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## Chapter-2

Developing Strong Scientific Human resource in Bihar

Learning through low cost experiment

Under supervision of Prof. H.C.Verma IIT Kanpur

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**Developing Strong Scientific Human resource in Bihar**  
**Learning through low cost experiment**  
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Science for all through Experiment in Bihar under supervision of Prof. H.C.Verma, IIT Kanpur. Prof Verma felicitated by Hon'ble Sri Nitish Kr Ji, CM, Bihar in year 2018.

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- **Dr. Rakesh Kr Singh, developed about 500 low cost science experiment at all levels of study, under the supervision of eminent academician Prof. H.C.Verma, IIT Kanpur.** He demonstrated these experiment under various situations including classrooms/ conferences, public lecture, School and university students in different district of Bihar. Dr. Rakesh conducted more than 100 workshops with such low cost experiments, including in **RashtriyaAviskarAbhiyan programme &Unnat Bharat Abhiyan -Initiative of Govt. of India** The main objective of this programme highlights-  
Youth must be made to understand the beauty of doing science, the pleasure of doing science, and the ultimate bliss when results of science make you understand nature, master it, control it, and finally make things that improve the quality of life of humankind.
- These workshops have attracted attention of students and encouraged them to ask relevant questions in science at all levels of study. Such efforts have also helped in demystifying scientific research and developing scientific thinking in students/ faculty members.
- The present Government has taken several steps for developing research within the country in frontline areas such as Nanotechnology, Biotechnology and Information technology. Such innovative practices supplement this move by helping create interest in basic understanding in science without which cutting edge research is not at all possible.
- Dr. Rakesh Kr Singh given training programme to almost district of Bihar students and faculty member. SCERT-Dept. of Education, Govt. of Bihar; Kilkari, Dept. of Education, Govt. of Bihar, Bihar School Examination board, Patna, Science for Society Bihar, College/Universities including IIT's, NIT's, BIT invited me to explore such low cost science teaching-learning methodologies.

Science Movement for strong scientific human resource development in state Bihar though low cost Experiment under Anvesika activities, coordinated by Prof. H.C.Verma, IIT Kanpur



Low cost laboratory



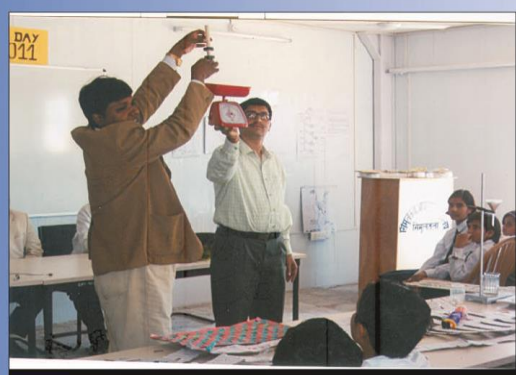
Teachers workshop at - DPS, Patna



Conducting Teachers workshops as a Resource person at Secretariat, Dept. of HRD, Govt. of Bihar



DAV teachers workshop at Bihar & Jharkhand



National Science Day, Simultalla, HRD, Jamui, Govt. of Bihar



Anveshika are centers for developing innovative experiments related to Physics teaching and learning, promoting experiment-based Physics teaching and Inspired for research. There are 22 Anveshikas in India working under the umbrella of **National Anveshika Network of India (NANI)** under the leadership of eminent teacher Prof. H.C.Verma, IIT Kanpur. Dr. Rakesh Kr Singh is Coordinator of Patna Anvesika and Senior Resource Person of his group.



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## Senior Recourse Persons of Utsahi Physics Teachers

(A group evolved through IIT Kanpur Initiated Project on Innovative Physics Teaching)

Coordinated by Prof. H.C.Verma, IIT Kanpur

**For Revitalization of Physics Education through Innovative Teaching Methods and Inspire for Research at all level of study**



Receiving Senior Resource Person appreciation by Prof. H.C.Verma in IIT Kanpur initiative project.

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**Prof. H.C.Verma, IIT Kanpur with all Senior Resource Person including Dr. Rakesh Kr Singh in a session the issues and Challenges of Science Education and Research in India and role of low cost Physics Experiments.**

- ❖ Nature is beautiful and understanding it, from quarks and leptons to Galaxies, is even more beautiful. Learning Physics and sharing it with students and fellow colleagues is an exciting experience and also a great challenge. Through workshops on Physics experiments, Science shows, Teacher's training Camps and numerous other activities, Utsahi Physics Teachers are spreading the fragrance of Physics learning thrill among students and teachers from middle school to Postgraduate level. **This group has been coordinated by Professor H. C. Verma, Dept. of Physics, IIT Kanpur.** He is Professor of Physics at IIT Kanpur and is constantly interacting with Physics teachers at school and colleges/university levels towards making Physics Teaching interesting and more meaningful. From these interactions, this group of highly motivated teachers has evolved which we call **“Utsahi Physics Teachers.**
- ❖ **Senior Resource Persons (SRP):** These are Physics teachers who have attended several NWUPTs (National workshops of utsahi Physics teachers at IIT Kanpur) and are very active in training other teachers in Physics Teaching Workshops in their regions. These persons are highly committed towards education and spend significant amount of time in conducting workshops, contacting teachers, and so on. This is in addition to their regular institutional duties. There are altogether **15 SRP'S and they are working** nationwide effort to renew the interest of students/ teachers in science and research activities.



Science Movement for strong scientific human resource development in state Bihar though low cost Experiment



Patna Women's College



HRD, Govt. of Bihar



DPS Patna



Varsnasi



IIT, Kanpur



Mohaniya, Kamur, Sasaram



National Conference



Session at Bhagalpur



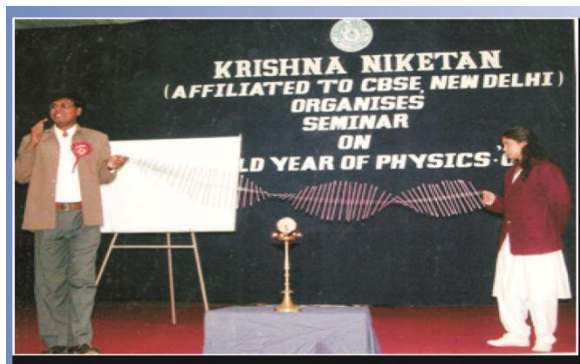
with Awarded Children



Science Movement for strong scientific human resource development in state Bihar though low cost Experiment.



Mohania, Kamur, Sasaram



Session at Patna and Kishanganj district of Bihar

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# क्षितिज

युवामन के सपने और सृजन का दैनिक जागरण भाग

## आसान प्रयोग से 'भौतिकी' की जानकारी संभव

पूर्णिया, जागरण प्रतिनिधि : 'भौतिकी' के कठिन से कठिन सिद्धांतों का समझने के लिए विद्या विहार इंस्टीट्यूट आफ टेक्नालाजी पूर्णिया में एक सेमिनार का आयोजन किया गया।

विद्या विहार के सभागार में सम्पन्न हुए सेमिनार में पटना वीमेंस कालेज के प्रोफेसर राकेश कुमार सिंह ने छात्रों को भौतिकी के सिद्धांतों को सरल प्रयोगों द्वारा समझ विकसित करने के दिशा में प्रयास के तहत महत्वपूर्ण व्याख्यान दिया। इस दौरान सरस्वती, सुगम एवं सुलभ प्रयोगों के द्वारा भौतिकी के विभिन्न उपपादनों के उपयोग के लिए वैज्ञानिकों द्वारा दिए गये सिद्धांत के बारे में छात्रों को विस्तार से अवगत करवाया।

जिसमें स्प्रिंग फोर्स, टंग आफ वार, स्प्रिंग फोर्स, भारतीयता, सवेग संरक्षण के सिद्धांतों एवं ध्वनि तरंग एवं आर्गन पाइप का प्रभाव, चुम्बकीय बल, फर-डि का सिद्धांत आदि के बारे में बताते हुए प्रो.सिंह ने इस उदाहरण के साथ छात्रों को समझाया। इस दौरान प्लास्टिक की बोतल, नली, पॉन, स्प्रिंग तथा बच्चों के खिलौने आदि के प्रयोग के तहत छात्रों को भौतिकी के सिद्धांतों

संबोधित करते शिक्षक व उपस्थित छात्र को समझने में आसानी हुई। प्रो. सिंह ने छात्रों को इंजीनियरिंग के पढ़ाई के उपयोग शोध करने एवं तकनीक विकास के लिए परिश्रम करने को कहा।

उन्होंने प्रयोगों के महत्व का विस्तृत विवरण देते हुए परिभाषा, सूत्र, गणित के साथ साथ अन्तर्निहित वैज्ञानिक अवधारणा की समझ पर बल देते हुए प्रयोगों पर बल दिया। इस क्रम में संस्थान के निदेशक प्रो. (डा.) अशोक यादव ने भी प्रयोगों में अन्तर्निहित वैज्ञानिक अवधारणा की विवेचना देते हुए छात्रों को भौतिकी के सिद्धांतों का

प्रयोग कर आगे बढ़ने की अपील की। इससे पूर्व मंच की अध्यक्षता करते हुए निदेशक ने डा. अनिल कुमार पंकज ने छात्र एवं छात्राओं को डा. सिंह का विस्तृत परिचय दिया। कार्यक्रम का धन्यवाद ज्ञापन भौतिकी के प्राध्यापक आरएस मिश्रा ने किया।

जागरण



Science Movement for strong scientific human resource development in society though learning science low cost Experiment



Students Teachers workshops organized for *Vaishali* and *Munger* district of Bihar with mentorship of Prof. RajmaniPdSinha, chairman, Bihar School Examination board and Prof. H.C.Verma and some others academic support.



VTU-Bangalore faculty member appreciated

Session at Simultalla School, Jamui, Bihar

04 metro hindustantimes HINDUSTAN TIMES, PATNA TUESDAY, AUGUST 18, 2015

**myview**  
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**When did Anveshika began and when did you join it?**  
Anveshika was conceptualised in 2001 by physics professor in IIT-Kanpur HC Verma, who has written many textbooks for school and college students. In subsequent years, Anveshika centres were opened in various states. I was selected to join Anveshika in 2004 by professor Verma. Patna Science College physics professor Amarendra Narayan and I are the Bihar state coordinators of Anveshika. At present, there are about 25 Anveshikas in India.

**What are its aims?**  
Anveshikas aim at motivating young minds to develop innovative experiments in physics, develop teaching methods and promote experiment-based physics teaching and research. They aim at making concepts of physics and science more approachable and fun for the masses. It is a drive that goes beyond textbooks and classrooms.

**What is the target group of**

**Anveshika aims at making science fun**

**SIX QUESTIONS**

**ANVESHIKA?**  
Anveshika targets everyone, from teachers in schools, colleges or universities, to students in educational institutions and even the general public. It is not limited to those who have advanced degrees in physics or science.

**What methodology do you use?**  
Our motto is 'see and learn'. We use low-cost experiments to show people the physics principles that apply in everyday situations, like pouring water in a pan or taking off a shirt and also explain why those principles apply to those situations. With such experiments, we

**RAKESH KUMAR SINGH**  
Rakesh Kumar Singh is Assistant professor in the university centre for nano-science and nanotechnology and the professor in-charge (establishment) of Aryabhatta Knowledge University. He is also one of the Bihar state coordinators of Anveshika, a centre under the National Anveshika Network of India, which aims at creating scientific temper among the people.

force them to think and then enable them to identify scientific principles in other situations.

**Has research suffered in recent years? If yes, Why?**  
There have been advancements in some areas, while some areas are lagging. Students in schools and colleges have become less interested in science as they are not able to enjoy it. Although they read and write a lot, they do not learn many things. This is the problem why students often move to a career in government service despite having

a science background.

**How has been the response to your programmes?**  
People, especially students, are now getting interested in science and have expressed their willingness in contributing to science. This is a good thing, as it would create manpower and help in technological advancement of science in the country. This understanding of science involved in everyday life would also make them more aware and mature.

**AS TOLD TO ANISH**



UGC –NAAC Peer team member and Eminent academicians appreciating such innovative method of teaching science and Nanotechnology research for the development of Bihar

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UGC –NAAC team, Delhi appreciating

Low cost of teaching Science

Nanomaterial synthesis and its behavior



Prof. A.K.Choudhary of IIT Roorkee visited  
Nanomaterials research activity

Prof. P. Bhattacharya, Director, IIT Patna Felicitating as a  
Resource person in Teachers workshop at IIT Patna

### **Vice Chancellors meeting with Governor and Low-cost Teaching methodology**

In proceeding of the meeting under the chairmanship of Hon'ble Chancellor held on 25.11.207 held at Raj bhavan, Patna proceeding, Vice Chancellor Aryabhata Knowledge university, Patna highlighted stressed learning through low cost experiments. Thus, academicians also cite the scientific work carried out by Dr. Rakesh Kumar Singh.



State Council of Educational Research and Training (SCERT), Dept. of Education, Govt. of Bihar highly appreciated to Dr. Rakesh Kr Singh efforts for School Teachers/Students support for inculcating scientific temperament



IIT Kanpur



NIT Patna



IIT Patna

Delivering lecture as a Resource person

Teaching through low cost Experiment session in IIT's, NIT's



राज्य शिक्षा शोध एवं प्रशिक्षण परिषद्  
महेन्द्र पटना-800006 {बिहार}  
STATE COUNCIL OF EDUCATIONAL RESEARCH & TRAINING,  
MAHENDRU, PATNA-800006 (BIHAR)  
(शिक्षा विभाग, बिहार सरकार)



हसन वारिस, निदेशक  
Hasan Waris, Director

Tele No : 0612-2370783 (O)  
Fax No. : 0612-2371117 (O)  
Email : scertbihar@sify.com

**To Whom IT May Concern**

*It is certified that Dr. Rakesh Kumar Singh, Lecturer, Department of Physics, Patna women's College, Patna is actively involved in different activities of State Council Of Educational Research and Training, Bihar, Patna from 2009 to 2012. His main contributions are :*

- i. He is actively involved in the development of training modules "UTPRERAK" for secondary school's Science teachers of Bihar.*
- ii. Apart his contribution as Resource Person in different programmes of SCERT is also praise worthy. He delivered several lectures to science teachers of secondary schools on Physics education and "Teaching through Low Cost Experiment". His lectures motivated the science teachers and enhanced their teaching capacity.*
- iii. Mr. Singh also worked as Member of Jury during different Academic year in State Level Jawahar Lal Nehru Bal Vigyan Pradarshni organized by State Council Of Educational Research and Training under the guideline of National Council of Educational Research and Training, New Delhi.*

*Mr. Singh is hard working, sincere and committed teacher who has full command on his subject. He helped in sharpening the teaching skills of the science teachers who participated in different workshops or training programme.*

*I wish him every success in his life.*

  
Director 18.12.12