PAC(16.38)

"TRANING PROGRAMME ON THE USE OF VIRTUAL LABORATORIES IN SCIENCE AT SECONDARY SCHOOL LEVEL FOR THE TEACHERS OF MINORITY/SC/ST CONCENTRATED AREAS"

CO-ORDINATOR
Dr. RASHMI SINGHAI

NCERT
REGIONAL INSTITUTE OF EDUCATION, BHOPAL

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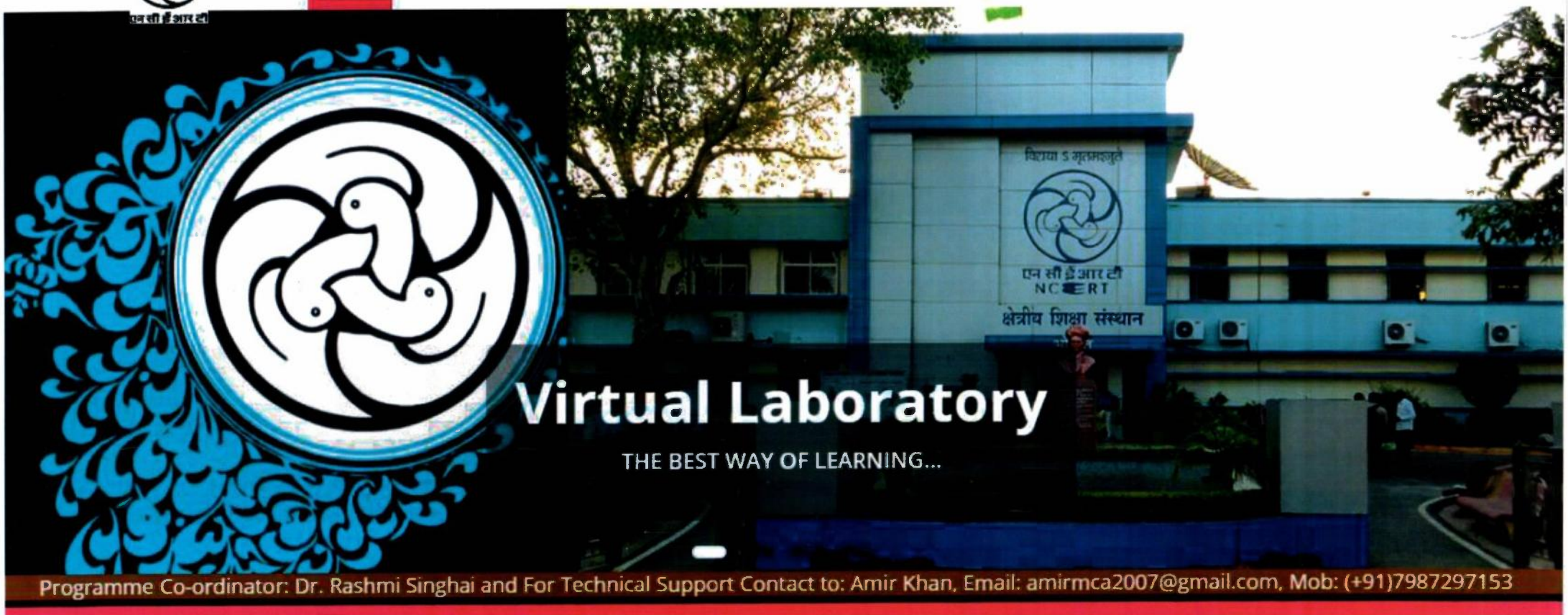

Virtual Laboratory

THE BEST WAY OF LEARNING...

Programme Co-ordinator: Dr. Rashmi Singhai and For Technical Support Contact to: Amir Khan, Email: amirmca2007@gmail.com, Mob: (+91)7987297153

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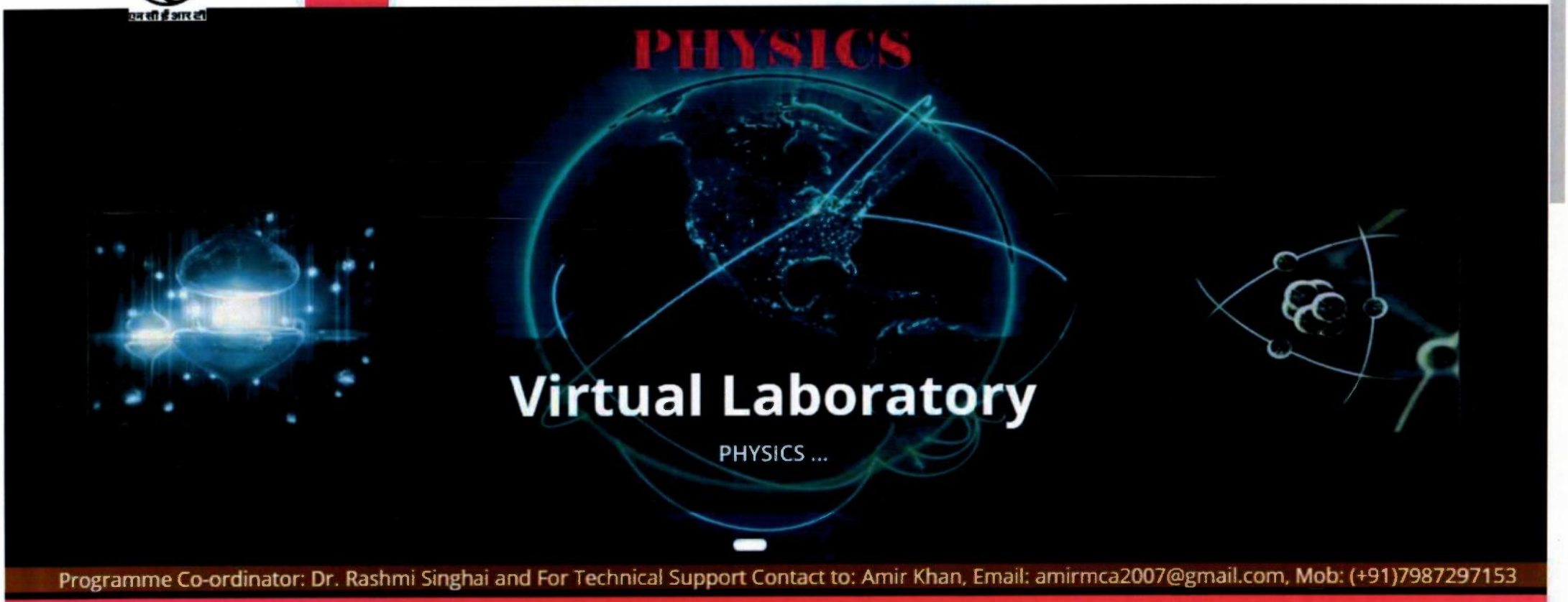

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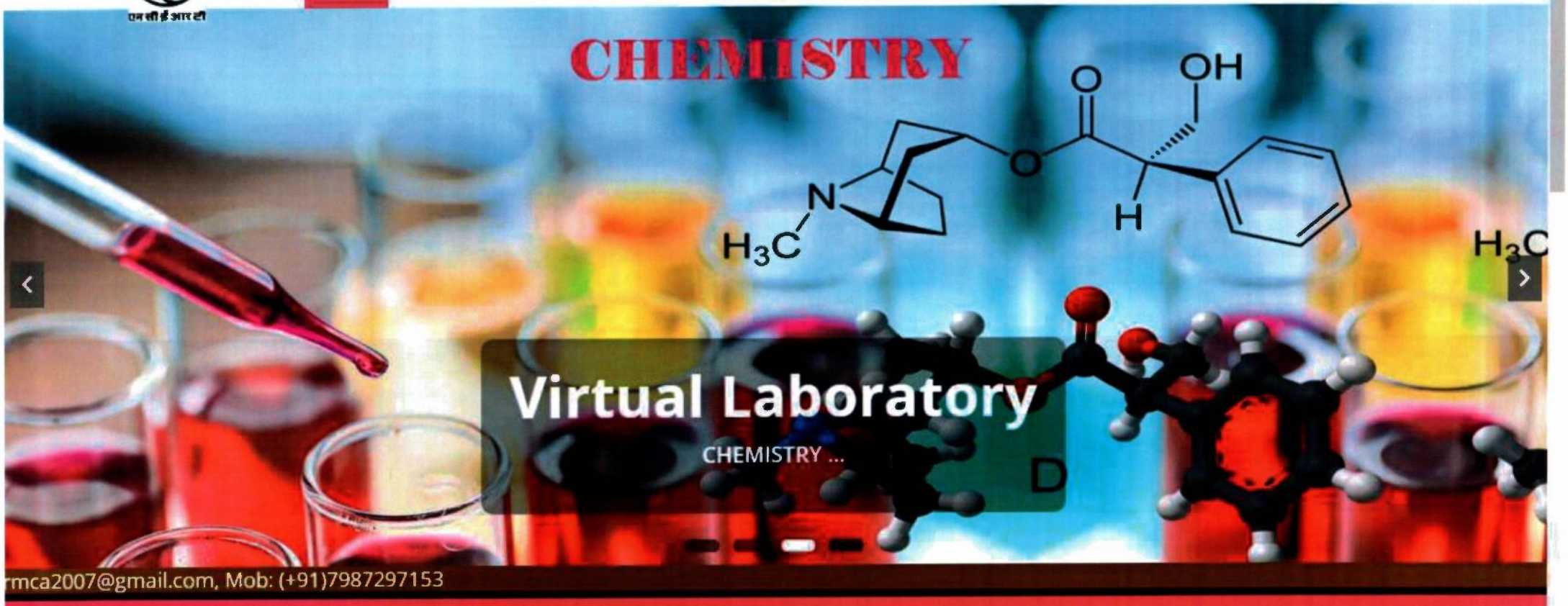

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Pre-Service And In Service Programmes

Regional Institute of Education, Bhopal is a constituent unit of National Counil of Educational Research and Training (NCERT), an autonomous body under the Ministry of Human Resource Development, Government of India. We are committed to delivering quality Teacher Education programmess both pre-service and in-service. Currently we offer One year M.Ed. . Two year B.Ed. program and four year integrated teacher preparation programmes of B.A.Ed and B.Sc.Ed. for preparing secondary school teachers in Science, Mathematics, English and Social Science. Our in-service programmes cater to the professional development needs of teachers, teacher educators and other school functionaries. In addition we also have one year programme on Diploma in Guidance and Counselling for preparing teacher counsellors. The Institute is affiliated to Barkatullah University, Bhopal for the award of degrees. The Diploma Course in Guidance and Counseling (DCGC) is awarded by NCERT.

We have a strong team of faculty members who have excellent records in teaching and research. We also work closely with the Ministry of Human Resource Development in implementing various Government of India initiatives in school education. We have a good track record of campus placement for our students and in the recent years almost 100% of them get the placements through the campus recruitment.

All students belonging to the Scheculed Castes/Tribes admitted to the Institute shall be awarded scholarship, provided they are not getting any financial assistance from any other source. Upto 50% of the remaining students will be awarded the merit-cum-means scholarship as per rules.

PHYSICS VIRTUAL LAB

Physics Virtual Lab: Modern physics refers to the post-Newtonian conception of physics developed in the first half of the 1900's. These concepts embody the study of tiny (subatomic) particles or lightening fast speeds. They find applications in technologies such as atomic energy or semiconductors.

CHEMISTRY VIRTUAL LAB

Chemistry Virtual Lab: It is designed to help students link chemical computations with authentic laboratory chemistry. The lab allows students to select from hundreds of standard reagents (aqueous) and manipulate them in a manner resembling a real lab. They find applications in technologies such as more practicals to the students...

BIOLOGY VIRTUAL LAB

Biology Virtual Lab: Below is a list of freely available online biology lab resources, including microscopy, genetics and life science. General biology and virtual labs. The Interactive Library – This EdInformatics.com site is a list of links to interactive biology sites. Some Java applets are standalone and some come with lesson plans and notes ...

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Books available

CLASS-X (Section-A)
(Virtual Laboratory)

LIVE

PHYSICS

1. Focal Length Concavemirror
2. OHMS Law
3. Refraction of Light using Glass Slab

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LIVE

CHEMISTRY

1. Find PH Value
2. To Study Physical and Chemical
3. Metal Disp. Reactivity Series.

Get Video

LIVE

BIOLOGY

1. Photo Synthesis
2. Respiration
3. Stomata Slide Preparation

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PPT

e-Content

DEVELOPMENT OF E-CONTENT

ICTFORUM T PACK Mabdous

Information School Education

TPACK

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CLASS-IX (Section-B)
(Virtual Laboratory)

LIVE

PHYSICS

1. Archimedes Principle
2. Density
3. Verification_of_third_law_of_motion
4. Coming Soon...
5. Coming Soon...
6. Coming Soon...

Get Video

LIVE

CHEMISTRY

1. Chemical Reactions
2. Law of Conservation of Mass
3. Mixand2
4. Preparation of True solution
5. Separation of Substances
6. Change of State

Get Video

LIVE

BIOLOGY

1.Plant Tissue
2. Imbibition in Raisins
3. BioT S Dicot
4. Coming Soon...
5. Coming Soon...
6. Coming Soon...

Get Video

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e-Content

DEVELOPMENT OF E-CONTENT

ICTFORUM T PACK Mabdous

Information School Education

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REFERENCES

ACKNOWLEDGEMENT

We are grateful to Amrite labs, PhET Interactive Simulations and Youtube for Videos/Simulations used to develop the teaching learning material to meet the educational goal.

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ABC

Heading Course

ABC

Heading Course

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AMRITA LABS

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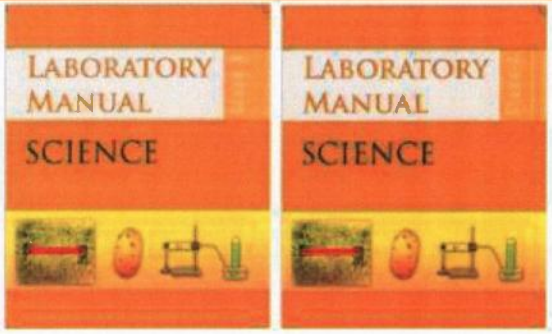
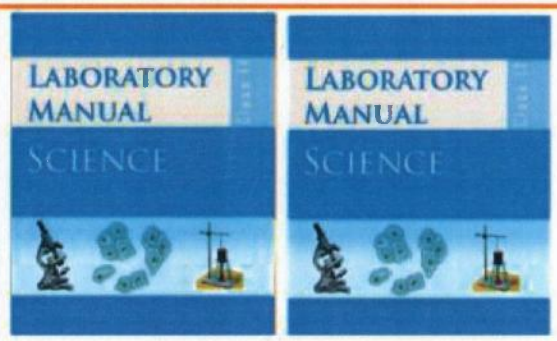


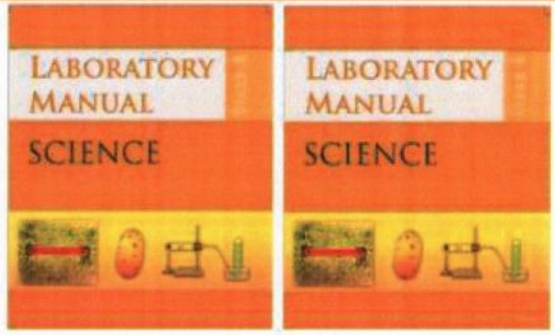
NCERT LAB MANUAL CLASS X

About



NCERT LAB MANUAL CLASS IX

About AMRITA LABS



AMRITA LABS

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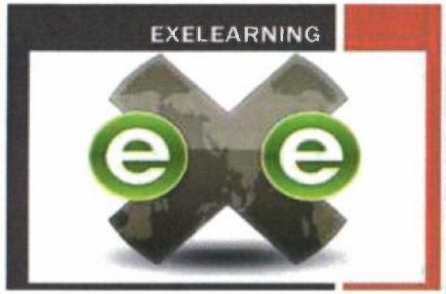
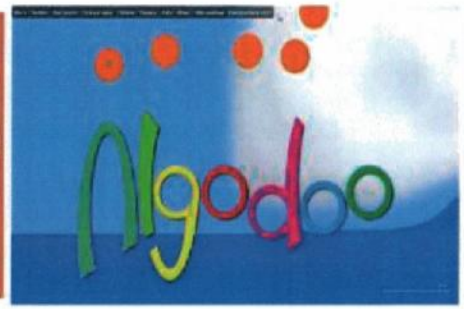
SOFTWARES

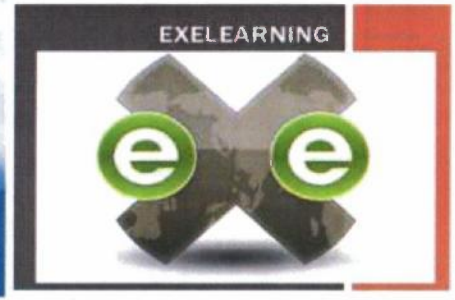
SOFTWARES:

SOFTWARE: Systems software includes the operating system and all the utilities that enable the computer to function. Applications software includes programs that do real work for users. For example, word processors, spreadsheets, and database management systems fall under the category of applications software.

- EXE Learning Tool.
- PHET.
- Algodoo.
- ""





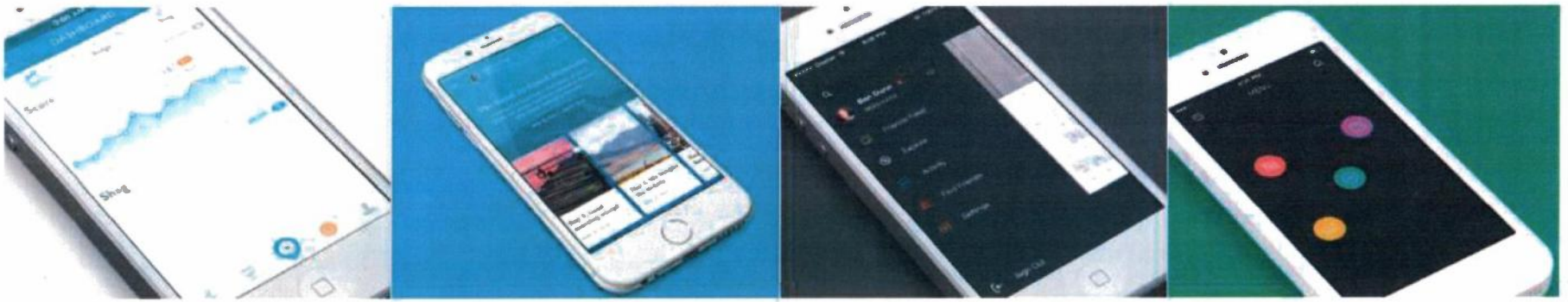


The eLearning HTML5 & XHTML editor (eXeLearning) is a web-based authoring environment designed to assist teachers and academics in the design, development and publishing of web-based learning and teaching materials without the need to become proficient in HTML, XML or complicated web-publishing applications.

With eXeLearning, users can develop a learning structure that suits their content delivery needs and build a resource that is flexible and easily updated. —The Outline pane of eXe's graphical user interface enables users to design an outline that reflects their own preferred hierarchical structure and taxonomy, i.e. topics-sections-units, or books-chapters-verses, etc. This can be established at the outset or can develop as the resource is built.

Mobile Apps

SMART LEARNING...BY SMART PHONES



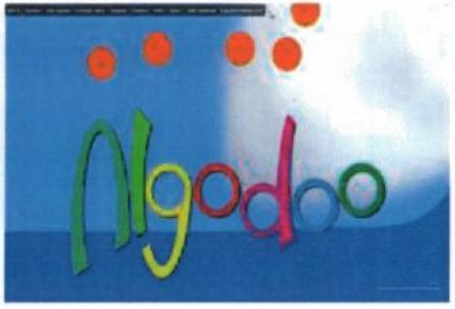
INTRODUCTION:

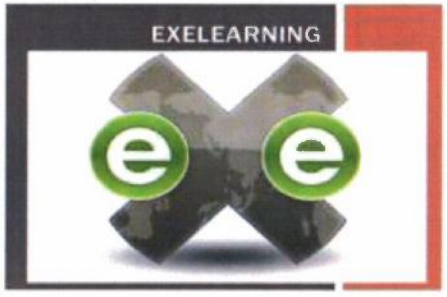
A smart phone is not smart, only a smart user and app makes it smart . The processor of present phones is much better than that of first manned mission to moon. High memory storage, strong processor, bigger screen, brilliant colour display, large mega pixel camera , blue tooth connectivity , internet , and large number of mobile Apps contributed from all over the world make it a power full teaching learning tool . The idea itself surprises that how a mobile can be used as a learning aid. Whereas on the other hand students are forced to keep aloof themselves from the mobile. People consider it as a menace. But every coin has two sides. I am presenting few applications of smart phone in teaching learning. My focus is more on use of it as a versatile all in one instrument. Users are left to themselves to explore further uses of smart phone.

ROLE OF SMART PHONE AS A LABORATORY TOOLS:

A smart phone is not smart, only a smart user and app makes it smart . The processor of present phones is much better than that of first manned mission to moon. High memory storage, strong processor, bigger screen, brilliant colour display, large mega pixel camera , blue tooth connectivity , internet , and large number of mobile Apps contributed from all over the world make it a power full teaching learning tool . The idea itself surprises that how a mobile can be used as a learning aid. Whereas on the

Gallery





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About Us

About US

Welcome to "VIRTUAL SCIENCE LABORETORY" A inititative of Regional Institution of Education, Bhopal. M.P. (India),(A constituent Unit of NCERT). This package is specially developed for the students of classes IX & X to provide them access to laboratories through virtual labs. The main objective is to provide access even offline to facilitate the availablity for urban and rural area students, where there is no access to physical labs/equipments are not available owing to being scarce or costly and the lack of internet connectivity. The experiments can be accessed anytime anywhere. Exercises are provided at the end of each experiment for self evalution. This attempt also fulfills the objective of inclusive education where each child can access it as per their need and thus everyone's learning can be enriched.

" PAC (16.38) "

" Virtual Laboratory: Programme is Runing from 23/03/18 to 27/03/2018 - Programme Photos."

APPROACH PAPER

Scientific understanding attitude are enhanced by relating theory to practical aspects. These enhances development of concepts and building of scientific temper. Schools of rural and tribal belts lack laboratory and instrumentation facilities which prove to be a hindrance in teaching-learning process. Science education at elementary level does not include practical aspects in curriculum due to which students do not develop a scientific vision. Henceforth, development of practical approach towards understanding and concept building in science has become a burning issue for discussion among academicians and researchers. ICT, the most valuable tool of present day education system can be utilized to its fullest in filling up of this gap. Through ICT, virtual or real experiments can be demonstrated to students which would impart a great enhancement of their understanding and also would facilitate their learning. ICT techniques provide audio-visual cues that help in memorizing the key concepts at ease and furnishes a better ability to understand and relate to theoretical aspects of science. Students are thus free to share scientific ideas and observations among themselves which will help them to improve their academic performance. ICT based virtual lab modules aims to be used to develop quality of science education and enhance teaching-learning process. It will also enhance the quality of lecture delivery in classroom and make learning effective, interactive and enjoyable.

In-service training programs are an integral component of the academic activities of Regional Institute of Education, Bhopal. It is our abiding duty to serve the needs of state under our jurisdiction with the fruits of our experimentations in educational innovations and best practices.

E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational

organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centres. It has a significant implications for open and distance learning institutions.

The purpose of e-content development is to create an information rich society. Every one in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated e-content will provide access to high quality meaningful digital content and serve as an effective virtual teacher.

Using the art of technology in the studio functional at Regional Institute of Education Bhopal, participants will be trained in the developing of e- content
ICT integration of the content with the help of various Free and Open Source Software will also be dealt with.

Ojectives:

(1) To formulate strategies to make teachers aware to integrate the use of the virtual laboratory in the class room teaching learning so that the student can understand the concept easily

(2) To facilitate neat, easy, harmless and efficient ways of learning techniques to use ICT enabled virtual laboratories.

(3) To enable wider range of experiments so that students can relate science to the real life experiences.

(4) To integrate the use of mobile technology in the classroom teaching-learning.

Methodology:

(1) Three days workshop for modification of the developed material

(2) Five days training programme on the developed material for secondary school teachers of minority/SC/ST dominated areas".

दैनिक प्रतिवेदन– 24.03.2018

श्यामला हिल्स की हसीन वादियों में प्रातः कालीन सैर का आनंद लेते हुए द्वितीय दिवस का आरंभ हुआ और फिर प्रथम दिवस के विशयांशों पर सामूहिक चर्चा होती रही।द्वितीय दिवस के आरंभ में प्रातः 9:30 पर सभी आई.सी.टी. प्रयोगशाला क्रं. 1 में उपस्थित हुए ।

1. डॉ रश्मि सिंघई कार्यक्रम समन्वयक के सानिध्य में द्वितीय दिवस का आरंभ हुआ तथा श्रीमती रागिनी भट्ट स्त्रोत विशेषज्ञ द्वारा बडी सरलता से वर्चुअल प्रयोगशाला के संबंध में निर्देश दिए गए।

2. चाय के अंतराल उपरांत श्री आमिर खान स्त्रोत विशेषज्ञ द्वारा कम्प्यूटर आधारित कक्षा शिक्षण एवं प्रयोगशाला के वर्चुअल प्रयोग के लिए स्वयं द्वारा अभ्यास (लर्निंग बाई डूइंग)पर चर्चा की गई।

3. भोजन अवकाश के पश्चात श्रीमती जागृति शर्मा स्त्रोत विशेषज्ञ द्वारा कक्षा में रसायन विज्ञान की प्रायोगिक अवधारणा पर सामूहिक विचार विमर्श किया गया एवं सहभागियों की सकारात्मक भूमिका रही।

4. डॉ. रश्मि सिंघई स्त्रोत विशेषज्ञ द्वारा प्रशिक्षण की आवश्यकता एवं उपयोगिता पर विस्तार से प्रकाश डाला गया।

सभी प्रतिभागियों ने प्रशिक्षण में सकारात्मकता दर्शाते हुए उत्कृष्ट कार्य के लिए आशवासन दिया।

दैनिक प्रतिवेदन– 23.03.2018

अपर परियोजना संचालक राष्ट्रीय माध्यमिक शिक्षा अभियान, म.प्र. भोपाल, की पहल पर हाईस्कूल स्तर परविज्ञान के वर्चुअल प्रयोगशाला हेतु प्रशिक्षण की कार्यशाला क्षेत्रीय शिक्षा संस्थान, भोपाल में दिनांक 23/03/2018 को प्रारंभ हुई। इस कार्यशाला में प्रथम दिवस 9:30 से रजिस्ट्रेशन एवं 10 बजे उद्घाटन कार्यक्रम प्रारंभ हुआ।संस्थान के प्राचार्य डॉ. काकड़िया जी ने कार्यशाला का उद्घाटन किया इस कार्यक्रम में डॉ. आई.बी. चुगतई, डॉ. तिवारी एवं अन्य प्रोफेसर तथा रिसोर्स पर्सन उपस्थित रहे। कार्यक्रम का कुशल संयोजन एवं संचालन कार्यक्रम समन्वयक डॉ. रश्मि सिंघई ने किया। कार्यशाला के प्रथम सत्र मेंडॉ. रागिनी भट्ट ने e-content तैयार करने की सरलतम विधियाँ बतायीं इस पश्चात् डॉ. एल.एस. चौहान ने बहुत बेहतरीन सूक्ष्म जानकारियाँ, विभिन्न Appsएवं उनका उपयोग, उपयोग की विधियाँ एवं प्रेजेण्टेशन प्रस्तुत किया, लंच के उपरांत डॉ. ओझा ने e-contentतैयार करने की विधियां विस्तार से बतायीं एवं सभी से एक–एक e-contentतैयार करने हेतु प्रेरित किया। ICT-Labएवं स्टूडियो का भ्रमण कराया एवं उससे अवगत कराया

इस कार्यशाला में म.प्र. के 24 शिक्षक एवं महाराष्ट्र के विभिन्न जिलों के19 शिक्षक भाग ले रहें हैं।

प्रशिक्षण में आवास एवं भोजन व्यवस्था उत्तम है। प्रशिक्षण में पेयजल एवं चाय की व्यवस्था अच्छी हैं परन्तु इसमें डिस्पोजेबल ग्लास एवं कप का उपयोग न हो तो प्रशिक्षण Ecofriendlyएवं स्वच्छ भारत अभियान के अनुरूप हो सकेगा।

साभार।

दैनिक प्रतिवेदन– 25.03.2018

हाई स्कूल स्तर विषय पर विज्ञान के वर्चुअल प्रयोगशाला हेतु आयोजित प्रशिक्षण कार्यक्रम के तीसरे दिवस का प्रारंभ पूर्व निर्धारित समय पर स्रोत विशेषज्ञ डॉ. रागिनी भट्ट के 'पावर पाइण्ट प्रस्तुतीकरण' को सरलतम् तरीके से कम समय में कैसे बनाये, विषय पर व्याख्यान, प्रदर्शन के साथ प्रारंभ हुआ। डॉ. रागिनी द्वारा इस विषय पर बेहर सरलतम् तरीके से प्रोजेक्टर के माध्यम से प्रस्तुतीकरण द्वारा न केवल प्रशिक्षणार्थीयों को पावरपाइंट की बारीकियों से अवगत कराया गया वरन् सभी को स्वंय करके एक–एक प्रस्तुतीकरण भी तैयार कराया गया।

लंच के पूर्व के सत्र का आगाज़ केन्द्रीय विद्यालय, भोपाल से स्रोत विशेषज्ञ के रूप में आई श्रीमती जागृति शर्मा द्वारा खेल–खेल में सीखें पर आधारित चेम्बोला द्वारा हुआ। जिसमें सभी प्रतिभगियों को चेम्बोला पर आधारित विज्ञान प्रश्नोत्तरी को वितरित कर प्रश्नों को हल कराया गया एवं शीघ्र व सभी उत्तर देने वाले प्रतिभागियों को प्रोत्साहित किया गया।

दोपहर लंच के पश्चात् द्वितीय सत्र का प्रारंभ एक बार पुनः डॉ. रागिनी भट्ट स्रोत विशेषज्ञ द्वारा पावर पाइंट प्रस्तुतीकरण द्वारा विविध बिन्दुओं को स्वंय कराकर स्पष्ट किया गया।

तृतीय दिवस के अंतिम सत्र में स्रोत विशेषज्ञ के रूप में शासकीय उत्कृष्ट उ.मा. विद्यालय, रतलाम से उपस्थित हुए श्री ललित मेहता जी द्वारा पावर पाइंट तकनीकी के उन्नत प्रयोग–प्रदर्शन से प्रतिभागियों को अवगत कराया साथ ही उनकी जिज्ञासाओं का तत्काल समाधान प्रस्तुत किया गया।

गौरतलब है महाराष्ट्र व मध्य प्रदेश के चयनित शिक्षकों हेतु वर्चुअल प्रयोग हेतु आयोजित प्रशिक्षण क्षेत्रीय शिक्षा संस्थान, भोपाल की पाठ्यक्रम निर्देशिका डॉ. रश्मि सिंघई के निर्देशन में कुशल विशेषज्ञों द्वारा संचालित किया जा रहा है।

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हम शिक्षक है, अपनी संस्कृति भलीभांति निर्वहन करते है। इसलिये हर कार्य के पहले प्रभु का बंडन करते है।

विज्ञान वर्चुअल कार्यशाला का चतुर्थ दिवस प्रातः 9:30 से आरंभ हुआ। सबसे पहले पहले पीरियड में बहुमुखी प्रतिभा की धनी श्रीमती रागिनी भट्ट मैडम आयीं और उन्होंने बड़ी ही सहजता व Simple systematic method से पावरपाइंट बनाना सिखाया और खेल–खेल में चांद, तारे दिखलाकर एनीमेशन भी बतलाया।

इसके बाद आमिर सर और के.डी. शर्मा जय और वीरू की जोड़ी की तरह आये और D.V.D. खोलने के सारे गुण सिखलायें। अंत में जादू भी दिखलायें, पहलेबाहरस को बुलायें फिर दूर भगायें।लेकिन चौरसिया जी घबराए और मन ही मन बुदबुदाये कि कही Pen drive से सारा डाटा डिलीट न हो जाए।

"Lunch के बाद का Period आलस के कारण थोड़ा कष्टप्रद होता है तो मुझे खाने के बाद का पीरियड थोड़ा अखर रहा था, क्योंकि भरा हुआ पेट आराम की मांग कर रहा था''

फिर भी सीखने की ललक को हमनें अपने अंदर संजोए रखा। धैर्य के मज़बूत धागे ने भावनाओं को पिरोए रखा।'' इसके बाद शांत, गंभीर श्री ललित मेहता जी की बारी आयी। मेहता जी ने Exe में Presentation सिखलायी।

बीच–बीच में हम सबके चहेते शैलेन्द्र जैन ने भी अपनी सहभगिता दिखलायी लेकिन हमको टाइपिंग तो भी न आयी। हमारा दिमाग तो तब चकराया। जब मेहता जी ने Presentation बनाने का बतलाया। तभी आमिर सर संकट मोचन हनुमान बनकर आये और ई–मेल ड्राइव के ज़रिये Script बोल कर लिखना सिखलाये।हम मन ही मन घबराएऔर दिल से निकली दुआएं।

और अंत में हम विज्ञान वर्चुअल कार्यशाला की Co-ordinatorश्रीमती रश्मि सिंघई मैडम (जो कि विदुषी होने के साथ–साथ बहुत ही मिलनसार व मृदुभाषी महिला हैं) उनके मित्रवत व्यवहार व सहयोत्मक रवैये से हम लोगो को पता ही नही चला कि चार दिन कैसे निकल गये लगा जैसे कल ही की तो बात है और अब जाने की बेला भी आ गयी।

इस ट्रेनिंग प्रोग्राम के सभी ट्रेनीज़ को बहुत लाभ हुआ होगा और इस ज्ञान का प्रयोग अपनी–अपनी शालाओं में करेंगे तो सभी के उत्साह वर्धन हेतु कुछ पंक्तियां

ICT ज्ञान के पावन पुंज से ज्योति नई जलाना आगे कदम बढ़ाना प्रतिपल आगे कदम बढ़ाना। आसमान को दे चुनौती, मंज़िल को पास बुलाना। ब्रम्हा का तुम लेख मिटा दो, भाग्य स्वंय बनाना। जिसके धागे राह नहीं हो। उस मंज़िल तक जाना आगे कदम बढ़ाना, प्रतिपल कदम बढ़ाना।

इन चार लाइनों के साथ में अपनी वाणी को विराम देती हूँ।

लेकर क्षमा सिंधु का पानी कीर हृदय की खोले।।

यदि हो गया अपराध मुझसे ज्ञात व अज्ञात में।

अथवा प्रमाण वश बोलती हूँ कोई बात में।।

खेद पहुंचा हों अगर मेरे वचन व्यवहार में।

तो क्षमा करना मुझे, क्षमा चाहूं प्यार से।।

दैनिक प्रतिवेदन– 27.03.2018

भारत की विशालता के दो भाग महाराष्ट्र और मध्यप्रदेश का संगत क्षेत्रीय शिक्षा संस्थान, भोपाल में देखने को मिला।

प्रातः दक्षिण भारतीय व्यंजन का आनन्द लेन के पश्चात् समस्त प्रतिभागी प्रातः 09:30 बजे अपनी निर्धारित समय पर आई.सी.टी. प्रयोगशाला में उपस्थित हुए।

सर्वप्रथम मध्यप्रदेश लोक शिक्षण संचालनालय में कक्षा 9वीं एवं 11वीं के परिणाम को विकसित करने वाले नवाचारी शिक्षक श्री घनश्याममहतकर बैतूल ने परीक्षा परिणाम की पूरी प्रक्रिया को विस्तार से समझाया। पश्चात् स्त्रोत विशेषज्ञ श्री शैलेन्द्र जैन सर एवं श्री ललित मेहता जी ने सभी प्रतिभागियों को अपने–अपने प्रस्तुतीकरण के लिए प्रोत्साहित किया और श्री आमिर खॉन ने सभी के प्रस्तुतिकरण को एकत्रित कर संशोधन किये तथा तर्नुरूप निर्देश दिये।

चाय पकोड़ा के पश्चात् सभी प्रतिभागियों ने अपने प्रस्तुतिकरण कमबद्ध तरीके से बड़े ही रूचिकर एवं प्रभावी रूप से प्रस्तुत किये।

प्रस्तुतीकरण में सभी स्त्रोत विशेषज्ञों की योग्यता, प्रभावशीलता स्पष्ट रूप से परिलक्षित हो रही थी। जिस कारण विगत चार दिवस के प्रयासों की सफलता दिखाई दे रही थी।

प्रस्तुतिकरण बहुत ही प्रभावशाली रहा।

भोजन अवकाश उपरांत श्री आमिर खॉन विशेषज्ञ ने पावर पॉईट प्रेज़ेन्टेशन के लिए वीडियो एडिटर के लिये फिल्मोरा सॉफ्टवेयर के माध्यम से साउंड एडिटिंग के बारे में सिखाया।

तत्पश्चात् सभाकक्ष में प्रोफेसर एवं प्राचार्य श्री प्रधान सर, श्री एल.के. तिवारी एवं श्री प्रजापति की उपस्थिति में समापन समारोह सम्पन्न हुआ। जिसमें प्रतिभागियों श्री पंकज सिंह परिहार, श्री भारत गारघाटे, श्रीमती सुशीला पाण्डेय ने अनेक अनुभव बांटे।

श्री नरपतलाल खींची ने प्रशिक्षण के अपने अनुभव सभी के सामने प्रस्तुत किये।

अन्त में श्री नित्यानंद प्रधान सर, प्राचार्य, क्षेत्रीय शिक्षा संस्थान, भोपालने सभी प्रतिभागियों को सम्बोधित किया और उन्होंने प्रशिक्षण की अवधिके सम्बन्ध में 'Split Mode'के महत्व को बताया और प्रशिक्षणार्थियों को 21st Century Skills for Teachers & Students के लिए इन्टरनेट एवं कम्प्यूटर के महत्व पर गहरा प्रकाश डाला।

कार्यक्रम के अन्त सभी प्रतिभागियों को प्रमाण–पत्र कायक्रम डी.वी.डी. के वितरण के साथ कार्यक्रम का समापन हुआ।

and this is the beginning.....

miles to go.....

Apparatus required

To determine the density of a solid (which is denser than water) by using a spring balance and a measuring cylinder.

- Iron stand
- Measuring cylinder
- Spring balance
- Any solid body

Theory

To determine the density of a solid (which is denser than water) by using a spring balance and a measuring cylinder.

All matter has mass and volume. Mass and volume are the physical properties of matter and may vary with different objects The amount of matter contained in an object is called mass. Its measure is usually given in grams (g) or kilograms (kg). Volume is the amount of space occupied by an object. The units for volume including liters (l), meters cubed (m^3), and gallons (gal).

Consider two different substances such as iron and cotton of same mass. It is observed that Iron will occupy less volume as compared to cotton. This is due to their differences in density. Density of Iron is more than that of cotton.

The mass of a unit volume of a substance is called its density.

Density = Mass of the Substance / volume of the Substance

If D is the density of a body of mass M and volume V, then

$D = M / V$

In S.I units density is expressed in kg m^{-3}.

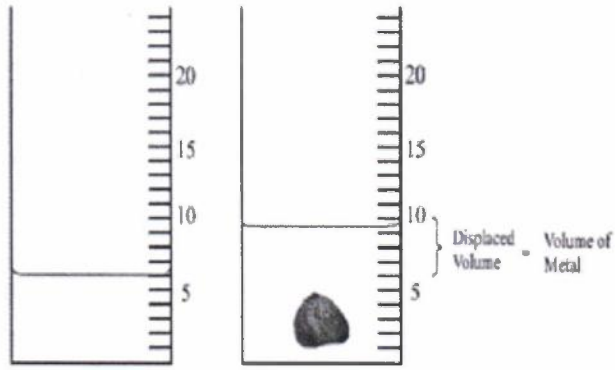
Most of the substances expand on heating and contract on cooling, but the mass remaining constant for all cases. The density of most of the substances decreases with the increase in temperature and increases with decrease in temperature. But water contracts when cooled up to 4^0C but expands when cooled further below 4^0C . Thus the density of water is maximum at 4^0C.

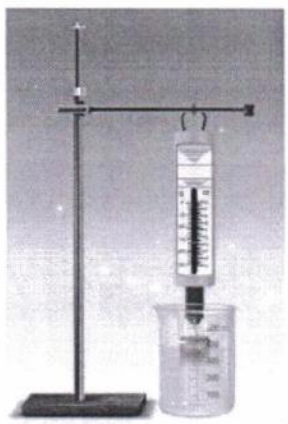
Relative density of a substance is defined as the ratio between the density of the substance to the density of water at 4^0C. Relative density is also known as **specific gravity**. The relative density of a substance is a pure number without any unit. It tells how many times a substance is heavier than water.

Relative density (R.D) of a substance can be calculated by dividing density of a substance with the density of water.

Procedure

TO DETERMINE THE DENSITY OF A SOLID (WHICH IS DENSER THAN WATER) BY USING A SPRING BALANCE AND A MEASURING CYLINDER.





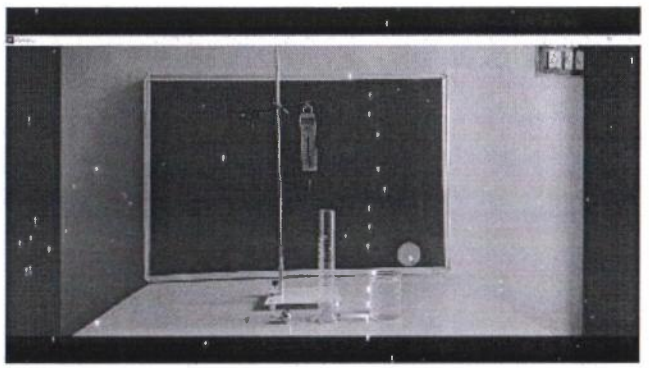
Take a metallic solid block.

- Tie it with a thin strong thread to hang it on the hook of the spring balance.
- Note the least count of the spring balance.
- Hang the block on the hook of spring balance. It is better to hang the spring balance with the help of an iron stand or clamp stand so that it remains static while noting the mass of the block.
- Carefully observe the gravitational mass of the solid block and note it down. Repeat it thrice and calculate mean of the three readings taken.
- Take a graduated glass cylinder of proper size and capacity. Fill it with water up to a known volume level mark.
- Tie the rectangular metallic block by a thin strong thread and immerse it fully in water taken in the graduated cylinder. The block displaces water and the water level rises. Note the position of water level (meniscus) keeping the eye in horizontal position with the level (to avoid error due to parallax).
- Find the difference of two positions of the water level to find volume of metallic block immersed.
- Repeat it thrice and calculate the mean of three observations taken.

- Take a graduated glass cylinder of proper size and capacity. Fill it with water up to a known volume level mark.
- Tie the rectangular metallic block by a thin strong thread and immerse it fully in water taken in the graduated cylinder. The block displaces water and the water level rises. Note the position of water level (meniscus) keeping the eye in horizontal position with the level (to avoid error due to parallax).
- Find the difference of two positions of the water level to find volume of metallic block immersed.
- Repeat it thrice and calculate the mean of three observations taken.

Simulator

TO DETERMINE THE DENSITY OF A SOLID (WHICH IS DENSER THAN WATER) BY USING A SPRING BALANCE AND A MEASURING CYLINDER.



Observations

Record your observation of measurement of mass and volume in the below tables as shown

1. Table: For gravitational Mass of the Solid (M) Block

Sl.No	Initial reading (without block) M_1	Final reading(with solid block) M_F	Mass of the solid M_F-M_1
1			M_1=.....g
2			M_2=.....g
3			M_3 =.....g

Mean gravitational mass of the solid block. =.....g.wt (by spring balance)

2. Table: For Volume of the Solid Block (V)

Sl.No.	Initial reading (without block immersed)V_1(ml)	Final reading (with block immersed)V_F(ml)	Volume of the block $V=V_1-V_F$(ml)
1			V_1=.....ml
2			V_2=.....ml
3			V_3=..... ml

Mean volume of the solid block by graduated cylinder = ...ml(cm^3).

(i) Mass of the solid (m) = ... g

(ii) Mean volume of the solid block (V) =.....cm^3

(iii) Density (D) of the solid block = Mass / Volume

=..... g/cm^3

Least count of the spring balance: .....

Least count of the measuring cylinder: .....

Precautions

To determine the density of a solid (which is denser than water) by using a spring balance and a measuring cylinder.

1. Always used a thread of least weight and volume to tie the solid block.
2. The solid block should be dried before measuring mass and volume.
3. The indicator of the spring balance should be at zero before measuring the mass of the solid.
4. The solid block should be completely immersed in water of the measuring cylinder before observing its volume.
5. While immersing the solid block, the water of the measuring cylinder should not spill.
6. The solid block should not touch the brim and sides of the beaker.
7. Always note reading of lower meniscus of water level.

HOME

Preparation of True solution, Colloidal solution and Suspension

OBJECTIVES:

1.To prepare solution of various substances and identify them as True solution , colloidal solution and suspension.

2. To understand the properties of true solution, colloidal solution and suspension.

3. To be able to differentiate properties of true solution, colloidal solution and suspension.

THEORY:

True Solution is a homogeneous mixture of two or more substances in which substance dissolved (solute) in solvent has the particle size of less than 1 nm. Simple solution of sugar in water is an example of true solution. Particles of true solution cannot be filtered through filter paper and are not visible to naked eye.

Colloidal Solution is a heterogeneous mixture in which particle size of substance is intermediate of true solution and suspension i.e. between 1-1000 nm. Smoke from a fire is example of colloidal system in which tiny particles of solid float in air. Just like true solutions, Colloidal particles are small enough and cannot be seen through naked eye.They easily pass through filter paper. But colloidal particles are big enough to be blocked by Whatmann filter paper.

Suspension is a heterogeneous mixture in which particle size of one or more components is greater than 1000nm.When mud is dissolved in water and stirred vigorously, particles of mud are distributed evenly in water. After some time, the particles of this solution settle under water due to influence of gravity. This solution is an example of Suspension. Contrary to True Solution,particles of suspension are big enough to be seen with naked eye.

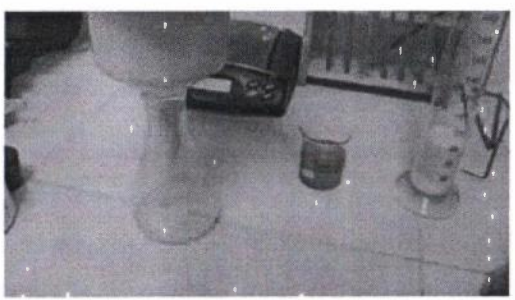
PROCEDURE:

PROCEDURE:

OBSERVE THE VIDEO CAREFULLY :

Now as you have observed the preparation of true solution, colloidal solution and suspension and understood the difference in particle size in all the three types of solutions , try to answer that whether the particles in true solution, colloidal solution and suspension can be separated by filtration :

Observe another video and check your answer-



Note that the particles in colloidal solution easily pass through ordinary filter paper. But colloidal particles are big enough to be blocked by Whatmann filter paper as shown in the video.

OBSERVATION TABLE:

FILL UP THE OBSERVATION TABLE -

S.NO	PROPERTY	TRUE SOLUTION	COLLOIDAL SOLUTION	SUSPENSION
1	APPEARANCE			
2	VISIBILITY OF SOLUTE PARTICLES			
3	TYNDALL EFFECT			
4	SEDIMENTATION			
5	FILTERABILITY			

Select the most appropriate answer for each of the following question-

In a solution the substance that is being dissolved is called the___

- a) Solvent
- b) Emulsifier
- c) Filtrate
- d) solute

What is one property of a suspension that is different from that of a solution or a colloid?

- a) If left to rest, the particles of a suspension will settle out.
- b) The particles of a suspension reflect light.
- c) A suspension is always clear
- d) Suspensions are colorless

DropDown Activity

Read and complete

A True solution is always [▾] , light passes through with no [▾] from solute particles which are very small in size. The solution is [▾] and does not settle out. A solution cannot be filtered but can be separated using the process of [▾] .

A suspension is cloudy and [▾] . The particles are larger than 10,000 Angstroms which allows them to be filtered. If a suspension is allowed to stand the particles will separate out by [▾]

A colloid is intermediate between a solution and a suspension. While a suspension will separate out a colloid will not. Colloids can be distinguished from solutions using the [▾] Light passing through a colloidal dispersion, such as smoky or foggy air, will be [▾] by the larger particles and the light beam will be visible.

Check | Show Feedback

Reflection

select substances each which forms true solution, colloidal solution and suspension in water which you use in daily life from the following-

sand , common salt , gelatin , baking soda , starch, detergent, ink,

Show Feedback

References:

NCERT Lab Manual

www. you tube.com/ smart learning for all

Reflection

select substances each which forms true solution, colloidal solution and suspension in water which you use in daily life from the following-

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Show Feedback

References:

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Experiment by Kenny Soewondo

Experiment :

To prepare solution of baking soda , egg albumin , and silica gel in water and classify them as true solution, colloidal solution and suspension on the basis of : 1) Transparency 2) Filtration criterion and 3) stability

Feedback

Objectives

To prepare a dicot stem transverse section to see Parenchyma tissue ,sclerenchyma tissue and other tissues with their arrangement in the plant.

Theory

Tissue is a group of cells having same structure and performing same function or to help each other to perform a function.

Plant tissue is of 2 types meristematic tissue and permanent tissue. Permanent tissue can be further classified as Simple permanent and Complex permanent tissue Simple permanent tissue is of three types – parenchyma, collenchymas & sclerenchyma. Complex tissues are Xylem & Phloem.

Arrangement of the tissues is as per the requirement of the plant as it needs different types of tissues for stem, leaves, root and fruit to perform different types of functions. It also affects their structures for the ease to perform a given function.

Procedure

See the given activity and try to understand the method of making the slide to observe different tissues in plants.

Fill up the table given here on your observations

S no	Characters	Observation	
		Parenchyma	Sclerenchyma
1	Shape of the cells		
2	Thickness of the cell wall		
3	Position		
4	Intercellular space		
5	Cells Arrangement		

While making the slide ,follow -

Dos & Don'ts

Stem should be soft & tender. Woody stem will be difficult to cut.

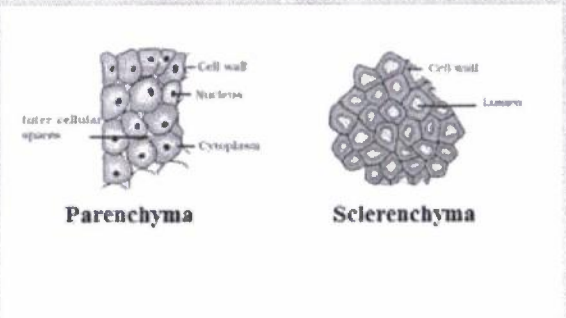
Sections & material should be kept wet always.

Sclerenchyma tissue is hard but should not be confused with xylem .

Xylem is present only in vascular bundles.

Parenchyma is made up of living cells and forms most of the parts in plants. It gives mechanical support to the plants and store food in some parts. Sclerenchyma is lignified and made up of dead cells. It also

Parenchyma is made up of living cells and forms most of the parts in plants. It gives mechanical support to the plants and store food in some parts. Sclerenchyma is lignified and made up of dead cells. It also gives mechanical support & found under epidermis & around vascular bundles.



Parenchyma Sclerenchyma

Simulator

SCORM Quiz

Q 1 Which tissue is more in quantity in the section seen ?

- (a)Parenchyma
- (b)Sclerenchyma
- (c)Collenchyma
- (d)Meristematic

Q 2 You are shown two slides of plant tissues : Parenchyma and sclerenchyma . You can identify the Sclerenchyma by the

- (a) Location of nucleus
- (b) Position of vacuoles.

Simulator

SCORM Quiz

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Q 2 You are shown two slides of plant tissues : Parenchyma and sclerenchyma . You can identify the Sclerenchyma by the

- (a) Location of nucleus
- (b) Position of vacuoles.
- (c) Shape or size of cells
- (d) thickness of cell wall

Q 3 Parenchyma cells are generally present :

- (a) below the endodermis in leaves and stem.
- (b) in hard portion of root & stem
- (c) in soft parts of stem root & leaves .
- (d) none of the above .

Q 4 On maturation sclerenchyma cells are -

- (a) dead
- (b) alive but inactive
- (c) highly active and alive
- (d) none of the above

- (b) alive but inactive
- (c) highly active and alive
- (d) none of the above

Q 5 What is the function of sclerenchyma cells

- (a) to provide storage .
- (b) to help in floating.
- (c) to provide mechanical strength.
- (d)to help in photosynthesis .

SUBMIT ANSWERS

References

Amrita labs O Labs

NCERT books

You tube

Experiments (if any)

Section cutting of monocot plant stem & root can be done to see the arrangement of tissues in them.

Feedback

दैनिक भास्कर

26-Mar-201
Bhopal Page 3

Experiments at just a click at animated science lab

Teachers learning virtual lab tech at Regional Institute of Education

DB Post Correspondent

Bhopal: Teachers of Madhya Pradesh and Maharashtra are witnessing a new kind of science lab at Regional Institute of Education (RIE). The lab is actually a software with animated objects. It is programmed for a few scientific experiments for high school students. A six-day-long training was initiated by the centre for 35 science teachers of government schools from the two states from March 23.

"At traditional labs, it takes a lot of resources to conduct even a common science experiment, but we are doing the same on computer screen here," said Pawan Sharma, a physics teacher.

"We prepared the software based on NCERT syllabus, but teachers can also add their own experiments. Study materials are available for free," said Rashmi Singhai, course director, RIE.

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Regional Institute of Education,Shyamla Hills, Bhopal,Madhya Pradesh, India

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REGIONAL INSTITUTE OF EDUCATION, BHOPAL

"Training Programme on the use of Virtual Laboratories in Science at Secondary School Level for the Teachers of Minority/SC/ST concentrated areas"

Date: 23rd to 27th March, 2018

TIME TABLE

Date	9:30 to 11:00 a.m.	TEA-BREAK	11:15 to 12:45 p.m.	LUNCH-BREAK	2:00 to 3:30 p.m.	3:45 to 5:15 p.m.
23-3-18 Friday	Registration & Inauguration		**NP**		**LSC**	**RS/RP**
24-3-18 Saturday	First Day Report **IBC/RB**		**AK**		**MD/RB**	**RS/RP**
25-3-18 Sunday	Second Day Report **JS**		**SKJ**		Practice Session **LH/CS/RP/KD**	Practice Session **RS/KD**
26-3-18 Monday	Third Day Report **MD/RB**		**JS**		Practice Session **JS**	Practice Session **AK/LM**
27-3-18 Tuesday	Fourth Day Report **RB**		**LM/MD**		Presentation by the Participants	Valedictory

NP – Prof. N. Pradhan, **IBC** – Prof. I.B. Chughtai, **LSC** - Mr. Lokendra Singh Chouhan, **RB** – Dr. Ragini Bhatt, **RS**- Dr. Rashmi Singhai, **RP** - Dr. R.P. Prajapati, **LM** – Mr. Lalit Mehta, **JS** – Ms. Jagriti Sharma, **SKJ**- Mr. S.K. Jain, **KD**- Mr. K.D. Sharma , **AK**- Mr. Amir Khan , **MD** – Dr. Murlidhar

(Dr. Rashmi Singhai)
Programme Coordinator

LIST OF PARTICIPANTS

"Training programme on the use of virtual laboratories at secondary school level for the teachers of minority/SC/ST concentrated areas"

23rd to 27th March, 2018

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