



# ONLINE LABS (OLabs) for school Lab experiments

[www.olabs.edu.in](http://www.olabs.edu.in)

M Sasikumar  
CDAC Mumbai

# About CDAC

- CDAC premier R&D organization of the Ministry of Electronics and Information Technology (MeitY), for carrying out R&D in IT, Electronics and associated areas.
- 12 centres all over India.
- Educational Technology is one of the interest areas of CDAC.

# About ETU @ CDAC Mumbai

- The Educational Technology Unit (ETU) of CDAC Mumbai is functional for last two decades.
- Working on building technologies for enhancing teaching learning experience.
- Activities of the group include
  - Tools development
  - Research in interest areas
  - Creating awareness on e-learning and related tools
  - Consultancy

# OLabs – Background

- *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 and theories they learn.*

# Why O Labs?

- **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 expert teachers

# Technology can expand the boundaries of a physical Lab

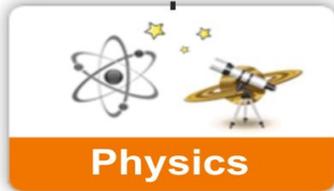
- Events occurring in large or small time windows can be simulated - *Demonstrating lifecycle of Mosquito.*
- Invisible objects can be 'made visible'- *Sensing magnetic field intensity.*
- Things impossible to perform in real labs - *behaviour of simple pendulum in atmosphere of Jupiter, etc.*
- Offers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

# Online Labs (OLabs) for school lab experiments

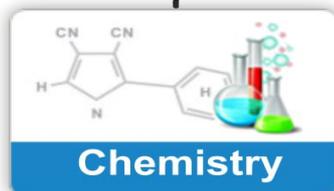
- Not meant to replace physical labs!
  - But augment and amplify them.
- Virtual labs address deficiencies of physical labs.
  - Infinite repetitions at no cost.
- It provides the ease and convenience of conducting experiments over the internet.
- Aimed to bridge the constraints of geographical distances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

# Olabs: What we have.

## Experiment/Lab Details



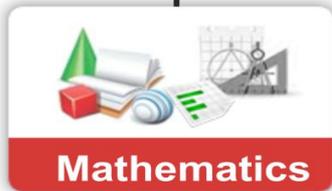
54



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



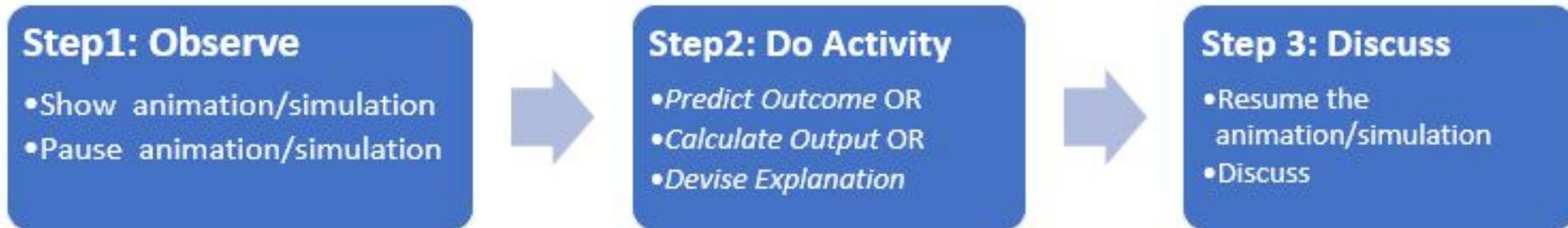
Resources

# Effective usage of OLabs in your school

- 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 (see the steps below)
- 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.

# Olabs: training and online usage

## Overall training Figures

	CBSE	State Board	Total
Schools trained	8358	1197	9555
Teachers trained	28746	4381	33127



Registered users on  
Olabs Portal.



# Important Links

- OLabs website – [www.olabs.edu.in](http://www.olabs.edu.in)
- OLabs FB page -  
<https://www.facebook.com/onlinelabs/>  
– Check OLabs FB page for announcements regarding OLabs orientation programmes
- OLabs Email – [support@olabs.co.in](mailto:support@olabs.co.in) /  
[etu@cdac.in](mailto:etu@cdac.in)

# 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



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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.

# 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, Centre 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 concerned authorities. Outcomes / 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**

# SCREENSHOTS

# 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

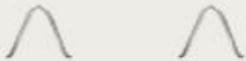
# OLabs - Physics

## Equivalent Resistance of Resistors(Series)

SAVE FULLSCREEN EXIT

Arrangement of Resistors:

Single



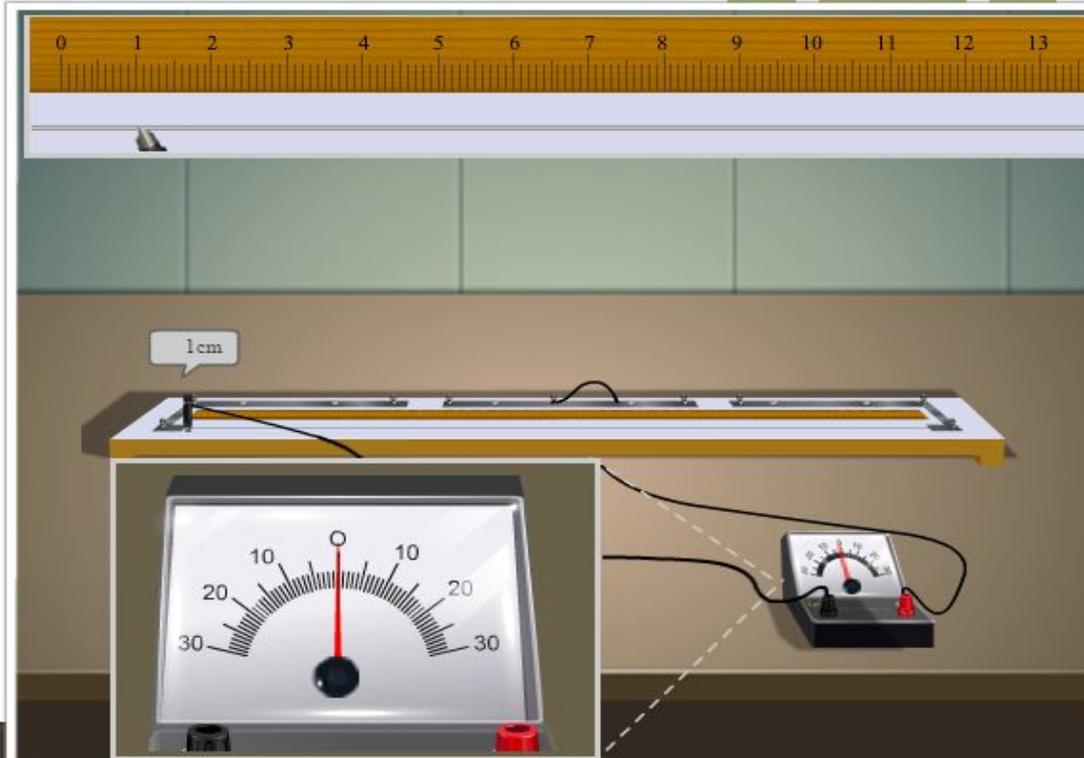
Start Experiment

Insert Key

Jockey Position(cm): 0.01

1  100

Reset



# OLabs - Chemistry

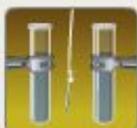
## Chemical Reactions

HELP

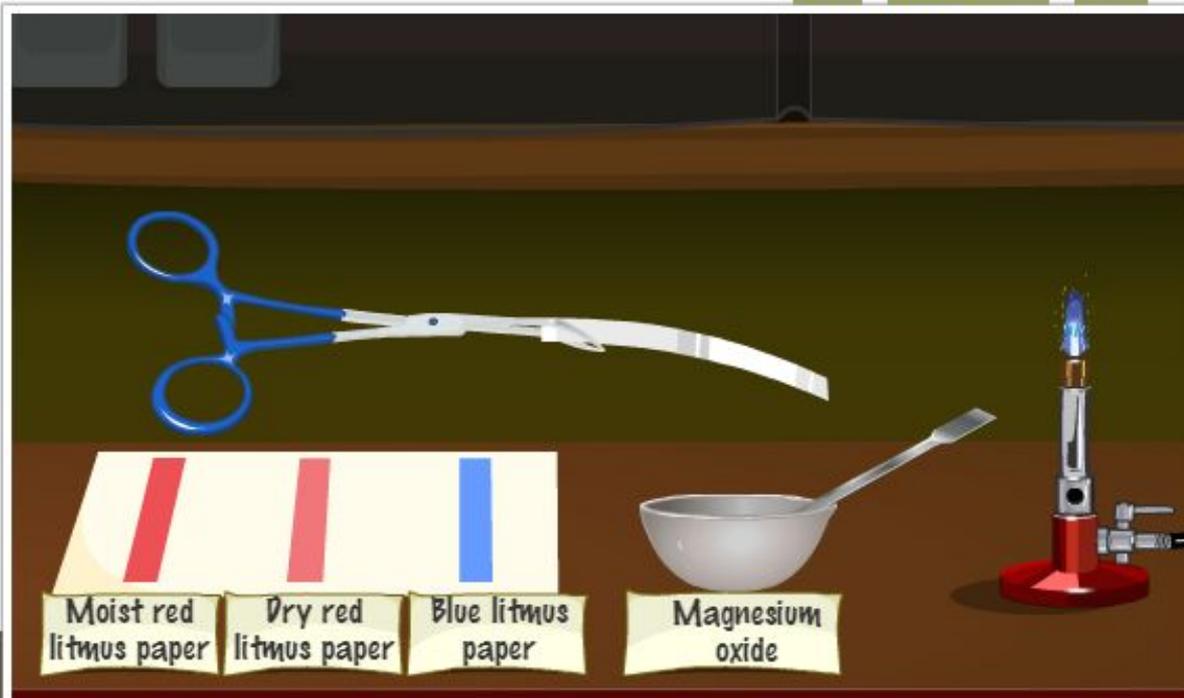
FULLSCREEN

EXIT

Select the reaction:

Burning of  
magnesium in  
airSublimation of  
dry ice $\text{Na}_2\text{SO}_4$  (aq)  
with  $\text{BaCl}_2$  (aq)Iron nail with  
 $\text{CuSO}_4$  (aq)Heating of  
 $\text{CuSO}_4$ 

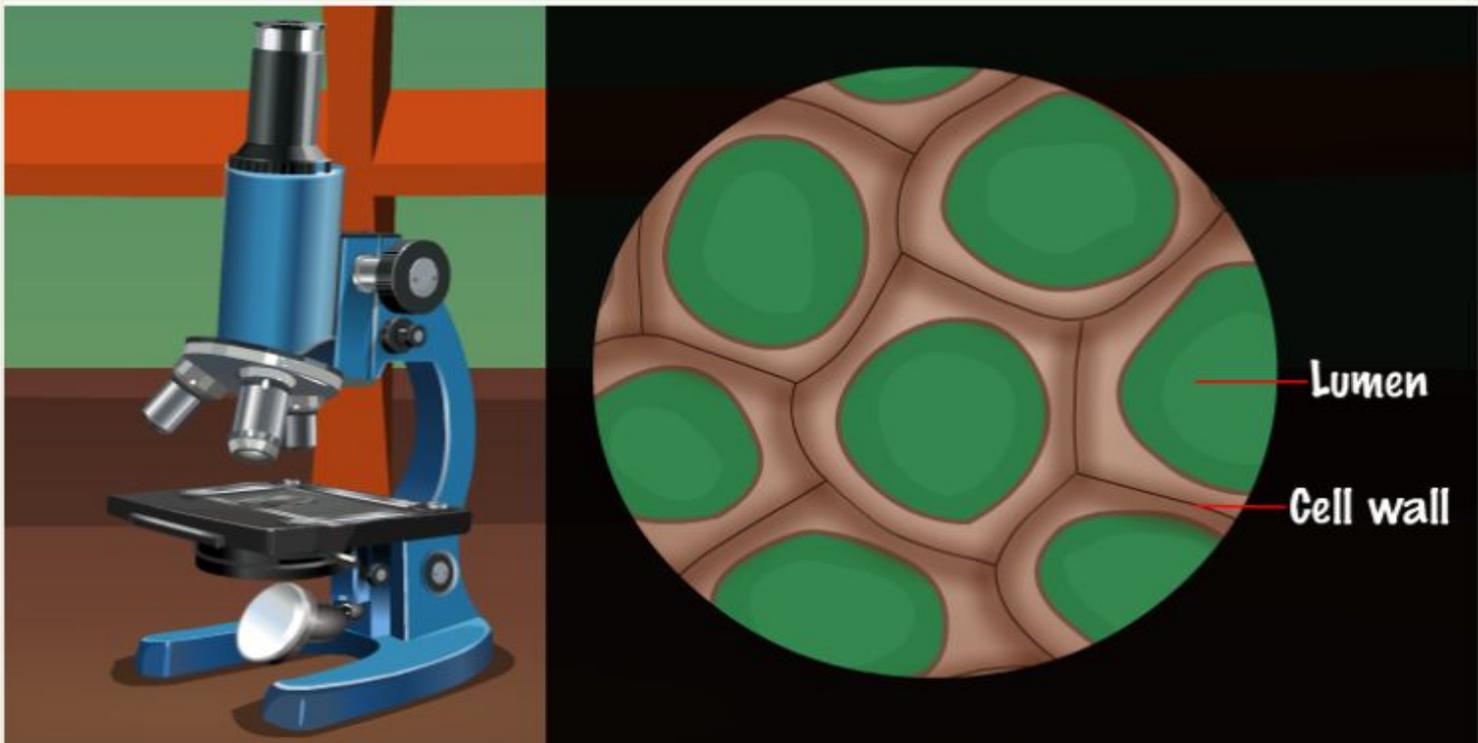
Melting of ice



# 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

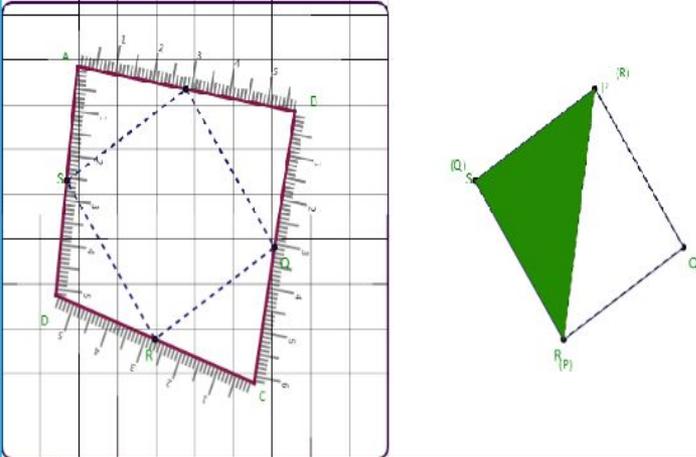


**OLabs**

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

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

Workbench



**Inference**

- △PQR covers △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

సాంధ్రత యొక్క సంకల్పం

వారము విధానము సంకాలనం వీడియో సిమ్యులేటర్ విచారణ వనరులు

H - నిర్ధారణ

ప్రస్తుత ఎంపికదానికి క్లిక్ చేయండి

కార్యాలయల పరిమళ పట్టిక

నమూనా మేకప్ మరియు వర్ణాన్ని చూడండి

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

15వ నెంబర్ యూనివర్సల్ డిజైన్ కేటగిరీ

ఒక వస్తువు కలిగి ఉన్న సప్టలం మొత్తం, లీటర్లలో ఉంది. సాంధ్రత తమ



OLabs – Regional Languages

కक्षा 9

నిर्देश

1. आसत चरवा है A से रेखा BC तक समान दूरी।
2. उभय कोन करने के लिए 'साधन' में Set square पर चिह्न करें।
3. एक Set square को ऐसी स्थिति में रखें कि बिंदु A, BC के समान दूरी।
4. Set square के आसत को दी गई रेखा BC पर इस तरह रखें कि दूसरी भुजा बस बिंदु A के समान दूरी में हो।

साधन

Set square

चित्र का प्रकार: न्यून कोण त्रिभुज

अवलोकन

- यह set square की सही स्थिति है।

पटल के निर्माण

एक क्षैतिज पटल पर एक लकड़ी के दर्पक स्थानांतरित करने के लिए आवश्यक बल

दो बसंत शीश का उपयोग न्यूटन के गति के तीसरे नियम का स्थापन

ध्वनि का परावर्तन के नियमों

न्यूटन के दूसरे नियम

1) अंग,  $\angle AOB$  एकाग्र वर्तुलखंडाधे आहेत.

2) से वर्तुलत शीकला,  $\angle AOB$ .

# Thank You

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**M Sasikumar - [sasi@cdac.in](mailto:sasi@cdac.in)**

**OLabs Website – [www.olabs.edu.in](http://www.olabs.edu.in)**

**ETU team – [etu@cdac.in](mailto:etu@cdac.in)**

**ETU website – [www.vidyakash.in](http://www.vidyakash.in)**