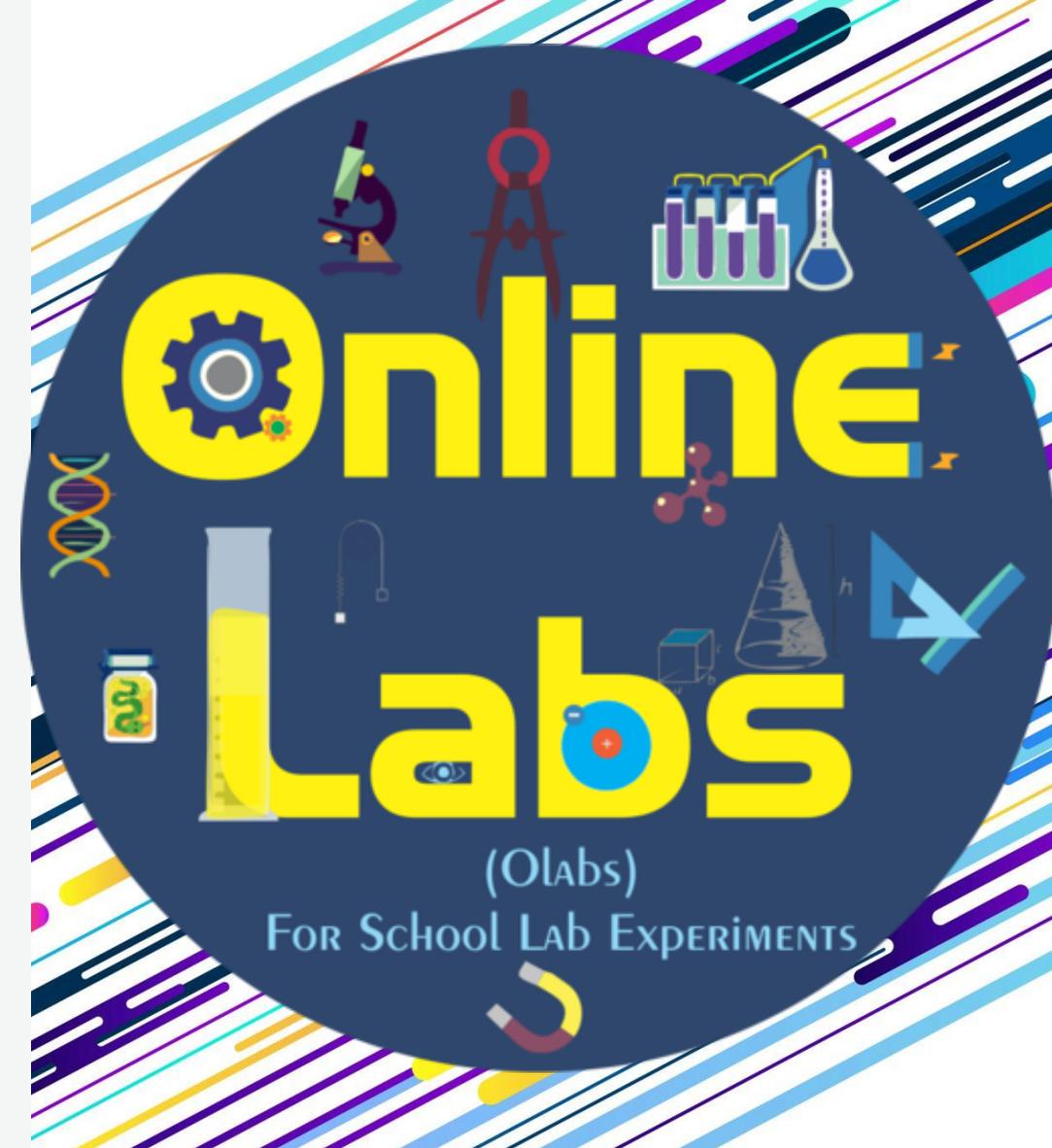


# Learning Chemistry and Biology through Online Labs (Virtual Labs)

Suman Ninoriya,  
ETU, CDAC Mumbai  
nsuman@cdac.in



# Need for Virtual Labs

- **Problems with Physical Labs**
  - Limited Infrastructure
  - No/minimal lab session
  - Limited lab access
  - Safety constraints, expensive and fragile equipment.
- **Others**
  - Inadequate 'higher order thinking skills'
  - Assessment of experiments difficult
  - Lack of quality teachers
  - Support for divyang students
- Not all activities amenable to physical labs

# What is OLabs?

- Online Labs (OLabs) for school lab experiments are simulation based labs
- Interactive simulations with real world behaviour
- Students can Explore, Conduct and Repeat at their own pace.
- Available for free web-based access on [www.olabs.edu.in](http://www.olabs.edu.in)
- Offline version available
- Not meant to replace physical labs!
  - But augment and amplify them.



olabs.edu.in  
(soon to be under Diksha)

# OLabs at present

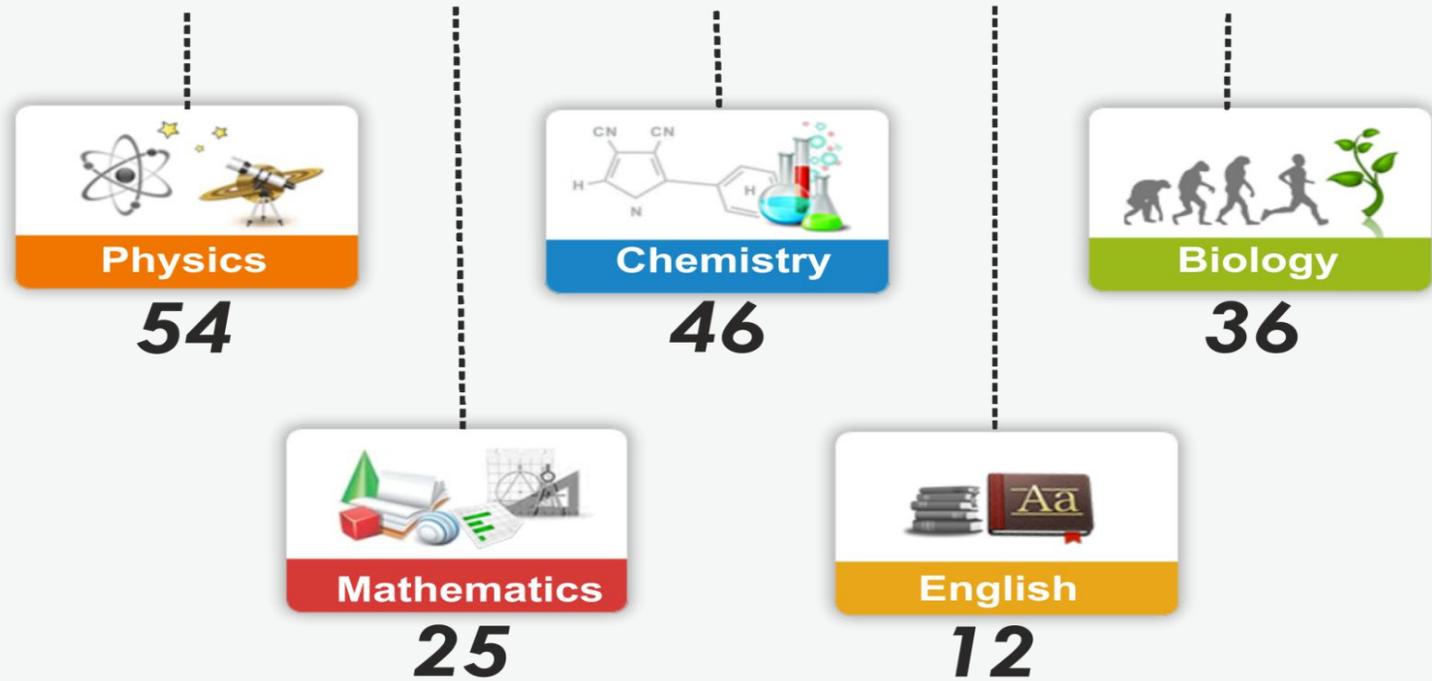
Classes:

- IX
- X
- XI
- XII

Available in

- English
- हिंदी
- മലയാളം
- मराठी

## Experiment/Lab Details



**Total Experiments : 173**

# Why OLABs?

- Compared to the many simulators available online, OLABs provide a **complete eco-system** for the lab.
- **Consistency** in terminology across the tabs
- Compliance with the **NCERT curriculum**.
- Content **reviewed and approved** by CBSE teachers.
- **High degree of interactivity** for the learner and multiple affordances.

OLabs is ready  
for use...

# OLabs eco-system

Theory relevant to the lab

Understanding of the process and its implications

The core simulator

Auxiliary requirements:  
plot, measurement and recording, etc

Review questions,  
references

# Olabs - Lab specific affordances

- In each lab, a set of affordances are provided.
- These are chosen based on the expectation and requirements of the lab.
- **Lab tools** such as Timer, measuring scale, protractor, calculator, thermometer, equipment that can be manipulated, etc
- **Support Tools** such as Play, Pause, Support, Help, etc
- **Variants** for various parameters
  - In Chemistry lab: various chemical testing methods can be select, no risk of chemicals etc
  - In biology : No need to wait for a long to complete a experiment, timer can be operated, Visualize the micro elements, adjust the view of microscope etc.
- **Observation Tables** to record data, where there is multiple iterations of the experiment is required.

# OLabs: A view of a Chemistry lab

## Paper Chromatography



Theory



Procedure



Animation



Simulator



Video



Viva Voce



Resources



Feedback

### Paper Chromatography

HELP

Select the mixture:

Red ink + Blue ink

Select the solvent:

Isopropyl alcohol + water

Show scale

#### Result

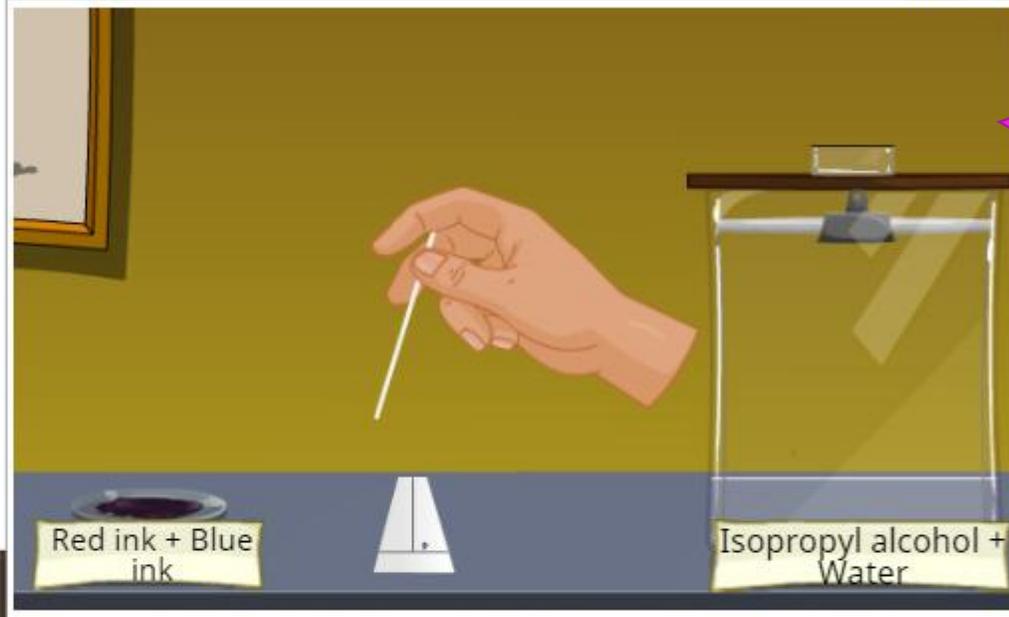
Distance travelled by the solvent

=

Distance travelled by blue ink

=

Distance travelled by red ink



Affordances

Lab Tools



# OLabs: A view of a Biology lab

## Characteristics of Dicot and Monocot Stem and Root



Theory



Procedure



Animation



Simulator



Video



Viva Voce



Resources



Feedback

## Characteristics of Dicot and Monocot Stem and Root

HELP

Select sample:



T.S. of  
sunflower  
stem



T.S. of  
sunflower  
root



T.S. of  
maize stem



T.S. of  
maize root

Reset



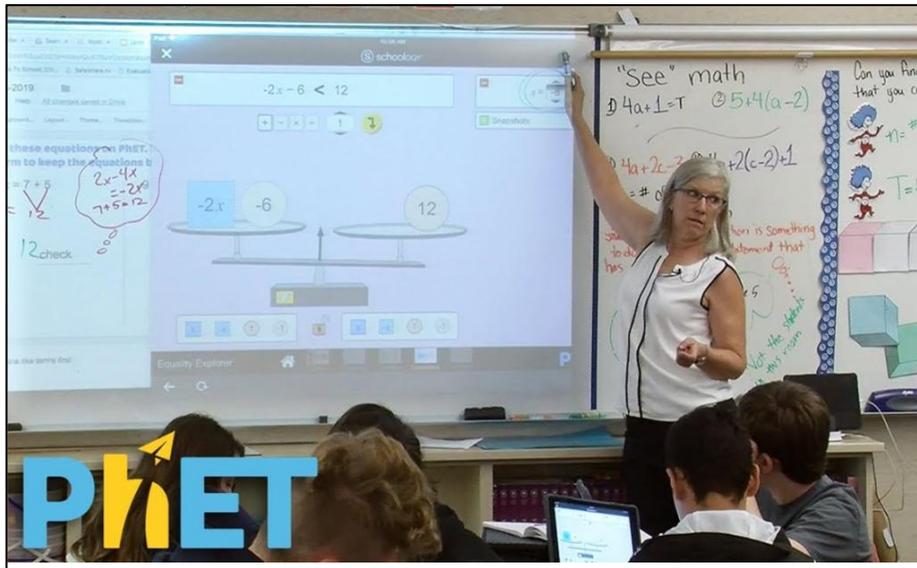
Affordances

Lab Tools

# Online labs: Use cases

Virtual Labs should be flexible enough to be adapted in diverse educational/learning environments and use-cases i.e.

- classroom & virtual classroom (formal education),
- in physical labs (revision or reflection),
- in computer rooms & at home (self-learning),
- in informal education, etc.



# OLabs Home page



**OLABS**

Funded by MeitY  
Ministry of Electronics and  
Information Technology



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

[Languages](#)



**PHYSICS**

**CHEMISTRY**

**BIOLOGY**

**MATHS**

**ENGLISH**

**Olabs Training  
Registration Form**

### Featured Simulation

Pythagoras theorem

### OLabs

The OLabs is based on the idea that lab experiments can be taught using the Internet, more efficiently and less expensively. The labs can also be made available to students with no access to physical labs or where equipment is not available owing to being scarce or costly. This helps them compete with students in better equipped schools and bridges the digital divide and geographical distances. The experiments can be accessed anytime and





# **Demo of OLabs Biology and Chemistry Labs**

# Summary

- We are happy to bring **OLabs platform** you to add value to the school education, in significant ways.
- We are working on to bring you better and more labs soon in form **OLabs Next G**
- 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.
- You can also contribute – **Translate, Train, Give feedback, Share ideas for new labs, 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>

# Thank you...

Suman Ninoriya, CDAC Mumbai; Priyanka Monde, CDAC Mumbai

nsuman@cdac.in, priyankam@cdac.in

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

Access OLABs page at  
<https://www.facebook.com/onlinelabs/>