



सी डैक
CDAC



AMRITA
VISHWA VIDYAPEETHAM
UNIVERSITY

OLABS: SCHOOL LABS ONLINE

Archana Rane
Suman Ninoriya

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

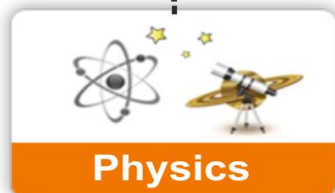
- Not meant to replace physical labs!
 - But augment and amplify them.
- Virtual labs address deficiencies of physical labs.
 - Infinite repetitions at no cost.
- It provides the ease and convenience of conducting experiments over the internet.
- Aimed to bridge the constraints of geographical distances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

Technology can expand the boundaries of a physical Lab

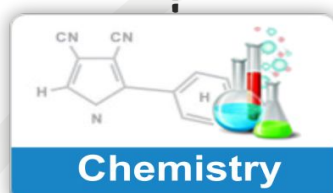
- Events occurring in large or small time windows can be simulated –
 - Demonstrating lifecycle of Mosquito.
- Invisible objects can be ‘made visible’
 - Sensing magnetic field intensity.
- Things impossible to perform in real labs
 - behaviour of simple pendulum in atmosphere of Jupiter, etc.
- Offers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

Olabs: What we have now

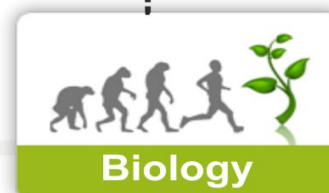
Experiment/Lab Details



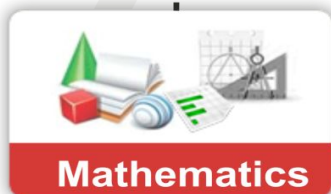
54



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 9th (3 experiments) and 12th (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 school mathematics.

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.

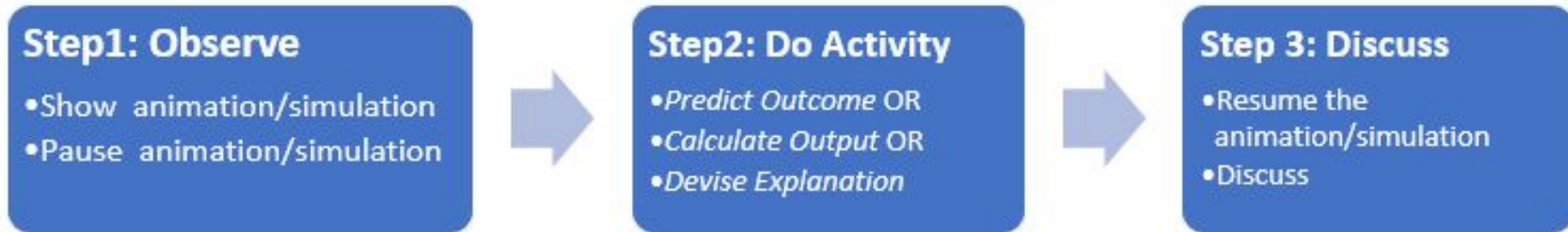
2. One you tube link written as cross-check (either for link or video) is showing error . If provided alternative or correct (playable link) then it can also be included as e-content. If this video is not available for mass then it can be excluded.

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
- **OLabs FB page** - <https://www.facebook.com/onlinelabs/>
- **OLabs Email** – support@olabs.co.in / 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
Website: 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: 16th 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 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
Website: www.cbseacademic.in

Tel: 011-23212603
Telefax: 01123234324



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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. 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, 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 any, for kind perusal and to get the out comes / 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 and Co-ordinator, O Labs Team at amritaolabs@gmail.com and Shri Pantina Chandrashekar at 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 OLabs



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

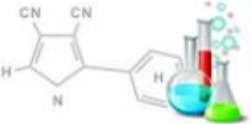
Ministry of Electronics and Information Technology



[Home](#) [About](#) [In the news](#) [Workshops](#) [Training](#) [Registration](#) [Contact us](#) [Login](#)




PHYSICS



CHEMISTRY



BIOLOGY



MATHS



ENGLISH

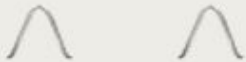
OLabs - Physics

Equivalent Resistance of Resistors(Series)

SAVE FULLSCREEN EXIT

Arrangement of Resistors:

Single



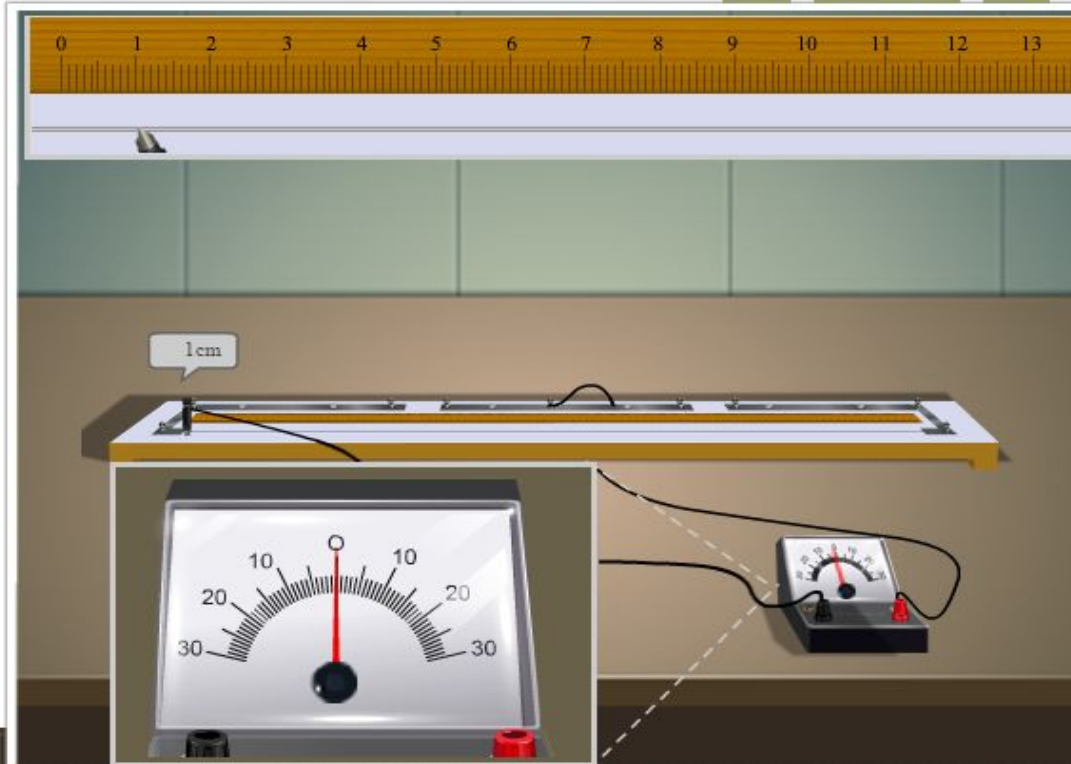
Start Experiment

Insert Key

Jockey Position(cm): 0.01

1 100

Reset



OLabs - Chemistry

Chemical Reactions

HELP

FULLSCREEN

EXIT

Select the reaction:



Burning of magnesium in air



Sublimation of dry ice



Na_2SO_4 (aq)
with BaCl_2 (aq)



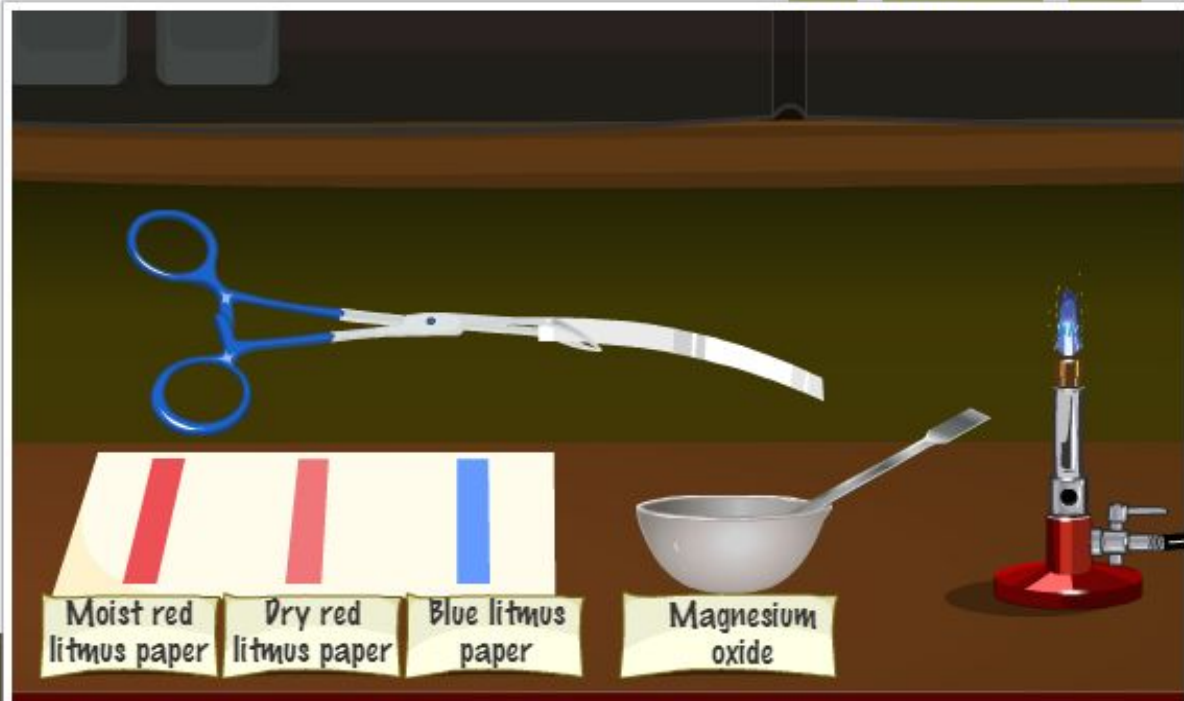
Iron nail with CuSO_4 (aq)



Heating of CuSO_4



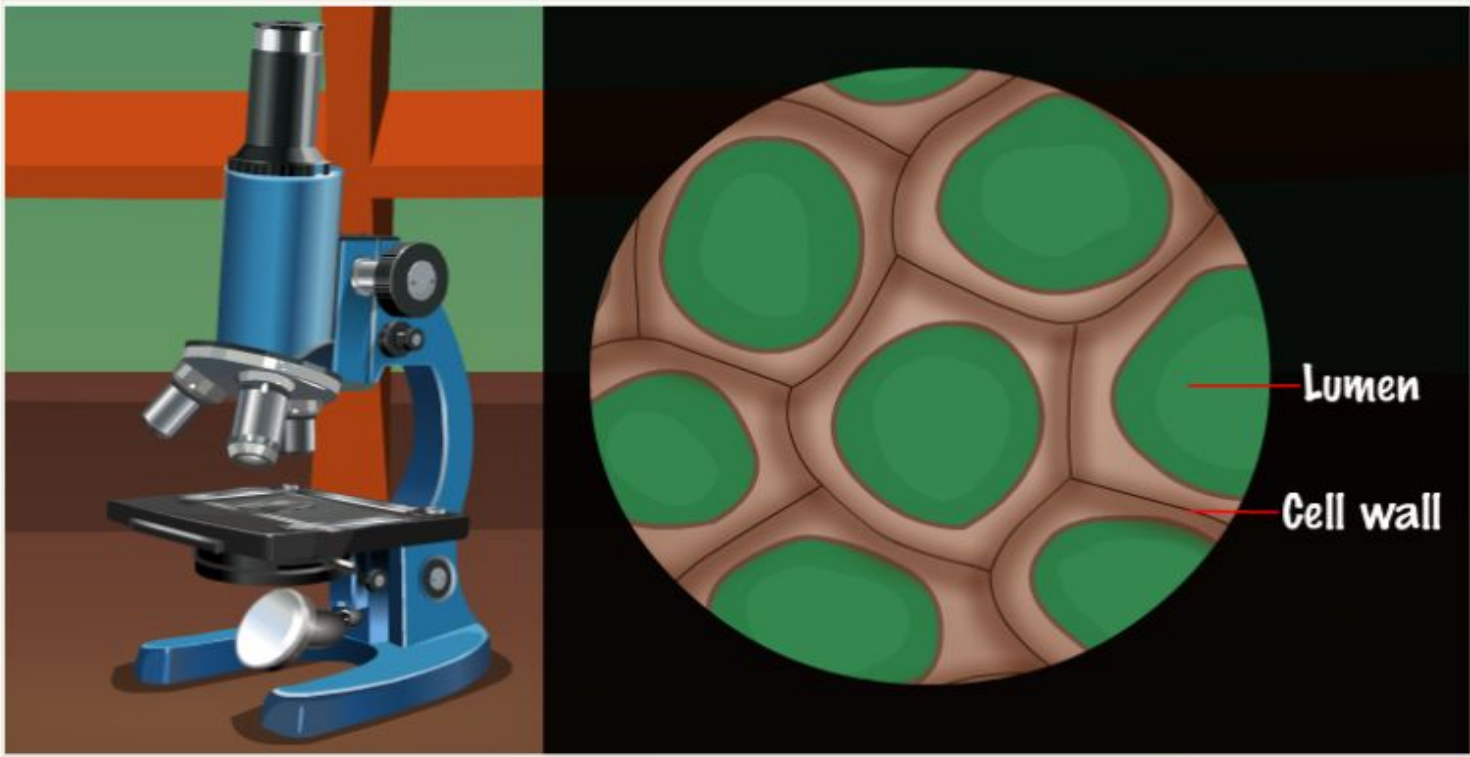
Melting of ice



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

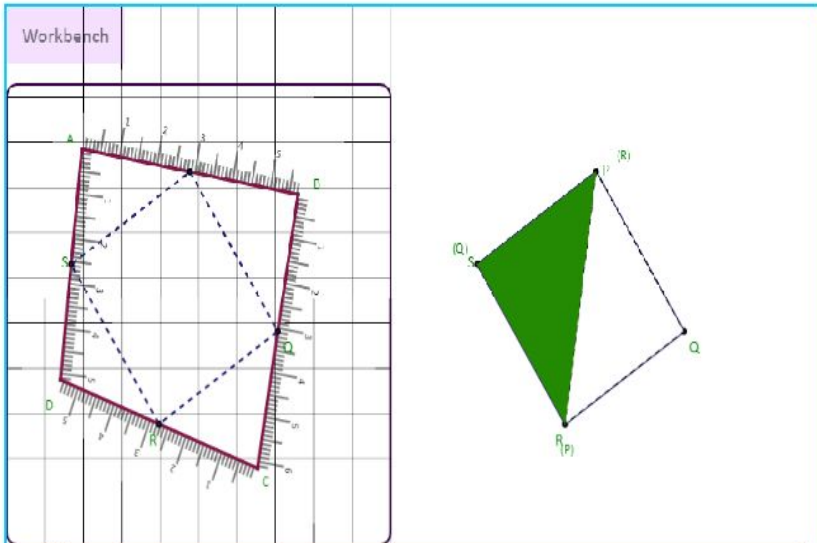
- Activity completed successfully.
- Please see the inference below.

Tools



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

The quadrilateral formed by the midpoints of a quadrilateral.



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

వారము విధానము సంబంధం పీడియా సిమ్ములేటర్ చివాచేస్ వనరుల

pH - నిర్ధారణ

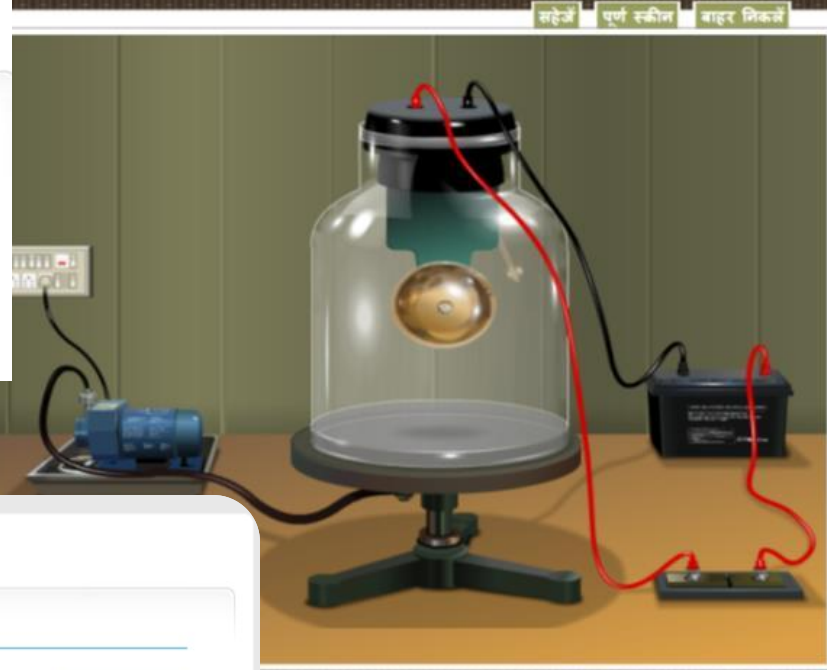
స్పర్శపద్ధతి ఎంపిక దానికి క్లిక్ చేయండి

కారకాలు మరియు ఫలితం

ఏ వనూనూ మెత్తమం వద్దనా నో కృషి షయోగాస్పి ఫారంధించండి

1 2 3 4 5 6 7 8 9 10 11 12 13 14

లెమన్ జాస్ (1), టోమాటో జాస్ (2), ఆరంజ్ జాస్ (3), ప్లెనాచిల్ జాస్ (4), గ్రీన్ జాస్ (5), యెలో జాస్ (6), పర్పుల్ జాస్ (7), బ్లూ జాస్ (8), డార్క్ బ్లూ జాస్ (9), లైట్ బ్లూ జాస్ (10), డార్క్ గ్రీన్ జాస్ (11), లైట్ గ్రీన్ జాస్ (12), డార్క్ పర్పుల్ జాస్ (13), లైట్ పర్పుల్ జాస్ (14)



ఒక వస్తువు కలిగి ఉన్న సస్థలం మొత్తం. లీటర్లలో ఉంది. సాంద్రత తమ

भौतिक विज्ञान

कक्षा 9

<p>బెల్ జార ప్రయోగం</p>	<p>టోస్ కి ఘనత్వ కి నిర్ధారణ</p>	<p>ఒక తీర్చిదిద్దిన పటం పై ఒక లకడీ కి భద్రత స్థానాంతరం చేయడానికి కొరత అవసరం</p>	<p>టో వస్తం తో ఒక ఉపయోగం న్యూటన్ కి తొలగే నియమం</p>
<p>రేల పై ఒక టోస్ లో తో ఘనం ద్వారా దానిని తీయండి</p>	<p>ఆర్కిమిడిస్ సిద్ధాంతం యొక్క నిరూపన</p>	<p>ఘనం యొక్క పారావర్తన నియమం</p>	<p>న్యూటన్ కి రెండవ నియమం</p>

त्रिभुज के मध्य बिंदु प्रमेय

निर्देश:

1. एक बिंदु O को A से जोड़ें।
2. O को B से जोड़ें।
3. O को C से जोड़ें।
4. O को A से जोड़ें।
5. O को B से जोड़ें।
6. O को C से जोड़ें।

त्रिभुज के मध्य बिंदु प्रमेय

त्रिभुज के मध्य बिंदु प्रमेय

त्रिभुज के मध्य बिंदु प्रमेय

त्रिभुज के मध्य बिंदु प्रमेय

त्रिभुज के मध्य बिंदु प्रमेय

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 →



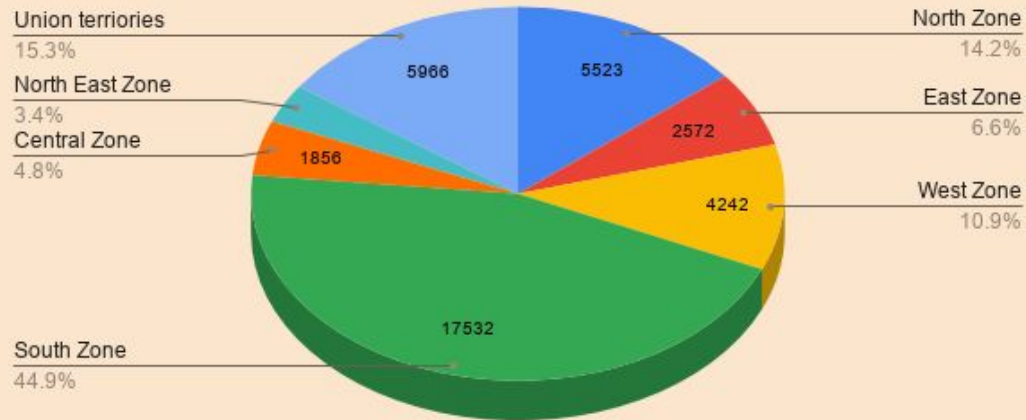
Statewise training – CBSE schools

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
Total	39005

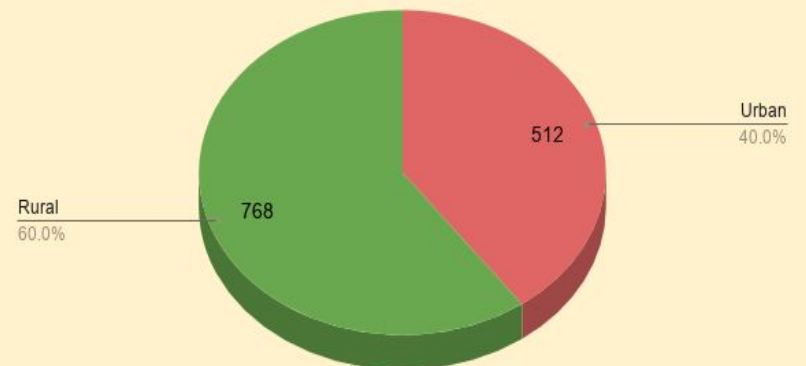
Insights of Training

Zone-wise training status

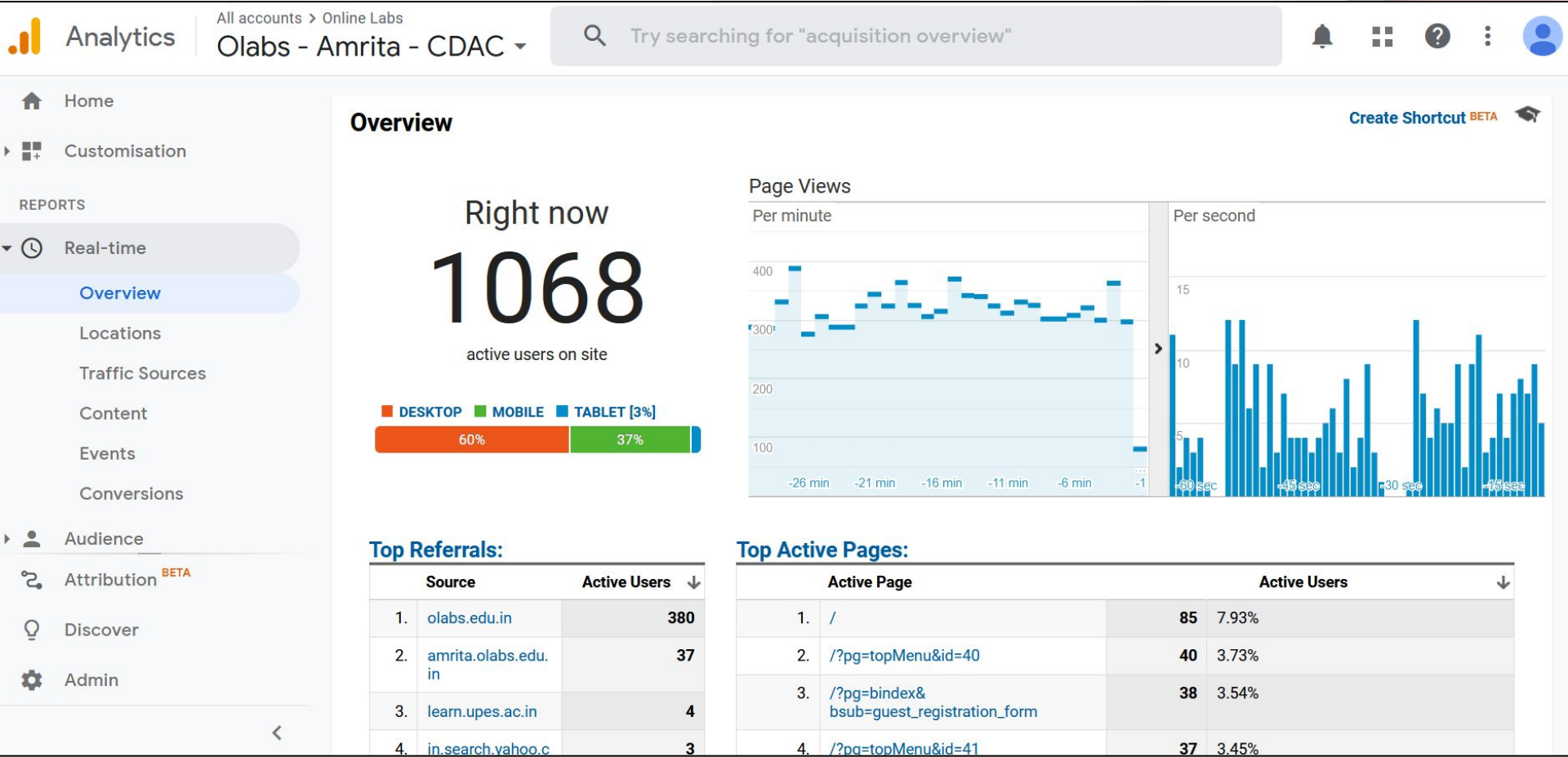


Total number of training conducted in the North East Region is : 52

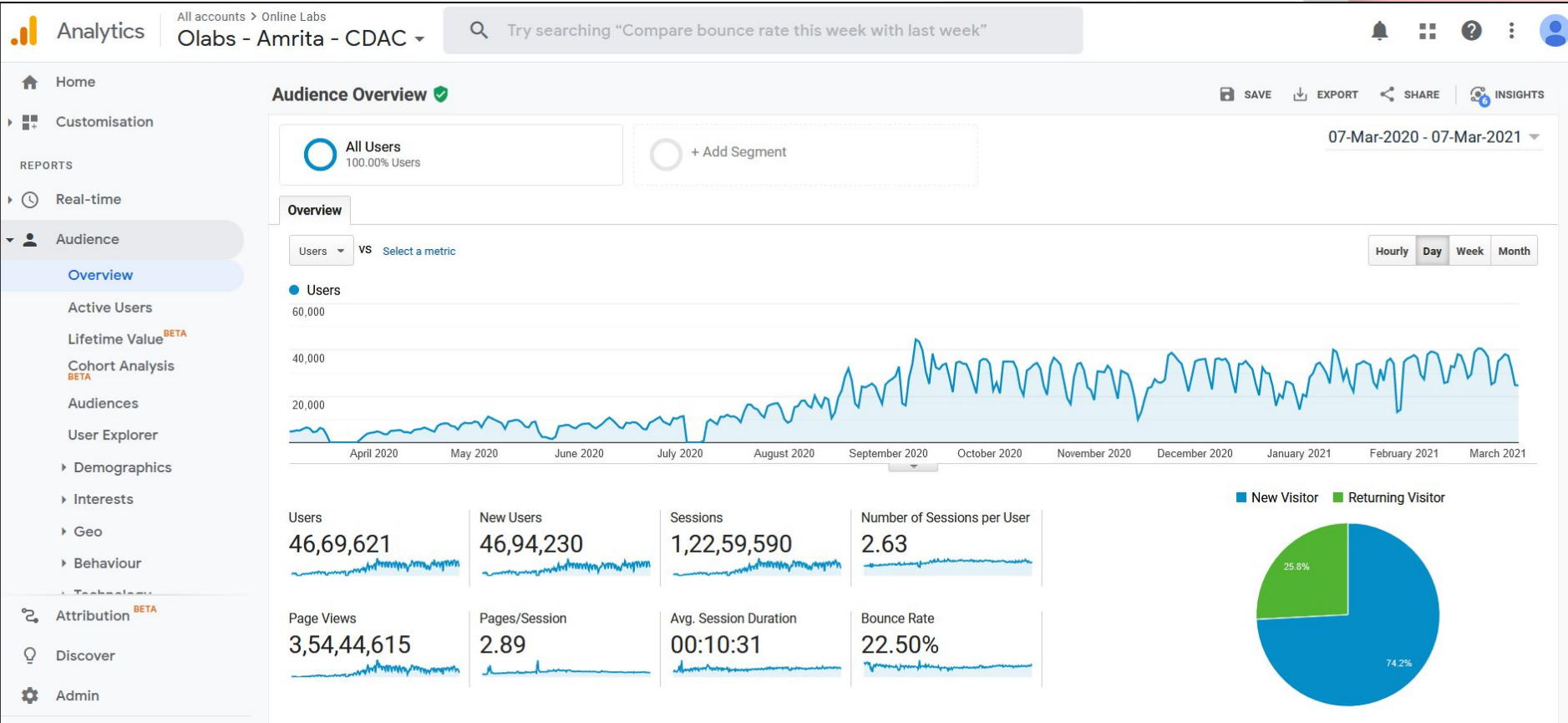
Status of Urban and Rural training in NE regions



Active users and pages



Audience Overview

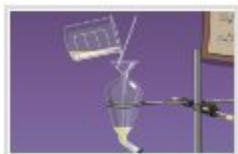




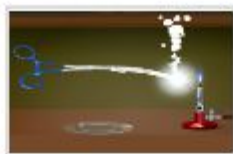
CHEMISTRY ACTIVITIES IN OLABS

Chemistry Labs – Class IX

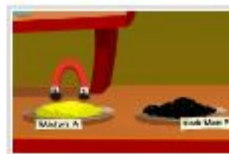
Class 9



Separation of Mixtures Using Different Techniques



Chemical-Reactions



Distinguish Between Mixture and Compound



Separation of Components of a Mixture



Distinguishing Between Solutions



Melting Point of Ice



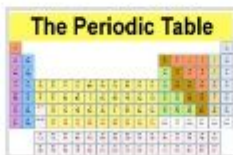
Boiling Point of Water



Rutherford's Scattering Experiment



Exothermic and Endothermic Reactions



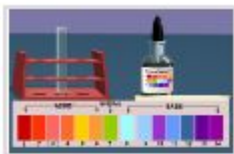
Modern Periodic Table



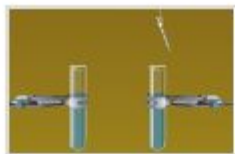
The Law of Conservation of Mass in a Chemical Reaction

Chemistry Labs – Class X

Class 10



Determine pH with pH indicator strips / universal indicator solution



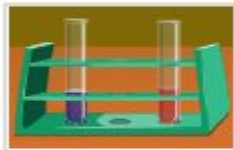
Single Displacement Reaction



Combination Reaction



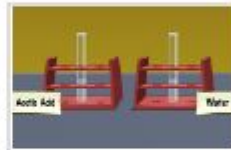
Decomposition Reaction



Properties of Acids and Bases



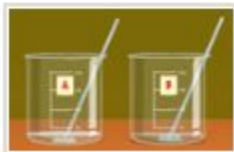
Double Displacement Reaction



Properties of Acetic Acid (Ethanoic Acid)



To Study The Relative Reactivity of Metals Using Salt Solutions



Cleaning Capacity of Soap with Hard and Soft Water



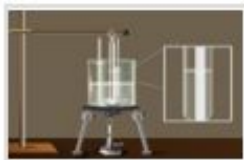
Saponification-The process of Making Soap

Chemistry Labs – Class XI

Class 11



Melting point of an Organic compound



Boiling point of Organic compound



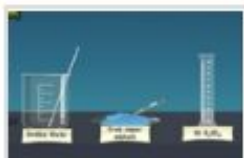
pH Determination



Chemical equilibrium



Quantitative Estimation



Purification of Impure samples by Crystallisation



Detection of Elements: Lassaigne's Test



Basic Laboratory Techniques



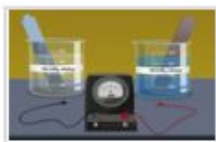
Qualitative Analysis of Anions



Qualitative Analysis of Cations

Chemistry Labs – Class XII

Class 12



Determination of EMF of a Cell



Determination of concentration of KMnO_4 solution



Kinetic Study on the Reaction between Iodide Ions and Hydrogen Peroxide



Kinetic Study on the Reaction between Potassium Iodate and Sodium Sulphite



Preparation of Inorganic Compounds



Qualitative Analysis of Oils & Fats



Qualitative Analysis of Proteins



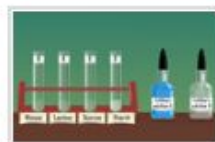
Paper Chromatography



Kinetics Study on the Reaction between Sodium Thiosulphate and Hydrochloric Acid



Preparation of Organic Compounds



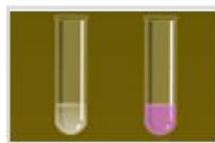
Qualitative Analysis of Carbohydrates



Effectiveness of Different Common Oils in Forming Emulsions



Preparation of Lyophilic and Lyophobic Sols



Tests for the functional groups



Thermochemistry

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

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