

Exploring Virtual Labs for Mathematics

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Background

Laboratory a key component

School education in India faces many challenges

- Lack of infrastructure including labs.
- *Students come out with little practical knowledge of the concepts they learn.*

Why Virtual Labs ?

Problems with Physical Labs

- Limited Infrastructure
- No/minimal lab session
- Limited lab access
- Safety constraints and fragile equipment's.

Inadequate 'higher order thinking skills'

Assessment of experiments difficult

Approach – Virtual Labs



Not meant to replace physical labs!

But augment and amplify them.



Virtual labs address deficiencies of physical labs.

Infinite repetitions at no cost.



It provides the ease and convenience of conducting experiments over the internet.

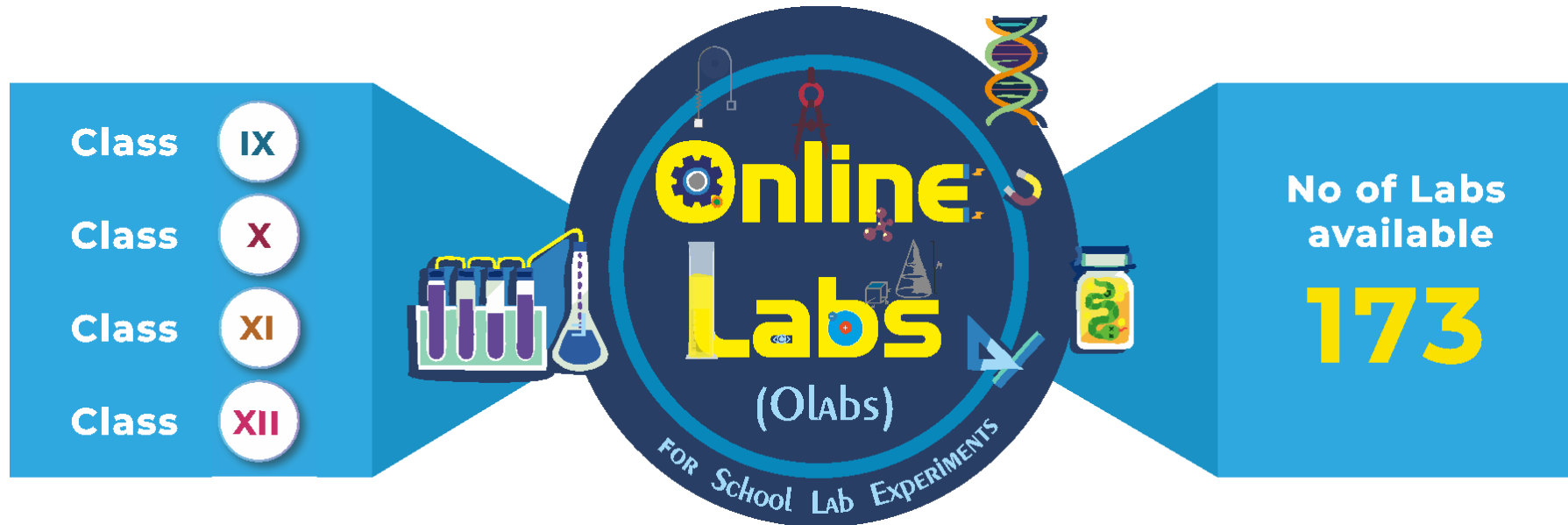


Aimed to bridge the constraints of geographical distances and time.

Technology can expand the boundaries of a physical Lab



Ministry of Electronics and Information Technology
Government of India



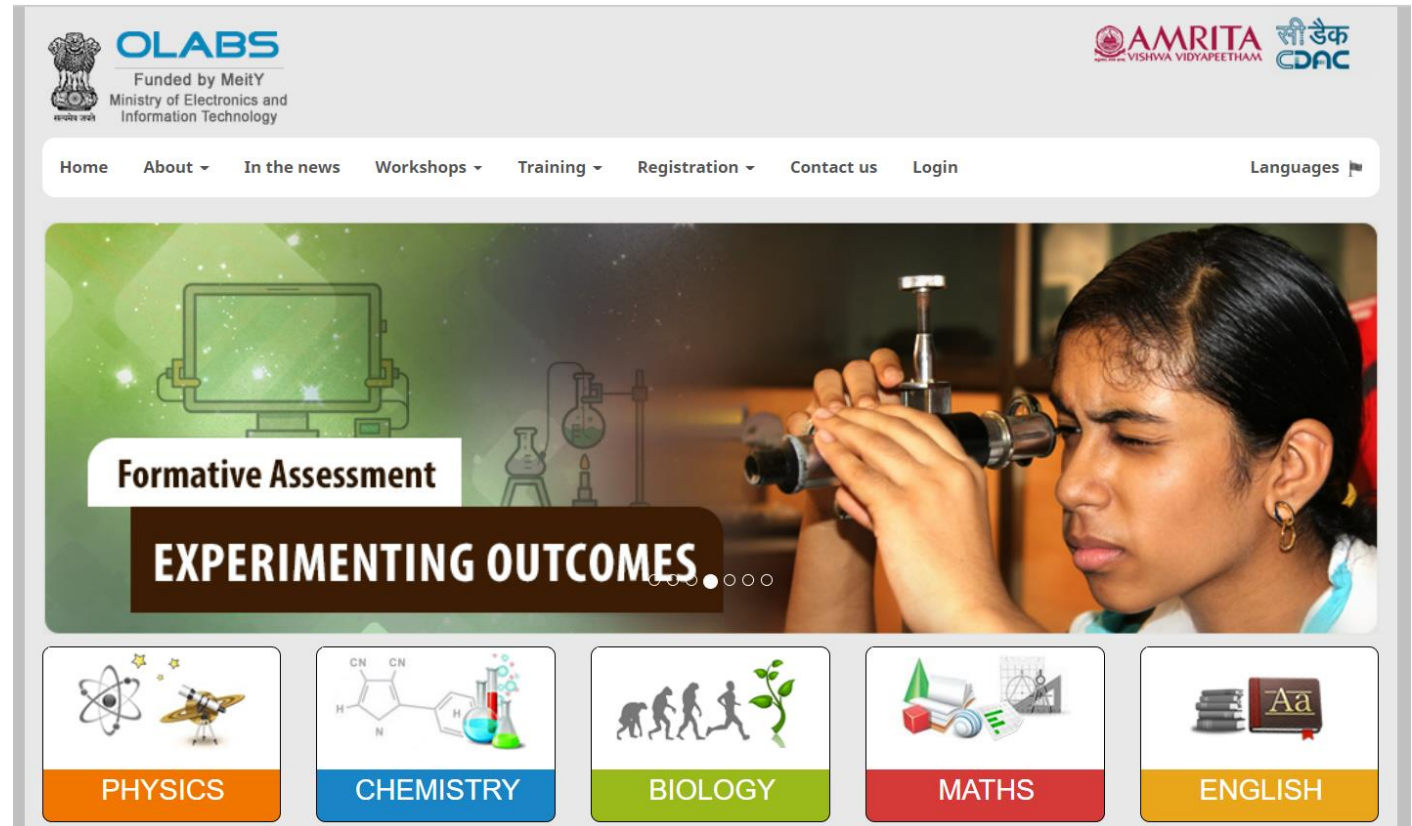
www.olabs.edu.in



OLabs Homepage



www.olabs.edu.in



The screenshot shows the OLabs homepage. At the top left is the Indian government emblem and the OLABS logo, which includes the text "OLABS", "Funded by MeitY", and "Ministry of Electronics and Information Technology". At the top right are the logos for AMRITA VISHWA VIDYAPEETHAM and CDAC. Below the logos is a navigation menu with links for Home, About, In the news, Workshops, Training, Registration, Contact us, and Login. On the far right of the menu is a "Languages" dropdown. The main banner features a background image of a student using a microscope. Overlaid on the banner is the text "Formative Assessment" and "EXPERIMENTING OUTCOMES". Below the banner are five subject category buttons: PHYSICS (with an atom and satellite icon), CHEMISTRY (with a chemical structure and lab glassware icon), BIOLOGY (with an evolution tree icon), MATHS (with a calculator and graph icon), and ENGLISH (with a book icon).

Journey So far.....

Olabs.edu.in
--- Now available under
Diksha

01

The OLABs project, supported by Meity, has produced over 170 virtual labs covering Science, Maths and English for school students.

02

Freely accessible on the web (olabs.edu.in).

03

A 10-plus year long journey till date.

04

Coming: A suite of about 700 more in the next couple of years.

Salient Features

Aligned to
CBSE
curriculum

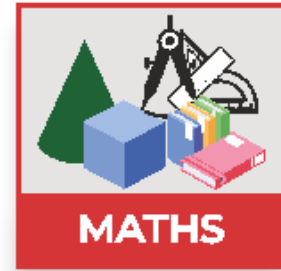
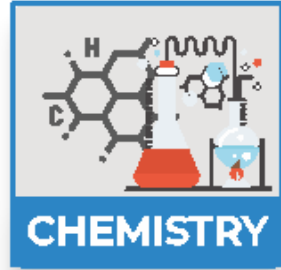
Interactive
2D/3D
simulations

Simulations
model real life
environment

Authentic
content

Intuitive
feedback and
guidance

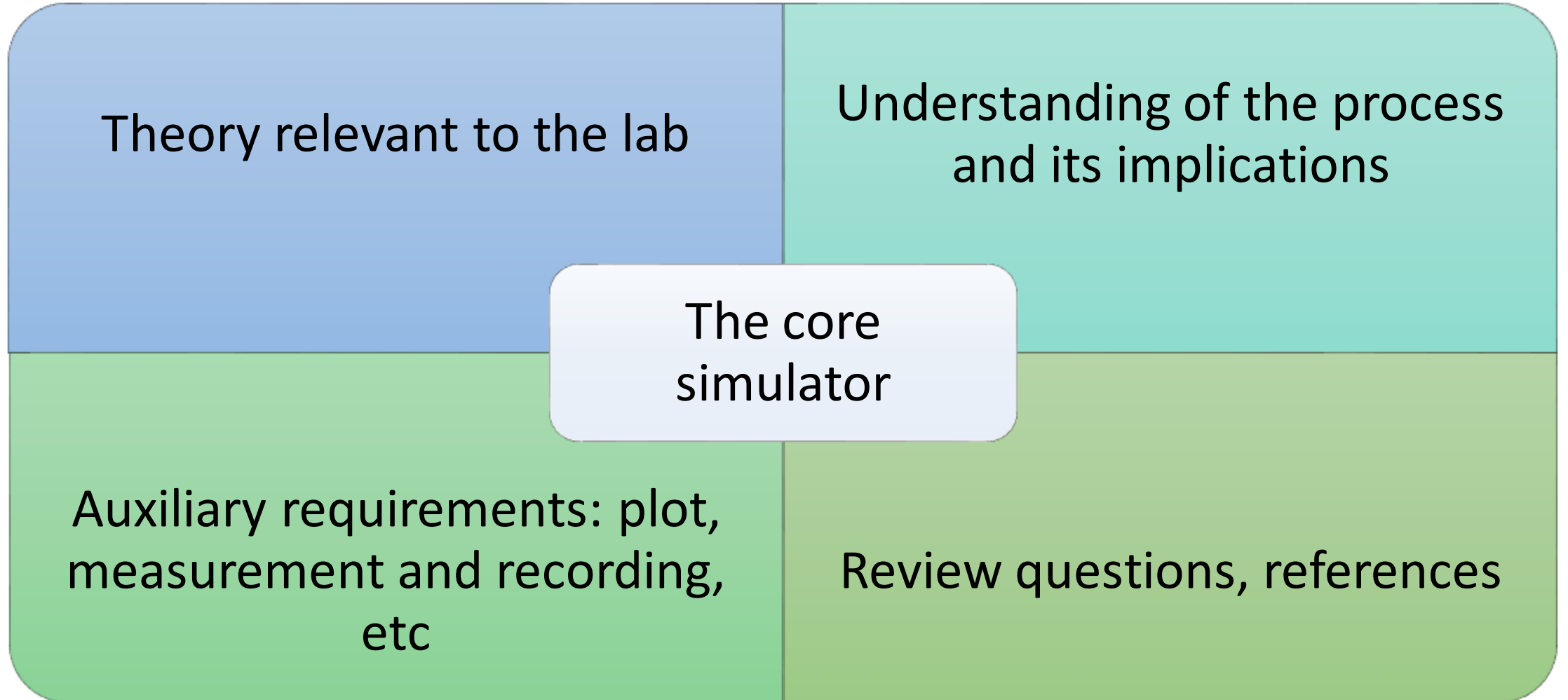
Labs available in subjects



Labs available in languages



Eco-system



Effective usage of Virtual Labs (OLabs) in your school – suggestions for teachers



**Minimally, use it for
demonstration in class**

To prepare students for the
physical lab

To reflect on the activities
performed in the lab



Can get more by ensuring students are actively
involved in the activity.



Active learning strategies can be interleaved with
usual lecture

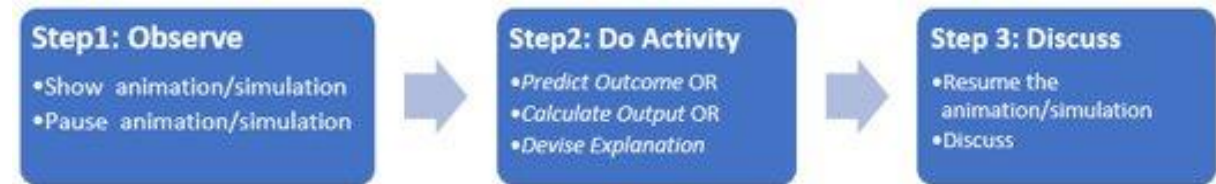


As Homework – Give inquiry-based activities



Encourage self-evaluation using “Viva-Voce”
section of each lab.

Proposed Active Learning Strategy for Virtual Labs (OLabs)



- Recommended time: 5-15 min
- *Predict Outcome* - Ask students to make prediction: “What will happen if ...”
- *Calculate Output* - Ask students to calculate next step or output.
- *Devise explanation* - Ask students to devise reason for process
- **Choose activity based on pedagogical purpose and learning objective of the Lab**

Using Virtual Labs (OLabs) : Scenario

- **Teachers (In the classroom/Lab)**
 - Explain labs before performing the practical/lab session
 - Explain a procedure
 - Demonstrate a phenomenon
 - Set expectation about a lab
 - Can frame review questions with the lab as the backdrop (after Lab Session)

Creative teachers and students can come up with many more innovative uses!

Usage Virtual Labs (OLabs)

Students

- Familiarize with the Lab before physical lab session
- Try variations available in the lab
- Do revision
- Use Lab to reinforce the concepts, answer question they may have, etc.

Mathematics Labs – Salient Features

- 3D representation for select labs
- Facilitates drawing geometric figures on workbench with given dimensions
- Tools provided relevant to lab
 - Show Scale
 - Cut triangle/rectangle
 - Rotate Clockwise
 - Rotate Anticlockwise
 - Drag/Drop
 - Superimpose
- Instructions provided on each step
- Actions taken by student/system in ‘Workbench’, displayed in ‘Observations’.
- Details inference and conclusion after completion of Lab. Also relevant illustration on workbench.

List of Labs

Class 6 –8
: 90+ labs

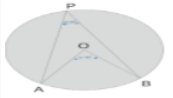
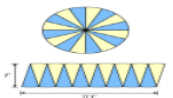

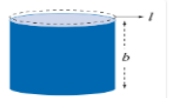




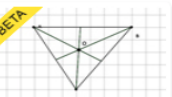

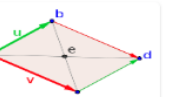
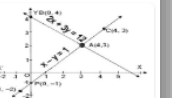

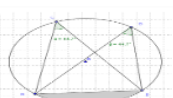

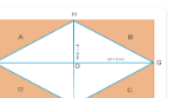


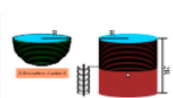

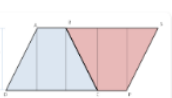
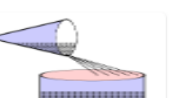
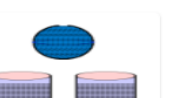
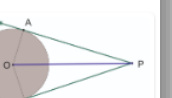
Class IX :
40+ Labs

Class IX :
40+ Labs

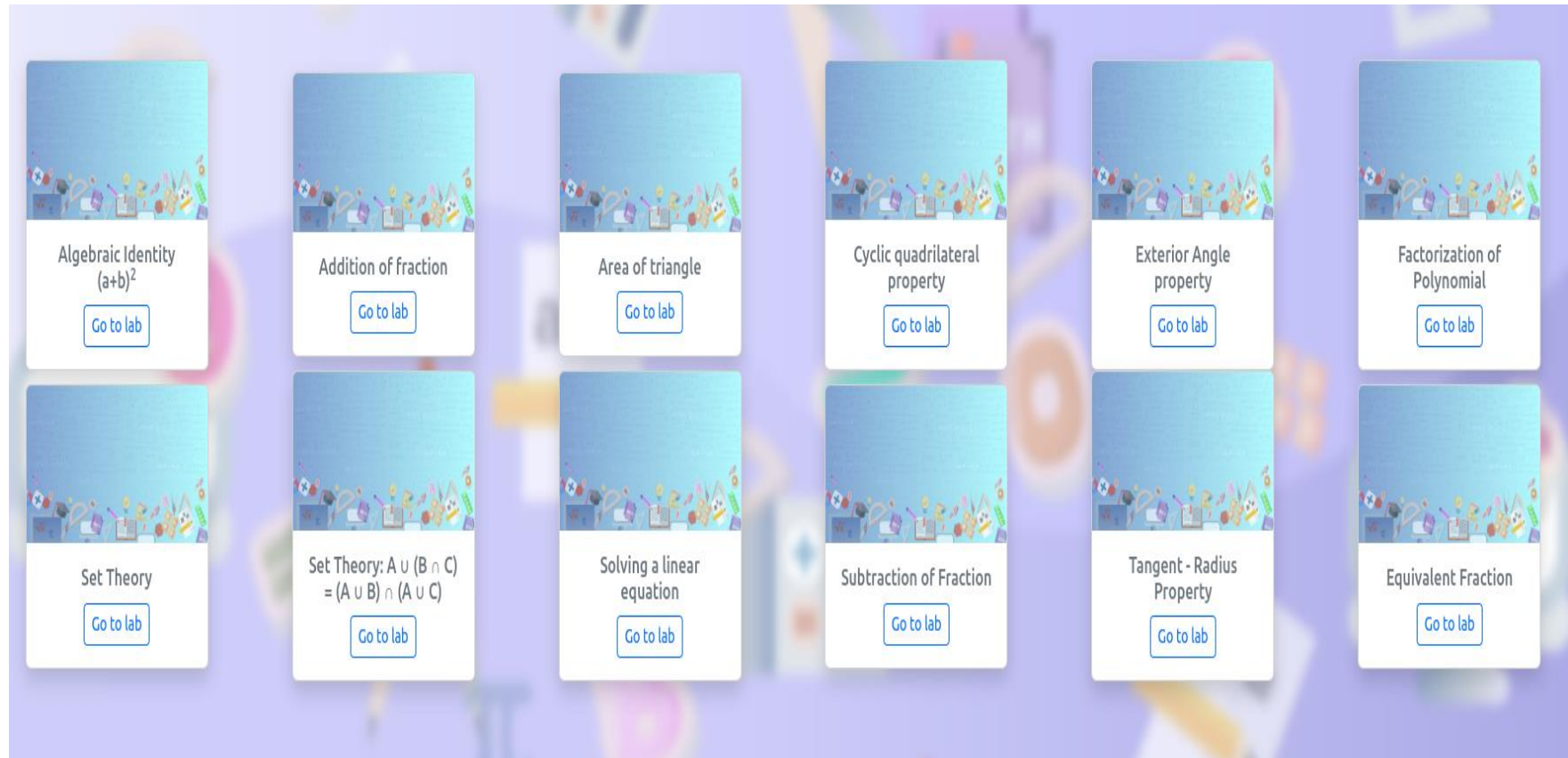
Class IX :
30+ Labs

Class IX :
25+ Labs

Screenshots

 <p>Angle at the centre</p> <p>Go</p>	 <p>Area of Circle</p> <p>Go</p>	 <p>Right circular cone</p> <p>Go</p>	 <p>Right circular cylinder</p> <p>Go</p>	 <p>Area of Cylinder</p> <p>Go</p>	 <p>Arithmetic Progression</p> <p>Go</p>
 <p>Centroid of Triangle</p> <p>Go</p>	 <p>Circumcentre of Triangle</p> <p>Go</p>	 <p>Incentre of Triangle</p> <p>Go</p>	 <p>Least Common Multiple</p> <p>Go</p>	 <p>Properties of Parallelogram</p> <p>Go</p>	 <p>Simultaneous Equations</p> <p>Go</p>
 <p>Volume of Cylinder</p> <p>Go</p>	 <p>Angles in the same segment</p> <p>Go</p>	 <p>Mid-Point Theorem</p> <p>Go</p>	 <p>Area of Rhombus</p> <p>Go</p>	 <p>Area of Parallelogram</p> <p>Go</p>	 <p>Pythagoras theorem</p> <p>Go</p>
 <p>Surface area of sphere</p> <p>Go</p>	 <p>Area of Triangle</p> <p>Go</p>	 <p>Area of Trapezium</p> <p>Go</p>	 <p>Volume of cone</p> <p>Go</p>	 <p>Volume of sphere</p> <p>Go</p>	 <p>Tangents to a circle</p> <p>Go</p>

Screenshots



OLabs NextG

Demonstration of Mathematics Labs

List of Labs for Demo

3D Labs

- Volume of Cylinder
- Cube and Cuboids

Geometry

- Cyclic Quadrilateral
- Area of Circle

Algebra

- Algebraic Identity
- Polynomials
- Fractions

OLabs in News

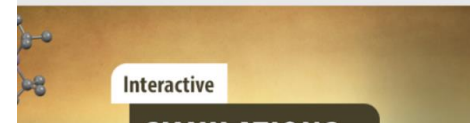
January 25, 2021

Online Labs reaches almost two lakh students

Online Labs reaches almost two lakh students



Published: 1st Aug 2018 1:55 pm



दुनिया किसान कल्याण विश्वास न्यूज मनोरंजन विजनेस लाइफस्टाइल टेक नान ऑ

ऑनलाइन लैब्स के लिए गुड न्यूज, स्कूल लैब नहीं तो क



Virtual labs come in handy for students in science practicals

THIS STORY IS FROM OCTOBER 14, 2020



MADURAI: As schools remain closed due to the Covid-19 pandemic, students, especially those preparing for board exams this year, have been missing out on practical science lessons for upcoming exams. However, virtual labs, accessible online, are helping

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- Abu Dhabi T10: All you need to know
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NEWS / EDUCATION / NEWS / OLABS TO HELP CBSE STUDENTS PERFORM SCIENCE EXPERIMENTS VIRTUALLY

TOP SEARCHES: Republic Day Speech AP EAMCET Seat Allotment KPSC FDA Exam Postponed AP ICET Counselling MHT

THIS STORY IS FROM AUGUST 12, 2020

OLabs to help CBSE students perform science experiments virtually

Shivangi Mishra | TNN | Aug 12, 2020, 15:35 IST

Rolled out nationwide in 2015, the initiative did not receive much attention from schools earlier



While online education has helped schools maintain learning continuity in some form or the other, students are missing out on practical

TIMES PP

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केन्द्रीय माध्यमिक शिक्षा बोर्ड

(मानव संसाधन विकास मंत्रालय, भारत सरकार, के अधीन एक स्वायत्त संस्थान)

शिक्षा सदन, 17, इन्स्टिट्यूशनल क्षेत्र, राउज एवेन्यू, दिल्ली-110002.

CENTRAL BOARD OF SECONDARY EDUCATION

(An Autonomous Organization under the Union Ministry of Human Resource Development, Govt. of India)
"Shiksha Sadan", 17, Institutional Area, Rouse Avenue, Delhi-110002

CBSE/ACAD/JD(SS)/2016

07.04.2016
Circular No. Acad.11/2016

All Heads of Institutions Affiliated to CBSE

Subject: Training of Teachers on Managing Online Lab Resources

Dear Principal

Online Labs (OLabs) for School Environment is a virtual online e-Learning initiative jointly developed by CDAC, Mumbai and Amrita University, Kollam with funding support from the Department of Electronics and Information Technology, Government of India. It has been developed to supplement the traditional physical labs and bridge the constraints of time and geographical distances. Olabs is a free resource for all schools (teachers and students) in India and is accessible free of cost on the website www.olabs.edu.in. For schools with absence or limited access internet facilities, a DVD version is also available on demand.

Endorsed By



विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

Endorsements



48493⁺

CBSE and State board teachers trained

12072⁺

Schools covered in training



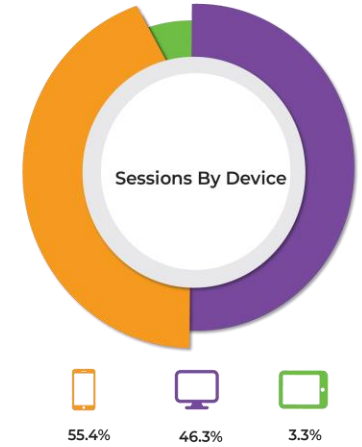
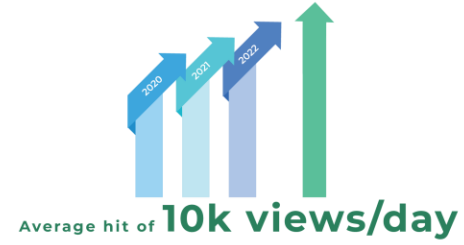
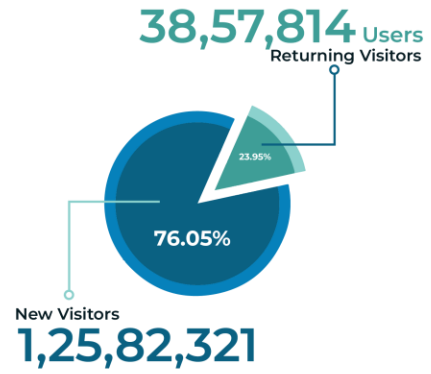
440000⁺

Users registered on OLabs website

Trainings

Country	Users	% Users
1. India	90,28,680	71.60%
2. United States	7,92,235	6.28%
3. Philippines	3,92,556	3.11%
4. United Arab Emirates	2,04,395	1.62%
5. Indonesia	1,59,599	1.27%
6. Malaysia	1,33,759	1.06%
7. Nigeria	1,32,355	1.05%
8. United Kingdom	1,02,097	0.81%
9. Pakistan	87,872	0.70%
10. Mexico	85,449	0.68%

Used By **20+ Countries**



OLabs Usage

Availability of OLABs



Website www.olabs.edu.in



Offline Windows installer



Android App

OLabs App



Download the Olabs app from



OR



<https://apps.mgov.gov.in/details?appid=1627>

Link to Video :

Olabs Ahead!



Yes, we are now on to add another 500+ labs to the pool.



Classes 6-12, and more subjects including languages, social science, etc.

120+ Math labs to be added for classes 6-12



Many improvements in light of the challenges mentioned earlier.

Learner tracking and analytics

Guidance in the lab

AR/VR capability

Richer simulation – variety within limits.

Help us help you....

1

Share the information to all fellow teachers...

2

Share your feedback on whatever you have explored in this regard.

3

Let us know if there are some concepts/topics on which you would like such a lab to be available.

Thank You

- *For any information, please write to us at:*
- Educational Technology Unit,
- C-DAC Mumbai
- [support\[at\]olabs\[dot\]co\[dot\]in](mailto:support@olabs.co.in)

