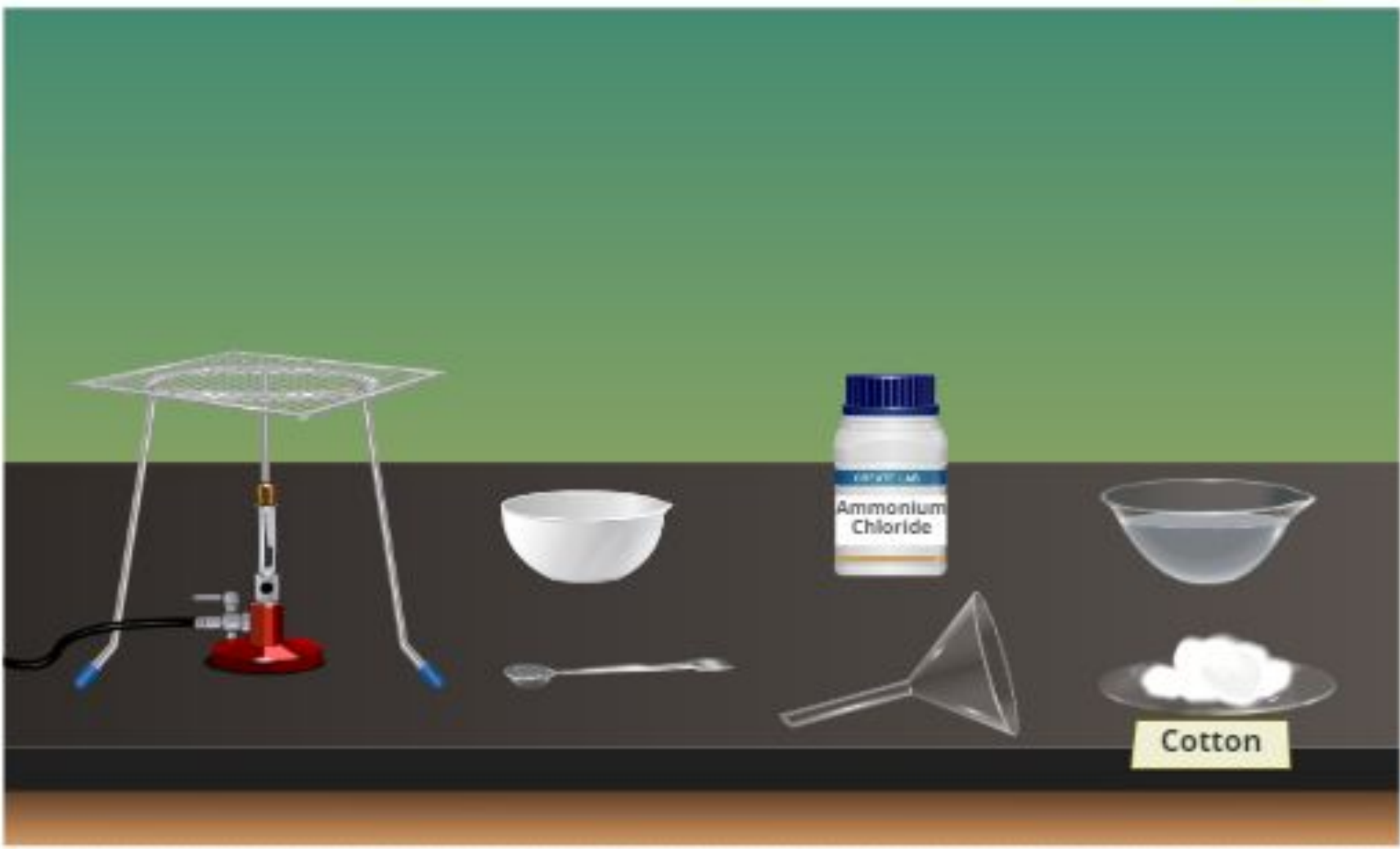
To study the changes in the state of sublimate solids on heating

HELP

Instructions:

1. Click on the cap.
2. Drag and drop the spatula towards the bottle.
3. Drag and drop the funnel towards the china dish.
4. Drag and drop the cotton towards the top of the funnel.
5. Drag and drop the china dish towards tripod stand.
6. Drag and drop the cotton into the glass bowl.
7. Drag and drop the wet cotton into the top of the china dish.
8. Click on the knob of the burner.

Reset



Ammonium Chloride

Cotton

Developed by Amrita University Under research grant from
Department of Electronics & Information Technology

