



सी डैक  
CDAC

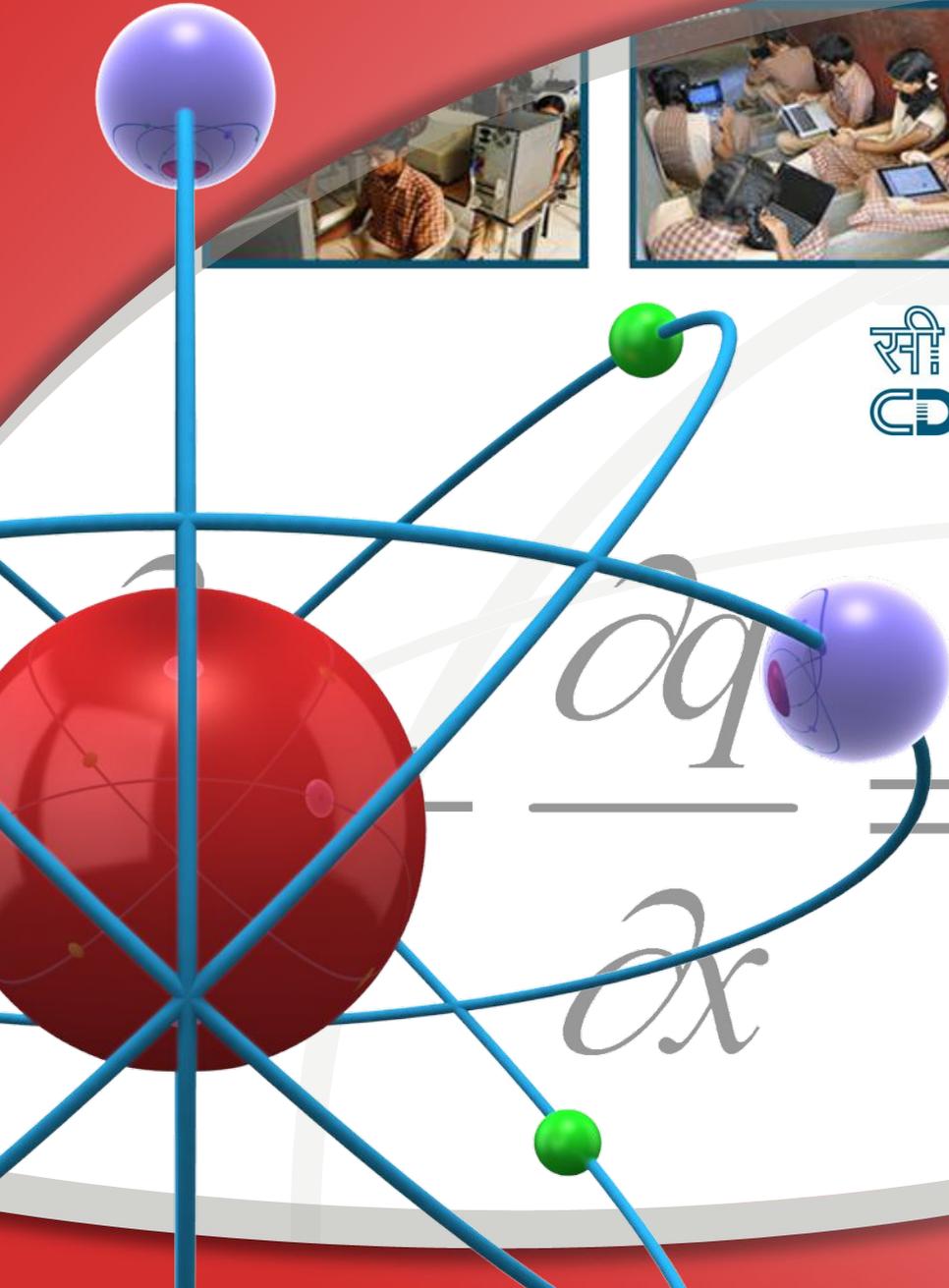


AMRITA  
VISHWA VIDYAPEETHAM  
UNIVERSITY

# OLABS: SCHOOL LABS ONLINE

Vaibhav Singh  
Prashant Chaubey

CDAC Mumbai



# About OLabs

## Project Title

Online Labs (OLabs) for school experiments

## Participating Organizations

C-DAC Mumbai & Amrita Vishwa Vidyapeetham

## Target Audience

CBSE schools, students & teachers

Physics, Chemistry,  
Biology,  
Mathematics &

## Classes Covered

Class IX, X, XI, XII

## Duration of Project

2010 onwards

# OLabs – Background

- **Laboratory a key component of science subjects.**
  - *Activities for other subjects*
- **School education in India faces many challenges**
  - lack of infrastructure including labs.
  - shortage of trained teachers.
  - *students come out with little practical knowledge of the concepts they learn.*

# Why OLABs?

- **Problems with Physical Labs**
  - Limited Infrastructure
  - No/minimal lab session
  - Limited lab access
  - Safety constraints and fragile equipments.
- **Others**
  - Inadequate 'higher order thinking skills'
  - Assessment of experiments difficult
  - Lack of quality teachers

# Online Labs (OLabs) for school lab experiments

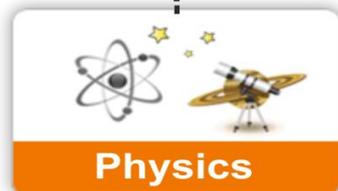
- Not meant to replace physical labs!
  - But augment and amplify them.
- Virtual labs address deficiencies of physical labs.
  - Infinite repetitions at no cost.
- It provides the ease and convenience of conducting experiments over the internet.
- Aimed to bridge the constraints of geographical distances and time.

# Technology can expand the boundaries of a physical Lab

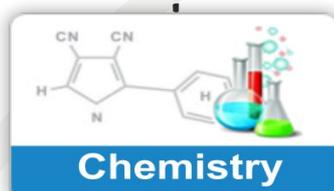
- Events occurring in large or small time windows can be simulated –
  - Demonstrating lifecycle of Mosquito.
- Invisible objects can be ‘made visible’
  - Sensing magnetic field intensity.
- Things impossible to perform in real labs
  - behaviour of simple pendulum in atmosphere of Jupiter, etc.
- Offers tremendous scope for open-paced learning, to account for varying learner profiles

# Olabs: What we have now

## Experiment/Lab Details



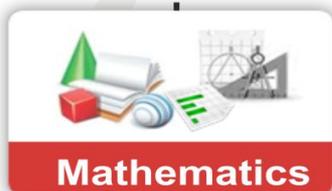
54



46



36



25



12

**Total Experiments : 173**

Classes:

- IX
- X
- XI
- XII

- हिंदी
- English
- മലയാളം
- मराठी

# Salient Features

interactive simulations  
with real world  
behaviour.

Students can Explore,  
Conduct and Repeat at  
their own pace.

Includes features such as  
recording observations,  
plotting graphs,  
calculations, etc which  
enhance the overall  
learning experience.

Experiments/activities  
aligned to CBSE  
curriculum.

Available for free  
web-based access on  
<http://www.olabs.edu.in>  
/

Offline version (Live DVD  
& Windows installer) are  
available on request.

# Contents of a Lab

Each experiment as sections covering following:

- **Theory** – conceptual background of the experiment, concepts, related laws, proofs, principles, etc.
- **Procedure** - detailed steps for conducting the experiment in the online & actual lab environment.
- **Animation** - for teacher's demonstration of the experiment in the class or in the laboratory.
- **Simulation** - a simulated laboratory environment with necessary apparatus to conduct the experiment online.
- **Viva Voce** – Questions on related lab for self-assessment

## Bell Jar Experiment



Theory



Procedure



Animation



Simulator



Viva Voce



Resources

# Snippets from Review Report by NCERT

## Chemistry:

1. All 46 resources in different section are completely acceptable to be included as e-content on different portal operated by NCERT.

2. We are also looking forward to for sim of 9<sup>th</sup> ( 3 experiments) and 12<sup>th</sup> ( 12 experiments), which is relevant and created to support experiential learning for students.

## Biology:

1. Among 36 contents in different section , all resources are completely acceptable to be included as e-content on different portal operated by NCERT.

2. It is suggested that important vocabulary should be included wherever it is applicable. Also, new terms should be incorporated and mentioned in separate section from each experiment.

## Mathematics

Among 25 resources in different section are acceptable to be included as e-content on different portal operated by NCERT.

2. We are also seeking such material for senior secondary mathematics.

It is to increase the number of resources in each section so that there are more problems for practice.

## English:

1. The content developed can be supported with more examples

2. Some more activities in simulations can be incorporated for practice by students.

3. All the e-content is satisfactory to be included in various portals maintained by NCERT

1. Among 42 contents in different section , 41 resources are completely acceptable to be included as e-content on different portal operated by NCERT.

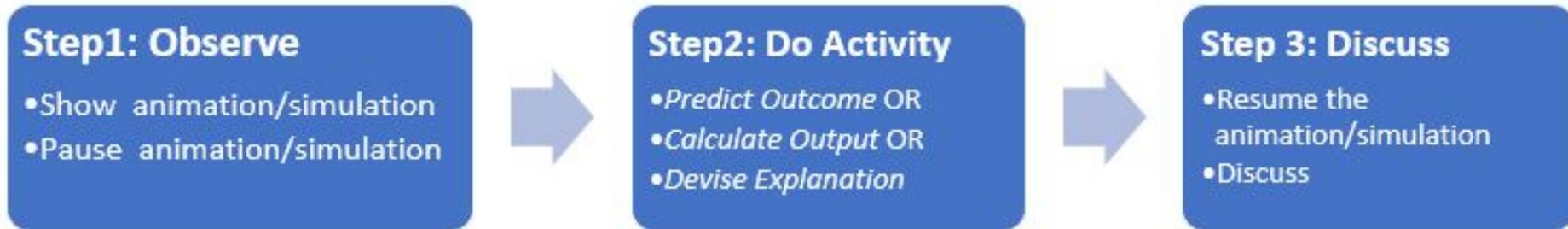
2. One you tube link written as cross-check (either for link or video) is showing error . If provided alternative or correct (playable link) then it can also be included as e-content. If this video is not available for mass then it can be excluded.

# Effective usage of 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 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 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 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.

# Important Links

- **OLabs website** – [www.olabs.edu.in](http://www.olabs.edu.in)
- **OLabs FB page** - <https://www.facebook.com/onlinelabs/>
- **OLabs Email** – [support@olabs.co.in](mailto:support@olabs.co.in) / [etu@cdac.in](mailto:etu@cdac.in)
- **Download Offline version**  
<http://www.olabs.edu.in/?pg=topMenu&id=289>
- **Are you using OLabs? Let us know**  
<http://www.olabs.edu.in/?pg=topMenu&id=288>



# **ENDORSEMENTS, AWARDS**

E-mail: [director@cbseacademic.in](mailto:director@cbseacademic.in)  
Website: [www.cbseacademic.in](http://www.cbseacademic.in)

Tel: 011-23212603  
23211576  
Tele Fax: 011-23234324



## केन्द्रीय माध्यमिक शिक्षा बोर्ड

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

शिक्षा सदन, 17, इन्सटिट्यूशनल क्षेत्र, राउज एवेन्यु, 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/DIR(ART&I)/2013

Dated: 16<sup>th</sup> February, 2013  
Circular No. Acad-15/2013

All the Heads of Institution  
Affiliated to CBSE

Subject: Roll out of Online Labs in CBSE affiliated schools across the country

Dear Principal,

Online Labs for School Experiments (OLabs) is a novel e-Learning project developed by CDAC, Mumbai and Amrita University, Kerala and based on the concept of virtual learning environment.

CBSE recommends OLabs to all the schools affiliated to the Board. For Kendriya Vidyalayas the roll out may be via ERNET, which provides network connectivity to all the Kendriya Vidyalayas. This is also to inform that OLabs is a facility which is available free of cost at [www.olabs.co.in](http://www.olabs.co.in) to all the schools affiliated to the Board.

Regards,

Vineet Joshi  
(Chairman)

# CBSE Circular & Endorsement – Feb 2013

# CBSE Circular 2016

E-mail: [directoracad.cbse@nic.in](mailto:directoracad.cbse@nic.in)  
Website: [www.cbseacademic.in](http://www.cbseacademic.in)

Tel: 011-23212603  
Telefax: 01123234324



**केन्द्रीय माध्यमिक शिक्षा बोर्ड**

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

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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](http://www.olabs.edu.in). For schools with absence or limited access internet facilities, a DVD version is also available on demand.

# CBSE Circular 2020



केन्द्रीय माध्यमिक शिक्षा बोर्ड  
(मानव संसाधन विकास मंत्रालय, भारत सरकार के अधीन एक स्वायत्त संगठन)  
**CENTRAL BOARD OF SECONDARY EDUCATION**  
(An Autonomous Organisation under the Ministry of Human Resource Development, Govt. of India)



CBSE/ Dir (Acad)/2020

September 2, 2020  
Circular No.: Acad- 65/2020

All the Heads of Institutions affiliated to CBSE

**Subject: Conduct of the practical work during the lockdown**

CBSE has advised schools to follow the Alternative Calendar developed by NCERT to continue education during the lockdown through alternative modes to achieve learning outcomes. Schools have reportedly started using these calendars and other prescribed pedagogical techniques such as experiential and joyful learning, integration of Arts and Sports and project based learning etc. It is also learnt that in addition to alternative calendar and guidelines given on the conduct of online classes (Pragyata), most of the schools have started using online virtual platforms for providing an experience of practical lab activities to the extent possible during this period.

In addition to measures being taken by schools regarding conduct of practical work, it is informed that a platform titled **OLabs** has been developed jointly by the Ministry of Electronics and Telecommunications, Government of India, CDAC, and Amrita University to facilitate a virtual experience of **CBSE syllabus aligned experiments for classes 9 to 12**. The **OLabs** are hosted at [www.olabs.edu.in](http://www.olabs.edu.in), and the access to it is free for schools on registration. This platform provides class wise experiments with detailed theory and procedure. Students can see animations and use simulation to have an experience as close to real experiments as possible. Students can also assess themselves and provide feedback.

Schools may also keep developing their own resources and explore other appropriate online platforms available in the public domain and use them only after establishing their effectiveness in attaining the desired learning outcomes.

Dr. Joseph Emmanuel  
Director (Academics)

# KVS & NVS circulars/emails



केन्द्रीय विद्यालय संगठन (मुख्या०)  
शहीदजीत सिंह मार्ग, १८ संस्थागत क्षेत्र,  
नई दिल्ली - ११० ०१६  
**KENDRIYA VIDYALAYA SANGATHAN (Hqrs.)**  
18, INSTITUTIONAL AREA, SJS MARG  
NEW DELHI - 110 016  
Ph. 26858570 Fax - 26514179

**E-mail/Speed Post**

Dated: -06-2016.

F. 110350-50/2016 / KVS (HQ) Acad/

The Dy. Commissioner / Director  
Kendriya Vidyalaya Sangathan  
All Regional Offices & All ZIETs.

**Subject:** Training of Kendriya Vidyalaya teachers on Managing Resources – regarding.

**Ref.:** 1. CBSE Circular No. Acad.11/2016 dated 07-04-2016  
2. CDACM (K)/Rollout/MS/75 dated 18-05-2016

**Madam / Sir,**

Please refer to the above cited letters (copy enclosed) regarding teachers on Managing Online Lab Resources.

In this context, you are requested to communicate the CBSE circulars to Principals of all KV's under your jurisdiction encouraging them to depute teachers to benefit from the Olabs training programme.

You are also requested to contact Dr. M. Sasikumar, Associate Director for Development of Advanced Computing to schedule workshops to incorporate the content of the workshops planned at the regional / ZIET level. Please inform this to the Dy. Commissioner / Director, KVS (HQ) if there are any other benefits of the workshops alongwith comments, if any, for kind perusal of the competent authority.

**Copy to:**

1. Dr. M. Sasikumar, Associate Director, Centre For Development of Advanced Computing, Gulmohar Cross Road No.9, Juhu, Mumbai-400 021.
2. PS to Commissioner, KVS (HQ).
3. PS to Addl. Commissioner (Acad.) KVS (HQ).
4. Guard File.

Joint Commissioner

F.No.12-11/2016-NVS(Acad)

Dated:- 24/04/2017

To

The Deputy Commissioner  
Navodaya Vidyalaya Samiti  
All Regional Offices(Except Hyderabad Region)

Sub:- Conduct of Online Lab Teacher training workshop for JNV Teachers under Digital India Programme-OLABS-reg.

Sir/Madam,

The Online Labs for School Experiments (O Labs) is a novel e-learning project developed by Amrita University in collaboration with CDAC Mumbai under a research grant from the Department of Information Technology, Government of India. It has been developed to supplement the traditional physical labs and bridge the constraints of time and geographical distances. O Labs is a free resource for all schools in India and is accessible free of cost on its website. O Labs content has been developed for Class IX and X in Physics, Biology, Chemistry, Mathematics and English and is aligned with CBSE syllabus.

For further information regarding fixing venues and dates of the training workshops, you are requested to please contact Dr. Prema Nedungadi, Director, AmritaCREATE, Amrita University, Mob.-9995911222, email is: [prema@amrita.edu](mailto:prema@amrita.edu) and Co-ordinator, O Labs Team at [amritaolabs@gmail.com](mailto:amritaolabs@gmail.com) and Shri Pantina Chandrashekar at [pantinashekar87@gmail.com](mailto:pantinashekar87@gmail.com). Contact No.09940653418.

After conduct of the said training, a report in this regard may be forwarded to this office. Your co-operation in this regard is highly solicited.

This issues with the approval of competent authority.

Yours faithfully,

(N.Uma Maheswara Rao)  
Assistant Commissioner (Acad)

# Launch of O Labs



**OLabs was launched during Good Governance week celebrations on Dec 28, 2015 by Honourable minister of IT Shri Ravi Shankar Prasad**



# **A PEEP INTO OLABS**

# OLabs Homepage



ONLINE LABS

Funded by MeitY

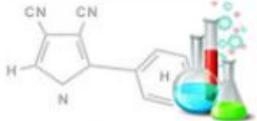
Ministry of Electronics and Information Technology



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PHYSICS



CHEMISTRY



BIOLOGY



MATHS



ENGLISH

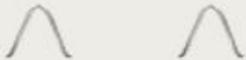
# OLabs - Physics

## Equivalent Resistance of Resistors(Series)

SAVE FULLSCREEN EXIT

Arrangement of Resistors:

Single



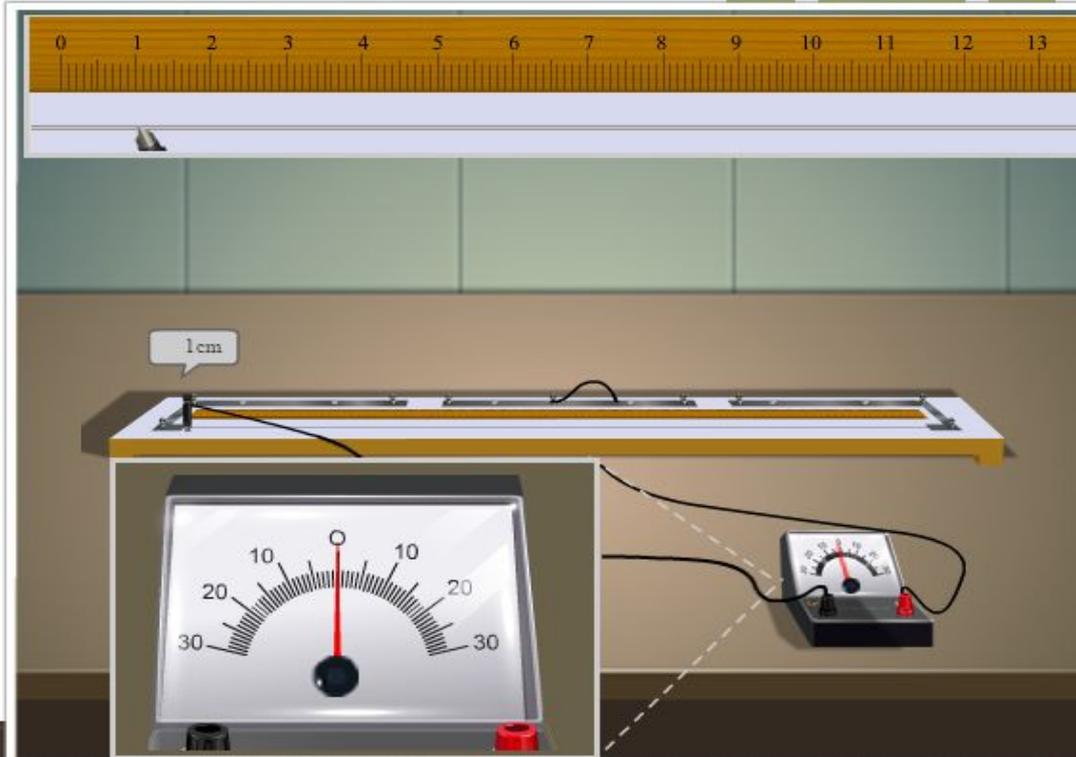
Start Experiment

Insert Key

Jockey Position(cm): 0.01



Reset



# OLabs - Chemistry

## Chemical Reactions

HELP

FULLSCREEN

EXIT

Select the reaction:



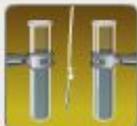
Burning of magnesium in air



Sublimation of dry ice



$\text{Na}_2\text{SO}_4$  (aq)  
with  $\text{BaCl}_2$  (aq)



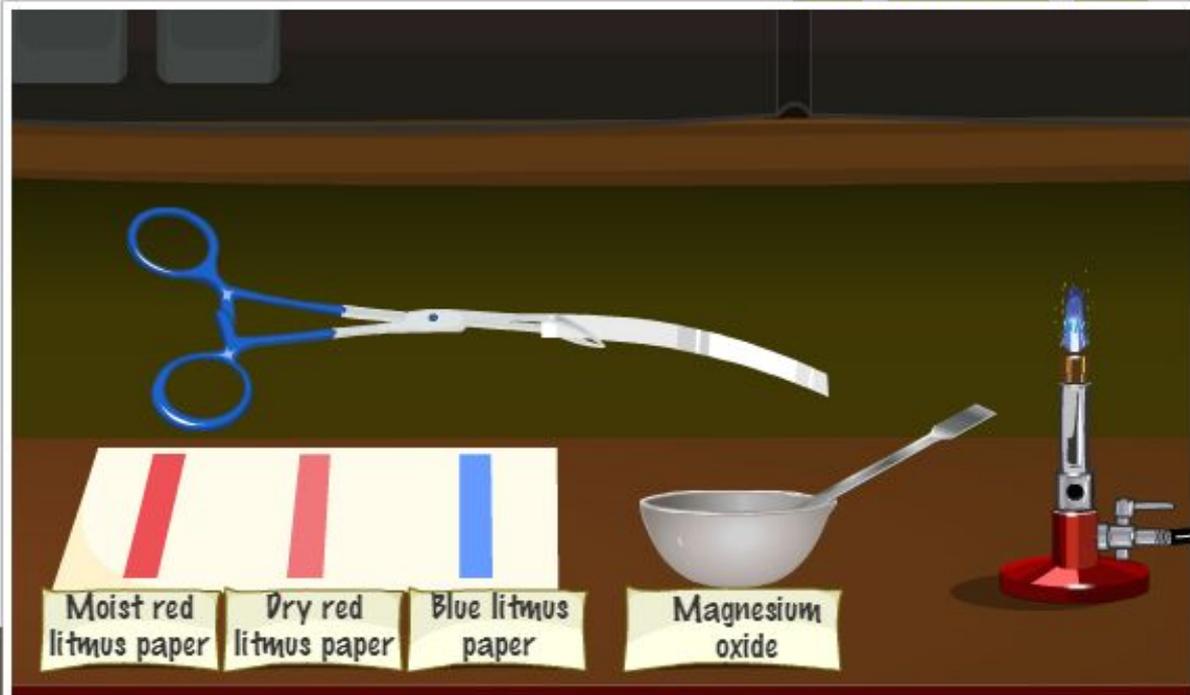
Iron nail with  $\text{CuSO}_4$  (aq)



Heating of  $\text{CuSO}_4$



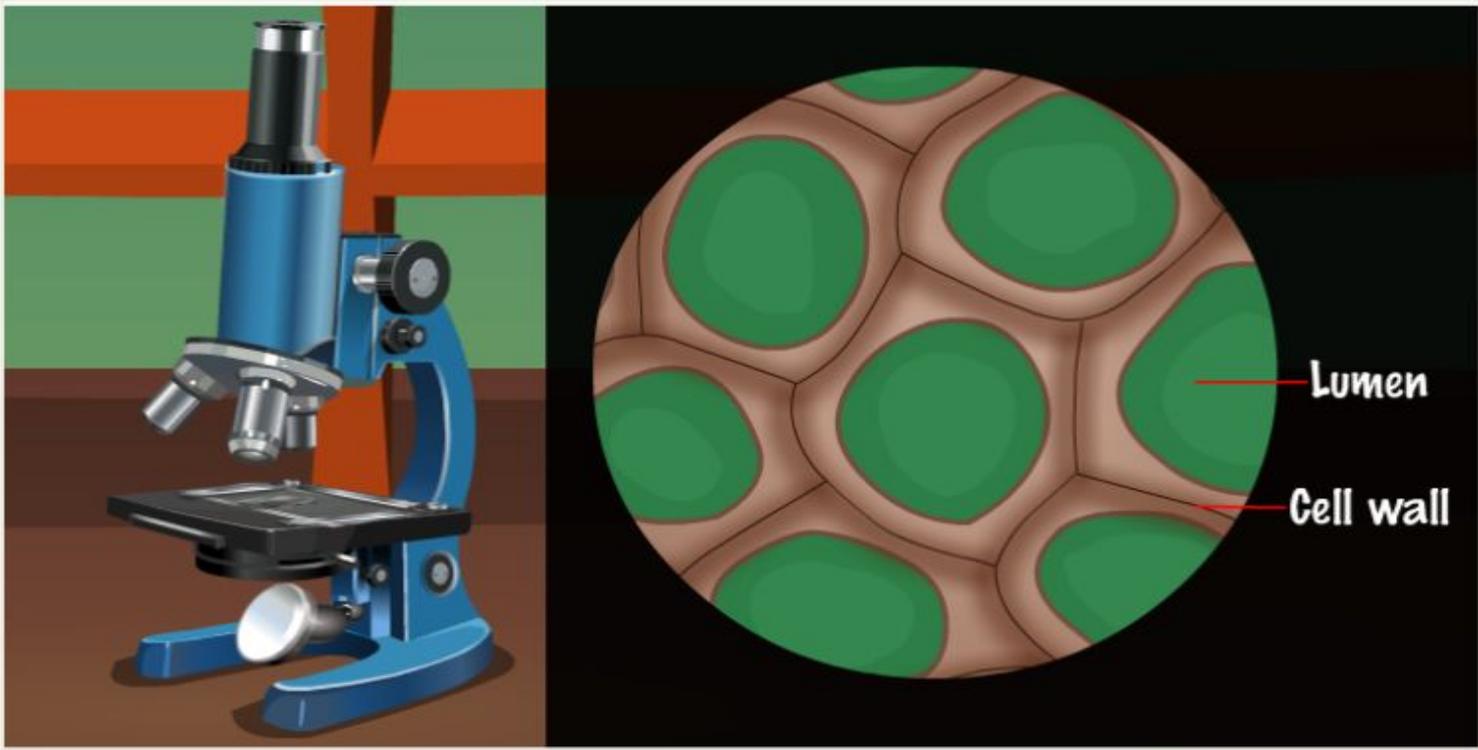
Melting of ice



# OLabs - Biology

**Plant and Animal Tissues**

HOME FULL SCREEN SAVE



Lumen  
Cell wall

These cells are long, narrow and have hard and extremely thick secondary walls due to uniform distribution of lignin.

<< || >> 🔊

Developed by CDAC Mumbai & Amrita University  
Under research grant from department of IT



# OLabs - Mathematics

Theory Procedure Animation Simulator Self Evaluation Reference Feedback

### Instructions

- Activity completed successfully.
- Please see the inference below.

### Tools

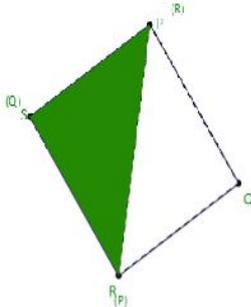
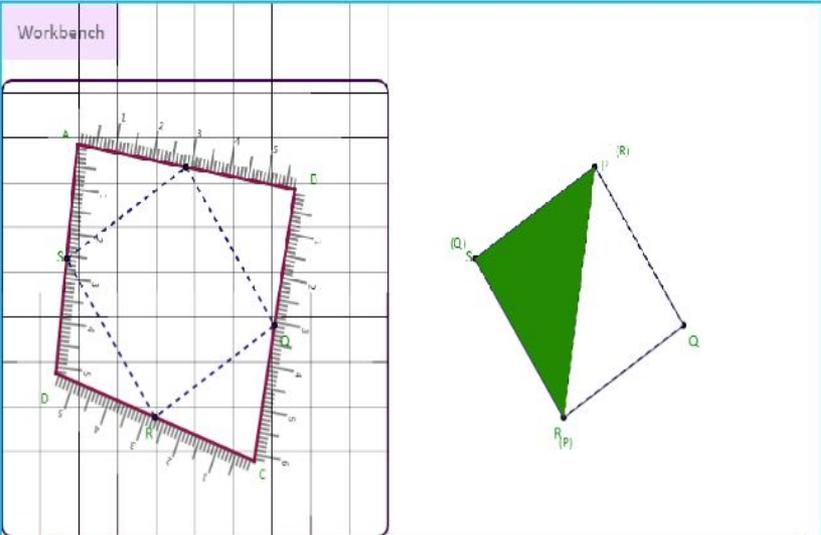


**OLabs**

- Show scale AB
- Show scale BC
- Show scale CD
- Show scale DA

### The quadrilateral formed by the midpoints of a quadrilateral.

Workbench



**Inference**

Conclusion :

- $\triangle PQR$  covers  $\triangle PSR$  exactly.
- Thus  $SP=QR$  and  $RS=PQ$  therefore,
- Quadrilateral PQRS is a parallelogram (by definition).

Restart

# OLabs - English

## Tense Conversion

[Instructions](#) [Theory](#) [Hints](#)

**Select tense**  
Simple Present Tense change to Future Perfect Tense

**Sentence in Simple Present Tense**  
Sarah catches a ball.

**Sentence in Future Perfect Tense**

Sarah [ ] [ ] caught a ball .

Feedback			
Items	Result	Description	Remedy
Main Verb	✓	'main verb' is correct.	---
Helping Verb	✗	'helping verb' is missing.	Drag 'helping verb' from word repository and drop it in the proper blank box.

### Word Repository

were will have caught was is be been has had are being going to catches catch catching am

[Submit](#) [Next](#) [Show Answer](#)

# OLabs in Regional

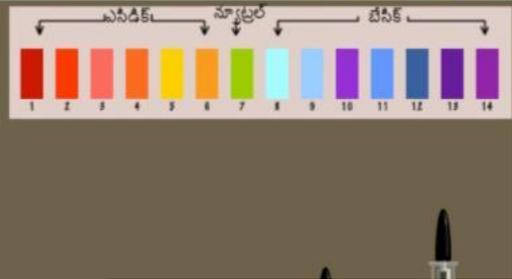
# Languages

ఘన సాంద్రత యొక్క సంకల్పం

- వార్తలు
- విధానము
- సంచాలనం
- వీడియో
- సిమ్ములేటర్
- చివాచీస్
- పనరుల

## pH - నిర్ధారణ

స్వీచ్‌పై పంచెకాచి క్లిక్ చేయండి  
 కూరగాయలు మరియు పళ్ళెం :  
 ఏ వనూనా మెత్తమం వద్దనా నోక్కు ప్రియోగాన్ని ప్రారంభించండి



ఒక పప్పును కలిగి ఉన్న ప్లంట్ మొక్క. లీటర్ల పంపు. సాంద్రత తమ



## भौतिक विज्ञान

### कक्षा 9

<p>బెల్ జార్ ప్రయోగం</p>	<p>టోస్ కి ఘనత్వ కి నిర్ధారణ</p>	<p>ఒక ఊత్తిజ పటం పర ఒక లకడీ కి కదలింక స్థానాంతరం కరణి కి నిగ్గ ఆవరణక బల</p>	<p>టో వసంత్ షేబ కు ఆపయం స్ట్యూం కి గతి కి తొసరే నియం కు సర్యాపన</p>
<p>రేత పర ఒక టోస్ లోఱే ఘనాం ద్ఱర ద్ఱర ద్ఱర</p>	<p>ఆకాగ్గింజింజ సిద్ధాంత్ కు సర్యాపన</p>	<p>ఘనం కు పరవర్తం కి నియం</p>	<p>స్ట్యూం కి ద్ఱరే నియం</p>

క్రిమిజు కి మఱ్య బిండు ప్రమేయ

నిర్దేశ:

1. మఱ్యబిండు 0.8 సిఢింజిల కింబి గవె.
2. ఆమల కడం, P, Q, R కి మఱ్య బిండు మిలవె.
3. మఱ్య బిండు 0 కి 0 సె మిలవె.
4. మఱ్య బిండు 0 కి 8 సె మిలవె
5. మఱ్య బిండు కి నిగ్గ సగలం ది బిండు పర కింక కం.

సిమ్ములేటర్ కింబి

బిండు P సిఢింజిల ✓  
 బిండు Q సిఢింజిల ✓  
 బిండు R సిఢింజిల ✓  
 కుంబి ఆంక సిఢింజిల ✓

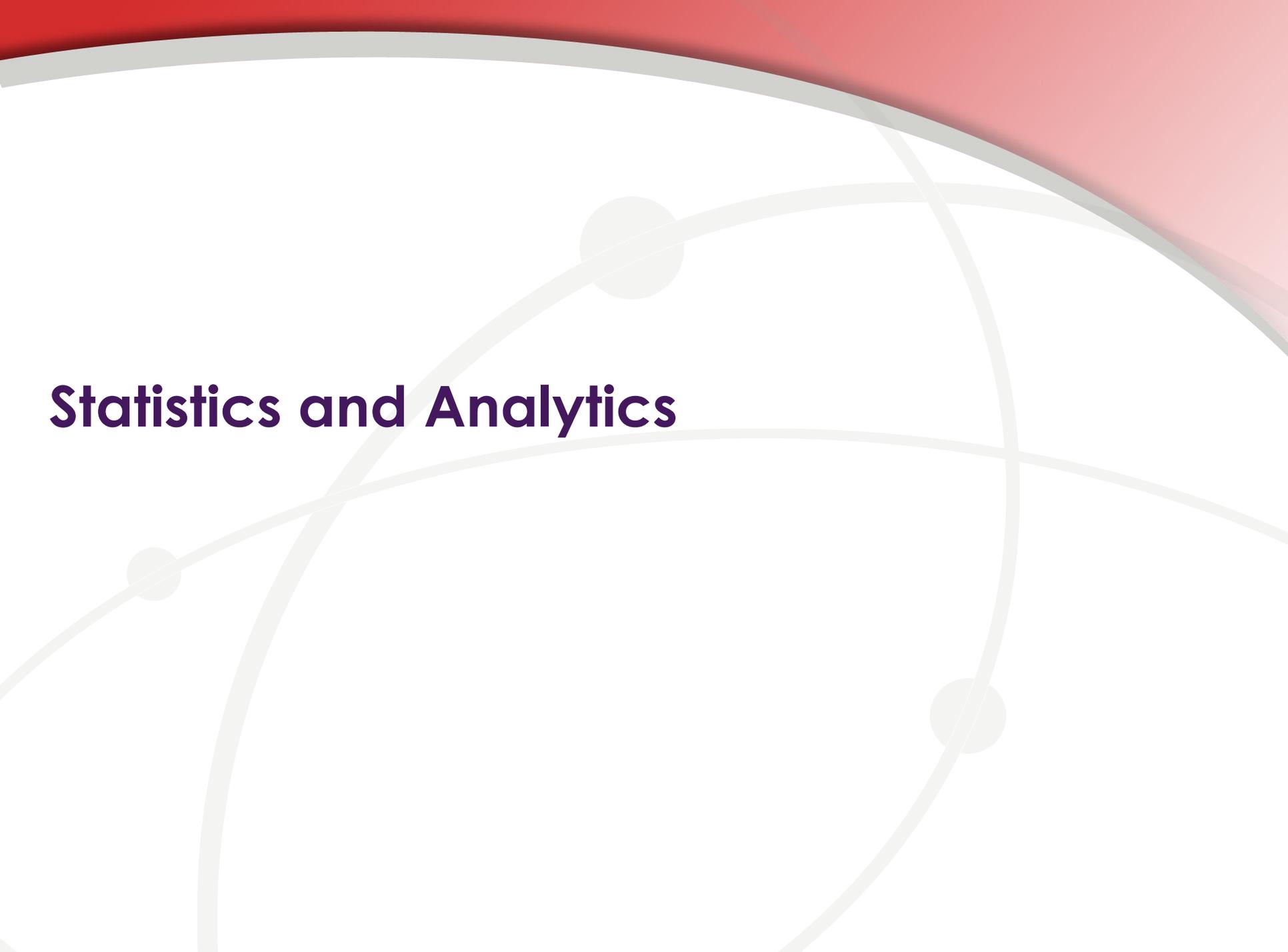
సిమ్ములేటర్ కింబి

బిండు కుంబి గుంబి కింక కం.

బిండు P సిఢింజిల ✓  
 బిండు Q సిఢింజిల ✓  
 బిండు R సిఢింజిల ✓  
 కుంబి ఆంక సిఢింజిల ✓

# OLabs on Mobile device





# **Statistics and Analytics**

# Olabs: training and online usage

## Overall training Figures



Total Teachers Trained	School Trained.
48493	12072

Registered users on Olabs Portal →



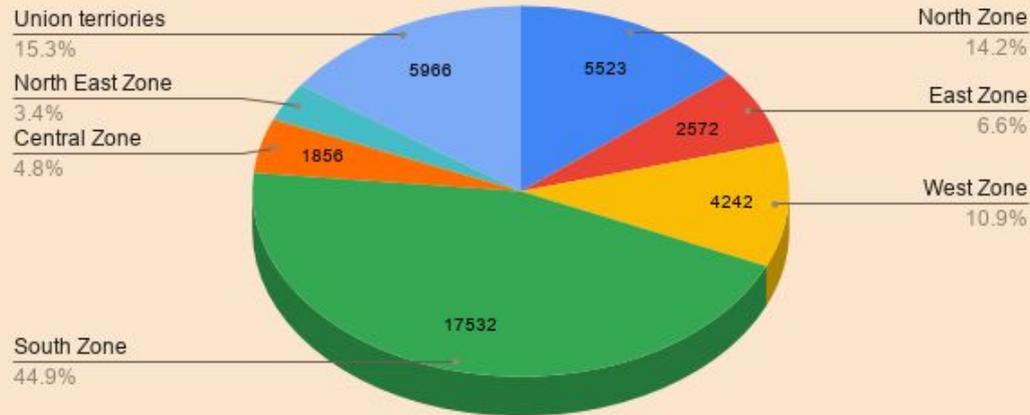
# Statewise training – CBSE schools

State	No. of teachers trained
Andaman and Nicobar Islands	317
Andhra Pradesh	846
Arunachal Pradesh	258
Assam	526
Bihar	619
Chandigarh	226
Chhattisgarh	305
Daman and Diu	3
Delhi	4901
Dadra and Nagar Haveli	35
Goa	35
Gujarat	992
Himachal Pradesh	111
Haryana	691
Jharkhand	369
Jammu and Kashmir	105

State	No. of teachers trained
Karnataka	2932
Kerala	9163
Lakshadweep	127
Maharashtra	2094
Meghalaya	64
Manipur	135
Madhya Pradesh	1551
Mizoram	15
Nagaland	40
Odisha	846
Punjab	727
Puducherry	357
Rajasthan	1121
Sikkim	162
Telangana	739
Tamil Nadu	3852
Tripura	114
Uttar Pradesh	3344
Uttarakhand	545
West Bengal	738
<b>Total</b>	<b>39005</b>

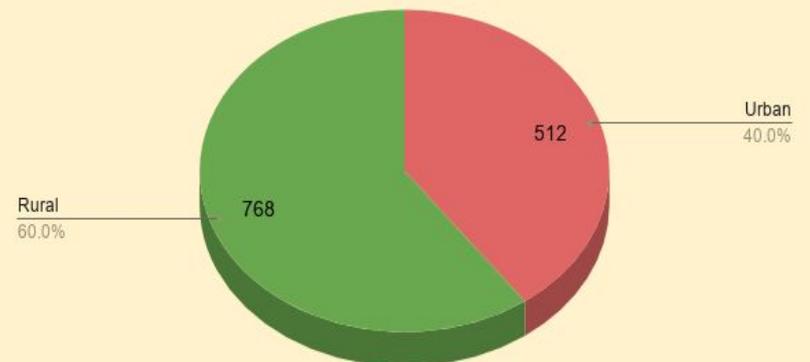
# Insights of Training

## Zone-wise training status



**Total number of training conducted in the North East Region is : 52**

## Status of Urban and Rural training in NE regions



# Active users and pages

- Home
- Customisation
- REPORTS
  - Real-time
    - Overview**
    - Locations
    - Traffic Sources
    - Content
    - Events
    - Conversions
  - Audience
    - Attribution BETA
    - Discover
    - Admin

## Overview

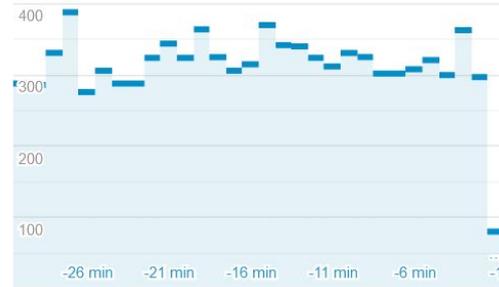
Create Shortcut BETA

Right now  
**1068**  
active users on site

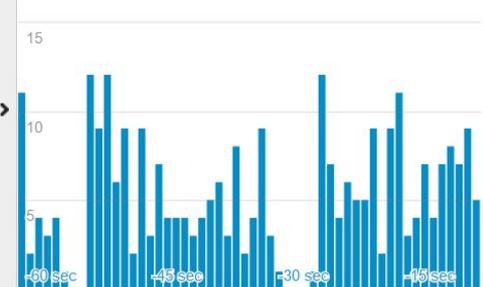


### Page Views

Per minute



Per second



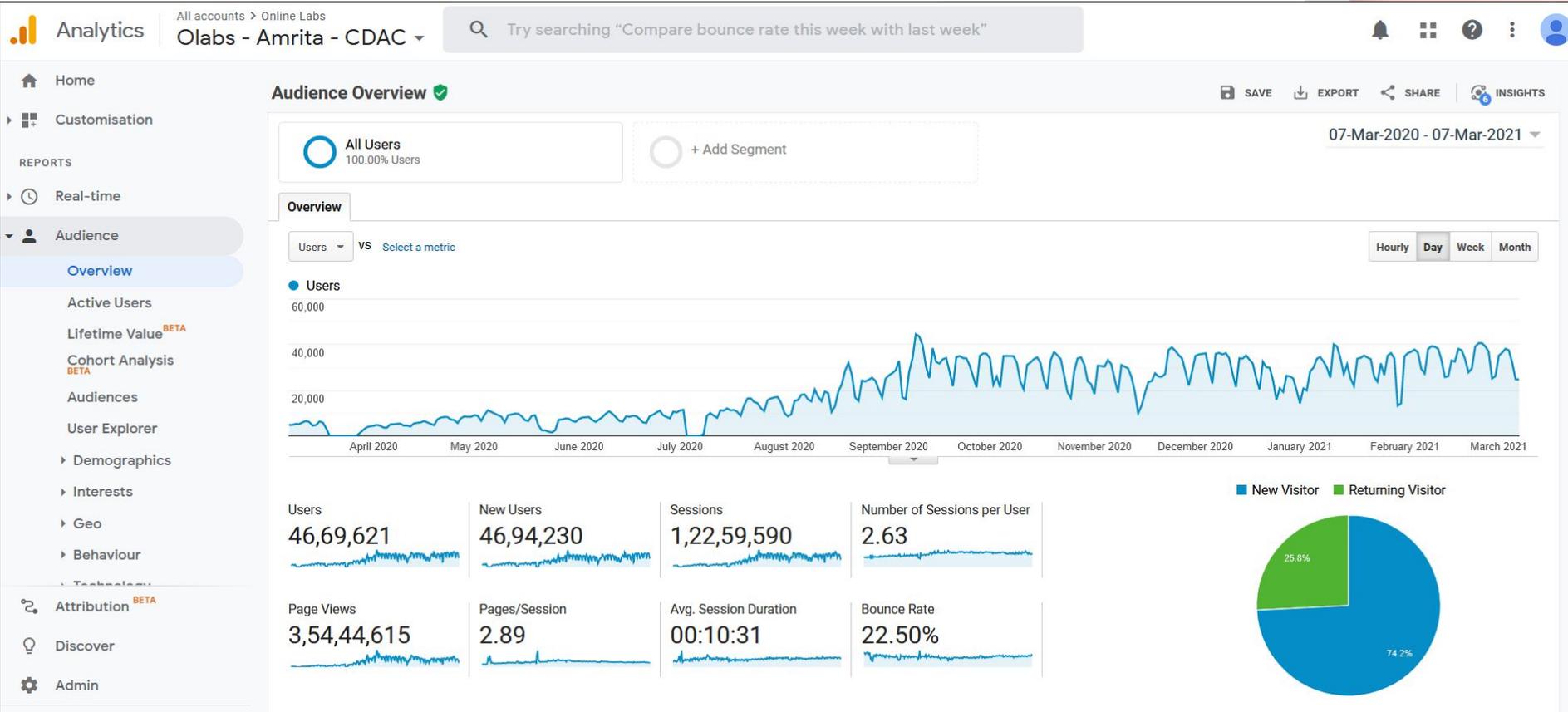
### Top Referrals:

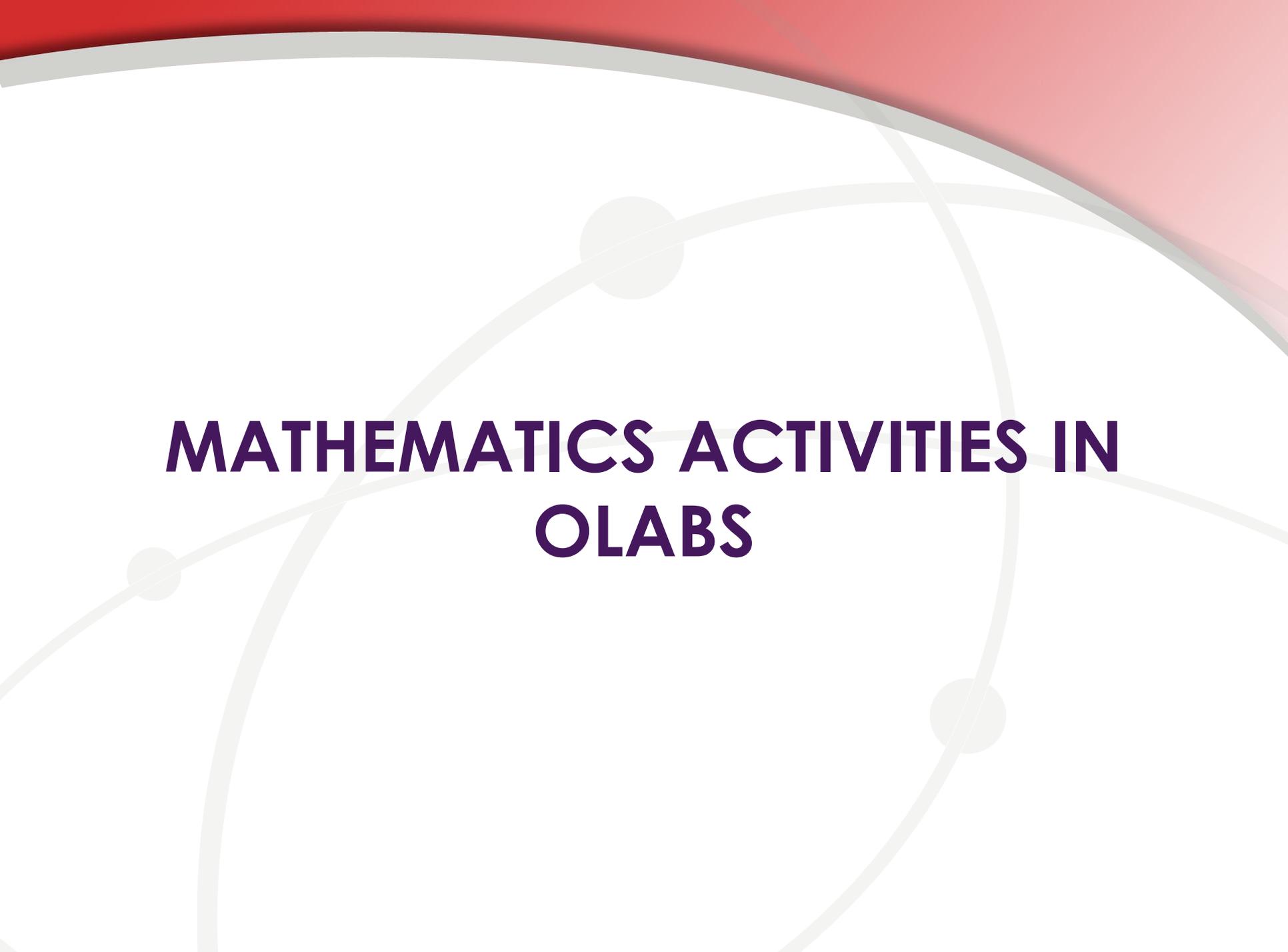
	Source	Active Users
1.	<a href="http://olabs.edu.in">olabs.edu.in</a>	380
2.	<a href="http://amrita.olabs.edu.in">amrita.olabs.edu.in</a>	37
3.	<a href="http://learn.upes.ac.in">learn.upes.ac.in</a>	4
4.	<a href="http://in.search.yahoo.c">in.search.yahoo.c</a>	3

### Top Active Pages:

	Active Page	Active Users	
1.	<a href="#">/</a>	85	7.93%
2.	<a href="/?pg=topMenu&amp;id=40">/?pg=topMenu&amp;id=40</a>	40	3.73%
3.	<a href="/?pg=bindex&amp;bsub=guest_registration_form">/?pg=bindex&amp;bsub=guest_registration_form</a>	38	3.54%
4.	<a href="/?pg=topMenu&amp;id=41">/?pg=topMenu&amp;id=41</a>	37	3.45%

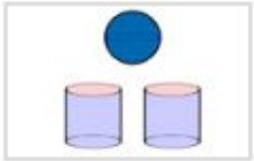
# Audience Overview



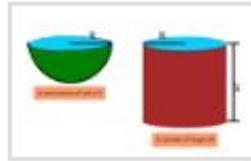


# **MATHEMATICS ACTIVITIES IN OLABS**

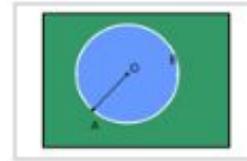
# Mathematics Labs – Class X



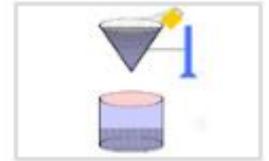
Volume of a sphere



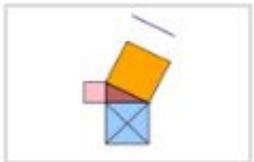
Surface area of a sphere



Angle at the centre of a circle by an arc



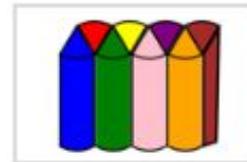
Volume of right circular cone



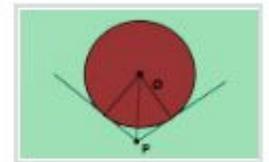
Pythagoras theorem



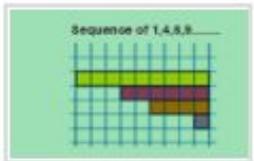
Surface area of a cylinder



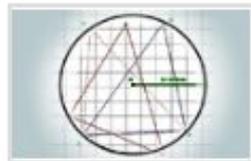
Volume of right circular cylinder



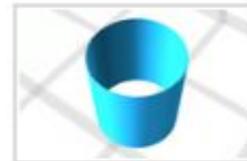
Tangents drawn from an external point



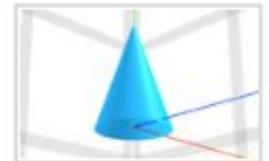
Arithmetic Progression



Angles in the Same Segment

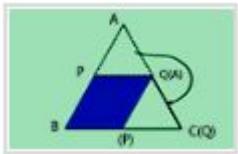


Right Circular Cylinder

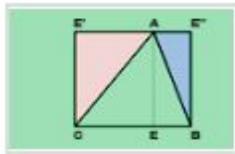


Right Circular Cone

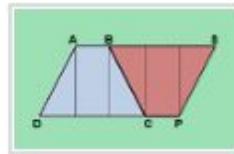
# Mathematics Labs – Class IX



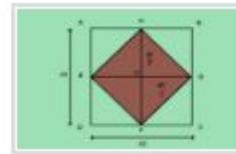
Mid Point Theorem



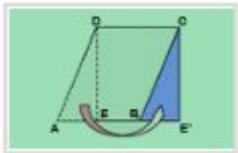
Area of Triangle



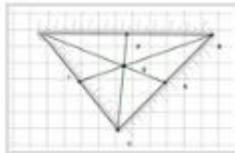
Area of Trapezium



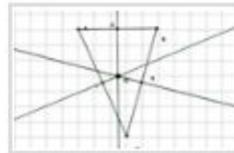
Area of Rhombus



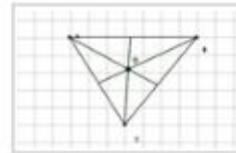
Area of Parallelogram



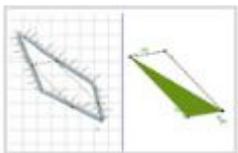
Centroid of a Triangle



Circumcentre of a Triangle



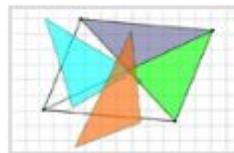
Incentre of a Triangle



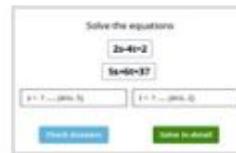
The quadrilateral formed by the mid-points of a quadrilateral



Area of Circle



Properties of Parallelogram

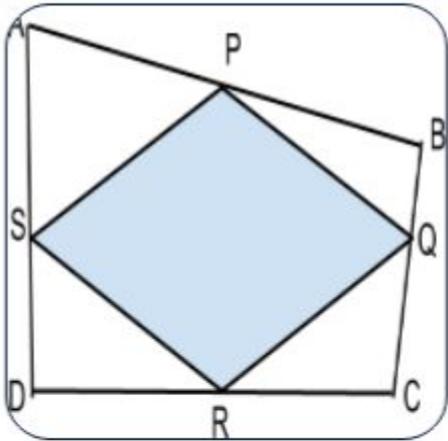


Solving Simultaneous Equations



Least common multiple

# Structure of a Mathematics Labs



**The quadrilateral formed by the midpoints of a quadrilateral.**

**Objective** To show that the figure obtained by joining the mid-points of consecutive sides of the quadrilateral is a parallelogram.

**Definition:** A parallelogram is a simple quadrilateral with two pairs of parallel sides. The opposite or facing sides of a parallelogram are of equal length. The opposite angles of a parallelogram are of equal measure.

**Pre-requisite knowledge:**

1. If in a quadrilateral, both pairs of opposite sides are equal, it is a parallelogram.

Start

# The quadrilateral formed by the mid-points of a quadrilateral

Instructions



Simulator



Self Evaluation



Reference

Workbench Area

## Instructions

- Midpoints of all sides of quadrilateral ABCD are marked.
- Click on midpoints of consecutive sides to join them and form quadrilateral PQRS inside quadrilateral ABCD.

## Tools

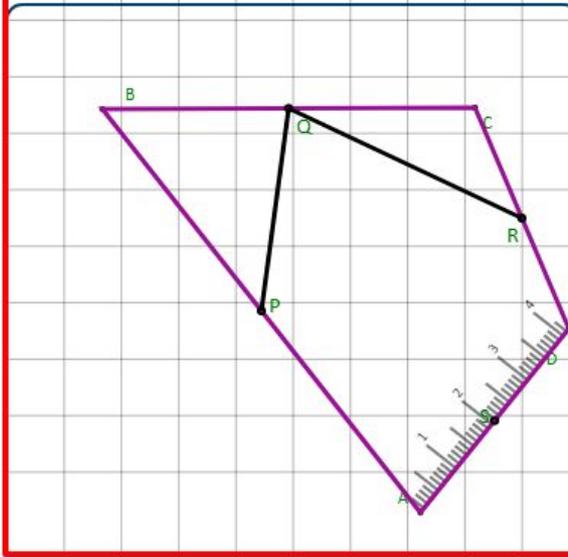


**Olabs**

- Show scale AB
- Show scale BC
- Show scale CD
- Show scale DA

## The quadrilateral formed by the midpoints of a quadrilateral.

### Workbench



### Observation



- Line PQ is drawn.
- Line QR is drawn.

Tool Box Observations & Conclusion

# Maths 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.

# Conclusion

- We are happy to bring this platform you to add value to the school education, in significant ways.
- We are working on to bring you better and more labs.
- Do share your feedback and suggestions; we certainly appreciate that.
- We do hope you will consider adopting it for your students and inform the students accordingly.

Thank you  
for  
your time

[etu@cdac.in](mailto:etu@cdac.in)  
[vidyakashetu@gmail.com](mailto:vidyakashetu@gmail.com)