



AMRITA
VISHWA VIDYAPEETHAM
UNIVERSITY
Established u/s 3 of UGC Act 1956

Online Labs (OLabs) for School Experiments



Raghu Raman , raghu@amrita.edu
**Center for Research in Advanced Technologies for Education
(CREATE)**

Vision for CREATE

“An Advanced Research Center to develop affordable and accessible educational technologies for societal benefit”



Our Inspiration
Chancellor, AMMA

Multidisciplinary Team



**Animators, 2D,
3D, Graphic
Artists**

**Subject Matter
Experts**

**Linguists,
Speech
specialists**

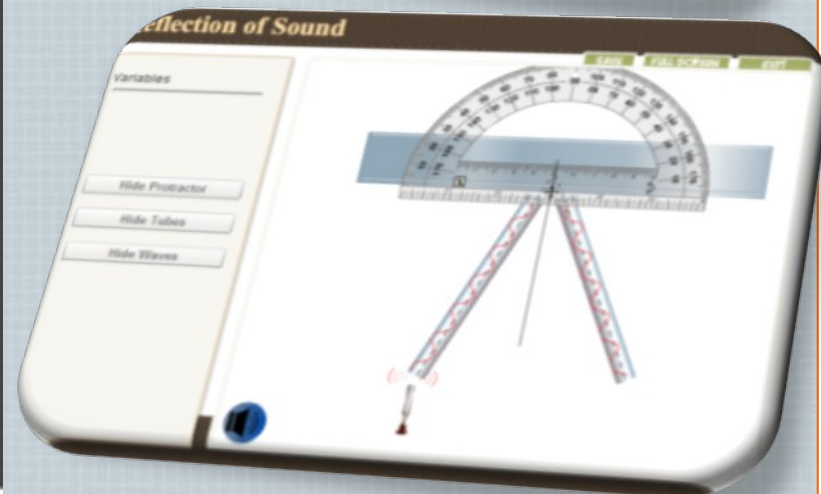
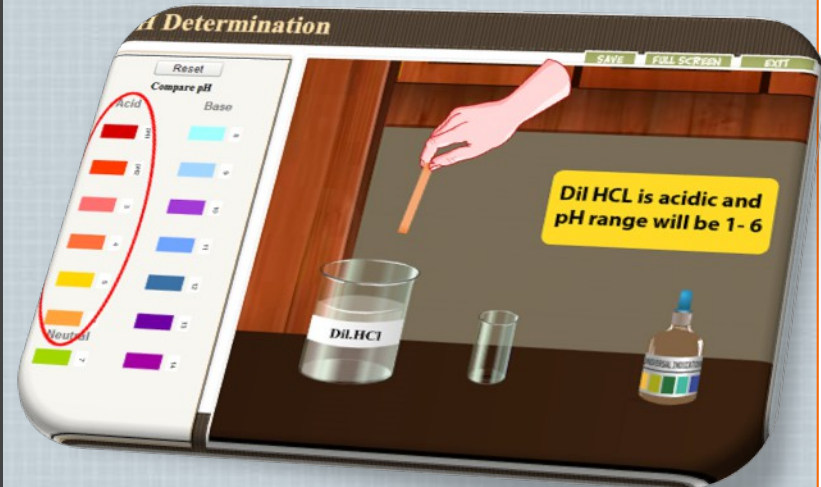
**Software Architect,
Engineers, Database**

Why O Labs?

- Science Labs are limited in today's schools by lack of equipment
- Students get insufficient time at labs
- Students are not able to explore
- Dangerous substances or breakable equipments
- Lack of good subject teachers
- Formative assessment of Lab skills is difficult

OLabs Objectives

- **Interactive Simulations** which model real life environment and behaviour
- Gives students flexibility to **Repeat, Explore, and Conduct** experiments at their own pace
- **Teacher Training** workshops and support for schools
- Experiments and evaluation component aligned to **NCERT Syllabus**
- Allows for both **Formative** and **Summative** assessment of practical skills
- Ease of access - **Cloud** based model and **CD** for offline access



Olabs – Phase 1

Subjects

Physics



Chemistry



Class

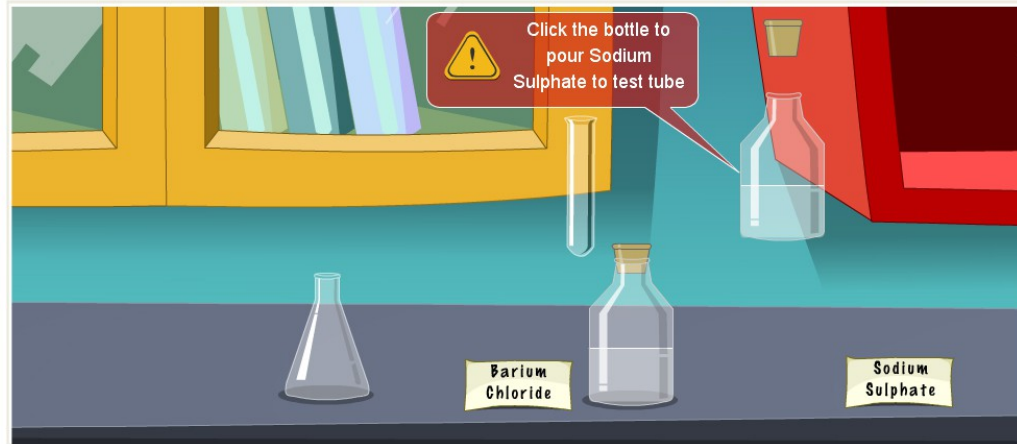
9-10

Experiments

30

Type of reaction-Sodium Sulphate and barium chloride

SAVE FULL SCREEN EXIT



Take Sodium Sulphate in the test tube.



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Olabs – Phase 2

Total Experiments

124

Subjects
Physics
Chemistry
Biology
Mathematics
English

Classes
9
10
11
12

Languages
Hindi
Marathi
Malayalam

www.olabs.co.in



ONLINE LABS

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

सी डैक
CDCC

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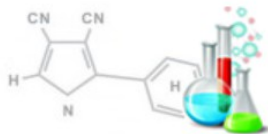
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BRINGING TO LIFE ABSTRACT
EXPERIMENTATION CONCEPTS...



PHYSICS



CHEMISTRY



BIOLOGY



MATHS

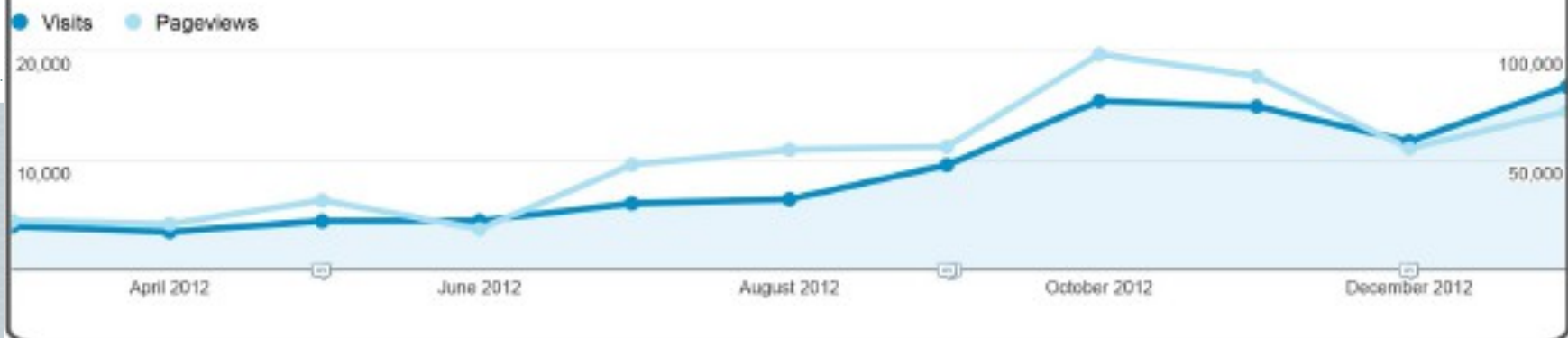


ENGLISH

AMRITA
VISHWA VIDYAPEETHAM
UNIVERSITY

Visitors Overview

Mar 1, 2012 - Jan 31, 2013



Total number of experiments

30

Total schools trained

112

Total students registered

56000+

Teachers trained

3359+

Workshops conducted

11

Visits to website per month

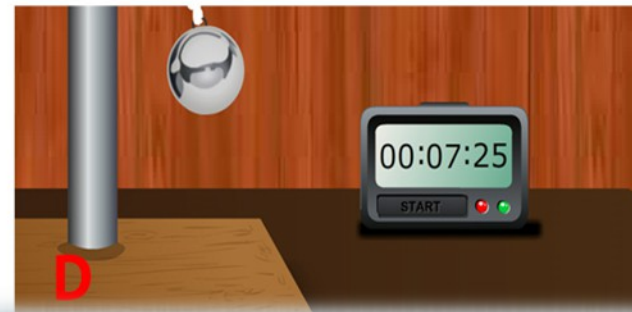
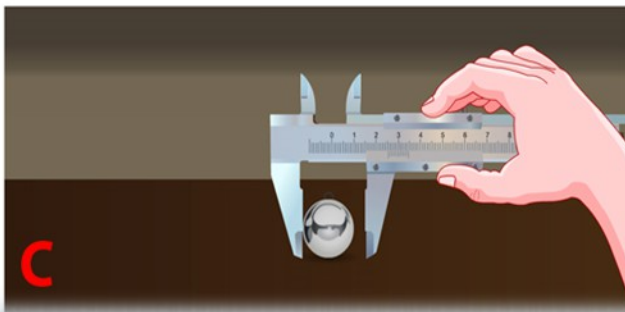
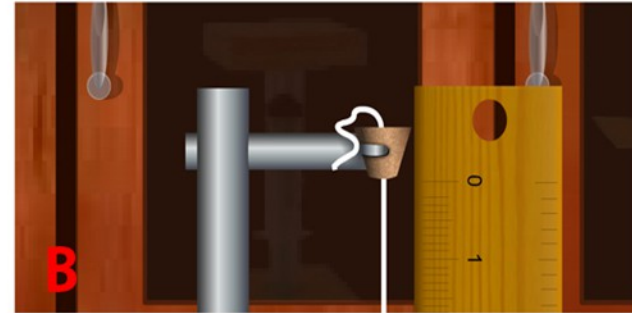
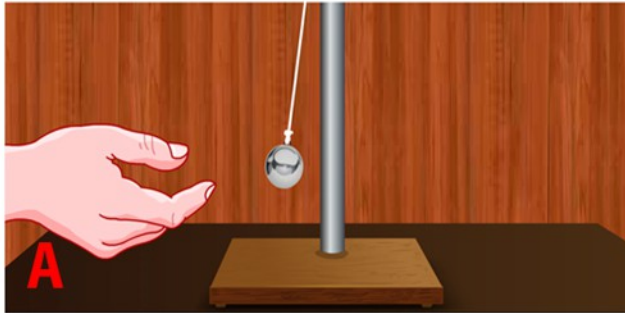
100,300+

Page views per month

50,800+

Assessment of Procedural and Manipulative Skills

Arrange the events in the correct order.



Assessment of Concepts & Understanding of the Experiments

Assessment of Reporting and Interpreting Skills



Olabs approach

- Teacher/SME's involvement at design stages
- Teachers piloting in their own classrooms
- Incorporating feedback
- Review by expert group of teachers at CBSE
- Training workshops for both teachers and students
- Online and Phone support

OLabs Framework - Salient Features

- Evaluation – auto evaluated multiple-choice questions & Viva-Voce questions that enable better performance in practical examination
- Provision of links to glossary at relevant places
- Intuitive Feedback & guidance throughout
- The entire Lab, including Animation & Simulation can be configured easily by a Teacher.
- Perform, record and learn experiments; anywhere, anytime.
- Can easily be extended to support Physics & Chemistry Labs of other classes.

Integrated experience

The screenshot shows the 'ONLINE LABS' interface for the experiment 'Laws of Reflection of Sound'. The page includes a navigation menu with 'About', 'News', 'Labs', 'Feedback', 'Contact us', and 'Login'. A breadcrumb trail indicates the user's location: 'you are here > home > physics > class 9 > laws of reflection of sound'. The main content area is titled 'Laws of Reflection of Sound' and features several interactive elements: 'Theory', 'Procedure', 'Animation', 'Video', 'Simulator', 'Viva Voce', and 'Resources'. Callouts point to these elements, describing them as: 'Name of the experiment' (pointing to the title), 'Aim, objective of the experiment' (pointing to the 'Theory' section), 'Animation of the experiment' (pointing to the 'Animation' icon), 'Interactive Simulation' (pointing to the 'Simulator' icon), 'Additional learning resources' (pointing to the 'Resources' icon), 'Detailed procedure to carry out the experiment' (pointing to the 'Procedure' icon), 'Real lab video of experiment' (pointing to the 'Video' icon), and 'Self evaluation & Viva voce questions' (pointing to the 'Viva Voce' icon). The 'Theory' section contains text: 'Our Objective: ... of reflection of sound.', 'What is reflection? Reflection is the ... interface between ... returns into the ... examples include ...', and 'Do you know how sound propagates? Sound propagates through air as a longitudinal wave. The speed of sound is determined by the properties of the air, and not by the frequency or amplitude of the sound. If a sound is not absorbed or transmitted when it strikes a surface, it is reflected. The law for reflection is the same as that of light, i.e., the angle ...'. A diagram at the bottom illustrates sound wave reflection at an interface, showing incident wavefronts, a normal line, and reflected wavefronts.

Teacher mode – “Reflection of Sound” Experiment

The screenshot displays a digital simulation interface for a physics experiment. At the top, there is a navigation bar with five tabs: 'Theory', 'Procedure', 'Animation', 'Simulator', and 'Viva'. The 'Simulation' tab is active, showing a central workspace titled 'Reflection of sound'. This workspace contains a protractor with two tubes positioned at a 40-degree angle. A blue alarm clock is placed below the tubes. A text box at the bottom of the workspace provides instructions: 'Move the lower end of Tube 1 at an angle of 40 degree on the protractor and position the timer at the mouth of Tube 1.' Navigation controls are located at the top right of the workspace, including 'HOME', 'FULL SCREEN', and 'SAVE' buttons. A speech bubble on the left points to the text box, and another on the right points to the simulation area. A third speech bubble at the bottom right points to the navigation controls. The interface also includes a search bar at the bottom left and a copyright notice at the bottom center.

Theoretical background: The experiment demonstrates the reflection of sound. A sound wave is emitted from the mouth of Tube 1, reflects off the surface of Tube 2, and is heard at the mouth of Tube 1. The angle of incidence is equal to the angle of reflection.

Procedure: 1. Set up the apparatus as shown in the simulation. 2. Move the lower end of Tube 1 at an angle of 40 degrees on the protractor. 3. Position the timer at the mouth of Tube 1. 4. Observe the reflection of sound.

Observations: The sound is heard at the mouth of Tube 1, indicating that it is reflected by Tube 2.

Conclusion: The angle of incidence is equal to the angle of reflection.

Student Mode- “Concave Mirror Experiment”

Simulation

Help

Instructions

To record Observations

Instruction navigation

Concave Mirror Experiment

Show Help
 Show Rays
 Show Labels

Aim : To study reflection in concave mirror and observe image formation in different positions of the object

Apparatus:
A concave Mirror
An object
A light source

Now click the next icon to go to next instruction

Back Next

Observation Table

S.NO.	Object Position	Image Position	Image Size	Nature of Image
1	Between Pole and Focus	Behind the Mirror	Enlarged	Virtual & Erect
2	At Focus	At Infinity	Highly Enlarged	Real & Inverted
3	Between F & C	Beyond C	Enlarged	Real and Inverted
4	At C	At C	Equal to Object	Real and Inverted

Self-Evaluation

you are here: Home > Physics > class 9 > verify laws of reflection of sound

Verify laws of reflection of sound

Theory Procedure Animation Simulator Viva Voce

✓ 1) Sound waves cannot propagate in

Air Water
 Vacuum Metals

✗ 2) In which medium would you be able to hear the sound in the experiment?

From the air
 From the metal tube
 From the wooden plank
 From the air and metal tube

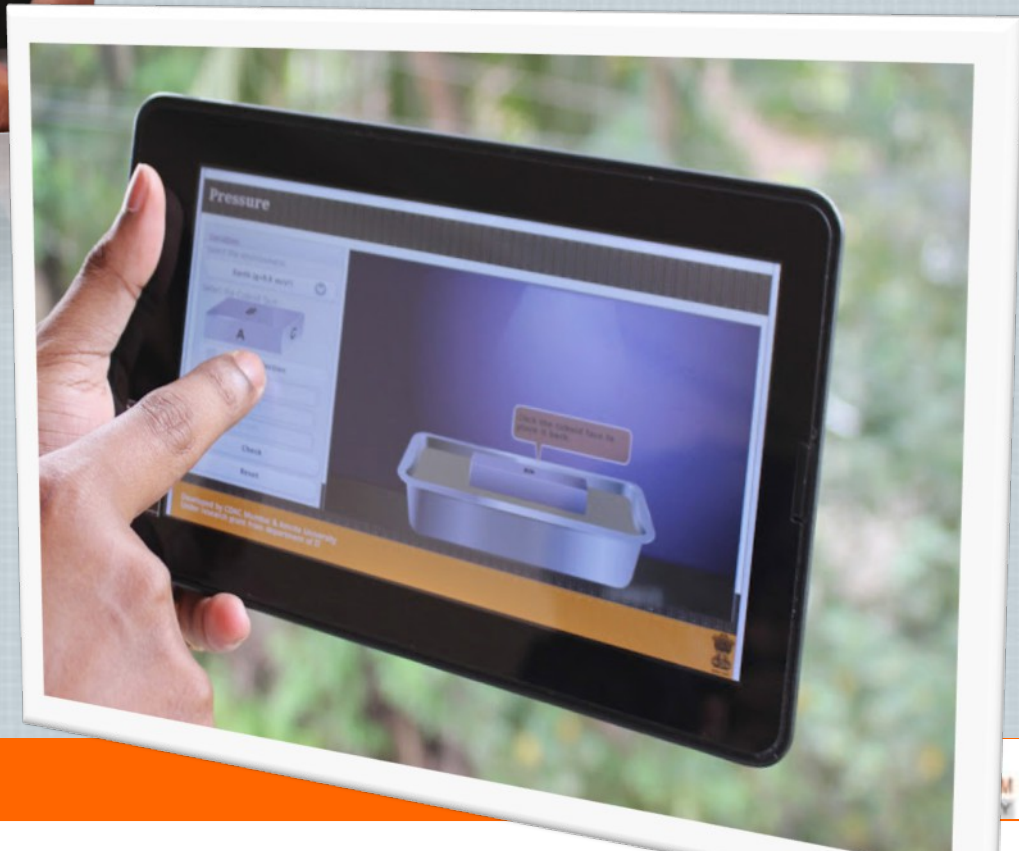
✗ 3) The sound should be directed towards

The table
 Along the axis of tube
 Above the tube
 Below the tube

✓ 4) If the air in experimental room warms up, the speed of sound in it

Increases
 Decreases
 Remains the same
 Can't be predicted

× Find: Next Previous Highlight all Match case



OLabs ecosystem



AMRITA
VISHWA VIDYAPEETHAM
UNIVERSITY



Deployment Partner



सत्यमेव जयते

DEPARTMENT OF INFORMATION TECHNOLOGY

Ministry of Communications & Information Technology, Government of India

Ski