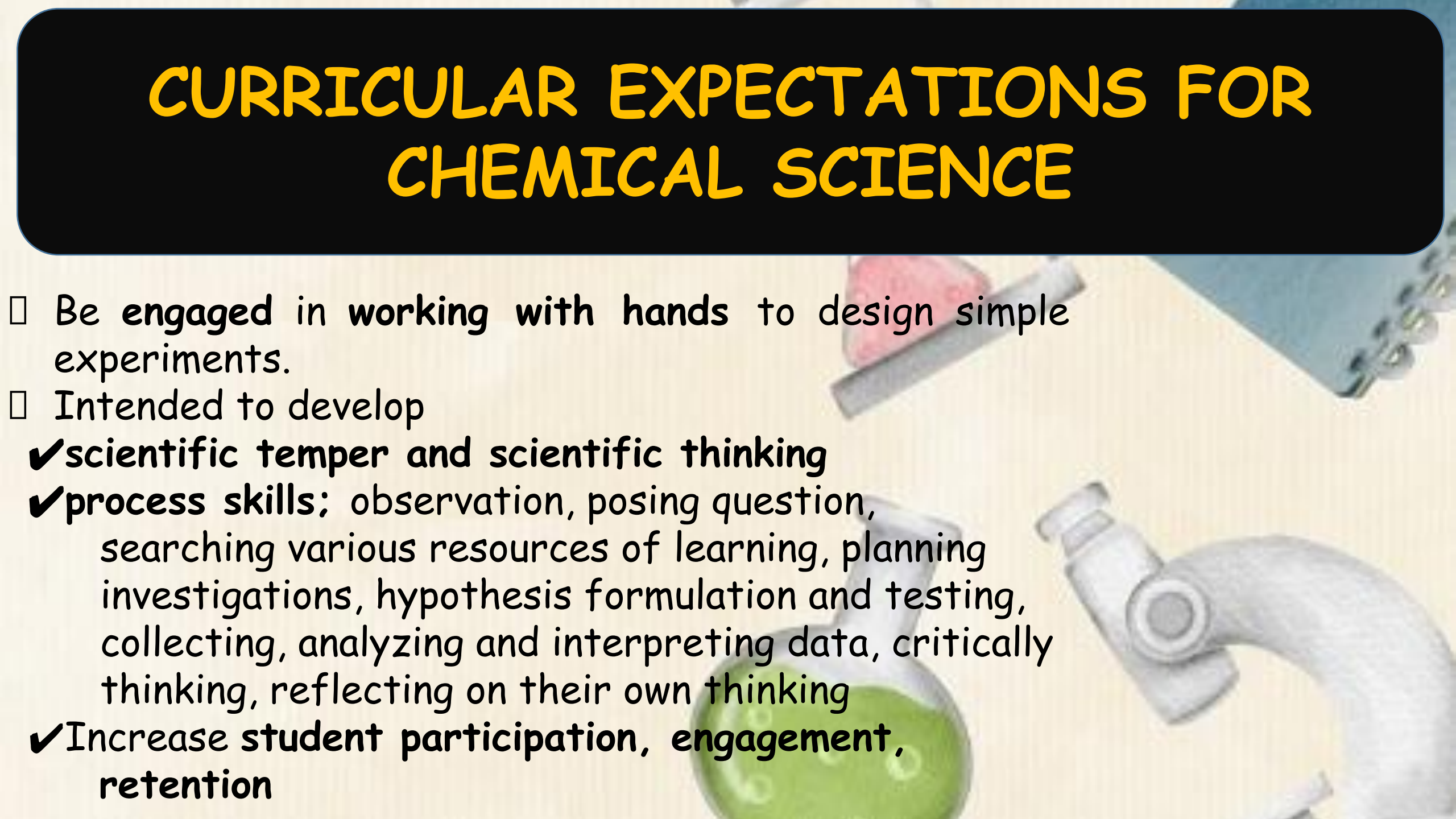




# DEVELOPING ECONTENT FOR TEACHING AND LEARNING OF CHEMISTRY

रसायन विज्ञान के शिक्षण और सीखने के लिए ई-सामग्री का विकास  
करना

# CURRICULAR EXPECTATIONS FOR CHEMICAL SCIENCE

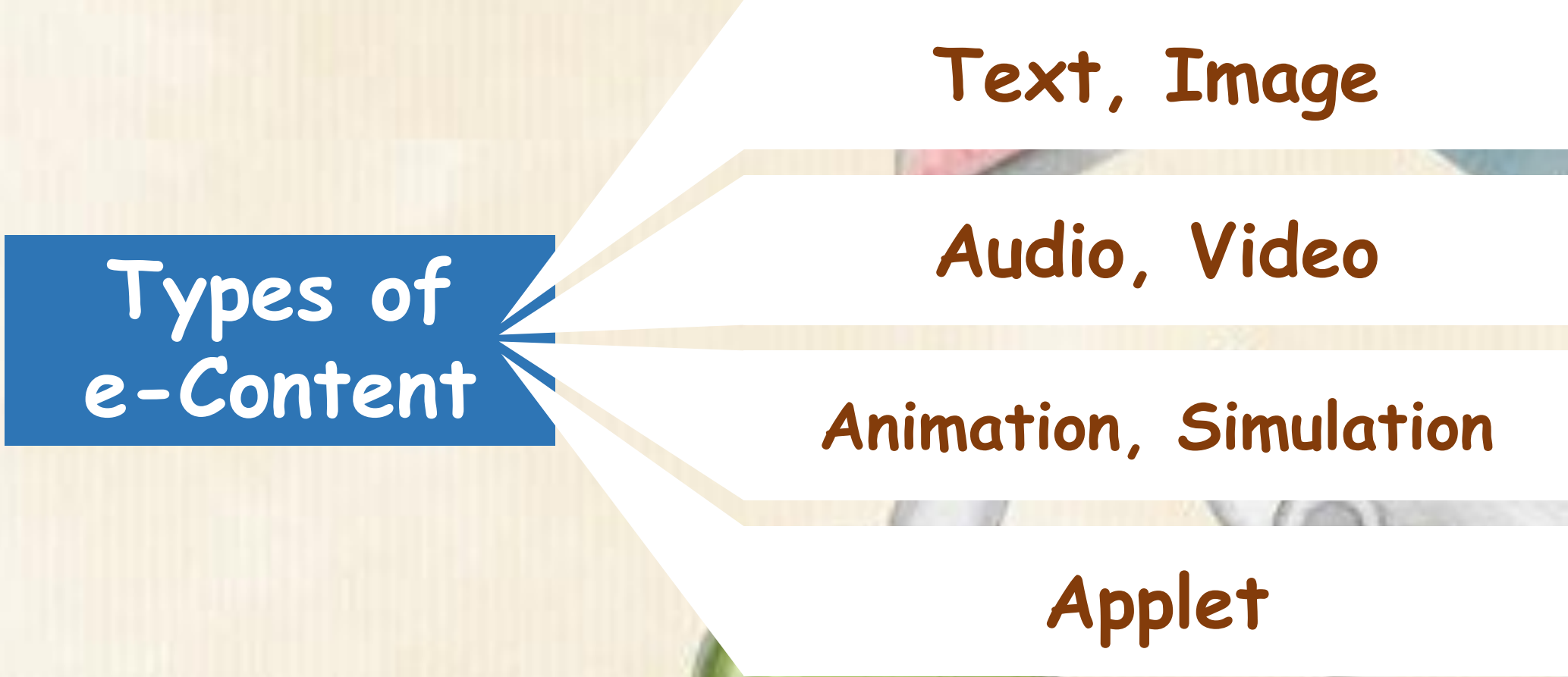
- Be engaged in working with hands to design simple experiments.
  - Intended to develop
    - ✓ scientific temper and scientific thinking
    - ✓ process skills; observation, posing question, searching various resources of learning, planning investigations, hypothesis formulation and testing, collecting, analyzing and interpreting data, critically thinking, reflecting on their own thinking
    - ✓ Increase student participation, engagement, retention
- 
- A background image showing laboratory glassware on a wooden surface. In the center, a round-bottom flask contains a green liquid. To its right, a white microscope is partially visible. Above the flask, a test tube is held by a red rubber stopper. In the top right corner, a blue spiral-bound notebook is partially visible.

# NEED FOR DEVELOPING E-CONTENT FOR CHEMISTRY

- ✓ Supplement to traditional teaching.
- ✓ For illustrating complex or abstract concepts
- ✓ For promoting engagement and retaining information
- ✓ For meeting the diverse learning needs and preferences of individual learners;  
Customization of e-content
- ✓ For illustrate the practical applications of chemistry concepts



## Types of e-Content



A diagram with a central blue box on the left containing the text 'Types of e-Content'. Four white boxes branch out to the right from the right side of the blue box. Each white box contains a list of content types: 'Text, Image', 'Audio, Video', 'Animation, Simulation', and 'Applet'. The background is a blurred image of a laboratory setting with a pipette, a beaker of green liquid, and a blue notebook.

**Text, Image**

**Audio, Video**

**Animation, Simulation**

**Applet**

# SOFTWARES/TOOLS; e-Content Development

## Mind Mapping/ Concept Mapping

✓ Free Plane, Free Mind, Mindomo

## Infographics

Canva, Easelly

## Animation

Scratch, Tupi

## Interactive

H5P, PHET, OLABS

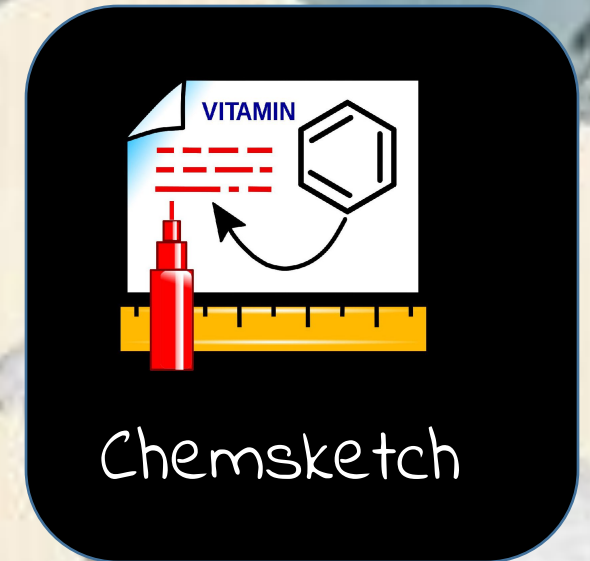
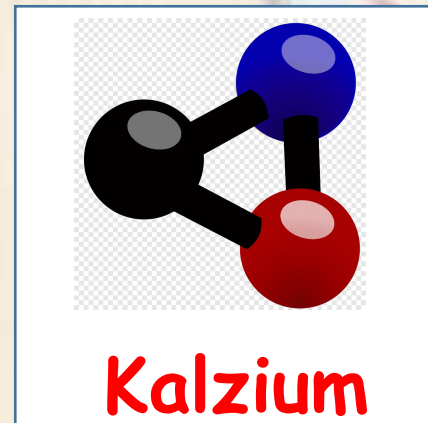
# Mind Map

- A graphical way to represent ideas and concepts
- Visual thinking tool that helps structuring information, better analyze, comprehend, synthesize, recall and generate new ideas
- Mind mapping Free and Open Educational software: [Free Mind](#) and

# Open Educational Repositories

- ❑ e-Pathshala (<https://epathshala.nic.in>)
- ❑ NCERT (<https://ncert.nic.in>)
- ❑ Online Labs (OLabs) for School Lab Experiments – Interactive Simulations ([www.olabs.edu.in](http://www.olabs.edu.in))
- ❑ PhET Interactive Simulations (<https://phet.colorado.edu/>)
- ❑ SWAYAM (<https://swayam.gov.in/>)
- ❑ SAKSHAT (<https://www.sakshat.ac.in>)
- ❑ DIKSHA (<https://diksha.gov.in/index.html>)

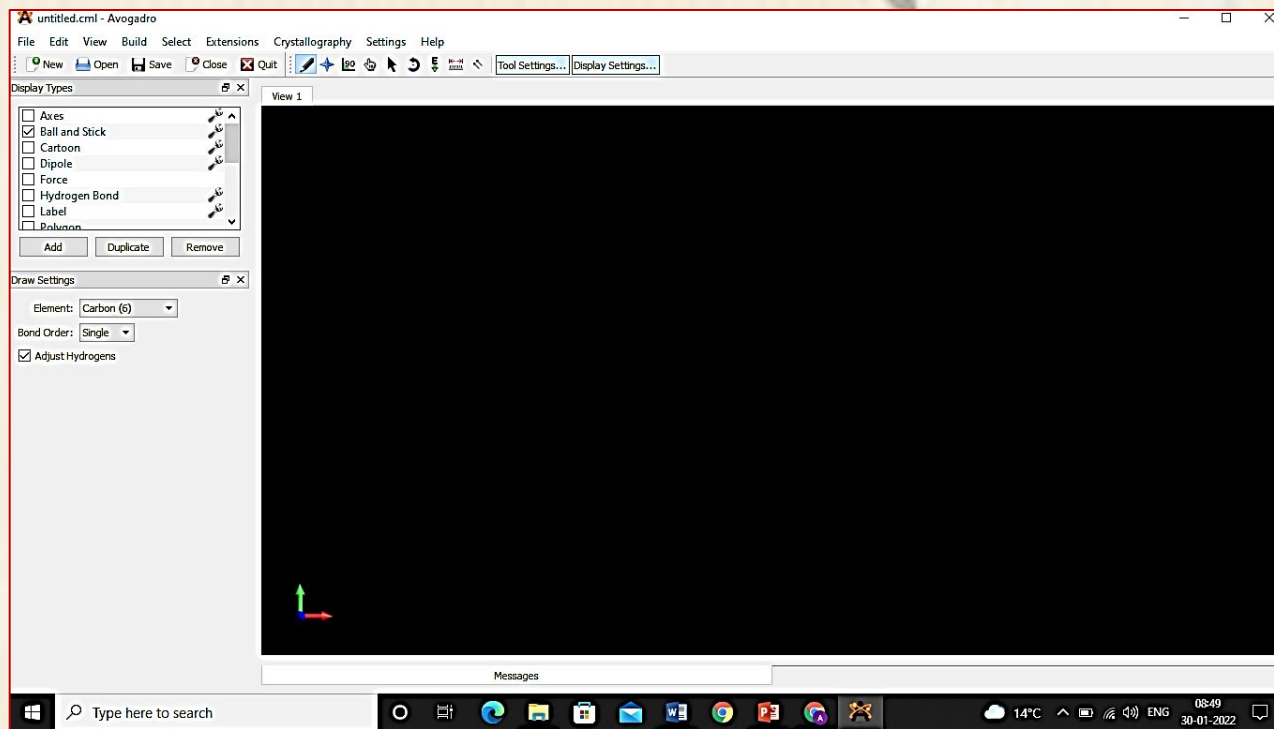
# Free and Open Source SOFTWARES





# Avogadro

...Molecule Editor Software



- ❑ Free and Open Source software
- ❑ Construct, edit and view molecules in 3D
- ❑ 3D Molecular Editor and Visualization tool; Huge fragment library to load inbuilt structures
- ❑ Freely downloaded on Mac, Windows, and Linux OS
- ❑ Downloaded from <http://avogadro.cc>

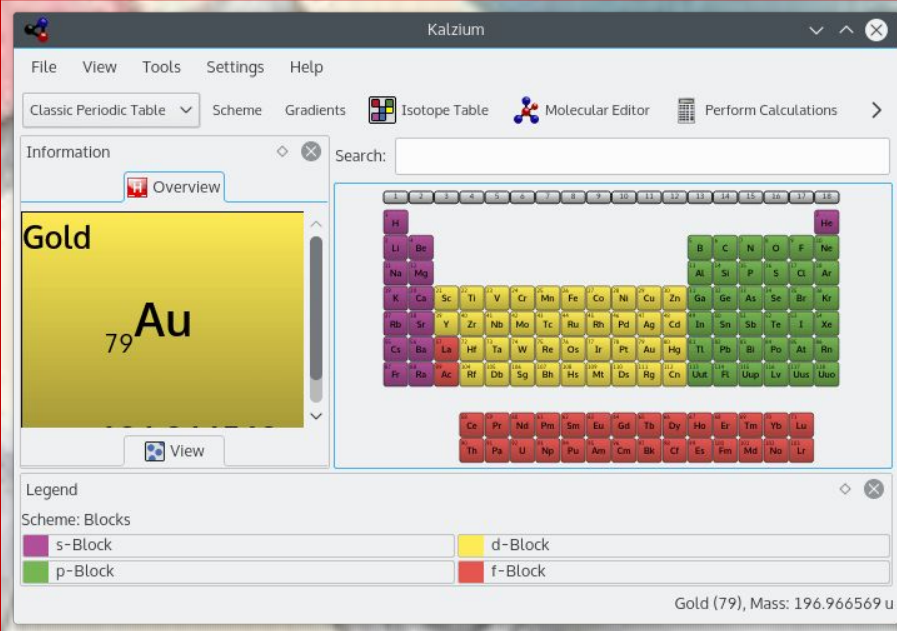
# Learning Periodic Properties of Elements

## □ Kalzium

- ✓ Application software for exploration of elements and properties, their classification
- ✓ OER downloaded freely in Ubuntu

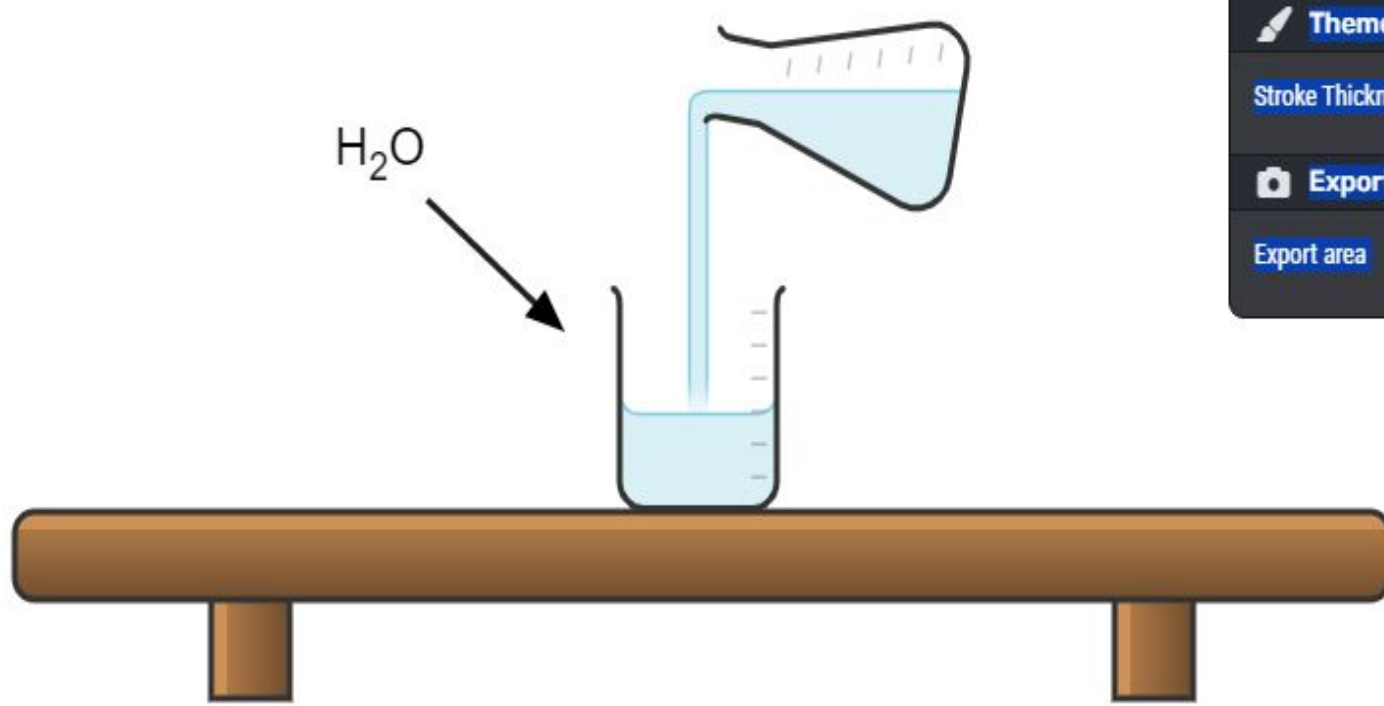
## □ RSC Periodic table:

- ✓ Interactive periodic table
- ✓ features history, alchemy, podcasts, videos, and data trends across the periodic table.
- ✓ Detailed Elements information
- ✓ <https://www.rsc.org/periodic-table/#>



The screenshot displays the Kalzium application window. The title bar reads "Kalzium". The menu bar includes "File", "View", "Tools", "Settings", and "Help". Below the menu bar, there are several tool buttons: "Classic Periodic Table" (dropdown), "Scheme", "Gradients", "Isotope Table", "Molecular Editor", and "Perform Calculations". A search bar is located on the right side of the information panel. The main content area is split into two parts: on the left, a large yellow box displays "Gold" and "79 Au"; on the right, a full periodic table is shown with elements color-coded by block. A legend at the bottom left identifies the blocks: s-Block (purple), p-Block (green), d-Block (yellow), and f-Block (red). The status bar at the bottom right shows "Gold (79), Mass: 196.966569 u".

Software interface for ChemixLab. Top navigation includes: + New, Download Image, Cloud, ? Help, What's New, English. Top right: Follow @ChemixLab. Left sidebar: Search apparatus, Chemistry, Containers (Test Tube, Test Tube With Side Arm, Bung / Stopper, Beaker, Displacement Beaker, Conical Flask, Conical Flask With Side Arm, Boiling Flask, Volumetric Flask, Round Bottom Flask, Watch Glass). Top right panel: Diagram Settings, Properties, Theme, Stroke Thickness, Export, Export area (Automatic). Main workspace: Diagram of a beaker on a stand with a conical flask pouring liquid into it. An arrow labeled  $H_2O$  points to the beaker. Bottom right: Zoom slider (25% to 300%, 100% selected). Bottom status bar: 2:28 PM.

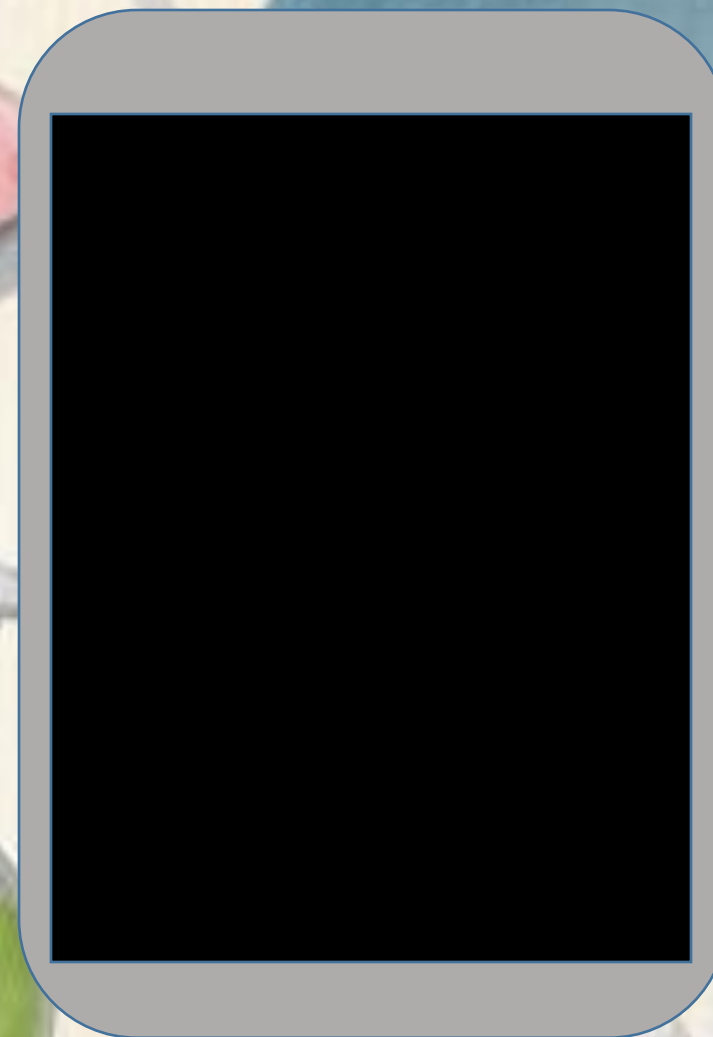


**CHEMIX** (<https://chemix.org/>)

25% 50% 100% 200% 300%

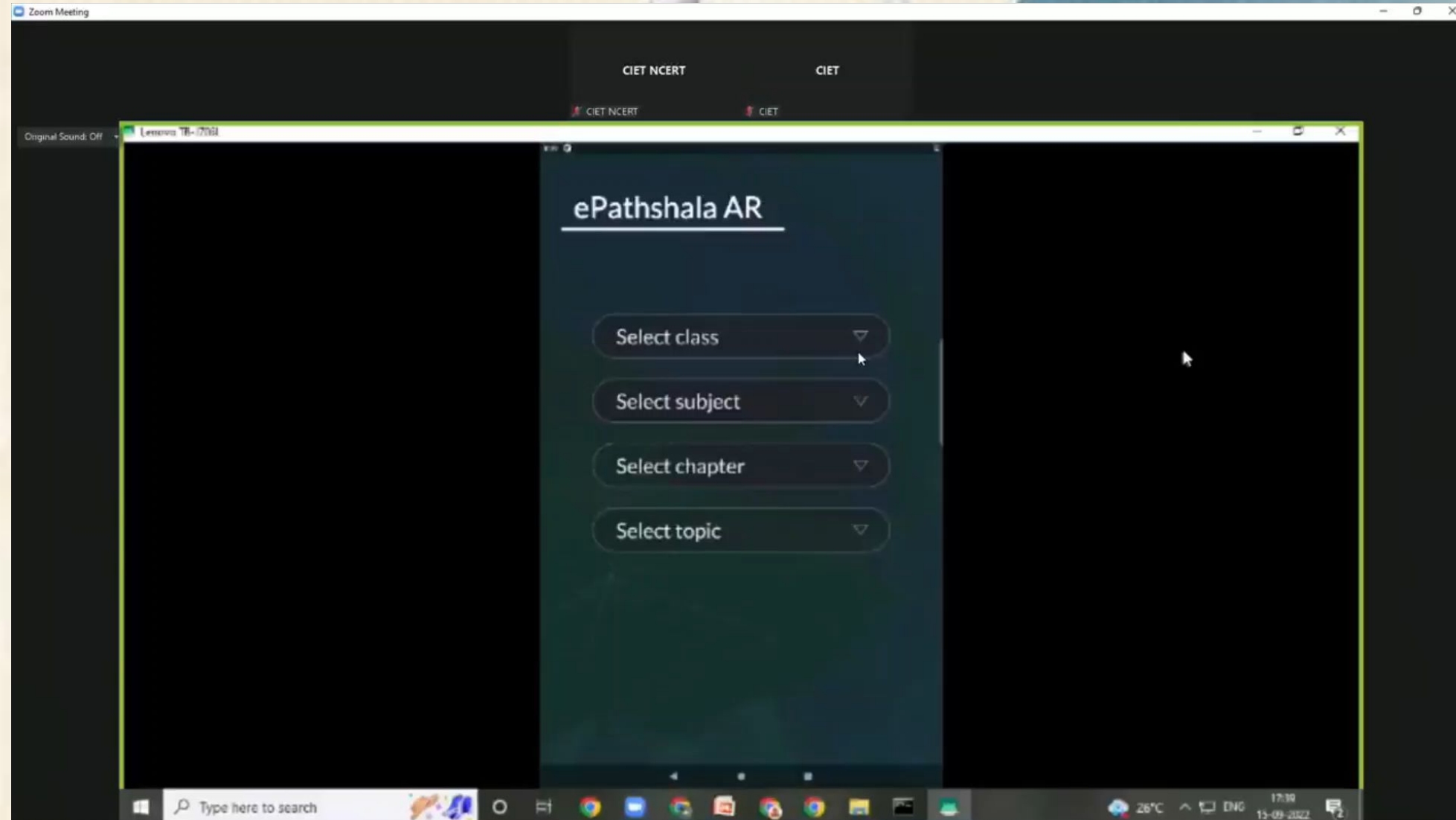
# Mobile APPs for Chemistry

- **Periodic table**
- **Beaker**
- **Chemspider** (online database of chemicals owned by the Royal Society of Chemistry)
- **Chairs!** (visual pattern puzzle game)
- **Happy Atoms** (world of molecules)
- **My Molecularium** (Molecule Building Game)



# Augmented Reality (AR) resources

ePathshala  
AR



Thanks for your  
attention

for any queries...

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